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Technical Assistance for the Port of Cortes Modernization Project

April 2007

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INTRODUCTION

The U.S. Trade and Development Agency (USTDA) provided a Grant to the Client, Empresa Nacional Portuaria, of Honduras, for the Technical Assistance pursuant to the Grant Agreement between USTDA and the Client dated March 23, 2004

The Port of Cortes, located on Honduras' north coast with direct access to the Caribbean Sea. The Port is the largest in Honduras with five berths handling containers, dry bulk, liquid bulk, conventional and refrigerated cargo. The port serves cargo from Honduras, El Salvador, Nicaragua and Guatemala.

Although the port is presently run by ENP, the Comisión Presidencial para la Modernización del Estado (CPME) is preparing enabling legislation to permit privatization of the port sector, with assistance from the World Bank and Inter-American Development Agency (IDB).

The Technical Assistance focuses on areas considered crucial to the success of the port, regardless of the scope and schedule of the privatization process:

1. Information Technology
2. Maintenance and Repairs
3. Service Boats
4. Fire Protection
5. Cargo Handling Improvements

This report is organized in sections which correspond to each of these numbered tasks.

The specific location of the project

The project is focused on the Port of Cortes on the North coast of Honduras with direct access to the Caribbean and near to its western boundary with Guatemala. The scope of work also includes the other ports in Honduras, specifically, Tela, La Ceiba, Puerto Castilla and San Lorenzo. Some tasks apply to Port of Cortes and others apply to all five ports. Tasks 1.1 on information systems and 3.3 on patrol boats apply to all five ports.

Honduras has ports on both the Atlantic and Pacific Oceans that are served by a number of shipping companies linking the country with the U.S., Asia, Europe, and the rest of the Western Hemisphere. The National Port Authority (ENP), an autonomous governmental institution established in 1965, is responsible for operating Honduras' seaports and providing loading and warehousing services for vessels and merchandise handled at the different ports.

The northern port of Puerto Cortés, Honduras's principal seaport and Central America's largest deep-water port, operates 24 hours a day and is also used for the shipment of goods to and from El Salvador and Nicaragua. Puerto Cortés, located 35 miles from the industrial city of San Pedro Sula, is among the three main ports in Central America, which handle over 80 percent of the region's total sea cargo. Puerto Cortés caters to a broad range of cargo shippers' needs, including container, Roll-on/Roll-off (Ro/Ro) and bulk facilities. Shipping time to major southern U.S. ports is approximately 48 hours. Honduras has two other ports capable of handling ocean-going freight: Puerto Castilla on the Atlantic and San Lorenzo on the Pacific. Located near most of the shrimp farm activity, the San Lorenzo port is 28 feet deep and has 973 feet of docking space. The Caribbean ports of Tela, La Ceiba and Puerto Lempira can only handle small coastal craft. Most companies in Honduras utilize Puerto Cortés, which controls nearly 90% of the country's vessel traffic.

In 2001, Honduran ports handled 6,881,885 metric tons of cargo (64.5% imports and 35.5% exports), reflecting an increase of 6.8% compared to 6,442,470 tons handled in 2000. A total of 2,154 ships arrived at Honduran ports during that same period, reflecting a 1.1% increase over the number of

ships served during the previous year.

The ENP is in the midst of a ports renovation project. Scheduled projects include building a bulk solids terminal at Puerto Cortés, concessioning the port of Roatan, and constructing a container terminal at Puerto Cortés.

Over the past several years, Central American governments have been discussing plans for the construction of a four-lane interoceanic highway or "dry canal" connecting Puerto Cortés on the Caribbean with the Port of Cutuco in El Salvador and Corinto in Nicaragua on the Pacific, providing intercontinental shippers an attractive option to the Panama Canal.

Honduras has a 13,603 km official road network connecting the ports and airports with the secondary cities and rural areas of the country. The country has good surface connections with the rest of Central America, and the domestic road network has generally satisfied local and foreign companies' distribution and transportation needs. Of Honduras' total roads, 3,199 km is paved primary roads; 2,565 km is (sometimes paved) secondary roads and 7,839 km is (rarely paved) tertiary roads.

General description of the site

The Port of Cortes has five berths. Berth 1 is used for petroleum products by Chevron, which has an 850,000 bbl tank farm. Berth 1A is used for molasses and other liquid products. Berths 3 is 200 m long with a depth of 11 m, and is primarily used for dry bulk using ships gear, portable hoppers and trucks. Berths 4 is 325 m with a depth of 9 m,, and Berth 5 is 475 m with a depth of 10.5 m The 1200 m long and 400 m wide access channel is 14m deep.

Overview of the project goals.

The Technical Assistance Program was organized to develop detailed and specific, useable recommendations, as well as training programs for implementation of improvements, based on thorough study of the existing facilities, operations, procedures and problems. The Technical Assistance is organized into the various categories of efforts, requiring specialized expertise. DMJM Harris organized its efforts to provide the high level of expertise required in each area, while coordinating the overlapping activities.

Overview of organizations involved

US Trade and Development Agency (USTDA)

The U.S. Trade and Development Agency (USTDA) is a foreign assistance agency that delivers its program commitments through overseas grants, contracts with U.S. firms, and the use of trust funds at several multilateral development bank groups. The projects supported by USTDA activities represent strong and measurable development priorities in host countries and offer opportunities for commercial participation by U.S. firms. Public and private sector project sponsors in developing and middle-income countries request USTDA support to assist them in implementing their development priorities.

USTDA's program is designed to help countries establish a favorable trading environment and a modern infrastructure that promotes sustainable economic development. To this end, the agency funds overseas project sponsor access to U.S. private sector expertise in the areas of: 1) trade capacity building and sector development; and 2) project definition and investment analysis.

Mission Statement

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, feasibility studies, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment.

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit from U.S. exports of goods and services.

Empresa Nacional Portuaria (ENP)

Empresa Nacional Portuaria is a decentralized institution created through decree No. 40 of October 14, 1965, emitted by the sovereign National Congress of Honduras and has jurisdiction over all the maritime ports of the country. Its objective is the economic development of the nation, providing adequate and efficient services and installations in the maritime port.

ENP is an institution oriented towards growth, leader in its commitment to permanently improve the quality of the productive relations of the stakeholders (clients, employees, suppliers, government and society). ENP considers that the key to success is in balancing the interests of these groups offering faculties to all the employees which are focused on value-added activities.

ENP's goal is to create leadership positions in the market with the objective of establishing and developing short, medium and long-term investment opportunities, to provide high quality and productive port services and to work with flexible and competitive tariffs capable of competing in the global economy.

DMJM Harris

DMJM Harris is a transportation and infrastructure company, with headquarters in New York City and Los Angeles. The company responds to problem-solving opportunities in the following key market sectors: Highway/Bridge, Transit/Rail, Marine, Airports and Energy Infrastructure. There are more than 40 DMJM Harris offices in locations across the country. DMJM Harris is an operating company of AECOM Technology Corporation. Through the combined efforts of over 28,000 people AECOM offers a unique blend of global reach, local knowledge, innovation and technical excellence.

Saybe y Asociados S. de R.L.

SAYBE Y ASOCIADOS, S. DE R.L., is a Consulting firm in Engineering and Architecture established in Honduras in 1970. During more than three decades the firm has executed a great quantity of projects, alone or in partnership with well known local and foreign consulting firm, most financed by the Interamerican Development Bank, The World Bank, USAID and others. The average number of staff for the last ten years is 200, including 40 full time professionals.

TECNISA Técnica de Ingeniería, S.A.

TECNISA is one of the oldest and most highly regarded engineering consulting firms in Honduras.

Comisión Presidencial para la Modernización del Estado (CPME)

While not directly involved in the present study, the Presidencial Commission for Modernization of the

State (CPME) is an entity the Consultant is expected to establish contact with and consider in the study. CPME was established under decree number 190-91 (emitted 07/01/1991 in the Gazette no.26636 of 11/12/1991) to prepare reforms to government entities. Among other areas, the commission has prepared plans for privatization of operations at Honduras ports.

Summary of Scope of Services

The Terms of Reference from the Grant Agreement set forth the detailed scope of services for the Technical Assistance, The Technical Assistance is organized in several categories of effort:

1. Information Technology
2. Maintenance and Repairs
3. Service Boats
4. Fire Protection
5. Cargo Handling Improvements

Task 1: Review & Recommend Information Technology Systems

The port's operations are uncoordinated due to the lack of adequate information texchange capability. This situation exists in the administration, finance, operations, planning, and maintenance functions of the port. At the start of the study, the Port had a limited network linking the computers in the port. Data exchange by computer was by email through the web, rather than an internal network. It was recommended to expand the fiber optic cable. The Port has since installed 7 km of fiber optic cable. Key administrators cannot get to data on other computers or from other departments. No provisions are available to have information received from shipping agencies that have data in electronic form. An interface with customs does not exist. The Port is also pursuing a bid for a Virtual Private Network (VPN) with Cisco. The Port is pursuing a bid for Lotus Domino and Lotus Notes, software for messaging and collaborative applications.

Interchange of information, and availability of equipment or facilities, spare parts and personnel are not possible with other ports under the Empresa Nacional Portuaria's (ENP) control. After privatization of Puerto Cortes, ENP will be responsible for operating and coordinating the other ports. Some of ENP's responsibilities will be transferred to a new Port Authority for monitoring and controlling the private operator. The need to collect and monitor information relating to port operations, cargo movements, efficiency, and data for determining fees to be government will be required.

Developing adequate systems at this time will insure the transition to privatization is carried out without serious consequences to the users.

A multifaceted approach is needed to improve the operations of ENP before the privatization, and continue to be effective after privatization of Puerto Cortes. DMJM Harris carried out the following assignments:

1.1 Review and evaluate the existing computer capability of ENP in Puerto Cortes and other ports
1.2 Review and evaluate data collection, billing, operational, record keeping, and other programs used by ENP
1.3 Prepare recommendations to establish a computer network within Puerto Cortes to tie together the various departments and functions.
1.4 Prepare recommendation to allow ENP to tie into networks of clients having electronic data collection capabilities.
1.5 Prepare recommendations to allow ENP to tie into networks from Customs 1.6 Prepare

recommendations for computer software to collect and share operational data and prepare billing information.
1.7 Prepare recommendations for computer software to interface with clients', electronic data and data exchange with Customs
1.8 Prepare an interim report and presentation of the evaluation of the existing computer systems and software, and alternatives for a network and software applications

Following the presentation of alternatives and Client review of the interim report in November 2005, the following additional tasks were carried out as described in this report:
1.9 Establish specifications for recommended hardware requirements of each subsystem or functional system
1.10 Establish performance guidelines or procedures for recommended software applications for each subsystem or functional system
1.11 Establish a training program for system users for each subsystem or function system
1.12 Prepare cost estimates and sources of supply for hardware, software, installation, and training for each subsystem or functional system
1.13 Prepare a project schedule of the recommended installations for each subsystem or functional system

Subsequent to delivery of the draft final report in August 2006, a meeting and presentation was conducted in January 2007 to review Client comments, for preparation of this final report. It was noted that ENP is in the process of implementing a number of the recommendations provided in this project. In that regard, the Port has:
Increased its installed base 300 work stations and 100 on order;
Installed 7 km of fiber optic cable;
Is bidding out a Virtual Private Network (VPN);
Is reviewing product offerings for Uninterruptible Power Supplies (UPS);
Is planning to acquire messaging and electronic mail software this year;
Is reviewing the potential for maintenance software upgrades; and
Is reviewing Terminal Operating System software.

The report includes recommended hardware and software improvements totaling approximately $2.5 million, including a new terminal operating system, financial and human resources software, servers, work stations, disk systems, printers and uninterruptible power supplies. The report identifies U.S. sources of supply for software including, among others, Navis, Tideworks Technology, SSA Global and AutoDesk and for hardware including, among others, IBM, Hewlett Packard, Dell, Symbol Technologies, Psion Teklogix, APC, Tripp Lite, Eaton and Liebert. A schedule for installation and training over 6 months is indicated in the report.

Task 2: Evaluate Maintenance and Repair Procedures

Maintenance and spare parts control is currently not efficient. An organized system for keeping track of repairs to individual pieces of equipment and inventory of spare parts does not exist. Repairs and preventive maintenance on equipment are not recorded arid analyzed for persistent problems. Frequency and types of breakdowns are not correlated with equipment usage. Inventory and allocation of spare parts is random and uncoordinated. The problems are due to the lack of centralized facilities, adequate supervisory systems, modern data collection, and personnel qualifications and training. DMJM Harris carried out the following assignments:

2.1 Review and evaluate the maintenance organization and procedures, including spare parts controls, of vehicles, cargo handling equipment, and boats
2.2 Prepare recommendations to centralize, rationalize, and improve maintenance and spare parts facilities and operations

2.3 Prepare recommendations, for computer equipment, programs and procedures for maintenance and spare parts function, and interface with administrative departments
2.4 Prepare conceptual layouts and requirements for centralized maintenance facilities
2.5 Prepare lists of recommended maintenance equipment to service vehicles properly, cargo handling equipment, and boats
2.6 Prepare an interim report and presentation of the evaluation of maintenance facilities and operations and alternatives for centralization and rationalization of the maintenance operations

Following the presentation of alternatives in November 2005 and Client review of the interim report, the following additional tasks were carried out, as described in this report:
2.7 Establish a training program for system users for each subsystem or functional system
2.8 Prepare cost estimates and sources of supply for centralized facilities, maintenance equipment; hardware, software, installation, and training for each subsystem or functional system
2.9 Prepare a project schedule of recommended installations for each subsystem or functional system.

Subsequent to delivery of the draft final report in August 2006, a meeting and presentation was conducted in January 2007 to review Client comments. At the meeting, it was noted that, as recommended in this project, ENP has expansion of the mechanical maintenance building underway for bidding and design of the expansion of the electrical maintenance building is planned for this year.

The report includes a Computerized Maintenance Management System (CMMS) at an estimated cost of $121,000, recommended improvements to the electrical maintenance building totaling $96,000, improvements to the mechanical maintenance building totaling $345,000, additional maintenance equipment, such as tire changing, air compressors, lube equipment, vehicle lifts, oil filter carts, pressure washers, diesel-powered welders, vertical milling machines, step vans, dumpsters and street sweepers. The report identifies US vendors for the CMMS, such as Datastream, Look Software, Spear Technologies, Qqest, Maintenance Connection, Eagle Technology, EPAC and eMaint, vendors for the maintenance equipment such as Branick Industries, Gardner Denver, Ingersoll-Rand, Parker Hannifin, Purolator Facet, Tennant, Clausing Industrial, Eastern Tools and Equipment, Miller Electric and Lincoln Electric, among others, and for building-related products. The report indicates a 4-month schedule for installation of the CMMS, the building additions would require an estimated 12 months and the equipment acquisition program would be an ongoing process.

Task 3: Evaluate & Recommend New Service Boats & Rehabilitation

The availability and adequacy of the tug boats are a serious operational problem. Port rules, require tug assistance for all vessel improvements, and ENP must provide the pilot (and the pilot boat), tug boats, and personnel to handle the lines. At times, sufficient tugs are not available or are not powerful enough, causing delays. Maintenance procedures of the tugs and pilot boats must be improved to maintain the present level of operations.

The port lacks a usable fire protection network and the network in the free zone does not have sufficient pressure. Only one of the three tug boats has fire fighting capability. The lack of a fireboat and the age and condition of the existing tugboats is an opportunity to address both problems with a single solution. The purchase of a large horsepower tug equipped with fire fighting capability, needs to be investigated. As part of the investigation of additional marine boats, ENP needs to examine the security aspects of Puerto Cortes and other ports. An evaluation of additional marine capability and improved security of the facilities, with or without privatization of Puerto Cortes, is justified. DMJM Harrisl developed an integrated approach to addressing service boats and security aspects that includes the following:
3.1 Review the operational needs for tug boats and inspect and evaluate the condition, operational acceptability, and maintenance procedures and controls of the existing tugs.

3.2 Review the operational needs for pilot boats and inspect and evaluate the condition, operational acceptability, and maintenance procedures and controls of the existing pilot boats
3.3: Review the requirements for patrol boats at Puerto Cortes and other ENP facilities
3.4 Prepare an interim report and presentation of the evaluation of the condition of existing boats: and maintenance procedures, and alternative requirements for new boats

Following the presentation of alternatives in December 2005 and Client review of the interim report, the following additional tasks were carried out, as described in this report:
3.5 Develop outline specifications for a new tug boat, incorporating firefighting capability
3.6 Prepare recommendations for improvement and modernization of boat maintenance systems and control of spare parts (with Tasks 1 and 2)
3.7 Develop recommendations for rehabilitation or for new pilot boats or other boats working in the port area
3.8 Develop recommendations and outline specifications for patrol boats
3.9 Develop a training program for boat operations and for boat maintenance
3.10 Prepare cost estimates for rehabilitation of existing equipment and new equipment broken down into various systems showing sources of supply
3.11 Prepare a project implementation schedule

After delivery of the draft final report in August 2006, a meeting and presentation was conducted in January 2007 to obtain the comments of the Client. In the meeting, ENP indicated that they are preparing bidding for a fourth tug of 2500 hp, equipped for fire fighting.

The report includes recommendations for an additional 5000 hp tug at an estimated cost of $7,000,000, or two 2500 hp tugs, and a new patrol boat at a cost of $950,000. If lower horsepower tugs are utilized, some larger ships may require assistance of two tugs in certain wind and current conditions. However, two 2500 hp tugs offer additional flexibility that they can be used separately or together, and one can back up the other in case of maintenance. The report also includes a recommendation that the new tug be equipped with firefighting equipment, and retrofitting two existing tugs or acquiring portable fire pumps to enable them to be used as well to combat marine and shoreside fires. A stability analysis should be carried out before placing portable pumps on existing tugs. The report identifies US sources of supply, including shipyards such as John Bludworth, Bollinger, Atlantic Marine, VT Halter Marine and SAFE Boats International, as well as naval architects, such as Alion-JJMA John J Mullen Associates and AMSEC M. Rosenblatt, marine engine suppliers such as Detroit Diesel, Caterpillar, Pratt & Whitney and Cummins, and marine electronics suppliers such as Motorola, Raymarine and Sperry Marine. The report includes a 12 month schedule for tug and pilot boat procurement activities followed by an estimated 12 months for construction, operational testing and delivery.

Task 4: Evaluate & Recommend Fire Protection Systems

The port's fire protection system is not operational. The intake pump station does not work, and the condition of the fire lines is unknown. Administration and maintenance buildings do not have fire detection or protection systems. Hazardous chemicals are handled in the port and stored at some facilities. The Free Zone, next to the port, has many buildings, storing a variety of goods and engaged in different manufacturing or processing operations. This entire area, does not have integrated fire protection systems (detection and suppression). ChevronTexaco's facility is new and has fire protection systems, but they are not tied into the port's capability. An effective plan to coordinate fire protection within the port, free zone, electricity company, and the municipality does not exist. The Contractor shall develop a plan, specifications and programs for a fire protection system and operational procedure (considering, the proposed fire boat), and include the following assignments:

4.1 Evaluate the existing fire protection capabilities of the port including any fire protection networks

within the port
4.2 Evaluate possible assistance from the local municipality or other facilities
4.3 Evaluate the fire protection needs of the port facilities including warehouses, maintenance, storage, administration facilities, chemical and petroleum handling and storage, hazardous dry bulk, and all other potential areas of danger
4.4 Evaluate the fire protection needs of the free zone including buildings and other areas
4.5 Develop and recommend a fire protection network for the port and free zone including fixed hydrants, sea water intake station, chemical and petroleum hazard detection and controls, fire and smoke detection and, controls in buildings, warehouses, shops, and factories in the free zone
4.6 Prepare an interim report and presentation of the evaluation of the fire protection, and alternative requirements for fire protection

Following the presentation of alternatives and Client review of the interim report, the following additional tasks were carried out, as described in this report:
4.7 Develop a fire protection plan in conjunction with the municipality and adjacent industries
4.8 Develop a training program for port and interface with municipality and local industry
4.9 Prepare a cost estimate for rehabilitation of existing facilities and new equipment broken down into various phases showing potential sources of supply.
4.10 Prepare a project implementation schedules for each systems or phase.

Subsequent to delivery of the draft final report in August 2006, a meeting and presentation was conducted in January 2007 to review comments of the Client, ENP, and the Fire Department. At the meeting, it was noted that, as recommended by this project, an agreement had been reached regarding completion of a new fire station whose construction had been abandoned several years earlier. In addition, the Port and the Fire Department were preparing to set up a fire brigade at the Port, which as recommended could be situated at the existing station after it is upgraded. The Port and Fire Department are also preparing to implement the recommendation for hazardous materials training for the fire fighters through TRAINMAR.

The report includes recommendations for development of the fire main and hydrant system in the port at an estimated cost of $2,915,000 and for installation of fire alarms and sprinkler systems in buildings at the port and free zone, at an estimated cost of $7,008,000. US sources of supply indicated in the report include among others SimplexGrinnell, Notifier, Koettler, Hiller Systems, Victaulic, Tyco, Reliable Automatic Sprinkler, Viking, A-C Fire Pump, Patterson Pump, Aurora Pump, Reddy-Buffaloes, Mueller and Kennedy Valve. The report includes a schedule estimate of approximately 1 year for detailed design and an addition 1 to 1-1/2 years for construction and installation of the fire main and hydrant system. The installation of sprinklers and alarms would require an estimated 2 years for detailed design. About 1-1/2 years would be needed for installation, but the overall time frame could be shortened by carrying out survey, design, fabrication and installation for the various building concurrently. As mentioned, additional portable fire pumps and a new tug with firefighting capability were also recommended to combat both marine and shoreside fires.

Task 5: Evaluate & Recommend Cargo Handling Improvements

This effort is to be carried out with the objectives being developed by the Commission for Modernization of the State (la Comisión para Modernización del Estado (CPME)). Developing improved cargo handling procedures of existing operations is needed until the full program of privatization is implemented. Improved cargo handing criteria and norms are needed to prepare contractual issues relating to privatization. Most of the port's operations relate to container handling which presently is a combined effort of ENP, port union labor, and the shippers. Productivity varies depending on ENP's resources, labor conditions and the shipper.

Dry bulk cargo handling results in traffic congestion, loss of products, disputes in charges, demurrage,

limitation of vessel size, and other problems. Although the bulk handling operations may be part of the concept for a single concessionaire, adequate criteria and operating parameters are not available. Previous attempts to privatize the bulk handling were not successful. Bulk imports are expected to increase and the customers are clamoring for effective terminal operations and adequate facilities by ENP, themselves, or a private operator.

Results of the Port's handling operations vary, and the need for change concentrates on these three areas:

- The first area is to improve both Lo-Lo and Ro-Ro handling of containers considering equipment type arid condition, labor practices, administrative functions, and private contractors
- The second area is the handling and storage of solid bulk commodities considering limitations on vessels, unloading equipment, environmental controls, storage in the port, truck loading, traffic controls, weighing, product losses, and administrative bottlenecks.
- The third area is in handling of break bulk cargo

DMJM Harris' Technical Assistance to ENP included the following assignments:

5.1 Establish lines of communication and dialog with ENP and CPME for coordinating and assisting in the privatization efforts.
5.2 Review and evaluate present cargo handling options, equipment, and procedures (containers, dry bulk, and break bulk)
5.3 Develop concepts for improved container handling efficiency be quicker and at lower cost
5.4 Recommend an overall strategy for container handling improvements including equipment, maintenance procedures, labor, information interchange, and administration
5.5 Develop concepts for improved general cargo and break bulk handling
5.6 Prepare recommendations for operational, management, supervisory, and administration procedures for incorporation into an overall information technology enhancement program
5.7 Prepare an interim report and presentation of the: evaluation of cargo handling and alternative recommendations for improvement

Following a presentation of alternatives in December 2005, and client review of the interim report, tasks 5.8 and 5.9 were carried out, as described in this report:
5.8 Develop training programs for operators, supervisors, maintenance, and support personnel
5.9 Prepare cost estimates and potential sources of supply for the recommended cargo handling enhancements and new programs

5.10 Evaluate existing and future projections, by commodity, of the dry bulk market
5.11 Develop cargo-handling requirements for each commodity group
5.12 Prepare overall conceptual requirements for a bulk terminal including equipment, storage, conveyors, truck loading, weighing, traffic control, etc.
5.13 Evaluate potential operational environmental nuisances and recommend abatement measures
5.14 Prepare an interim report and presentation of the evaluation of commodity market demands and alternative concepts for a bulk terminal.

Following the presentation of alternatives in December 2005 and Client review of the interim report, tasks 5.15 and 5.16 were carried out, as described in this report.
5.15 Prepare typical equipment and terminal performance and quality specifications or guidelines
5.16 Prepare cost estimates and potential sources of supply for the recommended systems

Subsequent to delivery of the draft final report in August 2006, a meeting and presentation was conducted in January 2007 to review Client comments, for preparation of this final report. In the

meeting, ENP indicated that they have increased the fleet of yard tractors to 57 units, and that they have 62 chassis including 20 cornerless units, 14 straddle carriers y 4 reach stackers. In addition to 2 gantry cranes, ENP has a mobile crane and is in the process of acquiring another. Similarly, it was noted that ENP and USTDA had reached an agreement for a feasibility study for the dry bulk unloading terminal in the Port of Cortés, which is planned to be carried out in 2007.

The report includes recommendations for a new mixed bulk terminal for development by a concession or BOT at an estimated initial cost of $31,500,000 and $2,800,000 for a second phase expansion. The report also includes recommendations for additional gantry crane(s) at a cost of $7,000,000 each as required, or used equipment at a cost of $3,500,000 to $5,000,000, Rubber Tired Gantry cranes (RTGs) at a cost of $2,500,000 each, forklifts and frontloaders. US sources of supply are identified in the report, including Mi-Jack Products, PACECO, GE Industrial Systems, Kalmar, Caterpillar, Kelly Tractor, Hyster, Yale Manufacturing, Case Equipment, Clark Equipment, John Deere and Bobcat, FMC Corporation and Continental Conveyor, Chief Industries, Heyl and Patterson, Roberts & Schaefer, among others. Used equipment, if authorized by the government, could be obtained from various U.S. ports and terminal operators. The report identifies in section 1 the vendors for terminal operating systems, such as Navis and Tideworks Technology. The report also identifies US sources of supply for engineering services, including DMJM Harris, Berger/ABAM and Moffatt & Nichol, among others.

Task 6: Prepare Interim and Final Reports and Presentations

Previously, DMJM Harris prepared interim reports for reporting evaluations and preliminary conclusions and recommendations. Interim reports included alternatives for consideration by ENP, and after consideration and review, has developed final recommendations. The presentations and interim reports in November and December 2005, were as follows:

6.1 An interim report or the evaluation of the existing computers and software systems, and presentation of alternatives for a computer network and software programs;

6.2 An interim report of the evaluation of the condition of the equipment and the maintenance facilities, including operations and spare parts control, and presentation of alternatives for rationalization and centralization of facilities and operations

6.3 An interim report of the evaluation of existing boats condition and maintenance procedures and presentation of alternatives for new boats, rehabilitation of existing boats, and recommended operating procedures

6.4 An interim report of the evaluation of the fire protection needs and presentation of alternative concepts for adequate fire protection

6.5 An interim report of evaluation of cargo handling operations, equipment condition, and potential commodity markets, and presentation of alternative recommendations for improvement of container and break bulk cargo handling and conceptual development of a bulk terminal

6.6 The draft of the Final Report incorporated the agreed to comments and suggestions of ENP developed during the interim presentations and was being submitted for review by ENP.

The draft Final Report was delivered in August 2006. In January 2007, a meeting and presentation was carried out to obtain the Client comments on the draft Final Report.

6.7 After receiving and agreeing to ENP's comments, the Final Report was prepared according to the requirements

1 REVIEW AND RECOMMENDATION OF INFORMATION TECHNOLOGY SYSTEMS

1.0 Introduction

The DMJM Harris team has prepared the final report providing evaluations, conclusions and recommendations. Previously, interim reports were provided, including alternatives for consideration by ENP. After consideration and review of the interim submittals by the Client, DMJM Harris has developed final recommendations. This section of the report addresses the evaluation of the existing computers and software systems, description of alternatives for a computer network and software programs, training program, cost estimates and project schedule. The report is based on review and evaluation following a site visit in November 2004, a follow up visit in October 2005 and a presentation in November 2005, at which Client comments were reviewed, delivery of the draft final report in August 2006, followed by a meeting and presentation in January 2007 to review Client comments. This section was prepared mainly by DMJM Harris IT systems expert, Edgar Capps, with assistance from TECNISA specialists, Fabio Mejía, Christian Cálix and Reivyn Cálix. On the first visit in 2004, Edgar Capps recommended some improvements. On the second visit in 2005, it was noted that some of these improvements had already been implemented, and additional recommendations were made. On the visit in 2007, it was noted that further improvements had been implemented, and the report was updated accordingly.

Management and operation of today's ports are heavily dependent upon fast, effective and coordinated transfer of data and communications between the various administrative, operational and maintenance functions at the port. The data compiled also serves as a critical source for both short and long term planning for port activities and interrelationships with port users and national customs responsibilities.

The establishment of the seamless functioning of its information technology system will be a key ingredient in the transition from its present government entity to a more flexible privatized system.

1.1 Review and evaluation of the existing computer capability of ENP in Puerto Cortes and other ports.

The existing computer capability in Puerto Cortes requires improvement to support the future development of the Port to better serve the needs of Port users. Although the three personnel in this group are well educated and worked to automate the port, it appears that the Information Division is understaffed. An outside vendor supports the group. This report recommends improvements that could be made to upgrade, expand, or replace current computer hardware systems and software applications. This analysis was done by observing the functional areas of administration, finance, and operations.

Communications and the Computer Network

The Port currently has a working network in place and plans to expand this capability locally and remotely. On the initial site visit in November 2004, it was noted that there was some fiber optic cable in place and recommended that this should continue to be expanded. Fiber optic cable is more reliable than copper based cable, and is the safest way to protect and improve network connections. As of January 2007, there was 7 km of fiber optic cable in place. Network diagrams were not available at the time of the evaluation.

There are connections to the Port of Castilla and the Port of San Lorenzo. Connections to the Port of La Ceiba would be desirable. Plans are being made to connect to three Honduran banks, and ship line interfaces have been discussed.

The Port is an active Internet user and has a local Internet Service Provider (ISP) with which they are satisfied. The Internet is currently being used for weather, email, and bill of lading information. It would

be desirable to use the Internet in providing connections to the ship lines, to the banks, and to other organizations needing access to port databases. The Port needs a Virtual Private Network (VPN), which is the subject of Bid No. 03/2007 – January 2007, in which it is planned to used a Cisco system.

Many of the leading ports of the world are implementing or have radio frequency (RF) systems today. Radio frequency is a technology whereby data can be transmitted by the use of radio waves. This means there is minimum use of hard-wired configurations, and data access is in real-time. The Port of Cortes was in a test phase of a radio frequency system when they were visited in November 2004, and this effort should be continued.

Computer Capability

In addition to network capability, other computer aspects are discussed in this section.

The Computer Center currently uses IBM computers, both host and personal computers. Some HP personal computers are also in use. The IBM eServer iSeries 820 (running the OS400V5R3 operating system) is one of the main host computers. This computer has 210 GB of disk and 6 GB or RAM. A second server has been added, the IBM iSeries 520 with 490 GB disk and 8 GB RAM. The iSeries 520 uses the DB2 DataBase Management System. Two front-end servers (running LINUX) support the IBM PC's and several dumb terminals at the Port. Osi 5 and Windows 2003 Server Operating System are being used. Most of the PCs run the Windows XP Professional Operating System (fewer than 10 are still running the Windows 2000 or Windows 98 Operating System). Microsoft Office 2003 and Computer Associates AllFusion Plex are also used. WebSphere is being used for software development in the Computer Center. IBM provides maintenance support and downtime has not been a problem even though there are several single points of failure.

The Computer Center has two high-speed IBM printers, which are in heavy use. One of the printers is an 1,000 line per minute (lpm) IBM printer recently installed as a replacement for an older unit. There appears to be a well-planned tape backup system. Hopefully, the need for paper output will be reduced with the implementation of other technologies, but due to the age of the printers, they should be upgraded even if the print requirements remain the same.

The disk capacity will also be too low and needs to be expanded as more software is added and Port cargo volume increases. Exact disk capacity can only be determined when combined with the software that will be running in the Port. Another reason for further disk expansion is backup capability.

The Engineering Division plans to use AutoCAD on their PC's. AutoCAD is a very good product for engineering design.

Most departments are using Microsoft Windows XP Professional and Microsoft Office XP or 2003 on their PC's. Older software products need to continue to be upgraded to the latest offerings from Microsoft.

Specific hardware upgrades are discussed in Section 1.9, and software recommendations are discussed in through Sections 1.6 and 1.7.

Hardware and Software Maintenance

Primary computer maintenance is provided by IBM and appears to be working quite well. Symbol provides the maintenance for their handheld computers, which are not critical, since the system is still in test phase. Specific vendors such as SSA Global provide maintenance of software, such as BPCS.

Emergency Power Equipment and Emergency Planning. There are mixed opinions about power problems at the Port. No problems were observed at the Computer Center. An additional Uninterruptible Power Supply (UPS) was installed in May 2006.. A more extensive discussion is provided in Section 1.9 under recommendations for power equipment and planning.

1.1.1 ENP data network

1.1.1.1 Description of the connection

The Empresa Nacional Portuaria (ENP) network can be summarized in the diagram in Appendices B-1 and 2. The Information Systems center is the location of the main applications servers used in the company. Here there is one i Series 820 applications server, an iSeries 520 server, a DNS server and a graphic image server.

In the server room, there is also a closet with the main rack, from which run the other switches of the network take off. From this rack, 3 fiber optic connections go out to the Accounting, Human Resources and Superintendency buildings. In May 2006, 1 Gbps switches were installed with the optical fiber. In Bid 02/2007, new 1 Gbps witches are to be purchased for the new 7 km single mode optical fiber.

From the Accounting building, a UTP connection goes out to Warehouse 1, and from Warehouse 1, another like connection goes out to the supply warehouse. It should be clarified that in Warehouse 1, what is installed is a signal amplifier. There is not any computing equipment installed in this warehouse, but only the signal is amplified before going on to the supply warehouse.

From the Human Resources building, a UTP connection goes out to the building of the Clinic. Hay nuevos enlaces de fibra óptica.

In the Superintendency building, there are no connections to extend the network to other buildings. The connection to the Internet is received and distributed from this building. The signal is received and filtered by a SUSE Linux server with Iptables and a PIX 515 and afterwards distributed by a switch.

From the Information Systems center a UTP connection goes out to Warehouse 4; this connection is to feed a wireless repeater to extend the network for the handhelds. In Warehouse 4, there are no computers. The following section describes the wireless network which is in operation for the use of handhelds (48 total).

In the Information Systems center, there are also modems which receive and send the signal to the ports of Castilla y San Lorenzo. In each of these ports, there is a similar modem to communicate with the Port of Cortés and to accede to the applications of the enterprise. In Puerto Castilla and San Lorenzo, there is a Server which carries out the requests for communication with the work stations. There are approximately 6 work stations in the ports.

1.1.1.2 Wireless network

The diagram provided by ENP staff (see Appendix B), presents the network which is used for handhelds to input the data from the containers in a direct way. With implementation of this network, it will be possible to avoid the process of inputting the data at a defined hour of the date and the data will be updated at the moment that readings are taken.

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This diagram shows the network. All of the ACP 1200 equipment has been installed and is working well.

Two additional ACP 1200 are to be purchased in Bid 02/2007, because there are 2 new points of access (Texaco and a place close to it).

The wireless network is connected to the UTP cable network in 2 places; this double linkup is for security, in the Superintendency building and in Warehouse 4.

1.1.1.3 General state of the network

The present network of ENP has some 300 work stations connected. There are 100 PCs on order in Bid 30/2006. This network utilizes the topology of an extended star and, as means of transport, copper cable, fiber optics and wireless technology. The standard utilized for the fiber optic network is EIA/TIA 568 B, The cabling is category 5e. The purchasing policy for connection materials is to acquire from market leaders.

The transport between buildings of greatest concentration of work stations is by means of fiber optics at a speed of 1 Gbps. The switches of 10/100/1000 Mbps were installed in May 2006 and are working well. The two IBM i-series (820 and 520) are connected using a 1 Gbps link (through a switch). New 10/100/1000 Mbps switches are to be purchased for the 7 km single mode optical fiber in Bid 03/2007.

The stations which are located far from the information systems building are connected by means of a wireless link. This wireless link is also used for the connection of handhelds used to input data from the containers directly into the system.

Each floor in each building has a switch for the network distribution. These switches are protected in locked cabinets to avoid access by unauthorized personnel.

The access to the Internet is provided by the firm Metrored, and done by means of a dedicated copper link at a speed of 768 Mbps ration 1/1. This is planned to increase in February 2007 to 2 M bits with Hondutel, the new ISP.

The connection to the ports of San Lorenzo and Castilla is made by means of a commuted link with an exclusive dedicated line. Each port has a server with SUSE Linux which makes requests to the server located in Empresa Nacional Portuaria. This server validates each request and makes the connection with the systems.

The work stations acquire their IP address automatically from a DHCP server with the SUSE Linux operating system. The IP is released in accordance with its MAC address.

1.1.1.4 Observations on the data network

- *The network is well designed and implemented and functioning in an effective manner to carry out the transactions with the AS/400 systems.*
- *The purchasing policies for materials for the network assure a greater productivity and minimize the risk of loss of connectivity due to equipment failure.*
- *The bottlenecks which were found in the communication between the information systems buildings and the other buildings have been eliminated with the purchase of new equipment connecting at 1 Gbps.*
- *The connections to the ports of San Lorenzo and Castilla should be upgraded to a higher speed link.*
- *The failures in connectivity are minimal and are attended to in appropriate time for their limited occurrence.*

- *Some cabinets containing connectivity equipment on each floor of the buildings need preventive maintenance.*
- *Due to the security policies of the enterprise, some points such as the security of the network, the real speed of the network, scanning of ports, etc., could not be reviewed.*

1.1.2 Policies and Procedures

Due to the restrictions on access to information, for reasons of security, the enterprise did not provide us with the policies and procedures related to the area of information systems, so that it is not possible to confirm that they exist. Notwithstanding this, it was possible to obtain an idea about the application of these policies and procedures, in case they exist, through the enterprise's users.

1.1.2.1 Observations on Policies and Procedures

- *The servers are backed up daily in the Computer Center.*
- *There are no policies on backup for the end users; each user backs up his or her own files.*
- *The users do not know some basic operations for resolving problems which happen frequently, due to the dependence on the information systems center. This sometimes results in extended delays which can be reduced by some tool to train or guide the employees to solve simple problems and not stop their work.*
- *The backups carried out for the systems are done at the request of users authorized for each area. Example: Accounting orders when it is necessary to do a backup. A policy which would control these backups should be formulated to have a better control over the information and in this way prevent the loss of information valuable to the enterprise.*
- *The general policies and procedures should be distributed at the level of the entire enterprise. An effective tool for this objective is the implementation of internal portals for the users to access information like this. Another form would be the distribution of introduction manuals containing this type of documentation.*

1.1.3 Security

The tests of security could not be carried out due to access restrictions, but the information systems department did make available basic information on how information security is implemented in Empresa Nacional Portuaria.

The internal network is protected from outside access by a firewall at the hardware level (CISCO brand PIX 515) and a firewall made with Iptables on a server with SUSE Linux. The security rules of Iptables could not be obtained, and it was not possible to make an analysis of the implementation of these tools.

Some cabinets are not isolated and are vulnerable to risks of sabotage, vandalism and / or accidents caused by users. The cabling is routed by means of channels and it can be seen that some are loose, this due to constant changes in the structure of the building which are not reported in advance to the information systems department.

The fiber optic link between the information systems building and the other buildings is underground.

The antivirus protection is controlled by each station with a client program of Norton Antivirus Corporate edition and the definitions are fed by means of a main server.

The access to the servers room is a sliding aluminum door with glass, and no lock. The only security is the entrance to the information systems building. To enter this building, it is necessary to go through 2 doors which are not reinforced security doors. Visitors who arrive at the information systems area could enter the servers room without any problems if they are not supervised.

1.1.3.1 Observations on Security

- *The CISCO PIX equipment together with the implementation of a Linux server with Iptables provides a very good wall of protection against intrusions, if it is well configured.*
- *There is no antivirus server to filter the signal from the Internet and external e-mail.*
- *Some Linux servers have an old version of SUSE Linux installed and are not up to date. The versions of packages which present flaws in security were not reviewed, due to access restrictions.*
- *A security door should be installed on the access to the servers room. This room contains costly and important information for the enterprise.*
- *It was not verified if the SPF (Sender Policy Framework) is implemented to protect the mail server.*
- *The Port is planning to acquire Lotus Domino and Lotus Nortes, software for messaging an electronic mail, through bidding in April / May 2007.*

1.1.4 Technical and Maintenance Support

The technical support of the enterprise is in the care of two people, who attend to problems arising in work stations and are not related to the systems.

Hardware is acquired by bidding and is bought in large lots of equipment. Only equipment of recognized brands is acquired and the purchase of clones is not permitted. This purchasing practice is good to standardize to the greatest degree possible the information systems equipment used and to take advantage of the backup offered by the vendors of this equipment.

To speed up the process of formatting and recovery of operating systems and applications necessary for the firm in the work stations, which sometimes cannot be repaired due to problems of software or of the operating system itself, a graphic image server with SUSE Linux is used.

Preventive maintenance of hardware of the workstations is programmed to be carried out twice a year. For its execution, it is necessary to have the collaboration of interns (social service of the computing students) which is received by Empresa Nacional Portuaria, inasmuch as the information systems personnel is not sufficient to carry out this task.

Due to the few personnel dedicated to resolving common problems, the perception of the users is of a support service rated as fair to poor. Problems are attended to according to their importance and sometimes a simple problem takes a long time to be resolved.

A listing of the workstations was obtained, but the list is not up to date, so that the total number of computers is approximate. At present, there are some 300 computers in the enterprise.

Even though the purchases assume a considerable increase in the number of computers in the enterprise, the growth in the annual growth in the number of computers is not high, because when equipment is replaced, the old equipment is passed to other areas and the excessively old equipment is

donated to institutions such as schools and not-for-profit organizations.

In the enterprise, there are several versions Windows; 95 percent of the machines run Windows XP Professional, while fewer than 5 per cent run Windows 98 or 2000.

1.1.4.1 Observations on Technical Support and Maintenance

- *There should be additional people to attend to common user problems to provide a quality service. There are presently 2 people, but it it not nearly enough. There are currently 300 PC, dozens of switch / hubs, a router, antenna, wireless bridges, dozens of access points, and other types of equipment and a wireless Cisco Works appliance. In Bid 03/2007, 121 new PCs are on order, dozens of printers, plus 20 additional Cisco switches of different configurations for the 7 km optical fiber, a Cisco VPN concentrator, Tivoli software to monitor the network with some 500 points to monitor, Cisco Works to configure and manage the Cisco equipment, Lotus Domino / Notes and a rack unit with 3 blade servers (for the Lotus Domino and other applications) and the additional Access Points (AP 1200).*
- *The formatting and recovery of workstations by means of a graphic images server is much faster than a manual installation, but when it is not accompanied by a backup procedure, the users lose their information most of the time, information which is often completely unrecovered.*
- *Maintenance plans should be prepared for network equipment, since the cabinets which protect this equipment were found to be dirty inside.*
- *Users could be trained to be able to provide some type of basic maintenance to their workstations.*
- *The variety of operating systems could represent a security problem, since the operating systems before Windows XP are off the market and do not have update support.*

1.1.5 Power System

The power system is found in acceptable conditions for a good supply of electrical power to equipment. Most of the desktop computers have an individual uninterruptible power supply (UPS). In some offices, there is a UPS for the printer and for the work terminals. The capacities range from 0.5 KVA to 5 KVA, 120 VAC.

The connections in the UPS of the work terminals are made directly to the wall with a NEMA 15 R power outlet, with the ground terminal connected to the equipment. It could not be determined whether the grounding system provides adequate values for the computing equipment installations.

The connections in the main server and in some buildings where there is a UPS of considerable size are made with outlets of 50 Amp, 240 VAC industrial conventional type, with electrical installations out of standards. The cables are visible and the distribution panels are not adequate (See photograph in Appendix B).

The protections for the equipment are limited to the voltage protectors which come incorporated in the UPS. Protection was not found for voltage transients, or for collateral damage from atmospheric discharges.

The information systems center commented that they have frequent problems with atmospheric discharges (lightning), especially with the copper components of the LAN.

1.1.5.1 Observations on the Power System.

- *It is recommended to change the 50 Amp industrial-type outlets to security outlets or some other*

type offering greater protection at the time of disconnecting the equipment in the server room and in the main UPS (See Annex 5).

- *The lightning-arrestor system could not be evaluated, but is designed for the protection of buildings. Accordingly, there is not an adequate protection for atmospheric discharges in the computing equipment, which results in costly losses each time a piece of equipment is damaged when lightning hits one of the port installations. It is recommended that a system designed for protection of the information systems network be implemented. This protection should not be limited to the AC power lines, but should be extended to all of the copper communications lines which can be reached by a discharge.*

1.2 Review and evaluation of the data collection, billing, operational, record keeping, and other programs used by ENP.

1.2.1 Data Collection

The Information Division is in the process of implementing the use of handheld computers from Symbol Technologies. There are some 60 handhelds since November 2006 and they are being integrated into the production system as personnel are trained. There are no plans to use handhelds at the new gate. At the time of the 2004 visit, the system was expected to be ready in the first half of 2005, and once implemented will replace much of the current offline data entry with a real time capability. Much of the current data collection is done by data entry from forms into either dumb terminals or PC's although online terminals are being used at the gates.

In computerized systems, hardware and software are developed and installed in a "prototype" or "test" system. Once the user is satisfied or the vendor certifies that the system is ready, more hardware is added and the systems go in "production". Once systems are in production, the user is dependent on the automated system, and it is important that other factors such as UPS's and backup procedures and/or facilities are in place.

1.2.2 Financial Systems

The Port currently runs two payroll systems, one for the union, and one for other ENP personnel. These systems were developed in-house and written in RPG or C++, which are two older computer languages used in software development. It is recommended that these systems be replaced by a packaged system such as the payroll system from SSA Global. Most of these vendor-developed systems provide the flexibility for the Port to incorporate their own local rules and requirements. The advantage of these packages is the worldwide usage by many users and the vendor maintained software capability. Most progressive organizations today are moving away from in-house software where vendor supported systems are available.

The Accounting Division currently uses the Business Planning Control System from SSA Global, of Chicago. This system is the BPCS version from 2001 and is implemented on the IBM AS400. Recommendations for software upgrades are addressed in Section 1.6.

The Billing System was designed in-house and is programmed in RPG and C++. It currently collects data from various forms, some of which will be replaced by handheld transactions on the Symbol handheld computers. Suggestions for upgrading Billing System software are addressed in Section 1.6.

The software used on the office PC's is Microsoft Windows XP Professional and Microsoft Office 2003. Windows XP has been upgraded with Service Pack 2 (SP2).

1.2.3 Operations Systems

A demonstration by the Operations Department indicated a very comprehensive array of data, running in a conventional file system. The Port's iSeries 520 server runs DB2 data base management system. There is no current use of data mining systems, such as IBM DB2 Data Warehouse Edition, to identify relationships or information of interest in large-volume data, although there is interest in implementing this technology. Much of the current data collection by this group will be upgraded to real time data collection with the implementation of the Symbol handheld computers.

Except at the old gate that was operational at the time of the initial site visit in November 2004, where dynamic data displays were observed, no other use of operational data was observed in the field. All other operational data seen was in an office environment. The new handheld system should improve this situation. Also, the new gate, which has multiple lanes, was not in operation at the time of the initial site visit in 2004, so it was hard to tell what effect that would have on operations. The new gate including scanning equipment was in operation during the November 2005 visit.

Other things observed were the two Paceco Cranes, only one of which was in operation during the initial visit. There did not appear to be any automation in these units, based on limited observation from outside the crane. No observations were made in the crane itself. Also, out of 11 straddle carriers, only 6 were operational, the others being out of commission for lack of repair parts or maintenance procedures or both. While an automated dispatch system or other automated aids to yard operations could be beneficial, the benefits would not be fully realized without also improving the maintenance system. Complaints were also noted, by tenant organizations, of a lack of yard tractors (hustlers), provided to the tenants, for transporting containers to and from the quay. However, an automated system with good data collection and retrieval capability for both the Port and tenant organizations will relieve a lot of this type of current deficiency assuming the system is real-time and available to tenants as well as the Port.

Another problem observed was the bad condition of the roads both on and off the terminal. This adds to transit time reliability and could adversely affect benefits of a sophisticated automated terminal operating system. This is being addressed elsewhere, but should be considered when selecting automated solutions.

Much of the current system is programmed in RPG. There are recommendations in Section 1.6 for upgrading this software and using a data base management system supported by a vendor and used worldwide by various seaports. The Port currently uses DB2 but has expressed interest in also using Oracle

The Vessel Planning Group uses an MS PowerPoint screen for a static berth display, supplemented by manual inputs and planning. A static display means that all there is a fixed picture on a CRT screen, with no capability of interacting with it or making dynamic changes. These procedures are nearly all manual. These manual procedures need to be replaced with a vendor-supported vessel planning system, which is recommended in Section 1.6. Of course, this type of planning system is based on a requirement for booking information, manifest information, bay plans, etc. If this information is in the Port computers, it was not shown to us on our visit. It is likely that a lot of work would have to be done to support such a vessel planning system. This work would include inputs from ship lines, brokers, forwarders, or any organization involved with the vessel requirements. Also, unless more berths are placed in operation than the two working on the site visit, providing an automated berth management system could possibly exceed requirements.

1.3 Recommendations to establish a computer network within Puerto Cortes to tie together the various departments and functions.

ENP currently has a local area network (LAN) in place with links to the Internet through an Internet Service Provider (ISP). This local network should be expanded to include more fiber optic cable connections. Any existing copper cable should eventually be replaced with fiber optic cable. Since this network is already established, the recommendation is to expand this capability within the Port.

In addition to the local cable component, there is a radio frequency (RF) component, which is part of the LAN. This radio frequency component uses cable connections between signal towers and radio transmission from tower to tower. The advantage to radio frequency technology is that the data is real-time, more accurate, and more comprehensive. Most of the world's leading ports use this technology today. An expansion of this radio frequency system is recommended for real-time data collection and retrieval. There would be advantages to both the Port and other organizations in using and having access to such an automated system.

Together, the local cable capability and the radio frequency system, currently implemented with Symbol Technology hardware and software, comprise the local area network (LAN). If the Port is looking for an alternative to the Symbol Technology radio frequency system it is implementing, Psion-Teklogix, Inc. Radio frequency applications are discussed in Section 1.9.

Access to the LAN from outside organizations is addressed in Sections 1.4, 1.5, and 1.7.

1.4 Recommendation to allow ENP to tie into networks of clients having electronic data collection capabilities.

The Port would like to tie into five of the major ship lines and two additional ports in Honduras. There is a current effort underway to also connect to three banks in Honduras. The Computer Department would like to use the Internet for these connections. It is recommended that this should be implemented as soon as possible using web services technology. Navis web access software is discussed in Section 1.6. The advantage of the Internet is that it is fast, free, and reliable. The advantage of web service technology is that it is real-time and less expensive than Electronic Data Interchange (EDI) technology, which is a more expensive, older technology, and not real-time.

EDI was designed for document exchange, not process integration. The key to web services is the integration of business processes into the system. For instance, if a ship line wants to re-route a container, the connected computers at ship line and terminal should be able to determine that the container was not found, or that the container can be re-routed, or that the container cannot be re-routed, or that it can be re-routed for a price. The ship line confirms or cancels the re-routing for each container, and the terminal confirms that the re-routing has been completed. The ship line updates its system to show the completion. In the past, this would have taken multiple phone calls with long delays. EDI was designed when the wide area networks were very slow and unreliable, that is for the high latency of pre-internet communication.

By allowing the ship line or other agency to communicate with the Port's computer, the people delay is removed. Today vendors have developed tools and components to accomplish these web services at a very low cost. Generally, both parties already have the network, the Internet, and both parties are already connected to it.

The same implementation can be applied to trucking companies, brokers, railroads, and distribution centers. Addition and integration of new technology such as cameras and telephony make the communications even better for all parties.

As the Port's automated systems become a port community system, web services provide real-time, 100 percent accuracy, and lower cost than EDI. The central database of the port community system

eliminates the replication of data and provides an automated link between various participants such as ship lines and trucking companies.

Some companies such as Microsoft and IBM provide components for web services and others such as Navis and PeopleSoft provide complete turnkey systems. The day of developing web services from scratch is gone.

Another alternative is a combination of web services and EDI, but this is not as desirable. As worldwide ports are continuing to automate, there is still a lot of EDI usage, but EDI is fading away and is not the latest technology. Web services is a newer, but proven technology for integrating computer systems over the Internet and even over the LAN at the Port.

It should be noted that the Port of Cortes already has a LAN is already in place with connection to the Internet. What is left is to set up the services and procedures between the clients and the Port. There may also be a need to increase the speed of this access. Information on the current access speed was not available on the site visit.

1.5 Recommendations to allow ENP to tie into networks from Customs.

The site visit included a meeting at the local Honduras Customs Office (known as "Customs") to discuss possible links to their system. While no senior Customs officials were available at the time, a representative from the Computer Center met with the DMJM Harris team.

Customs has Hewlett-Packard SIDUNEA (SIstema Aduanero Automatizado) (or ASYCUDA in English – Automated System for Customs Data) server and seems to be well organized for today's technology implementations. SIDUNEA (ASYCUDA) was developed under auspices of UNCTAD and is used in 80 countries and regions. One major ship line reported that it keys in manifest information on computer terminals for Customs prior to the vessel arrival. However, it was indicated by the Customs representative that the information most useful to the Port, the ship's manifest, was not usually ready to be sent to the Port by Customs until after the ship arrived in port. This manifest data provided to Customs by the various ship lines is sent earlier, but it usually takes Customs up to three days to process the data. It was also discovered that no information was provided from the Port to Customs and there are no plans to require any information. It is obvious that some changes would need to be made in order for a link to be useful.

In the United States, U. S. Customs provides manifest information to the ports and requires this data to be present 5 days before scheduled ship arrival. This information is used by the ports for operational and vessel planning. Since the planning is the same in Honduras, it would be necessary for Customs to make the data available from 3 to 5 days before ship arrival. Therefore, one of the primary uses of the communications link between the port and Customs would be for receipt of manifest data by the port from Customs.

Even though there is no requirement by Customs at present for data from the port, it is believed that at least holds and releases on cargo must take place manually at present. Therefore, the second use of an electronic link to Customs would be for the placing of holds and releases by Customs for selected cargo.

A third application for an electronic link would be for use by Customs in analyzing cargo movements through the port for interdiction requirements. With Customs having a real-time access to port cargo data, much time would be saved with greater reliability of the data needed for analysis.

The implementation of an electronic link could either be by a dedicated line to Customs from the port or by the Internet. Since the physical proximity of the Customs House is so close to the port, the dedicated line might by preferable.

The applications discussed here could be implemented by EDI (Electronic Data Interchange) or by web services. Since EDI is an older and more expensive technology, web services could well be the best method of implementing the exchange of data between the port and the Customs House.

1.6 Recommendations for computer software to collect and share operational data and prepare billing information.

Recommended software falls into two categories, systems software and applications software.

1.6.1 Recommended Systems Software

It is recommended that the two main host computers, the iSeries 820 or its replacement and the iSeries 520, be upgraded to the newer AIX Operating System, which can be implemented with the other operating systems in use. AIX (Advanced Interactive eXecutive or Advanced IBM UniX) is the IBM version of UNIX, conforms to the specifications of UNIX and runs on pSeries and other systems. There are four partitions, three used for Windows, Linux and AS("Application System")/400, so that AIX can be added in the fourth partition.

Another major piece of systems software is the development software. Currently some of the development at the Port is being done with RPG (Report Program Generator) or C++. It is recommended that the Port utilize IBM WebSphere, which is currently installed, to replace the older in-house developed software. The advantage of using WebSphere is greater efficiency, faster development, and easier maintenance.

Other system software is available from each vendor, but until a hardware decision is made, it would be difficult to select what is needed. Hardware solutions are discussed in Section 1.9.

1.6.2 Recommended Applications Software

Applications software will be addressed by the functional areas of operations, finance, and maintenance.

1.6.2.1 Operations Department. Currently, there are some very comprehensive applications running at the Port, which have mostly been developed in-house. In order to be ready for an increased workload and more efficient planning and operations, it is recommended that a standard port planning package be implemented to assist in yard, gate, and ship operations. Some vendors also have solutions for other functions such as billing and web services. The vendors considered include Navis, Tideworks, Maher Terminal Logistics Inc., IBM/Maersk, and Embarcadero Systems Corporation. No system should be implemented without graphics capability. In today's technology, graphics, pictures, animation, video, and audio are readily available.

a. Navis

Over 150 terminal operators currently use Navis in 38 countries worldwide, along with most of the major shipping lines. Few investments entail as much risk to the Port's business as the selection of the core Terminal Operating System (TOS).

Navis SPARCS. The heart of the Navis TOS, called **Navis SPARCS,** is a real-time graphical software product which maximizes terminal efficiency, productivity, and profitability by optimizing the utilization of labor, yard space, and equipment handling in real-time. The system can be customized to meet yard, vessel, or equipment planning needs and handles reefers, hazardous materials, and more.

Since SPARCS is modular, the Port could only license the capabilities needed. The initial software investment remains protected because as the user's requirements evolve, SPARCS also evolves. By simply adding the components and functionality required, the user can keep pace with industry and business changes.

SPARCS enables the user to fully automate and optimize vessel, yard allocation, and equipment dispatch with minimal human interaction, which means faster more efficient load and discharge. SPARCS allows equipment to handle more containers per hour and to better utilize yard space. Additionally, SPARCS keeps pace with advances in equipment technology, allowing the Port to maximize investment in the latest equipment such as twin lift straddle carriers. By helping optimize equipment, land, and container moves, vessels spend less time at the quay, enabling the Port to accept more requests from shippers and increase throughput.

SPARCS integrates the entire terminal operation, enabling the Port to plan containers directly from the gate to the vessel. By optimizing logistics flow through the terminal, SPARCS promotes rapid movement of cargo between the gate and the quay, reducing dwell times for goods and turnaround times for vessels. An integrated TOS promotes more efficient management of terminal operations enabling the Port to reduce congestion and strengthen customer relationships through faster turn times.

A real-time TOS that provides up to-date information on events throughout the terminal can help the Port to measure productivity gains, track lost time on cranes or in the yard, and react immediately to any exceptions. Using up to-date information, planners can quickly and easily determine the best way to optimize the terminal through yard allocation and vessel loading plans; they can see where containers are located and what equipment is available. With a real-time view of the terminal, planners can make more strategic decisions, optimizing labor and equipment resources.

Navis ExpertDecking enables the Port to fully automate yard positioning by automatically distributing containers throughout the yard based on user-defined constraints, preventing congestion and promoting throughput. More decisions are made logically; ExpertDecking fines the best position without mixing stacks and reduces rehandles. SPARCS automatically assigns containers to optimal positions across the yard, maintaining compliance with hazardous container segregation rules, ensuring proximity to the scheduled loading berth or rail track, and distributing for efficient multi-crane vessel operations.

Navis PrimeRoute uses modern operation research optimization methods to increase straddle and tractor utilization. With PrimeRoute, straddles and tractors are polled across multiple cranes and automatically dispatched to the optimal point of work in the yard, increasing utilization and lowering the number of vehicles required. PrimeRoute optimizes work assignments based on yard and equipment constraints, and operating rules such as target moves per hour. PrimeRoute provides comprehensive real-time monitoring of the operation as well as comprehensive statistical performance reporting for management.

Using a hand-held terminal interface, refrigerated container or reefer engineers and controllers can monitor reefer temperature, vent, humidity, oxygen, and carbon dioxide information. SPARCS automatically sends plug and unplug notices and alerts reefer mechanics when to inspect each reefer based on its own particular schedule. The user can also opt to include a live interface to an automatic reefer monitoring system.

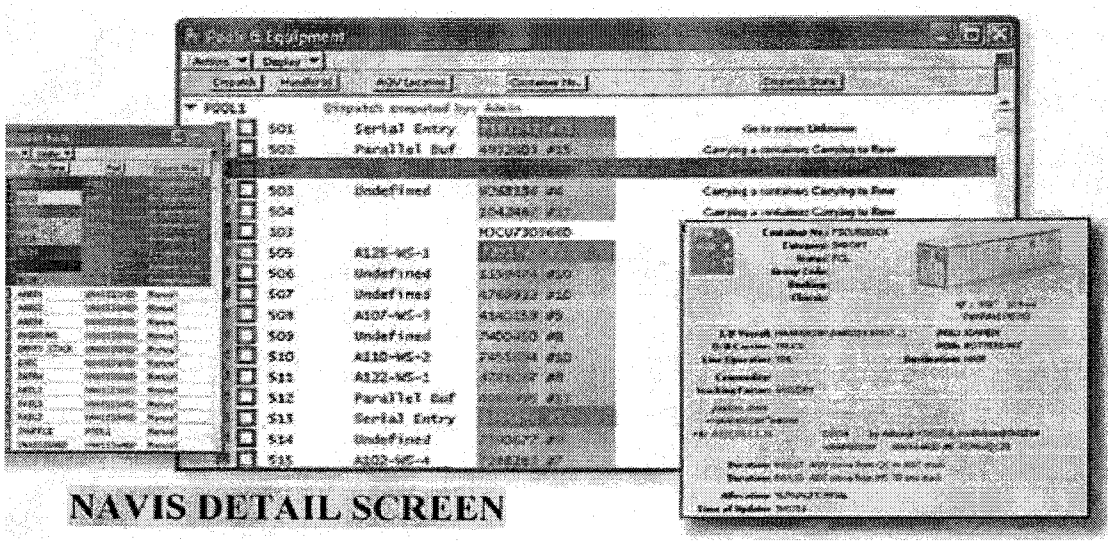
Navis' open system provides easy integration. Utilizing a standard XML interface, SPARCS links to third party technology and applications that support radio data terminals, position detection systems, and

optical character recognition systems. Specifically, Navis supports the following models of Symbol Technology products – the vehicle mounted VCR5040 and VCR6946, and the handheld PDT6842 and PDT8142.

Navis SPARCS supports a wide array of EDI (Electronic Data Interchange) formats including UN EDIFACT, ANSI X.12, and STIF.

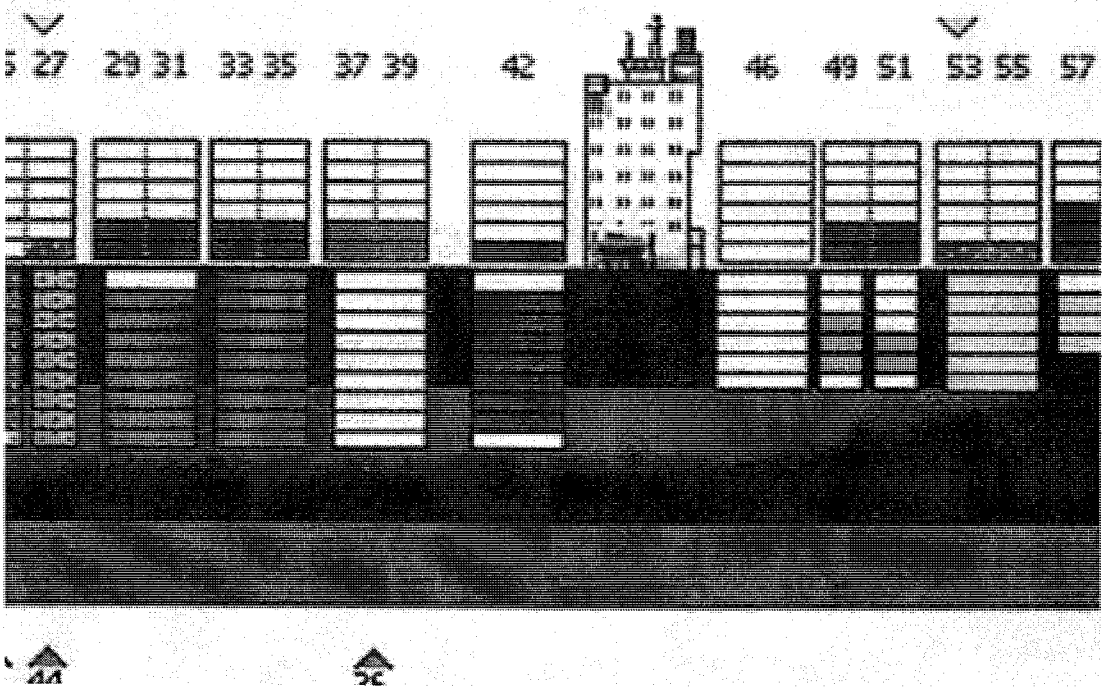
Shown below are two examples of Navis screens available in the SPARCS system. The first is a detail screen, which gives an example of the level of detail available to the user of the system. The user is able to start with a graphic of the yard plan and click all the way down to the individual container and its associated data.

The second example is the schematic of the vessel stow plan. Again the user is able to gain access to very detailed data about each container. In all of these graphics schemes, whether it is yard or vessel, the use of colors gives the operator a visual picture of where certain types of cargo are stored such as hazardous material or containers from a particular ship line.



NAVIS DETAIL SCREEN

NAVIS VESSEL SCHEMATIC



Navis Express is available to manage and maintain terminal business transactions, data processing, and accurately record and invoice all transactions and services. It interfaces with Navis SPARCS and drawing on the power of the Oracle RDBMS, Navis Express extends the Port's control over data management. Navis Express automates the Port's bookings, billing, data exchange, and reporting functions, all while capturing a complete history of all transactions and work.

Express is designed to work hand-in-glove with SPARCS, Navis' graphical planning and control software. SPARCS captures real-time data and Express maximizes every bit of it – tracking the complete history of every cargo movement generated in SPARCS, enabling an exchange of key information and providing greater visibility of data at the SPARCS planning level.

Express helps to speed up gate operations by increasing efficiency and leveraging technology. Express utilizes a broad range of electronic data formats to provide pre-advise and booking capability, enabling gate clerks to simply confirm rather than create records for each new gate transaction.

Express supports the Port's own unique gate configuration technologies and certified products, including automated weight scales, intercom systems, optical character recognition systems, automatic equipment identification readers, magnetic card readers, and more.

Express can be linked with WebAccess to establish an Internet connection between the terminal and your customer community. Customers can place or modify bookings, inquire upon the status of containers, request service orders, and resolve questions. Customs officials can update release status. Line operators can transmit stowage plans via EDI. With everyone connected, there's no waiting, no problems, and no costly data entry errors. The system provides greater efficiency, lower operating cost, and reduced staffing requirements. Customers and business partners will appreciate the better service and timely information.

Express puts an end to the paper shuffle and verbal orders by tracking billable services, then automatically sharing the data with your financial systems. Whether the terminal is loading containers, delivering steel coils, pre-chilling reefers, or tracking electrical power usage by the hour, the Port needs to keep an accurate account of the billable services provided. With Express, tracking and billing is done automatically, which means the revenues and profits don't get lost.

Navis WebAccess is available to provide Internet capabilities to improve a terminal's customer service and productivity by providing access to real-time container information, reports, appointment management, and automated event notification. This newer technology is an alternative to current industry EDI. EDI, an older technology, is expensive, and is not real time.

Navis WebAccess provides the capability for parties to update information in a secure environment including:

- ► Ship schedules and berth information
- ► Load and discharge lists
- ► Container details, status, and history
- ► Chassis inventory
- ► Equipment availability
- ► Delivery requirements
- ► Demurrage information and payments
- ► Holds (line, Customs, Agriculture, off-hire, service)
- ► Vessel and barge manifests
- ► Booking and B/L details
- ► Truck transactions
- ► Routing audits
- ► Appointments
- ► Interchange agreements
- ► Damage reports

The benefits to a terminal that uses WebAccess are numerous. The terminal can provide a higher level of customer service while reducing the number of calls to customer service. Gate appointments can streamline terminal operations. The terminal can provide greater visibility and security, and customize available data to each customer. Daily activity reports provide terminal performance information.

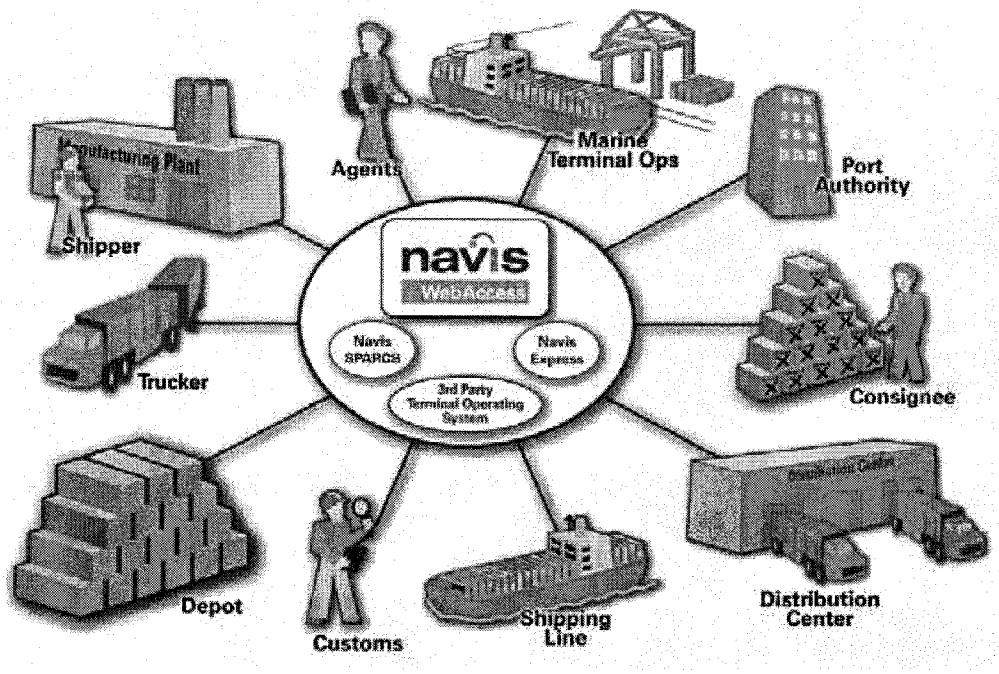
WebAccess provides information to the trucker, ship line, and others by web browser, text messaging, cellular phone, and email so it a lot less restrictive than some of the older legacy system capabilities.

Perhaps the biggest factor in favor of using Navis' WebAccess product is the real-time nature of the product and the cost savings over traditional EDI.

The Navis solution suite provides a complete system for real-time planning, management, and control of the Port's terminal operations. Navis solutions provide immediate visibility to critical data so the Port can make immediate, smarter decisions.

Navis software runs under the Windows Operating System and UNIX and interfaces with both Symbol and Teklogix radio frequency computer terminals.

NAVIS WEB SERVICES – LINKS TO ALL ENTITIES



b. Tideworks. Tideworks provides full-service terminal management and planning software solutions to terminal operators worldwide. It leverages proven technology and industry practices to help achieve more – more operational productivity, better communication with customers and partners, and shorter vessel turn times.

Tideworks was designed for the smaller terminals and but can handle up to 1 million TEU's or more annually, according to the vendor.

Mainsail is the Tideworks module used to scale terminal operations with fast cargo processing, real-time inventory visibility, and proactive customer solutions.

This terminal operating system efficiently manages every component of a container terminal operation, combining the best practices of hands-on terminal management with secure and reliable Internet driven technologies.

Mainsail Features – the following features are provided by the Mainsail module:

► Active inventory control
- Inventory management of containers, trailers, over-size cargo, chassis, gensets, and hazardous materials.
- Supports standard hazardous materials codes (CFR and IMDG) complying with both US and UN hazardous materials standards.

► Gate and yard management
- Receives and releases cargo at the gate.
- Integrates with optical character recognition (OCR), camera systems, and other e-gate technologies to ensure accuracy, reduce overhead, and speed up gate processing.
- Receives and validates bookings.
- Tracks the location and status of cargo throughout the facility.

► Import, export, and tranship processing
- Comprehensive solution for import, export, transhipment, and container flips.

► Terminal transactions and billing
- Tracks numerous transaction types including demurrage, hazardous materials, reefer maintenance, customs services, and others.
- Audit reports summarize work completed, users, and time for quick management reference.
- Integrates with terminal financial systems for billing processes.

► Statistical reporting
- Over 400 standard reports to manage the terminal
- Provides shipping lines and trucking companies access to over 15 reports via Mainsail Online.

► Mainsail online
- Connects shipping lines, brokers, and trucking companies to the terminal via the Internet with a web interface.
- Check on vessel schedules, submit bookings, execute searches, and update export, import, and container transactions.
- Eliminates costly data connections to the terminal.

► Enterprise terminal database

- Highly parameter driven, allowing for direct control over many components of the systems integration.
- System with the ability to process over 1 million TEU's per year.
- Collaborates with Spinnaker for real-time planning management and inventory visibility throughout the terminal operation.

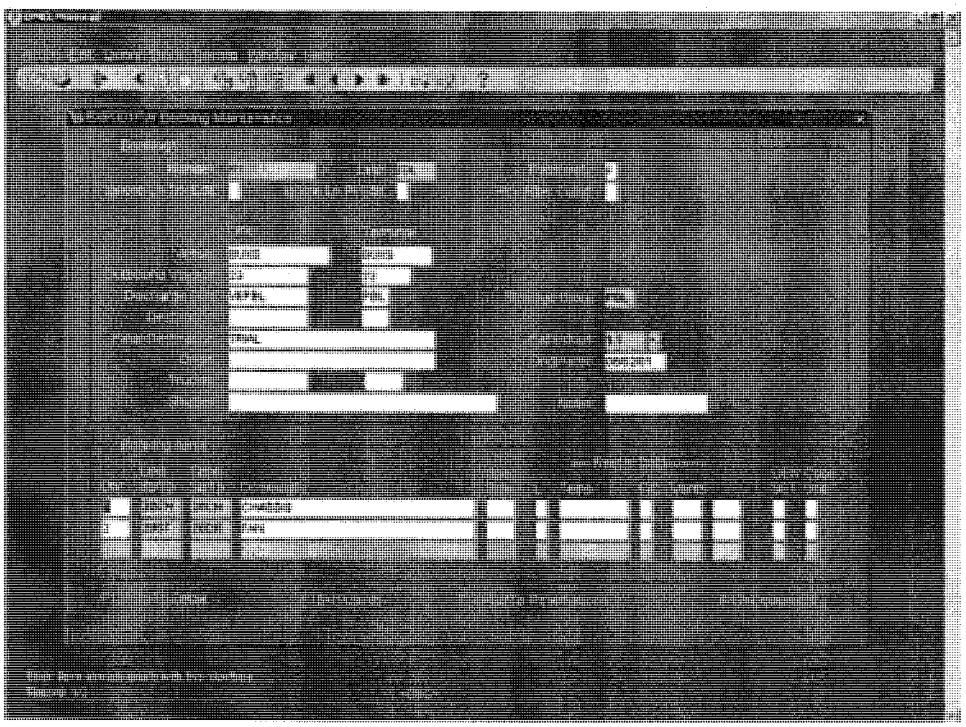
► Data interchange
- Supports industry standard EDIFACT and ANSI x12 as well as proprietary file types using Electronic Data Interchange (EDI) to connect with partners.

► Operating workflow and scheduling tools
- Configurable, parameter driven architecture can adapt to varying operating methods, facility layouts and vessel sharing arrangements.
- Incorporates both shipping line and terminal codes to eliminate confusion with differing naming conventions of vessels, ports, and equipment.
- Configure screens to individual user responsibilities.

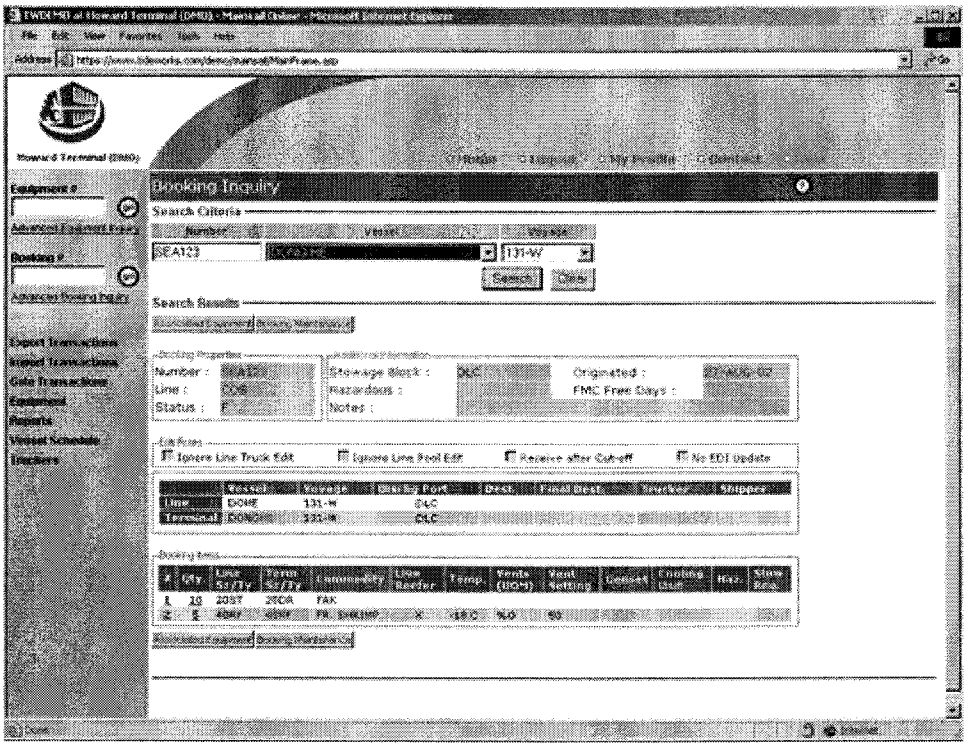
An online server runs on IBM compatible computers running the Windows 2000 Server Operating System. The Mainsail Client runs on IBM compatible computers with Windows 2000.

The following are example screens of Mainsail booking examples for both query and online applications.

TIDEWORKS BOOKING QUERY EXAMPLE



TIDEWORKS ONLINE BOOKING EXAMPLE



Spinnaker Planning System is the Tideworks module used to plan and direct the most advantageous cargo moves for yard, vessel, and berth operations.

Spinnaker provides graphical planning tools with flexible drag and drop capabilities to quickly direct real-time container information into efficient and accurate orders for vessel, gate, and yard moves.

Vessel berthing allows the terminal to adjust the physical positioning of individual vessels alongside the quay to schedule and plan for use of terminal facilities.

Yard mapping and equipment pooling automates yard planning and assignment of container moves. Optional direct integration with differential GPS, handheld devices, mounted mobile display units, and equipment software improve data accuracy and efficiency. Stow and pre-stow plans can be received through EDI interfaces.

Spinnaker Features – the following features are provided by the Spinnaker Planning Module:

► Vessel planning
- Send and receive pre-stow and stow plans.
- View and manipulate real-time, color coded container information into electronically dispatched work orders.
- Minimize stowage errors and incompatibilities
- Flexibly handle container, RO-RO, and over-size cargo.

- Yard planning with yard navigator
  - Maximize space utilization and the effectiveness of vessel and gate operations by automating container location assignments.
  - Manage container placement exceptions and correct container locations.

- Traffic control
  - Equipment pooling for assignment of container moves.
  - Real-time inventory, location, status, and next work instruction information for containers, equipment, and work teams.
  - Optional integration with Differential GPS, handheld devices, mounted mobile display units, and equipment software interfaces.
  - Achieve greater accuracy, reduced equipment usage, and advanced utilization of infrastructure.

- Vessel workflow and scheduling tools
  - Create detailed bay-by-bay directives by shift and gang to optimize vessel productivity.
  - Automate distribution of instructions to all vessel operations personnel.

- Vessel berthing
  - Plan the physical positioning of vessels alongside the quay.
  - Create and edit docks, berths, and cleat positions.
  - Assign vessel locations and tie-ups and print berthing reports.

- Vessel and yard editor
  - In a graphical setting, define all parameters and unique characteristics of each vessel for repeated use.
  - Graphically model the terminal's container yard to define all logical container storage positions.

- Advanced reporting
  - User-driven reporting tools allow the terminal to create custom reports without the need for custom development.
  - All reports are available with data accuracy.

- Active inventory control
  - Fully integrates with Mainsail and other terminal systems offering immediate inventory visibility throughout operation.

- System and partner integration
  - Supports industry standard and proprietary file names including BAPLIE, COPRAR, CASP, SAFE, STIF, AND XML files using Electronic Data Interchange (EDI) or IP networking for uninterrupted collaboration with partners, customers, and other third party entities.

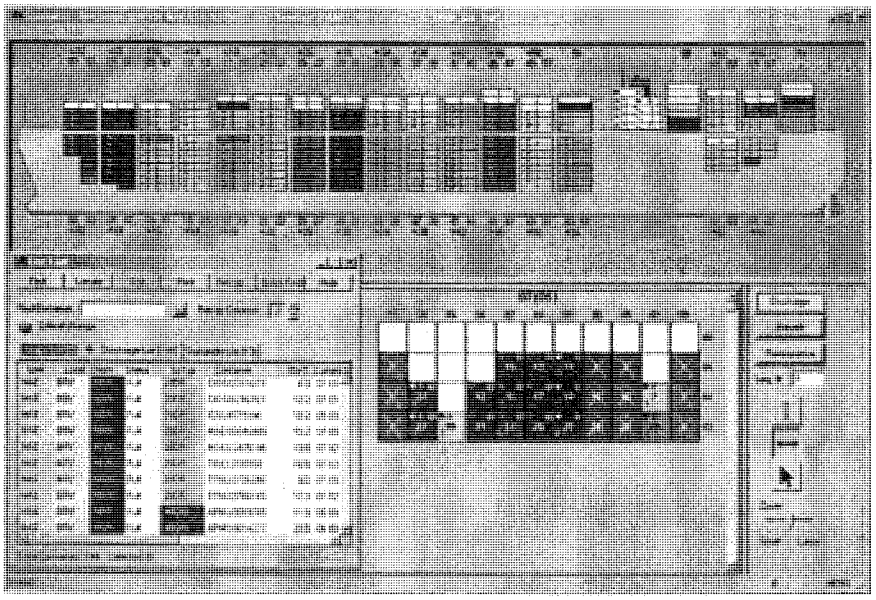
- Database technology
  - Uses the Oracle RDBMS, Microsoft Database Engine (MSDE), or SQL.Server database environments.

- Dual monitor support
  - Supports dual monitor configurations to view multiple screens of information at once.

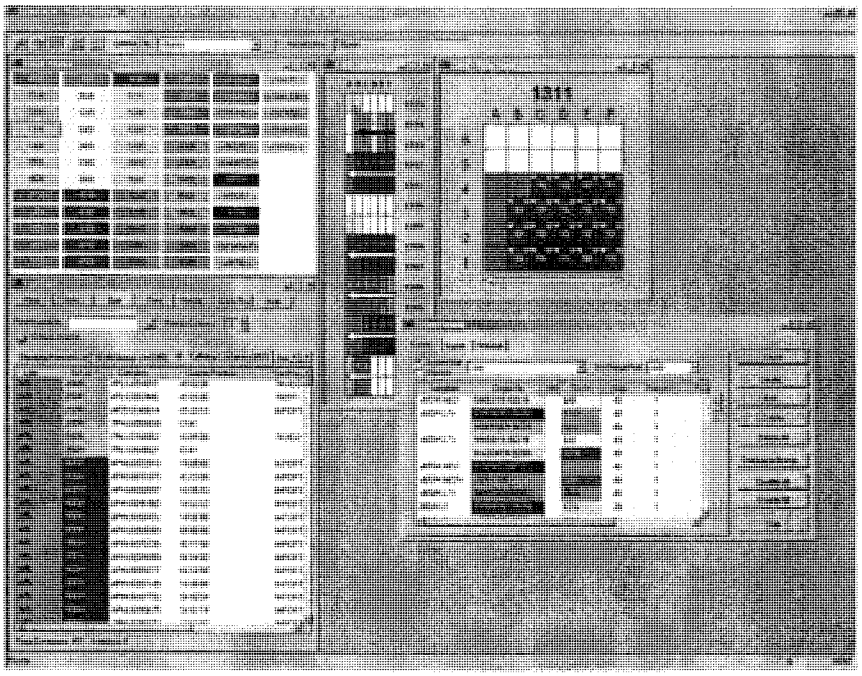
As with the Mainsail product, Spinnaker runs on IBM compatible computers under the Windows 2000 Operating System.

The following are examples of vessel discharge planning and yard planning.

TIDEWORKS VESSEL PLANNING SCHEMATIC



TIDEWORKS YARD PLANNING EXAMPLE



Genoa Breakbulk System is the Tideworks module used for breakbulk and general cargo operations to maximize productivity and exceed customer expectations. Genoa manages any type of RO-RO and breakbulk cargo – from autos to wood pulp – both on the terminal and throughout the inland distribution chain.

Prescheduled receipt and delivery automation simplifies and speeds up cargo handling. It can also handle unscheduled receipts and deliveries.

Vessel loading and discharge tools automate vessel operations orders while immediately updating terminal inventory. Barcode readers can also be used to make the process even faster and more seamless.

Real-time inventory control manages on-dock and warehouse cargo inventories using actual user defined locations.

Genoa Breakbulk System Features – the following features are offered in the Genoa Breakbulk Module:

► Vessel and truck planning
- Supports RO-RO operations, breakbulk cargoes, project cargo, and containers.
- Schedules individual cargo orders to specific carriers – whether by vessel, truck or barge,
- Automatically updates inventory and vessel manifests in real-time.

► Radio frequency computer terminals
- Integrates with radio-frequency terminals equipped with barcode scanners
- Scan cargo to verify its arrival or departure when discharging or loading a vessel, or truck
- Improves receipt and delivery, vessel operations, and inventory management productivity.
- Reduces data entry errors.

► Inventory management
- Electronically receive or key in vessel manifests for complete expected inventory.
- Track cargo manifests, shipper orders, ocean bookings, and trucks scheduled into the terminal.
- Pre-schedule and scan cargo upon arrival. Automatically verifies the cargo against delivery order data for real-time inventory visibility.

► Advanced reporting
- Comprehensive reporting tools allow you to monitor production, inventory, and operational history.

► System setup
- Flexible system for configuration to the terminal's facilities and processes.
- All codes and information can be defined to match terminal specific terminology.

► Yard and warehousing management
- Cargo warehouse and yard storage facilities can be configured to match the facility.
- Real-time inventory data is continually validated.

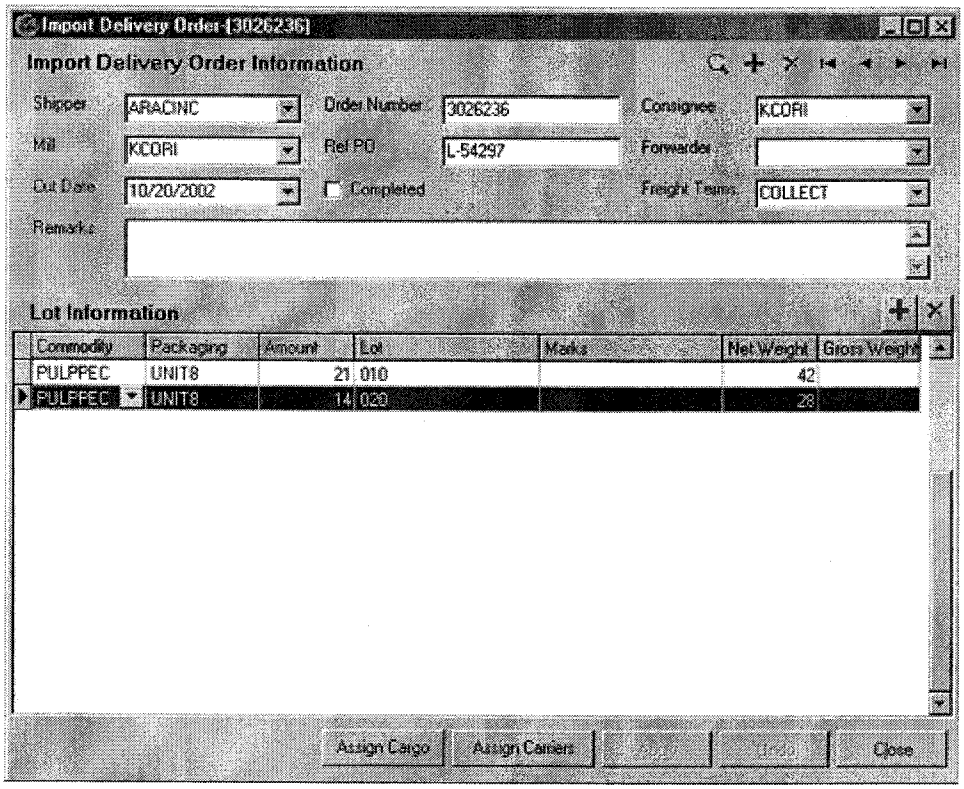
► Commodity management
- Define commodities, commodity packaging, product grade, damage codes, customers, and carriers.

► Data integration
- Provides EDI programs for receiving shipper orders and sending operations data to customers.
- EDI messages in ANSI, EDIFACT, or customer proprietary are supported.
- Interfaces with accounting systems for tonnage, production, demurrage, and storage information.

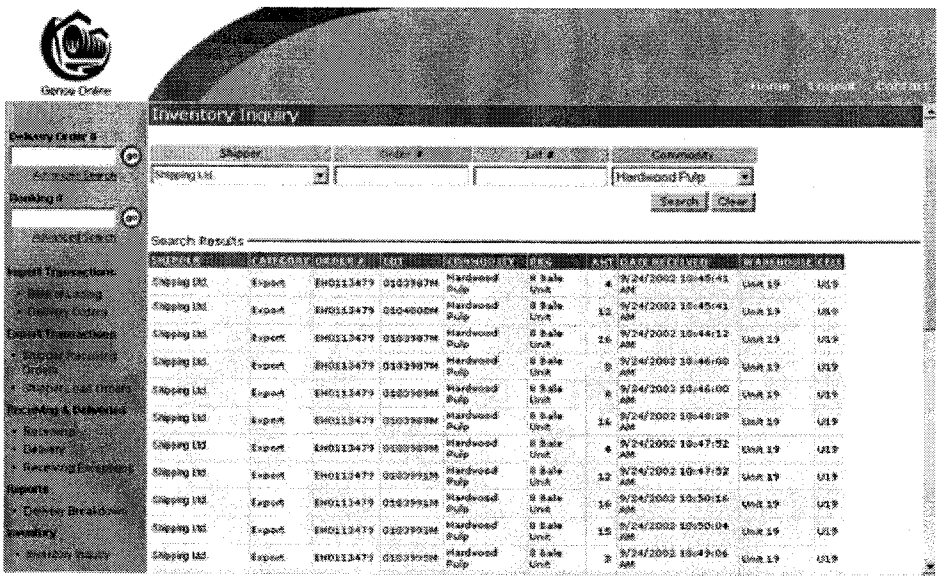
► Genoa online
- Customers can access business critical cargo data such as latest inventory, and historical data online.
- Customized Website displays cargo data in real-time.

The examples on the following page are examples of Genoa's delivery order and inventory inquiry.

TIDEWORKS IMPORT DELIVERY ORDER



TIDEWORKS INVENTORY INQUIRY



c. Maher Terminals Logistics Systems.

For over 25 years, Maher Terminals Logistics Systems, Inc. has been developing automated terminal operations systems. Their experience covers planning and operations for yard, vessel, and rail systems.

The SMART (Systems for Marine Automation in Real-Time) System is a fully integrated terminal management system built on an object oriented client/server architecture. The open systems architecture provides a flexible platform for existing systems or can operate in a stand-alone fashion.

The Container Terminal Management System provides extensive gate processing and management reporting functions and can be integrated with MTLS Graphical Systems for Yard and Vessel Planning.

Modules in the Container Terminal Management System are as follows:
- Gate Processing
- Empty Reservation
- Import Container Delivery
- Equipment Control
- Management Reporting
- Automatic Location Assignment
- Electronic Data Interchange
- Internet-based Customer Service Package

The hardware is IBM compatible running the Windows NT Operating System.

The Vessel Planning System uses SMART graphics and point and click technology to provide a real-time window into marine operations. It provides detailed container information, hazardous cargo integration, climate control integration, and overall depiction of vessel bay stow plans. Many detailed reports are available to assist the planner in managing vessel load and discharge plans.

The Yard Planning System provides a fully automated real-time window into yard operations. Yard visual screens provide view of terminal, overhead, block, row, and container views. These views are supported by lists of visual screens.

The Automated Receiving and Delivery System uses a hybrid technology known as Computer Character Recognition. The system takes a digital picture of your container, chassis, and driver. These digital images are translated into digital information, and are integrated with the Security System.

d. IBM

The acquisition in December 2004, of Maersk Data Systems by IBM will produce some competitive software and services in the shipping and seaport terminal operations area. IBM Transport & Logistics is a new competence center that will be established during the coming months. In the long term, the offerings of this group will cover the complete IT needs of customers in the transport and logistics industry operating on a large/global scale.

Currently, when you log onto either IBM or Maersk Data, you are taken to the IBM Website, which will be the basis of future offerings. At present, there is no software listed of major interest to the port.

e. Embarcadero Systems Corporation.

It was difficult to determine how extensive ESC's software offerings were since no examples were shown on their website. They have implemented new systems in California which are supposed to be state-of-the-art container applications, and a news release from Psion-Teklogix indicates they have implemented a system in Argentina with ESC.

ESC offers their CATOS (Computer Automated Terminal Operation System) software which has modules for gate, yard, vessel, and terminal management. They have over 20 years of experience developing terminal operations software.

f. Comparison of Alternative Systems

The comparison chart below only shows Navis and Tideworks because of the following:
Maher Terminals is implemented on older hardware and does not appear to have the customer base other vendors have.

IBM states that their new Transport and Logistics Division formed with the acquisition of Maersk is not ready for market yet.

Embarcadero Systems is primarily implemented in California and does not have as wide a customer base as Navis or Tideworks. They also do not have examples on their Website from which to make an analysis of how extensive their software is.

COMPARISON OF NAVIS AND TIDEWORKS TERMINAL OPERATING SYSTEMS (TOS)

FEATURE	NAVIS	TIDEWORKS
Number of customers	150 major container ports	52 container ports (including smaller ports and some major container terminals)
Countries represented	38	16
Container size limitation	No limit	Over 1 million TEU's annually
Yard planning system	Yes	Yes
Vessel planning system	Yes	Yes
Vessel berthing system	Yes	Yes
Rail planning system	Yes	Yes
Integrated gate electronics	Yes	Yes
Support of reefers	Yes	Yes
Support of over-size boxes	Yes	Yes
Support of chassis's	Yes	Yes
Graphical interface	Yes	Yes
Real-time inventory	Yes	Yes
Data base system	Oracle	Oracle
Web services	Yes	Yes
EDI	Yes (ANSI12, EDIFACT)	Yes (ANSI12, EDIFACT)
Administrative system	Yes	Yes
Support of radio frequency	Yes	Yes
Management reports	Yes	Yes
Break bulk system	Yes	Yes
Straddle carrier dispatch system	Yes	Yes
Vessel stability calculations	Yes	Unknown
Vessel lashing calculations	Yes	Unknown
Hazardous material tracking	Yes (UN, IMDG)	Yes (UN, IMDG)

The chart above reflects a similar offering between Navis and Tideworks, but it can be seen that Navis has a much broader customer base with fewer limitations. Navis also offers a much more comprehensive set of software alternatives than any other company in the Terminal Operating System market.

It is recommended that Navis be implemented at the Port since they have a greater worldwide presence and a more comprehensive offering of software products.

1.6.2.2 Finance Department. In addition to the in-house developed systems currently in use by the Port, the financial personnel are using a software package from SSA Global in Chicago called SSA BPCS (Business Planning and Control System). Since this package was introduced in 1982, it is recommended that it be upgraded to SSA FINANCE.

a. SSA FINANCIAL MANAGMENT

The following application modules are available in SSA Finance:
- general ledger
- accounts payable
- accounts receivable
- fixed assets
- purchasing
- inventory control
- job cost
- fund accounting
- draft services
- labor distribution

No attempt has been made to determine if all modules are needed, but it is recommended that general ledger, accounts payable, accounts receivable, and fixed assets be upgraded from the current SSA BPCS applications which are running at the Port.

The advantage of the upgrade from 1980's software to current offerings is to more accurately support today's requirements.

b. SSA HUMAN CAPITAL MANAGEMENT

Interest was expressed in automating the Human Resources Department. It is recommended that implementation of the SSA People Module be considered.

The following application modules are available in SSA People:
- human resources
- benefits administration
- flexible payroll
- eRecruitment
- self service
- learning management
- employee performance management

It is recommended that the SSA Payroll module be implemented to replace the current payroll systems running at the port. Further discussion with ENP would be necessary to determine which other modules should be used.

Other financial solutions considered and studied are as follows:

c. MICROSOFT BUSINESS SOLUTIONS - GREAT PLAINS

Although it is not recommended to convert to the Great Plains Systems, they would be a viable alternative to SSA Global if the Port wanted to make a change. One of our port contacts indicates they are considering a change from J.D.Edwards (now part of Oracle PeopleSoft) to Great Plains because it provides similar capability at less cost. Some of the reasons to use Great Plains are as follows:

- manage accounting and finances
- manage human resources and payroll processes
- automate and manage field service operations
- Integrate browser-based e-commerce solutions to connect with customers and vendors
- give employees browser-based access to vital business information
- customize Port applications to meet specific needs

d. ORACLE – PEOPLE SOFT

Another alternative to SSA Global is Oracle/PeopleSoft. This has even less attraction than Great Plains because of the high cost and complex implementation. However, the packaged solution has all of the capability that the Port would need and is considered as an alternative.

e. ORACLE – J. D. EDWARDS

Like PeopleSoft, J.D.Edwards is a comprehensive application system that has been implemented in other ports. Also, like PeopleSoft, this package is expensive and difficult to implement. Although it provides similar capabilities to SSA Global, it is not recommended to replace SSA Global. Another difficulty with J.D.Edwards is that it is now part of PeopleSoft and it was not clear where the two applications are headed.

After reviewing this extensive list of financial software, the recommendation to the Port is to stay with SSA Global, but to upgrade to the latest software products within SSA.

1.7 Recommendations for computer software and hardware to interface with clients' electronic data and data exchange with Customs.

In discussions with Honduran Customs, it was determined that the information available from this source was not timely and information from the Port to Customs was not required. Further discussions with ENP indicated a desire to get manifest data from other ports, but this could be a problem due to cargo shifts between port of origin and the Port of Cortes.

At the Port, there was an interest in connections to the ship lines. It is recommended that manifest data be acquired directly from the ship lines, probably at the same time they send the same data to Customs. The Computer Department would like to use the Internet for these connections, and this is the latest technology available in the industry.

Another alternative would be to use a service provider such as Sterling Commerce and use standard EDI (electronic data interchange) standards for transmission of this data. The EDI alternative is an older and more expensive method of transferring data and is not real time. Some seaports use a combination of EDI and web services.

Should the Port decide that some EDI is more advantageous than none, there are several transaction sets that may be applicable to the operation. The following are a list of transaction sets:

- 301 Booking – used to accept a booking request
- 310 Manifest – contains all B/L and container data
- 315 Status details – to notify terminal of Customs/Carrier releases
- 322 Terminals Operations – in and out gate activity
- 324 Vessel stow plan – to notify carrier of vessel stowage
- BAPLIE – bay plan – used for loading to vessel planning programs

EDI could be transmitted over the Internet which would be less expensive than going through a service provider.

Use of Web Services such as Navis Web services is a more modern, less expensive, and real time alternative to data sharing. EDI was a technology that was used before high-speed networks were available.

1.8 Interim report and presentation of the evaluation of the existing computer systems and software, and alternatives for a network and software applications.

On November 29, 2005, the presentation was made to the Port management group by Edgar L. Capps and the DMJM Harris team. After the presentation, a discussion session was held with the Director of Information Technology to review of the interim report. Several updates and other changes were suggested and have been incorporated in Sections 1 through 1.7 of this report.

Significant discussion items included the addition of the second server, an IBM eServer iSeries P5 520, at the Computer Center, the replacement of one of the high speed printers, review of the PC counts and software currently being used, and discussion of the network solutions.

In addition, in the period since the interim report sections were developed, many of the vendor Web sites have been upgraded and product information updated. Following up on the suggestion that these changes be provided, the updated information was incorporated in Sections 1 through 1.7.

The major recommendations were to keep IBM with upgrades and additions, upgrade the SSA Global Financial System, add the SSA Global Human Capital System, and install the Navis Terminal Operating System at the Port. All of these recommendations have been incorporated in this report in Sections 1.9 through 1.13.

1.9 Establish specifications for recommended hardware requirements of each subsystem or functional system.

Several IBM Servers are currently in use by the Port. It is recommended that these systems continue to be used but with upgrades and expansion.

Host Computers

There are two host computers in operation at the Port. One of the current host computers was added in 2005. This system is the IBM eServer iSeries Power5 Model 520. It has 8 GB of RAM and 490 GB of disk storage. The older server, the IBM AS400, has 6 GB of RAM and 200 GB of disk storage.

It is recommended that the AS400 be upgraded either to match the current iSeries Server or to the larger IBM eServer iSeries P5 570 Express. It is further recommended that both of these systems implement the AIX Operating System, the IBM version of UNIX. Either server could be used to run the entire

workload in a degraded fashion in the event of a system failure.

If there were a desire at the Port to switch vendors, an alternative recommended vendor for servers which could be considered would be Hewlett-Packard (HP). HP servers would also run UIX. Since HP is already implemented at Honduran Customs, there appears to be good support in the local area. However, switching vendors from IBM to HP would require an extensive conversion effort. Discussion with ENP management indicated that the Port management does not current wish to switch, and it is not recommended. Accordingly, this report does not seek to define the cost of this transition.

Front End Servers

In addition to the host servers, the two front-end servers running LINUX currently in use at the Port should be upgraded as well, and two more servers added for the second host.

When the new software is selected, the disk capacity should be evaluated to determine if more capacity is needed to accommodate the growing workload and software requirements.

A new 1000 line per minute (lpm) printer was added in 2005, but we also recommend the replacement of the other high-speed printer in the Computer Center. It is recommended that the older printer be replaced with the IBM Infoprint 6500 Line Printer. Models from 1000 lpm to 2000 lpm are available. It would also be useful to consider use of workgroup printers, which are less expensive and distribute the printing workload at the place closer to where it is used.

Workstations

Work stations from IBM in the IntelliStation series are available built around Intel Pentium 4 and AMD Opteron and running MS Windows XP.

Personal Computers

As noted, there are currently approximately 300 personal computers in use at the Port, consisting of IBM and HP PC's nearly all running the Microsoft XP Professional Operating System and Microsoft Office 2003. Fewer than 10 of these units run the older Windows 2000 and Windows 98 Operating Systems. It is recommended that these 10 PC's be upgraded and software upgraded to XP and Office 2003. Both IBM (Lenovo) and HP PC's are being used at the Port.

Handheld Computers (radio frequency handhelds and mobile units)

There is a current implementation ongoing at the Port using the Symbol handheld computers. If the Port is satisfied with this vendor and its products, then they should expand the radio frequency applications using Symbol products. The software recommended in section 1.6 works with Symbol products.

The Port considered Psion-Teklogix as an alternative, and determined that it was, in their opinion, a better solution except that Teklogix lacks support in Honduras. For this reason, it is not recommended that the Port implement a changeover to Teklogix. It is, however, recommended that the Port continue with their implementation of an expanded Symbol system.

At this time, the Port has enough handhelds either on-site or on-order to support their initial implementation.

Power Systems and Emergency Planning

As noted, the Port is out for bid for an Uninterruptible Power Supply (UPS). In addition to a UPS, there needs to be a decision about the whole power backup scheme. Is a generator needed? If a generator is provided, would sufficient fuel be available for several days of operation? What sort of battery backup is available? Is an automatic cutover switch needed? Is a power distribution unit needed?

In looking at UPS's and the power problem, three vendors were considered: American Power Company (APC), Eaton, and Liebert; there are a number of others, such as Tripp Lite of course. While a specific vendor is not recommended, it is advised that decisions be made on some of the following features to be incorporated in the UPS:

- Audible alarms
- Automatic self-test
- Intelligent battery management
- Status indicators
- Predictive failure notification
- automatic bypass switches
- generator compatibility
- hot swappable batteries
- power conditioning
- expansion capability

In an area as large as a seaport, a determination would need to be made about number and size of UPS units For instance, the units for the Computer Center, would be much larger, perhaps with a generator, than units for the gate or small offices. However, if the access units (PC's, handheld computers, network devices) are not also protected, it would be like putting money in the bank and not being able to get it out because the bank was closed. Not all devices would need to be protected continuously since in an emergency, certain units could be used for access while others could wait for power to be restored.

In addition to considering power outages, it is recommended that the port develop an emergency backup plan for other contingencies, such as hurricanes, fire, terrorist attacks, sabotage, and other unpredictable events. There are a number of vendors available to assist in this planning.

1.10 Performance guidelines or procedures for recommended software applications for each subsystem or functional system.

Terminal Operating System

The Terminal Operating System (TOS) should not be limited by volume since future expansion is expected. The Navis TOS has unlimited expansion capability. Tideworks products are also used in some of the other large container terminals. Some of the other software on the market is limited to fewer than one million TEU's, or has a limited installed base. The Port of Cortes handled close to half a million TEUs in 2004. However, container trades were forecast to grow over 3 percent per year. The TOS would need to be able handle these volumes.

The number of similar port installations around the world should also be used as a guideline as to the success of the TOS. Navis is installed and operational in many of the major container terminals around the world, including some of the largest. Although not as widely used as Navis, Tideworks is also installed in a large number of ports, including some major terminals.

Support for the TOS should be available for Honduras. Navis would support the implementation of their software in the Port of Cortes.

Financial Systems

The financial system should be able to support the volume expected in the Port. Today, there are about 600 bills per day that are prepared. A reasonable expansion of this volume can be expected in line with the forecasted growth in traffic. There do not appear to be any limitations of the SSA Global Financial and Human Resources software systems based on volume.

The payroll system must be capable of supporting a payroll system of 1,000 employees overall. This system must further be capable of running a weekly payroll of 100 employees and a biweekly payroll of 900 employees. The system must have the capability to further split the 900 employees into a 600 employee union payroll and a 300-employee executive/security payroll.

PC Software

Microsoft Windows XP Professional operating system and Microsoft Office are being used at the largest ports in the world. Given a powerful enough PC, there are no practical limitations on the performance of these software systems. Reliable performance of these systems would be based on planned backup procedures.

Microsoft Office 2003 Professional is the recommended PC application package for all Port users.

AutoCAD from Autodesk has proved to be an acceptable performer for small to large port engineering functions. It is reasonably priced and can perform the functions required for engineering planning and design.

1.11 Development of training program for system users for each subsystem or functional system

The training programs are recommended for Computer Department personnel, for users and for Port management.

1.11.1 Computer Center Training

The three major areas of training that will be required by Computer Department personnel would be for the IBM products, the Navis TOS, and the SSA Global Financial and Human Resources Systems.

IBM training. IBM offers three types of training for the computer professional. These consist of on-site training classes, IBM classroom training (at IBM sites), and distance learning courses. A complete listing of courses offered is available on IBM's training web site, www.ibm.com/training .

The most costly alternative is training at an IBM site, which also requires student travel and living expenses. The next type of training, on-site training, at the customer site incurs instructor travel and living expenses. The distance learning courses eliminate either student or instructor travel and living expenses. It should be noted that the courses offered at another site, for example by an instructor who could present a program in the Port of Cortés, would imply additional costs over those mentioned here, to cover travel and per diem or other costs, but would permit attendance at training by various specialists from ENP.

There are hundreds of courses offered by IBM. The following table illustrates a comparative example for two types of training for three of these courses, for public tuition in an IBM classroom or at a customer site, respectively:

IBM Course	Public Tuition per Student (USD)	Public Tuition for 14 students in IBM Classroom (USD)	On-site Class with IBM for up to 14 students (USD)
Universal Database Advanced Administration – 4 days	$1,795	$25,130 (plus student travel and living expenses)	$17,950 (plus instructor travel and living expenses)
Development Using WebSphere Studio – 5 days	$2,700	$37,800 (plus student travel and living expenses)	$26,995 (plus instructor travel and living expenses)
System Admin II – 5 days	$2,595	$34,930 (plus student travel and living expenses)	$23,950 (plus instructor travel and living expenses)

The next IBM table from the Web site gives examples of courses and pricing for classroom, shipped media, and online courses:

Course Title	Delivery Type	Course Code	Public Price (USD)
Backup and recovery media services/400 workshop	classroom	S6219	$2,385
Capacity planning for IBM eServer iSeries systems	classroom	S6295	$1,650
Disk pool, clustering design, implementation on IBM eServer iSeries - distance learning	classroom	AS540	$1,700
Introduction to IBM eServer iSeries systems for computer professionals	classroom	S6221 (details for this course are shown below)	$1,250
Workshop for iSeries access	classroom	S6172	$2,745
Advanced system iSeries	classroom	S6141	$1,595
Security concepts and implementation for iSeries	classroom	S6050	$995
Java for RPG programmers	classroom	S6184	$2,795
Linux on IBM eServer iSeries i5	classroom	AS560	$2,750
Introduction to iSeries and AS/400e for new users (DVL)	Shipped media	S08S1	$200

Workshop for advanced system operators Version 5 (DVL)	shipped media	S41S1	$690
System operator workshop for iSeries Version 5 (DVL)	shipped media	S29S1	$1,025
Introduction to iSeries for new users: getting started	online	S98W1	$60
Introduction to iSeries for new users: messages and commands	online	S98W2	$60
System management Part 1	online	S50A1	$60
System management Part 2	online	S51A1	$60
Web-enabling 5250 apps using the IBM webfacing tool (self-paced virtual class)	online	A85A2	$600
System operator workshop for iSeries Version 5	online	A24A2	$1,200

As an illustration of the type of information available on the Web about the courses, the following is a data sheet example for the one representative course. IBM provides these data sheets for each course listed on the Web site:

Course description: Introduction to IBM eServer iSeries Systems for Computer Professionals

► View schedule and enroll ► Add to my training plan

Interested in bringing a class to you? On-site training

Need to enroll more than one student? Multi-student classroom registration

Course code	**S6221**	**Skill level**	**Basic**
Duration	**3 days**	**Delivery type**	**Classroom**
Course type	**Public or private on-site**	**IACET credits**	**2.4**
Public price	**$1,250**		

Learn the fundamentals of the iSeries system. iSeries systems are a series of enterprise servers providing computing resources for advanced business and develop basic skills to use an iSeries system in a business environment.

Special note

IBM Education Advantage Program eligibility:

- Yes – IBM Education Pack – online account
- Yes – IBM Education Card
- Yes – IBM Corporate Education Pass

Audience

Computer professionals and consultants who wish to develop skills to use the iSeries system and who need to get hands-on experience on the iSeries platform.

Skills taught

- Utilize the iSeries value proposition in a business enterprise
- Define features and advantages of the iSeries architecture
- Incorporate basic iSeries operations and commands
- Comprehend concepts of iSeries security, backup and recovery, and printing
- Explain fundamentals of DB2 UDB for iSeries and the use of the integrated file system

iSeries work management, performance tuning, and capacity planning facilities

Course outline

- iSeries overview;: background, business success, value proposition
- iSeries architecture: integration of hardware and software features
- iSeries operations: sign-on, command organization, help and prompt facilities
- iSeries work management: work flow, resource allocation
- iSeries performance: resource management, timing and capacity planning
- iSeries database: interfaces, file structures, commands
- iSeries printing: using iSeries Spool Management
- iSeries security: iSeries facilities to secure access to iSeries objects
- iSeries problem management: IBM software support structure and methodology

Remarks

Course contact: RCHTSC@US.IBM.COM

Special note for IBM Business Partners authorized to remarket IBM IT Education Services public classes and on-site classes: This course is excluded from the IBM Technical Training Services for Public Education Program and the IBM Training Services for Enterprises- On-site Education Program for IBM Business Partners.

1.11.2 Application training for users

The most extensive training required at the Port will be in this area. Users need to be trained in the use of the financial and TOS systems. For new financial and TOS systems, it is recommended that on-site classroom training be considered because it can accommodate large groups of students and eliminates student travel and living expenses. It would require training classroom(s) at the Port or nearby community.

SSA Global Financial Training. The following table lists the courses which may be found on SSA Global's Web site, www.ssaglobal.com and clicking on "Learn more about education."

Course Description	Location	Duration	Cost Per Student (USD)
SSA FM 2.0 General Ledger	Chicago	3 days	$1,500
SSA FM 2.0 Accounts Payable	Chicago	1 day	$500
SSA FM 2.0 Fixed Assets	Chicago	2 days	$1,000

Navis Training

The detailed training plan is included in the total Navis installation plan. The training plan consists of 294 training hours.

1.11.3 Application training for management

It is important for management to be able to access planning and operational information in real-time without having to rely on technicians or batch reports. The new financial systems and TOS can be programmed to provide management with this capability, but they have to be trained in how to access these reports and information.

SSA Global Training for Management

Due to management time limitations, it is suggested that the Port have SSA Global set up two half-day sessions to familiarize management with the capabilities of the software.

Navis Training for Management

It is recommended that the Port request a course from Navis for management training. Due to limited management time, this course should consist of three half-day sessions, which give management an overview of information available in the system and methods of retrieval for this information.

Recommendation for Training Methodology

Based on cost examples shown above, it is recommended that on-site training be used at the Port supplemented by distance learning and self-paced training. In the case of IBM training, the offering is so extensive and complex, it is recommended that the Port contact the local IBM reseller, or access help on the web at www.ibm.com/training/ for IBM's recommendations on training.

1.12 Cost estimates and sources of supply for hardware, software, installation, and training for each subsystem or functional system

This section presents cost estimates for hardware, software, installation and training for each subsystem and functional system. Sources of supply, including contact information, are presented in Section 1.12.6.

1.12.1 Computer Hardware

SERVERS. IBM Web Prices are shown here for the options on the new server. IBM's Web site for this type of information can be found at www.ibm.com/eserver/iseries . The following table lists some of the options available to the Port:

IBM eServer iSeries					
MODEL	CLOCK RATE	SYSTEM MEMORY STD/MAX	INTERNAL STORAGE STD/MAX	PERFOR-MANCE (rPerf range)	STARTING PRICE (USD)
IBM System P5 520 Express	1.90GHz	1GB/32IGB	73.4GB/ 16.8TB	11.16	$11,896
IBM System p5 550 Express	1.90GHz	1GB/64GB	73.4GB/ 31.2TB	11.16/22.28	$15,484
IBM System p5 570 Model 9117-570A	1.50GHz	4GB	2x73.4GB		$24,927
IBM System p5 570 Model 9117-570B	1.5GHz	8GB	2x73.4GB		$35,290
IBM System p5 570 Model 9117-570C	1.5GHz	16GB	2x73.4GB		$70,662

DISK STORAGE. Disk prices for some storage options are shown in the table below. It is recommended that the Port consider the IBM TotalStorage DS4800 Midrange Disk System for primary use and the IBM 7210 External DVD-RAM Drive for convenience and supplemental use.

DISK PRODUCT	DESCRIPTION	IBM WEB PRICE (USD)
1815-82[a]	IBM TotalStorage DS4800 Model 82A	$53,995
1815-84[a]	IBM TotalStorage DS4800 Model 84A	$68,063
1815-88[a]	IBM TotalStorage DS4800 Model 88A	$108,000
1815-7711	DS4800 AIX host kit	$7,000
1710-10U	DS4000 EXP100 Storage Expansion Unit	$10,999
7210-030	IBM 7210 External DVD-RAM Drive	$1,500

PRINTERS. IBM's Web site for printer support is www.printers.ibm.com or they may be reached at 1-800-358-6661 for information on printers, both color and monochrome. The IBM Infoprint 6500 line printer offers printing speeds of 500 to 2,000 lines per minute (lpm), with speeds of 200 to 842 lpm in Near Letter Quality (NLQ) mode. The models and pricing for the IBM Infoprint 6500 line matrix printers is shown in the table below:

MODEL	Max. speed Fast draft mode (lpm(	Max. speed NLQ mode (lpm)	PURCHASE PRICE (USD)	MONTHLY MAINT. (USD/month)
v5p	500	200	$5,375	$94
v10	1500	400	$8,695	$115
v20	2000	842	$15,600	$199

Workgroup printers are smaller and less expensive than the high-speed line printer discussed above. An example of a workgroup printer is shown below for the IBM Infoprint 1512 Model. It can be seen that the cost of such a device is dependent on the features purchased with the unit. The IBM Infoprint 1512 is a 30 pages per minute (ppm), monochrome laser, entry-level workgroup printer with pricing as follows:

MACHINE TYPE	MODEL	FEATURE NUMBER	PART NUMBER	DESC.	LIST PRICE (USD)
4535	**N01**		**39V0432**	Infoprint 1512 n NA (LV)	$540
		4502	**39V0514**	550 Sheet Drawer	212
		4364	**53P7604**	64MB Memory DIMM	580
		4038	**75P4691**	32MB Flash Memory	439
		4164	**28P1840**	Ethernet 10/100BaseY X-3 port	380
		4180	**28P1871**	10 ft. Parallel Cable	26
		4193	**75P6857**	Wireless to Ethernet	265
		4171	**75P5449**	USB to Ethernet	137

A broad range of black and white and color laser printers is available from Hewlett-Packard (HP). Representative black and white models include HP Laser Jet 2400 at 30 ppm, HP Laser Jet 2240n at 40 ppm and HP Laser Jet 4250 at 45 ppm. Prices for these models range from $549 to 899. Representative color models include HP Color Laser Jet 3550 at 16 ppm and HP Color Laser Jet 3000 at 30 ppm; prices for these models range from $599 to 1,199. Detailed information for Hewlett-Packard products is available on www.hp.com.

WORKSTATIONS. Workstation options with pricing are shown in the table below. Although the higher priced options are shown, it is not anticipated that these higher priced units will be used unless the Engineering Department has a need for this type of processing power.

WORKSTATION DESC.	DETAILS	IBM WEB PRICE (USD)
IntelliStation M Pro 622540U	3GHz Intel Pentium 4 Windows XP Professional Memory 512MB	$1,175

IntelliStation M Pro 621810U	3GHz Intel Pentium 4 Windows XP Professional Memory 1GB	$1,399
IntelliStation M Pro 621820U	3,2GHz Intel Pentium 4 Windows XP Professional Memory 1GB	$1,465
IntelliStation A Pro 621746U	2.8GHz AMD Opteron Windows XP Professional Memory 4GB	$8,819
IntelliStation A Pro 621768U	2.2GHz AMD Opteron Windows XP Professional Memory 4GB	$9,739
IntelliStation A Pro 621738U	2.6GHz AMD Opteron Windows XP Professional	$11,779

PERSONAL COMPUTERS. The table below shows pricing on selected desktop personal computers in the Hewlett-Packard, Dell and Lenovo product lines. The table illustrates the range of starting prices and features, but is not intended as a comparison of brands.

VENDOR/MODEL	DESCRIPTION	STARTING PRICE (USD)
Hewlett-Packard		
HP Compaq 2000 Series	Low price business PC family	$379
HP Compaq 5000 Series	HP mainstream business PC family	$499
HP Compaq 7000 Series	Secure and serviceable with advanced features	$849
Dell		
Dell Dimension 1100	2.53GHz Intel CeleronD,256 MB, 80GB,CD-ROM	$379
Lenovo		
ThinkCentre 9215A1U	2.66GHz Intel Celeron, 256MB,40GB,CD-ROM	$449
ThinkCentre 8131CBU	A51, 2.53GHz,256MB,40GB,CD-ROM	$538
ThinkCentre 8131CBU	A51,2.53GHz,256MB,40GB,DVD-ROM	$568

1.12.2 Software

IBM AIX Operating System

MODEL	PROCESSOR GROUP	ONE TIME CHARGE (USD)
eServer i5 520	**E5**	**$430**
eServer i5 550	**E5**	**$430**
eServer i5 570	**F5**	**$1,225**

Terminal Operating System (NAVIS)

The estimated cost for a Terminal Operating System (TOS) depends on features, performance and capabilities. An estimated cost for a NAVIS system with the principal features required for the Port of Cortes, to include Navis SPARCS, Express and WebAccess and required modules, would be $1,500,000 license fee, with an annual maintenance cost of $300,000. The estimated cost for installation and training would be $430,000. Additional details are provided in Appendix G.

Financial Systems

The prices of Financial and Human Resources Systems from SSA Global were not available to DMJM Harris, but may be available directly to the customer.

Personal Computer Software

AutoCAD. The following table shows some of the AutoCAD prices from Autodesk. The Web site for Autodesk is www.autodesk.com and the product site is www.estore.autodesk.com . Information on resellers for Latin America is also available on the estore Web site.

DESCRIPTION	PRICE (USD)	DESCRIPTION	PRICE (USD)
AutoCAD 2006	$3,750	**Autodesk Raster Design 2006**	$1.695
Autodesk Architectural Desktop 2006	$4,695	**Autodesk VIZ 2006**	$1,995
Autodesk Combustion 4 for Windows	$995	**Autodesk Survey 2006**	$995

1.12.3 Installation

Conversion Methodology

Conversion and upgrade of computer hardware and software can be either complex or simple. In the case of the Port of Cortes, the hardware upgrade should be fairly straight forward if the Port stays with IBM, which is recommended. If there were enough room in the existing computer facility, bringing in new servers, disk drives, and printers would be simple. Therefore, it is assumed that space and accommodation for new hardware will not be difficult.

However, adding the AIX (IBM's version of UNIX) Operating System will require additional training.

Hardware

All hardware will be installed in existing office facilities and it is not expected that space will be a problem. However, there may be a requirement for additional power and air conditioning in the Computer Center for servers, disks, and printers. IBM can advise the Port of these requirements.

Software

Three major software vendors will be involved in software installation. These are the operating systems vendor (IBM), the Terminal Operating System Vendor (e.g., Navis), and the financial management and human resources vendor (SSA Global). Costs for on-site support during installation of these major software systems would need to be negotiated at the time software is selected and ordered although it was estimated that the TOS would involve installation charges of approximately $430,000 plus travel and per diem for installers. Navis has provided an estimate of their installation support costs shown in Appendix G.

Network Components

Since the Port already has a contract in place for network expansion, no attempt was made to suggest alternate vendor solutions. ENP management indicated their satisfaction with the current vendor and, accordingly, should stay with that service. However, it is recommended that network capacity and security be upgraded.

1.12.4 Training.

This section summarizes the cost of training for those areas covered in Section 1.11.

Computer Center training

This section addresses training for Computer Department personnel in the operation and maintenance of computer hardware and the AIX Operating System. There is not a requirement for other user training here.

There is a need, however, to provide training to Computer Department personnel in the installation, operation, and maintenance of the Navis and SSA Global Software.

Recommended training for Computer Department personnel is recommended as one week each for server, operating system, Navis, and SSA Global. The schedule for this training is shown in the spreadsheet in Section 1.13.

Application training for users

Financial Management and Human Resources Systems (SSA Global)
Section 1.11 shows three courses available from SSA Global consisting of six days for the Financial Systems. The cost of training in these packages is $500 per day per student in Chicago, or $3000 per student per course not including travel and per diem. It is recommended that the Port negotiate with SSA Global for on site training in these areas, primarily for the Accounting Department.

At the present time, SSA Global has no human resources courses scheduled. The Port should negotiate an on site contract for the training of Human Resources Department personnel.

Terminal Operating System (Navis)

The training cost for the Terminal Operating System (TOS) is estimated at $44,100 which is included as part of the Navis installation. Please see Appendix G for details of the plan.

Application training for management

Management needs to know what the terminal operating system, the financial systems, and the human resources systems are capable of doing and how to retrieve either on-line information or predefined reports from these systems. It is recommended that five half day sessions be conducted (Navis – 3; SSA Global – 2) for this orientation. The Port should negotiate this training with each respective vendor as an on site offering for management.

1.12.5 Cost Estimates Summary

The table below summarizes the prices of the principal IT hardware, software, installation and training for the various systems considered. Many of the systems are available in a range of prices, depending on included components and performance specifications. In addition, for various items, multiple units are expected to be required. For instance, in the case of PCs, with an installed base of 180 PCs, assuming a service life of 5 years, replacement of approximately 36 units per year on average could be expected, in addition to any expansion of the number of units in service; thus, a price of $849 per PC on average for 36 units would lead to a total annual amount for replacement of approximately $30,000.

TABLE: SUMMARY OF HARDWARE, SOFTWARE, INSTALLATION AND TRAINING COSTS

ITEM	TYPE	UNITS (Budget)	ESTIMATED PRICE RANGE (USD) LOW	HIGH	AVERAGE	AMOUNT
Server (s)	IBM eServer iSeries P5 570 Server	1	$11,896	$70,672	$41,000	$41,000
Disk systems	IBM DS4800 Midrange Disk System	1	53,885	127,500	$90,000	$90,000
Line printers	IBM Infoprint 6500 Line Printer	2	5,375	15,600	$10,000	$20,000
Laser printers	IBM Infoprint 1512 Workgroup Printer or comparable HP Laser Jet	10	540	2,500	$1,000	$10,000
Work stations	IBM IntelliStations	8	1,175	11,779	$6,000	$48,000
Personal computers	HP Compaq, Dell or Lenovo	30	449	849	$0	$0
Server operating system	IBM AIX Operating System	2	430	1,225	$0	$0
Terminal Operating System (TOS)	Navis Terminal Operating System	1		1,500,000	$1,500,000	$1,500,000
Maintenance for TOS	Navis Annual Maintenance (first year cost)	1		300,000	$300,000	$300,000
Installation and training for TOS	Navis Installation and Training (initial cost)	1		430,000	$430,000	$430,000
CAD	AutoCAD Engineering Software	8	1,695	4,695	$3,000	$24,000
Financial management software	SSA Finance	NA			NA	NA
Human resources software	SSA People	NA			NA	NA
Financial Management and HR	SSA Global Training	10	3,000	6,000	$4,000	$40,000
UPS	APC. Tripp Lite, Eaton, Liebert	NA			NA	NA
Total						$2,503,000

1.12.6 Sources of Supply

Sources of supply for IT systems are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

1.12.6.1 Computer Hardware

Supplier: **Dell Inc.**
Dell Latin America
Address: One Dell Way
Round Rock, Texas 78682
USA
Telephone: 1-512-728-4379 / 1-800-433-9014 (toll free in USA);
1-512-723-0020; 800-0123 ask for 866-686-9848 (toll free in Honduras)
Fax: NA
E-mail: NA
Contact: Customer Service

Web: http://www.dell.com

Supplier: **Hewlett-Packard (Latin America)**
Address: Waterford Building, 9th Floor
5200 Blue Lagoon Drive
Miami, FL 33126
USA
Telephone: 1-305-267-4220
Fax: 1-305-265-5550
E-mail: NA
Contact: Customer Service
Web: http://www.hp.com

Supplier: **IBM Corporation**
Address: 1133 Westchester Avenue
White Plains, NY 10604
USA
Telephone: 1-800-426-4968 (toll free in USA)
Fax: NA
E-mail: NA
Contact: Customer Service
Web: http://www.ibm.com/products/us

Supplier: **Psion Teklogix**
Address: 1810 Airport Exchange Blvd., Suite 500
Erlanger, KY 41018
USA
Telephone: 1-800-322-3437 (toll free in USA)
Fax: NA
E-mail: NA
Contact: Customer Service
Web: http://www.psionteklogix.com

Supplier: **Symbol Technologies, Inc**
Address: Latin America Headquarters
2730 University Drive
Coral Springs, FL 33065
USA
Telephone: 1-954-255-2610
Fax: 1-954-340-9454
E-mail: NA
Contact: Customer Service
Web: http://www.symbol.com

1.12.6.2 Software

1.12.6.2.1 Financial Software

Supplier: **Microsoft Great Plains Business Solutions**
Address: One Lone Tree Road
Fargo, ND 58104-3911
USA
Telephone: NA

Fax: NA
E-mail: NA
Contact: NA
Web: http://www.microsoft.com

Supplier: **Oracle Corp**
Address: 500 Oracle Parkway
Redwood Shores, CA 94065
USA
Telephone: 1-650-506-7000, 1-800-672-2531 (Toll free in USA)
800-0123 then ask for 1-888-900-6500 (Toll free in Honduras)
Fax: 1-650-506-7200 800-ORACLE1 (Toll free in USA)
Fax: NA
E-mail: preguntas_ww@oracle.com
Contact: Sales / Ventas
Web: http://www.oracle.com

Note: J.D. Edwards and PeopleSoft were acquired by Oracle; information on these product lines is also available from Oracle

Supplier: **Lawson Software**
Address: 380 St. Peter Street
St. Paul, MN 55102-1302
USA
Telephone: 1-651-767-7000
Fax:
E-mail: nick.buse@lawson.com
Contact: Nick Buse
Web: http://www.lawson.com

Supplier: **Softbrands**
Address: Two Meridian Crossings, Suite 800
Minneapolis, MN 55423
USA
Telephone: 1-612-851-1500
Fax: 1-612-851-1560
E-mail: info@softbrands.com
Contact: Sales
Web: http://www.softbrands.com

Supplier: **SSA Global**
Address: 500 West Madison Street, Suite 1600
Chicago, Illinois 60661
USA
Telephone: 1-312-258-6000
Fax: 1-312-474-7500
E-mail: support@ssaglobal.com
Contact:
Web: http://www.ssaglobal.com

1.12.6.2.2 Terminal Operating Systems Software

Supplier: Navis LLC

Address:	1000 Broadway, Suite 150 Oakland, CA 94607 USA
Telephone:	1-510-267-5000
Fax:	1-510-267-5100
E-mail:	Mbardi@navis.com
Contact:	Martin Bardi
Web:	http://www.navis.com/home.jsp

Supplier:	**Tideworks Technology**
Address:	1129 SW Klickitat Way Seattle, WA 98134 USA
	Tideworks Technology — Central/South America Torre Edison Plaza Via Ricardo J. Alfaro y Calle 10, El Paical Panama, Republic of Panama
Telephone:	1-206-654-3640 (Washington state), 1-206-382-4470, 507-321-7027 (Panama)
Fax:	1-206-382-0443 (Washington state), 1-206-382-0443 507-430-9839 (Panama)
E-mail:	sales@tideworks.com
Contact:	Sales
Web:	http://www.tideworks.com

Supplier:	**Embarcadero Systems Corporation**
Address:	1701 Harbor Bay Parkway Alameda, CA 94502 USA
Telephone:	1-510-749-7400, 1-866-ESC-0088 (1-866-372-088) (toll free in USA)
Fax:	1-510-749-3800
E-mail:	info@esystem.com
Contact:	Sales
Web:	http://www.embarcaderosystems.com

Supplier:	**Maher Terminal Logistics Systems, Inc.**
Address:	Four Connell Drive Berkeley Heights, NJ 07922 USA
Telephone:	1-908-665-2100
Fax:	1-908-790-5678
E-mail:	Coleman@mtls.com
Contact:	George E. Coleman, Director of Worldwide Marketing
Web:	http://www.mtls.com

1.12.6.3 Power Systems

Supplier: **American Power Conversion Corp. (APC)**
Address: 1332 Fairgrounds Road
W. Kingston, RI 02892

Regional office for Honduras:
5301 Blue Lagoon Dr Suite 610
Miami, Florida 33126
USA

Telephone: 1-305-266-5005 x202 (Florida); 1-877-272-2722
Fax: NA
E-mail: NA
Contact: Sales
Web: http://www.apc.com

Supplier: **Eaton Corporation**
Address: Eaton Center
1111 Superior Avenue
Cleveland, OH 44114-2584
USA
Telephone: 1-216-523-4400; 1-800-386-1911 (toll free from USA)
Fax:
E-mail: customer@eaton.com
Contact: Customer Service
Web: http://www.eaton.com

Supplier: **Liebert Corporation**
Address: 1050 Dearborn Drive
Columbus, Ohio 43085
USA
Telephone: 1-614-888-0246
Fax: 1-614-841-6022
E-mail: info@liebert.com
Contact: Sales
Web: http://www.liebert.com

Supplier: **Tripp Lite**
Address: 1111 W. 35th Street
Chicago, IL 60609 USA
Telephone: 1-773-869-1234, 1-773-869-1111
Fax: 1-773-869-1177, 1-773-869-1329
E-mail: NA
Contact: Support Specialist
Web: http://www.tripplite.com

1.13 Project schedule of the recommended installations for each subsystem or functional system

The figure shows a the schedule over a 6-month period for installation and training regarding a new server, operating system, terminal operating system, human resources and financial management software. The schedule does not include the time required for vendor review and procurement procedures. In addition, it should be noted that the acquisition of work stations, personal computers and other equipment is an ongoing process.

SCHEDULE FOR TRAINING, AND HARDWARE / SOFTWARE INSTALLATION

	During Month 1	During Month 2	During Month 3	During Month 4	During Month 5	During Month 6
TRAINING						
Computer Center Personnel						
IBM Server Training	■					
IBM AIX Training	■					
Navis			■	■	■	■
SSA Global		■				
Application Training for Users						
TOS - Navis for Operations Users			■	■	■	■
SSA Global Finance for Accounting			■			
SSA Global HR for Human Resources				■		
Application Training for Management						
Navis (3 half days)						■
SSA Global (2 half days)						■
HARDWARE INSTALLATION						
Host Computer Server	■					
Front End Servers		■				
Personal Computers	■					
SOFTWARE INSTALLATION						
AIX	■					
Terminal Operating System			■	■	■	■
Financial and HR Systems		■				
AutoCAD	■					

2 EVALUATION OF MAINTENANCE AND REPAIR PROCEDURES

2.0 Introduction

DMJM Harris has prepared the final report providing evaluations, conclusions and recommendations. Previously, interim reports were submitted including alternatives for consideration by ENP. After consideration and review of the interim submittals by the Client, DMJM Harris has developed final recommendations. This report covers the evaluation of the condition of the equipment and the maintenance facilities, including operations and spare parts control, presentation of alternatives for rationalization and centralization of facilities and operations, a training program, cost estimates and project schedule

This report is based on a site visit and survey of the Port of Cortes (ENP) institutional, administrative, and managerial areas and an evaluation of equipment and infrastructure conducted by DMJM Harris maintenance expert, Mr. Glenn Lindholm, in July 2005 with assistance from Mr. Jose Sandoval of Saybe y Asociados, a follow up visit to go over the interim findings and update information in November 2005 and delivery of the draft final report in August 2006, followed by a meeting and presentation in January 2007 to review Client comments.. The information thus gathered was analyzed and the report written by DMJM Harris maintenance expert, Mr. Dave Rudolf together with Mr. Lindholm.

As trade volumes increase and the investment in complex equipment required to handle these volumes continues to grow, particularly for developing ports, port managers are challenged to provide continuous, timely and efficient maintenance. A port's equipment and infrastructure have to be kept in a condition so that it is readily available when needed by the operations staff. Inability to meet these demands results in poor service, delays, increased charges, and frustration leading to major economic costs.

The following specific areas that have a marked effect on maintenance and material condition of port facilities and equipment were examined:

- Government and institutional policy considerations;
- Maintenance strategy and objectives;
- Maintenance policy and fleet management;
- Equipment inventory and condition;
- Maintenance department organization;
- In-house or outside contracting;
- Maintenance management programs;
- Maintenance facilities; and
- Material supply and control.

In each category, an evaluation was made of the existing conditions pertinent to maintenance, problems were identified, their causes were examined, and recommendations were prepared to improve maintenance procedures and systems.

2.1 Review and evaluation of the maintenance organization and procedures, including spare parts controls, of vehicles, cargo handling equipment, and boats

Policy and planning

Long range planning: Long range planning at ENP was found in general to be not much more than one year, despite the fact that some individual projects such as the expansion of Berth 6 have been in the planning stages for some time. In the port and terminal industry five year plans covering traffic, revenue, operating costs, capital costs, etc., are typically prepared and submitted to government or other higher authority above the port management for approval.

Expenditure controls: As ENP is a government-owned enterprise, the procurement of equipment and parts at the Port is subject to expenditure controls by the Honduran government. The purchase of any material in excess of Honduran Lempiras (HNL) 30,000 (US Dollar (USD) 1,590) must be approved by the country's ministers. In contrast, in a major U.S. port, the Director of Engineering and Maintenance had the authority to purchase any item of material (within standard procurement guidelines which required at least 3 bids or quotations) up to USD 2,500. The controls imposed by the Honduran government result in excessive delays in repair of equipment and require excessive investment in spare parts inventory.

Capital equipment: Funding of major equipment, a line item in the port's budget is determined by suggestions of the Minister of Finance. The most recent capital equipment line item was quoted as about USD 60,000, wholly inadequate for even a smaller developing port. A memo from the Port's maintenance department proposed purchases of equipment valued at USD 6,895,000 in 2005. The capital equipment plan at a major U.S. port could run from USD 3,000,000 to 10,000,000. Most U.S. ports have the ability to issue bonds for long term capital uses. ENP cannot issue bonds and must fund capital from revenues.

Employment policies: Management positions at ENP are politically sponsored. This tends to limit longevity and dilutes corporate memory in the management of maintenance. Since the government terms are four years, the ENP management personnel are likely to be replaced on this 4-year cycle. Not only does this inhibit upward mobility but the learning curve must restart with every change of management.

Maintenance records and management systems: There were no records of demand availability/downtime or maintenance efficiency available at the time of the survey. Demand availability is defined as {working hours/ (working hours minus (-) maintenance hours while working)}. This can also be expressed as downtime which is merely the time equipment is out of commission as a result of mechanical/electrical failure divided by operating time or 100% minus (-) Demand Availability. Maintenance efficiency is defined as {working hours/ (working hours plus (+) maintenance hours while working plus (+) maintenance hours while not working)}. These are very important to measure the effectiveness of maintenance and to judge the trend of performance of maintenance personnel. Maintenance records facilitate keeping the appropriate records that will allow continuing compilation and calculation of demand availability and maintenance efficiency.

Equipment

Equipment availability: General equipment availability was as follows at the time of the site visit in July 2005:

Table 2-1a. Major Equipment Availability as of July 2005

Equipment type	# in inventory	(3)Serviceable	(4)Under maintenance	Available (3)-(4)	% Available
Ship-to-Shore (STS) cranes	2	2	0	2	100%
Straddle Carrier	10	6	2	4	40%
Yard tractors	47	47	15	32	68%
Forklift Trucks (FLTs)	38	38	8	30	78%
Chassis	42	42	6	36	85%
Mobile cranes	1	1	0	1	100%
Boats	3	3	1	1	33%

Table 2-1a is a snapshot as of the date of the survey in July 2005.

Table 2-1b: Major Equipment Availability as of August 1, 2006

Equipment type	# in inventory	Operational	Not operational	% Operational
Ship-to-Shore (STS) cranes	2	1	1	50%
Straddle Carrier	10	4	6	40%
Yard tractors	57	40	17	70%
Forklift Trucks (FLTs)	55	30	25	78%
Chassis	62	52	10	85%
Mobile cranes	6	3	3	100%

At the meeting in January 2007, an updated snapshot of major equipment availability as of August 1, 2007, was obtained. It should be noted that the information is limited to the operational or non-operational condition of the equipment at a single point in time. Particularly for equipment where there is a limited number of units, such as the ship-to-shore cranes, it would be important to review equipment status over a period of time. It cannot be determined from a single report what the overall availability was for the ship-to-shore cranes. In addition, it should be noted that subsequently, according to information in January 2007, the fleet of straddle carriers has been increased to 14.

A maintenance goal should be to have a 90% availability for all miscellaneous equipment except for Ship-to-Shore (STS) cranes which should be 100%. The straddle carrier availability of only 40% is especially unsatisfactory. .

Equipment replacement and fleet management: Table 2-2 is a partial list of some of the major equipment in the ENP inventory. For purposes of this report, only STS cranes, straddle carriers, and yard tractors are listed. It is important for replacement and, hence, capital budget purposes to have an up to date listing of all equipment with the associated age, hours and costs since, as equipment ages, there is a trend of increasing costs.

Table 2-2. Partial Equipment Inventory Listing

Inv. No.	Equipment	Manufacturer	Year Purchased	Age	Oper Hours	Oper Cost	Maint Cost	Total Cost
1	STS	Paceco	1976	29				
2	STS	Paceco España	1994	11				
1	Straddle Carrier	FEL	1993	12				
2	Straddle Carrier	FEL	1993	12				
3	Straddle Carrier	FEL	1993	12				
4	Straddle Carrier	FEL	1997	8				
5	Straddle Carrier	FEL	1997	8				
6	Straddle Carrier	FEL	1997	8				
7	Straddle Carrier	Nelcon	1985	10				
8	Straddle Carrier	Nelcon	1985	10				
9	Straddle Carrier	Nelcon	1999	6				
10	Straddle Carrier	Nelcon	1999	6				
	Yard Tractor	Kalmar	2005	New				
	Yard Tractor	Kalmar	2005	New				
71-3	Yard Tractor	Kalmar	2003	2				
72-1	Yard Tractor	Kalmar	2003	2				
73-9	Yard Tractor	Kalmar	2003	2				
74-1	Yard Tractor	Kalmar	2003	2				
49-9	Yard Tractor	Ottawa	1996	9				
50-7	Yard Tractor	Ottawa	1996	9				

51-5	Yard Tractor	Ottawa	1996	9
52-3	Yard Tractor	Ottawa	1996	9
53-1	Yard Tractor	Ottawa	1996	9
54-9	Yard Tractor	Ottawa	1996	9
55-1	Yard Tractor	Ottawa	1996	9
56-4	Yard Tractor	Ottawa	1996	9
57-2	Yard Tractor	Ottawa	1996	9
58-0	Yard Tractor	Ottawa	1996	9
59-0	Yard Tractor	Ottawa	1996	9
60-6	Yard Tractor	Ottawa	1996	9
61-4	Yard Tractor	Ottawa	1996	9
62-2	Yard Tractor	Ottawa	1996	9
63-0	Yard Tractor	Ottawa	1996	9
64-8	Yard Tractor	Ottawa	1996	9
65-5	Yard Tractor	Ottawa	1996	9
66-3	Yard Tractor	Ottawa	1996	9
67-1	Yard Tractor	Ottawa	1996	9
37-4	Yard Tractor	Capacity	1995	10
38-2	Yard Tractor	Capacity	1995	10
35-0	Yard Tractor	Capacity	1995	10
40-8	Yard Tractor	Capacity	1995	10
41-6	Yard Tractor	Capacity	1995	10
46-4	Yard Tractor	Capacity	1995	10
43-2	Yard Tractor	Capacity	1995	10
44-0	Yard Tractor	Capacity	1995	10
45-7	Yard Tractor	MAN	1995	10
46-5	Yard Tractor	MAN	1995	10
47-3	Yard Tractor	MAN	1995	10
48-1	Yard Tractor	MAN	1995	10
36-6	Yard Tractor	Capacity	1993	12
27-5	Yard Tractor	Capacity	1992	13
28-3	Yard Tractor	Capacity	1992	13
29-1	Yard Tractor	Capacity	1992	13
30-9	Yard Tractor	Capacity	1992	13
31-7	Yard Tractor	Capacity	1992	13
32-5	Yard Tractor	Capacity	1992	13
33-3	Yard Tractor	Capacity	1992	13
34-1	Yard Tractor	Capacity	1992	13
25-9	Yard Tractor	Ottawa	1990	15
26-7	Yard Tractor	Ottawa	1990	15

Operating hours and costs were not available at the time of the survey. It is important that ENP use such analysis including summaries of costs in determining their five year plan and annual budgets. Despite the In general yard tractors have a service life of about 10 years. The service life may be longer if the operating hours are substantially less than 20,000.

There are a number of points that the table emphasizes:

- About 50% of the yard tractors in the fleet were over 10 years of age when the site visits were carried out in 2005, although this situation has likely improved since 10 units have been added to the fleet according to the January 2007 numbers. While the operating hours of the equipment was not available, as equipment gets older, its maintenance costs increase and it becomes more cost effective to replace.
- There are four manufacturers of yard tractors in the fleet. As the number of manufacturers and models increases, the necessity for replacement parts increases. Additional repair training is also required to service several distinct brands or manufacturers.
- Although not listed in the table above there are some fork lift trucks that are 25 years old. Spare parts are almost impossible to get and repair costs are no doubt higher than replacement costs.

Equipment planning practices: As of the survey several areas of deficiency were found in the current equipment planning practice:

- Excessive government controls and interference delay and frustrate the planning function;
- Information systems are inadequate;
- A systematic replacement policy was lacking; and
- Reluctance and delays in disposing of obsolete or exhausted equipment have increased the maintenance burden.

Equipment procurement policy: The following purchasing guidelines for ENP severely restrict the procurement process resulting in delays for ordering and delivery of parts and materials. The inevitability of delays forces personnel making repairs to pigeonhole parts outside the inventory system resulting in bias to historical records for usage.

a. < 500 HNL (USD 26.50) – Able to direct purchase based on price and quality.
b. 500 HNL < but < 30,000 HNL (USD 1590) - Need two quotes, internal approval within ENP
c. 30,000 HNL < but < 100,000 HNL (USD 1,590 to 5,300)- Require three quotes, internal approval within ENP
d. > 100,000 HNL(USD 5,300) - Need government approval

Since the government ministers only meet every 3 weeks to two months and their approval is required for all purchases over Honduran Lempiras (HNL) >30,000, delays in receipt of parts are inevitable.

Ship-to-Shore Cranes (STS).

Fig. 2-1a STS crane

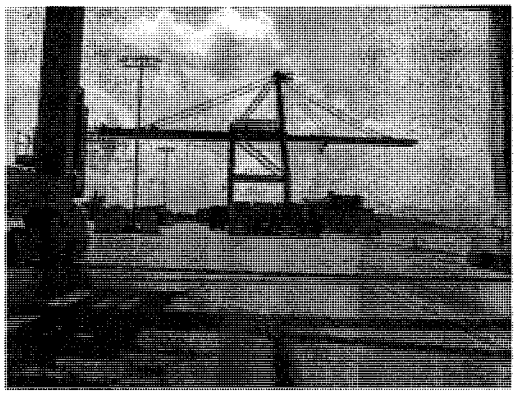


Fig. 2-1b STS crane

The Ship-to-Shore Cranes (STSs) seemed to be very well maintained. The machinery houses were clean and the electrical cabinets were dry with wiring well marked.

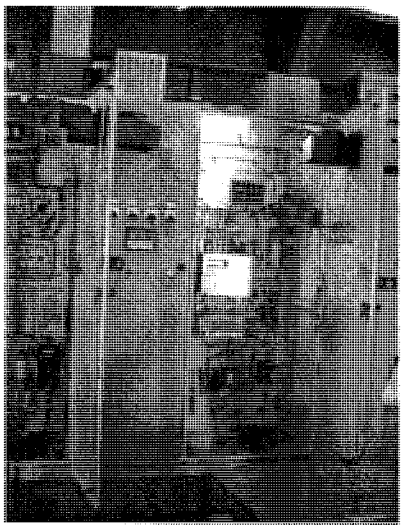


Fig. 2-1c Electrical cabinet in STS crane

There appeared to be sufficient mechanical and electrical parts to support routine corrective and preventive and corrective maintenance. There was only one spare spreader available for the Paceco España crane. Because of the headblock-to-spreader connection detail, it was noted in 2005 that it will fit only the newer Paceco crane.

Since 40% or more of all crane downtime is attributable to the spreader as a result of the shock and vibration that it experiences, it was recommended that a spare for each crane is critical. At the meeting in January 2007, it was noted that the Port had a 4 spreaders, 2 for the 2 cranes and 2 spares, and that modifications had been made to permit all to fit both cranes interchangeably.

During the survey it was noted that weight testing of the cranes was performed using containerized cargo. This is unsatisfactory since weight testing should be accomplished at a factor (100% or 125%) of the rated load of the crane.

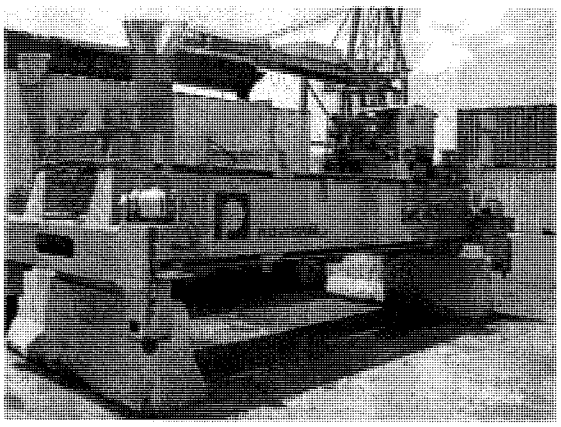


Fig. 2-1d Spare spreader for Paceco España STS crane

ENP leases one mobile harbor crane to supplement operation of the two STSs. As of January 2007, the Port was in the preparing to lease a second one. While this crane serves an excellent purpose, typically a mobile harbor crane is only 60 to 70% as productive as a standard STS.

Straddle Carriers. A straddle carrier, although not as large a ship-to-shore crane, can be just as complex to repair and maintain.

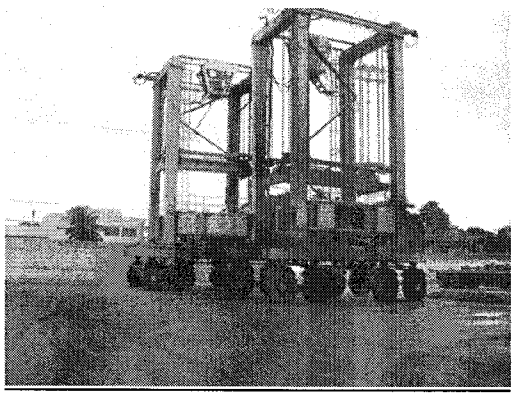


Fig. 2-2a Straddle carriers

Most of the older straddle carriers such as those in the ENP inventory as shown above use extensive hydraulics for hoist, travel, and spreader functions. Hydraulics require very tight tolerances to accommodate the high system pressures and leaks throughout the system at seal areas are a continual problem, not just for maintenance but for pollution of the terminal surfaces and ultimately the environment. The hydraulic leaks and the oil contamination of the terminal surface were obvious as can be seen from the tire tracks in Fig. 2-2a and in the puddles shown in Fig. 2-2b.

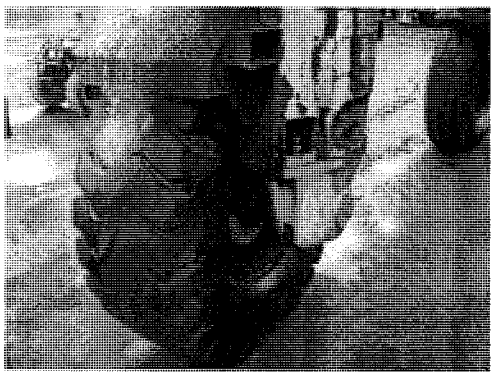


Fig. 2-2b Straddle carrier wheel

Testimony to the difficult maintenance of straddle carriers is the fact that four of the machines were out of commission without any prognosis for repair or estimate for restoration to operational condition.

Yard chassis: Many of the yard chassis can accommodate only 40-foot and 20-foot containers. However, by January 2007, the Port had acquired 20 cornerless units, which can accommodate 20, 40 and 45-ft. containers.

Disposal of retired equipment: There exist a number of retired, and in some cases cannibalized, pieces of equipment on the terminal. Some retired equipment is shown in Fig. 2-3. Retired equipment takes up space, the cannibalized parts are used and take too long to remove from the retired equipment.

Fig. 2-3. Retired equipment

Maintenance Department Organization

1. General: Fig. 2-4 shows the current ENP Maintenance Department Organization:

Mechanical Maintenance Organization

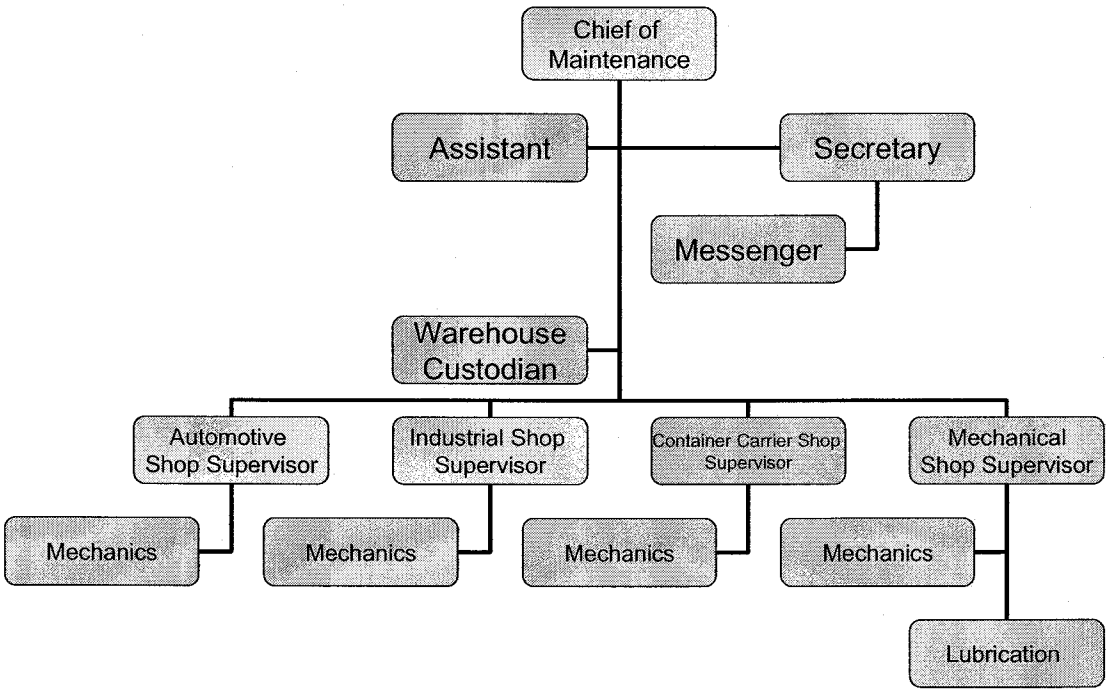


Fig. 2-4a. Mechanical Maintenance Department Organization Chart

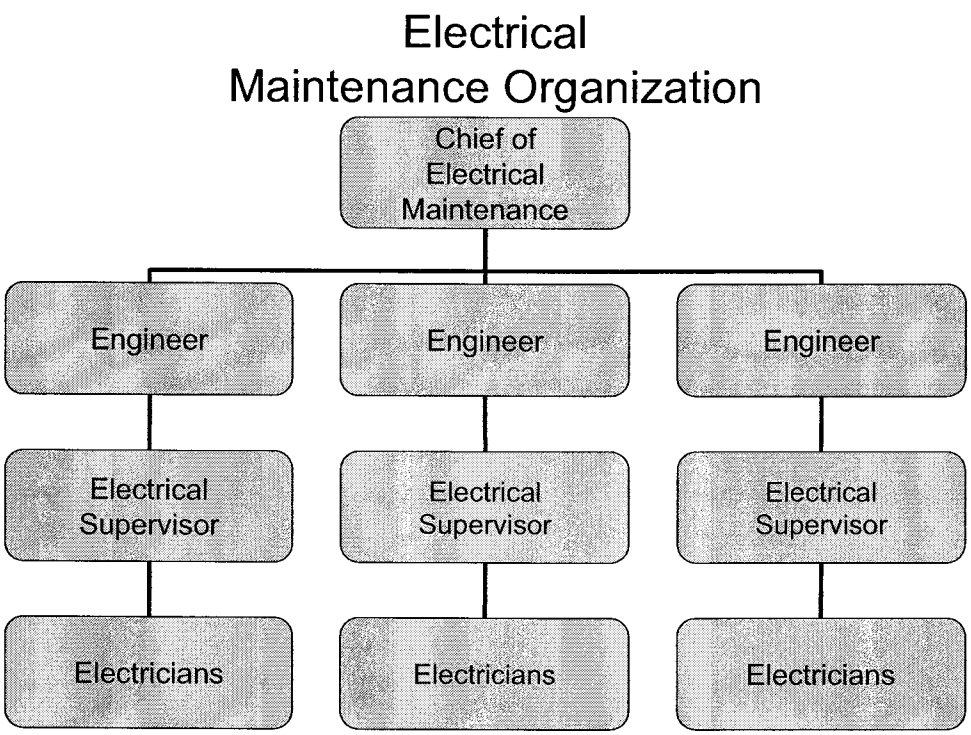


Fig. 2-4b Existing Electrical Maintenance Department Organization Chart

The evaluation of the maintenance organization showed it to be functioning well. However, having two mechanical shop supervisors seems to be excessive. Also the facilities maintenance function is under the Port Superintendent despite the fact that it is really a maintenance function.

Maintenance Management Systems

Current program: The objective of a maintenance management system is to achieve high reliability and maintenance efficiency coupled with low maintenance costs. In order to do this the independent variables, such as man-hours to complete a repairs, both preventive and corrective, parts replaced, costs of labor and materials, and work completed versus that scheduled, must be compiled. From this data indices must be developed which measure the control of these variables. The only viable way of doing this is through a computerized maintenance management system (CMMS).

ENP currently has a system called Maintrack, reported to be designed initially for housing cooperative and condominium maintenance, which is used exclusively for parts inventory and control. The Maintrack system was purchased in 1995 and has never been updated. A work order and preventive maintenance scheduling and tracking system is not in place at ENP but is planned for the near future.

Two of the key functions of maintenance management are now performed manually:
a. Work orders, a sample form as shown in Fig. 2-5; and
b. Preventive maintenance (PM) check sheets as shown in the example in Fig. 2-6.

Work order form

E.N.P. O/T DE MANTENIMIENTO AL DEPTO. DE:

No. DE ORDEN	NOMBRE DEPENDENCIA	COD. DEP. SOLICITANTE	AUTORIZADO POR:
FECHA DE EMISION	FECHA DE RECIBIDO	TIPO DE ACTIVO	No. DE CONTROL
EMITIDO POR:	RECIBIDO POR:	INVENTARIO	OTROS

DESCRIBA DEFICIENCIAS

OBSERVACIONES:

SOLICITUDES DE COMPRA Y COTIZACION			PROCESO DE LA ORDEN USO DE EQUIPO		
FECHA DE EMISION	No. DE CONTROL	EN BODEGA	No. INVENTARIO	HORAS	VALOR

CONTABILIDAD — REPORTE MANO DE OBRA Y MATERIALES

FECHA D. M. A.	MANO DE OB. Ficha No.	TIEMPO COD.	TIEMPO HORAS	NUMERO DE REQUISION	DEBITOS

RESPONSABLE	PROCESADO POR:	ORIGINAL: CONTABILIDAD COPIA 1: MANTENIMIENTO VERDE COPIA 2: SUPERVISION AMARILLO COPIA 3: SOLICITANTE AZUL
FECHA:	FECHA:	

80-64-0693-0

Fig. 2-5. Manual Work Order Form

250 Hour Service — Small Pm's

FEL

DUE – IN –
ACTUAL –

1. CAMBIAR ACEITE DE MOTORES (15W40)
2. CAMBIAR FILTRO DE ACEITE – BT 339
3. CAMBIAR FILTRO DE COMBUSTIBLE – FF 5018
4. CAMBIAR SEPERADOR DE AGUA – FS1280
5. CAMBIAR FILTRO DE AIRE – AF 490SM
6. CHECAR BANDAS DEL MOTOR
7. CAMBIAR COOLAT
8. CAMBIAR ACEITE DE TRANSMISIONES (10W)
9. CAMBIAR FILTRO DE TRANSMISIONES – 284530
10. CAMBIAR ACEITE REDUCTORES Y DIFERENCIALES (85W140 o 90)
11. CAMBIAR ACEITE DIFERENCIALES DE RODAMIENTO (85W140 o 90)
12. LUBRICAR CADENAS
13. LUBRICAR CONTRA PESOS — CHECK TORQUE TUBE
14. ENGRASAR PARTE ALTA DE LA UNIDAD Y CAMBIAR GRASSMATICS
15. ENGRASAR TIJERAS
16. CAMBIAR ACEITE DEL FRENOS DE LEVANTE (85W140 o 90)
17. CAMBIAR ACEITE DEL GATAS DE LEVANTE (85W140 o 90)
18. ENGRASAR PARTE BAJA DE LA UNIDAD
19. ENGRASAR EL SPREADER
20. LIMPIAR BATERIAS
21. CHECAR HOIST/LOWER LIMIT SWITCHES.
22. LIMPIAR VIDRIOS DE CABINA.
23. REVISAR LUZ DEL SPREADER
24. CHECK WHEEL NUTS AND TYRE PRESSURES

Fig. 2-6. Manual Preventive Maintenance Sheet

Not only have the PM check sheets been developed manually, but there is very little description on the sheet to assist the mechanic or technician in the details of performing the check. It is interesting to note the mix of Spanish and English in the manual PM check sheet. Further, there is no systematic means for follow-up work found in the course of performing the check. The scheduling of preventive maintenance is also being done manually, and there appears to be no formal system for handling backlogs of PM checks.

Under the current maintenance management scenario, it is virtually impossible to accurately determine equipment reliability, maintenance efficiency, and cost control at ENP. This inhibits establishment of objectives for management and supervision.

Material Supply and Control

1. Materials Acquisition: The most significant problem noted that is associated with the acquisition of materials is the length of time for the approval process. Table 2-3 lists the steps and the times in this process.

The minimum time to complete these steps is approximately 30 days. Although this may be satisfactory for stock replenishment if ordering is done based on proper reorder points, it is not satisfactory for ordering materials that are needed to complete corrective maintenance where parts are not on the shelf.

Table 2-3. Material Purchase Flow Chart

Item	Process	Description	Time
1	Preparation of a Purchase Order	The supervisors of the warehouse of the maintenance department prepare requisitions when the material or part is not available	10 min.
2	Signature of Chief of Department	The previously prepared requisition is carried to the chief for review and signature	2 min.
3	Signature of Superintendency	Once signed by the chief of department, it is sent for signature by the port superintendent	1 day
4	Signature of Supply Warehouse	When the requisition arrives at the department signed by the superintendent, it is sent to the supply warehouse for review and signature.	1 day
5	Receipt by General Services	Once with all the corresponding signatures, it is sent to S/G so that the chief of the division can send it to the pricers	1 day
6	Process of Quotation	The pricer goes to the different suppliers who sell materials or parts who are being solicited, in case of having he material the supplier presents his quote.	1 week
7	Review of Prices	Once the quotes are presented, the prices are reviewed, this work is handled by means of the Maintracker system which records the latest prices for different materials and parts which have been purchased.	2 days
8	General Review of Quotations	Once the prices have been reviewed, the quotes are reviewed to see if they have the seal of the company, the signature of who quoted, if the costs are ok, etc.	1 day
9	Preparation of Purchase Order	Once priced, reviewed, the purchase order is prepared.	10 min.
10	Review of Purchase Order	Afterwards, the POs are reviewed, if all the data is correct (tax, price, date etc.)	1 day
11	Signature of Chief of Purchasing	Once prepared, reviewed, the PO is signed by the Chief of Purchasing	1 day
12	Signature of Chief Service Division	Signed by the Chief of Purchasing, it is signed by the Chief of Division	1 day
13	Signature Auditing	Once it comes out of general services, it is sent to auditing for their review and signature	1 or 2 weeks
14	Signature Management	Signed by the auditor, it is sent to Management	2 days
15	Supplier	Once the Purchase Order has all the signatures, it is sent to the supplier to supply the product.	1 week

In-House or Contractor Maintenance

In House Maintenance: Over 90% of all repairs done at ENP are accomplished in-house. There are several advantages to this:

a. There are no transportation charges to the overhauling shop;
b. The Port is at the mercy of the workload and possible delays at the outside shop;
c. The Port is better able to monitor quality control on its own premises; and
d. The Port may be able to perform the work more economically at its own facility.

Contracted Maintenance: There are also some advantages to doing the work with an outside contractor and corresponding disadvantages to doing work in-house:

a. More specific skills may be available with an outside contractor;
b. More extensive facilities may be available with an outside contractor;
c. Because an outside contractor may do the work at a higher volume, it may cheaper than in-house work; and
d. The repair environment may be cleaner and more organized than in-house.

The only work that is done off-site at ENP is electric motor reconditioning and repairs plus a few motor and transmission overhauls.

Maintenance Facilities

Stock Bins and Locating System: The system for locating the parts seems to be working adequately. The Maintrack system "knows" the location, quantity and last price paid on the part.

The storage of the parts needs to be improved. Fig. 2-7 shows a typical parts storage shelf.

Fig. 2-7 Parts Storage Shelves

The parts are stored without adequate separation between parts. This tends to lead to commingling of

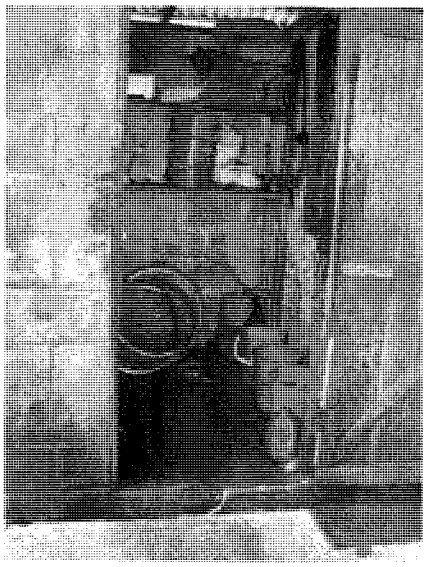
parts and difficulty in determining quantities available. Also the shelves are dusty and dirty.

Cycle Counts: Counting of parts to check quantities is routinely accomplished twice a year and seems to be working well.

Parts Room Security: Although the general storage parts room seems very secure, the satellite storerooms, while manned during the day, are easily accessible during off hours, resulting in a loss of accountability and a potential for pilferage.

Consumables: Consumables are not readily available. Nuts, bolts, and cleaning supplies are controlled. This may be because of pilferage. Controlling rather than pre-expending these materials for the most part adds considerable administrative time and cost to maintenance.

Lubricants: This area of material control requires the most Improvement. Figures 2-8a and b show local haphazard storage with poor categorization.



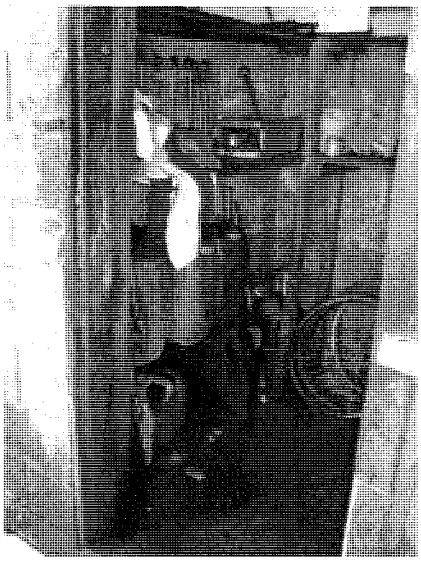


Fig. 2-8a. Lubricant storage closet **Fig. 2-8b. Lubricant storage closet**

Some lubricants were open and may have been contaminated with water and particulate matter as shown in Fig. 2-8a&b.

Fuel Storage: Although fuel is stored properly in above ground tanks, the curb stones around the pumps do not provide for containment of fuel spills and had gaps that would allow escape of the fuel to the terminal surface.

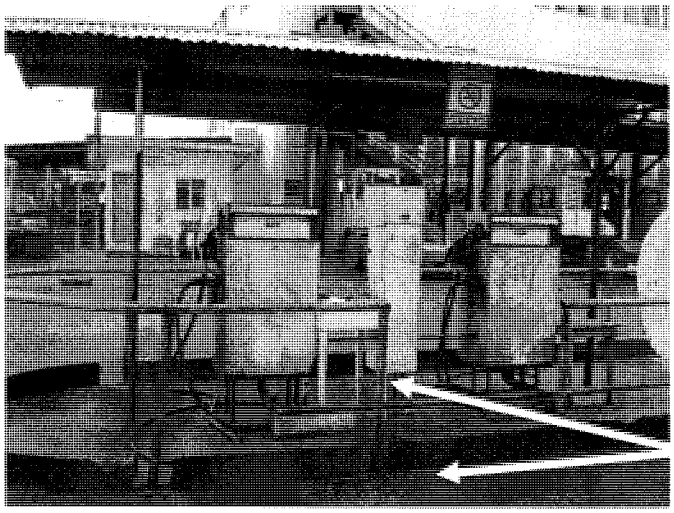


Fig. 2-9. Fuel pumps and above-ground storage

Oily Waste Disposal: Only one separator was in use on the terminal during the site visit in 2005. This separator, shown in Fig. 2-10, had no capability for diversion of rainwater. It was commented that this permitted spilling of oil during heavy rain conditions. Additional separators and better drainage were recommended. At the meeting in January 2007, it was noted that the Port has constructed 3 pits and was in the process of implementing the recommendations.

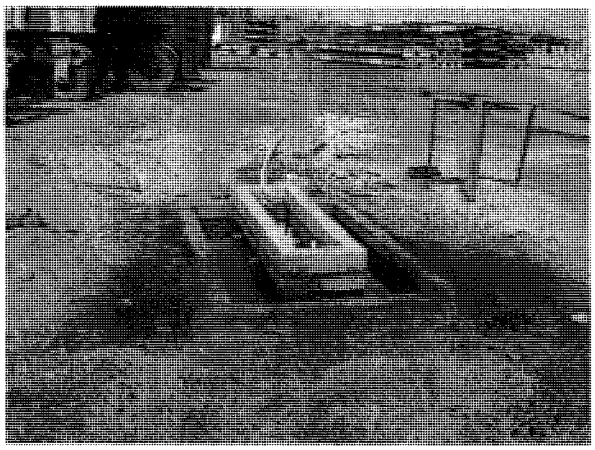


Fig. 2-10. Oil water separator

2.2 Recommendations to centralize, rationalize, and improve maintenance and spare parts facilities and operations

Policy and planning

Recommended policy: The government should stimulate the development of a port organization that effectively operates in a commercial manner emphasizing responsibility and accountability at the appropriate levels as a means to measure performance. Only if levels of performance can be identified and can be related to achievable goals can effectiveness be assessed.

Rolling five year plan: Since prediction of the plan components may be difficult to forecast, in the case of ENP it is recommended that a rolling five year plan be implemented where the first year of the plan is developed in detail and subsequent years developed with broader criteria so that the port can modify the plan as conditions change. Most ports use consultant assistance, an engineering firm with port planning and forecasting experience, in this process. Some firms that have the capability to assist in the long range planning process are DMJM Harris, Moffatt & Nichol, HPA and TranSystems. ENP would be the entity to engage such firms.

Purchasing approval: The approval levels for purchasing should be revised to allow more autonomy, however strict controls on the process should be enforced.

Employment policy: A change in policy to allow continuity and corporate memory should be considered.

Port objectives: Overall port objectives should be expressed quantitatively such as a percentage of return on fixed assets, volume of traffic to be handled, cost per ton of cargo, and/or cost per container handled. Our survey revealed no written or stated quantitative port objectives. These objectives are critical to establishing whether port management has sufficient resources to conduct its operations effectively.

Operations objectives: Although ENP seems to be striving to improve productivity and reduce accidents and injuries, there are no specific written or stated goals. Examples of operational goals that ENP should consider are:

- Minimize schedule delays to container vessels;
- Minimize truck or road vehicle turnaround times;
- Maximize gross container moves per hour on vessels; and
- Minimize waiting times for vessel access to a berth.

Reasonable numbers should be assigned and assessed periodically to provide incentives for those involved with operations and support functions. These goals are important because they have a direct impact on the goals which the maintenance department must achieve.

Maintenance objectives: Since the reliability of port equipment will support operational objectives ENP should set specific goals. Some recommended goals would be:

- Demand availability (Reliability) of Ship-to Shore (STS) cranes – 100%
- Demand availability of straddle carriers – 95%
- Maintenance efficiency – 75%
- Equipment availability – 90%

Purchasing guidelines: The following changes to the purchasing guidelines are recommended:

All purchases should require 3 quotations or bids by known or qualified suppliers except where sole source is dictated by the following:

Urgent operational requirement where revenue or customer service is at stake;
Only original equipment manufacturer part can be used; or
Only one supplier is known to stock or manufacture a specific part.

The following thresholds should apply:

a) Less than < HNL 50,000 (USD 2,650) - May be approved by the Maintenance Department Head;
b) HNL 50,000L to 300,000 (USD 2,650 to 21,900) - May be approved by the General Manager; and
c) Greater than > 300,000 (USD 21,900) or capital budget item – Must be approved by Minister of Finance and advertised to the public.

At the meeting in January 2007, concern was expressed about the potential for corruption inherent in increased budgetary and purchasing authority or reduction in the review process. It should be noted an increase in budgetary and purchasing authority must be accompanied by a system of requiring multiple bids, qualification of vendors and implementation of procurement safeguards, including documentation of bids, publication of solicitations, confidentiality of bidding information, evaluations according to defined criteria, written selections, notification of successful and unsuccessful bidders and of the basis for the decisions and policies for staff to minimize any opportunities for collusion.

Specifications: Detailed specifications are very important to the procurement process. The detail may vary in complexity depending on the monetary level of the purchase but should be provided regardless of the items to be purchased. It was found the specifications used by ENP to be too general in nature and not catalogued to allow repeated use for similar parts or standardization of procurement. There should be a concerted effort at fleet standardization. A non-standardized fleet requires a larger inventory of spare parts, resulting in more warehouse space being required. The chances of being out of stock increase and a substantial increase in investment in inventory is required. Although standardization does not guarantee 100% standardization of parts because of upgrades and model changes, the vast majority of parts remain common. Bid documents should contain requirements for maintenance and operating manuals as well as maintenance and operator training where required for new equipment.

Recommended Maintenance Department Organization

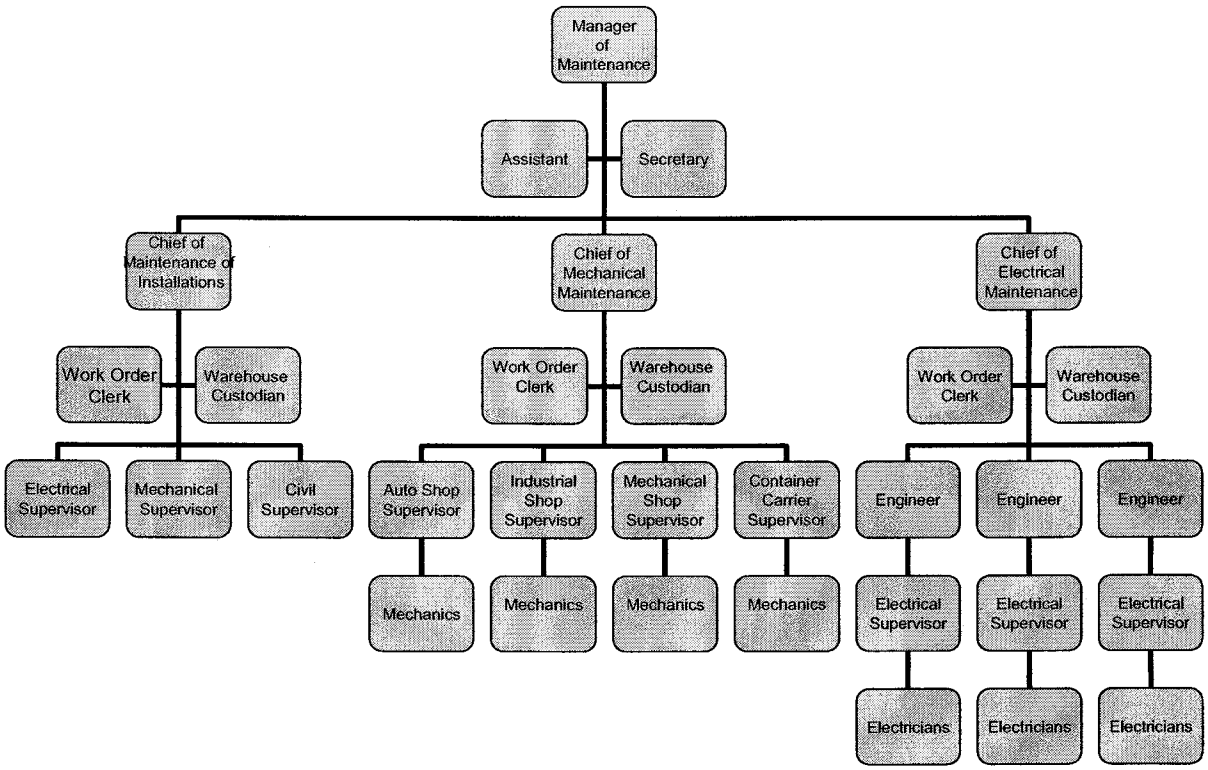


Fig. 2-11. Recommended Maintenance Department Organization Chart

Description of recommended changes to the ENP Maintenance Department Organization

1. The new organization in Figure 2-11 includes combining the two existing maintenance organizations, Mechanical in Figure 2-4a and the Electrical in Figure 2-4b under the control of a Maintenance Department Manager. The Civil Works Department should be relocated to the Maintenance Department from the Operations Department. The Civil Works Department is a maintenance function and therefore should be located within the maintenance organization. The Manager position is a new position within the ENP organization. The justification for the new position would be for direct supervision of all maintenance departments, preparation, submission and adherence to monetary budgets and responsibility for efficiencies of material handling equipment.
2. The changes within the Mechanical Maintenance organization would be the elimination of the Assistant position. The new Manager of Maintenance would assume some of the responsibilities of the present Chief of maintenance. The Secretary position is felt to be redundant. The Maintenance Managers secretary would handle any clerical duties. Under the Mechanical Shop Supervisor the position of Lubrication should be considered for deletion if an automated maintenance management system is implemented. The preventative maintenance (PM) work orders will delegate these duties to assigned mechanics.
3. All divisions, Mechanical, Electrical and Civil, will need to have Work Order/Data Entry Clerks to do the corrective maintenance work orders, print out the preventative maintenance work orders and enter data from completed work orders. These are extremely important positions. Much of the success of any CMMS systems will be determined by the actions of these individuals.

It is recommended that the number of Mechanical chiefs be reduced to one and that a Civil Works Chief position be created, directly under the Director of Maintenance as shown in the Revised Maintenance Department Organization, Fig. 2-11.

The Civil Works Chief would have various construction and cleaning trades under his supervision and would be responsible for maintenance of buildings, warehouses, grounds, terminal surfaces, general power distribution and environmental equipment such as oil/water separators.

Position descriptions: Accountability is the single most important factor to be considered when developing an organizational structure. It must apply to managers and supervisors as well as the skilled craftsmen or laborers. As the duties and responsibilities are assigned and placed at the various positions on the organization chart, each position must be defined to assign responsibilities and measure results. This is done through position descriptions. Position descriptions should be available for all management and hourly positions and should list the tasks to be performed, the percentage of the total time that each task is performed, and special conditions such as lifting heavy objects, working at heights, etc. Although the Human Resources Department said that these were available, it was not possible to obtain these during the site visit for this study.

Employee manual: This is essential for each non-union employee to read and become familiar with an employee manual, so that they understand company policy and programs that apply to them. It should describe the following:

i. Working hours
ii. Benefit programs
iii. Overtime
iv. Disciplinary infractions and penalties
v. Behavior standards
vi. Retirement
vii. Performance standards and evaluations
viii. Training programs
ix. Safety
x. New employee indoctrination

There was no employee manual available during the survey for this study. ENP should begin developing one so that employees have a complete understanding of company policy. It is too easy to make up policy as time goes on. To be fair and equitable to employees, it should be standardized and in writing.

Performance evaluations: One of the basic objectives we expect from an organization is good performance. The manager or supervisor needs to ask: How good is performance? Can it be improved? How can we achieve these improvements? How do we motivate personnel? These evaluations are not being performed at ENP in any routine or standardized fashion. In order to provide incentives for personnel to increase their level of performance, each employee (only management and supervisory at ENP) should be evaluated once or twice a year by his superior using a standardized form using goals that were set during the most recent previous evaluation as a basis. The evaluation should be done by the superior or supervisor one-on-one with the employee present. At the time of the evaluation, a set of goals and objectives should be set forth for the next evaluation period. The performance evaluation should also be used as a basis for any merit pay increase for the employee.

The key to effective control is to identify specific independent objectives or control variables that, if properly identified by the supervisor will minimize costs and optimize performance. These variables, also known as control points vary depending on the level of the organization. A higher level control point might be something like crane downtime while a lower level control point might be the percentage of scheduled work completed during a shift. From a manager's standpoint, the evaluation of expected versus actual performance is critical to improving maintenance. Performance evaluation should be a major focus of the ENP Maintenance Department.

Awards: An award program should also be considered by ENP. A system of awards provides tangible benefits, beyond compensation, to those individuals who excel in their performance. Awards may take any form as long as they are something to which the employee attaches benefit. As an example an award program might provide educational assistance to members of an employee's family, thereby not only motivating the employee but also serving a social need.

Training: Although craft and skill training programs are being carried out routinely there appears to be no formal or informal training program for management or supervisory personnel. A training program should consist of the following, at a minimum:

- Knowledge of equipment and facilities to be maintained;
- Supervisory skills;
- Port policy;
- Planning;
- Budgeting and cost control; and
- Problem solving.

Although this training could be accomplished in-house, international experts and training firms, local institutions of higher learning or management consultancies are better sources for assistance in this area.

In addition to the existing training courses skill training should be arranged for appropriate mechanical personnel specifically for the types of equipment actually used, such as Cummins engines and Allison transmissions. This training should be added to the equipment purchase specifications so that this will reflect the newest model of engines and transmissions used at the facility.

Safety training: This training is organized and documented by ENP Human Resources for yard workers as part of the overall training program. Over 30 courses are available for training yard personnel. This program is excellent.

Storage of spare parts, lubricant and fuel

The shelves should be modified to provide individual bin or drawers with covers to prevent dirt and contamination of unpackaged parts.

While manning during off hours is not absolutely essential, the responsibility for security and accountability should be delegated to a senior member of the shift on duty.

Careful control of lubricants is critically important for two reasons:
- Contamination of lubricants can cause particulate damage to bearings, seals, and hydraulic valves and cylinders. This results in reduced service life and pre-nature failures.
- Careless categorization can result in the wrong application with similar results to that of contaminated lubricants.

It is recommended that new lubrication storage facilities be built with the capability to store drums and containers properly labeled. Purification equipment should be purchased so that certain fluids can be cleaned and reused. This equipment should be used to filter all oil when changing or adding fluid to equipment. This will increase service life of engines and hydraulic equipment. Reduced service life of engines overhauled by ENP was reported during the survey visit. Improper or contaminated lubricants could very well be a major factor in these premature failures.

Fuel storage: These should be closed to prevent of environmental contamination.

ENP should consider adding oily water separators, a graphic of which is shown below at both the mechanical shop and the straddle carrier repair area.

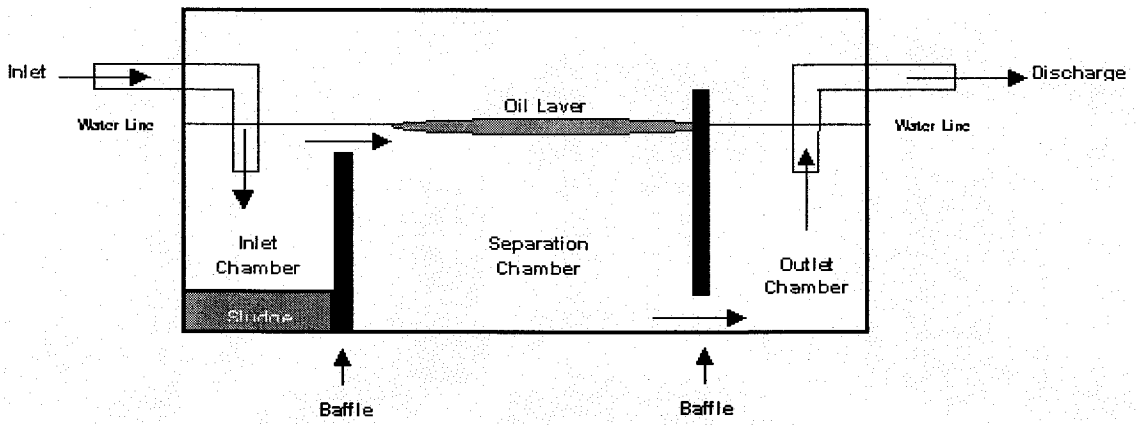


Fig. 2-12. Oil Water Separator

The oily wastewater is introduced through the system inlet. Water turbulence is calmed in the inlet chamber behind the first baffle, where solids settle out and form sludge on the bottom of the chamber. As the wastewater flows over the first baffle to the middle, or separation, chamber, oil droplets rise to the surface and are trapped behind a second, higher baffle, which has an opening along its bottom edge. The remaining water passes under the second baffle into the outlet chamber, where it is diverted to a discharge point. Consequently, solid sludge can be collected from the bottom of the inlet chamber and oil droplets that accumulate at the water's surface in the separation chamber can be skimmed off or otherwise routed to a separate holding tank. This particular type is covered so rainwater cannot enter the

system causing spillage of contaminants. There are a number of manufacturers of similar equipment.

Equipment

The following are recommended equipment changes:

- At the time of the site visit in 2005, about 50% of the yard tractors in the fleet were over 10 years of age and it was recommended that they should be considered for replacement depending on operating hours and total annual cost. In January 2007, it was noted that the Port had increased the fleet from 47 to 57 yard tractors, and was thus making progress on improving the age profile of the fleet.

- It is recommended that the suppliers for each type of equipment be limited to 2 or 3 in order to provide for competition yet minimize the spare parts inventory and training.

- It is recommended that old forklifts and other equipment having high repair costs be replaced.

- Since 40% or more of all crane downtime is attributable to the spreader as a result of the shock and vibration that it experiences, a spare for each crane is critical. This should be a key item in development of the next capital budget. As mentioned in January 2007, the Port has implemented this recommendation, having on hand 2 spreaders for the 2 cranes, and 2 spares, and having made modifications so that all are interchangeable.

- ENP should procure either a water tank or concrete weights to accurately test the cranes when specified by government requirements or when structural repairs are accomplished.

- ENP should consider purchasing a third STS for the wharf and terminating the lease of the mobile harbor crane since only on rare occasions would stevedores need more that three cranes on any one vessel. In January 2007, it was noted that the Port had replaced the mobile crane with another, also on lease, and was in the process of obtaining another.

- ENP should consider purchase of chassis that also accommodate 45-foot containers. Although several in the existing fleet have been modified to do so, more are required. As noted in January 2007, the Port has started implementing this recommendation, having acquired 20 cornerless chassis.

- It is recommended that the current system be replaced with the latest state-of-the-art maintenance management system.

- ENP should seriously consider elimination of the straddle carrier operating system for one that is more economical to operate and easier to maintain. A straddle carrier operating system could be efficient if they were used to transport containers from directly under the STS crane to the storage stack. However, the straddle carriers used at the Port of Cortes are too high to clear the STS portal beams so yard tractors and chassis are use for the transportation from the crane to the stack. This means that straddle carriers are under-utilized since they are used merely for stacking and loading to trucks.

- Since yard tractors and chassis are needed to work under the STS crane because of height restrictions a reasonable interim measure may be stacking accomplished by reach stackers or toploaders, equipment much cheaper to procure and much easier to maintain. It was noted in January 2007 that the Port had acquired 4 reach stackers, but that the space limitations in the Port constrain the use of reach stackers. When denser stacking is required ENP should consider

rubber tire gantry cranes (RTGs) working in conjunction with the yard tractors and chassis. An RTG is much easier to maintain than a straddle carrier even with slightly more complex electronics and it is much more environmentally friendly. Electronic maintenance should be no problem for ENP electricians, who maintain the STS cranes very successfully.

- Retired equipment should be removed from the terminal because of the following:
  1) It takes up valuable space that can be used for container or breakbulk storage.
  2) It tends to collect water, which can breed mosquitoes.
  3) It can leak oil and hydraulic fluids that contaminate the environment.
  4) When parts are difficult to obtain, this equipment tends to be a source of used parts. New parts should always be used in the repair function as the service life and reliability of used parts is suspect and can actually increase the cost of maintenance.

Summary of Maintenance Recommendations

Establish and publish port and operational objectives.

Establish and publish maintenance objectives.

Increase the long range planning horizon to five years.

Provide more autonomy for purchasing at the terminal level by increasing approval levels while adhering to firm purchasing policy guidelines.

Increase capital equipment budget to replace outdated equipment and purchase new equipment to handle increasing freight volumes.

Retire and replace old, obsolete and obsolescent equipment in yard tractor and fork lift truck fleets.

Develop a file and catalog of detailed equipment and parts specifications that can be used for repeated purchases.

Purchase a new spreader to allow the availability of a spare for each crane. As mentioned in January 2007, the Port has implemented this recommendation, acquiring additional spreaders so there are 2 spreaders for the 2 cranes and 2 spare spreaders, and making modifications so that they are interchangeable.

Consider replacement of the straddle carrier system with one that is less complex and maintenance intensive.

Purchase additional yard chassis that can accommodate 45 foot containers. As mentioned in January 2007, the Port has acquired 20 cornerless chassis, which can accommodate containers of different sizes, including 45 ft.

Remove retired equipment from the terminal.

Place the civil works organization in the Maintenance Department.

Develop position descriptions for all non-union and management positions. As mentioned in January 2007, the vast majority of positions are union.

Develop an employee manual for all non-union employees.

Develop and establish a performance measurement system for management and supervisory personnel.

Maintain personnel tenure in management and supervisory positions by carrying them over when the political leadership changes.

Establish an awards program that recognizes outstanding performance.

Arrange training on Cummins engines and Allison transmissions for appropriate mechanics.

Expand the electrical maintenance facility. As mentioned in January 2007, the Port expects to carry out the design work in the current year.

Expand the mechanical maintenance facility to allow repairs to be accomplished out of the weather. Combine vehicle repair with other mechanical maintenance. As mentioned in January 2007, the expansion of the mechanical maintenance facility is underway for bidding.

If straddle carriers are to be used in the future, a separate facility with appropriate office and work space should be constructed.

A terminal pavement sweeper should be purchased to minimize debris and associated tire repairs.

Remodel parts stowage shelves to include separate bins and better identification.

Improve control of spare parts inventory, including quantities and uses for each type of part.

Pre-expend small consumables such as nuts, bolts, spray cans, and cleaning fluids.

Build storage specifically designed for oil and lubricants. Storage should allow for better identification and better means for transfer to equipment.

Purchase lubricant purification equipment for recycling oil and filtration devices for filling various hydraulic systems.

Purchase oily waste separators for the mechanical and straddle carrier maintenance areas. As noted in January 2007, the Port is in the process of implementing recommendations, having installed 3 pits.

ENP should review the various maintenance functions except for motor reconditioning and repair to determine if some of the functions performed in-house would be more cost effective if performed through outside contract. The analysis should include such factors as:

a) Frequency of repair;
b) Labor skills required;
c) Availability of labor;
d) Special equipment required;
e) Quality assurance;
f) Taxes;
g) Availability of materials; and
h) Urgency of repairs required.

Although most diesel engines and transmissions are repaired in-house by ENP the service life of the engines following repair is much less than a typical service life for a completely overhauled diesel engine or about 15,000 hours. This may be due a number of factors affected by both the overhaul process and periodic maintenance. It may well be associated with the repair environment, which is unsatisfactory with respect to cleanliness and layout. It is appropriate for ENP to analyze this situation very carefully, looking

at historical records, shop practices, and terminal conditions to determine the underlying causes. A cost analysis should reveal whether it would be more cost effective to pay more for an outside maintenance contractor (OMC) to overhaul these components in the anticipation of obtaining a longer service life.

The content of the contracts can be very complex, and administration once awarded depends on the included terms. Therefore, a person who has extensive experience in contracts should work closely with the technical persons who are responsible for writing the specifications. A person with experience in contracts, as well as technical people, should be included in any evaluation of bids or negotiations with potential OMCs.

In order to validate the above recommendations ENP should consider contracting with consultants, such as DMJM Harris' JWD Group, Moffatt & Nichol, or TranSystems, who are experienced in yard planning to evaluate such parameters as yard area, traffic flows, handling rates, gate volumes, etc. and make concrete recommendations tailored specifically to the Port of Cortes.

2.3 Recommendations, for computer equipment, programs and procedures for maintenance and spare parts function, and interface with administrative departments

Recommendations on equipment planning and procurement: The process involves historical workloads, information extrapolated for the future, and industry forecasts. Some important notes are:

a) Traffic forecasts must be developed in sufficient detail to allow calculations of volumes to be handled by each type of equipment.
b) The anticipated hourly production must be assessed for each type of equipment. Then equipment hours required is the product of hourly production rate and the volume of cargo
c) Equipment inventory levels require the use of operating schedules, equipment availability, and operating practices. Peaking factors must be applied to the average equipment inventory level calculation.
d) After administrative and financial constraints are applied the plan should specify which equipment will be retained, which will be retired or disposed of and which units will be procured.
e) A piece of equipment should be retired when the cost of keeping it is greater than the revenue it earns. A piece of equipment should be replaced when the cost of keeping the equipment is greater that the cost of disposing of it and replacing it with a new unit.

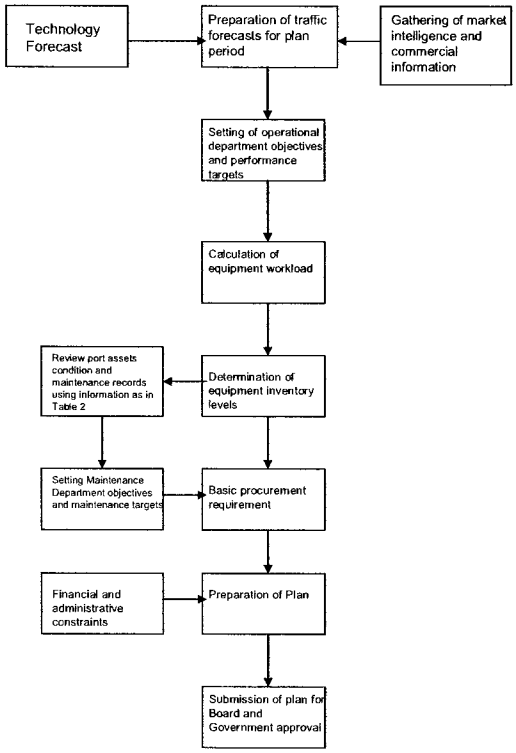


Fig. 2-13. Planning and Procurement Flow Chart

The Chief of the Mechanical Department issued a letter to the General Manager on December 28th, 2004 identifying many of the needs for the equipment plan specifically related to the boxes in Fig. 2-13 associated with determining inventory levels. This is an excellent start toward systematizing the equipment planning process.

There are several remedies that can vastly improve this procurement process:

- Allow the maintenance department management and supervision to be more autonomous with respect to approval levels for ordering materials.
- Install a computerized maintenance management system, such as Datastream. This will improve the process through the following:
    - Automation of the formulating and routing of requisitions.
    - Establishment of valid reorder points.
    - Improved forecasting and budgeting for parts requirements.
    - Improve tracking of outstanding requisitions
    - A system for recording receipts of material that has been ordered.

- Within this system establish a work order and preventive maintenance program.

Replacement System: The best computerized maintenance management system would automate data accumulation and storage, allow quick, yet informative report presentations of critical indices of independent variables. Other desired attributes are that it would be compatible with other port automated systems such as general accounting and financial plus be priced reasonably with respect to others on the market. One of the best systems evaluated, which would certainly fit the needs of ENP, would be the *Datastream version 7i.*

Datastream is the most widely deployed web-architected asset management system in the world. It allows an organization to manage assets, compile asset information, and control and document maintenance activities. In the case of ENP those assets are all equipments on which maintenance is performed. The design of the system is modular with the ultimate goal of optimizing asset performance. Following is a brief description of some of the key modules:

Asset Management: This module would allow ENP to record, maintain, structure and standardize physical information of mechanical, electrical, or civil assets. The assets can be tracked by position, past location, and maintenance history. Depreciation and warranty information can also be tracked. Key performance indicators and cost histories can be produced from the data accumulated. Screens are user friendly and input of information can be learned by data input personnel quickly.

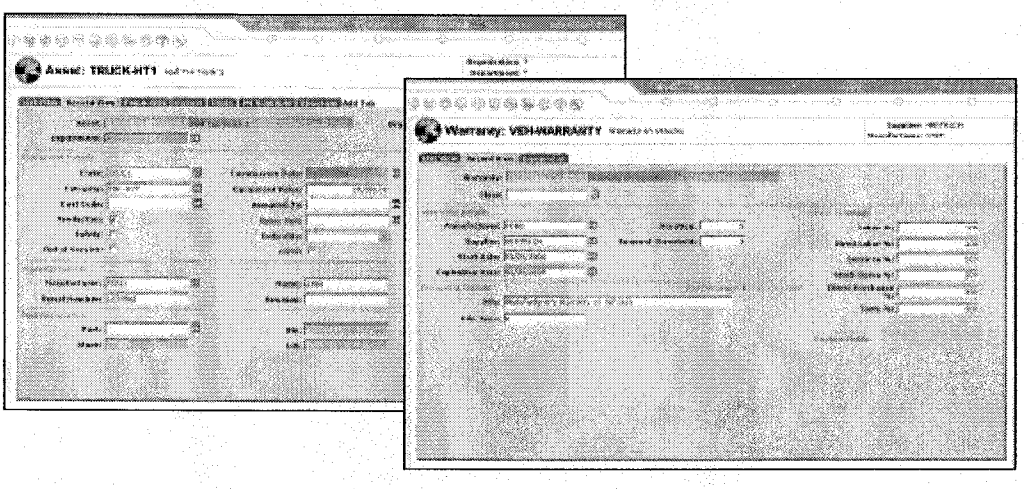


Fig. 2-14. Sample Asset Management Screens

Work Management: The work management module assists in managing, planning, and monitoring the resources necessary to complete work. Work requests can be manually generated by request or automatically generated by the system in the case of preventive maintenance (PM). PMs can be set up based on fixed calendar dates, meter readings, or changing frequencies depending on thresholds. On completion of a work order, labor hours, material costs, actions taken, and freeform comments can be added to allow key performance indicators associated with costs and performance to be reported based on accumulated data.

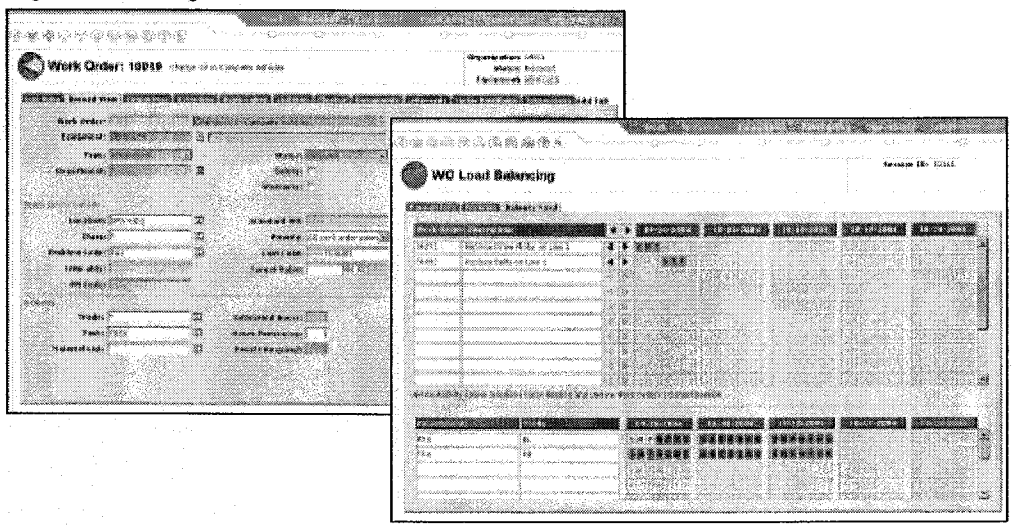


Fig. 2-15. Sample Work Management Screens

Purchasing Management: The Purchasing Management module automates and controls processes required for purchasing expenditures. Requisitions can be created manually or automatically when inventory drops below minimum stock levels. The following can be created in this module:

1) Requests for quotations from suppliers;
2) Purchase orders for immediate needs;
3) Blanket purchase orders;
4) Vouchers for invoices received from suppliers; and
5) Standard contracts for purchase of materials.

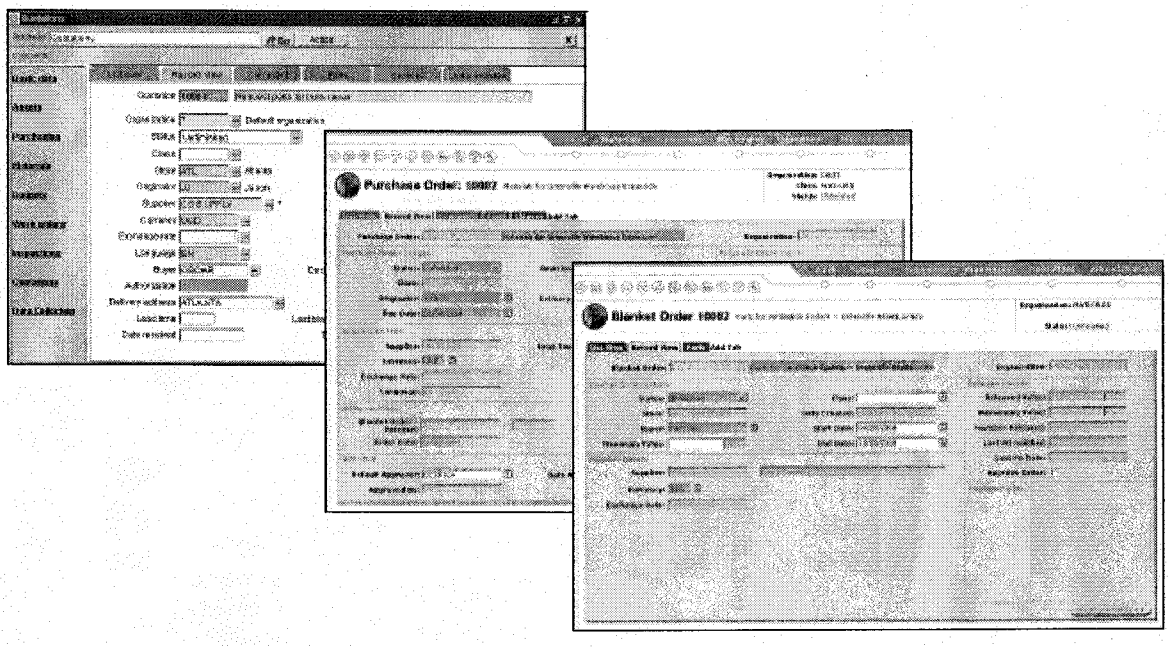


Fig. 2-16. Sample Purchasing Management Screens

Materials Management: This module tracks and controls reservations, requisitions, allocations, issues, receipts, and repairs for all parts and materials needed for work orders.

Budget Management: The budget management module automates the budget establishment process including the supervision, control, and analysis of the expenditures associated with all maintenance work. It links the financial structure of the organization with the organizational and physical assets. Analysis of expenditures serves as input to critical indicators used in assessing the organization's performance.

Other modules include functionality to do inspection management, project management, barcoding, and calibration management. Datastream can be configured in Spanish and can use the Honduran Lempira as the base currency. Sales are conducted through agents in the United States. Further information is available on their website at: http://www.datastream.net/products/datastream7i.asp.

2.3.1 Comparison of Maintenance Management Systems

A summary comparison of the six maintenance management systems is presented in Table 2-4. Although most of the systems analyzed appeared to be viable alternatives Datastream system is the most comprehensive of those compared. It is worth noting that only two of the systems, Datastream and Proteus IV, are available in Spanish. It is recommended that ENP further investigate and evaluate each of the systems according to budget, reporting requirements, and user interface. Most suppliers are willing to come to the port to provide demonstrations and further assistance in selection of their software. Further details are provided in Appendix C.

Table 2-4
Comparison of Maintenance Management Systems

Asset Management:						
• Ability to create unit & secondary hierarchies	x	x		x	x	x
• Intra-department equipment transfers	x	x	x	x	x	x
• Create PM's from the meter updates.	x	x	x	x	x	x
• Allow asset performance reports by location	x	x	x	x	x	x
• Equipment specs included in asset listing						
Work Orders:						
• Corrective WO include "Parent / Child" relationship.	x		x	x	x	x
• PM WO use hour meter or calendar	x	x	x	x	x	x
• "Special" work orders for accidents, operational incidents	x	x	x	x	x	x
• Allow users to view costs: purchasing/inventory/labor	x	x	x	x	x	x
Purchasing:						
• Vendor sales and quote history.	x	x	x	x	x	x
• Create quotes for non-inventory stock items	x	x	x	x	x	x
• Create requisitions for non-inventorystock items	x	x	x	x	x	x
Inventory:						
• Create, find and verify quantities and bin locations for inventory items	x	x	x	x	x	x
• Search Inventory by business unit	x	x	x	x	x	x
• Allow intra department Inventory Transfers	x	x	x	x	x	x
• Automated inventory re-order	x		x		x	x
• Reporting Inventory Usage / History	x	x	x	x	x	x
Language:						
• User interface currently available in Spanish	x					x
Compatibility of Data:						
• Compatible with existing accounting and financial system	x	x	x	x	x	x
• Compatible with MS Sql Server	x		x	x		x
Service:						
• Where is the closest support office?	Mexico	NJ,USA	RI, USA	CA, USA	UT, USA	Mexico
Users:						
• How many clients are using the system	29,000	1000+	500	300	4,000	3000
Cost of software:						
• Based on number of concurrent users 15	$ 79,950	$ 15,420	$ 22,485	$ 37,425	$ 7,485	$ 36,975

2.4 Conceptual layouts and requirements for centralized maintenance facilities

Electrical Maintenance Building: Currently the electrical maintenance facility is too small for the work that is being accomplished and there is inadequate office space for administrative functions. ENP has also considered electronic card repair, although it should be noted that the need for in-house card repair is questionable considering the infrequent usage of cards. In fact, the Department chief mentioned that only once in the last three years was a card needed but not in stock. Nevertheless the building requires expansion. As shown in Fig. 2-17, it is recommended that a 30 ft by 50 ft (approx. 9 m x 15 m) extension be built. As indicated in January 2007, implementation of the expansion of the electrical maintenance facility is underway, with design to be undertaken during the year.

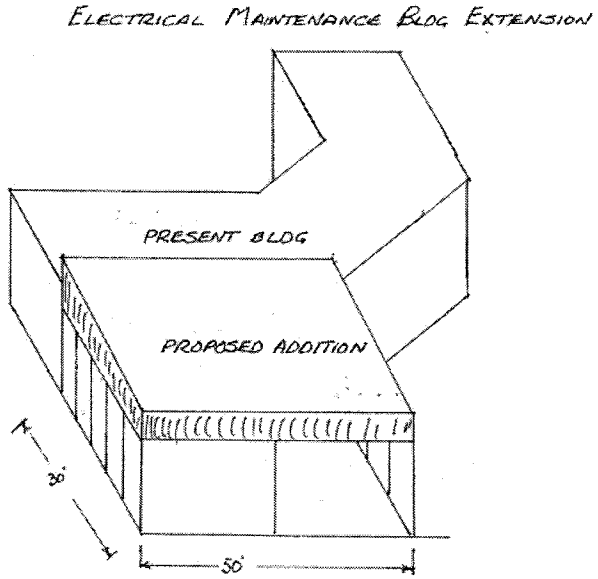


Fig. 2-17. Proposed Extension of Electric Maintenance Building

Mechanical Maintenance Facility: Presently all maintenance and repairs are accomplished in the open. When it rains, maintenance must be postponed. There is an urgent need for the following capabilities and areas:

a) Tire repair and changing equipment;
b) A service vehicle equipped with parts bins, welding equipment and an air compressor;
c) A central lubrication system with tanks, pumps and dispensers;
d) Steam cleaning and power washing equipment;
e) Oil/water separators for the steam cleaning facility;
f) An improved technical library, properly catalogued with documents available in Spanish; and
g) Rest facilities for employees.

As shown in the isometric and plan view drawings Fig. 2-18, a 50 by 100 ft (approx. 15 x 30 m) expansion and compartmentation are recommended: As was indicated in January 2007, implementation of the expansion of the mechanical maintenance facilities is underway for bidding.

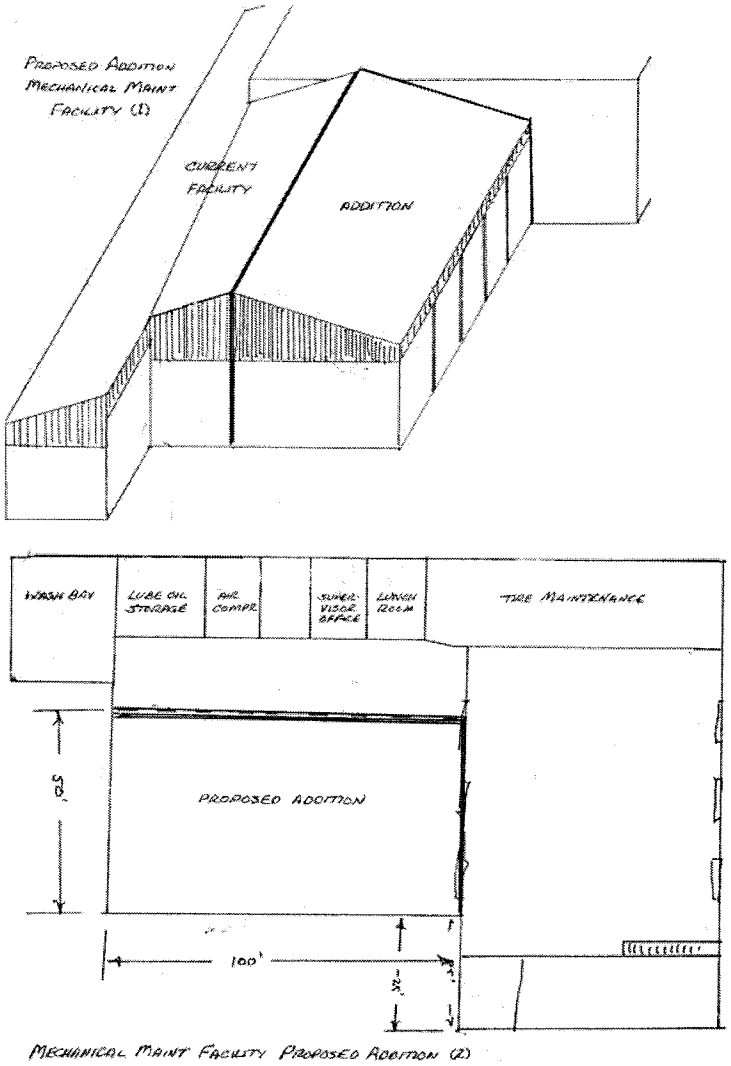
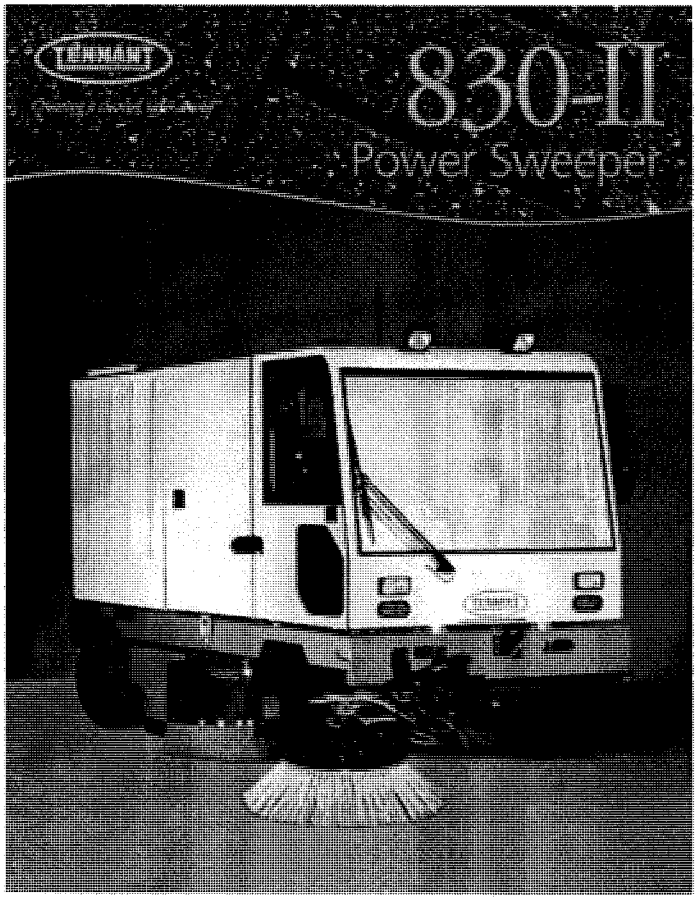


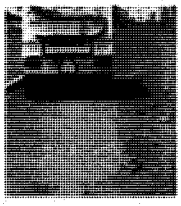
Fig. 2-18. Proposed Mechanical Maintenance Facility Addition

Straddle Carrier Maintenance: Currently all repairs are accomplished in the open, where machines are subject to contamination of critical electrical and hydraulic systems. Some pre-expended parts not in the inventory system are stored near the repair area and used as ready spares. There is no computer access for straddle carrier repair. Although elimination of straddle carriers is recommended, if it is determined that these machines are to continue in service, there should be a repair facility. The facility should be enclosed and have appropriate office space, parts storage, lube and hydraulic storage facilities, rest facilities for employees, and technical library. A building of roughly 50 ft by 60 ft (approx. 15 x 18 m) with a minimum of 2 work bays would be the minimum for adequate straddle carrier repairs. This however could cost several million US dollars. This cost is one more reason to replace the straddle carriers with other handling equipment.

Terminal Pavement: Although in general the pavement is in good condition, there is excessive loose debris that needs to be periodically swept up. Loose debris is responsible for unnecessary repairs to tires and general reduction of tire service life. Removal of debris is best accomplished by a mechanized sweeper which ENP should consider purchasing, such as the Tennant® 830-II.


TENNANT
830-II
Power Sweeper

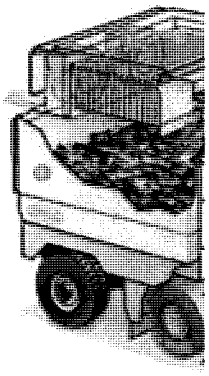
Unsurpassed Dust Control



Innovative dry-dust control improves ambient air quality by sucking up dust and dirt stirred up by brushes.

Powerful. Easy to use. Maneuverable. Compact. The Model 830-II sweeper offers all of this and more, including a state-of-the-art dry-dust control system that is simply the best in the business.

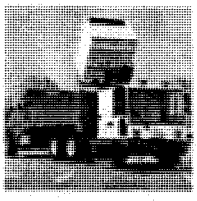
The 830-II's excellent sweeping ability begins with a self-adjusting, center-point-suspended main brush that efficiently picks up sand, dirt, rocks, broken glass and bulky light debris. Main brush dust is pulled by twin, high-volume vacuum fans into a long-lasting, high-capacity filter to remove dust particles and exhaust clean air.



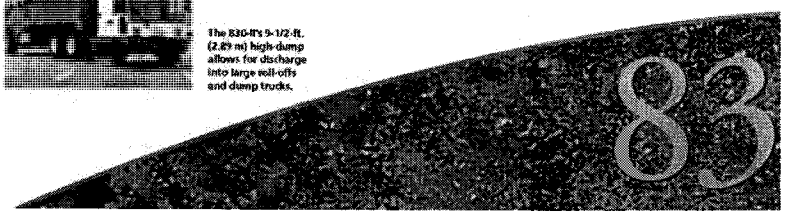
And there's more. One-button sweeping makes operation easy and requires less training time; an unobstructed view ensures a clear view of the sweeping area and bystander safety; and finally, four-wheel steering allows the machine to maneuver easily around obstacles, corners and heavy traffic.

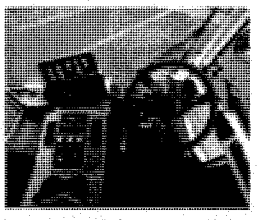
Productivity-Enhancing Options

- Waterless side brush dust control for areas incompatible with water.
- Vario Sweeping Brush moves in and out, up and down to reach hard-to-access areas on either side of machine.
- A 9½-ft. (2.89 m) high-dump allows discharge into large roll-off bins and dump trucks.



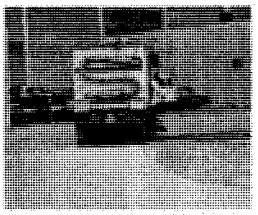
The 830-II's 9-1/2-ft. (2.89 m) high-dump allows for discharge into large roll-offs and dump trucks.



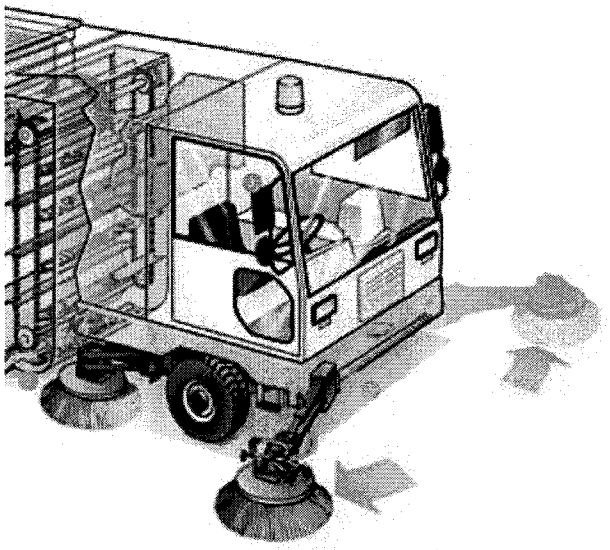


One button controls the sweeping functions. Ergonomic touch panel controls all other sweeping and debris-dumping functions.

Downtown obstacles and congestion pose no problem for the 830-II.

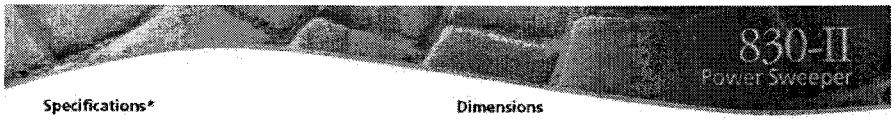


Especially effective in cleaning industrial facilities with large amounts of fine dust.



The Model 830-II

1. Two high-volume vacuum fans draw dry dust through a large-capacity synthetic-tinged polyester filter that effectively prevents dust exhaust.
2. Centrally suspended main brush penetrates crevices of any surface for thorough cleaning.
3. Roomy, quiet cab with heater-pressurizer, quad mirrors and spring-suspension luxury seat secure comfortable ride.
4. Stainless-steel hopper holds up to 3.4 cubic yds. (2.1 cubic m) of debris.
5. Vario Sweeping Brush cleans hard-to-reach areas.

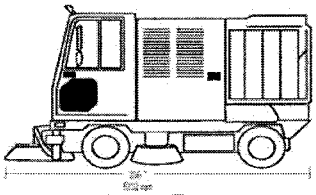


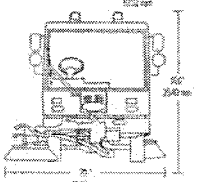
Specifications*

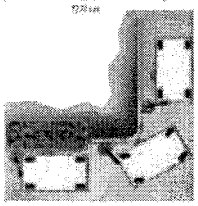
Propelling System		
Speed forward	0-25 mph	40 km/h
Parking diesel	90 hp	67 kW
Sweeping System		
Cleaning path		
- main broom only	51 in	1295 mm
- with right side brush	69 in	1750 mm
- with dual side brushes	87 in	2210 mm
- and auxiliary brush	126 in	3200 mm
Hopper volume	3.4 yds³	2600 L
Hopper capacity (low dump)	2000 lb	3175 kg
Hopper capacity (multi-level dump)	4000 lb	1815 kg
Dust Control System		
Synthetic filter	211 ft²	20 m²
Filter cleaning	Hydraulic shaker motor	
Dimensions		
Length (with Vario Sweeping Brush*)	175 in	4439 mm
Width	70 in	1778 mm
Height	100 in	2540 mm
Weight		
Base weight	12,500 lb	5670 kg
With options	13,600 lb	6170 kg
Tennant Value Added Equipment includes:		
4-wheel power steering	One button sweeping system activation	
Sliding glass windows	System Monitoring warning lights	
Premium cloth suspension seat	Premium cloth passenger seat	
Heater/defroster	Keyed lockdown belts	
Easy-touch controls		
Optional Equipment		
9'6" High dump	Right-hand Vario Sweeping Brush	
Air conditioning	Left hand steering operator position	
Turbo charged diesel engine	Vacuum wand	
Radial tires	AM/FM radiotape deck	
High pressure sprayer	Extra tire	
Foam filled tires	Engine access chip kit	
Side brush dust control skirting	Hydrant fill kit	
Left-hand side brush	Night lighting kit	
Left-hand Vario Sweeping Brush		

* Subject to change without notice
(Some optional items are available to all countries)

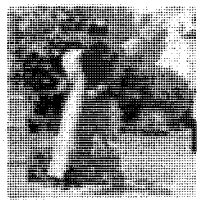
Dimensions







Power 4-wheel steering gives the machine impressive maneuverability to easily sweep around obstacles and corners.



Vacuum wand extends cleaning into hard-to-reach places. Spray nozzle helps dislodge packed debris for better pickup.

Creating a cleaner, safer world™

Tennant Company offers the most complete line of floor and surface maintenance equipment, floor coatings, brushes, and cleaning detergents in the world. Our sales and service networks are able to provide you with integrated custom cleaning solutions to meet any floor care need.

ISO 9001 Certified

TENNANT

Tennant Company
P.O. Box 1452
Minneapolis, MN U.S.A. 55440
Call toll-free: 1-800-553-8033
In Quebec call: 514-335-6061
Fax: 763-540-1437
www.tennantco.com

2.5 Lists of recommended maintenance equipment to service vehicles properly, cargo handling equipment, and boats

Maintenance equipment needs, goods and services

1. Computerized Maintenance Management System (CMMS), including work management, materials requisitions, purchasing and budget management

2. Mechanical shops equipment, as follows:

2.1 Tire changing equipment:

a. Large industrial tire changer;
b. Smaller changer for vehicle tires; and
c. Tire spreader for casing repairs.

2.2 Lubrication storage and dispensing equipment:

a. Pneumatic barrel pumps(four units);
b. Pneumatic grease pump(one unit);
c. Hose reels and dispensers:
   1) one for grease;
   2) four for oils; and
d. Diaphragm pump for pumping used oil to used oil storage tank.

2.3 Engine coolant and dispensing equipment:

a. Barrel pump; and
b. Hose reel and dispenser.

2.4 Mechanical service truck. This should be a covered van like a step van. It should contain the following equipment:

a. Engine-driven air compressor;
b. Engine-driven welding machine; and
c. Storage compartments for parts and tools.

2.5 New stationary air compressor for mechanical shop with six (6) pneumatic hose reels and regulators for shop interior. In January 2007, it was indicated that this recommendation had already been carried out and that the Port had two 10 hp air compressors in the mechanical shop.

2.6 New milling machine for the mechanical fabrication shop to increase their manufacturing capabilities. In January 2007, ENP indicated that the acquisition of a new milling machine was pending.

2.7 Steam cleaning equipment. Two, diesel oil fired, electrically-driven hot water, high pressure washers to clean equipment. In January 2007, ENP indicated that the acquisition of steam cleaning equipment in accordance with the recommendation was pending.

2.8 12,000, minimum, pound (6 ton) capacity hydraulic lift to allow vehicles and yard tractors to be elevated for maintenance and repairs

2.9 Portable filtration equipment for hydraulic and lubrication oils, 2 each

3. Electrical Department equipment, as follows:

3.1 Service van to hold maintenance equipment and parts to provide faster response to calls. Van to be covered, i.e. step van with work bench, parts and tool storage cabinets.

4. Power Sweeper

5. Detailed appraisal of maintenance systems requirements, alternatives and equipment needs study.

2.6 Interim report and presentation of the evaluation of maintenance facilities and operations and alternatives for centralization and rationalization of the maintenance operations

DMJM Harris prepared an interim report and made a presentation to ENP Management using MS PowerPoint in Spanish. After the presentation by Mr. Glenn Lindholm, the findings were discussed with Mr. Edgardo Paredes, Chief of Mechanical Maintenance. The discussion focused on some updates and clarifications regarding information about maintenance operations in the interim report.

1. Two yard tractors originally listed in existing equipment inventory in Table 2-2 were identified as having been removed.
2. Some corrections regarding the threshold levels for government approval of purchasing were made, as reflected in Section 2.12.
3. The revised Maintenance Department organization was amended in line with Client suggestions to merge the Civil Works Department into the Maintenance Department. The Electrical Maintenance and Mechanical Maintenance Departments were combined into the revised Maintenance Department. A new position of Manager of Maintenance was created to oversee the expanded Maintenance Department.
4. The Client requested that unionized employees be excluded from proposed performance evaluations and a company employee manual, because it the union may object to these constraints. The report text was amended to note that the recommendations would apply only to non-union personnel.
5. The Computerized Maintenance Management System (CMMS), its functions and benefits were discussed.
6. It was noted that some of the recommendations for equipment replacement were in the process of implementation.

2.7 Establishment of a training program for systems users for the Computerized Maintenance Management System

This section describes the training program for systems users of the Computerized Maintenance Management System, functional systems and subsystems. The training program was provided by the vendor for the recommended software Datastream 7i or comparable system, but a similar program from others would apply for alternative systems or vendors which may be selected by the Port.

2.7.1 Section 1.0 – Services Overview

This Implementation Services Document (ISD) identifies the services and activities that would be provided by the Datastream Systems, Inc. (Datastream) and the Client. EMPRESA NACIONAL PORTUARIA (ENP) project team during the Datastream Now! or comparable system implementation effort. Roles and responsibilities have been identified for each part of the teams, as well as specific services and time frames.

Sections within this document correspond to specific tasks identified in the Project Schedule in Section 3. The document provided by Datastream describes tasks in detail, and a similar document would form the basis for the service contract between ENP and Datastream.

2.7.1.1 Regular Service

Regular Service is defined as those services required for implementation of Datastream Now! or comparable system. It is understood that Datastream will provide services to supplement the ENP Datastream 7i or comparable system implementation efforts. The actual services to be performed are

detailed in Section 2 and 3 of this document, and include:

- Project Management
- Project Consultant Assistance

2.7.1.2 Project Plan

It is important to note that this document addresses the ENP Datastream 7i or comparable system implementation described under the Agreement. During the project, only the following modules will be implemented.

- Administration
- Equipment
- Materials
- Purchasing
- Work Management (Work Orders and Preventive Maintenance Process)

Only items referenced in the Datastream Now! or comparable system product matrix would be covered; anything outside the scope of that functionality would not be included and would need to be addressed in a change order. In addition, any services not included in this ISD or Datastream Now! or comparable system implementation plan will be considered out of scope. Any additional services would require proper change control procedures

Project Budget

The table below provides a breakdown of the Datastream Implementation Services Cost Estimate of the project:

Service Category	Resource	Days	Cost
Hosted Installation and Initial Configuration	Technical Consultant	N/A	Included
Datastream Now! or comparable system Services	Project Lead Consultant	15	$33,990
Project Management	Project Manager	N/A	Included
Total Service Cost			**$33,990**

* Travel expenses not included in above pricing. Travel expenses, meals, lodging, transportation and air fare are not included in consulting prices and are billed to the customer at actual cost plus a 10% processing fee.

** Datastream proposed that the Datastream Now! or comparable system services be billed in three Milestones:

- Milestone 1– Completion of Week 1 of the Datastream Now! or comparable system Services $11,330
- Milestone 2 – Completion of Week 2 of the Datastream Now! or comparable system Services $11,330

- Milestone 3 – Completion of Week 3 of the Datastream Now! or comparable system Services $11,330

2.7.1.4 – Services Clarifications:

The following assumptions have been made in preparing this information:

- Daily rates for this implementation are in US Dollars. Along with the rates, payment terms would be established during completed contract negotiations.
- Days of consulting are based on an eight-hour workday.
- The tasks and associated days are only for one site of the ENP implementation.
- Travel expenses will be based on actual travel costs to include a $34.00 (US Dollars) per-diem charge. Datastream consultants will make every effort to hold expenses to a reasonable level, staying at hotels of ENP's choosing.
- The Datastream Project Manager will be engaged during the implementation of this project and involved up until the conclusion of the project.
- The Project Schedule does not define the specific dates of the project, only the proposed order and timeframes. The Datastream Project Manager will coordinate with the ENP team to confirm the exact dates of the project tasks.
- The commitment durations of Datastream resources are limited as described in the Description of Services and Project Schedule.
- Confirmation of on-site task readiness made by the ENP Project Manager will be considered by Datastream as a work authorization to commit billable Datastream resources. A failure of on-site task readiness on the part of ENP that impacts the completion of Datastream activities will cause ENP to incur additional expense charges as described in the Agreement.

2.7.2.0 – Scope of Services

The following pages contain detailed descriptions of the services considered necessary to implement the ENP project. Datastream would include in the scope that the content herein reflects Datastream's understanding of the nature and scope of the ENP project. Each task described correlates to an action item on the project schedule.

2.7.2.1 – Work Authorization Procedure

In order to confirm the scheduling of all resources of Datastream or other vendor, a work authorization procedure would be utilized. The scheduling/booking of Datastream or other vendor resources must be done at least four weeks prior to the task initiation. The procedure is as follows:

1. The Datastream Project Manager will send the ENP Project Manager the Work Authorization Form, which will include the Datastream resource(s), number of days with start and end dates, deliverable and cost information.
2. The ENP Project Manager will review the Work Authorization Form and, within one working day, send an "approval" e-mail making a positive response / confirmation that the work can be done as proposed on the Work Authorization Form.
3. Datastream proposes that absent a response from ENP, the work will be considered as approved by them. If no "approval e-mail" is received from the ENP Project Manager within one working

day, the "Work Authorization" will be considered as "Approved" so Datastream resources will be scheduled.

4. If changes are required, then the ENP Project Manager must notify the Datastream Project Manager within one working day of receipt of the work authorization.
5. If any addenda or cancellations are required, the ENP Project Manager must notify the Datastream Project Manager within one working day of receipt. The Datastream Project Manager will send an updated Work Authorization Form, which will then follow the same procedure.

The approval of the Work Authorization from the ENP Project Manager will originate an assignment order for the Datastream resource; once the task is finalized, an invoice will be sent to ENP. Therefore, if a signed work authorization is submitted and ENP cancels or asks for a delay it is understood that ENP potentially could be charged if the scheduled consultants' time cannot be reallocated; ENP would be charged as described in the Agreement.

2.7.2.2 – Change Control Procedures

Datastream has proposed the following change control procedure: Any modification or deviation from the agreed functionality, or changes to the time or costs agreed for the contract will be subject to the following procedure.

Any project team member may initiate change control whenever there is a perceived need for a change that will affect the contract of work or any element of the project. The project team member should use the prescribed standard Change Control Notice (CCN) forms as appropriate for the change.

1. Agreement to a Change Control Notice signifies agreement to a change in overall costs, functionality, time scales, or other identified impact.
2. A change will be identified to Project Managers by any of the prescribed quality communication documents. It can be introduced via verbal conversation or other form of communication, but must be supported by the appropriate change control document.

Procedure for Identifying & Implementing Changes

The person who is functionally responsible from ENP project team for the area of change will:

- Complete a change control document for the proposed changes
- Submit copies to the relevant parties, including internal or external parties for assessment
- Record the change with a reference to the change control document in the change control log
- Investigate the impact of the proposed change
- Evaluate the impact of not performing the change
- Prepare a response to the proposed change
- File the change control document **original** in the project infrastructure library, which **must not be removed** except for making copies
- Consult with the person whether the change should be performed and obtain authorization for implementing the change.

If the change is not agreed upon:

- The Project Manager will discuss and document the objection with the Change Owner

- The proposed change will be re-negotiated, if possible, or withdrawn if it is agreed to be non-essential. In this case the reasons will be documented on the CCN

Monitoring of changes

The changes will be monitored by the Project Manager and reviewed with the Core Team during Project Status Meetings/Project Conference Calls to establish priority and possible resolution.

2.7.2.3 – Project Management Tasks

Successful implementation of Datastream Now! or comparable systems requires that the project be accurately planned with key goals and objectives established and documented. These goals will be developed by the ENP / Datastream or other vendor project team and published to provide a clear understanding of timelines and project milestones. Managing these goals, objectives, and milestones is a critical component of effective implementation, because they will form the criteria against which success will be measured.

Datastream or other vendor will provide the following Project Management services:

- Perform Business Assessment meeting(s) or conference calls
- Develop Project Plan and Schedule
- Manage and update Project Plan and Schedule
- Coordinate project events with ENP core team and Datastream or other vendor services
- Prepare and distribute project reports as specified
- Participate in or review results of kickoff and review meetings to ensure accurate and on-time delivery
- Perform miscellaneous project administration (e.g. arrange travel, internal project updates)
- Anticipate problem areas and expedite solutions

2.7.2.4 – Datastream or other Vendor Resources

Datastream or other vendor will appoint a Project Team to support ENP implementation effort. The team will consist of:

- **Project Manager** – This individual will be the single point of contact for ENP and will be responsible within Datastream or other vendor for the success of the project. This individual will ensure timely, quality support by the Datastream or other vendor Implementation team as well as be responsible for ENP overall satisfaction and goal achievement.

- **Project Lead Consultant** – This individual will be the on-site resource responsible for the implementation of Datastream Now! or comparable system. This EAM consultant is the primary on-site specialist who will review the client's business processes, provide direction on decisions about the Datastream 7i or comparable system, configure and test the Datastream 7i or comparable system, and provide overall assistance in the implementation effort. The Datastream Lead Consultant will work closely with ENP on-site personnel and project management to facilitate a technically sound implementation.

- **Technical Consultant** – This Datastream or other vendor representative will install the Datastream 7i or comparable system software. The Technical Consultant will work closely with ENP Information Resources staff to ensure that software is appropriately configured on the proper platform. Following installation, the Technical Consultant will perform system testing to ensure connectivity and system operation. If this is a hosted installation, the Technical Consultant will perform the installation from Corporate Headquarters of Datastream or other vendor.

- **Project Coordinator** -This Datastream representative will be responsible for assisting the Project Manager in scheduling and assigning resources. They will also serve as an in-house resource and contact for ENP Team.

2.7.2.5 – ENP Resources

Below are the recommended ENP resources for the implementation of Datastream Now! or comparable system.

- **Project Manager** – This individual, along with the Datastream or other vendor Project Manager, is responsible for the overall success of the project and is the Datastream or other vendor Project Manager counterpart.

- **Core Team Members** – ENP assembles a Core Team that consists of key decision-makers with knowledge of the different business units and processes (i.e. maintenance operations, inventory management and procurement). These individuals are heavily involved during the initial planning process to develop the appropriate design and implementation of Datastream 7i or comparable system.

- **Extended Project Team Members** – ENP Subject Matter Experts will make up the Extended Project Team. These resources, from different business units and departments, fulfill specific roles in the implementation process and assist the Core Team. Many of these resources will have responsibilities within their business units once the system is live.

- **System Administrator(s)** – These individuals are responsible for administration of the Datastream 7i or comparable system including maintaining application security, system codes and configurations. The System Administrators are members of the Core Team and help facilitate the decision-making process.

- **IT Support Staff** – These ENP individuals are responsible for all technical issues, including network and Internet connectivity.

2.7.2.6 – Datastream Now! or comparable system Installation

Hosted Installation of Datastream 7i or comparable system

This offsite task consists of the hosted installation of Datastream 7i or comparable system. Two databases will be installed: the Production Database and the Training Database. Once tested, the Integrator will provide the Information Systems personnel with the connection information.

Deliverables

The deliverable will be a functional installation of Datastream 7i or comparable system. URLs, usernames, and passwords will be sent to the Information Systems personnel.

2.7.2.7 – Datastream Now! or comparable system Implementation Tasks

Datastream or other vendor would provide implementation for an agreed Datastream or comparable Computerized Maintenance Management System. Implementation of additional capabilities, if required, would result in additional costs. Datastream proposed that implementation is limited to the functionality included in the Datastream Now! or comparable system configuration listed. Any functionality requested outside the scope of Datastream Now! or comparable system will constitute a change in scope, requiring a full needs assessment to assess the appropriate number of days to successfully complete the requested tasks. Any additional days or services requested will be billed at the standard rate of $1,800/day for consultants & $2,000/day for Project Management.

Datastream Now! or comparable system

The following outlines the standard Datastream Now! or comparable system implementation & tasks.

Core Team Training

Datastream 7i or comparable system overview provides Customer Core Team members with the knowledge required to make decisions that will affect the implementation of Datastream 7i or comparable system. Hands-on training with the system provides the Core Team Members with a working level of understanding. The Core Team Training task will consist of in-depth training on the Datastream Now! or comparable system configuration.

Day 1	Navigation and Equipment
Introduction	Welcome: Description of Datastream 7i or comparable system and Course Objectives
Navigation	Basic System Navigation
	Logging In, Menu Bar, Tool Bar, Form Navigation
	Searching, Sorting, Save Layout, Export to Excel and Filter Data (Dataspys)
Equipment	Define Assets, Positions, Systems and Locations
	Discuss Equipment Hierarchy and Cost Rollup
	Create Equipment Manufacturers, Cost Codes, Departments
	Generate Equipment Classifications and Categories
	Create Equipment Closing Code Setup
	Add Custom Fields
	Set up Equipment Warranty Documents
	Introduce Warranty Claims
Equipment Hierarchy	**Create Equipment Hierarchies and Cost Roll-up**
Meters	**Create and Manage Meters**
	Associate Meters to Equipment

	Take Meter Readings and Roll Readings Down in Structure

Day 2	Materials
Review	**Review and/or Complete Previous Day's Topics**
Materials	Create Stores, Bins, Purchase Order Terms, Tax Codes, Commodities, Review Units of Measure, and Reasons for Return
	Create Suppliers and Part Manufacturers
	Define and Manage Parts Information and Components of the Parts Catalogue
	Bin-to-Bin Transfers
	Asset / Part Association and Asset Initialization
Physical Inventory	**Create and Manage Stock Takes**
Materials Management	**Low Stock Requisitions**
	Store-to-Store Transfers
	Non-Purchase Order Receipts
	Part Issue and Return Screen

Day 3	Work
Review	**Review and/or Complete Previous Days' Topics**
Work Setup	Create Trades and Personnel – More discussion on Departments
	Create Shifts and Supervisors
	Create Material Lists, Task Lists and Permits
	Review Work Order Priorities and Work Order Types
	Preventive Maintenance Setup
	Discuss Preventive Maintenance Routes
Work	**Preventive Maintenance Batch Generation**
	Work Order Screen Overview
	Creating Work Requests Using Work Order Screen

	Work Order Screen: Activity Details (Scheduling, Recording Labor, Part Reservations, Part Issues, Meter Readings, and Closing)
	Issue Parts with Materials Management Screen
	Work Order Quick Close
	Standard Work Orders
	Work Order Scheduling Screen

Day 4	Projects, Service Requests
Review	**Review and/or Complete Previous Days' Topics**
Projects	Project Budget Codes and Project Setup
Work	Quick Review of Work Order Against Project
Service Requests	Service Request Setup (Systems, Properties, Customers, Standard Work Orders, Service Codes, and Personnel Setup)
	Create Service Request (Call Center Screen)
	Create Service Request (Caller Screen)
	Assigning Personnel
	Relationship between Work Orders and Service Requests (two lifecycles)
	Booking Hours and Issuing Parts on Service Request Screen
	Recording Log Entries
	Information Requests

Day 5	Purchasing
Review	**Review and/or Complete Previous Days' Topics**
Materials Review	**Stock Replenishment – Review of Part-Stock-Supplier Setup**
	Review Low Stock Requisitions
	Review Parts Issue
Purchasing Setup	Create Clauses, Secondary Delivery Address and Review Purchase Order Terms
	Create and Approve Manual Requisitions for Stock Parts, Non-Stock Parts Services, and Parts tracked by Asset
	Generate Purchase Orders
Purchasing	Create Manual Purchase Orders, Including Asset PO

	Purchase Order Revisions and Revision History
	Purchase Order Receiving
	Return Goods to Supplier
	Assign Part Codes

Day 6	Operations and Administration
Review	**Review and/or Complete Previous Days Topics**
Operations	**HTML Setup**
	Screen Flow Setup
	Overview Screen Setup with Portlets and HTML Content
	Screen Flow Functionality
	Classes and Custom Field Review
	Document Setup
	System Code Review (Types, Statuses, and Codes)
Security	**Audit Trail Setup**
	Multi-Organization Setup
	Installation Parameters
	Organization Setup
	User Groups
	Status Authorizations
	User-Level Security
	Screen Designer
Reports	Brief overview for how to access extra reports in Oracle Forms. Not available for customers on SQL.

Deliverables

These days of implementation will yield a Core Team trained on the functionality of Datastream Now! or comparable system.

Risks

If resources are not committed during the training days of the implementation, then a transfer of knowledge will not take place. This transfer of knowledge is critical in the creation of the implementation plan.

System Design and Configuration Assistance

This session will be conducted at the conclusion of Core Team Training. Topics of discussion include data naming conventions, equipment hierarchy setup, security settings and other system setup issues. A System Design document will be delivered the end of the Data Development week to provide the project team with a document of the actions taken to complete the design of the Datastream 7i or comparable system.

Day 7-10	System Design and Configuration Assistance
Review	Review Questions from Training
	Map out scope of initial implementation to include which screens will be utilized.
	Give ideas and develop base naming conventions for Parts, Assets, Employees, Trades, Classes, Cost Codes, Departments, etc.
	Discuss Equipment Hierarchy and create a basic plan for customer to design their structures (Assets, Positions, Systems, & Locations).
	Define action plan for customer to begin data collection and data entry in Datastream 7i or comparable system. This should cover all primary modules.
	Discuss security groups and rights associated.
	Review of Basic Menu / Screen Access for each Group
	Create Users
	Assign Users to Groups
	Start initial Screen Design for each Group
	Make formal plans and task assignments for follow up Data Development Week. This time should be used to identify Tasks for the consultant to cover the final week and which tasks the customer will be responsible for.

Deliverables

The deliverable from implementation planning will be the beginning of a System Design document that will be delivered after the Data Development week. This document outlines the actions taken to complete the design of the Datastream 7i or comparable system.

Risks

If resources are not committed during system design and configuration assistance, then a transfer of knowledge will not take place. This transfer of knowledge will be critical in carrying out assigned tasks during the execution phase of the implementation. Inability to carry out the assigned task may cause the project and implementation to fail.

Data Development Assistance

The object of this task is to begin the setup of the proper data elements needed to start utilizing the Datastream 7i or comparable system. System configuration will also continue as needed to make sure that all security and configuration changes are complete and documented. The customer System Administrator needs to be available for this entire task in order to gain the knowledge to add or modify these settings in the future.

Day 11 to 15	Data Development Assistance
Review	Review Implementation Questions
	Continue Configuration
	Custom Field Creation
	Begin population of base table data (Cost Codes, Department, Trades, etc.)
	Consultant Documentation Time

Deliverable

The System Design document from the System Design and Configuration phase will be the complete. Also, from the third week should be a minimally developed database, aided by the Datastream Consultant. The level of ENP's input time in developing the database with its own resources will determine if the database is ready for production.

Risks

Risks include that the action items discussed during System Design and Configuration Assistance are not executed properly and that the personnel involved are not committed full time. In addition, if a resource is not assigned to mirror the Datastream Consultant, transfer of knowledge may not take place.

2.7.3.0 – Project Staffing/Scheduling

Task Name & Description	*Resource(s)*	*Estimated Task Duration*	*Estimated Time Required*
Definition Phase			
Alignment/Kickoff/ISD: Project kickoff and subsequent creation of ISD.	Project Manager	Included	100%
Design Phase			
Product Installation: Hosted Installation of Datastream 7i or comparable system	Technical Consultant **Client Resources:** Customer IT	Included	100% 0%

Task Name & Description	Resource(s)	Estimated Task Duration	Estimated Time Required
Core Team Training: Product training for the core team to develop an understanding of Administration, Equipment, Work Orders, Preventive Maintenance, Inventory and Purchasing	Project Lead Consultant **Client Resources:** Customer Core Team	6 days	100% 100%
System Design and Configuration: Develop a design for the completion of the Datastream 7i or comparable system implementation through security and configuration setup	Project Lead Consultant **Client Resources:** Customer Core Team	4 days	100% 100%
Develop Phase			
Data Development: Enter data as needed to help progression to a live production database.	Project Lead Consultant **Client Resources:** Customer Project Lead	5 days	100% 80%
Implementation Phase			
Go Live: Customer starts using the system.	**Client Resources:** Customer Project Lead	N/A	100%
Project Closeout: Review and sign off on project	Project Manager **Client Resources:** Customer Project Manager	Included	100% 100%

2.8 Cost Estimates and Sources of Supply

2.8.1 Cost Estimate for Electrical Building Addition.

Table 2-5a: Electrical Maintenance Building 30 x 50 ft. addition - Estimated Cost (USD)

					S.F.	1,500	
		LABOR		MATERIALS		EQUIPMENT	
DESCRIPTION		UNIT	TOTAL	UNIT	TOTAL	UNIT	TOTAL
GENERAL CONDITIONS			$14,090		$5,292		$2,100
STEAM CLEAN - VORTECHNICS OR COMPARABLE			$0		$0		$0
SITE WORK-N/A			$752		$157		$1,074
CONCRETE			$4,959		$7,861		$0
MASONRY - WALLS - 8" CONCRETE MASONRY UNITS (CMU)			$0		$0		$0
METAL BUILDING / STEEL			$7,550		$13,690		$1,560
CARPENTRY			$127		$87		$0
FINISH CARPENTRY / MILLWORK / SET OWNERS ITEMS			$0		$0		$0
MOISTURE PROTECTION			$445		$839		$0
DOORS / HARD WALL (H.W.) / GLASS / STOREFRONT			$400		$2,430		$0
GYPSUM ASSEMBLIES			$1,817		$2,387		$0
FINISHES - PAINT - FLOORING			$4,221		$1,908		$0
SIGNAGE			$0		$0		$0
FURNISHINGS TO CONVEYING SYSTEMS - N/A			$0		$0		$0
		SUBTOTAL	$34,362	**TOTAL**	$34,650	**TOTAL**	$4,734
						TOTAL	**$73,746**
DIVISION	SUB		AMOUNT	NOTES			
							SqFt cost
SITEWORK			-				$ -
SURVEY ALLOWANCE			-				
STRIPING			-				
LANDSCAPING			-				$ -
MASONRY - REAR WALL ONLY			-				$ -
MASONRY - FRONT / SIDES - SPLIT FACE -10'			-				
MASONRY REBAR			-				
METAL BUILDING - ALLOWANCE - $11.75 / SQUARE FOOT (SF)			-				$ -
METAL BUILDING LABOR			-				$ -
MISCELLANEOUS STEEL-PIPE BOLLARDS			-				$ -
ROUGH CARPENTRY			-				$ -
FINISH CARPENTRY			-				$ -
MILLWORK			-				$ -
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)			-				$ -
SHEET WATERPROOFING			-				$ -
ROOFING - CONNECTION			-				$ -
CAULKING			350	WINDOWS			$ 0.23
INTERIOR DOORS							
DOORS / WINDOWS			-				$ -
OVERHEAD DOOR - 10'X12'			-				$ -
STOREFRONT - WINDOWS - #6			2,400	4'X4'-1" INSULATED GLASS-$550 EA			$ 1.60
DRYWALL			-				$ -
HARD TILE			-				$ -
ACOUSTICAL CEILING			-				$ -
CARPET			-				$ -
PAINT - EXTERIOR BLOCK			-				$ -
SPECIALTIES			-				$ -
EXTERIOR / INTERIOR SIGNAGE			-				$ -
TOILET ACCESSORIES			-				$ -
FIRE EXTINGUISHERS			275	$275 EA			$ 0.18
FIREPLACE			-				$ -
KITCHEN EQUIPMENT			-				$ -
AWNINGS			-				$ -
DOCK EQUIPMENT			-				$ -
MINI-BLINDS			750	$125 PER WINDOW			$ 0.50
PLUMBING - RESTROOM			-				$ -
DRAIN - STEAM CLEAN			-				$ -
AIR COMPRESSOR LINE			-				$ -
HVAC-SPLIT SYSTEM			3,700	400 SF/TON @ $1850 TON=2 TONS			$ 2.47
ELECTRICAL - $4 SF			6,000	1500 SF			$ 4.00
LIGHT FIXTURES			-	This cost to cover -High Bay Lights/200AMP Panel/			$ -
FIRE ALARM			-	Convenience Outlets			$ -
SECURITY SYSTEM			-	and Lights-2'x4'			$ -
TELE/DATA CABLING			-				$ -
		N/A	-				$ -
	SUBCONTRACTOR TOTAL===>		**$13,475**			**TOTAL COST**	$87,221
				Insurance & Business fee		0.50%	$436
						SUB-TOTAL	$87,657
				Construction Company fee		10.0%	$8,766
						SUB-TOTAL	$96,422
					Bond	0.0%	$0
ARCHITECTURALS	$1,500			**NEW BUILDING/SITE TOTAL PRICE**			**$96,422**
FOUNDATION PLANS - METAL BUILDING	$1,500						
						COST / S.F.	**$ 64.28**

Table 2-5b: Electrical Maintenance Building Addition Details - Estimated Cost (USD)

GENERAL CONDITIONS			LABOR		MATERIAL		EQUIPMENT	
DESCRIPTION	QTY.	UNIT	UNIT	TOTAL	UNIT	TOTAL	UNIT	TOTAL
Superintendent	1	month (mo.)	$7,000.00	$7,000		$0		$0
Project Management Assistant (P.M.A.)/ Submittal Assistant	1	month (mo.)	$833.00	$833		$0		$0
Project Manager	1	month (mo.)	$3,907.00	$3,907		$0		$0
Builders Risk	1,000,000	%	$0.00	$0		$0		$0
General Liability	1,500,000	%	$0.06	$0	$0.00	$0	$0.00	$0
Survey/Layout	8	hours		$0	$125.00	$1,000		$0
Utility Hook Up Fees	0	Lump Sum (LS)		$0			$0.00	$0
Permits	$ -	$$	$0.00	$0	$0.00			$0
Plan Expense	1	Lump Sum (LS)	$0.00	$0	$450.00	$450		$0
Miscellaneous Supplies	1	month (mo.)		$0	$300.00	$300		$0
Testing	0	Lump Sum (LS)	$4,000.00	$0		$0		$0
Job Utilities	0	month (mo.)		$0		$0	$200.00	$0
Winter Protection	0	month (mo.)		$0	$0.00	$0	$450.00	$0
Telephone/Mobile	1	month (mo.)		$0	$175.00	$175		$0
Temporary Toilets	1	month (mo.)		$0	$90.00	$90		$0
Temporary Construction	0	Lump Sum (LS)		$0		$0		$0
Job Signs	1	each (ea.)	$0.00	$0	$200.00	$200		$0
Travel / food / lodging	0	month (mo.)	$200.00	$0		$0		$0
Temporary Fences	0	Lineal foot (LF)	$1.00	$0	$1.00	$0		$0
Safety	1	Lineal foot (LF)		$0	$450.00	$450		$0
Fall Protection	0	Lineal foot (LF)	$2.50	$0	$2.50	$0		$0
Temporary Labor	1	month (mo.)	$150.00	$150	$25.00	$25		$0
Dumpster / Removal	1	each (ea.)	$0.00	$0	$450.00	$450		$0
Field Office / Trailer	1	month (mo.)	$0.00	$0	$0.00	$0	$200.00	$200
Company Truck Expense	1	month (mo.)	$0.00	$0		$0	$300.00	$300
Storage Trailers	0	month (mo.)	$20.00	$0	$150.00	$0	$20.00	$0
Tools / Equipment	1	Lump Sum (LS)	$500.00	$500	$1,250.00	$1,250		$0
Fuels / Oil / Tolls	1	month (mo.)	$0.00	$0	$350.00	$350		$0
Daily Cleaning	1	month (mo.)	$200.00	$200		$0		$0
Final Cleaning	1,500	Lump Sum (LS)		$0	$0.20	$300	$0.00	$0
Architectural Plans	1	each (ea.)		$0	$0.00	$0	$1,500.00	$1,500
Structural Engineer	1	each (ea.)	$1,500.00	$1,500	$0.00	$0		$0
			SUBTOTAL==>	$ 14,090		$ 5,040		$ 2,000
			0.0%	$ -	5.0%	$ 252	5.0%	$ 100
				$ 14,090		$ 5,292		$ 2,100
			TOTAL GENERAL CONDITIONS===>			$ 21,482		
CONSTRUCTION MANAGER						22%		
Management Trailer		month (mo.)	$75.00	$0	$250.00	$ -		$0
Furniture		Lump Sum (LS)		$0	$2,984.00	$0	$150.00	$0
Water cooler		month (mo.)		$0	$20.00	$0		$0
Cleaning of trailer		month (mo.)	$0.00	$0	$216.00	$0		$0
Telephone system		each (ea.)		$0	$700.00	$0	$2,250.00	$0
Fax		each (ea.)		$0	$415.00	$0	$340.00	$0
Copier		month (mo.)		$0	$75.00	$0	$163.00	$0
Office equipment		month (mo.)		$0	$55.00	$0		$0

2.8.2 Cost Estimate for Mechanical Maintenance Building Addition.

Table 2-6a: Mechanical Maintenance Building Addition - Estimated Cost (USD)

					S.F.	6,925	
		LABOR		MATERIALS		EQUIPMENT	
DESCRIPTION		UNIT	TOTAL	UNIT	TOTAL	UNIT	TOTAL
GENERAL CONDITIONS			$51,360		$11,645		$4,725
STEAM CLEAN VORTECHNICS OR COMPARABLE			$1,500		$4,950		$0
SITE WORK-N/A			$0		$0		$0
CONCRETE			$14,713		$14,773		$0
MASONRY - WALLS - 8" CONCRETE MASONRY UNITS (CMU)			$12,273		$7,364		$4,909
METAL BUILDING / STEEL			$29,200		$52,960		$6,040
CARPENTRY			$405		$271		$0
FINISH CARPENTRY / MILLWORK / SET OWNERS ITEMS			$0		$0		$0
MOISTURE PROTECTION			$323		$673		$0
DOORS / HARD WALLS (H.W.) / GLASS / STOREFRONT			$2,010		$16,250		$0
GYPSUM ASSEMBLIES			$11,062		$3,949		$0
FINISHES - PAINT - FLOORING			$13,350		$5,197		$0
SIGNAGE			$0		$0		$0
FURNISHINGS TO CONVEYING SYSTEMS - N/A			$0		$0		$0
		SUBTOTAL	$136,197	TOTAL	$118,031	TOTAL	$15,674
						TOTAL	$269,902
DIVISION	SUB		AMOUNT	NOTES			
							SqFt cost
			-				$ -
SITEWORK			-				$ -
SURVEY ALLOWANCE			-				
STRIPING			-				
LANDSCAPING			-				$ -
MASONRY - REAR WALL ONLY			-				$ -
MASONRY - FRONT / SIDES - SPLIT FACE -10'			-				
MASONRY REBAR			-				
METAL BUILDING - ALLOWANCE - $11.75 / SQUARE FOOT (SF)			-				$ -
METAL BUILDING LABOR			-				$ -
MISCELLANEOUS STEEL - PIPE BOLLARDS			-				$ -
ROUGH CARPENTRY			-				$ -
FINISH CARPENTRY			-				$ -
MILLWORK			-				$ -
EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)			-				$ -
SHEET WATERPROOFING			-				$ -
ROOFING - CONNECTION			-				$ -
CAULKING			-	WINDOWS			$ -
INTERIOR DOORS							
DOORS / WINDOWS			-				$ -
OVERHEAD DOOR -10'X12'-			-				$ -
STOREFRONT - WINDOWS -#6			-	4'X4'-1/4" TEMPERED GLASS-$550 EA			$ -
DRYWALL			-				$ -
HARD TILE			-				$ -
ACOUSTICAL CEILING			-				$ -
CARPET			-				$ -
PAINT - EXTERIOR BLOCK			-				$ -
SPECIALTIES			-				$ -
EXTERIOR / INTERIOR SIGNAGE			-				$ -
TOILET ACCESSORIES			1,400	$550 -STALL(2)/$300 TOILET ACCESSORIES			$ 0.20
FIRE EXTINGUISHERS			550	$275 EA			$ 0.08
FIREPLACE			-				$ -
KITCHEN EQUIPMENT			-				$ -
AWNINGS			-				$ -
DOCK EQUIPMENT			-				$ -
MINI-BLINDS			-				$ -
PLUMBING - RESTROOM			7,500				$ 1.08
DRAIN - STEAM CLEAN			1,650				$ 0.24
AIR COMPRESSOR LINE			3,500	Hard Pipe			$ 0.51
HEATING VENTILATING AIR CONDITIONING (HVAC) - WINDOW UNITS			-	(2) WINDOW UNITS			$ -
ELECTRICAL - $4 SF			27,700	6925 SF			$ 4.00
LIGHT FIXTURES			-	This cost to cover -High Bay Lights/200AMP Panel/			$ -
FIRE ALARM			-	Convenience Outlets/Air Compressor Connection			$ -
SECURITY SYSTEM			-	and Lights-2'x4'			$ -
TELE/DATA CABLING			-				$ -
			-				$ -
SUBCONTRACTOR TOTAL===>			$42,300			TOTAL COST	$312,202
				Insurance & Business fee		0.50%	$1,561
						SUB-TOTAL	$313,763
				Construction Company Fee		10.0%	$31,376
						SUB-TOTAL	$345,140
					Bond	0.0%	$0
ARCHITECTURALS	$2,500			NEW BUILDING/SITE TOTAL PRICE			$345,140
FOUNDATION PLANS - METAL BUILDING	$2,500						
						COST / S.F.	$ 49.84

Table 2-6b: Mechanical Maintenance Building Addition Details - Estimated Cost (USD)

GENERAL CONDITIONS			LABOR		MATERIAL		EQUIPMENT	
DESCRIPTION	QTY.	UNIT	UNIT	TOTAL	UNIT	TOTAL	UNIT	TOTAL
Superintendent	4	MOS	$7,000.00	$28,000		$0		$0
Project Management Assistant (P.M.A.)/ Submittal Assistant	4	MOS	$833.00	$3,332		$0		$0
Project Manager	4	MOS	$3,907.00	$15,628		$0		$0
Builders Risk	1,000,000	%	$0.00	$0		$0		$0
General Liability	1,500,000	%	$0.06	$0	$0.00	$0	$0.00	$0
Survey / Layout	12	HRS		$0	$125.00	$1,500		$0
Utility Hook Up Fees	0	LS		$0			$0.00	$0
Permits	$ -	$$	$0.00	$0	$0.00			$0
Plan Expense	1	LS	$0.00	$0	$450.00	$450		$0
Miscellaneous Supplies	5	MOS		$0	$300.00	$1,500		$0
Testing	0	LS	$4,000.00	$0		$0		$0
Job Utilities	0	MOS		$0		$0	$200.00	$0
Winter Protection	0	MOS		$0	$0.00	$0	$450.00	$0
Telephone / Mobile	4	MOS		$0	$175.00	$700		$0
Temporary Toilets	4	MOS		$0	$90.00	$360		$0
Temporary Construction	0	LS		$0		$0		$0
Job Signs	1	EA	$0.00	$0	$200.00	$200		$0
Travel / food / lodging	0	MOS	$200.00	$0		$0		$0
Temporary Fences	0	LF	$1.00	$0	$1.00	$0		$0
Safety	1	LS		$0	$450.00	$450		$0
Fall Protection	0	LF	$2.50	$0	$2.50	$0		$0
Temporary Labor	4	MOS	$150.00	$600	$25.00	$100		$0
Dumpster / Removal	4	EACH	$0.00	$0	$450.00	$1,800		$0
Field Office / Trailer	4	MOS	$0.00	$0	$0.00	$0	$200.00	$800
Company Truck Expense	4	MOS	$0.00	$0		$0	$300.00	$1,200
Storage Trailers	0	MOS	$20.00	$0	$150.00	$0	$20.00	$0
Tools / Equipment	1	LS	$500.00	$500	$1,250.00	$1,250		$0
Fuels / Oil / Tolls	4	MOS	$0.00	$0	$350.00	$1,400		$0
Daily Cleaning	4	MOS	$200.00	$800		$0		$0
Final Cleaning	6,900	LS		$0	$0.20	$1,380	$0.00	$0
Architectural Plans	1	EA		$0	$0.00	$0	$2,500.00	$2,500
Structural Engineer	1	EA	$2,500.00	$2,500	$0.00	$0		$0
			SUBTOTAL==>	$ 51,360		$ 11,090		$ 4,500
			0.0%	$ -	5.0%	$ 555	5.0%	$ 225
				$ 51,360		$ 11,645		$ 4,725
			TOTAL GENERAL CONDITIONS===>			$ 67,730		
						$ 16,932.38	PER MO.	
CONSTRUCTION MANAGER						20%		
Management Trailer		MO	$75.00	$0	$250.00	$ -		$0
Furniture		LS		$0	$2,984.00	$0	$150.00	$0
Water cooler		MO		$0	$20.00	$0		$0
Cleaning of trailer		MO	$0.00	$0	$216.00	$0		$0
Telephone system		EA		$0	$700.00	$0	$2,250.00	$0
Fax		EA		$0	$415.00	$0	$340.00	$0
Copier		MO		$0	$75.00	$0	$163.00	$0
Office equipment		MO		$0	$55.00	$0		$0

2.8.2.1 US Sources of Supply for Selected Building Products

Sources of supply for selected building products are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

Products: Industrial buildings

Supplier: **Washington Group International, Inc.**
Address: 720 Park Blvd.
Boise, ID 83712
USA
Telephone: 1-208-386-5000
Fax: 1-208-386-7186
E-mail: NA
Contact: NA
Web http://www.wgint.com

Products: Telecommunications

Supplier:	**Lucent Technologies, Inc.**
	600 Mountain Ave.
	Murray Hill, NJ 07974-2008
	USA
Telephone:	1-908-582-8500, 1-888-4-LUCENT (toll free in USA)
Fax:	1-908-508-2576
E-mail:	NA
Contact:	Sales
Web:	http://www.lucent.com

Supplier:	**Cisco Systems, Inc.**
	170 W. Tasman Dr.
	San Jose, CA 95134
	USA
Telephone:	1-650-404-3500, 1-800-533-NETS (toll free in USA)
Fax:	1-408-526-4100
E-mail:	NA
Contact:	Sales
Web:	http://www.cisco.com

Supplier:	**Graybar Electric Co., Inc.**
Address:	34 N. Meramec Avenue
	St. Louis, MO 63105
	USA
Telephone:	1-314-573-9200,1-800-GRAYBAR(1-800-472-9227) (toll free in USA)
Fax:	1-314-573-9455
E-mail:	NA
Contact:	Sales
Web:	http://www.graybar.com

Product: Indoor and outdoor lighting

Supplier:	**Holophane**
	214 Oakwood Ave.
	Newark, OH 43055
	USA
Telephone:	1-740-345-9631
Fax:	1-740-349-4426
E-mail:	NA
Contact:	Sales
Web:	http://www.holophane.com

Supplier:	**Lithonia Lighting**
Address:	1400 Lester Rd.
	Conyers, GA 30012
	USA
Telephone:	1-770-922-9000
Fax:	1-770-922-1677
E-mail:	NA
Contact:	Sales
Web:	http://www.lithonia.com

Product: Street, outdoor and area lighting

Supplier: **Unique Solutions Div., Holophane Lighting Corp.**
515-T McKinley Ave.
Newark, OH 43055
Telephone: 1-740-349-4160
Fax: 1-800-346-5923 (toll free in USA)
E-mail: NA
Contact: Unique Solutions
Web: http://www.holophane.com

Product: Electrical control systems and circuit breakers

Supplier: **Eaton Corp., Cutler-Hammer Group**
Address: 1000 Cherrington Pkwy
Moon Township, PA 15108
USA
Telephone: 1-412-893-3300
Fax: NA
E-mail: NA
Contact: Sales
Web: http://www.cutler-hammer.com

Product: Power distribution

Supplier: **GE Industrial Systems**
Address: 1635 Broadway
Fort Wayne, IN 46802
USA
Telephone: 1-260-439-2000,1-770-644-7713
Fax 1-770-644-7713
E-mail: NA
Contact: Sales
Web: http://www.geindustrial.com

Product: Other industrial electrical products

Supplier: GE Industrial Systems
Telephone: 1-305-551-5176
Fax: 1-305-551-5129

Product: Air conditioning

Supplier: **Carrier Corp.**
Address: Carrier Pkwy., A&R Bldg.
Syracuse, NY 13221-4808

Latin America sales:
Carrier Interamerica Corporation – CMS – Sales
3450 NW 115 Ave
Miami FL 33178
USA

Telephone:	1-315-432-6000(New York), 800-227-7437 (toll free) 1-305-590-1000 (Latin America sales / Florida)
Fax:	1-315-432-7583 (New York), 1-305-590-1090 (Latin America sales / Florida)
E-mail:	ricardo.e.corrie@carrier.utc.com
Contact:	Ricardo E. Corrie
Web:	http://www.carrier.com

Product: Security systems

Supplier:	**ADEMCO**
Address:	180-T Michael Dr. Syosset, NY 11791 USA
Telephone:	1-516-921-6704, 1-800-645-7492 (toll free in USA)
Fax	1-516-496-7454
E-mail:	NA
Contact:	Sales
Web:	http://www.ademco.com

Supplier:	**Honeywell Security**
Address:	2700 Blankenbaker Pkwy Ste 150 Louisville KY 40299 USA
Telephone:	1-502-297-5700; 1-800-467-5875 (toll free in USA)
Fax:	1-502-666-7021
E-mail:	NA
Contact:	NA
Web:	http://www.security.honeywell.com

Product: Security gates, slide/swing gate operators, access control equipment, systems integration, industrial barrier gates & navigational lights

Supplier:	**EDKO, Inc.**
Address:	1019 Airpark Dr. Sugar Grove, IL 60554 USA
Telephone:	1-630-556-4499, 800-800-EDKO (toll free in USA)
Fax:	1-630-556-4478
E-mail	sales@edco.com
Contact:	Sales
Web:	http://www.edko.com

Product: ***Fire alarm and suppression***

Please see Section 4.

2.8.3 Cost Estimate for Maintenance Equipment.

Table 2-7a: Maintenance Equipment Costs and Sources of Supply
Tire Changing Equipment

Item A: **Large Industrial Tire Changer**

Supplier Name: **Kwick Way Products Inc.**
Address: 500 57th Street, Marion, IA 53203
Telephone: 1-319-377-9421 / 1-800-553-5953 X256
Fax: 1-319-377-9421
E-mail:
Contact Name: Mitch Malcolm
Web: www.kwick-way.com

Brand:	***Kwick-Way***	***Kwick-Way***
Model:	Jumbo 26	Jumbo 56 MAXI SA
Cost:	NA	NA

Supplier Name: **Eagle Equipment Inc. / Standard Tools & Equipment**
Address: 4810 Clover Road, Greensboro, NC 27405
Telephone: 1-336-697-7177 / 800-336-2776
Fax: 800-590-9841
E-mail: sales@eagleequip.com
Contact Name:
Web: www.eagleequip.com

Brand:	***Corgi***	***Corgi***	***Corgi***
Model:	HD600	AG52L HD	12000 ECL
Cost:	$ 8,740	$ 18,780	$ 24,100

Supplier Name: **S & J's Discount Tools**
Address: 2892 Prarie Dr., Lewis Center, OH 43035
Telephone: 1-877-355-7455
Fax: 1-877-907-0041
E-mail:
Contact Name:
Web: www.sjdiscounttools.com

Brand:	***Coats***	***Coats***	***Coats***
Model:	5000	6000	9000
Cost:	$ 9,492	$ 8,465	$ 11,857

Item B: **Small Tire Changer**

Supplier Name: **Eagle Equipment Inc.**
Address: 4810 Clover Road, Greensboro, NC 27405
Telephone: 1-336-697-7177 / 800-336-2776
Fax: 800-590-9841
E-mail: sales@eagleequip.com
Contact Name:
Web: www.eagleequip.com

Brand:	***Coats***	***Corgi***	***Coats***
Model:	4050A	A9220-1500	9024E
Cost:	$ 3,299	$ 6,220	$ 9,999

Supplier Name: **Automotive Service Equipment**
Address: 379 Cardinal Circle, Torrington, CT 06790
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 419-831-0245
E-mail: contact@asedeals.com
Contact Name:
Web: www.asedeals.com

Brand:	***Accuturn***	***Accuturn***	***Accuturn***	***Ranger***	***Ranger***	***Ranger***
Model:	220A	320S	326SFA	RX850	RX950	R26EX
Cost:	$ 2,466	$ 2,835	$ 5,455	$ 1,664	$ 1,843	$ 4,001

Supplier Name: **Kwick Way Products Inc.**
Address: 500 57th Street, Marion, IA 53203
Telephone: 1-319-377-9421 / 1-800-553-5953 X256
Fax: 1-319-377-9421
E-mail:
Contact Name: Mitch Malcolm
Web: www.kwick-way.com

Brand:	***Kwick-Way***	***Kwick-Way***
Model:	585 Tilt - Tower	586 Tilt -Tower
Cost:	NA	NA

Supplier Name: **S & J's Discont Tools**
Address: 2892 Prarie Dr., Lewis Center, OH 43035
Telephone: 1-877-355-7455
Fax: 1-877-907-0041
E-mail:
Contact Name:
Web: www.sjdiscounttools.com

Brand:	***Coats***	***Coats***	***Coats***
Model:	4050A	5030E	5050E
Cost:	$ 2,212	$ 2,992	$ 4,537

Supplier Name: **America's Pride**
Address: 75 County St., Seekonk, MA 02771
Telephone: 1-508-336-9629 / 1-800-348-4244
Fax: 1-800-460-9416
E-mail: websales@americasprideonline.com
Contact Name:
Web: www.americasprideonline.com

Brand:	***Ranger***	***Ranger***
Model:	RX-850	RX-950
Cost:	$ 1,732	$ 1,918

Supplier Name: **Automotive Service Tools**
Address: 4000 Surfside Blvd. Suite 507, Corpus Christi, TX 74802
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 1-972-291-2655
E-mail: salesrep@automotiveservicetools.com
Contact Name:
Web: www.automotiveservicetools.com

Brand:	***Coats***	***Coats***
Model:	5030 (A or E)	COA-7050EX
Cost:	$ 3,299	$ 5,999

Item C: **Tire Spreader**

Supplier Name: **S & J's Discount Tools**
Address: 2892 Prarie Dr., Lewis Center, OH 43035
Telephone: 1-877-355-7455
Fax: 1-877-907-0041
E-mail:
Contact Name:
Web: www.sjdiscounttools.com

Brand:	***Branick***	***Branick***
Model:	5120	BR-EF
Cost:	$ 1,468	$ 4,371

Supplier Name: **ATS**
Address: 11500 Kilburn Road, Houston, TX 77055
Telephone: 1-713-956-6665 / 1-888-339-6665
Fax: 1-713-956-9565
E-mail: ats@alltiresupply.com
Contact Name:
Web: www.alltiresupply.com

Brand:	***Branick***	***Branick***	***Branick***	***Branick***	***Branick***
Model:	5120	BR-LREF	BR-EF	BR5660	BR-EFHD
Cost:	$ 1,380	$ 1,440	$ 3,984	$ 6,147	$ 6,177

Supplier Name: **Mile-X Equipment, Inc.**
Address: 801 N. 2nd Street, Coldwater, OH 45828
Telephone: 1-419-678-3818 / 1-800-837-3818
Fax: 1-419-678-2489
E-mail: sales@mile-x.com
Contact Name:
Web: www.mile-x.com

Brand:	***Branick***	***Branick***
Model:	5120	BR-LREF
Cost:	$ 1,079	$ 1,269

Supplier Name: **Myers Tire Supply**
Address: 7409 Whitepine Road, Richmond, VA 23237
Telephone: 804-794-3311/ 1-800-552-4411
Fax: 804-794-3461 / 1-804-714-0721
E-mail:
Contact Name:
Web: www.myerstiresupply.com

Brand:	***Branick***
Model:	5120
Cost:	$ 1,429

NA = Not Available / Not Applicable

Manufacturer:
Supplier name: **Branick Industries, Inc.**
Address 4245 Main Ave.
PO Box 1937
Fargo, ND 58107-1937
E-mail sales@branick.com
Telephone Phone: 701-281-8888, 800-437-4394 (toll free)
Fax Fax: 701-281-5900
Web http://www.branick.com

Table 2-7b: Maintenance Equipment Costs and Sources of Supply Air Compressors

Item A: **Diesel Powered Air Compressor**

Supplier Name: **US Diesel Engines LLC.**
Address: 100 W. Southern St. Unit 19, Birghton, CO 80601
Telephone: 1-303-654-1195 / 1-866-734-3735
Fax: 1-720-294-9776
E-mail: usdieselengines@aol.com
Contact Name:
Web: www.usdieselengines.com
Brand: ***ETQ***
Model: ETQDA011
Cost: $ 2,188

Supplier Name: **Diesel America West**
Address: P.O. Box986, Friday Harbor, WA 98250
Telephone: 1-360-378-4182 / 1-800-343-7351
Fax: 1-360-378-3315
E-mail: dawest@rockisland.com
Contact Name:
Web: www.daest.com
Brand: ***Loadstar***
Model: L100-22C125P30
Cost: $ 6,711

Supplier Name: **Cummins-Wagner**
Address: 717 N. Haven Circle, Chesapeake, VA 23322
Telephone: 1-757-547-4419
Fax: 1-757-547-3219
E-mail:
Contact Name: Randy Beauchamp
Web: www.cummins-wagner.com
Brand: ***Gardner Denver***
Model: HDR5-L3
Cost: $ 4,300

Supplier Name: **OESSCO**
Address: 4331 Bainbridge Blvd. , Chesapeake, VA 23324-0097
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: www.oessco.com
Brand: ***Champion***
Model: HDR5-3
Cost: $ 5,757

Item B: **Shop Air Compressor**
(20 HP, 440V, 3PH)

Supplier Name: **Cummins-Wagner**
Address: 717 N. Haven Circle, Chesapeake, VA 23322
Telephone: 1-757-547-4419
Fax: 1-757-547-3219
E-mail:
Contact Name: Randy Beauchamp
Web: www.cummins-wagner.com
Brand: ***Gardner Denver***
Model: EFC99F (Rotary Screw)
Cost: $ 9,773
Air Dryer: $ 1,807
Oil/Water Separator: $ 578

Supplier Name: **Cummins-Wagner**
Address: 717 N. Haven Circle, Chesapeake, VA 23322
Telephone: 1-757-547-4419
Fax: 1-757-547-3219
E-mail:
Contact Name: Randy Beauchamp
Web: www.cummins-wagner.com
Brand: ***Gardner Denver***
Model: HRA20-12
Cost: $ 6,901
Air Dryer: $ 1,807
Oil/Water Separator: $ 578

Supplier Name: **Automotive Service Tools**
Address: 4000 Surfside Blvd. Suite 507, Corpus Christi, TX 74802
Telephone: 1-860-626-9633 / 1-866-593-0600
Fax: 1-972-291-2655
E-mail: salesrep@automotiveservicetools.com
Contact Name:
Web: www.automotiveservicetools.com
Brand: ***Bend Pak Ranger***
Model: R20130H603
Cost: $ 2,999
Air Dryer: Not Included
Oil/Water Separator: Not Included

Supplier Name: **Automotive Service Equipment**
Address: 379 Cardinal Circle, Torrington, CT 06790
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 1-419-831-0245
E-mail: contact@asedeals.com
Contact Name:
Web: www.asedeals.com
Brand: ***BelAire***
Model: 5312D
Cost: $ 4,605
Air Dryer: Not Included
Oil/Water Separator: Not Included
Belt Guard After Cooler: $ 399 May need two
Low Oil Switch: $ 167 May need two
Auto Tank Drain: $ 83
Vibration Pads: $ 29

Supplier Name: **Green Valley Compressor**
Address: 429 N. Main, Keller, Texas 76248
Telephone: 1-360-378-4182 / 1-800-735-3507
Fax: 1-817-431-2070
E-mail: gv1@get.net
Contact Name: Troy Stapely
Web: www.greenvalleycompressor.com
Brand: ***Ingersoll Rand***
Model: 2000E20-FP
Cost: $ 6,955
Air Dryer: Not Included
Oil/Water Separator: Not Included
Air Cooled After Cooler: Included
Low Oil Switch: Included
Auto Tank Drain: Included
Vibration Pads: Not Included

Supplier Name: **Green Valley Compressor**
Address: 429 N. Main, Keller, Texas 76248
Telephone: 1-360-378-4182 / 1-800-735-3507
Fax: 1-817-431-2070
E-mail: gv1@get.net
Contact Name: Troy Stapely
Web: www.greenvalleycompressor.com
Brand: ***Ingersoll Rand***
Model: UP6-20 20HP (Rotary Screw)
Cost: $ 9,954
Air Dryer: $ 2,281
Oil/Water Separator: Not Included
Air Cooled After Cooler: Included
Low Oil Switch: ?
Auto Tank Drain: ?
Vibration Pads: Not Included
Sound Enclosure: Included

Supplier Name: **Mile-X Equipment, Inc.**
Address: 801 N. 2nd Street, Coldwater, OH 45828
Telephone: 1-419-678-3818 / 1-800-837-3818
Fax: 1-419-678-2489
E-mail: sales@mile-x.com
Contact Name:
Web: www.mile-x.com
Brand: ***Champion***
Model: HRA25-12ADV
Cost: $ 6,263
Air Dryer: Not Included
Oil/Water Separator: Not Included
Air Cooled After Cooler: Included
Low Oil Switch: Included
Auto Tank Drain: Included
Vibration Pads: Included
Sound Enclosure: Not Included

Supplier Name: **Industrial Air Compressors**
Address: 6356 Carter Ave., Merriam, Kansas 66203
Telephone: 1-913-671-1830
Fax: 1-913-671-1870
E-mail: info@industrial-air-compressors.com
Contact Name:
Web: www.industrial-air-compressors.com
Brand: ***Belaire***
Model: 278-5312D
Cost: $ 5,365
Air Dryer: $ 2,575 (Model # 278-HT75)
Oil/Water Separator: Not Included
Air Cooled After Cooler: Not Included
Low Oil Switch: Not Included
Auto Tank Drain: Not Included
Vibration Pads: Not Included
Sound Enclosure: Not Included

Supplier Name: **OESSCO**
Address: 4331 Bainbridge Blvd. , Chesapeake, VA 23324-0097
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: www.oessco.com
Brand: ***Champion***
Model: HRA20-12
Cost: $ 7,561
Air Dryer: Not Included
Oil/Water Separator: Not Included
Air Cooled After Cooler: Not Included
Low Oil Switch: Included
Auto Tank Drain: Included
Vibration Pads: Included
Sound Enclosure: Not Included

Supplier Name: **Hydraulic Service Company Inc.**
Address: 3215 Victory Boulevard, Portsmouth, VA 23702
Telephone: 1-757-487-2513
Fax: 1-747-487-4381
E-mail: websales@hydraulicservice.com
Contact Name: Mg Hassell
Web: www.hydraulicservice.com
Brand: ***Graco***
Model: HR10-12
Cost: $ 7,330
Air Dryer: Not Included
Oil/Water Separator: Not Included
Air Cooled After Cooler: Included
Low Oil Switch: Included
Auto Tank Drain: Included
Vibration Pads: Included
Sound Enclosure: Not Included

Manufacturers

Supplier Name: **Gardner Denver**
Address: 1800 Gardner Expwy.
Quincy, IL 62301
Telephone: 1-217-222-5400, 1-800-682-9868 (toll free)
Fax 1-217-228-8243
Web http://www.gardnerdenver

Supplier Name: **Ingersoll-Rand Co.**
Address: 200 Chestnut Ridge Rd.
Woodcliff Lake, NJ 07675
Telephone: 1-201-573-0123, 1-800-847-4041 (toll free)
Fax 1-201-573-3172
Web http://www.ingersoll-rand.com

Supplier Name: **Champion Equipment**
Address: 120 Mushroom Blvd.
Rochester, NY 14623
Telephone: 1-585-427-7411
Fax 1-585-427-7483
Web http://www.championequipment.us

Table 2-7c: Maintenance Equipment Costs and Sources of Supply Lube Equipment

Supplier Name: **OESSCO**
Address: 4331 Bainbridge Blvd. , Chesapeake, VA 23324-0097
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: www.oessco.com

Item A: **Grease Pump & Dispensor**

Description:	400 # Grease Pump	Grease Reel	Grease Handle	Inlet Grease Hose	3/8"Grease Swivel
Brand:	***Graco***	***Graco***	***Graco***	***Graco***	***Graco***
Model:	222-071	224-056	234-114	218-550	224-569
Unit Cost:	$ 1,313	$ 623	$ 96	$ 48	$ 74

Item B: **Oil Pumps & Reels**

Description:	55 Gal Oil Pump	50' Oil Reel	Oil Control Handle	Inlet Oil Hose
Brand:	***Graco***	***Graco***	***Graco***	***Graco***
Model:	204-264	224-058	234-114	218-549
Unit Cost:	$ 1,187	$ 517	$ 210	$ 44

Item C: **Antifreeze Diaphram Pump & Reel**

Description:	Diaphram Pump (for Antifreeze & Waste Oil)	50' Antifreeze Reel	Antifreeze Bib
Brand:	***Graco***	***Graco***	***Graco***
Model:	D73-525	243-582	180-685
Unit Cost:	442	492	19

Supplier Name: **Mile-X Equipment, Ic.**
Address: 801 N. 2nd Street, Coldwater, OH 45828
Telephone: 1-419-678-3818 / 1-800-837-3818
Fax: 1-419-678-2489
E-mail: sales@mile-x.com
Contact Name:
Web: www.mile-x.com

Item A: **Grease Pump & Dispensor**

Description:	Grease Reel	Air/Water/Oil Hose Reel
Brand:	***Hosetract***	***Hosetract***
Model:	HC-350	MC-550
Unit Cost:	$ 397	$ 356

Item B: **Waste Oil Recovery Pump & Tank**

Description:	Waste Oil System	Waste Oil System	Waste Oil System	Waste Oil System
Brand:	***JohnDow***	***JohnDow***	***JohnDow***	***JohnDow***
Model:	AGS180D	AGS-245D	AGS-285D	AGS-500D
Unit Cost:	$ 3,025	$ 3,679	$ 3,679	$ 4,739

Supplier Name: **Lube Technology/Willmar International**
Address: P.O. Box 456, ADA, MI 49301
Telephone: 1-616-676-1792
Fax: 1-616-676-1287
E-mail: wmogrady@iserv.net
Contact Name:
Web: www.iserv.net/~wmogrady/lube.html

Item A: **Grease Pump & Dispensor**

Description:	400# Grease Pum	Follower Plate	50', 1/4"Grease I	"Z"Swivel	Grease Reel
Brand:	***Lincoln Automotive***	***Lincoln Automotive***	***Lincoln Automotive***	***Lincoln Automotive***	***Lincoln Automotive***
Model:	LT926ME	LT83366ME	LT75600ME	LT5253ME	LT8315ME
Unit Cost:	$ 292	$ 37	$ 74	$ 15	$ 452

Item B: **Oil Pumps & Reels**

Description:	55 Gal Oil Pump	Oil Reel	Oil Control Valve
Brand:	***Lincoln Automotive***	***Lincoln Automotive***	***Lincoln Automotive***
Model:	LT424ME	LT8313ME	LT775ME
Unit Cost:	$ 260	$ 488	$ 84

Supplier Name: **Hydraulic Service Company Inc.**
Address: 3215 Victory Boulevard, Portsmouth, VA 23702
Telephone: 1-757-487-2513
Fax: 1-757-487-4381
E-mail: websales@hydraulicservice.com
Contact Name: Mg Hassell
Web: www.hydraulicservice.com

Item A: **Grease Pump & Dispenser**

Description:	120# Grease Pump	Follower Plate	Grease Valve	"Z" Swivel	Grease Reel
Brand:	***Graco***	***Graco***	***Graco***	***Graco***	***Graco***
Model:	224-058	Included W/Pump	242-056	202577	
Unit Cost:	675		94	54	Not Quoted

Item B: **Waste Oil Recovery Pump & Tank**

Description:	Waste Oil Recovery System (For 55 Gallon Drum)
Brand:	***Graco***
Model:	224701
Unit Cost:	$ 1,177

Item C: **Oil Pumps & Reels**

Description:	Oil Pump (55 Gal)	Oil Control Handl	Oil Reel, 50', 1/2"
Brand:	***Graco***	***Balcrank***	***Graco***
Model:	225-640	3330-009	224-058
Unit Cost:	$ 650	$ 283	$ 515

Item D: **Antifreeze Mixing Pump (Diaphram Type)**

Description:	Antifreeze Mixing Pump	Dual Inlet Manifold	Suction Hose (2) Req.	Wall Mounting Bracket	Hose Reel LP, 50', 1/2 "	Control Handle
Brand:	***Graco***	***Graco***	***Graco***	***Graco***	***Graco***	
Model:	23626 (1040 Pump	685984	236054	189233	243982	
Unit Cost:	$ 566	$ 181	$ 171	$ 63	$ 525	Not Quoted

Manufacturers:

Supplier Name: **Hosetract Industries**
Address: P.O. Box 80008
Fort Wayne, IN 46898-0008
Telephone: 1-260-489-8828, 1-888-489-8828 (toll free)
Fax 1-260-489-6088
Web http://www.hosetract.com

Supplier Name: **John Dow Industries, Inc.**
Address: 120 E. Tuscarawas Ave.
Barberton, OH 44203
Telephone: 1-330-753-6895, 1-800-433-0708 (toll free)
Fax 1-330-753-6419
Web NA

Supplier Name: **Lincoln Industrial Corporation**
Address: One Lincoln Way
St. Louis, MO 63120-1578
Telephone: 1-314-679-4200
Fax 1-800-424-5359
Web http://www.lincolnindustrial.com

Supplier Name: **Graco, Gusmer, Liquid Control, Decker**
Address: 88 11th Ave NE
P.O. Box 1441
Minneapolis, MN 55440-1441
Telephone: 1-612-623-6741, 1-877-844-7226
Fax 1-612-623-6580
Web http://www.graco.com

Table 2-7d: Maintenance Equipment Costs and Sources of Supply Vehicle Lifts

Supplier Name: **OESSCO**
Address: 4331 Bainbridge Blvd. , Chesapeake, VA 23324-0097
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: www.oessco.com

Description:	Two Post 15,000#	Two Post 20,000#	Four Post 19,000#
Brand:	***Mohawk***	***Mohawk***	***Mohawk***
Model:	TP-15	TP-20	TR-19
Unit Cost:	$ 13,280	$ 27,551	$ 10,765

Supplier Name: **Eagle Equipment Inc.**
Address: 4810 Clover Road, Greensboro, NC 27405
Telephone: 1-336-697-7177 / 800-336-2776
Fax: 800-590-9841
E-mail: sales@eagleequip.com
Contact Name:
Web: www.eagleequip.com

Description:	Two Post 15,000#	Two Post 15,000# - HD	Four Post 15,000#
Brand:	***Bend Pak***	***TP0-15***	***FP-155-18***
Model:	MX-15C	Eagle	Eagle
Unit Cost:	$ 5,299	$ 5,999	$ 4,499

Supplier Name: **Automotive Service Equipment**
Address: 379 Cardinal Circle, Torrington, CT 06790
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 419-831-0245
E-mail: contact@asedeals.com
Contact Name:
Web: www.asedeals.com

Description:	Two Post 15,000#	Two Post 18,000#	Four Post 18,000#	Four Post 27,000#
Brand:	***Bend Pak***	***Bend Pak***	***Bend Pak***	***Bend Pak***
Model:	MX-15C	MX-18C	BP-18	BP-27
Cost:	$ 4,285	$ 4,280	$ 5,255	$ 6,270
Rolling Bridge:			RJ-15	RJ-25
Cost:			$ 2,090	$ 3,560

Supplier Name: **Hill Equipment Company**
Address: 1226 Executive Boulevard, Suite 123, Chesapeake, VA 23320
Telephone: 1-757-548-4808
Fax: 1-757-548-1023
E-mail:
Contact Name: John Hill
Web:

Description:	Two Post 15,00#	Two Post 18,000#
Brand:	***Rotary***	***Rotary***
Model:	SPO15	SPO18
Cost:	$ 10,280	$ 13,747
Freight to Norfolk	$ 1,153	(Freight for both units)

Freight port of exit to destination additional.

Manufacturers:
Supplier Name: **Mohawk Lifts**
Address: P.O. Box 110
Amsterdam, NY 12010-0110
Telephone: 1-518-842-1431, 1-800-833-2006
Fax Fax: 518-842-1289
Web http://www.mohawklifts.com

Supplier Name: **Bend-Pak / Ranger**
Address: 1645 Lemonwood Dr.
Santa Paula, CA. USA 93060
Telephone: 1-800-253-2363 Toll Free
Fax 1-805-933-9970, 1-800-253-2363
1-805-933-9160 Fax
E-mail Sales Department sales@bendpak.com
Export Sales Department exportsales@bendpak.com
Web http://www.bendpak.com

Supplier Name: **Rotary Lift**
Address: 2700 Lanier Dr.
Madison, IN 47250
Telephone: Phone: 812-273-1622, 800-640-5438 (toll free)
Fax Fax: 812-273-6502, 800-578-5438 (toll free)
Web http://www.rotary-lift.com

Table 2-7e: Maintenance Equipment Costs and Sources of Supply Hydraulic Oil Filter Cart

Supplier Name: **Grainger**
Address: 1401 Sewells Point Road, Norfolk, VA 23502
Telephone: 1-757-855-3153
Fax: 1-757-855-9542
E-mail:
Contact Name:
Web: www.grainger.com
Description: 3/4 HP, 10 GPM, 10 Micron
Brand: ***Parker***
Model: 10MF40SC 10C
Unit Cost: $ 1,491

Supplier Name: **Norman Filter Company, L.L.C.**
Address: 9850 S. Industrial Drive, Bridgeview IL 60465
Telephone: 1-708-233-5521
Fax: 1-708-430-5961
E-mail: sales@normanfilters.com
Contact Name:
Web: www.normanfilters.com
Description: 1/2 HP, 5 GPM, 10 Micron
Brand: ***Norman Filter Company, L.L.C.***
Model: NEF05
Unit Cost: $ 1,396

Supplier Name: **PNUCOR**
Address: 452 South Lake Blvd., Richmond, VA 23236
Telephone: 1-804-794-0000
Fax: 1-804-379-9216
E-mail: vtaylor@pnucor.com
Contact Name: Vicki Taylor
Web: www.purlator-facet.com
Description: 3/4HP, 6.5 GPM, 10 Micron
Brand: ***Purolator-Facet***
Model: PFC06 100 10M
Unit Cost: $ 1,143

Supplier Name: **Hydraulic Service Company Inc.**
Address: 3215 Victory Boulevard, Portsmouth, VA 23702
Telephone: 1-757-487-2513
Fax: 1-757-487-4381
E-mail: websales@hydraulicservice.com
Contact Name: Mg Hassell
Web: www.hydraulicservice.com
Brand: ***Norman Filter***
Model: NEF11610AQ603N
Cost: $ 1,600

Note: Prices do not include freight)

Manufacturers:
Supplier Name: **Parker Hannifin Corp.**
Address: 8676 E. M-89
Richland, MI 49083
Telephone: 1-269-629-5000, 1-800-272-7537
Fax 1-269-629-5385
Web http://www.parker.com

Supplier Name: **Purolator Facet, Inc.**
Address: 8439 Triad Dr.
Greensboro, NC 27409
Telephone: Phone: 336-668-4444, 800-852-4449 (toll free)
Fax Fax: 336-668-4452
Web http://www.purolator-facet.com

Table 2-7f: Maintenance Equipment Costs and Sources of Supply Pressure Washers

Supplier Name: **Silver Eagle Manufacturing**
Address: P.O Box7346, Cut-N-Shoot, TX 77306
Telephone: 1-936-264-2219 1-800-342-2822
Fax: 936-264-2219
E-mail: mike@silvereaglemanufacturing.com
Contact Name:
Web: www.silvereaglemanufacturing.com
Description: 4 GPM, 4000 PSI, 10 HP
Brand: ***Silver Eagle Manufacturing***
Model: 4040 ESEO
Unit Cost: $ 4,297

Supplier Name: **Acme Cleaning Equipment**
Address: 6839 Picadilly, Houston, TX 77061
Telephone: 1-713-643-4343
Fax: 1-713-643-9880
E-mail: sales@acmecleaningequipment.com
Contact Name:
Web: www.acmecleaningequipment.com
Description: 4.0 GPM, 4000 PSI, 15 HP
Brand: ***Niagara***
Model: 4004E04-233
Unit Cost: $ 8,295

Supplier Name: **Amazing Machinery**
Address: 2288 Gunbarrel Road, Suite111-151, Chattanooga, Tennessee 37421
Telephone: 1-423-490-0085 1-800-504-7453
Fax: 1-423-899-9772
E-mail: salea@amazingmachinery.com
Contact Name:
Web: www.amazingmachinery.com
Description: 5 GPM, 3000 PSI, 10 HP
Brand: ***Amazing Machinery***
Model: NLH-10ES-230/3-A
Unit Cost: $ 3,818

Supplier Name: **Hydraulic Service Company Inc.**
Address: 3215 Victory Boulevard, Portsmouth, VA 23702
Telephone: 1-757-487-2513
Fax: 1-757-487-4381
E-mail: websales@hydraulicservice.com
Contact Name: Mg Hassell
Web: www.hydraulicservice.com
Description: 3.3 GPM, 3500 PSI, 13 Hp (Honda Gas)
Brand: ***MY-T-M***
Model: HSP-3504-3MGH
Unit Cost: $ 3,665

Supplier Name: **Equipment Trade Service**
Address: 20E Winona Ave. , Norwood, PA 19077
Telephone: 1-610-583-7657
Fax: 1-610-583-5479
E-mail:
Contact Name: Steve
Web: www.etspressurewashers.com
Description: 4.0 GPM, 3500 Psi, 10 HP
Brand: ***Steam Jenny***
Model: HPW3540
Unit Cost: $ 4,500

Supplier Name: **Hydro Engineering Inc.**
Address: Salt Lake City, UT 84119
Telephone: 800-247-8424 Ext. 121
Fax: 801-972-3265 / 810-763-6459
E-mail: dfelice@hydroblaster.com
Contact Name: Doug Felice
Web: http://www.hydroblaster.com
Description: 5.0 GPM, 3000 PSI, 10 Hp
Brand: ***Hydroblaster***
Model: 5/3000EHOV
Unit Cost: $ 9,149
Shipping: $ 750

Note: Prices do not include freight

Manufacturers:
Supplier Name: **Niagara National Corporation**
Address: 2160 Hills Ave.
Atlanta, GA 30318
Telephone: 1-404-350-2600, 1-800-635-8342 (toll free)
Fax 1-404-350-2615
Web http://www.niagaranationalcorp

Supplier Name: **Jenny Products, Inc.**
Address: 850 N. Pleasant Ave.
Somerset, PA 15501
Telephone: 1-814-445-3400
Fax 1-814-445-2280
Web http://www.steamjenny.com

Table 2-7g: Maintenance Equipment Costs and Sources of Supply Street Sweepers

Supplier Name: **Mid-Atlantic Waste Systems**
Address: 7700 Old Alexandria Ferry Road, Clinton, MD 20735
Telephone: 1-301-856-6840
Fax: 1-301-856-1292
E-mail: sales@mawaste.com
Contact Name: David Askew
Web: www.midatlanticwaste.com
Description: Regenerative Air Sweeper
Brand: ***Tymco***
Model: 600
Unit Cost: $ 127,465

Supplier Name: **Atlantic Machinery Inc.**
Address: 2702 Garfield Avenue, Silver Spring, MD 20910
Telephone: 1-301-585-0800
Fax: 1-301-585-7681
E-mail: sales@atlanticmachinery.com
Contact Name: Trevor Gardner
Web: www.atlanticmachinery.com
Description: High Dump Regenerative Sweeper
Brand: ***Schwarze***
Model: A7000
Unit Cost: $ 137,442

Supplier Name: **Birsch Industries**
Address: 476 Viking Drive, Suite 102, Virginia Beach, VA 23452
Telephone: 1-757-622-0355
Fax: 1-757-625-7552
E-mail: buster@birsch.com
Contact Name: Buster Lankford
Web: www.birsch.com
Description: Truck Mounted Street Sweeper (Broom Style)
Brand: ***Tennant***
Model: Centurion
Unit Cost: $ 176,770

Supplier Name: **Birsch Industries**
Address: 476 Viking Drive, Suite 102, Virginia Beach, VA 23452
Telephone: 1-757-622-0355
Fax: 1-757-625-7552
E-mail: buster@birsch.com
Contact Name: Buster Lankford
Web: www.birsch.com
Description: Sentinel Street Sweeper
Brand: ***Tennant***
Model: Centurion
Unit Cost: $ 101,745

Manufacturers:
Supplier Name: **Tennant Co.**
Address: 701 N. Lilac Dr., P.O. Box 1452
Minneapolis, MN 55440
Telephone: 1-763-540-1200, 1-800-553-8033
Fax 1-763-513-2142
Web http://www.tennantco.com

Supplier Name: **TYMCO International, Ltd.**
Address: 225 Industrial E., P.O. Box 2368
Waco, TX 76705-2368
Telephone: 1-254-799-5546, 1-800-258-9626
Fax 1-254-799-2722
Web http://www.tymco.com

Supplier Name: **Schwarze Industries, Inc.**
Address: 1055 Jordan Rd.
Huntsville, AL 35811
Telephone: 1-256-851-1200, 1-800-879-7933
Fax 1-256-851-1110
Web http://www.schwarze.com

Table 2-7h: Maintenance Equipment Costs and Sources of Supply Diesel Powered Welders

Supplier Name: **US Diesel Engines LLC.**
Address: 100 W. Southern St. Unit 19, Birghton, CO 80601
Telephone: 1-303-654-1195 / 1-866-734-3735
Fax: 1-720-294-9776
E-mail: usdieselengines@aol.com
Contact Name:
Web: www.usdieselengines.com
Description: 170 Amp Welder Generator
Brand: ***ETQ***
Model: DWG6LE-R
Unit Cost: $ 3,399

Supplier Name: **J.W. Godliffe & Sons, Inc.**
Address: 1900E Elizabeth Ave. , P.O. Box 4370, Linden, NJ 07036
Telephone: 908-486-8230 / 1-800-419-0580
Fax: 1-908-486-9366
E-mail: info@cyberweld.com
Contact Name:
Web: www.cyberweld.com
Description: 250 Amp Stick/MIG Welder
Brand: ***Miller***
Model: Bobcat 250D
Unit Cost: $ 6,075

Supplier Name: J & R Welding Supply
Address: **270 Milton Ave , Ballston Spa, NY 12020**
Telephone: 1-518-885-9685
Fax: 1-518-885-1519
E-mail: johnn@jandrweldingsupply.com
Contact Name:
Web: www.jandrweldingsupply.com
Description: 300 Amp Stick/MIG/TIG
Brand: ***Lincoln***
Model: Classic 300D
Unit Cost: $ 8,138
Wire Feed Module: $ 1,163
TIG Module: $ 1,067
GFCI Recep. Kit: $ 45
Arc StartSwitch: $ 64

Note: Prices for the Miller & Lincoln models above do not include shipping.
Prices are for the welders only, and do not include cables or accessories.

Manufacturers:
Supplier Name: **Eastern Tools & Equipment Inc. (ETQ)**
Address: 1040 S Rockefeller Ave.
Ontario, CA 91761
Telephone: 1-909-390-8989
Fax 1-909-390-6068
Web http://easterntools.com/

Supplier Name: **Miller Electric Manufacturing Co.**
Address: 1635 W. Spencer St.
Appleton, WI 54914
Telephone: 1-920-734-9821, 800-4-A-Miller, 800-426-4553
Fax 1-920-735-4134
Web http://www.millerwelds.com

Supplier Name: **The Lincoln Electric Co. Inc.**
Address: 22801 St. Clair Ave.
Cleveland, OH 44117
Telephone: 1-216-481-8100, 888-921-9353 (toll free)
Fax 1-216-486-1751
Web http://www.lincolnelectric.com

Table 2-7i: Maintenance Equipment Costs and Sources of Supply Step Vans 14' & 16'

Supplier Name: **Virginia Truck Center**
Address: 740 S.Military Highway, Virginia Beach, VA 23464
Telephone: 1-757-424-3000 ext 139
Fax: 1-757-523-1891
E-mail: dduck@virginiatruckcenter.com
Contact Name: Donald Duck
Web: www.virginiatruckcenter.com
Description: Step Van 16', W/Cummins Diesel & Allison Automatic Transmission
Brand: ***Freightliner***
Model: MT55
Unit Cost: $ 61,486

Freightliner Price Includes A/C & Bulkhead, No Bins in Back
Price shown is for 16' Unit, Deduct $500 for 14' Unit

Supplier Name: **Hall Automotive**
Address: 3512 Virginia Beach Blvd., Virginia Beach, VA23452
Telephone: 1-755-798-2290
Fax: 1-757-498-2310
E-mail: skipp@hallauto.com
Contact Name: Skipp Webb
Web: www.hallauto.com
Description: Step Van, 14', 14,500 GVW, Diesel Powered,Auto Transmission
Brand: ***Workhorse***
Model: W42
Unit Cost: $ 50,572

Supplier Name: **Hall Automotive**
Address: 3512 Virginia Beach Blvd., Virginia Beach, VA23452
Telephone: 1-757-798-2290
Fax: 1-757-498-2310
E-mail: skipp@hallauto.com
Contact Name: Skipp Webb
Web: www.hallauto.com
Description: Step Van, 18', 14,500 GVW, Diesel Powered,Auto Transmission
Brand: ***Workhorse***
Model: W42
Unit Cost: $ 53,312

Workhorse Prices Include A/C & Bulkhead, Shelves along Driver's side in Body

Supplier Name: **Freedom Ford**
Address: 1020 West Mercury Blvd. Hampton, VA 23666
Telephone: 1-757-838-0222
Fax: 1-757-825-1157
E-mail: khollop@fredomford.com
Contact Name: Kathleena Hollopeter
Web: http://www.freedomautomotive.com
Description: Step Van, 14' 14,500 GVW, Gas Powered, Auto Transmission
Brand: ***Utilimaster***
Model: W-I 14'
Unit Cost: $ 36,875

Supplier Name: **Freedom Ford**
Address: 1020 West Mercury Blvd. Hampton, VA 23666
Telephone: 757-838-0222
Fax: 1-757-825-1157
E-mail: khollop@fredomford.com
Contact Name: Kathleena Hollopeter
Web: http://www.freedomautomotive.com
Description: Step Van, 18' 14,500 GVW, Gas Powered, Auto Transmission
Brand: Utilimaster
Model: W-I 18'
Unit Cost: $ 37,132

Utilimaster prices include A/C, bulkhead & utility bin package on driver's side in rear.

Note: Vehicles are available from dealers noted in Virginia, as well as others in Miami FL, New Orleans LA, Houston TX and throughout the US, depending on client preferences and shipping costs, and export services from dealers or manufacturers.

Manufacturers:

Supplier Name: **Freightliner Corp.**
Address: 2701 N.W. Vaughn St., Suite 300-T
Portland, OR 97210-5355
Telephone: 1-503-735-8000, 1-800-385-4357
Fax 1-503-735-8921
Web http://www.freightliner.com/

Supplier Name: **Workhorse Custom Chassis**
Address: 600 Central Ave., Suite 220
Highland Park, IL 60035
Telephone: 1-847-681-1550, 1-877-946-7731
Fax 1-847-681-0276
Web http://www.workhorse.com

Supplier Name: **Utilimaster**
Address: 65906-T State Rd. 19
Wakarusa, IN 46573
Telephone: Phone: 574-862-4561, 800-582-3454 (toll free)
Fax Fax: 574-862-3349
Web http://www.utilimaster.com

Table 2-7j: Maintenance Equipment Costs and Sources of Supply Automated Trash Truck & Dumpsters

Supplier Name: **Virginia Truck Center**
Address: 740 S.Military Highway, Virginia Beach, VA 23464
Telephone: 1-757-424-3000 ext 139
Fax: 1-757-523-1891
E-mail: dduck@virginiatruckcenter.com
Contact Name: Donald Duck
Web: www.virginiatruckcenter.com
Description: Front Loading Trash Truck
Brand: ***Freightliner Condor Chassis, Heil Body Attachment***
Model: Freightliner Condor, Low Cab Forward
Unit Cost: $ 184,384.00

Description: 8 Yard Front Load Container
Unit Cost: $ 969

Supplier Name: **Hall Automotive**
Address: 3512 Virginia Beach Blvd., Virginia Beach, VA23452
Telephone: 1-757-798-2290
Fax: 1-757-498-2310
E-mail: skipp@hallauto.com
Contact Name: Skipp Webb
Web: www.hallauto.com
Description: Front Loading Trash Truck
Brand: ***Autocar Xpeditor Chassis, E-Z Pack 40 cu.yd, Front Load Body***
Model: Autocar WX64 Chassis, E-Z Pack FLOO80E40SE Body
Unit Cost: $ 166,360.00

Description: 8 Yard Front Load Container
Unit Cost: $ 1,000

Note: These prices do not include US Federal Excise Tax (FET) (12%) or other taxes The purchaser should inquire whether the exports may be exempted from FET.

Note: Vehicles are available from dealers noted in Virginia, as well as others in Miami FL, New Orleans LA, Houston TX and throughout the US, depending on client preferences.

Manufacturers:
Supplier Name: **Heil Enviromental Industries, Ltd.**
Address: 5751-T Cornelison Rd., P. O. Box 8676
Chattanooga, TN 37414-0676
Telephone: 1-423-899-9100, 1-800-824-4345 (toll free)
Fax 1-423-855-3478
Web http://www.heil.com

Supplier Name: **McClain E-Z Pack**
Address: P.O. Box 607
Galion, OH 44833-0607
Telephone: 1-419-468-2120
Fax 1-419-468-4895
Web http://www.mcclaingroup.com

Table 2-7k: Maintenance Equipment Costs and Sources of Supply Vertical Milling Machine

Supplier Name: **Redmond & Son Inc, Machinery**
Address: 900 Great Southwest Pkwy, P.O. Box 4406, Atlanta, GA 30336
Telephone: 404-346-7788 / 1-800-428-9898
Fax: 1-404-346-7763
E-mail: mail@redmond-machinery.com
Contact Name: Marvin Smith
Web: www.redmond-machinery.com
Description: Vertical Milling Machine, 10" X 54" Table,3-HP, 3-Phase Motor,Three Axis DRO
Brand: ***Clausing/Atlas***
Model: 3VS08
Unit Cost: $ 15,040

Supplier Name: **Ganesh Machinery**
Address: 202621 Plummer Street, Chatsworth, CA 91311
Telephone: 1-818-349-9166 / 1-888-542-6374
Fax: 1-818-349-9166
E-mail: sales@ganeshmachinery.com
Contact Name:
Web: http://www.ganeshmachinery.com
Description: 3-Axis Milling Machine W/ANILAM 5300MK CNC Control
Brand: ***Ganesh***
Model: GMV-3 R3
Unit Cost: $ 29,990

Description: Vertical Milling Machine, 10" x 54"Table, 3-HP, 3-Phase Motor,Three-Axis DRO
Brand: ***Ganesh***
Model: GMV-3 W/Package # 3
Unit Cost: $ 13,490

Supplier Name: **Wells-Index**
Address: 701 West Clay Ave.Muskegon, MI 49440-1064
Telephone: 1-231-759-0950
Fax: 1-231-728-7457
E-mail: mailto:wellsindex@aol.com
Contact Name: Rick Robinson
Web: http://www.wellsindex.com
Description: Vertical Milling Machine, 10" X 48" Table, 3-HP, 3-Phase Motor
Brand: ***Wells-Index***
Model: 847
Unit Cost: $ 14,995

Manufacturers:
Supplier Name: Clausing Industrial, Inc.
Address: 1819 N. Pitcher St.
Kalamazoo, MI 49007
Telephone: 1-269-345-7155
Fax 1-269-345-5945
Web http://clausing-industrial.com

2.8.4 Cost Estimate for CMMS Installation.

Table 2-8: Computerized Maintenance Management System (CMMS) - Estimated Costs (USD)

Port of Cortes	Project Without Hosting	Project With Hosting
Software	$38,985	$38,985
Support	$7,797	$7,797
Hosting	NA	$6,840
Services	$67,990	$67,990
Total	$114,772	$121,612

Details:

Datastream 7i Software	Qty	Unit Price	Per	Total Software	Support - 20% of Software	Hosting per user/month	Total Annual Hosting
Named Seats	15	$2,599	named user	$38,985	$7,797	$38	$6,840
Professional Services							
Datastream 7i Now Implementation	1	$33,990	project	$33,990			
Installation**	5	$2,000	per day	$10,000			
Data Migration - Custom*	1	$18,000	Job	$18,000			
Project Management	3	$2,000	per day	6,000			
Total Services				**$67,990**			

The above cost estimate was based on a configuration for Datastream 7i, one CMMS product considered. Costs may vary depending on the vendor, product and specifications.

2.8.4.1 Sources of Supply for CMMS Installation

Sources of supply for Computerized Maintenance Management Systems (CMMS) are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

Supplier: **Datastream**
Address: 50 Datastream Plaza
Greenville, SC 29605-3451
USA
Telephone: 1-864-422-5001, 1-800-955-6775 Ext. 2534 (toll free in USA)
Fax: 1-864-422-5000, 1-864-236-2651

E-mail: info@datastream.net
Contacts: John M. Sterling III
Christel Novella
Web: http://www.datastream.net
Product: Datastream 7i

Supplier: **LookSoftware, Inc.**

Address:	121 Lake Latimer Cove Kennesaw, GA 30144 USA
Telephone:	1-610-685-LOOK (1-610-685-5665)
Fax:	1-610-685-5669
E-mail:	Info@looksoftware.com
Contact:	NA
Web:	http://www.looksoftware.com

Note: Enterprise Asset Manager (EAM) was formerly marketed as MainTracker from Elke and BPCS Plant Maintenance from SSA Global.

Supplier:	**Spear Technologies**
Address:	436 – 14th Street, Suite 200 Oakland, CA 94612 USA
Telephone:	1-510-267-3333
Fax:	1-510-267-3344
E-mail:	Sales@speartechnologies.com
Contact:	Sales
Web:	http://www.speartechnologies.com

Supplier:	**Qqest Asset management Services**
Address:	9350 South 150 East Suite 300 Sandy, Utah 84070 USA
Telephone	1-801-262-1611, 1-800-730-9965 (toll free in USA)
Fax	1-801-281-3566
Contact:	Brandon Gunn, Sales Representative
Web:	http://www.managerplus.com
Product:	Manager Plus

Supplier:	**Maintenance Connection Inc.**
Address:	1947 Galileo Ct. Suite 101 Davis, CA 95616
Telephone:	1-888-567-3434 (toll free in USA)
Fax:	1-888-567-3434 (toll free in USA)
E-mail:	sales@maintenanceconnection.com
Contact:	Cary Yokum
Website:	http://www.maintenanceconnection.com
Product:	Maintenance Connection

Supplier:	**Eagle Technology, Inc.**
Address:	10500 N. Port Washington Rd. Mequon, WI 53094 USA
Telephone:	1-262-241-3845, 1-800-388-3268 ext 233 (toll free in USA)
Fax:	1-414-241-5248
E-mail:	eagle@execpc.com
Contact:	Ted Pyle, Regional and International Sales Manager
Web:	http://www.eaglecmms.com
Product:	Proteus IV

Supplier:	**EPAC Software Technologies, Inc.**
Address:	42 Ladd St. East Greenwich, R.I. 02818
Tel	1-407-656-0834
Contact:	Don Scraper, Sales
Website:	http://www.epacst.com
Product:	EPAC CMMS

Supplier:	**eMaint Enterprises, LLC**
Address:	7 Chester Ave. Medford, NJ 08005 USA
Telephone:	1-609-714-1689 ext. 170
E-mail:	matthew.oles@emaint.com
Contac:	Matthew Oles
Website:	http://www.emaint.com
Product:	eMAINT X3

2.9 Schedule of Installations

The estimated schedule milestones for a normative schedule for development and installation of the CMMS system and training would require approximately 3 - 4 months overall to get the system up and running and get the people trained on it, set up any data entry, retrieval systems, transition from the manual system and start up. Familiarization and further training would be required on an ongoing basis. These are the key component elements of the schedule

• Conduct discussions with vendor(s)	1 day
• Site visit by vendor personnel	2 days
• Sign contract	1 day
• Site survey and preparations for installation	1 week
• Installation of software and training personnel	2 weeks
• Preparation of PM and asset data for input	4 weeks
• Transition from existing system to Datastream or comparable system	4 weeks
• Familiarization, adaptation and additional data input	ongoing

3 EVALUATION AND RECOMMENDATION OF NEW SERVICE BOATS AND REHABILITATION

3.0 Introduction

The DMJM Harris team has prepared the final report providing evaluations, conclusions and recommendations. Previously, interim reports were provided including alternatives for consideration by ENP. After consideration and review of the interim submittals by the Client, DMJM Harris develop final recommendations. This section of the report addresses the evaluation of the existing tugs, pilot boats and patrol craft and alternative requirements for new boats. The report is based on review and evaluation following a site visit in October 2005, a presentation in November 2005, at which Client comments were reviewed, and delivery of the draft final report in August 2006, followed by a meeting and presentation in January 2007 to review Client comments.

In addition to the review of the operational needs for tug boats, the project requires the inspections of certain vessels and reporting on the operational acceptability, conditions, maintenance procedures, and recommendations for operating procedures and modifications to or the replacements of those vessels. These issues are addressed in this report, which also includes supporting data and photographs. The report was prepared by John H. Leary, the marine boats expert on the DMJM Harris team, who was accompanied on the visits by Jose Sandoval from Saybe y Asociados.

3.1 Inspect, Evaluate Condition, Operation Acceptability, Maintenance Procedures and Controls of Existing Tugs

Inspections

The vessels that were inspected, including dates and locations, are indicated below.

Vessel Name	Place	Date inspected
M/V GENERAL TIBURCIO CARIAS ANDINO	Puerto Cortes	17 Oct 2005
M/V DR. MARCO AURELIO SOTO	Puerto Cortes	17 Oct 2005
M/V FRANCISCO MORAZAN	La Ceiba	18 Oct 2005

It should be understood that these vessels were inspected afloat. Therefore the condition of the exterior of the propellers, shafts, struts, rudders, coolers, hull below the waterline, etc. was not visible, and their conditions could not be determined. In addition tanks and compartments were not open for inspection, so the conditions of the interiors of these spaces could not be determined.

Condition of *M/V DR Y GRAL. TIBURCIO CARIAS ANDINO*

The vessel was inspected afloat (Fig. 3-A1) and is a welded steel model bow tug, built in 1993 at C.N.P. Freire, S.A. (Hull Number 185) in Spain. Its principal dimensions (meters) are 20.25 x 8.25 x 4.30 with a gross register tonnage of 185. No registration documents were available.

Fig. 3-A1 -Bow, *M/V DR Y GRAL. TIBURCIO CARIAS ANDINO*

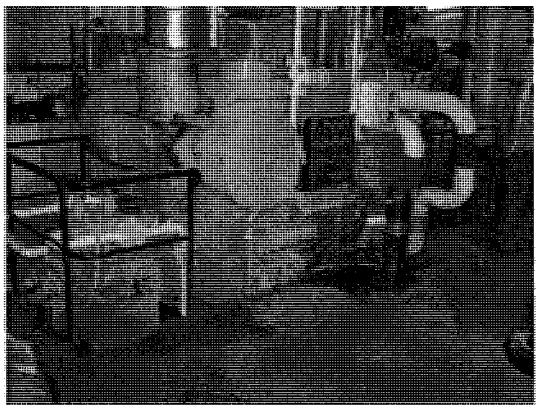


Fig. 3-A2 -Main Engine Port

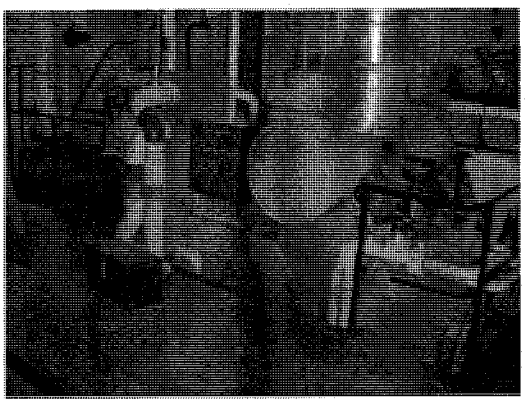


Fig. 3-A3 -Main Engine Starboard

It was classed and issued a loadline certificate by Lloyd's Register of Shipping in 1993. It has a crew of five. Its main propulsion consists of two Caterpillar Model 3508-STD (Fig. 3-A2 and A3) engines each with 960 horsepower for a total of 1920 horsepower for the vessel. Each engine drives a separate propeller. The vessel has two rudders. It has two Cummins Model 6B5.9-GC1/M generators each with a capacity of 65.6 KW.

Fig. 3-A4 -Fire Pump

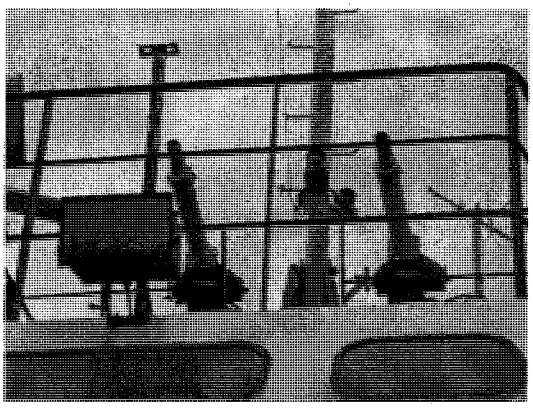


Fig. 3-A5 -Monitors Above Bridge

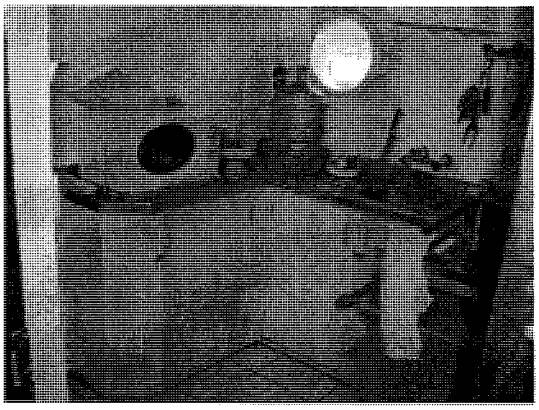
The system for fighting external fires consists of two ITUR Type IN 150/400 fire pumps (Fig. 3-A4) in the engine room with a capacity of 1500 gallons per minute each. The pumps are driven by power take offs at the forward ends of the two main engines. The fire lines run from the two pumps extend up to two monitors, which are mounted on the roof of the bridge (Fig. 3-A5).

The condition of the machinery and the fire fighting system in the engine room appeared to be good as far as it could be determined from visual inspection. The space was free of excessive grease and oil, and the bilges were free of excessive oil and water. The structure in the machinery spaces was free of distortion as far as visible, and the coatings had not failed.

Fig. 3-A6 -Bridge

The bridge (Fig. 3-A6) was equipped with a VHF radio, magnetic compass, radar, echo sounder and radio direction finder. The condition of the bridge was good as far as visible with the exception of moderate

pitting in the exterior bridge deck plating.



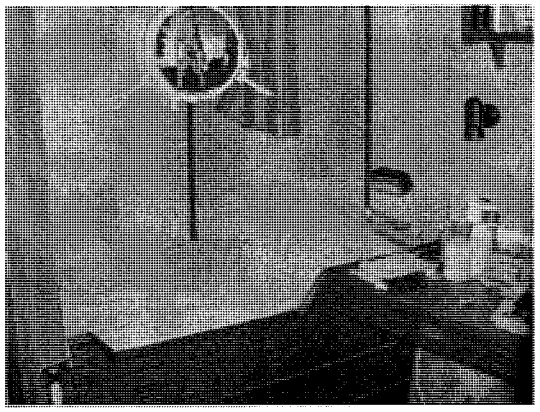


Fig. 3-A7 -Galley

Fig. 3-A8 -Cabin

The interior of the accommodations was in good condition as far as visible (Fig. 3-A7 and A8).

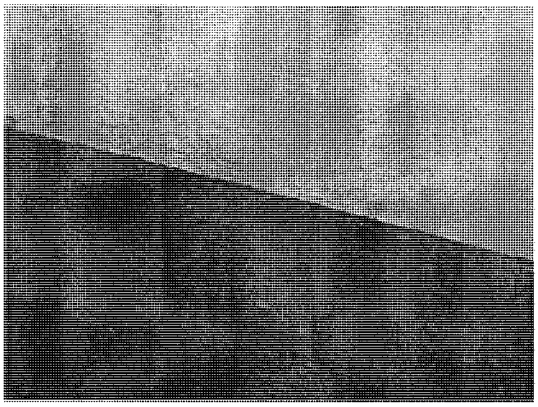


Fig. 3-A9 -Heavy Pitting at Base of Forward House Bulkhead

The exterior of the accommodations and the weather decks were in good condition as far as visible with the exception of heavy pitting at the base of the forward bulkhead (Fig. 3-A9) and as noted above. The coatings had not failed and the structure was free of obvious damage and distortion.

Condition of *M/V DR MARCO AURELIO SOTO*

The vessel was inspected afloat (Fig. 3-B1 and B2) and is a welded steel model bow tug, built in 1980 at Halter Marine, Inc., New Orleans, Louisiana, USA (Hull Number 842). Its principal dimensions (feet) are 72.50 x 25.00 x 16.00. The operating draft is 9.00 feet. No registration documents were available. No documentation was provided to indicate the vessel has ever been classed or that it ever had a loadline certificate. It has a crew of five. Its main propulsion consists of two Caterpillar Model 3508 engines each with 960 horsepower for a total of 1920 horsepower for the vessel. Each engine drives a separate

propeller. The vessel has two rudders. It has two Detroit Diesel Model 471 generators each with a capacity of 40 KW for a total of 80 KW for the vessel.

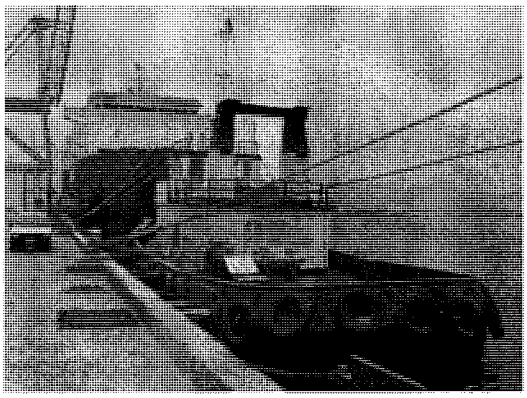


Fig. 3-B1 -Bow, *M/V DR MARCO AURELIO SOTO* **Fig. 3-B2 -Stern**

The vessel has no equipment for fighting external fires away from the vessel (e.g. on another vessel or on dock).

The condition of the machinery in the engine room appeared to be good as far as it could be determined from visual inspection. However the port side stern tube was leaking (Fig. 3-B3). The space was free of excessive grease and oil, and the bilges were free of excessive oil and water. The structure in the machinery spaces was free of distortion as far as visible, and the coatings had not failed.

Fig. 3-B3 -Port Stern Tube

The bridge was equipped with a VHF radio, magnetic compass, radar, echo sounder, tachometers and a Global Positioning System. The condition of the bridge was good as far as visible (Fig. 3-B4 and B5).

Fig. 3-B34-Bridge

Fig. 3-B5 -Bridge

Fig. 3-B6 -Galley

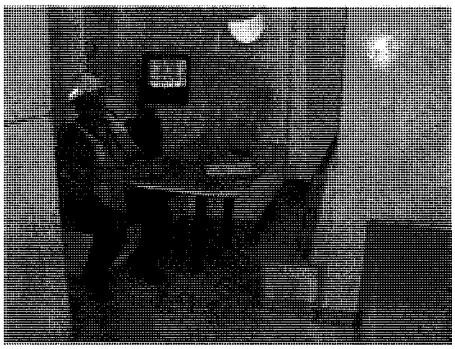


Fig. 3-B7 -Mess

Fig. 3-B8 -Cabin

The interior of the accommodations was in good condition as far as visible (Fig. 3-B6 to B8).

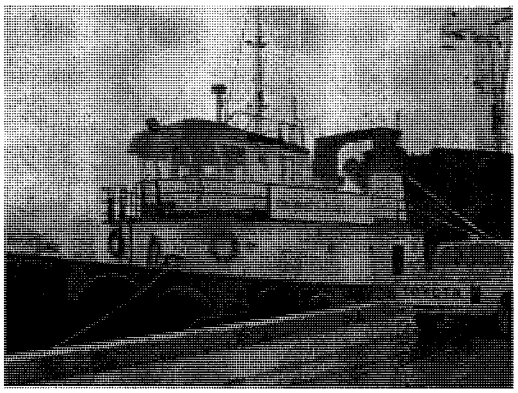


Fig. 3-B9 -Superstructure Port Side

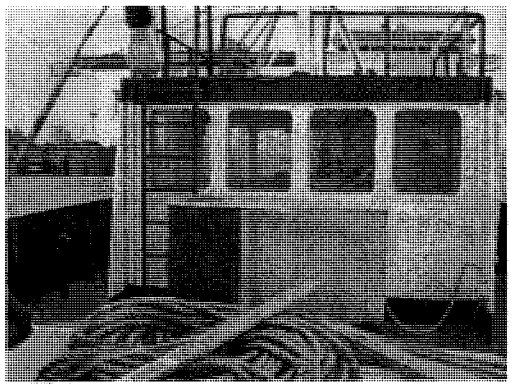


Fig. 3-B10 -Bridge Looking Forward

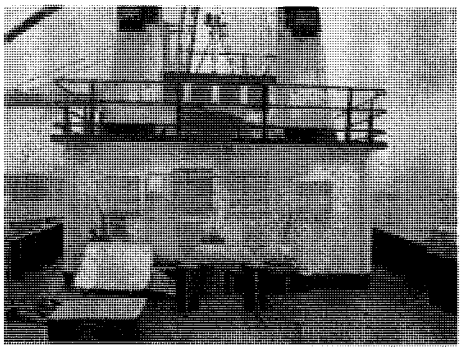


Fig. 3-B11 -Superstructure Looking Forward

The exterior of the accommodations was in good condition as far as visible (Fig. 3-B9, B10 and B11). The coatings had not failed and the structure was free of obvious damage and distortion.

The main deck was free of heavy distortion or damage, but there was heavy pitting in the main deck aft of the superstructure (Fig. 3-B12, B13 and B14). The coating had not failed.

Fig. 3-B12 -Main Deck Aft Heavy Pitting

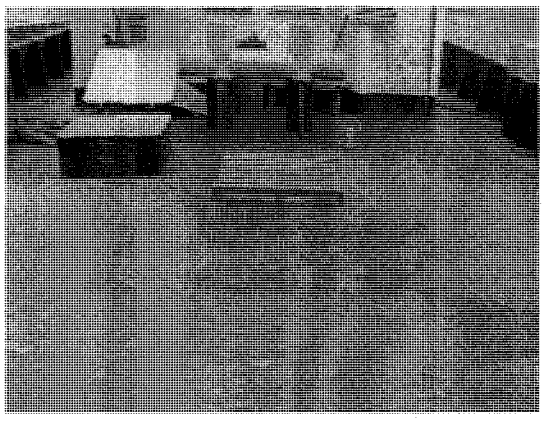


Fig. 3-B13 -Main Deck Starboard

Fig. 3-B14 – Main Deck Aft -Heavy Pitting

Condition of *M/V GENERAL FRANCISCO MORAZAN*

The vessel was inspected afloat (Fig. 3- C1 and C2) and is a welded steel model bow tug, built in 1980 at Halter Marine, Inc., New Orleans, Louisiana, USA (Hull Number 841). Its principal dimensions (feet) are 72.50 x 25.00 x 16.00. The operating draft is 9.00 feet. No registration documents were available. No documentation was provided to indicate the vessel has ever been classed or that it ever had a loadline certificate. It has a crew of five. Its main propulsion consists of two GM Model 12V-149 engines each with 800 horsepower for a total of 1600 horsepower for the vessel. Each engine drives a separate propeller. The vessel has two rudders. It has two Detroit Diesel Model 471 generators each with a capacity of 40 KW for a total of 80 KW for the vessel.

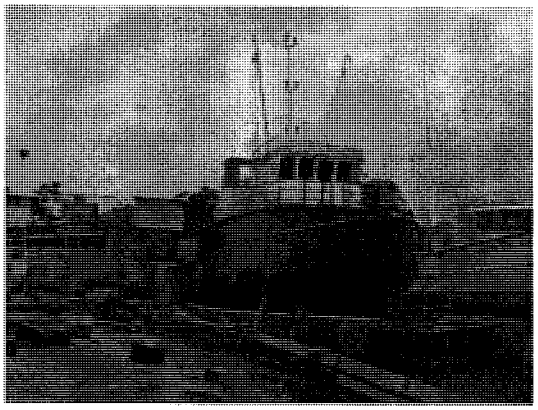


Fig. 3-C1 -Bow, *M/V GENERAL FRANCISCO MORAZAN*

Fig. 3--C2 -Superstructure Starboard Side

The vessel has no equipment for fighting external fires away from the vessel (e.g. on another vessel or on a dock).

The vessel was inspected in a shipyard in La Ceiba, where it had recently come out of dry dock. A significant amount of hull plating and internal structure had been replaced in the dry dock. Primer coats of paint had been applied, but the final coatings had not yet been applied when the vessel was inspected.

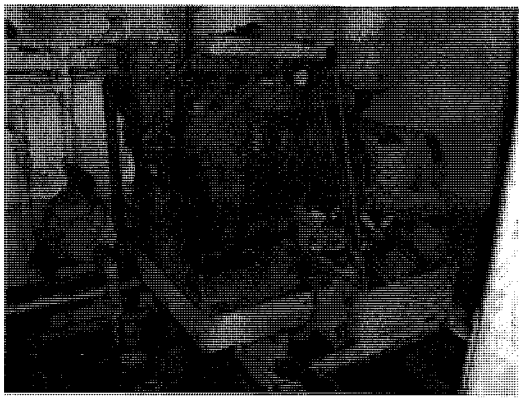


Fig. 3-C3 -Generator (Typical)

Fig. 3-C4 -Main Deck Structure Engine Room

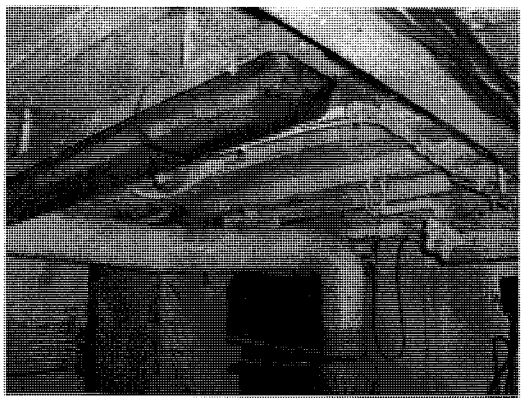


Fig. 3-C5 -Main Deck Structure Engine Room

The condition of the machinery in the engine room appeared to be good as far as it could be determined from visual inspection (Fig. 3-C3). The space was free of excessive grease and oil, and the bilges were free of excessive oil and water. The structure in the machinery spaces was free of distortion as far as visible, and the coatings had not failed (Fig. 3-C4 and C5).

Fig. 3-C6 -Bridge Looking Forward

Fig. 3-C7 -Bridge

The bridge was equipped with a VHF radio, magnetic compass, radar, echo sounder, tachometers, rudder angle indicator, single side band radio, new pneumatic engine controls and a Global Positioning System. Some of this equipment had been removed while the vessel was undergoing repairs and was to be reinstalled before the vessel again entered service. The condition of the bridge was good as far as visible (Fig. 3- C6 and C7).

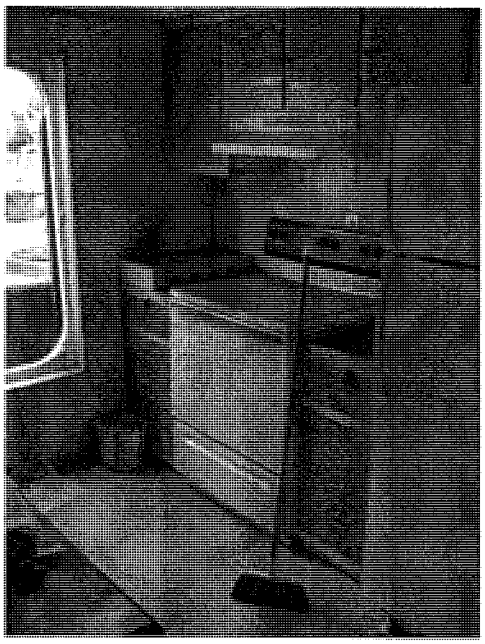


Fig. 3-C8 -Galley

The interior of the accommodations was in good condition as far as visible (Fig. 3-C8, C9, C10, C11 and C12).

Fig. 3-C9 -Mess Area

Fig. 3-C10 -Cabin

Fig. 3-C11 -Storage

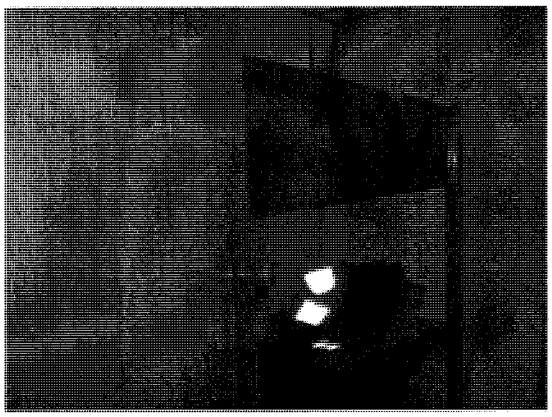


Fig. 3-C12 -Cabin

The exterior of the accommodations was in good condition as far as visible (Fig. 3-C13, C14, C15 and C16). However there was minor pitting on the forward bulkhead about one foot above the main deck. The final coating system had not yet been applied to the entire structure; only primary coats had been applied in places. The coatings that were in place had not failed and the structure was free of obvious damage and distortion.

Fig. 3-C13 -Superstructure Looking Forward

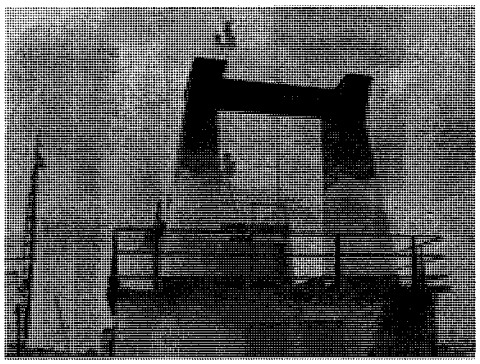


Fig. 3-C14 -Stacks

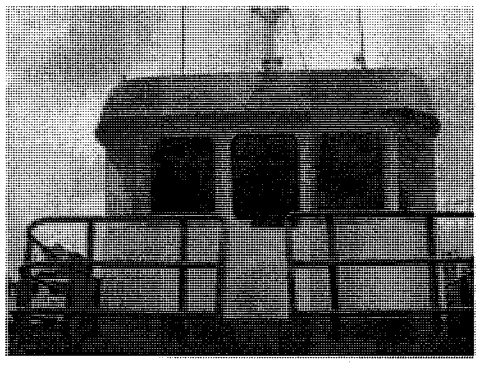


Fig. 3-C15 -Bridge

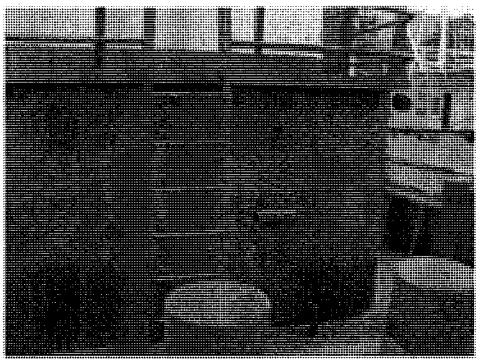


Fig. 3-C16 -Forward Bulkhead

The main deck was free of heavy distortion or damage (Fig. 3- C17, C18, C19 and C20). The coatings that were in place had not failed.

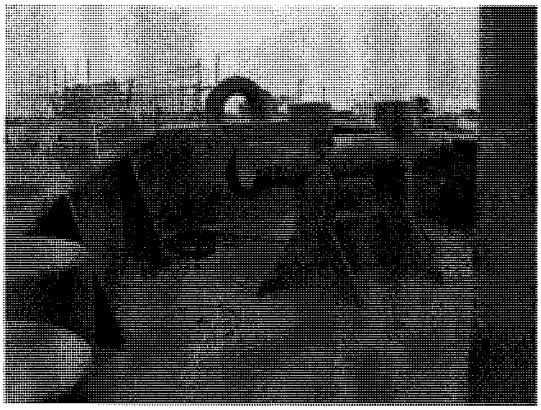


Fig. 3-C17 -Main Deck Forward

Fig. 3-C18 -Main Deck Forward

Fig. 3-C19 -Main Deck Starboard Looking Aft

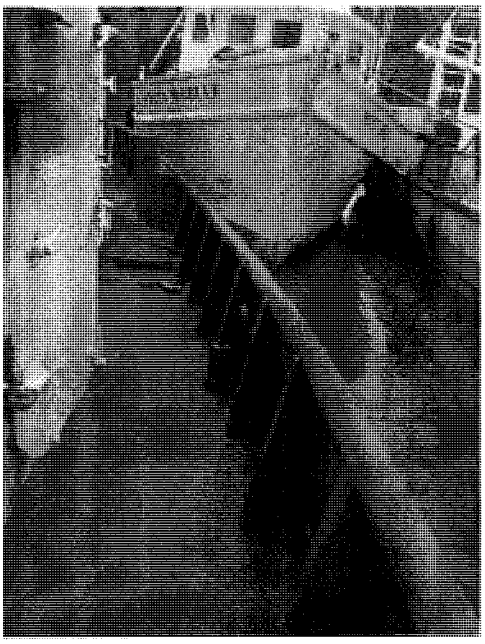


Fig. 3-C20 -Main Deck Port Looking Aft

Maintenance Procedures

All of the above vessels are maintained using the same schedule according to the operations personnel at ENP. This schedule is as follows.

Frequency of Dry Docking: Every two years
Frequency of Sandblasting/Painting Hull: Every two years
Ongoing Chipping and Painting: None
Frequency of Pulling Tail Shafts: At dry docking
Frequency of Servicing Sea Valves: At dry docking
Frequency of Opening Sea Chests: At dry docking
Frequency of Changing Oil in Machinery: 250 hours
Frequency of Changing Filters in Machinery: 250 hours
Frequency of Coating Interior of Tanks: At dry docking

This maintenance schedule meets or exceeds the standards in the industry, except that there is no ongoing chipping and painting. The vessel's exterior steel surfaces should be regularly inspected, and any local coating failures should be prepared and painted.

The operations personnel also stated that there are no spare parts for the vessels kept in inventory by ENP, except for minor items such as belts and filters. ENP relies on the manufacturers of the machinery and their distributors to supply replacement parts when they are needed. It is recommended that one set of major spare parts (liner, piston, connecting rod, valves, etc.) should be kept on hand for each type of engine in the vessels.

Operational Need for Tug Boats

The ENP officials were interviewed and have provided data concerning the port and the sizes of the ships calling at the port. According to the data the maximum allowable draft in the port is 11 meters (36 feet). The data also indicates that the port accommodates ships of a length of 600 feet or less. The port officials also indicated that currents in the port are minimal. Using this data and assuming reasonable proportions of ships, the delivered horsepower required of tugs to hold varying sizes of ships against a beam wind and a current of ½ mile per hour on the beam were estimated and are shown below. This analysis assumes that the tugs will produce 25 pounds per horsepower applied transversly to the longitudinal axis of the ship. Of course moving the ship against the assumed wind and current speeds will require even more horsepower. These figures are only approximations, and a detailed study would be required to produce definitive results.

	WIND SPEED		
Ship Length (Ft)	**20 MPH**	**40 MPH**	**60 MPH**
250	202	576	1199
300	292	829	1726
350	397	1129	2349
400	518	1475	3068
450	656	1866	3883
500	810	2304	4794
550	980	2788	5801
600	1166	3318	6904
650	1393	3894	8102
700	1654	4999	9397

Ship Length (Ft)	20 MPH	40 MPH	60 MPH
750	1937	6015	10787
800	2241	7118	12274
850	2568	8309	13856
900	2916	9588	15534
950	3287	10954	17308

The maximum brake horsepower produced by the port's three tugs M/V Dr y Gral. Tiburcio Carias Andino, M/V Dr. Marco Aurelio Soto and M/V General Francisco Morazán is 1920, 1920 and 1600, respectively. The above figures estimate that the port's existing tugs are adequate to handle the size ships that have been calling at the port provided the wind speeds are below about 40 miles per hour and the current is below about ½ mile per hour. This estimate also recognizes that two tugs must be used for larger ships. This is consistent with comments made by the port's operations personnel during interviews. The above figures also estimate that tugs with more horsepower will be needed if the port is to accommodate larger vessels and/or operate under more severe environmental conditions. Therefore it is recommended that the port obtain a 5000 horsepower tug as soon as possible as an addition to the current fleet. This enhancement to the tug fleet will demonstrate to the shipping community that the port can safely handle the larger vessels. Section 3.5 discusses the particulars of the tug recommended for future operations with larger ships.

The installation of portable fire pumps and monitors on the existing tugs should be investigated as a temporary means of equipping these vessels with fire fighting capability. Due consideration should be given to the effect that portable firefighting equipment would have on the vessels' stability and structure.

3.2 Inspect, Evaluate Condition, Operational Acceptability, Maintenance Procedures and Controls of Existing Pilot Boats

Inspection

The vessel that was inspected, including date and location, is indicated below.

Vessel Name	Place	Date
M/V LIC ANTONIO JOSE COELLO	Puerto Cortes	17 Oct 2005

This vessel was inspected out of the water, so the exterior of the hull was visible.

Condition of *M/V LIC ANTONIO JOSE COELLO*

The vessel was inspected out of the water, resting in cradles on land (Fig. 3-D1 and D2). The vessel is a welded steel, single chine, model bow pilot launch. It was built in 1993 at C.N.P. Freire, S.A. (Hull Number 397) in Spain. Its principal dimensions (meters) are 13.00 x 4.00 x 2.25 with a gross register tonnage of 28. No registration documents were available. No classification or loadline documents were made available. It has a crew of two. Its main propulsion consists of two Caterpillar Model 3306-DI-TA engines each with 250 horsepower for a total of 500 horsepower for the vessel. The engines had been removed for servicing before the inspection. Each engine drives a separate propeller. The vessel has two rudders. It has no independent generators but has an alternator on each main engine which provides 12 volt DC power when the vessel is underway. The vessel is also equipped with a 120 volt AC system, which is supplied by shore power when the vessel is at a dock.

Fig. 3-D1 -Bow, *M/V LIC ANTONIO JOSE COELLO* **Fig. 3-D2 -Stern**

The vessel has no equipment for fighting external fires (e.g. on another vessel or on a dock).

Fig. 3-D3 -Bridge

Fig. 3-D4 -Passenger Seating

The bridge was equipped with a VHF radio, magnetic compass, radar, echo sounder, rudder angle indicator, tachometers, searchlight and loudhailer. The condition of the bridge was good as far as visible (Fig. 3-D3). The cabin aft of the bridge is equipped with seating for 10 persons (Fig. 3-D4).

The interior of the accommodations was in good condition as far as visible.

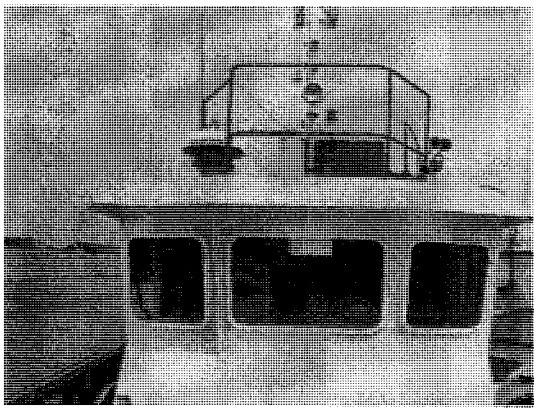


Fig. 3-D5 -Bridge

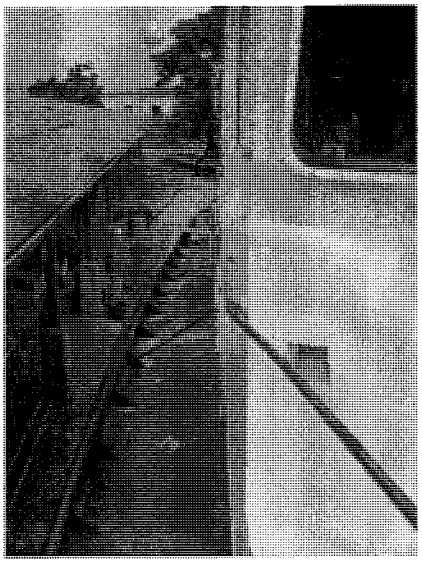


Fig. 3-D6 -House Side And Deck

The exterior of the accommodations was in good condition as far as visible (Fig. 3-D5 and D6). The coatings had not failed and the structure was free of obvious damage and distortion.

Fig. 3-D7 -Skeg & Keel

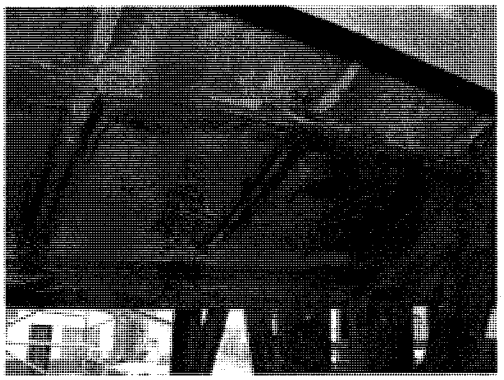


Fig. 3-D8 -Keel Plating

Marine growth had been cleaned from the exterior of the hull plating at the time of the inspection. The hull exterior was to be blasted and painted. Approximately 60% of the keel plating was being replaced (Fig. 3-D8), and approximately 40% of the skeg was being replaced (Fig. 3-D7) at the time of the inspection. Also the associated interior framing and structure were being replaced in way of the replaced plating. The exterior keel coolers had been removed for servicing.

Maintenance Procedures

The above vessel is maintained using the same schedule as the tugs according to the operations personnel at ENP. This schedule is as follows.

Frequency of Dry Docking: Every two years
Frequency of Sandblasting/Painting Hull: Every two years
Ongoing Chipping and Painting: None
Frequency of Pulling Tail Shafts: At dry docking
Frequency of Servicing Sea Valves: At dry docking
Frequency of Opening Sea Chests: At dry docking
Frequency of Changing Oil in Machinery: 250 hours
Frequency of Changing Filters in Machinery: 250 hours
Frequency of Coating Interior of Tanks: At dry docking

This maintenance schedule meets or exceeds the standards in the industry, except that there is no ongoing chipping and painting. The vessel's exterior steel surfaces should be regularly inspected, and any local coating failures should be prepared and painted.

The operations personnel also stated that there are no spare parts for the vessels kept in inventory by ENP, except for minor items such as belts and filters. ENP relies on the manufacturers of the machinery and their distributors to supply replacement parts when they are needed. It is recommended that one set of major spare parts (liner, piston, connecting rod, valves, etc.) should be kept on hand for each type of engine in the vessels.

Operational Need for Pilot Boats

In an interview with a port pilot, it was learned that approximately 150 ships requiring pilotage call at the port every month. This is an average of about five ships per day. Most ships enter the central area of the harbor, away from the docks, without a pilot. The pilot then boards the ship and directs it to a dock. About three times per month ships request that a pilots board outside of the harbor (offshore) and direct the ships into the harbor and then to the docks.

The port has only one pilot boat, which was out of service and under maintenance and repair when it was inspected. A smaller substitute vessel was on hire to provide transportation for pilots to and from ships. The port's own pilot boat was deemed adequate to serve the pilots needs in the harbor and for occasional offshore service, assuming sound judgment concerning weather is used when venturing offshore. The vessel's ongoing maintenance and repairs should place it in good condition for its service.

What should be noted is that the port does not own a backup vessel that could be used in the event that its only pilot boat must suddenly leave service due to engine malfunction, accident, etc. The port should consider the value of a second pilot boat as compared to losses that could be incurred if its only pilot boat suddenly goes out of service.

3.3 Review Operational Needs for Patrol Boats

The port personnel stated that the port has two patrol boats, one of which was made available for inspection. The patrol boat was inspected on a trailer at the port facility in Puerto Cortes. The vessel is a Reefsport 29 and is built of fiberglass. It has a chine type hull, no enclosed cabin and is similar to a "bay boat". It measured 29' – 0" x 7' – 11" x 4' – 0"(approx). It is powered by two Yamaha V6 outboard motors at 200 horsepower each for a total of 400 horsepower for the vessel. The vessel is equipped with

radar, tachometers, speedometer, fish finder/depth sounder. The hull of the vessel is in good condition and is well maintained. The condition of the engines and other equipment is unknown, but they are free of obvious damage (Fig. 3- E1, E2, E3, E4 and E5).

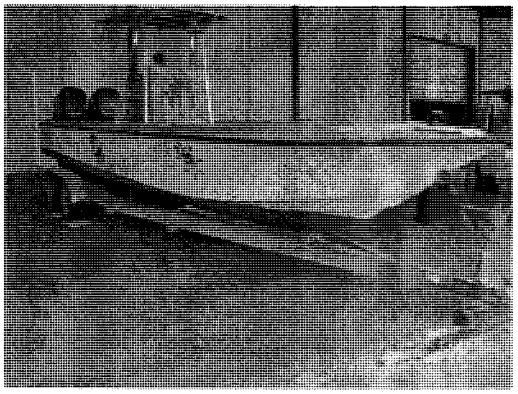


Fig. 3-E1 -Starboard Side, 29 ft patrol boat

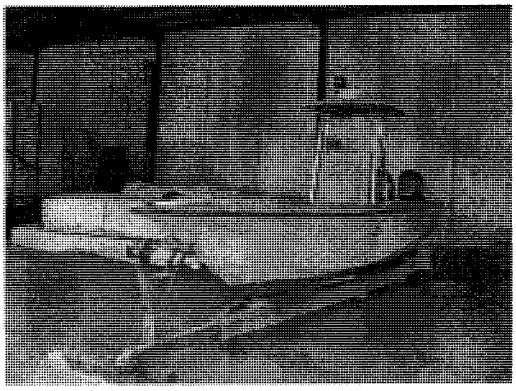


Fig. 3-E2 -Port Side

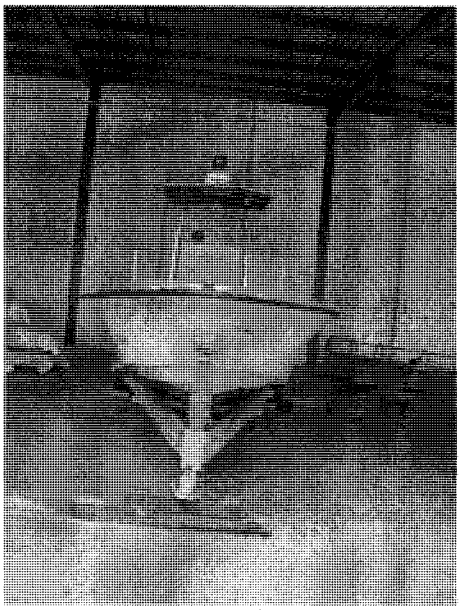


Fig. 3-E3 -Bow

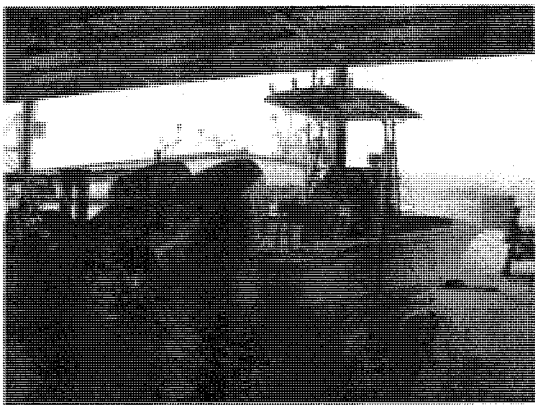


Fig. 3-E4 -Stern

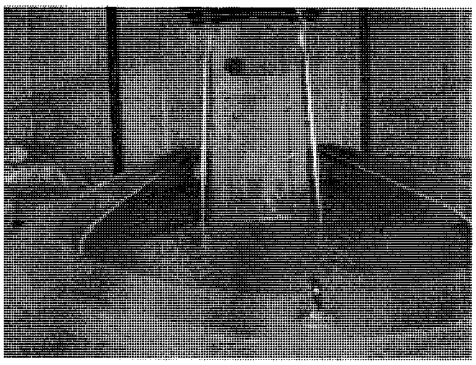


Fig. 3-E5 -Interior

This vessel is adequate for high speed patrol inside of the port under relatively calm conditions. However due to the vessel's geometry, it would be susceptible to severe motions and accelerations or "slamming" when operating in even moderate seas. It would not be suitable for patrolling outside of the port (offshore) on a regular basis. Furthermore the vessel offers no protection from the elements for the operator.

SAFEBoat

The recommended alternative to the port's current patrol boats would be a vessel similar to a U. S. Coast Guard "SAFEBOAT" (Fig. 3-E6). "SAFEBOAT" ("Secured Around Flotation-Equipped" Boat) is approximately 25 feet long with twin 200 HP outboard motors, which provide adequate speed for patrolling and observation. Its hull is rigid, but it is equipped with foam flotation around its perimeter at the gunwale. This device resists "plowing" of the bow into waves and also provides residual stability when the vessel heels. The foam flotation is out of the water and does not interfere with the vessel's motion through the water when the vessel operates at high speed in relatively calm water. However when the foam flotation submerges due to the vessel's heeling or pitching in rougher waters, it instantly provides more buoyancy and enhances the vessel's stability. The vessel is also equipped with an enclosure to protect the operators from the weather, spray, wind and waves. The vessel also has four seats mounted on hydraulic cylinders to protect the operators from impact forces due to the vessel's motions. Finally the vessel is can be easily transported overland on its own trailer, and it can also be equipped with two gun mounts for "M60" or "240" machine guns.

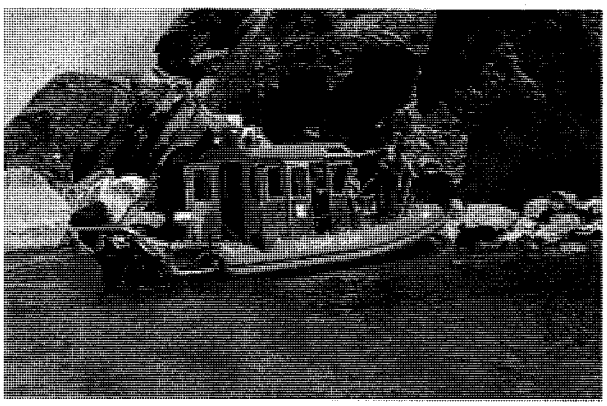


Fig. 3-E6 -USCG SAFEBoat

3.4 Preparation of Interim Report and Presentation of Evaluation and Alternatives

The presentation of alternatives by DMJM Harris expert, John H. Leary, P.E., took place in the Port of Cortes on December 1, 2005 and was attended by Mr. Edgardo Paredes from the Empresa Nacional Portuaria. Mr. Paredes had also attended all of the tug inspections in the Port of Cortes and La Ceiba. Mr. Paredes indicated their preference for a single higher horsepower vessel to two lower horsepower vessels. It was also indicated that there was provision in the budget for a new vessel.

3.5 Outline Specifications for New Tug Boat

The following outline specifications for a new tug boat are intended to be a guide in developing detailed plans and specifications by a naval architect.

Length	95.00 feet
Breadth	33.00 feet
Depth	16.00 feet
Material	Welded Steel
Engines	Two diesel at 2500 HP each
Generators	Two diesel at 80 KW each
Propulsion	Two rotating (Z-Drives)
Steering	Included in Z-Drives (no rudders)
Accommodation	Seven
Bridge equipment	VHF radios, magnetic compass, radar, echo sounder, GPS
Classification	American Bureau of Shipping (ABS) or equivalent including FFV (Fire Fighting Vessel) Class 1

The minimum requirements for ABS FFV Class 1 are

Number of water monitors	2
Discharge rate per monitor	5280 gallons per minute
Number of pumps	1 or 2
Total capacity	10,560 gallons per minute
Monitor range	394 feet
Minimum height of water trajectory	148 feet
Hose connections each side of vessel	4
Firefighter's outfits	4
Fuel oil for vessel and all monitors	24 hours continuous

In addition the vessel should have the additional generating capacity required to power the electric motor-driven fire pumps.

At the meeting in January 2007, ENP indicated that they were preparing the bidding for a new tug boat in the 2500 hp class. The new tug should be equipped with two diesel engines of 1250 HP each and should have the ABS or equivalent classification including FFV Class 1 as described above. With this size of tug, it can be expected that two tugs may be required for some of the larger vessels if wind and current conditions warrant. However, acquiring two 2500 hp tugs instead of a single larger tug offers additional flexibility that they can be used separately or together, and one can back up the other in case of maintenance. The new tug would be equipped as a fire fighting vessel. Together with the one existing tug equipped for fire fighting, this would provide the Port with a backup in the even one of the two fire fighting vessels is laid up for maintenance.

3.6 Improvement, Modernization of Maintenance; Control of Spare Parts

As stated in Section 3.1, the maintenance procedures and schedule meet or exceed the standards in the industry, except that there is no ongoing chipping and painting. Therefore the vessels should continue to be maintained under the present procedures, but the vessels' exterior steel surfaces should be regularly inspected, and any local coating failures should be prepared and painted.

As stated in Section 3.1, no major spare parts for the vessels are kept on hand. Only minor items, such as belts and filters, are kept. It is recommended that one set of major spare parts (liner, piston, connecting rod, valves, etc.) should be kept on hand for each type of engine in the vessels. It is further recommended that a spare tail shaft and spare left and right propellers for each type of vessel be obtained and kept available. Being able to quickly replace damaged major parts with spares can significantly reduce the amount of time that a vessel is out of service. The removed damaged parts can be repaired or replaced while a vessel is back in service after the spares in inventory are quickly installed in the vessel.

3.7 Recommendations for Rehabilitation of Pilot Boat or New Pilot Boat

The pilot boat that the port has was undergoing rehabilitation during its inspection. As explained in Section 3.2 the ongoing repairs were placing it good condition for its service. For reasons also explained in Section 3.2 it is recommended that a second pilot boat be obtained of at least the same size and with features similar to the existing pilot boat. Outline specifications for the new pilot boat are presented in Section 3.8. In addition the new vessel should have independent generators to power a 120 V AC electrical system. It should also have twin screws and have seating for about 10 persons for transport between ship and shore. It is also recommended that the vessel be built to the standards of the American Bureau of Shipping or a similar classification society.

3.8 Recommendations and Outline Specifications for Patrol Boats

As stated in Section 3.3 the features of the port's pilot boat limits its ability to operate in adverse weather conditions. It is recommended that the port obtain two "SAFEBOAT" type patrol boats like those operated by the U. S. Coast Guard (Fig. 3- E6). The outline specifications for such a vessel are as follows.

Length	25 feet
Hull Material	Fiberglass
Gunwale Floatation	Foam
Crew Enclosure	Aluminum
Seating	Shock-absorbing, four persons
Propulsion	Two 200 HP outboard gasoline engines
Overland Transport	Trailer with rubber tires
Navigation	VHF radio, radar, GPS, searchlights, magnetic compass, echo sounder, loud hailer
Fuel Tanks	Built-in

3.9 Training Program for Boat Operations and Boat Maintenance

It is recommended that ENP investigate the opportunities provided by the U. S. Coast Guard International Maritime Training program. The Coast Guard hosts international students at its Training Centers in Mobile, AL, Petaluma, CA and Yorktown, VA. The Coast Guard also has Mobile Training Teams that

provide training and technical assistance each year to approximately 2,500 international students in approximately 60 countries. Instructors can offer lesson plans in the host nation's language. This training includes vessel operations and maintenance. The U. S. Coast Guard also offers correspondence courses.

The training should begin with deckhands and assistant engineers learning basic seamanship and maintenance practices through the Coast Guard training. This will form a foundation for the safe operation of the vessels. The deckhands and assistant engineers should take continuing classroom or correspondence courses periodically as they gain skill and experience and progress to officer level. Logs should also be kept of their time on duty.

Deck officers and engineers should refresh their skills by taking the Coast Guard correspondence courses or periodically attending classroom courses with the Coast Guard.

As this program proceeds the officers will train their assistants through the normal course of operating the vessels, supplemented by formal coursework. This type of program will become self-perpetuating and lead to safe operation of the vessels and prolonged vessel life.

All personnel, crew and officers alike, should take formal courses in fire fighting.

The following specific U. S. Coast Guard courses, or equivalent courses, are recommended as part of a training program.

CREW-41 – CREWMAN, SMALL BOAT – This course familiarizes the student with small boat operations and provides training toward qualification as a boat crewman on the 41-foot utility boat. The course material covers duties and responsibilities of a crewmember, deck seamanship, retrieval of people from the water, towing, fire fighting, and dewatering.

CG-30 – BASIC NAVIGATION TECHNIQUES – A practical course designed to teach techniques in coastal and open-ocean navigation, including chart preparation, rules of the road, bearing taking, and trip planning.

CG-32 – DECK SEAMANSHIP – Training on techniques of marlinespike seamanship, line handling, launch and recovery of small boats, and man overboard recovery.

CG-11 – SMALL BOAT OPERATIONS – This course familiarizes students with procedures to be followed for the safe and effective operation of small boats (50 feet/15 meters length). Course contents will be tailored to meet requesting country's needs and desires. Possible course topics include coxswain skills, navigation, towing, deck seamanship, marlinespike seamanship, navigation rules, fire fighting, and engineering casualty control.

DC-06 – DAMAGE CONTROL AND FIREFIGHTING TEAM – This course is designed to provide students with the training required to act as a team member in fire fighting and damage control repair parties, an introduction to current USCG-approved repair locker equipment, and Damage Control Training Team (DCTT) methods for the small cutter fleet.

CG-31 – SHIPBOARD FIRE FIGHTING – Demonstration and training of use of shipboard fire fighting equipment and techniques. Training takes place in the classroom and in practical hands-on exercises.

CG-43 – STABILITY – Classroom training and discussion on the critical role of stability on ship and small boat performance.

Any personnel who have not yet had formal training in the areas covered by the above courses should

participate. Because the courses do not have prerequisites, they may be taken in any order. However the courses should be spaced far enough apart, perhaps two-month intervals, to allow the students to return to work on the port's vessels and put their newly acquired skills into practice.

3.10 Cost Estimates, Sources of Supply –Rehabilitation of Ex isting Equipment, Construction of New Equipment

The estimated cost of having a new tug boat built, as outlined in Section 3.5, is US $7,000,000.

The estimated cost of having a new patrol boat built, as outlined in Section 3.7, is US $950,000.

Some shipyards capable of building the tug boat and/or patrol boat are as follows. John Bludworth Shipyard LLC, Corpus Christi TX; Bollinger Shipyards, Inc., Lockport, Louisiana; and Atlantic Marine, Inc., Jacksonville FL.

Sources of supply for boats and marine systems are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

3.10.1 Boats

Supplier:	**John Bludworth Shipyard, LLC**
Address:	3101 Navigation Corpus Christi, TX 78402 USA
Telephone	1-361-887-7981
Fax	1-361-887-6014
E-mail:	gdanna@jbludshipyard.com
Contact:	Gasper D'Anna
Web	http://www.jbludshipyard.com

Supplier:	**Bollinger Shipyards, Inc.**
Address:	P. O. Box 250 Lockport, LA 70374 USA
Telephone:	1-985-532-2554
Fax:	1-985-532-7225
E-mail:	Roberts@bollingershipyards.com
Contact:	Robert Socha
Web:	http://www.bollingershipyards.com

Supplier:	**Atlantic Marine, Inc.**
Address:	8500 Heckscher Dr. Jacksonville, FL 32226 USA
Telephone:	1-904-251-1507
Fax:	1-904-251-1507
E-mail:	kwilson@atlanticmarine.com
Contact:	Kevin Wilson
Web:	http://www.atlanticmarine.com

Supplier: **VT Halter Marine, Inc.**

Address:	900 Bayou Casotte Parkway Pascagoula, MS 39581 P.O. Box 1328 Pascagoula, MS 39568 USA
Telephone:	1-228-696-6888
Fax:	1-228-696-6899
E-mail	vthmsales@vthm.com
Contact:	Sales
Web	http://www.vthalter.com

Supplier:	**SAFE Boats International, LLC**
Address:	8800 SW Barney White RD Port Orchard, WA 98367 USA
Telephone	1-360-674-7161
Fax	1-360-674-7149
E-mail:	NA
Contact:	Sales
Web:	http://www.safeboats.com

3.10.2 Naval Architecture

Supplier:	**Alion-JJMA Corporation dba John J Mullen Associates**
Address:	4300 King St 400 Alexandria, VA 22302-1503 USA
Telephone:	1-703-933-6687, 703-418-0100
Fax:	NA
E-mail:	moakes@alionscience.com; contact@alionscience.com
Contact:	Mark Oakes
Web:	http://www.alionscience.com

Supplier:	**AMSEC LLC, M. Rosenblatt & Son**
	Maritime Plaza 1201 M St., SE Washington DC 20003 2829 Guardian Lane, Virginia Beach VA 23452 USA
Telephone:	1-202-608-8400 (Washington), 1-757-463-6666 (Virginia)
Fax:	1-202-544-5645, 1-757-463-9110 (Virginia)
E-mail:	NA
Contact:	Contracts department
Web:	http://www.amsec.com

Supplier:	**Leary Engineering**
Address:	530 Natchez St Ste 310 New Orleans LA 70130

	USA
Telephone:	1-504 522-3483
Fax	1-504-586-0448
E-mail	jleary@learyeng.com
Contact	John Leary, P.E.
Web	http://www.learyeng.com

3.10.3 Marine Engines

Supplier:	**Detroit Diesel**
Address:	13400 Outer Drive, West Detroit, MI 48239-4001 USA
Telephone:	1-313-592-5000
Fax:	NA
E-mail:	ddcinfo@detroitdiesel.com
Contact:	Sales
Web:	http://www.detroitdiesel.com

Supplier:	**Caterpillar Inc.** 100 NE Adams St. Peoria, IL 61629 USA
Telephone:	1-309-578-6298 or 1-800-321-7332 (toll free in USA)
E-mail:	CAT_Power@cat.com
Contact:	Marine Power
Web:	http://www.cat.com

Supplier:	**Pratt & Whitney** 400 Main Street East Hartford, CT 06108 USA
Telephone:	1-860-565-4321
E-mail:	info@pw.utc.com
Contact:	Power Systems
Web:	http://www.pw.utc.com

Supplier:	**Cummins, Inc.** 500 Jackson St. P.O. Box 3005 Columbus, IN 47202-3005 USA
Telephone:	1-812-377-5000
Fax:	1-812-377-3334
E-mail:	NA
Contact:	Marine Sales
Web:	http://www.cummins.com

3.10.4 Marine Electronics

Supplier:	**Motorola, Inc.**
Address:	1303 E. Algonquin Rd. Schaumburg, IL 60196 USA
Telephone:	1-847-576-5000
Fax:	1-847-576-5372
E-mail:	NA
Contact:	Customer Service
Web:	http://www.motorola.com

Supplier:	**Raymarine Inc.**
Address:	21 Manchester Street Merrimack NH 03054 USA
Telephone:	1-603-881-5200 or 1-800-539-5539 (toll free in USA)
Fax:	1-603-864-4756
E-mail:	NA
Contact:	Sales
Web	http://www.raymarine.com

Supplier:	**Sperry Marine** 1070 Seminole Trail Charlottesville, VA 22901 USA
Telephone:	1-434-974-2656; 1-434-974-2000; 1 800-974-2360 (toll free in USA)
Fax:	1-434-974-2259,1-434-974-2360
E-Mail:	sales_commercial@sperry-marine.com
Contact:	Commercial Sales
Web:	http://www.sperrymarine.northropgrumman.com

Supplier:	**Northstar**
Address:	30 Sudbury Road, Acton MA 01720 USA
Telephone:	1 978 897 6600, 1 800 628 4487 (Toll free in USA)
Fax:	1 978 897 7241
E-mail:	sales@bntmarine.com
Contact:	Sales
Web	http://www.northstarcmc.com

Supplier:	**Garmin International Inc.** 1200 East 151st Street Olathe, KS 66062-3426 USA
Telephone:	1-913-397-8200
Fax:	1-913-397-8282
E-mail:	NA
Contact:	Sales
Web:	http://www.garmin.com

Supplier:	**KVH**
Address:	50 Enterprise Center Middletown, RI 02842-5279 USA
Telephone:	1-401-847-3327
Fax:	1-401-849-0045
E-mail:	NA
Contact:	Sales
Web:	http://www.kvh.com

Supplier:	**Simrad**
Address:	19210 33rd Ave. W., Suite A Lynwood, WA 98036 USA
Telephone:	1-425-778-8821
Fax:	1-425-771-7211
E-mail:	NA
Contact:	David Parkinson, Sales
Web:	http://www.simradusa.com

Supplier:	**Maretron**
Address:	9034 N. 23rd Ave., Suite 13 Phoenix, AZ 85021 USA
Telephone:	1-602-861-1707
Fax:	1-602-861-1777
E-mail:	sales@maretron.com
Contact:	Sales
Website:	http://www.maretron.com

3.11 Project Implementation Schedule

The following table provides a working schedule for the tasks recommended in this report. The vertical line to the right of the tasks represents the time at which the tasks are commenced. Please note particularly that from the beginning of this modernization program, ten months will be required to complete the planning, design and obtaining construction quotes on the new tug. It is estimated that the construction of the new tug will take approximately seven months.

TASK	MONTHS 1	2	3	4	5	6	7	8	9	10	11	12
OBTAIN SPARE PARTS FOR VESSELS												
CHIPPING AND PAINTING PROGRAM	ONGOING ---------->											
CREW TRAINING PROGRAM	ONGOING ---------->											
PREPARE OWNER'S REQUIREMENTS FOR TUG												
PREPARE OWNER'S REQUIREMENTS FOR PILOT BOAT												
PREPARE OWNER'S REQUIREMENTS FOR PATROL BOAT												
NAVAL ARCHITECT'S TUG BOAT DESIGN												
NAVAL ARCHITECT'S PILOT BOAT DESIGN												
PATROL BOAT SPECIFICATIONS												
SOLICIT QUOTES ON TUG BOAT												
SOLICIT QUOTES ON PILOT BOAT												
SOLICIT QUOTES ON PATROL BOAT												
REVIEW QUOTES ON TUG BOAT												
REVIEW QUOTES ON PILOT BOAT												
REVIEW QUOTES ON PATROL BOAT												
TUG BOAT CONSTRUCTION											----> ?	
PILOT BOAT CONSTRUCTION											----> ?	
PATROL BOAT CONSTRUCTION							----> ?					

Figure: Project Implementation Schedule for Service Boats

4 EVALUATION AND RECOMMENDATION OF FIRE PROTECTION SYSTEMS

4.0 Introduction

The DMJM Harris team has prepared the final report, providing evaluations, conclusions and recommendations. Previously, interim reports were provided, including alternatives for consideration by ENP. After consideration and review of the interim submittals by the Client, DMJM Harris has developed final recommendations. This section of the report addresses the evaluation of the existing fire protection capabilities of the Port and Free Zone, description of alternatives requirements for fire protection, training program, cost estimates and project schedule.

The evaluation of the Port of Cortes fire protection capabilities and the capabilities of the surrounding terminals, municipality and the naval base was based on a site visit conducted in April, 2005, follow up contacts during 2005, a presentation in December 2005, at which comments of the Client, ENP, and of the Fire Department of Puerto Cortes were reviewed and delivery of the draft final report in August 2006, followed by a meeting and presentation in January 2007 to review comments of the Client and the Fire Department. This section was prepared mainly by DMJM Harris fire protection expert, William Burket, who was accompanied on the site visits by TECNISA fire protection specialist, Vladimir Pineda, and by Christopher H. Born, P.E. Director of Fire Protection Engineering with DMJM Harris team member, Clark Nexsen, who prepared the cost estimates and Jorge Carranza, a TECNISA engineer, prepared a data base on the buildings at the Port. The port had prearranged meetings with many of the stakeholders within the port.

The positive attitudes and willingness to work together indicated a positive step to forming a partnership between all of the port agencies. This partnership will foster effective planning and response to emergencies within the port and the city of Puerto Cortes.

4.1 Evaluation of the existing fire protection capabilities of the port including any fire protection networks within the port

The port facility was found to have virtually no fire protection systems other than portable fire extinguishers and one of its three tugboats that can flow 3,000 gallons per minute of firefighting water. The structures located at the port and the free zone contain no fire detection / fire alarm systems or fire sprinkler systems. A warehouse on the port has a sprinkler system installed, but it is out of service. The system has not been maintained, and is in need of an evaluation from a fire protection company. The port facility relies on the municipal fire department for response to emergencies within the port. The municipal fire department has only 1 fire station with 4 pieces of apparatus, which have a bare minimum of equipment. The equipment consists of only about 300-500 feet of hose, 3 or 4 Self Contained Breathing Apparatus (SCBA), and assortment of small hand tools and appliances. In addition to responses within the port, the municipal fire department is responsible for providing emergency response capabilities to all the facilities surrounding the port, the Honduran Naval Base and protecting over 124,000 citizens of Puerto Cortes.

Several facilities, specifically the Texaco terminal, Elcosa power company, Hondupetrol terminal and the naval base, have personnel trained in basic firefighting (fire brigade levels) and can offer some equipment such as firefighting foam and vessels. Each of these facilities can provide training and familiarization with the specifics of the types of petroleum products and firefighting equipment located on the facility. Several of the facilities have provided funding to repair fire apparatus, just completed replacing a diesel engine in one of the fire trucks. The management staff has assisted the fire department in developing and providing administrative support of the fire departments budget process. All agencies agreed that in addition to the lack of resources and equipment, training in all areas just as basic firefighting, hazardous materials/WMD response and Incident Command System was desperately needed.

4.1.1 The fire hydrant system for the port is out of service, as illustrated in Figure 4.1.1, although the fire hydrants located at the free zone are in service. According to Port personnel, the hydrants are supplied from the two water towers, as shown in Figure 4.1.2. There is one 250,000-gallon tower located at the port and a 75,000-gallon tower located at the free zone. There is a plan to construct a 100,000-gallon concrete reservoir adjacent to the port water tower. This would greatly increase the availability of the water supply for firefighting efforts. Every hydrant within the port is in need of repair or replacement and has been secured at the cutoff valve located at the base of the hydrant. The condition of the underground water mains that supply the hydrants at the port is unknown, but most likely the mains should be replaced due to the age and possible deterioration of the existing water main system. The only water supply to fight a fire within the port facility is located on the fire department tankers and a tugboat with firefighting capabilities, which is shown on Figure 4.1.3. There is one 2.5" hose connection located on the wall of pump room at the port water tower that can be utilized to re-fill fire department tankers. But this connection is not readily accessible due to obstructions just as fences and lack of roadways or driveways. Access can be accomplished by removing the fence and stretching hose lines to the connection.

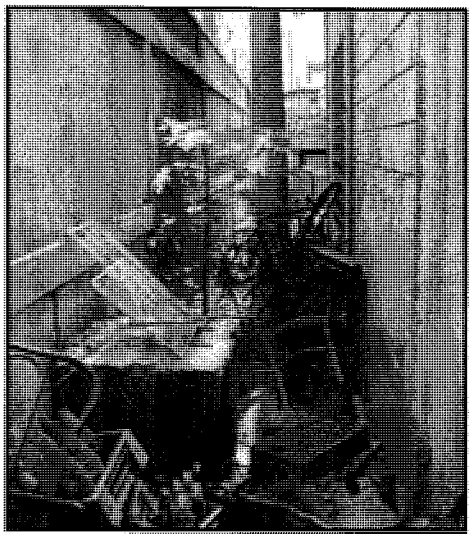


Figure 4.1.1: The only hydrant that is in-service, is inaccessible.

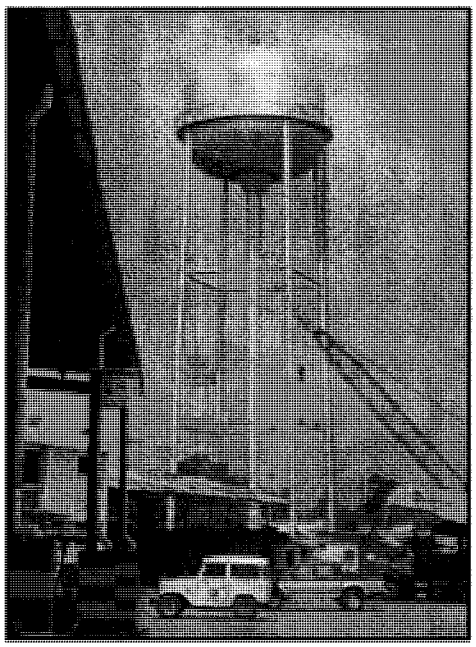


Figure 4.1.2: Water tower on the port facility.

4.1.2 The tug, Doctor General Tiburcio Carias Andino, can flow 3,000 gallons per minute (gpm) of firefighting water, as illustrated in Figure 4.1.4. It has the capabilities of supplying land-based fire apparatus and pier side fire main systems with water, through a manifold shown in Figure 4.1.5. The vessel appears to be in good seaworthy condition and should be considered as a reliable response platform. This vessel can be an asset within the port to provide waterborne firefighting capabilities to port facilities, vessels at anchor or underway within the port's harbor. The tugboat can also assist the local fire department and the naval base with firefighting capabilities. Since no other tug is so equipped, the port has significantly less protection when the tug is laid up than at other times.

Figure 4.1.3: The tug Doctor y General Tiburcio Carias Andino.

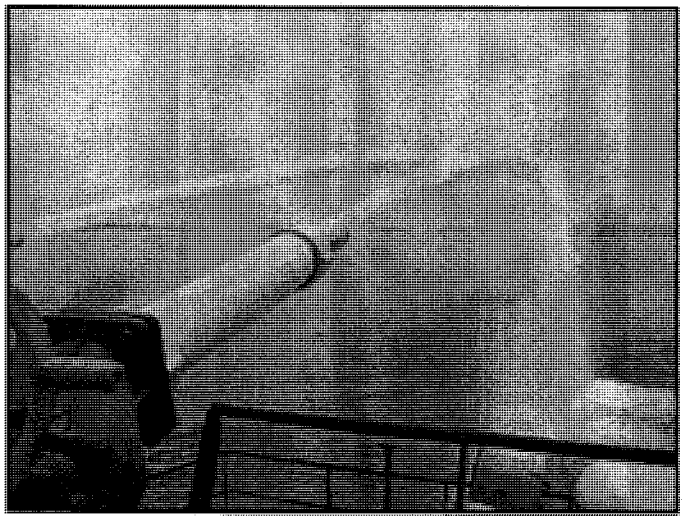


Figure 4.1.4: Tug flowing water through the monitors.

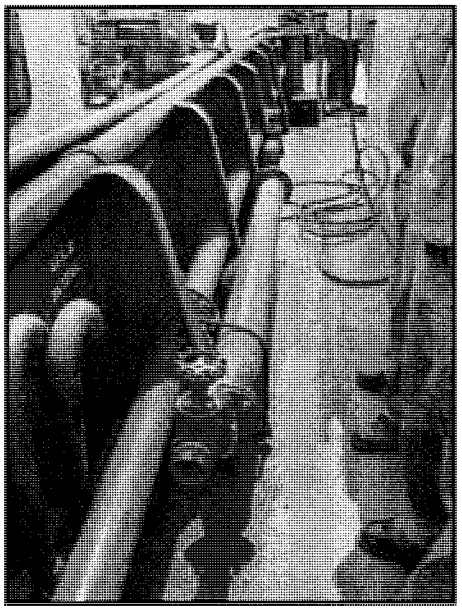


Figure 4.1.5: The portside manifold can supply firefighting water to land-based equipment.

4.1.3 The response to emergencies on the port facility rests solely with the local fire department, which has very limited resources. Portable fire extinguishers are located throughout many of the structures, but over 50 percent of the extinguishers require some form of maintenance. Some port personnel are trained in basic firefighting (Fire Brigade Levels) but lack basic equipment, such as personal protective equipment and self-container breathing apparatus (SCBAs), and necessary training to provide an adequate response to any fire incident.

4.1.4 The port has several buildings and other large structures that require the response of fire department aerial apparatus. The closest ladder truck is over 50 miles away in San Pedro Sula, ash shown in Figure 4.1.6. Considering the response time and the potential consequences of the delay, the Puerto Cortes fire department should acquire its own aerial ladder.

Figure 4.1.6: The closest ladder truck to the Port of Cortes is based in San Pedro Sula.

4.1.5 There are no capabilities within either the port community or the local fire department to respond to hazardous materials incidents or any weapons of mass destruction (WMD) situations. It should be noted that due to the quantity of containerized cargo and bulk products that are shipped through the port, it is imperative the port have the ability to respond in a safe and efficient manner to incidents involving hazardous materials and the threat of a WMD event.

4.2 Evaluate possible assistance from the local municipality or other facilities

4.2.1 The Puerto Cortes municipal fire department has one fire station, shown in Figure 4.2.1, that is stocked with a minimum of equipment and has 4 pieces of apparatus (that are stocked with bare minimum equipment.) The fire station is located on port property at the west side of the port near the free zone, but is outside the port fence. This station is located in area that is subject to flooding during heavy downpours. The station has access to the port through a gate that is located behind the firehouse, but presently this gate is kept secured by port personnel due to security issues.

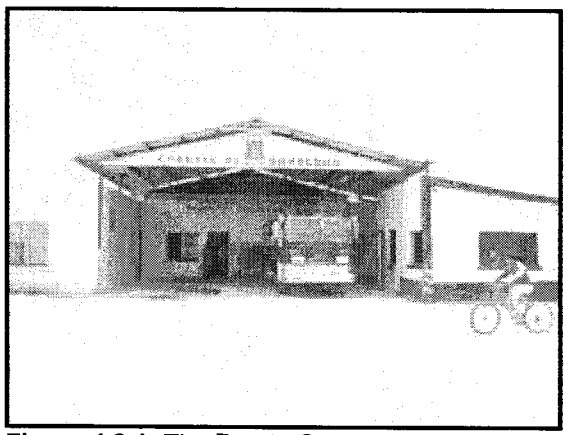


Figure 4.2.1: The Puerto Cortes municipal fire station is located by the west gate of the port near the free zone.

At the time of the site visit in April 2005, the station housed 2 –1000 gpm pumpers, shown in Figures 4.2.2 and 4.2.3, and 2 –1000 gallon tankers, shown in Figures 4.2.4 and 4.2.5. The apparatus are older model units, which require continuous maintenance and will need to be replaced in the near future.

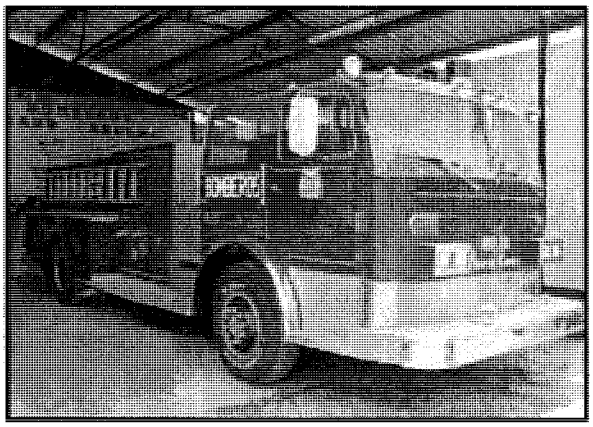


Figure 4.2.2: 1000 gpm pumper.

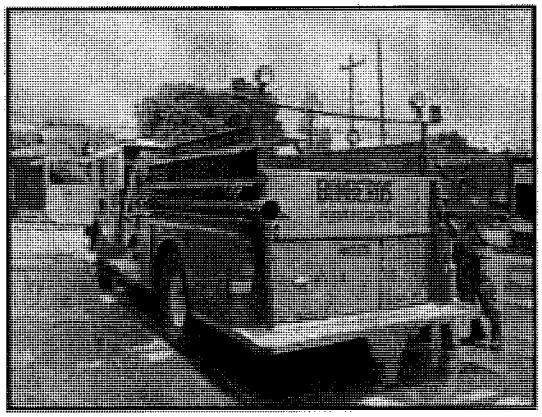


Figure 4.2.3: 1000 gpm pumper.

Figure 4.2.4: First run tanker.

The apparatus is equipped well below normal standards of firefighting equipment. The pumpers have enough hose and appliances to place approximately 3 hose lines into service, as can be seen in Figure 4.2.6. Most fire apparatus in the U.S. carry at a minimum axes, pike poles, firefighting foam, portable generators, exhaust fans, forcible entry tools, appliances and 1000 feet of large supply hose. Most fire department pumpers can place 6 hose lines into service.

At the meeting in January 2007, the Fire Department stated that it had expanded its fleet and had 7 units in service: 4 pumpers, 2 tankers and 1 ambulance. The equipment includes units from the 1980s and 1990s. The additions to the fleet were obtained by acquisitions and rehabilitation of existing units which were out of service.

Figure 4.2.5: Additional tanker.

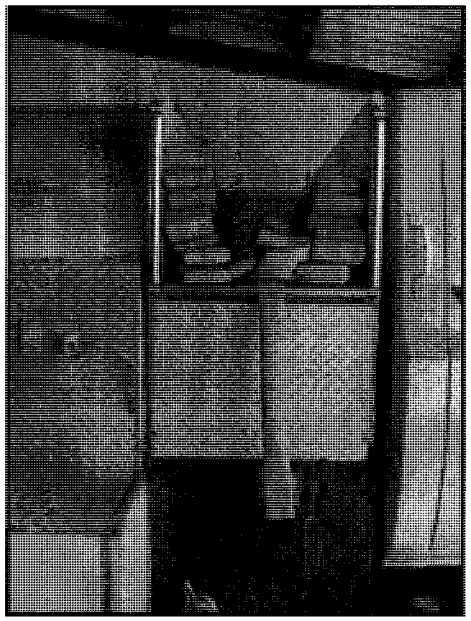


Fig. 4.2.6: Hose lines on tanker (note lack of adequate lines).

Figure 4.2.7: Monitors mounted on the top of the house of the tugboat.

Puerto Cortes fire department units carry no master stream devices. Master streams are large nozzles and monitors mounted on pumpers, vessels as shown in Figure 4.2.7, and aerial ladders that are designed to flow large quantities of water from a distance.

These devices are very important during a defensive operation. If the incident commander decides it is too dangerous to have personnel inside or near a structure or vessel, he will deploy the monitors to hold the fire to that structure, vessel or area. This is known as the defensive mode or operation. Due to the lack of aerial apparatus, elevated master streams cannot be deployed.

The apparatus has few hand tools and equipment normally found on most fire apparatus in other areas. Puerto Cortes Fire Department lacks axes, pike poles, firefighting foam, portable generators, exhaust fans and forcible entry tools. Fire department personnel have to share approximately 6 sets of turnout gear, as shown in Figure 4.2.8 and different brands of self-contained breathing apparatus (SCBA), as shown in Figure 4.2.9. Most fire departments issue their members their own turnout gear sized for each individual. Every firefighter on the scene of an incident should have a SCBA of the same brand with a spare air cylinder for each unit.

Figure 4.2.8: Turnout gear; note lack of adequate gear.

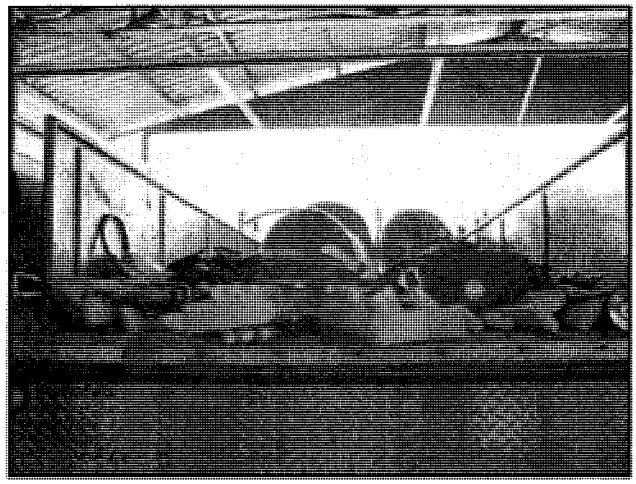


Figure 4.2.9: SCBAs are stored in the hose bed; only two SCBAs were observed on the unit.

The firefighters appear to be trained and continue to train on the basic firefighting procedures. The fire chief stated he is aware of the responsibilities his department faces concerning responses within the port, waterways and the city of Puerto Cortes. He will continue to respond to incidents within the port and to vessel fires within the harbor. He also stated he needs support from the port for additional funding for equipment and training to provide an effective and efficient response to incidents within the port community. The chief did indicate his need for more highly trained personnel. They do the best they can in house, but will require resources from outside of his department to provide the much needed training. There are many programs in the United States that could meet his needs. The fire department has developed a fire prevention office that could help develop fire prevention programs and response plans to help provide for a well-organized response.

A major concern is that the port and the fire department lack the equipment and training to respond to hazardous materials and WMD events. Personnel lack equipment such as monitoring and detection equipment, decontamination equipment, personal protection equipment, entry suits and respiratory protection required to safely mitigate this type of incident. These situations require large numbers of highly trained personnel to safely conduct hazardous materials operations. Due to the threat of terrorist attacks to ports around the world, the port must be able to detect, respond and mitigate a hazardous material or a WMD situation.

In light of the shortcomings in resources, the Puerto Cortes Fire Department will continue to respond to incidents within the port community and to the citizens of the city, as training, equipment and manpower will allow.

4.2.2 The ChevronTexaco Terminal, Elcosa Power Company, and Hondupetrol Fuel Terminal have fixed firefighting systems and water supply systems to protect certain areas and equipment on their terminals. Both Chevron and Hondupetrol have dock facilities that are protected with seawater pumping systems; the ChevronTexaco dock is shown in Figure 4.2.10. Most employees are trained in firefighting procedures and the operation of firefighting systems located on the terminals. All terminals rely on the local fire department for response to incidents at their terminals.

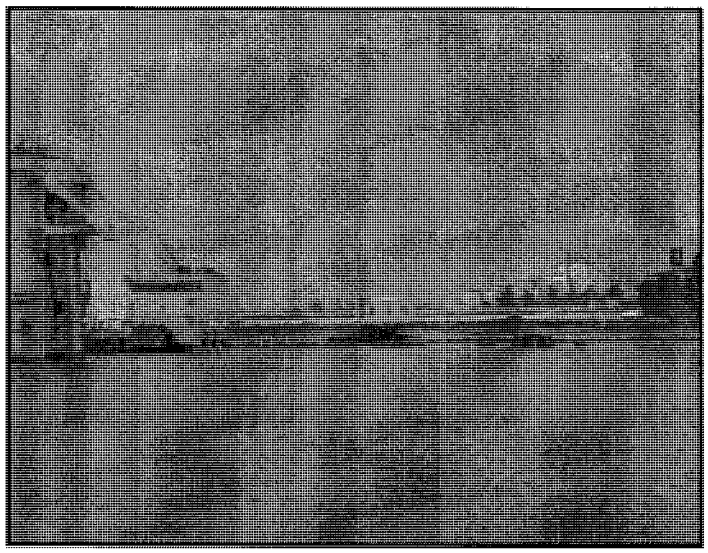


Figure 4.2.10: ChevronTexaco fuel dock with fire pump house located in the center of the dock.

All three terminal managers have indicated they have and will continue to provide support to the fire department and the local port community. The terminals can supply personnel and equipment such as firefighting foam to be utilized by the fire department on incidents within the port and the city. The managers have provided funding and administrative support for the repair of fire apparatus and administration of the fire departments budget.

4.2.3 The Honduran Naval Base is located in close proximity to the port. It appears the naval base wants to be a partner within the port community. The naval base commander indicated his navy personnel have only basic firefighting training. Thus he relies on the Puerto Cortes fire department to respond to incidents on the base and its naval vessels. The naval base has several vessels that can be a great asset during a marine fire. The two landing craft, shown in Figure 4.2.11, are excellent waterborne platforms that land-based firefighting equipment that can be deployed on to combat fires on vessel, at anchor, as shown on Figure 4.2.12, or to support land-based operations at the port's berths.

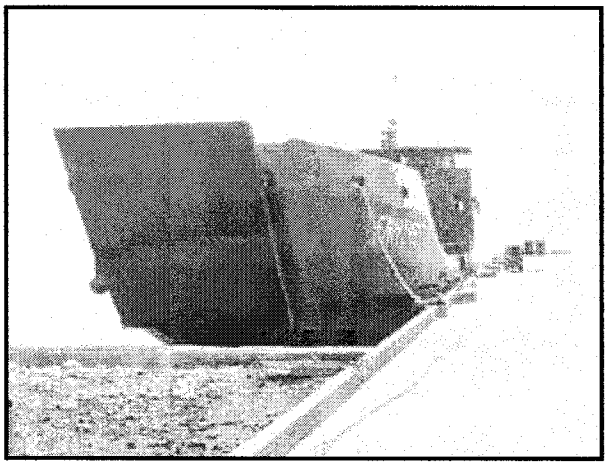


Figure 4.2.11: The naval base has 2 landing craft that can be utilized to load fire equipment.

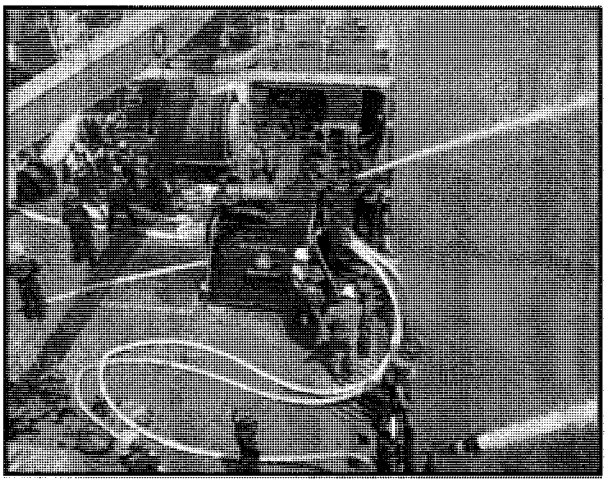


Figure 4.2.12: Firefighting equipment deployed on a vessel can respond to a fire on another vessel at anchor.

4.3 Evaluate the fire protection needs of the port facilities including warehouses, maintenance, storage, administration facilities, chemical; and petroleum handling and storage, hazardous dry bulk and all other potential areas of danger.

The ports hydrant and water main system is out of service. The port buildings lack fire protection systems. None are equipped with fire detection or alarm systems.

The types, sizes and flow rates of fire protection systems for buildings are identified in the 2003 International Fire Code (IFC), from the International Codes Council. Fire protection requirements for piers and wharves are identified in the 2005 National Fire Protection Association (NFPA) 307 Standard for Construction and Fire Protection of Marine Terminals, Piers and Wharves. The applicable sections of the

IFC are summarized below:

Section	Description
903	Automatic Sprinkler Systems
2301	General: High-piled combustible storage
2302	Definitions
2303	Commodity classification
2304	Designation of high-piled storage areas
2306	General fire protection and life safety requirements
2307	Solid-piled and shelf storage
2308	Rack storage
904	Alternative automatic fire-extinguishing systems
905	Standpipe systems
906	Portable fire extinguishers
907	Fire alarm and detection systems
912	Fire department connections
913	Fire pumps
Appendix B	Fire-flow requirements for buildings
Appendix C	Fire hydrant locations and distribution

Hiller, a fire protection company with an office in Chesapeake, Virginia, assisted in identification of the applicable IFC sections.

No sprinkler or standpipe systems are installed in any structure other than Warehouse 1. The condition of the sprinkler system in Warehouse 1, illustrated in Figures 4.3.1 and 4.3.2, could not be determined, due to a lack of maintenance records, and the sprinkler system's testing valves and piping have been permanently capped. All structures are equipped with portable fire extinguishers, of which over 50% require some form of maintenance such as recharging the portable extinguishers, 6-year maintenance and the hydrostatic testing of the cylinders.

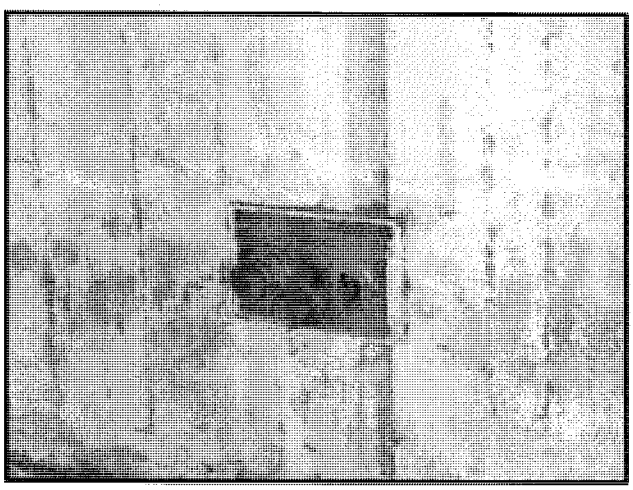


Figure 4.3.1: Sprinkler connection for the system at Warehouse 1.

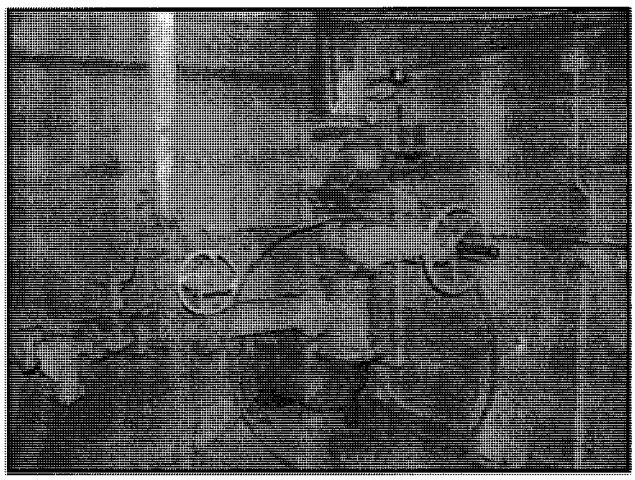


Figure 4.3.2: Sprinkler room for warehouse 1. All valves were open, but it could not be determined if the system was in service.

Table 4-1 summarizes the principal buildings situated at the port. The locations of these buildings are shown in the following figures. Additional information on the buildings pertinent to the development of fire protection systems is provided in Appendix E. The buildings include warehouses, administrative offices, shops and other structures. The specific requirements for fire protection for the various types of buildings are further described below.

Table 4-1
Port Buildings Description and Areas

No.	Name	Footprint area (m2)	Floors
1	DEA	1,268	2
2	DEA	367	1
3	Inverquim area	10,560	1
4	Sugar warehouse	2,122	1
5	Transquimica area	27,181	1
6	Trainmar office	1,074	1
7	Workers cafeteria	261	1
8	Civil works	282	1
9	Workshop	1,405	2
10	Warehouse No. 1	7,151	1
11	Accounting office	623	1
12	Electrical shop	174	1
13	Mechanical shop	582	1
14	Administration Building	450	3
15	Police	171	-
16	Bank	327	1
17	Cafeteria	107	1
18	HR office	256	1
19	Warehouse No. 4	5,110	1
20	Port superintendent office	482	3
21	Port captain	178	3
22	Transcoma area	7,880	-
23	Refrigerated warehouse	4,135	1
24	Solymar area	9,670	-
25	Anave area	13,555	-
26	Villafranca area	4,171	-
27	Seaboard area	22,418	-
28	Crowley area	10,096	-
29	Maquilas	7,503	1
30	Maquilas	7,509	1
31	Maquilas	1,491	1
32	Maquilas	6,117	1
33	Maquilas	7,589	1
34	Maquilas	3,717	1
35	Maquilas	3,353	1
36	Maquilas	2,582	1
37	Maquilas	433	1
38	Maquilas	-	1
39	Maquilas	4,612	1
40	Maquilas	4,310	1
41	Maquilas	3,237	1
42	Maquilas	7,197	1
43	Maquilas	1,031	1
44	Maquilas	1,784	1
45	Maquilas	1,819	1
46	Hon-Tai	3,488	1
47	Auto yard	19,949	-
48	Standard area	20,805	-
49	Maersk Sealand area	30,895	-

4.3.1 Waterfront: The waterfront consists of non-combustible concrete bulkheads and berths, as shown in Figure 4.3.3, with only one warehouse in close proximity to the berths. The warehouse is constructed of unprotected metal I-beams with metal roofing decking and metal panel walls. The warehouse has the ability to store many types of materials (See IFC section 2303). The types of materials stored will vary due to the types of cargos that are discharged from vessels. Although not one type of material or cargo is stored on a regular basis, it can be appropriate to design fire systems around worst case materials, such as plastics.

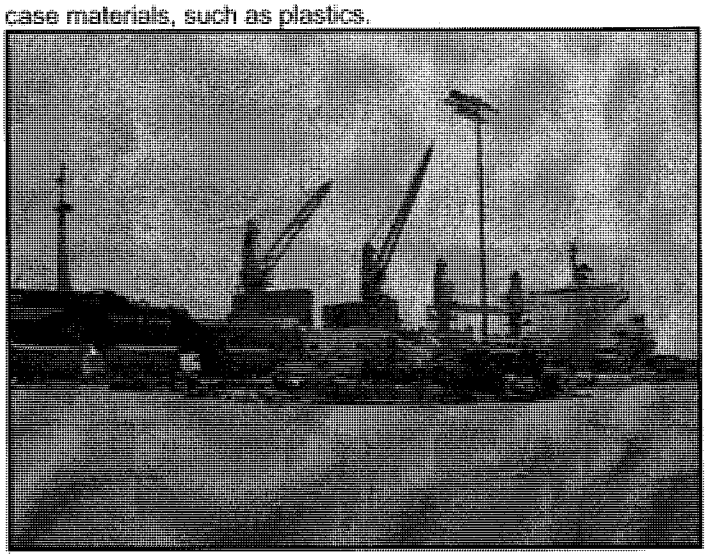


Figure 4.3.3: Concrete berth with no structures in close proximity to the vessel.

Vessels that moor alongside the berths can present a fire hazard to the port. Fires and hazardous materials incidents can occur with the cargo and within the vessel itself. The vessel's crew and the local fire department are responsible for mitigating incidents aboard the vessels.

The major concern is the lack of a water main system (hydrants) to supply fire apparatus in the event of a vessel fire or fires within the warehouse or other structures. The water main with hydrants no further than 400 feet apart (See IFC Appendix C of the Code Section C-105) should be installed to provide a water supply to fire apparatus. The tugboat could supplement a separate salt-water, water main system with seawater if the proper connections are installed within the saltwater main system. At one time, there was a fire pump located near the waterfront that supplied seawater to the port facility, but that equipment has been removed and the intake dismantled.

4.3.2 Warehouses and Storage facilities: Several large warehouses are located within the port facility. The fire load, which reflects the construction type and the type of items stored in the warehouses, changes on a daily basis. The warehouses are mostly constructed of unprotected metal I-beams with metal roofing decking and metal panel walls. The quantity of stored goods depends on the number of vessels that call on the port (See IFC Section 2303). During the fire protection review, the fire load within the warehouses was low, as can be seen in Figure 4.3.4. All warehouses and storage facilities lack fire detection/alarm system and sprinkler systems. Fire detection and alarm systems should be installed to provide early detection and notification of a fire (See IFC Section 907). Sprinkler systems, (See IFC Section 903) are very important to provide an advanced extinguishing capability to hold the fire in check or even extinguish the fire before the arrival of the local fire department.

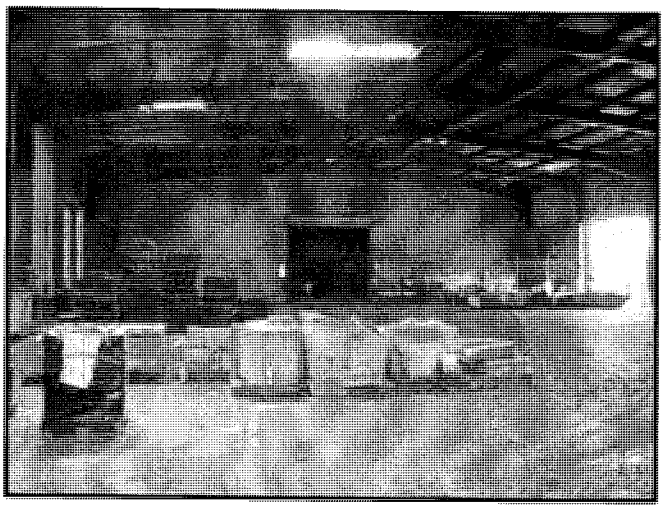


Figure 4.3.4: The limited cargo in warehouse 1 at the time of this photograph would result in a low fire load.

4.3.3 Administration Facilities: The administrative offices and facilities within the port have no fire detection/alarm systems (See IFC Section 907). The buildings are constructed of a masonry type of construction with flat roofs. The buildings lack sprinkler systems (See IFC Section 903) and standpipe systems (hose cabinets and hose connections) in the stairwells (See IFC Section 912). There are no exit signs installed and emergency exit routes are not posted. The life hazard is high during normal business hours and low during nighttime hours. Due to the number of personnel working within these offices, fire detection and alarm systems, exit lights and emergency exit routes should be installed to ensure a safe evacuation of the structure. Sprinkler and standpipe systems will greatly enhance the ability of the local fire department to combat a fire within these structures.

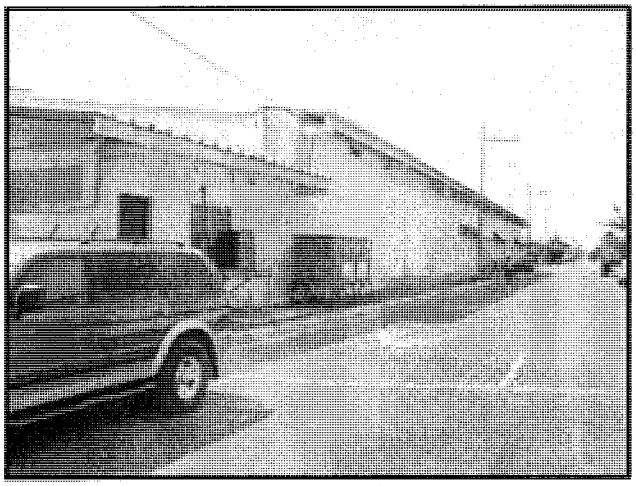
4.3.4 Chemical and petroleum handling: The surrounding chemical and petroleum facilities have adequate fixed fire fighting systems. Examples of this are the permanently mounted fire monitors supplied by water reservoirs that are supplemented by fire pumps at the piers. These supply seawater to the reservoir system. CO_2 fixed firefighting systems (See IFC Section 904) have been installed to protect specific structures within these terminals.

4.3.5 Hazardous materials, hazardous dry bulk: The port facility itself has no firefighting systems installed to protect the areas that may store dangerous bulk goods or hazardous materials. The hazardous materials that were identified on the port during the review were stored outside of Warehouse 1. Port officials noted that the pallets of 55-gallon drums were to be loaded and removed from the port the next day (See IFC Section 2303). Firefighting systems such as water main system, fixed fire monitors and atmospheric monitoring equipment would be necessary to protect these areas.

4.3.6 Maintenance facilities: Maintenance facilities normally have flammable and combustibles materials stored within the structures due to the type of work that has to be conducted there. The maintenance facilities are constructed of unprotected metal I-beams with metal roofing decking and metal panel walls. Some of the materials stored within the maintenance facilities are diesel fuel, gasoline, paints, lube oil products, oxygen and acetylene, etc. These facilities are not equipped within any fire detection/alarm system. Sprinkler systems and class ABC portable fire extinguishers should be installed to protect these areas. Fire detection and alarm systems are necessary to ensure early detection and notification of a fire (See IFC Section 903 and 907).

4.4 Evaluate the fire protection needs of the free zone including buildings and other areas.

The Free Zone consists of multiple warehouses that are located on the west side of the port. The warehouses, illustrated in Figures 4.4.1 and 4.4.2, are some 8 single story structures, which mainly store textile/fabric products and accommodate apparel assembly, packaging and labeling operations customary in a free zone. This area employs about 3,000 workers during normal working hours. There are a few open-air restaurants throughout the complex.



Figures 4. 4.1: Warehouses located in the free zone. **Figure 4.4.2:** Warehouses located in the free zone.

.4.1 The fire hydrants located at the free zone are in-service. However, there are sometimes vehicles parked in front of hydrants and no parking zones are not marked, and several hydrants were blocked by trailers during the site visit.

4.4.1 All structures lack fire detection and alarm systems (See IFC Section 907). No structure is protected with a sprinkler system (See IFC Section 903). The complex's hydrant system is in good working order and is supplied from the west water tower that is located within the free zone.

4.4.2 Sprinkler systems and alarm systems are highly recommended due to the fire load (See IFC Section 2301) and the number of people that could be working within the free zone. Figure 4.4.3 shows the quantity of fabric stored in one building. The sprinkler system can easily be supplied due to the good working condition of the hydrant system, which is supplied by the 75,000-gallon water tower. The free

zone recently had a fire in a warehouse and the incident was contained to the structure due to the efforts of the local fire department and the availability of the water supply. The structure had significant damage. This damage could have been reduced if a sprinkler and alarm system had been installed.

Figure 4.4.3: The quantity of fabric stored in a free zone warehouse results in a high fire load.

4.4.3 No parking zones and fire lanes should be established around the fire hydrants and the buildings to ensure no vehicles obstruct the access of fire department apparatus, as shown in Figure 4.4.4.

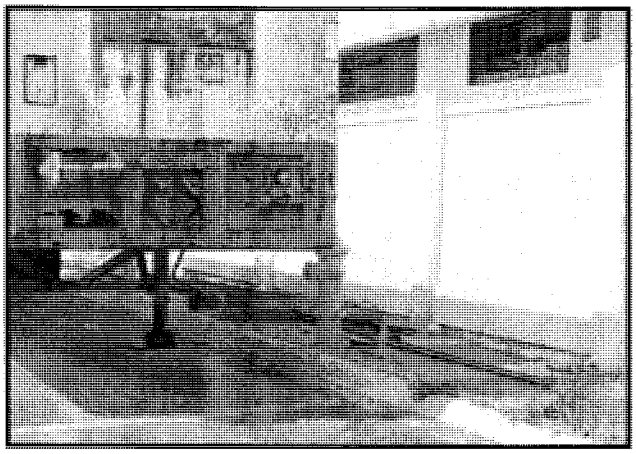


Figure 4.4.4: The trailer parked in front of fire hydrant would obstruct access in an emergency.

4.5 Develop and recommend a fire protection network for the port and free zone including fixed hydrants, sea water intake station, chemical and petroleum hazard detection and controls, fire and smoke detection and, controls in buildings, warehouses, shops, and factories in the free zone

4.5.1 The city fire department has one fire station located on port property by the free zone. A new fire station, shown in Figure 4.5.1, was under construction several years ago and that project has been abandoned due to funding issues. The port community should seek out funding to complete construction of the additional fire station for the following reasons:

- The new fire station will provide space for additional equipment and personnel. This will allow for more resources to meet the needs of the port and the citizens of the Puerto Cortes.
- The present fire station located at the port can house additional fire apparatus and firefighting equipment that can be purchased / obtained by the port and/or the city to provide protection on the port and the surrounding areas. This station could be turned back over to the port administration to operate this facility, but the port must be willing to train their personnel to operate and maintain the new fire apparatus.
- If the port does not wish to fully commit to providing fire protection to port property, an agreement should be established with the local fire department. This agreement could provide for development of a contingency plan and training program to provide the ability for both port and fire department personnel to maintain and respond the additional apparatus located at the port fire station to fire incidents within the port and the surrounding areas of the city.

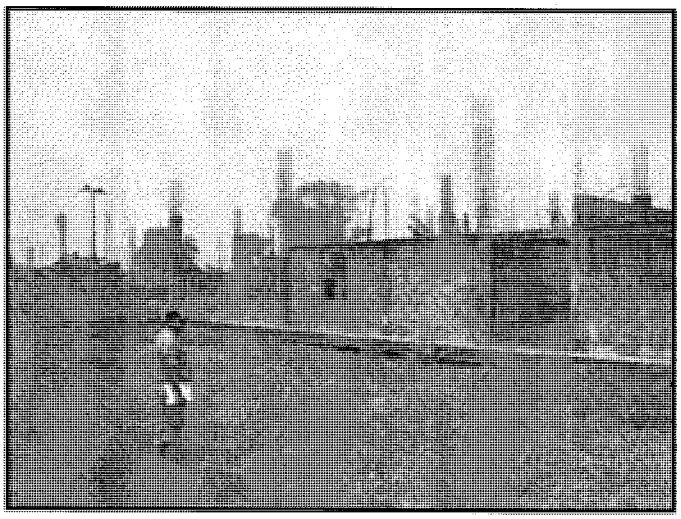


Figure 4.5.1: A new municipal fire station was under construction, but funding issues resulted in a halt of construction.

4.5.2 Port Facility Recommendations: The port facility is in need of planning, training and equipment to ensure the safety of the port and the ability to prevent and mitigate fire and hazardous materials incidents. Planning is an important element that will address community networking and emergency response contingency planning. Port officials should consider the following recommendations:

- The port should be the cornerstone of any partnership that is developed within the port community. Identify and assign port personnel to participate in local planning committees.
- Establish emergency planning committees within the port community and develop an emergency response contingency plan.
- Identify all available firefighting resources from the surroundings facilities and incorporate those items into the contingency plan.
- Develop a plan and an agreement that will identify resources the port owns that can be utilized by the city. An example is to allow the local fire department access to the fire hydrant system at the Free Zone. The city lacks hydrants and this agreement would allow the fire department tankers to re-fill their water tanks.

4.5.3 Smoke Detection and Alarm Systems: The port should install smoke detection systems and fire alarm systems in all buildings and structures within the port facility and the free zone in accordance with the 2003 International Fire Code. The smoke detection system will consist of smoke detectors installed in the overhead and ceiling areas of offices, warehouses, and maintenance and storage facilities. The fire alarm system will consist of pull stations and audible/visual sounding devices to alert personnel of a fire situation. Both systems can be monitored onsite by port security personnel. Fire service companies such as Hiller Systems, Kidde Fire Systems and others can install and train personnel on this equipment.

The following components make up a standard fire sprinkler and smoke/heat detection system.

Fire Sprinkler System

- Fire Hydrants
- Fire Department Connection
- Fire Pumps
- Post Indicator Valves
- Alarm System
- Piping (various sizes depending on required water flow)
- Sprinkler Heads (various types)

Sprinkler Control Room

Smoke / Heat/ Alarm Systems

- Main Alarm Panel
- Smoke/Heat Detectors
- Pull Stations
- Audio and Visual Alarm Speakers

Monitoring Site (Can be monitored by port personnel or a contract company)

4.5.4 Fire Hydrant and Water Main Systems: The present fire hydrant system should be accessed by a water utility company and repaired or replaced as necessary. The fire hydrants should be supplied by a water main system fed by the water towers and the hydrants should be located throughout the port facility and berths. The hydrants should be installed no more than 400 feet apart. Due to the square footage of the largest structure on the port, the hydrants should have a water flow of between 1,500 to 3,000 gallons per minute (See IFC Section C-105). Seawater systems are high maintenance and will require a separate water main system. This will be necessary to prevent salt water from contaminating fresh water systems.

If a seawater system is installed, it should be designed to supply certain hydrants that are located throughout the port. These hydrants should be independent from the fresh water system and be identified as such. The suction should be installed in an area that is not likely to shoal. The seawater pump for the Texaco Terminal is out of service due to the shoaling which has plugged the intake with sand. A seawater pump/intake system may not be required because of the ability of the fire tugboats to supply a salt water main if the proper connections are installed within the salt water main system. At the meeting in January 2007, the Fire Department indicated that salt water systems were no longer in use at the Port. The fire hydrant and water main system must be installed to support any type of sprinkler or stand pipe system. A local consultant has developed a water distribution plan for the port (see Appendix D), which it is recommended be considered to meet the needs of the port.

4.5.5 Sprinkler and Standpipe Systems: A fire sprinkler system should be installed in all warehouses, office buildings and maintenance and storage facilities. Sprinkler systems are highly recommended for the warehouses within the free zone. This is due to the high fire load contained at these warehouses. Most structures within the port should require an ordinary sprinkler system to be installed. The warehouses within the free zone would require an extra hazard system due to the square footage and items stored within the warehouses (See IFC Section 903). The sprinkler system will consist of fire pumps, piping, valves, alarm system, sprinkler heads and fire department connection. A sprinkler company can determine the type of sprinkler heads and whether a wet or dry sprinkler system is needed. A standpipe system should be installed in the stairways of all office buildings, maintenance/storage facilities and warehouses (See IFC Section 912). The system consists of pumps, hose cabinets that are fitted with a section of fire hose and a nozzle. This will allow for a quick extinguishment of a small fire by port personnel. Fire service companies such as Hiller Systems, Kidde Fire Systems and others can install and train personnel on this equipment.

4.5.6 Portable Fire Extinguishers: It is recommended that a procedure be established to provide for quick and effective maintenance of all portable fire extinguishers located within the port facility. This can be accomplished by furnishing the local fire department with the maintenance equipment and in return, the fire department would maintain the port's fire extinguishers. Fire service companies such as Hiller Systems, Kidde Fire Systems and others can install and train personnel on this equipment.

4.5.7 Fire Prevention: A relationship should be established with the local fire department prevention office to provide fire awareness and preventative measures for the port facility. This can include educational programs presented to the port employees. The fire department could train port personnel in the proper fire inspection techniques to ensure the safety of the personnel and the structures located on the port.

4.5.8 Chemical, Petroleum and Hazardous Materials: The Port should purchase atmospheric monitoring equipment to detect the presence for dangerous atmospheres due to chemicals, petroleum products, hazardous materials and or Weapons of Mass Destruction incidents. Additional equipment such as entry suits, decontamination equipment, communications equipment, chemical detection equipment, containment equipment and respiratory equipment will be needed to provide an adequate response to a hazardous materials incident.

4.5.9 Training: The port should consider selecting and training port personnel to form a fire brigade. This brigade could be first responders and work with the local fire department to mitigate emergency incidents on the port. The brigade could assist the local fire department with responses within the city. Port personnel could be trained on the following items:

Basic firefighting (fire fighting tactics, SCBAs, Hose line techniques, portable fire extinguishers, operating fire apparatus, first aid, etc)

- Fire prevention procedures and techniques
- Hazardous materials and WMD response procedures (identification of a hazardous material, response procedures, ICS, decontamination procedures, containment procedures, etc)
- Shipboard firefighting
- Operation and maintenance of any firefighting equipment owned by the port
- Incident Command System (ICS)
- Develop working relationships with the commercial terminals and the local fire department

4.5.10 Firefighting Equipment / Apparatus: The port is in need of firefighting equipment to ensure an effective and timely response to the port facility. The local fire department presently does not have the number and type of fire apparatus and equipment necessary to properly protect the port and the city. The port should consider obtaining the following equipment:

- Minimum of 1,000-gpm pumper/squirt fully equipped with firefighting equipment. This apparatus has the capability of establishing an elevated master stream like a 50 foot squirt type of apparatus.
- 100-foot aerial truck fully equipped with firefighting equipment. This piece of equipment will be utilized to reach multi-story buildings and provide elevated master streams.
- Portable fire pumps, shown in Figure 4.5.2, can provide fire protection at the berths and also be deployed onto vessels/tugs to establish waterborne firefighting capabilities. These pumps could also supply the water main system.

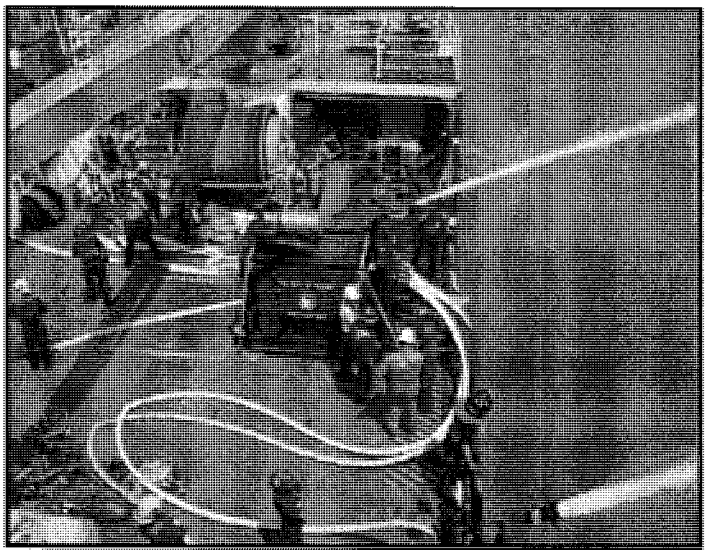


Figure 4.5.2: Port fire pumps can be utilized to support firefighting operations underway or at a berth.

The fire apparatus can be supplied from fire equipment companies such as, Seagrave, American La France, Pierce and others. Hale Pump Corporation and VTEC can supply the portable fire pumps.

4.6 Preparation of interim report and presentation of the evaluation of fire protection, and alternative requirements for fire protection

The interim presentation was made by the DMJM Harris team, including Fire Protection Expert, William Burket, in December 2005. The presentation was attended by Edgardo Paredes, Luís E. Landa, César Pineda of ENP management, the captain and seven other members of the Fire Department of Puerto Cortés, as well as representatives of the Texaco Refinery and Hondupetrol.

At the presentation, the ENP, Fire Department and local industry representatives reviewed information on the existing systems and alternatives presented by DMJM Harris for the fire protection network of the Port and free zone, including the water distribution and hydrant system, building sprinkler and standpipe systems and tug-mounted fire monitors.

The comments made included:

As noted in the interim report, the water distribution and hydrant system in the port is inoperative. In addition, the fire captain pointed out that the system in the free zone does not provide adequate pressure without additional pumps from the department when more than one hydrant is in service. In the final report, it is recommended the port complete construction of the water distribution and hydrant system in the port, and add additional booster pumps to ensure an adequate water supply for fire fighting in the free zone.

As noted in the report, the buildings do not have standpipes or sprinklers. The benefits and costs of standpipes were discussed, and it was noted that firefighters generally prefer to use their own hoses which can be tested. However, the firefighters expressed the view that having standpipes would offer some advantage in permitting the Port's own personnel to combat fires before the firefighters arise. In the final report, it is recommended that the buildings in the port and free zone be equipped with sprinkler systems, as well as smoke detectors and fire alarm systems to protect life and property.

It was also noted that there is only one tug equipped with fire fighting pumps and monitors. Thus, if this tug is out of service, for instance for maintenance and repair, there is no capability available on the port's other two tugs, although it was indicated in January 2007 that backup is available using the landing craft from the naval base. To remedy this situation, it is recommended that the port include fire fighting equipment in an additional tug to be acquired as recommended in Section 3. In addition, it is recommended that the port evaluate whether the two existing tugs not equipped with fire fighting capability can support portable fire pumps to provide backup fire fighting capability both in the interim until the new tug arrives and to supplement the other tugs on a long term basis.

In addition, the fire fighters noted that access to the Port in an emergency can be delayed awaiting the arrival of Port security personnel at the gate. It is recommended that communications and control between the Port and Fire Department be improved to signal the Port security staff of the need to meet Fire Department assets at the gate as soon as an emergency occurs without awaiting the actual arrival of the fire truck at the gatehouse. In addition, it is recommended that the Port consider the acquisition of an additional patrol vehicle such as an SUV with proper communications gear and staff to be ready for such emergency assignments. In January 2007, the Fire Department indicated that the problems with access to the Port had been resolved.

It was also noted that the industries have their own fire fighting needs, fire fighting equipment and brigades. It is recommended that the Port, municipal Fire Department of Puerto Cortes and the private industries, to include the Elcosa power company, the Texaco refinery and the Hondupetrol facility confer

regarding ways to coordinate their responses, share or make available fire fighting assets where mutually beneficial and ensure that personnel of each have the necessary training and resources to support fire fighting operations of the others.

4.7 Develop a fire protection plan in conjunction with the municipality and local industry

The first major step in developing a fire protection plan within the port is to establish and strengthen partnerships within the port community. During the review process, it was very evident that there is a willingness among all the stakeholders to ensure an effective fire prevention program and response matrix is established. Presently, the port relies solely on the local fire department to provide fire protection, but the fire department is in need of funding, equipment, manpower and training to provide the response that is necessary for the port and the citizens of the city. However, the adjoining industries also have their own internal fire brigades.

In order to establish the partnership, stability within the port community and city government must be maintained and specific goals and objectives should be identified and implemented. The fire chief's position should be filled with an experienced fire department officer and supported by local government. This individual should have the training and vision to look into the future of the fire service and implement the new trends.

There is a committee that is in place within the Chamber of Commerce which was formed to provide oversight of the fire department. The members of the committee consist of local government officials, terminal managers and other interested parties. It is unknown if the port authority has representation on this committee. If not, it is highly recommended they become involved. This group will have an excellent opportunity to provide oversight in the following areas:
Coordination of fire protection planning: Fire protection planning needs to be coordinated between the Port and municipality, as well as local industries, allowing for potential sharing of assets in an emergency situation.

Definition of coordination procedures: Command, control and communications procedures need to be defined to ensure prompt access and coordinated response to emergencies on the Port, in the City of at industrial facilities.

Oversee funding opportunities: The Port of Cortes Fire Department is involved in a two year funding program by which the Honduran government provides the local municipality with funds for the fire service. The committee could ensure the funding is distributed properly.

Ensure fire personnel development: It is important to ensure the stability of the fire chief's and officers' positions and to ensure personnel retention and development. This is important to ensure that the fire chief has the time in the position to implement ideas and goals and objectives to improve the fire department's response capabilities.

Identify, mentor and train new upcoming fire officers: To ensure the future of the Puerto Cortes Fire Department it is necessary to ensure the junior officers are properly trained in fire ground operations and administrative procedures. These officers can help support the Fire Chief's plan and will allow for a smooth transition when the fire chief's position must be filled in the future.

Seek out new training opportunities for the fire service: Training is vital to ensure effective response capabilities from the firefighters and fire officers. Training classes should be sought out in other areas or the courses can be presented within the City of Puerto Cortes. Since the Fire Department of Puerto Cortes serves the Port of Cortes as well as municipal needs, and can support fire fighting efforts of local

industry, it is especially important that the members of the fire brigade be equipped with the specialized training in requirements to safely combat fires in the Port involving buildings, warehouses, cargo, marine craft and tanks, as well as other emergencies in which they may be called to assist.

Develop firefighting and emergency response contingency plans: Contingency plans need to be developed, in conjunction with other members of the port community, to include the Port security organization, industrial fire brigades and security departments from the refinery, petroleum and electric power entities, free zone industries and concerned municipal organizations. Contingency planning is extremely important within a port community. The plan provides for a systemic and coordinated response to emergencies within the port and the city. The plan is important when several different agencies are responsible or can assist in the response and mitigation of an emergency incident.

The contingency and emergency response plan should address the following areas:

a. Purpose and Objectives
b. Coordination of Efforts
c. Updating and Review
d. Mutual Assistance Agreements
e. Governmental Jurisdictions and Responsibilities
f. Port Jurisdictions and Responsibilities
g. City/Local Jurisdictions and Responsibilities
h. Commercial Jurisdictions and Responsibilities
i. Response Coordination
j. Establish a Resource/ Notification List
k. Updating Procedures

When this plan is developed it should be reviewed and signed by all officials and agencies that are identified within the plan. It is important that it be reviewed, distributed and implementation plans be developed at all levels of the port and industry. It is also essential that it be updated periodically.

At the meeting in January 2007, ENP and the Fire Department indicated that development of a General Emergency Plan had been initiated.

New fire station: The fire department has one fire station located on port property by the free zone. A new fire station was under construction several years ago and that project has been abandoned due to funding issues. The port community should seek out funding to resume construction of the additional fire house for the following reasons:
The second fire station will provide space for additional equipment and personnel. This will allow for more resources to meet the needs of the port and the citizens.

In January 2007, ENP and the Fire Department indicated that the funds had been placed in trust and the bidding was in preparation to complete construction of the new fire station.

Existing fire station: The present fire station located at the port but outside the perimeter fence can house additional fire apparatus and firefighting equipment that can be purchased / obtained to provide protection on the port and the surrounding areas. Personnel from the port, the city and local industries can develop a contingency plan and training program to provide the ability to maintain and respond the additional apparatus located at the port fire station as well as personnel and equipment from local industries to fire incidents within the port and the surrounding areas of the city.

If the new firehouse is completed as recommended, it would be advisable to keep the old firehouse that is on port property and house new firefighting equipment which could be acquired by the port but shared with staffing provided by the fire department in this station. This facility would serve the port, as well as municipality and adjoining industries. In this case, it would be convenient to relocate the fence to the other side of the station from its present location, and open a new exit from the station directly to the Port, providing direct access into the Port area. In the event access was required to the municipality to support the apparatus housed at the new station, the apparatus from the existing station could proceed out one of the existing Port gates.

Partnership with the port to provide equipment and manpower at the existing firehouse: Consideration was given to the possibility of establishing an internal port fire brigade, using port supplied equipment and port personnel to provide fire protection inside the port from the old firehouse. This station could be turned back over to the port administration to operate this facility, but the port would have to train personnel in fire fighting, operation and maintenance of the apparatus. Unless the port wants to commit to this expansion of the scope of its responsibilities and activities to include fire emergencies on its property, the port could continue to utilize the services of the Fire Department of Puerto Cortes. The Fire Department could continue to maintain resources at the existing firehouse. A practical alternative to having separate municipal and Port fire brigades would be to provide for sharing on costs for maintenance of the Fire Department between the Port and the municipality, development of joint contingency plans and training programs covering both Fire Department personnel and Port staff, enabling Fire Department personnel to maintain and respond with the apparatus located at the port fire station to fire incidents within the port and the surrounding areas of the city, as well as facilitating the internal support by Port security or internal fire brigade staff.

Access into the Port for fire fighters: It was originally recommended that access be provided to the port through the rear lot of the firehouse. ENP has however expressed concern about security issues and the need to tighten up access through the Port perimeter. For this reason, when there is an emergency inside the Port, the fire department has to proceed from the fire house to a gate in order to enter the Port. Conversely, the fire department needs prompt access into the Port in order to respond swiftly to emergencies, something that is also important to protecting the assets of the Port from fire damage and ensure safety of property and personnel inside the Port. The Port, however, requires that the fire brigade be accompanied inside the Port by port security personnel. It was reported that the fire brigade has been delayed at the gate awaiting Port personnel to arrive in an emergency. In order to address these concerns, it is recommended, firstly, that the Port provide to both the Fire Department and its own security personnel communications gear to allow the two organizations to communicate on a real-time basis during a contingency situation, including sharing of information about emergencies before the Fire Department arrives at the gate, and, secondly, to develop and equip an additional mobile security unit with a vehicle with appropriate communications gear and staff to stand by to accompany Fire Department personnel inside Port property and assist their effort.

At the meeting in January 2007, the Fire Department indicated that the prompt access had been resolved. In addition, it was noted that use of the existing station as a second facility inside the Port perimeter would provide immediate access to the Port area.

Access to water supply: It is recommended that the Fire Department be allowed access to the base of the water tower and the hydrants within the free port to fill the fire apparatus tanks due to the lack of a fire hydrant system within the city. Due to the nature of fire emergencies, it is imperative that this access be provided immediately in a contingency situation, whether the emergency is on Port property or in the city.

Fire extinguisher service: It was suggested that the port or another agency purchase the equipment necessary to refill and maintain portable fire extinguishers, and provide it to the Puerto Cortes Fire

Department for their personnel to be trained and conduct the servicing of the portable fire extinguishers. In return the port would have their fire extinguishers serviced by the fire department. Considering that over 50% of the fire extinguishers on the port facility are in need of servicing, it is important to develop a mechanism to ensure that fire extinguishers are serviced regularly. This process could ensure the most effective tool in extinguishing a fire can be properly maintained and ready for service. As an alternative, the Port could train and equip their own personnel to service the extinguishers, or contract on outside vendor for the necessary service. Whether the Port assists the Fire Department in acquiring the needed equipment and training, handles the servicing itself or engages a third party enterprise to perform the work, it is essential that fire extinguishers be serviced and recharged or replaced if necessary on a regular basis. At the meeting in January 2007, ENP indicated that fire extinguisher service had been initiated, that 70% were in working condition and the remaining 30% would be serviceable in 3 months.

Fire prevention program: The Fire Department had just recently established a fire prevention office within their department. It is highly recommended that the port and industrial and commercial companies establish a relationship with the local fire department prevention office to provide fire awareness and preventative measures for the port community. This can include educational programs presented to employees. The fire department could train port community personnel in the proper fire inspection techniques to ensure the safety of the personnel and the structures located on the port and other local facilities. Fire safety for the Port should include proper storage and handling of combustible materials, proper use of electrical wiring, avoidance of sources of ignition and safe egress from buildings in the event of a fire emergency to ensure the protection of life and property.

Planning is a very important component within a port city. There is an oversight committee already working on many of the issues. It is recommended that this committee continue to work toward these goals but ensure that all agencies and willing participants be included in the planning process.

4.8 Training program for port and interface with municipality and local industry

Training is a comerstone of the fire and emergency response personnel capability. All personnel working for an organization that are responsible for responding to emergencies either on their terminals or within city limits must be properly trained. The training types can be identified in two groups:

- Recommended training for Port and Commercial facility personnel.
- Recommended training for Puerto Cortes Fire Department personnel.

Recommended training for Port and Commercial facility personnel should meet the standards as identified in National Fire Protection Association (NFPA) 1081 "Standards for Industrial Fire Brigade Member Professional Qualifications." This standard identifies the minimum job performance requirements necessary to perform the duties of an individual who is a member of an organized industrial fire brigade who provides services at a specific facility or site. These requirements can be applied to appropriate port personnel or employees of the commercial terminals. The standard identifies the type of training and requirements needed for personnel to respond to incidents on their facilities. This training would also be vital when working in cooperation with the local fire department.

Generally, facilities identify a safety officer who is responsible for the safety of the facility/terminal personnel as well as ensuring the response plans and emergency response equipment is in good order. The safety officer may identify response teams within the agency to respond to emergencies upon the facilities. In addition to the qualified safety officer, the response teams are the personnel who should receive the recommended training. The Fire Department should identify a training officer who can assist the facility safety officers in providing the necessary training.

Recommended training for Puerto Cortes Fire Department personnel should be comparable to that of most fire departments in the United States. The fire departments within the United States utilize standards that are identified by the National Fire Protection Association (NFPA). First, there are many basic standards that local fire departments should meet. Additionally, some standards are necessary due to additional hazards that the local fire departments are faced with such as waterfront facilities, marine vessel fires, petroleum facilities, warehouses, airports, etc.

There are many standards that can apply to training for local fire departments. Listed are some of the basic requirements of training that are recommended to the Puerto Cortes Fire Department:

1. Firefighter level I &II: NFPA 1001
2. Hazardous Materials awareness, operations, technician levels: NFPA 471
3. Emergency Medical Training: NFPA 1201
4. Driver Operator of Emergency Response Apparatus; pumper, tankers, aerials: NFPA 1002
5. Incident Command Training: NFPA 1561
6. WMD/Radiation Training: NFPA 471
7. Shipboard Firefighting: NFPA 1005 and 1405

All members of the Puerto Cortes Fire Department should receive the training listed above and the fire department officers should receive additional training through fire officer courses, fire instructor and Advanced Incident Command courses.

At the meeting in January 2007, the Fire Department indicated that most basic training needs are already being met. It was also noted that ENP and the Fire Department were preparing to initiate training regarding hazardous materials through TRAINMAR.

The ability to acquire the training can be difficult due to budgetary constraints, lack of training facilities and the availability of personnel to attend the training. The following items should be considered to provide training to both the fire department personnel and port/ commercial facility personnel.

Two alternatives are available to provide access to international training resources from the United States: (1) The Port, Fire Department and industrial facilities can bring bilingual U.S, instructors to train their personnel through courses in the Port of Cortes; or (2) Alternatively, the Port, Fire Department and industrial facilities can, first, identify fire department and port /commercial facility personnel and have the selected staff attend training courses abroad and, second, after they are trained and return, they can become instructors to train other personnel on-site in the Port of Cortes. This would allow personnel to return to Puerto Cortes and provide the training at the facilities by utilizing textbooks from organizations such as International Fire Service Training Association (IFSTA). Training facilities at Texas A&M and the National Fire Academy can provide instructor training. With either approach, it would be advantageous to coordinate and share training costs and resources between the Port, the Fire Department and industrial facilities.

Outside organizations and companies can be contracted to provide the training in-house in the Port of Cortes or at their facilities in the United States. Many topics can be presented in-house, but with the lack of a training facility, some areas cannot be addressed. Companies such as Special Rescue Services, as well as Texas A&M University can provide these services. If training facilities can be made available in the Port of Cortes, it can be advantageous from a cost standpoint to bring an instructor to train multiple staff on site, instead of sending several individuals abroad.

Training facilities can be built on or near the port facility that allow for practical training evolutions to be

conducted. Many standards within Firefighter Level I and II require practical evolutions such as live burns, ladder placements, hose line and search and rescue. Without these types of training sites, it will be difficult to provide the level of training necessary to meet the standards. Outside organizations can also assist in developing the specifications for these training facilities.

Both the port/commercial facilities and the fire department should partner together to provide not only the funding together but also the personnel to seek out these training opportunities. By working as partners this will allow for a professional and well-trained emergency response force not only for the port community but also for the citizens of Puerto Cortes.

4.9 Preparation of a cost estimate for rehabilitation of existing facilities and new equipment and sources of supply

The cost estimates for the rehabilitation of existing facilities, and identification of United States sources of supply were prepared by DMJM Harris team member, Clark Nexsen, which provided fire protection engineering consulting services.

4.9.1 Fire sprinkler and alarm systems at the Port and free zone

Clark Nexsen, under the direction of Christopher H. Born, P.E., prepared cost estimates and preliminary bills of material for the installation of fire sprinkler and fire alarm systems in the existing buildings of the port and free zone. An inventory and data base on the buildings at the Port prepared by TECNISA engineer Jorge Carranza provided inputs to the analysis of fire protection requirements for these structures. These cost estimates and bills of material are based on a site plan showing all building locations, and a description of the buildings including building footprints. The cost estimates were prepared using Means CostWorks 2006 software as published by R.S. Means, based on prices in the Norfolk, Virginia area. These cost estimates do not include any adjustments for working outside of the Norfolk, Virginia area. All costs are shown in US dollars. Additionally, these cost estimates do not include freight charges or travel expenses. It can be anticipated that domestic US freight and container shipping charges would apply to transport US fire protection equipment to a U.S. Port of Exit and from there to the Port of Cortes. The travel costs for personnel, however, would vary depending on the number of buildings handled concurrently by personnel from the U.S. There are a multitude of buildings included in this study, and the likelihood is that a contractor will deal with multiple buildings on any trip to perform this work. Therefore, the impact of freight and travel costs on any particular building is difficult at best to quantify. The summary table provides estimated fire alarm and sprinkler system costs for each building, as well as totals for each building, and total estimated fire alarm system and sprinkler system costs for all of the buildings included in this study.

The system costs included in the summary table for each building are taken from the preliminary cost estimates included in section 4.9.3 of the report. For example, the estimated fire alarm cost for building 1 is $16,960. This includes material costs such as wire, conduit, a fire alarm control panel, signaling devices (horn/strobes and strobes), a digital communicator to transmit an alarm signal to a constantly attended location such as a monitoring company, guard shack, etc., detectors and manual pull stations. This number also includes subsistence for the installation crew, and markups such as contingency, overhead and profit.

The sprinkler system cost for building 1 is estimated to be $92,540, and this includes an estimated system cost based on square foot costs from Means CostWorks, as well as subsistence, contingency, overhead and profit. Since one estimate was provided per building, and this estimate includes both fire alarm and sprinkler system costs, it was necessary to allocate the markups between the fire alarm and sprinkler system costs for purposes of providing the breakdown in the summary table. This was

accomplished by totaling the direct costs for both systems (material labor, subsistence and equipment rental), and then allocating all markups proportionally. In the estimate for building 1, for example, direct fire alarm system costs are estimated to be $12,505 and direct sprinkler system costs are estimated to be $67,500, for a total estimated direct cost of $80,005. Therefore, 15.63% of the markups of $29,495 are allocated to the fire alarm system cost and 84.37% are allocated to the sprinkler system cost.

In addition, Clark Nexsen has provided a cost estimate and sources of supply for new underground water lines, valves, fire hydrants, etc., at the port. This cost estimate is based on site utility plans from the Study for Improvement of the Potable Water System in the Port of Cortes prepared by Honduran engineering firm, Consultores en Ingeniería (Coinsa) and provided to DMJM Harris by ENP. These costs are based on the US national average costs as provided by R. S. Means Company.

Typically, the installation of a fire sprinkler system requires several steps. Where as-built or construction drawings of a building are available, a layout technician will design the sprinkler system to take into account the design requirements of the applicable standard (oftentimes NFPA 13 "Standard for Installation of Sprinkler Systems" as developed by the National Fire Protection Association), the building floor plan, structural system, etc. For an average size building, it typically takes several weeks to complete the system layout. At this point, the design is often submitted to whoever is responsible for approving the design. For typical commercial work in the United States, this is often a local building official, fire marshals office, etc.

Following approval of the design (and in the case of new construction suitable progress in erecting the building), a site survey is generally performed to ensure that the system can be installed as drawn, without conflicts with structural members, other building systems, etc. Following this survey work, the drawings are modified to become fabrication drawings, with actual center-to-center or "cut" dimensions and identification labels indicated for each piece of pipe.

A stocklist is then generated from the fabrication drawing, and this list is sent to a fabricator who cuts each piece to length, welds any threaded or grooved outlets to the mains as indicated, grooves or threads the ends as appropriate, and pulls fittings onto the ends of the pipe as appropriate. Each piece is also marked with the corresponding identification label from the fabrication drawing.

This fabricated piping is then shipped to the jobsite along with fittings, couplings, sprinkler heads, hangar material, valves, etc., as required for the complete system. If the system design accurately reflects the building to be protected, the fabricated material is installed without needing to do much cutting or other refabrication of pipe in the field. Of course, there are often conflicts that arise on a jobsite so some cutting and fabrication of pipe on the jobsite is to be expected. Also, the drop and riser nipples that connect sprinkler heads to the branch lines are often cut in the field after accurate dimensions can be obtained from the branch piping to the ceilings or decks.

In the case of the buildings at the Port of Cortes, it appears that very little is available in the way of drawings. Therefore, detailed survey work to measure the buildings, draw the floor plans, and determine the appropriate occupancy classifications will need to take place before any layout can occur. Following this survey work and the generation of floor plans, the sequence of design and construction should be the same, although it probably will not be necessary to survey the buildings before going into fabrication. This is because the initial survey work should be performed in sufficient detail that the layout drawings reflect the actual construction and any conflicts from the beginning. Essentially, the layout drawings will be taken to the level of effort required for fabrication drawings since the survey work would have already been performed. However, the overall time to design any building is probably a little bit lengthened by the lack of as-built or construction drawings and the need to create the floor plans from scratch.

The design process for the fire alarm systems is similar, although there is not a "fabrication" process involved. Instead, following the design of the systems and any approval process, the fire alarm control panel, pull stations, smoke detectors, signaling devices, etc., are sent to the jobsite along with the required raceways, wire, etc. The simplest thing to do in the case of the Port of Cortes is to have the sprinkler designer create any floor plans, then provide them to the fire alarm designer for their use in laying out the fire alarm systems. From the development of floor plans, it will probably take the fire alarm designer approximately one week per building to lay the systems out, perform battery calculations, requisition materials, etc.

It is difficult to determine an overall schedule for the installation of fire sprinkler and fire alarm systems in these buildings. First, a significant effort must be undertaken to survey the buildings, create floor plans and then design the systems. It is estimated that a minimum of twelve weeks is needed to perform the survey work required. An additional ninety weeks of design time is probably reasonable to complete the design for all of the buildings. Finally, the field time required to install the systems is dependent on how large a work force is mobilized. The attached summary table provides an estimated number of man-days for each building to install the fire alarm and sprinkler systems. Note that these estimates cover installation time only, and not design, survey or travel time.

While the amount of work to design and install fire protection systems in each of these buildings is significant, the overall process does not have to proceed in a linear fashion. Instead, it is suggested that after the system designs for the first several buildings are completed, fabrication and installation immediately take place. While this installation is occurring, the survey and design work for later buildings can occur. This would occur until all of the systems are completed. By having survey, design, fabrication and installation work proceed concurrently, the overall timeframe to accomplish this work can be shortened noticeably.

TABLE 4-2: SUMMARY OF FIRE PROTECTION SYSTEM COSTS FOR BUILDINGS AT THE PORT OF CORTES AND FREE ZONE

Bldg No.	Bldg Name	Fire Alarm Cost (USD)	Sprinkler System Cost (USD)	Total Cost (USD)	Est. Man Days (Fire Alarm)	Est. Man Days (Sprinkler)
1	DEA	$16,960	$92,540	$109,500	25	125
2	DEA	$9,550	$23,050	$32,600	10	18
4	Sugar Warehouse	$13,650	$150,350	$164,000	15	75
5	Transquimica	$17,515	$43,985	$61,500	15	45
6	Trainmar Office	$14,815	$41,685	$56,500	15	52
7	Workers Cafeteria	$8,500	$15,100	$23,600	5	7
8	Civil Works	$9,550	$17,950	$27,500	10	15
9	Workshop	$13,750	$95,750	$109,500	16	94
10	Warehouse 1	$24,500	$474,000	$498,500	18	412
11	Accounting Office	$13,520	$47,980	$61,500	12	60
12	Electrical Shop	$9,095	$10,305	$19,400	10	10
13	Mechanical Shop	$7,360	$23,140	$30,500	10	20
14	Admin. Bldg	$18,525	$59,975	$78,500	14	66
15	Police	$8,625	$9,975	$18,600	9	9
16	Bank	$8,965	$19,535	$28,500	10	14
17	Cafeteria	$8,660	$6,740	$15,400	8	8
18	HR Office	$7,975	$16,025	$24,000	8	12
19	Warehouse 4	$20,675	$325,325	$346,000	20	190
20	Port Superintendent	$16,820	$54,680	$71,500	16	72
21	Port Captain	$14,100	$20,900	$35,000	12	18

Building No.	Building Name	Fire Alarm Cost (USD)	Sprinkler System Cost (USD)	Total Cost (USD)	Est. Man Days (Fire Alarm)	Est. Man Days (Sprinkler)
23	Refrigerated Whse	$20,000	$394,500	$414,500	16	210
29	Warehouse	$22,300	$475,700	$488,000	20	278
30	Warehouse	$22,300	$466,200	$488,500	20	278
31	Warehouse	$13,240	$84,760	$98,000	14	56
32	Warehouse	$21,450	$388,050	$409,500	16	228
33	Warehouse	$21,550	$470,450	$492,000	16	284
34	Warehouse	$17,780	$253,720	$271,500	16	140
35	Warehouse	$17,375	$233,125	$250,500	14	125
36	Warehouse	$15,940	$233,125	$202,500	14	97
37	Warehouse	$11,650	$30,450	$42,100	10	16
38	Warehouse	$8,090	$8,710	$16,800	8	10
39	Warehouse	$18,925	$304,075	$323,000	18	172
40	Warehouse	$17,335	$288,665	$306,000	16	162
41	Warehouse	$17,950	$226,050	$244,000	16	120
42	Warehouse	$22,270	$448,730	$471,000	20	268
43	Warehouse	$12,540	$101,460	$114,000	14	39
44	Warehouse	$13,970	$143,030	$157,000	16	66
45	Warehouse	$13,590	$144,410	$158,000	14	68
46	"Hon-Tai"	$19,920	$229,580	$249,500	20	122
	TOTAL	$591,285.00	$6,473,780.00	$7,008,500.00	242	2739

4.9.2 Underground utility costs

This section provides the cost estimates for the underground utilities, specifically water mains for fire hydrants in the Port of Cortes and free zone. The cost estimates are shown in US dollars.

Water Distribution,

1.	Erosion & Sediment Control	24,000	LF	@	$1.00	=	$24,000.00
2.	Excavation	23,750	LF	@	$1.00		$23,750.00
3.	Pavement Removal (including sawcut)	23,750	LF	@	$12.00		$285,000.00
4.	Select Backfill	13,300	CY	@	$18.00	=	$239,400.00
5.	Select Bedding, No. 57 Stone	1,330	Ton	@	$18.00	=	$23,940.00
6.	Undercut and Disposal of Undercut	16,000	CY	@	$6.00	=	$96,000.00
7.	PVC Water ,3/4"	95	LF	@	$2.00	=	$190.00
8.	PVC Water Main, 2"	5,987	LF	@	$3.50	=	$20,954.50
9.	Galvanized Water Main, 2 1/2"	433	LF	@	$24.50	=	$10,608.50
10.	PVC Water Main, 4"	7,693	LF	@	$8.50	=	$65,390.50
11.	Suspended PVC 4"	476	LF	@	$24.00	=	$11,424.00
12.	PVC Water Main, 6"	5,010	LF	@	$12.85	=	$64,378.50
13.	Ductile Iron Water Main, 8"	4,964	LF	@	$39.00	=	$193,596.00
14.	2"x2"x2" Tee	10	EA	@	$60.50	=	$605.00
15.	4"x4"x2" Tee	5	EA	@	$116.00	=	$580.00
16.	4"x4"x4" Tee	22	EA	@	$116.00	=	$2,552.00
17.	8"x8"x2 1/2" Tee	1	EA	@	$700.00	=	$700.00
18.	8"x8"x2" Tee	4	EA	@	$880.00	=	$3,520.00
19.	8"x8"x8" Tee	11	EA	@	$795.00	=	$8,745.00
20.	8"x8"x4" Tee	2	EA	@	$795.00	=	$1,590.00
21.	2" 90 Deg Bend	13	EA	@	$26.00	=	$338.00
22.	4" 90 Deg Bend	8	EA	@	$70.00	=	$560.00
23.	4" 45 Deg Bend	1	EA	@	$77.00	=	$77.00
24.	6" 90 Deg Bend	4	EA	@	$126.00	=	$504.00
25.	8" 45 Deg Bend	2	EA	@	$525.00	=	$1,050.00
26.	8" 90 Deg Bend	4	EA	@	$525.00	=	$2,100.00
27.	8"x4" Increaser	2	EA	@	$445.00	=	$890.00

28.	2" Valve	16	EA	@	$575.00	=	$9,200.00
29.	4" Valve	21	EA	@	$455.00	=	$9,555.00
30.	Pavement Restoration-Concrete-8"	13,044	SY	@	$75.00	=	$978,300.00
31.	Meter 2"	5	EA	@	$1,250.00	=	$6,250.00
32.	Meter 2 1/2"	1	EA	@	$2,155.00	=	$2,155.00
33.	Connections for ships	16	EA	@	$3,500.00	=	$56,000.00
34.	Fire Hydrants	10	EA	@	$1,750.00	=	$17,500.00
35.	Bore and Jack- 6m/track 2"	204	LF	@	$375.00	=	$76,500.00
36.	Bore and Jack- 6m/track 4"	224	LF	@	$475.00	=	$106,400.00
37.	Bore and Jack- RR and creek-2 1/2"	150	LF	@	$375.00	=	$56,250.00
38.	Bore and Jack- 6m/track 8"	140	LF	@	$575.00	=	$80,500.00
39.	Bore and Jack- pits, mobilization	16	EA	@	$3,375.00	=	$54,000.00
40.	Traffic Control	1	LS	@	$75,000.00	=	$75,000.00

Subtotal	**$2,535,053.00**
Mobilization (5%)	**$126,752.65**
Contingency (10%)	**$253,505.30**
Total	**$2,915,310.95**

4.9.3 Building cost estimates and preliminary bills of material

This section provides the cost estimates for sprinkler and fire alarm systems for the Port of Cortes and free zone. The cost estimates are shown in US dollars.

Building 1 DEA

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101080 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 10,000 SF	13,641.50	S.F.	$2.06	$28,100
D40104101220 s	Wet pipe sprinkler systems, steel, ord haz, ea addl fl, 10,000 SF	13,641.50	S.F.	$1.72	$23,500
D40 Fire Protection Subtotal					**$51,600**
Total D Services					**$51,600**
E Equipment & Furnishings					
	Per Diem	150.00	Day	$127.60	$19,100
Subtotal					**$19,100**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	10.00	C.L.F.	$119.01	$1,200
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	300.00	L.F.	$3.19	$955
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$2,805**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	14.00	Ea.	$137.99	$1,925
283 Subtotal					**$6,500**
Total E Equipment & Furnishings					**$28,405**
Estimate Subtotal					**$80,005**

General Conditions (10%)	**$8,000**
G.C. O&P (15%)	**$13,200**
Architectural Fee (6%)	**$6,075**
Contingency	**$2,150**
Estimate Total	**$109,500**

Preliminary Bill of Material

Building 1 DEA

Quantity	Unit of Measure	Item
50	Feet	4" Schedule 10 pipe
320	Feet	3" Schedule 10 pipe
1250	Feet	1-1/4" Schedule 40 pipe
1350	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
2	Each	3" Grooved outlet
1	Each	4" Grooved cap
2	Each	3" Grooved cap
30	Each	3" Grooved coupling
100	Each	1-1/4" threaded outlet
100	Each	1" screw elbow
100	Each	1-1/4" screw reducing tee
50	Each	1-1/4" screw tee
250	Each	1" screw reducing coupling
250	Each	½" pendent sprinkler head
1	Each	4" riser clamp
32	Each	3" pipe ring
150	Each	1-1/4" pipe ring
100	Each	1" pipe ring
750	Feet	All thread rod
282	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
14	Each	Smoke detector
4	Each	Visual alarm
8	Each	Audiovisual alarm
300	Feet	¾" EMT conduit
500	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 2 DEA

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410104 0 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 2000 SF	3,950.00	S.F.	$3.69	$14,600
D40 Fire Protection Subtotal					**$14,600**
Total D Services					**$14,600**
E Equipment & Furnishings					
	Per Diem	28.00	Day	$127.60	$3,575
Subtotal					**$3,575**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	3.00	C.L.F.	$119.01	$355
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	120.00	L.F.	$3.19	$385
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,065**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
28314650520 0 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	8.00	Ea.	$137.99	$1,100
283 Subtotal					**$4,598**
Total E Equipment & Furnishings					**$9,238**
Estimate Subtotal					**$23,838**
General Conditions (10%)					**$2,375**

G.C. O&P (15%)	**$3,925**
Architectural Fee (6%)	**$1,800**
Contingency	**$640**
Estimate Total	**$32,600**

Preliminary Bill of Material

Building 2 DEA

Quantity	Unit of Measure	Item
20	Feet	4" Schedule 10 pipe
60	Feet	3" Schedule 10 pipe
180	Feet	1-1/4" Schedule 40 pipe
144	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" grooved reducing coupling
1	Each	3" Grooved cap
5	Each	3" Grooved coupling
12	Each	1-1/4" threaded outlet
12	Each	1" screw elbow
12	Each	1-1/4" screw reducing tee
12	Each	1-1/4" screw tee
36	Each	1" screw reducing coupling
36	Each	½" pendent sprinkler head
5	Each	3" pipe ring
24	Each	1-1/4" pipe ring
12	Each	1" pipe ring
75	Feet	All thread rod
42	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
8	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
120	Feet	¾" EMT conduit
300	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 4 Sugar Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
D Services					
D40 Fire Protection					
D4010410158 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 10,000 SF	22,829.3 2	S.F.	$3.23	$73,500
D40 Fire Protection Subtotal					**$73,500**
Total D Services					**$73,500**
E Equipment & Furnishings					
	Per Diem	90.00	Day	$127.60	$11,500
Subtotal					**$11,500**
15					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	1.00	Month	$731.50	$730
015 Subtotal					**$730**
213					
21311350350 0 s	Fire Pumps, electric, 1000 GPM, 50 psi, 48 HP, 1770 RPM, 5" pump, incl. controller, fittings & relief valve	1.00	Ea.	$26,800.00	$26,800
213 Subtotal					**$26,800**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	10.00	C.L.F.	$119.01	$1,200
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00	L.F.	$3.19	$1,600
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$3,125**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,168**

Total E Equipment & Furnishings	**$46,323**
Estimate Subtotal	**$119,823**
General Conditions (10%)	**$12,000**
G.C. O&P (15%)	**$19,800**
Architectural Fee (6%)	**$9,100**
Contingency	**$3,225**
Estimate Total	**$164,000**

Preliminary Bill of Material

Building 4 Sugar Warehouse

Quantity	Unit of Measure	Item
240	Feet	6" Schedule 10 pipe
200	Feet	4" Schedule 10 pipe
2400	Feet	2" Schedule 10 pipe
1	Each	6" Flange
6	Each	6" Grooved elbow
1	Each	4" Grooved outlet
30	Each	6" Grooved coupling
20	Each	4" Grooved coupling
240	Each	2" Grooved coupling
1	Each	6" Grooved cap
2	Each	4" Grooved cap
42	Each	2" Threaded outlet
240	Each	¾" Threaded outlet
240	Each	17/32" upright sprinkler head
24	Each	6" pipe ring
24	Each	4" pipe rings
240	Each	2" pipe rings
500	Feet	All thread rod
298	Each	Beam clamp
1	Each	6" Alarm check valve
1	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
8	Each	Audiovisual alarm
500	Feet	¾" EMT conduit
1000	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Area 5 Transquimica

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101040 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 2000 SF	3,250.00	S.F.	$3.69	$12,000
D40104101060 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 5000 SF	6,300.00	S.F.	$2.30	$14,500
D40 Fire Protection Subtotal					**$26,500**
Total D Services					**$26,500**
E Equipment & Furnishings					
	Per Diem	60.00	Day	$127.60	$7,650
Subtotal					**$7,650**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	5.00	C.L.F.	$119.01	$595
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	300.00	L.F.	$3.19	$955
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$2,200**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	2.00	Ea.	$1,375.04	$2,750
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	2.00	Ea.	$845.00	$1,700
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	14.00	Ea.	$137.99	$1,925
283 Subtotal					**$8,730**
Total E Equipment & Furnishings					**$18,580**
Estimate Subtotal					**$45,080**

General Conditions (10%)	**$4,500**
G.C. O&P (15%)	**$7,425**
Architectural Fee (6%)	**$3,425**
Contingency	**$1,200**
Estimate Total	**$61,500**

Preliminary Bill of Material

Area 5 Transquimica

Quantity	Measure	Unit of Item	
40		Feet	4" Schedule 10 pipe
180		Feet	3" Schedule 10 pipe
450	Feet		1-1/4" Schedule 40 pipe
300		Feet	1" Schedule 40 pipe
2		Each	4" Flange
6		Each	4" Grooved elbow
2		Each	4" Grooved tee
12		Each	4" Grooved coupling
2		Each	4" x 3" Grooved reducing coupling
2		Each	3" Grooved cap
18		Each	3" Grooved coupling
30		Each	1-1/4" threaded outlet
30		Each	1" screw elbow
30		Each	1-1/4" screw reducing tee
30		Each	1-1/4" screw tee
90		Each	1" screw reducing coupling
90		Each	½" pendent sprinkler head
18		Each	3" pipe ring
30		Each	1-1/4" pipe ring
30		Each	1" pipe ring
300		Feet	All thread rod
78		Each	Beam clamp
2		Each	4" Alarm check valve
2		Each	4" OS&Y Valve
2		Each	4" Check valve
2		Each	Fire department connection
2		Each	Waterflow switch
2		Each	Tamper switch
2		Each	Water motor gong
2		Each	Fire alarm control panel
2		Each	Digital alarm coded transmitter
6		Each	Manual pull stations
14		Each	Smoke detector
4		Each	Visual alarm
8		Each	Audiovisual alarm
300		Feet	¾" EMT conduit
500		Feet	1 pair 18 gauge fire alarm cable
40		Each	4" square junction boxes

Building 6 Trainmar Office

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101080 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 10,000 SF	11,555.00	S.F.	$2.06	$23,800
D40 Fire Protection Subtotal					**$23,800**
Total D Services					**$23,800**
E Equipment & Furnishings					
	Per Diem	67.00	Day	$127.60	$8,550
Subtotal					**$8,550**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	8.00	C.L.F.	$119.01	$950
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	400.00	L.F.	$3.19	$1,275
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$2,875**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	12.00	Ea.	$137.99	$1,650
283 Subtotal					**$6,025**
Total E Equipment & Furnishings					**$17,450**
Estimate Subtotal					**$41,250**
General Conditions (10%)					**$4,125**
G.C. O&P (15%)					**$6,800**

Architectural Fee (6%)	**$3,125**
Contingency	**$1,100**
Estimate Total	**$56,500**

Preliminary Bill of Material

Building 6 Trainmar Office

Quantity	Measure	Unit of Item	
25		Feet	4" Schedule 10 pipe
260		Feet	3" Schedule 10 pipe
500	Feet		1-1/4" Schedule 40 pipe
500		Feet	1" Schedule 40 pipe
1		Each	4" Flange
3		Each	4" Grooved elbow
1		Each	4" Grooved tee
6		Each	4" Grooved coupling
1		Each	4" x 3" Grooved reducing coupling
1		Each	3" Grooved cap
25		Each	3" Grooved coupling
42		Each	1-1/4" threaded outlet
42		Each	1" screw elbow
42		Each	1-1/4" screw reducing tee
21		Each	1-1/4" screw tee
105		Each	1" screw reducing coupling
105		Each	½" pendent sprinkler head
26		Each	3" pipe ring
63		Each	1-1/4" pipe ring
42		Each	1" pipe ring
300		Feet	All thread rod
131		Each	Beam clamp
1		Each	4" Alarm check valve
1		Each	4" OS&Y Valve
1		Each	4" Check valve
1		Each	Fire department connection
1		Each	Waterflow switch
1		Each	Tamper switch
1		Each	Water motor gong
1		Each	Fire alarm control panel
1		Each	Digital alarm coded transmitter
4		Each	Manual pull stations
12		Each	Smoke detector
2		Each	Visual alarm
8		Each	Audiovisual alarm
400		Feet	¾" EMT conduit
800		Feet	1 pair 18 gauge fire alarm cable
40		Each	4" square junction boxes

Building 7 Workers Cafeteria

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104100580 s	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 2000 SF	2,808.00	S.F.	$3.57	$10,000
D40 Fire Protection Subtotal					**$10,000**
Total D Services					**$10,000**
E Equipment & Furnishings					
	Per Diem	12.00	Day	$127.60	$1,525
Subtotal					**$1,525**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	3.00	C.L.F.	$119.01	$355
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	150.00	L.F.	$3.19	$480
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$1,485**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	3.00	Ea.	$98.00	$294
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	6.00	Ea.	$137.99	$830
283 Subtotal					**$4,232**
Total E Equipment & Furnishings					**$7,242**
Estimate Subtotal					**$17,242**
General Conditions (10%)					**$1,725**
G.C. O&P (15%)					**$2,850**

Architectural Fee (6%)	**$1,300**
Contingency	**$460**
Estimate Total	**$23,600**

Preliminary Bill of Material

Building 7 Workers Cafeteria

Quantity	Unit of Measure	Item
10	Feet	4" Schedule 10 pipe
65	Feet	3" Schedule 10 pipe
50	Feet	1-1/4" Schedule 40 pipe
50	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
6	Each	3" Grooved coupling
10	Each	1-1/4" threaded outlet
10	Each	1" screw elbow
10	Each	1-1/4" screw reducing tee
20	Each	1" screw reducing coupling
20	Each	½" pendent sprinkler head
6	Each	3" pipe ring
10	Each	1-1/4" pipe ring
10	Each	1" pipe ring
100	Feet	All thread rod
26	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
3	Each	Manual pull stations
6	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
150	Feet	¾" EMT conduit
300	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 8 Civil Works

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101040 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 2000 SF	3,033.87	S.F.	$3.69	$11,200
D40 Fire Protection Subtotal					**$11,200**
Total D Services					**$11,200**
E Equipment & Furnishings					
	Per Diem	25.00	Day	$127.60	$3,200
Subtotal					**$3,200**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	250.00	L.F.	$3.19	$795
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,595**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	3.00	Ea.	$98.00	$294
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	5.00	Ea.	$137.99	$690
283 Subtotal					**$4,092**
Total E Equipment & Furnishings					**$8,887**
Estimate Subtotal					**$20,087**
General Conditions (10%)					**$2,000**
G.C. O&P (15%)					**$3,325**

Architectural Fee (6%)	**$1,525**
Contingency	**$540**
Estimate Total	**$27,500**

Preliminary Bill of Material

Building 8 Civil Works

Quantity	Unit of Measure	Item
20	Feet	4" Schedule 10 pipe
110	Feet	3" Schedule 10 pipe
150	Feet	1-1/4" Schedule 40 pipe
100	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
10	Each	3" Grooved coupling
10	Each	1-1/4" threaded outlet
10	Each	1" screw elbow
100	Each	1-1/4" screw reducing tee
10	Each	1-1/4" screw tee
30	Each	1" screw reducing coupling
30	Each	½" pendent sprinkler head
10	Each	3" pipe ring
10	Each	1-1/4" pipe ring
10	Each	1" pipe ring
100	Feet	All thread rod
30	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
3	Each	Manual pull stations
5	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
250	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 9 Workshop

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101080 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 10,000 SF	15,115.55	S.F.	$2.06	$31,100
D40104101220 s	Wet pipe sprinkler systems, steel, ord haz, ea addl fl, 10,000 SF	15,115.55	S.F.	$1.72	$26,100
D40 Fire Protection Subtotal					**$57,200**
Total D Services					**$57,200**
E Equipment & Furnishings					
	Per diem	110.00	Day	$127.60	$14,000
Subtotal					**$14,000**
015					
015433400160	Rent aerial lift to 25'high 2000 lb cap scissor type	1.00	Month	$731.50	$730
015 Subtotal					**$730**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	10.00	C.L.F.	$119.01	$1,200
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	600.00	L.F.	$3.19	$1,925
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$3,450**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$4,575**
Total E Equipment & Furnishings					**$22,755**
Estimate Subtotal					**$79,955**

General Conditions (10%)	**$8,000**
G.C. O&P (15%)	**$13,200**
Architectural Fee (6%)	**$6,075**
Contingency	**$2,150**
Estimate Total	**$109,500**

Preliminary Bill of Material

Building 9 Workshop

Quantity	Unit of Measure	Item
50	Feet	4" Schedule 10 pipe
400	Feet	3" Schedule 10 pipe
1510	Feet	1-1/4" Schedule 40 pipe
1010	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
2	Each	3" Grooved outlet
1	Each	4" Grooved cap
2	Each	3" Grooved cap
42	Each	3" Grooved coupling
84	Each	1-1/4" threaded outlet
84	Each	1" screw elbow
84	Each	1-1/4" screw reducing tee
84	Each	1-1/4" screw tee
252	Each	1" screw reducing coupling
252	Each	½" upright sprinkler head
1	Each	4" riser clamp
42	Each	3" pipe ring
84	Each	1-1/4" pipe ring
84	Each	1" pipe ring
750	Feet	All thread rod
210	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
4	Each	Visual alarm
8	Each	Audiovisual alarm
600	Feet	¾" EMT conduit
1000	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 10 Warehouse 1

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101600 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	76,933.32	S.F.	$3.32	$255,500
D40 Fire Protection Subtotal					**$255,500**
Total D Services					**$255,500**
E Equipment & Furnishings					
	Per diem	430.00	Day	$127.60	$55,000
Subtotal					**$55,000**
015					
015434001600	Rent aerial lift to 25'high 2000 lb cap scissor type	9.00	Month	$731.50	$6,575
015 Subtotal					**$6,575**
213					
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	30.00	C.L.F.	$119.01	$3,575
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,500.00	L.F.	$3.19	$4,775
260533500020 s	Outlet boxes, pressed steel, 4" octagon	30.00	Ea.	$16.30	$490
260 Subtotal					**$8,840**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	16.00	Ea.	$169.99	$2,725
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,950**

Total E Equipment & Furnishings	**$109,065**
Estimate Subtotal	**$364,565**
General Conditions (10%)	**$36,500**
G.C. O&P (15%)	**$60,000**
Architectural Fee (6%)	**$27,700**
Contingency	**$9,775**
Estimate Total	**$498,500**

Preliminary Bill of Material

Building 10 Warehouse 1

Quantity	Unit of Measure	Item
900	Feet	6" Schedule 10 pipe
600	Feet	4" Schedule 10 pipe
12300	Feet	2" Schedule 10 pipe
4	Each	6" Flange
12	Each	6" Grooved elbow
100	Each	6" Grooved coupling
50	Each	4" Grooved coupling
615	Each	2" Grooved coupling
4	Each	6" Grooved cap
6	Each	4" Grooved cap
1320	Each	1" threaded outlet
1320	Each	ESFR sprinkler head
75	Each	6" pipe ring
60	Each	4" pipe ring
615	Each	2" pipe ring
2750	Feet	All thread rod
750	Each	Beam clamp
3	Each	6" Alarm check valve
4	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
3	Each	Waterflow switch
3	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
16	Each	Audiovisual alarm
1500	Feet	¾" EMT conduit
3000	Feet	1 pair 18 gauge fire alarm cable
30	Each	4" square junction boxes

Building 11 Accounting Office

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101060 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 5000 SF	6,702.48	S.F.	$2.30	$15,400
D40104101200 s	Wet pipe sprinkler systems, steel, ordinary haz, ea addl fl, 5000 SF	6,702.48	S.F.	$1.80	$12,100
D40 Fire Protection Subtotal					**$27,500**
Total D Services					**$27,500**
E Equipment & Furnishings					
	Per diem	72.00	Day	$127.60	$9,175
Subtotal					**$9,175**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	8.00	C.L.F.	$119.01	$950
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	400.00	L.F.	$3.19	$1,275
260533500020 s	Outlet boxes, pressed steel, 4" octagon	30.00	Ea.	$16.30	$490
260 Subtotal					**$2,715**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	8.00	Ea.	$137.99	$1,100
283 Subtotal					**$5,675**
Total E Equipment & Furnishings					**$17,565**
Estimate Subtotal					**$45,065**

General Conditions (10%)	**$4,500**
G.C. O&P (15%)	**$7,425**
Architectural Fee (6%)	**$3,425**
Contingency	**$1,200**
Estimate Total	**$61,500**

Preliminary Bill of Material

Building 11 Accounting Office

Quantity	Unit of Measure	Item
30	Feet	4" Schedule 10 pipe
200	Feet	3" Schedule 10 pipe
660	Feet	1-1/4" Schedule 40 pipe
440	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
2	Each	3" Grooved outlet
1	Each	4" Grooved cap
2	Each	3" Grooved cap
20	Each	3" Grooved coupling
40	Each	1-1/4" threaded outlet
40	Each	1" screw elbow
40	Each	1-1/4" screw reducing tee
40	Each	1-1/4" screw tee
120	Each	1" screw reducing coupling
120	Each	½" pendent sprinkler head
1	Each	4" riser clamp
20	Each	3" pipe ring
40	Each	1-1/4" pipe ring
40	Each	1" pipe ring
300	Feet	All thread rod
100	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
8	Each	Smoke detector
4	Each	Visual alarm
8	Each	Audiovisual alarm
400	Feet	¾" EMT conduit
800	Feet	1 pair 18 gauge fire alarm cable
30	Each	4" square junction boxes

Building 12 Electrical Shop

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101020	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 1000 SF	1,871.96	S.F.	$3.36	$6,275
D40 Fire Protection Subtotal					**$6,275**
Total D Services					**$6,275**
E Equipment & Furnishings					
	Per diem	20.00	Day	$127.60	$2,550
Subtotal					**$2,550**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,440**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	3.00	Ea.	$98.00	$294
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	4.00	Ea.	$137.99	$550
283 Subtotal					**$3,952**
Total E Equipment & Furnishings					**$7,942**
Estimate Subtotal					**$14,217**
General Conditions (10%)					**$1,425**
G.C. O&P (15%)					**$2,350**

Architectural Fee (6%)	**$1,075**
Contingency	**$380**
Estimate Total	**$19,400**

Preliminary Bill of Material

Building 12 Electrical Shop

Quantity	Unit of Measure	Item
10	Feet	4" Schedule 10 pipe
90	Feet	3" Schedule 10 pipe
60	Feet	1-1/4" Schedule 40 pipe
120	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
6	Each	3" Grooved coupling
10	Each	1-1/4" threaded outlet
10	Each	1" screw elbow
10	Each	1-1/4" screw reducing tee
20	Each	1" screw reducing coupling
20	Each	½" upright sprinkler head
10	Each	3" pipe ring
10	Each	1" pipe ring
100	Feet	All thread rod
26	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
3	Each	Manual pull stations
4	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 13 Mechanical Shop

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101060 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 5000 SF	6,261.39	S.F.	$2.30	$14,400
D40 Fire Protection Subtotal					**$14,400**
Total D Services					**$14,400**
E Equipment & Furnishings					
	Per diem	30.00	Day	$127.60	$3,825
Subtotal					**$3,825**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	3.00	C.L.F.	$119.01	$355
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	10.00	Ea.	$16.30	$163
260 Subtotal					**$1,158**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	2.00	Ea.	$169.99	$340
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	1.00	Ea.	$103.99	$104
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	3.00	Ea.	$98.00	$294
283 Subtotal					**$2,958**
Total E Equipment & Furnishings					**$7,941**
Estimate Subtotal					**$22,341**
General Conditions (10%)					**$2,225**
G.C. O&P (15%)					**$3,675**
Architectural Fee (6%)					**$1,700**
Contingency					**$600**

Estimate Total **$30,500**

Preliminary Bill of Material

Building 13 Mechanical Shop

Quantity	Unit of Measure	Item
20	Feet	4" Schedule 10 pipe
100	Feet	3" Schedule 10 pipe
300	Feet	1-1/4" Schedule 40 pipe
200	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
10	Each	3" Grooved coupling
20	Each	1-1/4" threaded outlet
20	Each	1" screw elbow
20	Each	1-1/4" screw reducing tee
20	Each	1-1/4" screw tee
60	Each	1" screw reducing coupling
60	Each	½" upright sprinkler head
10	Each	3" pipe ring
20	Each	1-1/4" pipe ring
20	Each	1" pipe ring
200	Feet	All thread rod
30	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
3	Each	Manual pull stations
1	Each	Visual alarm
2	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
300	Feet	1 pair 18 gauge fire alarm cable
10	Each	4" square junction boxes

Building 14 Administration Bldg.

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101040 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 2000 SF	4,841.28	S.F.	$3.69	$17,900
D40104101200 s	Wet pipe sprinkler systems, steel, ordinary haz, ea addl fl, 5000 SF	9,682.56	S.F.	$1.80	$17,500
D40 Fire Protection Subtotal					**$35,400**
Total D Services					**$35,400**
E Equipment & Furnishings					
	Per diem	80.00	Day	$127.60	$10,200
Subtotal					**$10,200**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	12.00	C.L.F.	$119.01	$1,425
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	600.00	L.F.	$3.19	$1,925
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$4,000**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	6.00	Ea.	$103.99	$625
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	8.00	Ea.	$98.00	$785
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	15.00	Ea.	$137.99	$2,075
283 Subtotal					**$7,755**
Total E Equipment & Furnishings					**$21,955**
Estimate Subtotal					**$57,355**

General Conditions (10%)	**$5,725**
G.C. O&P (15%)	**$9,450**
Architectural Fee (6%)	**$4,350**
Contingency	**$1,550**
Estimate Total	**$78,500**

Preliminary Bill of Material

Building 14 Administration Building

Quantity	Unit of Measure	Item
50	Feet	4" Schedule 10 pipe
315	Feet	3" Schedule 10 pipe
370	Feet	1-1/4" Schedule 40 pipe
740	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
3	Each	3" Grooved outlet
1	Each	4" Grooved cap
3	Each	3" Grooved cap
30	Each	3" Grooved coupling
66	Each	1-1/4" threaded outlet
66	Each	1" screw elbow
66	Each	1-1/4" screw reducing tee
132	Each	1" screw reducing coupling
132	Each	½" pendent sprinkler head
2	Each	4" riser clamp
30	Each	3" pipe ring
66	Each	1" pipe ring
400	Feet	All thread rod
96	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
8	Each	Manual pull stations
15	Each	Smoke detector
6	Each	Visual alarm
12	Each	Audiovisual alarm
600	Feet	¾" EMT conduit
1200	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 15 Police

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101020 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 1000 SF	1,831.69	S.F.	$3.36	$6,150
D40 Fire Protection Subtotal					**$6,150**
Total D Services					**$6,150**
E Equipment & Furnishings					
	Per diem	18.00	Day	$127.60	$2,300
Subtotal					**$2,300**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,440**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	2.00	Ea.	$98.00	$196
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	3.00	Ea.	$137.99	$415
283 Subtotal					**$3,719**
Total E Equipment & Furnishings					**$7,459**
Estimate Subtotal					**$13,609**
General Conditions (10%)					**$1,350**
G.C. O&P (15%)					**$2,250**

Architectural Fee (6%)	**$1,025**
Contingency	**$365**
Estimate Total	**$18,600**

Preliminary Bill of Material

Building 15 Police

Quantity	Unit of Measure	Item
10	Feet	4" Schedule 10 pipe
65	Feet	3" Schedule 10 pipe
105	Feet	1-1/4" Schedule 40 pipe
60	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
6	Each	3" Grooved coupling
6	Each	1-1/4" threaded outlet
6	Each	1" screw elbow
6	Each	1-1/4" screw reducing tee
18	Each	1" screw reducing coupling
18	Each	½" pendent sprinkler head
6	Each	3" pipe ring
6	Each	1-1/4" pipe ring
6	Each	1" pipe ring
100	Feet	All thread rod
18	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
2	Each	Manual pull stations
3	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 16 Bank

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104100580 s	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 2000 SF	3,518.00	S.F.	$3.57	$12,500
D40 Fire Protection Subtotal					**$12,500**
Total D Services					**$12,500**
E Equipment & Furnishings					
	Per diem	24.00	Day	$127.60	$3,050
Subtotal					**$3,050**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,440**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	2.00	Ea.	$98.00	$196
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	4.00	Ea.	$137.99	$550
283 Subtotal					**$3,854**
Total E Equipment & Furnishings					**$8,344**
Estimate Subtotal					**$20,844**
General Conditions (10%)					**$2,075**

G.C. O&P (15%)	**$3,450**
Architectural Fee (6%)	**$1,575**
Contingency	**$560**
Estimate Total	**$28,500**

Preliminary Bill of Material

Building 16 Bank

Quantity	Unit of Measure	Item
10	Feet	4" Schedule 10 pipe
80	Feet	3" Schedule 10 pipe
105	Feet	1-1/4" Schedule 40 pipe
140	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
8	Each	3" Grooved coupling
14	Each	1-1/4" threaded outlet
14	Each	1" screw elbow
14	Each	1-1/4" screw reducing tee
28	Each	1" screw reducing coupling
28	Each	½" pendent sprinkler head
8	Each	3" pipe ring
14	Each	1-1/4" pipe ring
14	Each	1" pipe ring
100	Feet	All thread rod
36	Each	Beam clamps
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
2	Each	Manual pull stations
4	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 17 Cafeteria

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104100560 s	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 1000 SF	1,151.15	S.F.	$3.39	$3,900
D40 Fire Protection Subtotal					**$3,900**
Total D Services					**$3,900**
E Equipment & Furnishings					
	Per diem	16.00	Day	$127.60	$2,050
Subtotal					**$2,050**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,440**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	2.00	Ea.	$98.00	$196
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	4.00	Ea.	$137.99	$550
283 Subtotal					**$3,854**
Total E Equipment & Furnishings					**$7,344**
Estimate Subtotal					**$11,244**
General Conditions (10%)					**$1,125**
G.C. O&P (15%)					**$1,850**

Architectural Fee (6%)	**$855**
Contingency	**$300**
Estimate Total	**$15,400**

Preliminary Bill of Material

Building 17 Cafeteria

Quantity	Unit of Measure	Item
10	Feet	4" Schedule 10 pipe
70	Feet	3" Schedule 10 pipe
35	Feet	1-1/4" Schedule 40 pipe
60	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
6	Each	3" Grooved coupling
6	Each	1-1/4" threaded outlet
6	Each	1" screw elbow
6	Each	1-1/4" screw reducing tee
12	Each	1" screw reducing coupling
12	Each	½" pendent sprinkler head
6	Each	3" pipe ring
6	Each	1" pipe ring
100	Feet	All thread rod
12	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
2	Each	Manual pull stations
4	Each	Smoke detector
2	Each	Visual alarm
4	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 18 HR Office

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101040 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 2000 SF	2,754.15	S.F.	$3.69	$10,200
D40 Fire Protection Subtotal					**$10,200**
Total D Services					**$10,200**
E Equipment & Furnishings					
	Per diem	20.00	Day	$127.60	$2,550
Subtotal					**$2,550**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,440**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	2.00	Ea.	$169.99	$340
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	2.00	Ea.	$98.00	$196
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	3.00	Ea.	$137.99	$415
283 Subtotal					**$3,379**
Total E Equipment & Furnishings					**$7,369**
Estimate Subtotal					**$17,569**
General Conditions (10%)					**$1,750**
G.C. O&P (15%)					**$2,900**

Architectural Fee (6%)	**$1,325**
Contingency	**$470**
Estimate Total	**$24,000**

Preliminary Bill of Material

Building 18 HR Office

Quantity	Unit of Measure	Item
10	Feet	4" Schedule 10 pipe
50	Feet	3" Schedule 10 pipe
75	Feet	1-1/4" Schedule 40 pipe
100	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
1	Each	4" x 3" Grooved reducing coupling
1	Each	3" Grooved cap
5	Each	3" Grooved coupling
10	Each	1-1/4" threaded outlet
10	Each	1" screw elbow
5	Each	1-1/4" screw reducing tee
5	Each	1-1/4" screw tee
25	Each	1" screw reducing coupling
25	Each	½" pendent sprinkler head
5	Each	3" pipe ring
5	Each	1-1/4" pipe ring
10	Each	1" pipe ring
100	Feet	All thread rod
20	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
2	Each	Manual pull stations
3	Each	Smoke detector
2	Each	Visual alarm
2	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 19 Warehouse 4

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410158 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 10,000 SF	54,975.4 2	S.F.	$3.23	$177,500
D40 Fire Protection Subtotal					**$177,500**
Total D Services					**$177,500**
E Equipment & Furnishings					
	Per diem	210.00	Day	$127.60	$26,800
Subtotal					**$26,800**
015					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	5.00	Month	$731.50	$3,650
015 Subtotal					**$3,650**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$7,325**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,868**

Total E Equipment & Furnishings	**$75,343**
Estimate Subtotal	**$252,843**
General Conditions (10%)	**$25,300**
G.C. O&P (15%)	**$41,700**
Architectural Fee (6%)	**$19,200**
Contingency	**$6,775**
Estimate Total	**$346,000**

Preliminary Bill of Material

Building 19 Warehouse 4

Quantity	Unit of Measure	Item
580	Feet	6" Schedule 10 pipe
540	Feet	4" Schedule 10 pipe
5000	Feet	2" Schedule 10 pipe
4	Each	6" Flange
8	Each	6" Grooved elbow
60	Each	6" Grooved coupling
50	Each	4" Grooved coupling
300	Each	2" Grooved coupling
2	Each	6" Grooved cap
4	Each	4" Grooved cap
110	Each	2" Threaded outlet
605	Each	1" Threaded outlet
605	Each	ESFR sprinkler head
55	Each	6" pipe ring
50	Each	4" pipe ring
300	Each	2" pipe ring
1200	Feet	All thread rod
405	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
1200	Feet	¾" EMT conduit
2400	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 20 Port Superintendent

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101060 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 5000 SF	5,185.15	S.F.	$2.30	$12,000
D40104101200 s	Wet pipe sprinkler systems, steel, ordinary haz, ea addl fl, 5000 SF	10,370.30	S.F.	$1.80	$18,700
D40 Fire Protection Subtotal					**$30,700**
Total D Services					**$30,700**
E Equipment & Furnishings					
	Per diem	88.00	Day	$127.60	$11,200
Subtotal					**$11,200**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	10.00	C.L.F.	$119.01	$1,200
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00	L.F.	$3.19	$1,600
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$3,450**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	9.00	Ea.	$169.99	$1,525
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	6.00	Ea.	$103.99	$625
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	8.00	Ea.	$98.00	$785
283146505200 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	12.00	Ea.	$137.99	$1,650
283 Subtotal					**$6,805**
Total E Equipment & Furnishings					**$21,455**
Estimate Subtotal					**$52,155**

General Conditions (10%)	**$5,225**
G.C. O&P (15%)	**$8,600**
Architectural Fee (6%)	**$3,950**
Contingency	**$1,400**
Estimate Total	**$71,500**

Preliminary Bill of Material

Building 20 Port Superintendent

Quantity	Unit of Measure	Item
50	Feet	4" Schedule 10 pipe
270	Feet	3" Schedule 10 pipe
430	Feet	1-1/4" Schedule 40 pipe
860	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
3	Each	3" Grooved outlet
1	Each	4" Grooved cap
3	Each	3" Grooved cap
27	Each	3" Grooved coupling
72	Each	1-1/4" threaded outlet
72	Each	1" screw elbow
72	Each	1-1/4" screw reducing tee
144	Each	1" screw reducing coupling
144	Each	½" pendent sprinkler head
2	Each	4" riser clamp
27	Each	3" pipe ring
72	Each	1" pipe ring
300	Feet	All thread rod
99	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
8	Each	Manual pull stations
12	Each	Smoke detector
6	Each	Visual alarm
9	Each	Audiovisual alarm
500	Feet	¾" EMT conduit
1000	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 21 Port Captain

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410102 0 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 1000 SF	1,915.00	S.F.	$3.36	$6,425
D4010410116 0 s	Wet pipe sprinkler systems, steel, ordinary haz, ea addl fl, 1000 SF	3,830.00	S.F.	$1.71	$6,550
D40 Fire Protection Subtotal					**$12,975**
Total D Services					**$12,975**
E Equipment & Furnishings					
	Per Diem	30.00	Day	$127.60	$3,825
Subtotal					**$3,825**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	9.00	C.L.F.	$119.01	$1,075
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	450.00	L.F.	$3.19	$1,425
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	35.00	Ea.	$16.30	$570
260 Subtotal					**$3,070**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	6.00	Ea.	$169.99	$1,025
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	6.00	Ea.	$103.99	$625
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
28314650520 0 s*	Detection Systems, smoke detector, ceiling type, excl. wires & conduit	9.00	Ea.	$137.99	$1,250
283 Subtotal					**$5,710**
Total E Equipment & Furnishings					**$12,605**
Estimate Subtotal					**$25,580**

General Conditions (10%)	**$2,550**
G.C. O&P (15%)	**$4,225**
Architectural Fee (6%)	**$1,950**
Contingency	**$685**
Estimate Total	**$35,000**

Preliminary Bill of Material

Building 21 Port Captain

Quantity	Unit of Measure	Item
50	Feet	4" Schedule 10 pipe
195	Feet	3" Schedule 10 pipe
110	Feet	1-1/4" Schedule 40 pipe
220	Feet	1" Schedule 40 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
3	Each	3" Grooved outlet
1	Each	4" Grooved cap
3	Each	3" Grooved cap
18	Each	3" Grooved coupling
18	Each	1-1/4" threaded outlet
18	Each	1" screw elbow
18	Each	1-1/4" screw reducing tee
36	Each	1" screw reducing coupling
36	Each	½" pendent sprinkler head
2	Each	4" riser clamp
18	Each	3" pipe ring
18	Each	1" pipe ring
180	Feet	All thread rod
36	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
9	Each	Smoke detector
6	Each	Visual alarm
6	Each	Audiovisual alarm
450	Feet	¾" EMT conduit
900	Feet	1 pair 18 gauge fire alarm cable
35	Each	4" square junction boxes

Building 23 Refrigerated Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D401035015 80 s	Preactn sprinkler systems, steel,blk, sch 40,ex haz, 1 fl, 10,000 SF	44,485.98	S.F.	$3.45	$153,500
D40 Fire Protection Subtotal					**$153,500**
Total D Services					**$153,500**
E Equipment & Furnishings					
	Detection System for Preaction Releasing	1.00		$71,500.00	$71,500
	Per diem	226.00	Day	$127.60	$28,800
Subtotal					**$100,300**
15					
015430400160	Rent aerial lift to 25'high 2000 lb cap scissor type	6.00	Month	$731.50	$4,400
015 Subtotal					**$4,400**
213					
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
260533500020 s	Outlet boxes, pressed steel, 4" octagon	30.00	Ea.	$16.30	$490
260 Subtotal					**$7,165**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845

28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,068**
Total E Equipment & Furnishings					**$149,633**
Estimate Subtotal					**$303,133**
General Conditions (10%)					**$30,300**
G.C. O&P (15%)					**$50,000**
Architectural Fee (6%)					**$23,000**
Contingency					**$8,125**
Estimate Total					**$414,500**

Preliminary Bill of Material

Building 23 Refrigerated Warehouse

Quantity	Measure	Unit of Item	
580		Feet	6" Schedule 10 pipe
4500		Feet	2" Schedule 10 pipe
4		Each	6" Flange
8		Each	6" Grooved elbow
50		Each	6" Grooved coupling
300		Each	2" Grooved coupling
2		Each	6" Grooved cap
100		Each	2" Grooved cap
100		Each	2" Threaded outlet
500		Each	1" threaded outlet
500		Each	ELO upright sprinkler head
50		Each	6" pipe ring
300		Each	2" pipe ring
1200		Feet	All thread rod
350		Each	Beam clamp
2		Each	6" Preaction valve
3		Each	6" OS&Y valve
1		Each	4" Check valve
1		Each	Fire department connection
2		Each	Waterflow switch
2	Each		Tamper switch
1		Each	Water motor gong
1		Each	6" Flanged tee
2		Each	6" Grooved tee
4		Each	6" Butterfly valve
2		Each	6" Grooved check valve
1		Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4		Each	Pipe stands
1		Each	Two zone releasing panel
5800		Feet	Linear heat detection cable
1		Each	Fire alarm control panel
1		Each	Digital alarm coded transmitter
6		Each	Manual pull stations
2		Each	Visual alarm
12		Each	Audiovisual alarm
1200		Feet	¾" EMT conduit
2400		Feet	1 pair 18 gauge fire alarm cable
30		Each	4" square junction boxes

Building 29 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	80,720.28	S.F.	$3.32	$268,000
D40 Fire Protection Subtotal					**$268,000**
Total D Services					**$268,000**
E Equipment & Furnishings					
	Per diem	298.00	Day	$127.60	$38,000
Subtotal					**$38,000**
15					
015434001600*	Rent aerial lift to 25'high 2000 lb cap scissor type	6.00	Month	$731.50	$4,400
015 Subtotal					**$4,400**
213					
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$7,325**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	18.00	Ea.	$169.99	$3,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$6,068**

Total E Equipment & Furnishings	**$88,493**
Estimate Subtotal	**$356,493**
General Conditions (10%)	**$35,600**
G.C. O&P (15%)	**$59,000**
Architectural Fee (6%)	**$27,100**
Contingency	**$9,575**
Estimate Total	**$488,000**

Preliminary Bill of Material

Building 29 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
675	Feet	6" Schedule 10 pipe
490	Feet	4" Schedule 10 pipe
7750	Feet	2" Schedule 10 pipe
4	Each	6" Flange
12	Each	6" Grooved elbows
70	Each	6" Grooved coupling
45	Each	4" Grooved coupling
515	Each	2" Grooved coupling
4	Each	6" Grooved cap
6	Each	4" Grooved cap
100	Each	2" Threaded outlet
850	Each	1" threaded outlet
850	Each	ESFR sprinkler head
65	Each	6" pipe ring
49	Each	4" pipe ring
515	Each	2" pipe ring
2700	Feet	All thread rod
629	Each	Beam clamp
3	Each	6" Alarm check valve
4	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
3	Each	Waterflow switch
3	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
18	Each	Audiovisual alarm
1200	Feet	¾" EMT conduit
2400	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 30 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101600 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	80,784.83	S.F.	$3.32	$268,500
D40 Fire Protection Subtotal					**$268,500**
Total D Services					**$268,500**
E Equipment & Furnishings					
	Per diem	298.00	Day	$127.60	$38,000
Subtotal					**$38,000**
015					
015434001600	Rent aerial lift to 25'high 2000 lb cap scissor type	6.00	Month	$731.50	$4,400
015 Subtotal					**$4,400**
213					
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$7,325**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	18.00	Ea.	$169.99	$3,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$6,068**

Total E Equipment & Furnishings	**$88,493**
Estimate Subtotal	**$356,993**
General Conditions (10%)	**$35,700**
G.C. O&P (15%)	**$59,000**
Architectural Fee (6%)	**$27,100**
Contingency	**$9,575**
Estimate Total	**$488,500**

Preliminary Bill of Material

Building 30 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
675	Feet	6" Schedule 10 pipe
490	Feet	4" Schedule 10 pipe
8000	Feet	2" Schedule 10 pipe
4	Each	6" Flange
12	Each	6" Grooved elbows
70	Each	6" Grooved coupling
45	Each	4" Grooved coupling
515	Each	2" Grooved coupling
4	Each	6" Grooved cap
6	Each	4" Grooved cap
100	Each	2" Threaded outlet
900	Each	1" threaded outlet
900	Each	ESFR sprinkler head
65	Each	6" pipe ring
49	Each	4" pipe ring
515	Each	2" pipe ring
2700	Feet	All thread rod
629	Each	Beam clamp
3	Each	6" Alarm check valve
4	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
3	Each	Waterflow switch
3	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
18	Each	Audiovisual alarm
1200	Feet	¾" EMT conduit
2400	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 31 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101600 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	16,040.77	S.F.	$3.32	$53,500
D40 Fire Protection Subtotal					**$53,500**
Total D Services					**$53,500**
E Equipment & Furnishings					
	Per diem	70.00	Day	$127.60	$8,925
Subtotal					**$8,925**
015					
015433400160	Rent aerial lift to 25'high 2000 lb cap scissor type	2.00	Month	$731.50	$1,475
015 Subtotal					**$1,475**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	12.00	C.L.F.	$119.01	$1,425
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	600.00	L.F.	$3.19	$1,925
260533500020 s	Outlet boxes, pressed steel, 4" octagon	25.00	Ea.	$16.30	$405
260 Subtotal					**$3,755**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,168**
Total E Equipment & Furnishings					**$18,323**
Estimate Subtotal					**$71,823**

General Conditions (10%)	**$7,175**
G.C. O&P (15%)	**$11,800**
Architectural Fee (6%)	**$5,450**
Contingency	**$1,925**
Estimate Total	**$98,000**

Preliminary Bill of Material

Building 31 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
280	Feet	6" Schedule 10 pipe
1300	Feet	2" Schedule 10 pipe
4	Each	6" Flange
4	Each	6" Grooved elbows
28	Each	6" Grooved coupling
100	Each	2" Grooved coupling
2	Each	6" Grooved cap
50	Each	2" Grooved cap
50	Each	2" Threaded outlet
165	Each	1" threaded outlet
165	Each	ESFR sprinkler head
24	Each	6" pipe ring
100	Each	2" pipe ring
400	Feet	All thread rod
124	Each	Beam clamp
1	Each	6" Alarm check valve
2	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valves
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
8	Each	Audiovisual alarm
600	Feet	¾" EMT conduit
1200	Feet	1 pair 18 gauge fire alarm cable
25	Each	4" square junction boxes

Building 32 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	65,809.13	S.F.	$3.32	$218,500
D40 Fire Protection Subtotal					**$218,500**
Total D Services					**$218,500**
E Equipment & Furnishings					
	Per diem	244.00	Day	$127.60	$31,100
Subtotal					**$31,100**
015					
01543340016 0*	Rent aerial lift to 25'high 2000 lb cap scissor type	5.00	Month	$731.50	$3,650
015 Subtotal					**$3,650**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	35.00	Ea.	$16.30	$570
260 Subtotal					**$7,245**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	18.00	Ea.	$169.99	$3,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590

283 Subtotal	**$6,068**
Total E Equipment & Furnishings	**$80,763**
Estimate Subtotal	**$299,263**
General Conditions (10%)	**$29,900**
G.C. O&P (15%)	**$49,400**
Architectural Fee (6%)	**$22,700**
Contingency	**$8,025**
Estimate Total	**$409,500**

Preliminary Bill of Material

Building 32 Warehouse (Free Zone)

Quantity	Measure	Unit of Item	
600		Feet	6" Schedule 10 pipe
600		Feet	4" Schedule 10 pipe
6600		Feet	2" Schedule 10 pipe
4		Each	6" Flange
8		Each	6" Grooved elbow
4		Each	4" Grooved elbow
60		Each	6" Grooved coupling
45		Each	4" Grooved coupling
440		Each	2" Grooved coupling
2		Each	6" Grooved cap
4		Each	4" Grooved cap
60		Each	2" Threaded outlet
660		Each	1" threaded outlet
660		Each	ESFR sprinkler head
60		Each	6" pipe ring
60		Each	4" pipe ring
440		Each	2" pipe ring
1600		Feet	All thread rod
560		Each	Beam clamp
2		Each	6" Alarm check valve
3		Each	6" OS&Y Valve
1		Each	4" Check valve
1		Each	Fire department connection
2		Each	Waterflow switch
2		Each	Tamper switch
1		Each	Water motor gong
1		Each	6" Flanged tee
2		Each	6" Grooved tee
4		Each	6" Butterfly valve
2		Each	6" Grooved check valve
1		Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4		Each	Pipe stand
1		Each	Fire alarm control panel
1		Each	Digital alarm coded transmitter
6		Each	Manual pull stations
2		Each	Visual alarm
18		Each	Audiovisual alarm
1200		Feet	¾" EMT conduit
2400		Feet	1 pair 18 gauge fire alarm cable
35		Each	4" square junction boxes

Building 33 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	81,641.50	S.F.	$3.32	$271,000
D40 Fire Protection Subtotal					**$271,000**
Total D Services					**$271,000**
E Equipment & Furnishings					
	Per diem	300.00	Day	$127.60	$38,300
Subtotal					**$38,300**
015					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	6.00	Month	$731.50	$4,400
015 Subtotal					**$4,400**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	35.00	Ea.	$16.30	$570
260 Subtotal					**$7,245**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	18.00	Ea.	$169.99	$3,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$6,068**
Total E Equipment & Furnishings					**$88,713**

Estimate Subtotal	**$359,713**
General Conditions (10%)	**$36,000**
G.C. O&P (15%)	**$59,500**
Architectural Fee (6%)	**$27,300**
Contingency	**$9,650**
Estimate Total	**$492,000**

Preliminary Bill of Material

Building 33 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
675	Feet	6" Schedule 10 pipe
490	Feet	4" Schedule 10 pipe
7750	Feet	2" Schedule 10 pipe
4	Each	6" Flange
12	Each	6" Grooved elbow
70	Each	6" Grooved coupling
45	Each	4" Grooved coupling
515	Each	2" Grooved coupling
4	Each	6" Grooved cap
6	Each	4" Grooved cap
100	Each	Threaded outlet
850	Each	1" threaded outlet
850	Each	ESFR sprinkler head
65	Each	6" pipe ring
49	Each	4" pipe ring
515	Each	2" pipe ring
2700	Feet	All thread rod
629	Each	Beam clamp
3	Each	6" Alarm check valve
4	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
3	Each	Waterflow switch
3	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valves
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
18	Each	Audiovisual alarm
1200	Feet	¾" EMT conduit
2400	Feet	1 pair 18 gauge fire alarm cable
35	Each	4" square junction boxes

Building 34 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	39,988.97	S.F.	$3.32	$133,000
D40 Fire Protection Subtotal					**$133,000**
Total D Services					**$133,000**
E Equipment & Furnishings					
	Per diem	156.00	Day	$127.60	$19,900
Subtotal					**$19,900**
15					
01543340016 0*	Rent aerial lift to 25'high 2000 lb cap scissor type	3.00	Month	$731.50	$2,200
015 Subtotal					**$2,200**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	18.00	C.L.F.	$119.01	$2,150
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	900.00	L.F.	$3.19	$2,875
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	30.00	Ea.	$16.30	$490
260 Subtotal					**$5,515**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,068**
Total E Equipment & Furnishings					**$65,383**

Estimate Subtotal	**$198,383**
General Conditions (10%)	**$19,800**
G.C. O&P (15%)	**$32,700**
Architectural Fee (6%)	**$15,100**
Contingency	**$5,325**
Estimate Total	**$271,500**

Preliminary Bill of Material

Building 34 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
290	Feet	6" Schedule 10 pipe
230	Feet	4" Schedule 10 pipe
3840	Feet	2" Schedule 10 pipe
4	Each	6" Flange
8	Each	6" Grooved elbow
40	Each	6" Grooved coupling
23	Each	4" Grooved coupling
240	Each	2" Grooved coupling
2	Each	6" Grooved cap
4	Each	4" Grooved cap
48	Each	2" Threaded outlet
420	Each	1" threaded outlet
420	Each	ESFR sprinkler head
25	Each	6" pipe ring
25	Each	4" pipe ring
240	Each	2" pipe ring
800	Feet	All thread rod
290	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valves
2	Each	6" Grooved check valves
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
900	Feet	¾" EMT conduit
1800	Feet	1 pair 18 gauge fire alarm cable
30	Each	4" square junction boxes

Building 35 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	36,072.92	S.F.	$3.32	$120,000
D40 Fire Protection Subtotal					**$120,000**
Total D Services					**$120,000**
E Equipment & Furnishings					
	Per diem	139.00	Day	$127.60	$17,700
Subtotal					**$17,700**
15					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	3.00	Month	$731.50	$2,200
015 Subtotal					**$2,200**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	18.00	C.L.F.	$119.01	$2,150
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	900.00	L.F.	$3.19	$2,875
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	30.00	Ea.	$16.30	$490
260 Subtotal					**$5,515**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,068**
Total E Equipment & Furnishings					**$63,183**

Estimate Subtotal	**$183,183**
General Conditions (10%)	**$18,300**
G.C. O&P (15%)	**$30,200**
Architectural Fee (6%)	**$13,900**
Contingency	**$4,900**
Estimate Total	**$250,500**

Preliminary Bill of Material

Building 35 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
290	Feet	6" Schedule 10 pipe
170	Feet	4" Schedule 10 pipe
3540	Feet	2" Schedule 10 pipe
4	Each	6" Flange
8	Each	6" Grooved elbow
40	Each	6" Grooved coupling
23	Each	4" Grooved coupling
220	Each	2" Grooved coupling
2	Each	6" Grooved cap
4	Each	4" Grooved cap
48	Each	2" Threaded outlet
390	Each	1" threaded outlet
390	Each	ESFR sprinkler head
25	Each	6" pipe ring
17	Each	4" pipe ring
220	Each	2" pipe ring
800	Feet	All thread rod
262	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
900	Feet	¾" EMT conduit
1800	Feet	1 pair 18 gauge fire alarm cable
30	Each	4" square junction boxes

Building 36 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101580	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 10,000 SF	27,778.19	S.F.	$3.23	$89,500
D40 Fire Protection Subtotal					**$89,500**
Total D Services					**$89,500**
E Equipment & Furnishings					
	Per diem	111.00	Day	$127.60	$14,200
Subtotal					**$14,200**
015					
015434400160*	Rent aerial lift to 25'high 2000 lb cap scissor type	3.00	Month	$731.50	$2,200
015 Subtotal					**$2,200**
213					
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	14.00	C.L.F.	$119.01	$1,675
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	700.00	L.F.	$3.19	$2,225
260533500020 s	Outlet boxes, pressed steel, 4" octagon	30.00	Ea.	$16.30	$490
260 Subtotal					**$4,390**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,068**
Total E Equipment & Furnishings					**$58,558**

Estimate Subtotal	**$148,058**
General Conditions (10%)	**$14,800**
G.C. O&P (15%)	**$24,400**
Architectural Fee (6%)	**$11,200**
Contingency	**$3,975**
Estimate Total	**$202,500**

Preliminary Bill of Material

Building 36 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
260	Feet	6" Schedule 10 pipe
320	Feet	4" Schedule 10 pipe
3840	Feet	2" Schedule 10 pipe
4	Each	6" Flange
3	Each	6" Grooved elbow
40	Each	6" Grooved coupling
23	Each	4" Grooved coupling
240	Each	2" Grooved coupling
2	Each	6" Grooved cap
4	Each	4" Grooved cap
64	Each	2" Threaded outlet
420	Each	1" threaded outlet
420	Each	ESFR sprinkler head
25	Each	6" pipe ring
25	Each	4" pipe ring
240	Each	2" pipe ring
800	Feet	All thread rod
290	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
700	Feet	¾" EMT conduit
1400	Feet	1 pair 18 gauge fire alarm cable
30	Each	4" square junction boxes

Building 37 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101540 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 2000 SF	4,658.39	S.F.	$4.35	$20,200
D40 Fire Protection Subtotal					**$20,200**
Total D Services					**$20,200**
E Equipment & Furnishings					
	Per Diem	26.00	Day	$116.00	$3,025
Subtotal					**$3,025**
015					
015433400160	Rent aerial lift to 25'high 2000 lb cap scissor type	1.00	Month	$731.50	$730
015 Subtotal					**$730**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	8.00	C.L.F.	$119.01	$950
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	400.00	L.F.	$3.19	$1,275
260533500020 s	Outlet boxes, pressed steel, 4" octagon	25.00	Ea.	$16.30	$405
260 Subtotal					**$2,630**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,168**
Total E Equipment & Furnishings					**$10,553**
Estimate Subtotal					**$30,753**
General Conditions (10%)					**$3,075**

G.C. O&P (15%)	**$5,075**
Architectural Fee (6%)	**$2,325**
Contingency	**$825**
Estimate Total	**$42,100**

Preliminary Bill of Material

Building 37 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
120	Feet	6" Schedule 10 pipe
1000	Feet	2" Schedule 10 pipe
4	Each	6" Flange
2	Each	6" Grooved elbow
10	Each	6" Grooved coupling
20	Each	2" Grooved coupling
1	Each	6" Grooved cap
10	Each	2" Grooved cap
10	Each	2" Threaded outlet
50	Each	1" threaded outlet
50	Each	ESFR sprinkler head
10	Each	6" pipe ring
10	Each	2" pipe ring
100	Feet	All thread rod
20	Each	Beam clamp
1	Each	6" Alarm check valve
2	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
8	Each	Audiovisual alarm
400	Feet	¾" EMT conduit
800	Feet	1 pair 18 gauge fire alarm cable
25	Each	4" square junction boxes

Building 38 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101020 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 1000 SF	1,549.00	S.F.	$3.36	$5,200
D40 Fire Protection Subtotal					**$5,200**
Total D Services					**$5,200**
E Equipment & Furnishings					
	Per diem	18.00	Day	$127.60	$2,300
Subtotal					**$2,300**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	4.00	C.L.F.	$119.01	$475
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	200.00	L.F.	$3.19	$640
260533500020 s	Outlet boxes, pressed steel, 4" octagon	20.00	Ea.	$16.30	$325
260 Subtotal					**$1,440**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	4.00	Ea.	$169.99	$680
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	2.00	Ea.	$98.00	$196
283 Subtotal					**$3,304**
Total E Equipment & Furnishings					**$7,044**
Estimate Subtotal					**$12,244**
General Conditions (10%)					**$1,225**
G.C. O&P (15%)					**$2,025**
Architectural Fee (6%)					**$930**
Contingency					**$330**
Estimate Total					**$16,800**

Preliminary Bill of Material

Building 38 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
80	Feet	6" Schedule 10 pipe
120	Feet	2" Schedule 10 pipe
4	Each	6" Flange
1	Each	6" Grooved elbow
8	Each	6" Grooved coupling
6	Each	2" Grooved coupling
1	Each	6" Grooved cap
6	Each	2" Grooved cap
6	Each	2" Threaded outlet
18	Each	1" threaded outlet
18	Each	ESFR sprinkler head
6	Each	6" pipe ring
6	Each	2" pipe ring
50	Feet	All thread rod
12	Each	Beam clamp
1	Each	6" Alarm check valve
1	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
2	Each	Manual pull stations
2	Each	Visual alarm
4	Each	Audiovisual alarm
200	Feet	¾" EMT conduit
400	Feet	1 pair 18 gauge fire alarm cable
20	Each	4" square junction boxes

Building 39 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	49,617.74	S.F.	$3.32	$165,000
D40 Fire Protection Subtotal					**$165,000**
Total D Services					**$165,000**
E Equipment & Furnishings					
	Per diem	190.00	Day	$127.60	$24,200
Subtotal					**$24,200**
015					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	4.00	Month	$731.50	$2,925
015 Subtotal					**$2,925**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	20.00	C.L.F.	$119.01	$2,375
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,000.00	L.F.	$3.19	$3,200
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	35.00	Ea.	$16.30	$570
260 Subtotal					**$6,145**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,068**
Total E Equipment & Furnishings					**$71,038**

Estimate Subtotal	**$236,038**
General Conditions (10%)	**$23,600**
G.C. O&P (15%)	**$38,900**
Architectural Fee (6%)	**$17,900**
Contingency	**$6,325**
Estimate Total	**$323,000**

Preliminary Bill of Material

Building 39 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
850	Feet	6" Schedule 10 pipe
4210	Feet	2" Schedule 10 pipe
4	Each	6" Flange
8	Each	6" Grooved elbows
70	Each	6" Grooved coupling
362	Each	2" Grooved coupling
2	Each	6" Grooved cap
126	Each	2" Grooved cap
126	Each	2" Threaded outlet
615	Each	1" threaded outlet
615	Each	ESFR sprinkler head
80	Each	6" pipe ring
362	Each	2" pipe ring
1200	Feet	All thread rod
442	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
1000	Feet	¾" EMT conduit
2000	Feet	1 pair 18 gauge fire alarm cable
35	Each	4" square junction boxes

Building 40 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
D Services					
D40 Fire Protection					
D401041016 00 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	46,368.70	S.F.	$3.32	$154,000
D40 Fire Protection Subtotal					**$154,000**
Total D Services					**$154,000**
E Equipment & Furnishings					
	Per diem	178.00	Day	$127.60	$22,700
Subtotal 15					**$22,700**
015416433400160	Rent aerial lift to 25'high 2000 lb cap scissor type	4.00	Month	$731.50	$2,925
015 Subtotal 213					**$2,925**
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal 260					**$32,700**
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	20.00	C.L.F.	$119.01	$2,375
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,000.00	L.F.	$3.19	$3,200
260533500020 s	Outlet boxes, pressed steel, 4" octagon	35.00	Ea.	$16.30	$570
260 Subtotal 283					**$6,145**
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590

283	**$5,068**
Subtotal	
Total E Equipment & Furnishings	**$69,538**
Estimate Subtotal	**$223,538**
General Conditions (10%)	**$22,400**
G.C. O&P (15%)	**$36,900**
Architectural Fee (6%)	**$17,000**
Contingency	**$6,000**
Estimate Total	**$306,000**

Preliminary Bill of Material

Building 40 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
600	Feet	6" Schedule 10 pipe
450	Feet	4" Schedule 10 pipe
4800	Feet	2" Schedule 10 pipe
4	Each	6" Flange
4	Each	6" Grooved elbows
50	Each	6" Grooved coupling
40	Each	4" Grooved coupling
120	Each	2" Grooved coupling
2	Each	6" Grooved cap
4	Each	4" Grooved cap
96	Each	2" Threaded outlet
520	Each	1" threaded outlet
520	Each	ESFR sprinkler head
60	Each	6" pipe ring
45	Each	4" pipe ring
120	Each	2" pipe ring
800	Feet	All thread rod
225	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
1000	Feet	¾" EMT conduit
2000	Feet	1 pair 18 gauge fire alarm cable
35	Each	4" square junction boxes

Building 41 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D40104101600 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	34,824.94	S.F.	$3.32	$115,500
D40 Fire Protection Subtotal					**$115,500**
Total D Services					**$115,500**
E Equipment & Furnishings					
	Per diem	136.00	Day	$127.60	$17,400
Subtotal					**$17,400**
015					
015434001600	Rent aerial lift to 25'high 2000 lb cap scissor type	3.00	Month	$731.50	$2,200
015 Subtotal					**$2,200**
213					
213113503750 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	18.00	C.L.F.	$119.01	$2,150
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	900.00	L.F.	$3.19	$2,875
260533500020 s	Outlet boxes, pressed steel, 4" octagon	35.00	Ea.	$16.30	$570
260 Subtotal					**$5,595**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	12.00	Ea.	$169.99	$2,050
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$5,068**
Total E Equipment & Furnishings					**$62,963**

Estimate Subtotal	**$178,463**
General Conditions (10%)	**$17,800**
G.C. O&P (15%)	**$29,400**
Architectural Fee (6%)	**$13,500**
Contingency	**$4,775**
Estimate Total	**$244,000**

Preliminary Bill of Material

Building 41 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
600	Feet	6" Schedule 10 pipe
450	Feet	4" Schedule 10 pipe
3120	Feet	2" Schedule 10 pipe
4	Each	6" Flange
4	Each	6" Grooved elbow
50	Each	6" Grooved coupling
40	Each	4" Grooved coupling
96	Each	2" Grooved coupling
2	Each	6" Grooved cap
4	Each	4" Grooved cap
96	Each	2" Threaded outlet
336	Each	1" threaded outlet
336	Each	ESFR sprinkler head
60	Each	6" pipe ring
45	Each	4" pipe ring
96	Each	2" pipe ring
800	Feet	All thread rod
201	Each	Beam clamp
2	Each	6" Alarm check valve
3	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
2	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
12	Each	Audiovisual alarm
9000	Feet	¾" EMT conduit
1800	Feet	1 pair 18 gauge fire alarm cable
35	Each	4" square junction boxes

Building 42 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410160 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 50,000 SF	77,428.20	S.F.	$3.32	$257,000
D40 Fire Protection Subtotal					**$257,000**
Total D Services					**$257,000**
E Equipment & Furnishings					
	Per diem	288.00	Day	$127.60	$36,700
Subtotal					**$36,700**
15					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	6.00	Month	$731.50	$4,400
015 Subtotal					**$4,400**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	24.00	C.L.F.	$119.01	$2,850
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,200.00	L.F.	$3.19	$3,825
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$7,325**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	18.00	Ea.	$169.99	$3,050
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	6.00	Ea.	$98.00	$590
283 Subtotal					**$6,068**
Total E Equipment & Furnishings					**$87,193**

Estimate Subtotal	**$344,193**
General Conditions (10%)	**$34,400**
G.C. O&P (15%)	**$57,000**
Architectural Fee (6%)	**$26,100**
Contingency	**$9,225**
Estimate Total	**$471,000**

Preliminary Bill of Material

Building 42 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
700	Feet	6" Schedule 10 pipe
490	Feet	4" Schedule 10 pipe
8000	Feet	2" Schedule 10 pipe
4	Each	6" Flange
12	Each	6" Grooved elbows
70	Each	6" Grooved coupling
45	Each	4" Grooved coupling
350	Each	2" Grooved coupling
4	Each	6" Grooved cap
6	Each	4" Grooved cap
100	Each	2" Threaded outlet
825	Each	1" threaded outlet
825	Each	ESFR sprinkler head
65	Each	6" pipe ring
49	Each	4" pipe ring
350	Each	2" pipe ring
2700	Feet	All thread rod
464	Each	Beam clamp
3	Each	6" Alarm check valve
4	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
3	Each	Waterflow switch
3	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
6	Each	Manual pull stations
2	Each	Visual alarm
18	Each	Audiovisual alarm
1200	Feet	¾" EMT conduit
2400	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

Building 43 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410158 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 10,000 SF	11,091.91	S.F.	$3.23	$35,800
D40 Fire Protection Subtotal					**$35,800**
Total D Services					**$35,800**
E Equipment & Furnishings					
	Per diem	53.00	Day	$127.60	$6,775
Subtotal					**$6,775**
15					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	1.00	Month	$731.50	$730
015 Subtotal					**$730**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	10.00	C.L.F.	$119.01	$1,200
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	500.00	L.F.	$3.19	$1,600
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	25.00	Ea.	$16.30	$405
260 Subtotal					**$3,205**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,168**
Total E Equipment & Furnishings					**$47,578**

Estimate Subtotal	**$83,378**
General Conditions (10%)	**$8,350**
G.C. O&P (15%)	**$13,800**
Architectural Fee (6%)	**$6,325**
Contingency	**$2,225**
Estimate Total	**$114,000**

Preliminary Bill of Material

Building 43 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
150	Feet	6" Schedule 10 pipe
120	Feet	4" Schedule 10 pipe
900	Feet	2" Schedule 10 pipe
4	Each	6" Flange
4	Each	6" Grooved elbow
20	Each	6" Grooved coupling
10	Each	4" Grooved coupling
72	Each	2" Grooved coupling
2	Each	6" Grooved cap
2	Each	4" Grooved cap
24	Each	2" Threaded outlet
120	Each	1" threaded outlet
120	Each	ESFR sprinkler head
15	Each	6" pipe ring
12	Each	4" pipe ring
72	Each	2" pipe ring
300	Feet	All thread rod
99	Each	Beam clamp
1	Each	6" Alarm check valve
2	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
8	Each	Audiovisual alarm
500	Feet	¾" EMT conduit
1000	Feet	1 pair 18 gauge fire alarm cable
25	Each	4" square junction boxes

Building 44 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
D Services					
D40 Fire Protection					
D4010410158 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 10,000 SF	19,192.99	S.F.	$3.23	$62,000
D40 Fire Protection Subtotal					**$62,000**
Total D Services					**$62,000**
E Equipment & Furnishings					
	Per diem	82.00	Day	$127.60	$10,500
Subtotal					**$10,500**
15					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	2.00	Month	$731.50	$1,475
015 Subtotal					**$1,475**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	12.00	C.L.F.	$119.01	$1,425
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	600.00	L.F.	$3.19	$1,925
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	25.00	Ea.	$16.30	$405
260 Subtotal					**$3,755**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,168**
Total E Equipment & Furnishings					**$52,598**

Estimate Subtotal	**$114,598**
General Conditions (10%)	**$11,500**
G.C. O&P (15%)	**$18,900**
Architectural Fee (6%)	**$8,700**
Contingency	**$3,075**
Estimate Total	**$157,000**

Preliminary Bill of Material

Building 44 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
200	Feet	6" Schedule 10 pipe
160	Feet	4" Schedule 10 pipe
1500	Feet	2" Schedule 10 pipe
4	Each	6" Flange
2	Each	6" Grooved elbow
20	Each	6" Grooved coupling
16	Each	4" Grooved coupling
72	Each	2" Grooved coupling
2	Each	6" Grooved cap
2	Each	4" Grooved cap
36	Each	2" Threaded outlet
200	Each	1" threaded outlet
200	Each	ESFR sprinkler head
16	Each	6" pipe ring
16	Each	4" pipe ring
72	Each	2" pipe ring
400	Feet	All thread rod
104	Each	Beam clamp
1	Each	6" Alarm check valve
2	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
8	Each	Audiovisual alarm
600	Feet	¾" EMT conduit
1200	Feet	1 pair 18 gauge fire alarm cable
25	Each	4" square junction boxes

Building 45 Warehouse

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					
Line Number	**Description**	**Quantity**	**Unit**	**Unit Total Incl O&P**	**Ext. Total Incl O&P**
D Services					
D40 Fire Protection					
D4010410158 0 s	Wet pipe sprinkler systems, steel, extra hazard, 1 floor, 10,000 SF	19,569.93	S.F.	$3.23	$63,000
D40 Fire Protection Subtotal					**$63,000**
Total D Services					**$63,000**
E Equipment & Furnishings					
	Per diem	82.00	Day	$127.60	$10,500
Subtotal					**$10,500**
15					
01543340016 0	Rent aerial lift to 25'high 2000 lb cap scissor type	2.00	Month	$731.50	$1,475
015 Subtotal					**$1,475**
213					
21311350375 0 s	Fire Pumps, electric, 1500 GPM, 100 psi, 139 HP, 1770 RPM, 6" pump, incl. controller, fittings & relief valve	1.00	Ea.	$32,699.98	$32,700
213 Subtotal					**$32,700**
260					
26052320185 0 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	12.00	C.L.F.	$119.01	$1,425
26053305502 0 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	600.00	L.F.	$3.19	$1,925
26053350002 0 s	Outlet boxes, pressed steel, 4" octagon	25.00	Ea.	$16.30	$405
260 Subtotal					**$3,755**
283					
28312350360 0 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
28312350561 0 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	8.00	Ea.	$169.99	$1,350
28312350562 0 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	2.00	Ea.	$103.99	$208
28312350640 0 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
28312350700 0 s	Detection Systems, break glass station, excl. wires & conduit	4.00	Ea.	$98.00	$390
283 Subtotal					**$4,168**
Total E Equipment & Furnishings					**$52,598**

Estimate Subtotal	**$115,598**
General Conditions (10%)	**$11,600**
G.C. O&P (15%)	**$19,100**
Architectural Fee (6%)	**$8,775**
Contingency	**$3,100**
Estimate Total	**$158,000**

Preliminary Bill of Material

Building 45 Warehouse (Free Zone)

Quantity	Unit of Measure	Item
200	Feet	6" Schedule 10 pipe
160	Feet	4" Schedule 10 pipe
1500	Feet	2" Schedule 10 pipe
4	Each	6" Flange
2	Each	6" Grooved elbow
20	Each	6" Grooved coupling
16	Each	4" Grooved coupling
72	Each	2" Grooved coupling
2	Each	6" Grooved cap
2	Each	4" Grooved cap
36	Each	2" Threaded outlet
210	Each	1" threaded outlet
210	Each	ESFR sprinkler head
16	Each	6" pipe ring
16	Each	4" pipe ring
72	Each	2" pipe ring
400	Feet	All thread rod
104	Each	Beam clamp
1	Each	6" Alarm check valve
2	Each	6" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
2	Each	Tamper switch
1	Each	Water motor gong
1	Each	6" Flanged tee
2	Each	6" Grooved tee
4	Each	6" Butterfly valve
2	Each	6" Grooved check valve
1	Each	1500 gpm, 75 psi diesel fire pump complete, including controller, jockey pump, jockey pump controller and test header
4	Each	Pipe stand
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
4	Each	Manual pull stations
2	Each	Visual alarm
8	Each	Audiovisual alarm
600	Feet	¾" EMT conduit
1200	Feet	1 pair 18 gauge fire alarm cable
25	Each	4" square junction boxes

Building 46 Hon-Tai

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
R.S. Means					
Construction Plaza					
63 Smiths Lane					
Kingston, MA 02364-0800					
Assembly SubDivision Total Report					

Line Number	Description	Quantity	Unit	Unit Total Incl O&P	Ext. Total Incl O&P
D Services					
D40 Fire Protection					
D40104101080 s	Wet pipe sprinkler systems, steel, ordinary hazard, 1 fl, 10,000 SF	37,525.00	S.F.	$2.06	$77,500
D40104101220 s	Wet pipe sprinkler systems, steel, ord haz, ea addl fl, 10,000 SF	43,195.00	S.F.	$1.72	$74,500
D40 Fire Protection Subtotal					**$152,000**
Total D Services					**$152,000**
E Equipment & Furnishings					
	Per diem	145.00	Day	$127.60	$18,500
Subtotal					**$18,500**
260					
260523201850 s	Fire alarm cable, FEP Teflon, 150 volt, to 200 Deg.C, #18, 1 pair	20.00	C.L.F.	$119.01	$2,375
260533055020 s	Electric metallic tubing (EMT), 3/4" diameter, to 15' high, incl 2 terminations, 2 elbows & 11 beam clamps per 100 LF	1,000.00	L.F.	$3.19	$3,200
260533500020 s	Outlet boxes, pressed steel, 4" octagon	40.00	Ea.	$16.30	$650
260 Subtotal					**$6,225**
283					
283123503600 s	Detection Systems, fire alarm control panel, 4 zone, excl. wires & conduit	1.00	Ea.	$1,375.04	$1,375
283123505610 s	Detection Systems, strobe & horn, ADA type, excl. wires & conduit	14.00	Ea.	$169.99	$2,375
283123505620 s	Detection Systems, visual alarm, ADA type, excl. wires & conduit	4.00	Ea.	$103.99	$415
283123506400 s	Detection Systems, code transmitter, excl. wires & conduit	1.00	Ea.	$845.00	$845
283123507000 s	Detection Systems, break glass station, excl. wires & conduit	8.00	Ea.	$98.00	$785
283 Subtotal					**$5,795**
Total E Equipment & Furnishings					**$30,520**
Estimate Subtotal					**$182,520**
General Conditions (10%)					**$18,300**
G.C. O&P (15%)					**$30,100**
Architectural Fee (6%)					**$13,900**

Contingency	**$4,900**
Estimate Total	**$249,500**

Preliminary Bill of Material

Building 46 Hon-Tai

Quantity	Unit of Measure	Item
30	Feet	4" Schedule 10 pipe
320	Feet	3" Schedule 10 pipe
320	Feet	2-1/2" Schedule 10 pipe
7000	Feet	2" Schedule 10 pipe
1	Each	4" Flange
3	Each	4" Grooved elbow
1	Each	4" Grooved tee
6	Each	4" Grooved coupling
2	Each	3" Grooved outlet
1	Each	4" Grooved cap
2	Each	3" Grooved cap
4	Each	2-1/2" Grooved cap
25	Each	3" Grooved coupling
25	Each	2-1/2" Grooved coupling
80	Each	2" threaded outlet
750	Each	½" threaded outlet
750	Each	½" upright sprinkler head
1	Each	4" riser clamp
32	Each	3" pipe ring
32	Each	2-1/2" pipe ring
480	Each	2" pipe ring
1400	Feet	All thread rod
544	Each	Beam clamp
1	Each	4" Alarm check valve
1	Each	4" OS&Y Valve
1	Each	4" Check valve
1	Each	Fire department connection
1	Each	Waterflow switch
1	Each	Tamper switch
1	Each	Water motor gong
1	Each	Fire alarm control panel
1	Each	Digital alarm coded transmitter
8	Each	Manual pull stations
4	Each	Visual alarm
14	Each	Audiovisual alarm
1000	Feet	¾" EMT conduit
2000	Feet	1 pair 18 gauge fire alarm cable
40	Each	4" square junction boxes

4.9.4 U.S. sources of supply

Sources of supply for fire protection systems are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

4.9.4.1 Fire Protection and Suppression Systems

Product: Sprinkler heads, alarm valves, waterflow and tamper switches, etc.

Supplier: **Reliable Automatic Sprinkler Company, Inc.**
Address: 525 North MacQuesten Parkway
Mt. Vernon NY 10552
USA

Latin America Sales office:
2200 Luna Road
Suite 160
Carrollton, TX 75006
Tel: Fax:

Telephone: 1-972-243-1472 (Texas), 1-919-668-3470 (New York), 1-800-431-1588 (toll free in USA)
Fax: 1-972-243-1428 (Texas), 1-800-848-6051 (toll free in USA)
E-mail: sbernal@reliablesprinkler.com
Contact: Sylvia Bernal, Latin America Sales Representative
Web: http://www.reliablesprinkler.com

Supplier: **Viking Corporation**
Address: 210 North Industrial Park Rd
Hastings, MI 49058
USA
Telephone: 1-269-945-9501,1-800-968-9501 (toll free in USA)
Fax: 1-269-945-9599
E-mail: techsvcs@vikingcorp.com
Contact: Sales
Web: http://www.vikingcorp.com

Product: Sprinkler heads, alarm valves, waterflow and tamper switches, etc., grooved fittings and couplings

Supplier: **Tyco Fire and Building Products**
451 N. Cannon Ave
Lansdale PA 19446

Latin America headquarters:
1802 SW 2nd St.
Pompano Beach FL 33069
USA
Telephone: 1-954-781-0866 (Florida), 1-215-362-0700 (Pennsylvania), 1-800-523-6512 (toll free in USA)
Fax: 1-954-781-9330 (Florida), 1-215-362-4731 (Pennsylvania)
Contact: Sales

Web: http://www.tyco-fire.com

Product: Grooved fittings and couplings, fire protection valves

Supplier: **Victaulic**
Address: 4901 Kesslersville Rd
Easton PA 18040
P.O. Box 31
Easton, PA 18044-0031
USA
Telephone: 1-610-559-3300, 1-800-PICK-VIC, (1-800-742-5842) (toll free in USA)
Fax: 1-610-559-3608, 1-610-250-8817
E-mail: vical@victaulic.com
Contact: Latin America Sales
Web: http://www.victaulic.com

Product: Threaded and flanged pipe fittings

Supplier: **Anvilstar Fire Products Division**
Address: 110 Corporate Dr, Ste 10
P.O. Box 3180
Portsmouth NH 03801
USA
Telephone: 1-708-534-1414,1-603-422-8000
Fax: 1-708-534-5441, 1-603-422-8033
E-mail: NA
Contact: Customer Service
Web: http://www.anvilintl.com

Product: Fire pumps

Supplier: **A-C Fire Pump Systems**
Address: 8200 N. Austin Ave
Morton Grove, IL 60053
USA
Telephone: 1-847-966-3700
Fax: 1-847-966-1914
Web: http://www.acfirepump.com

Supplier: **Patterson Pump**
Address: 2129 Ayersville Rd
P.O. Box 790
Toccoa GA 30577
Telephone: 1-706-866-2101
Fax: 1-706-866-0023
E-mail: fpsales@pattersonpumps.com
Contact: Fire Pump Sales
Web: http://www.pattersonpumps.com

Supplier: **Aurora Pump**
Pentair Pump Group
Address: 800 Airport Rd

	North Aurora IL 60542
	USA
Telephone:	1-630-859-7000
Fax	1-630-859-7060 (USA), 630-859-1226 (International)
E-mail:	aurora_info@pentairpump.com
Contact:	Sales
Web:	http://www.aurorapump.com

Supplier:	**Reddy-Buffaloes Pump, Inc.**
Address:	PO Box 557
	1 Dixie Drive
	Baxley GA 31513
Telephone:	1-912-367-6345
Fax:	1-912-367-5024
E-mail:	sales@rbpump.com
Contact	Sales
Web:	http://www.rbpump.com

Product: Fire alarm systems

Supplier:	**SimplexGrinnell**
Address:	100 Simplex Drive
	Westminster MA 01441
	USA
Telephone:	1-978-731-2500, 1-800-SIMPLEX (toll free in USA)
Fax:	1-978-731-7856
E-mail:	NA
Contact:	Sales
Web:	http://www.simplexgrinnell.com

Product:	**Notifier**
Address:	12 Clintonville Road
	Northford CT 06472-1653
	USA
Telephone:	1-203-484-716,1-800-289-3473 (toll free in USA)
Fax:	1-203-484-7118
E-mail:	NA
Contact:	Sales
Web:	http://www.notifier.com

Supplier:	**Siemens Building Technologies, Inc.**
	Fire Safety
Address:	8 Fernwood Rd
	Florham Park, NJ 07932
	Latin America:
	3371 Executive Way
	Miramar FL 33025
	USA
Telephone:	1-954-433-7328 (Florida), 1-973-593-2600 (New Jersey), 1-800-222-0108 (toll free in USA)
Fax:	1-954-433-7329 (Florida), 1-973-593-6665 (New Jersey)

E-mail: roger.ariza@siemens.com
Contact: Roger Ariza, Regional Manager, Latin America
Web: http://www.sbt.siemens.com/fis

Product: Fabricated sprinkler piping

Supplier: **GEM Fabrication**
Address: 10230 Statesville Blvd
P.O. Box 309
Cleveland NC 27013
USA
Telephone: 1-704-278-6700,1-800-845-2023 (toll free in the US)
E-mail: gemfab@gemfab.com
Contact Sales
Web: http://www.gemfabrication.com

Product: Fabricated sprinkler piping, ductile iron and PVC underground piping, fittings, valves, hydrants, etc.

Supplier: **Hughes Supply**
Address: 4295 Kearney St
Denver CO 80216
USA
Telephone: 1-303-394-0004,1-303-329-0013
E-mail NA
Contact Sales
Web: http://www.hughessupply.com

Product: Fabricated sprinkler piping

Supplier: **Quality Fabrication and Supply**
Address: 255 Primera Blvd., Suite 230
Lake Mary FL 32746
USA
Telephone: 1-407-585-3222, 1-407-585-3284
E-mail: dgc@qualityfab.net
Contact: David Capalino, VP, Sales and Marketing
Web: http://www.qualityfab.net

Product: Ductile iron pipe, fittings

Supplier: **USA Pipe and Foundry Company**
Address: 3000 30th Ave N
P. O. Box 10406
Birmingham, AL 35202
USA
Telephone: 1-205-254-7442, 866-DIP-PIPE (toll free in USA)
Fax 1-205- 254-7165
E-mail: NA
Contact: Sales
Web: http://www.uspipe.com

Supplier:	**Griffin Pipe Products**
Address:	1400 Opus Pl, Ste 700 Downers Grove IL 60515 USA
Telephone:	1-630-719-6500
Fax	NA
E-mail:	NA
Contact:	Sales
Web:	http://www.griffinpipe.com
Product:	Underground PVC pipe, fittings

Supplier:	**National Pipe and Plastics, Inc.**
Address:	3421 Old Vestal Rd Vestal NY 13850 USA
Telephone:	1-607-729-9381, 1-800-836-4350 (toll free in USA)
Fax	1-607-729-6130
E-mail:	rjm@nationalpipe.com
Contact:	Sales
Web:	http://www.nationalpipe.com
Product:	Valves, fire hydrants

Supplier:	**Kennedy Valve Company**
Address:	1021 East Water St Elmira NY 14902 USA
Telephone:	1-607-734-2211
Fax	1-800-952-4771 (toll free in USA)
E-mail:	NA
Contact:	Sales
Web:	http://www.kennedyvalve.com

Supplier:	**Mueller Company**
Address:	500 West Eldorado St Decatur IL 62525 USA
Telephone:	1-281-590-4600 (Texas),1-217-423-4471 (Illinois), 1-800-423-1323 (toll free in USA)
Fax:	1-419-710-0098
E-mail:	NA
Contact:	Abraham Quijada - International Sales Manager (Texas)
Web:	http://www.muellercompany.com
Product:	Fire Protection and Suppression Systems

Supplier:	**Hiller Systems**
Address:	833 Principal La Chesapeake VA 23320 USA
Telephone:	1-757-549-9123
Fax:	1-757-549-1083

E-mail:	sales@hillersystemsinc.com
Contact:	Sales
Web:	http://www.hillersystemsinc.com

Supplier:	**Koetter Fire Protection**
Address:	10351 Olympic Dr Dallas TX 75220 USA
Telephone:	1-214-358-3593, 1-800-441-0394 (toll free in USA)
Fax:	1-214-350-9930
E-mail:	NA
Contact:	Sales
Web	http://www.koetterfire.com

Supplier:	**SimplexGrinnell**
Address:	100 Simplex Drive Westminster MA 01441 USA
Telephone:	1-978-731-2500, 1-800-SIMPLEX (toll free in USA)
Fax:	1-978-731-7856
E-mail:	NA
Contact:	Sales
Web:	http://www.simplexgrinnell.com

4.9.4.2 Fire Apparatus

Supplier:	**Seagrave Apparatus LLC**
Address:	105 East 12th St Clintonville WI 54929 USA
Telephone:	1-715-823-2141
Fax:	1-715-823-5768
E-mail:	NA
Contact:	Sales
Web:	http://www.seagrave.com

Supplier:	**American LaFrance**
Address:	8500 Palmetto Commerce Parkway Ladson SC 29456 USA
Telephone:	1-843-486-7400, 1-888-253-8725 (toll free in USA)
E-mail:	customersupport@americanlafrance.com
Contact:	Customer Support
Web:	http://www.americanlafrance.com

Supplier:	**Pierce Manufacturing Inc.**
Address:	2600 American Dr. Appleton, WI 54912 Latin America: Matt Reda 3704 S.E. 45th Place Ocala, FL 34480 USA
Telephone:	1-920-832-3231 (Wisconsin), 1-352-867-7605 (Florida)
Fax:	1-920-832-3084 (Wisconsin), 1-352-867-7605 (Florida)
E-Mail:	mjmdreda@aol.com (Matt Reda), contactcenter@piercemfg.com
Web:	http://www.piercemfg.com

Supplier:	**Singer Associates**
Address:	7394 Gallerher Rd Gainesville VA 20155 USA
Telephone:	1-800-442-9700 (toll free in USA)
Web:	http://www.singerfire.com

4.9.4.3 Fire Protection Engineering

Supplier:	**Clark Nexsen**
Address:	6160 Kempsville Ci, Ste 200A Smithfield Building Norfolk VA 23502 USA
Telephone:	1-757-455-5800
Fax	1-757-455-5638
E-mail:	cborn@clarknexsen.com
Contact:	Christopher Born, Director, Fire Protection Engineering
Web:	http://www.clarknexsen.com

Supplier:	**Aon**
Address:	Aon Center 200 East Randolph Chicago IL 60601 USA
Telephone:	1-312-381-1000
Contact:	Fire Protection Engineering Service
Web:	http://www.aon.com

Supplier:	**Schirmer Engineering Corporation**
Address:	Chicago - Corporate HQ 707 Lake Cook Road Deerfield IL 60015-4997 USA
Telephone:	1-847- 272-8340
Fax:	1-847- 272-2365
E-mail:	jim_bichauski@schirmereng.com
Contact:	Jim Bichauski
Web:	http://www.schirmereng.com

Supplier:	**Hughes Associates Inc.**
Address:	3610 Commerce Dr Baltimore MD 21227-1652 USA
Telephone:	1-410-737-8677
Fax:	1-410-737-8688
E-mail:	info@haifire.com
Contact:	Sales
Web:	http://www.haifire.com

Supplier:	**The RJA Group, Inc.**
Address:	600 West Fulton St, Ste 500 Chicago, IL 60661 USA
Telephone:	1-312-879-7200. 1-312- 879-7220
Fax	NA
E-mail:	NA
Contact:	Sales
Web:	http://www.rjagroup.com

4.10 Prepare a project implementation schedule

4.10.1 Buildings systems

As discussed in Section 4.9, the following tasks will be required to implement the building sprinkler and alarm systems:

Development of layouts, construction drawings or as-built drawings for the buildings;
Design of the fire protection system;
Approval of the designs;
Site surveys;
Development of stocklists;
Procurement and delivery;
Installation; and
Testing and start-up.

The time required to develop base layouts for the buildings if detailed drawings are not available can vary. The design process can be expected to take approximately 90 weeks, or approximately 1 year 9 months. If all of the buildings are done sequentially. Subsequent procurement efforts could also vary depending on bidding requirements. Installation is expected to take another 4 to 6 weeks per building. Depending on whether work on the degree to which work is carried out concurrently on the various buildings, the installation of sprinklers and alarms systems throughout the Port could thus be accomplished in two to three years. The availability of funding for the estimated $7.0 million cost would also be a factor, and limitations on funding could necessitate phasing the work over a longer time frame.

4.10.2 Underground water mains and hydrants

Layouts have already been developed for the underground utilities by another firm. Detailed design of the system can be expected to take approximately 12 to 18 months. Another 12 to 18 months would be required for construction and installation. Thus, the Port and free zone's hydrant system could be developed and upgraded over 2 to 3 years, depending on the availability of funding for the estimated $2.9 million cost.

5. EVALUATION AND RECOMMENDATION OF CARGO HANDLING IMPROVEMENTS

5.0 Introduction

DMJM Harris has prepared the final report providing evaluations, conclusions and recommendations. Previously, interim reports were provided, including alternatives for consideration by ENP. After consideration and review of the interim submittals by the Client, DMJM Harris has developed final recommendations. This section of the report covers the evaluation of cargo handling operations, equipment condition, and potential commodity markets, recommendations for improvement of container and break bulk cargo handling and conceptual development of a bulk terminal, environmental abatement measures, training programs, cost estimates and potential sources of supply. The report is based on a review and evaluation following a site visit in November 2004, a follow up visit in April 2005 and a presentation in December 2005, at which Client comments were reviewed, delivery of the draft final report in August 2006, followed by a meeting and presentation in January 2007 to review Client comments. This section was prepared primarily by DMJM Harris cargo handling experts, Richard Olson, Ernest Ball, Klaus Kroeter and Sergio Canales, and trade forecasting expert Michael Sclar, with assistance from Saybe specialist, José Sandoval.

5.1 Lines of communication and dialog with ENP and CPME for coordinating and assisting in the privatization efforts.

Two site visits were made to the Port of Cortés for purposes of reviewing cargo handling operations and facilities. The visits were made to observe cargo handling methods and procedures currently used at the Port, and to evaluate and develop recommendations for improvements in procedure, equipment and management of these activities. On the visits to the Port, activities were conducted in three primary areas:

- Initially meetings were conducted at all levels within the Port administration in an effort to establish a dialog with each of the departments involved in the day to day operation and planning of the Port operation. These meetings were particularly helpful and provided a current understanding of the activities and problems within the Port from ENP's perspective.

- A tour of the Port was completed, including all of the berths, warehouses, gates, storage yards and miscellaneous areas. In addition, a variety of cargo operations were monitored and studied. These activities provided a real time view of the physical facilities within the Port as well as operating practices being used.

- Meetings were conducted with the four major container operators and two major bulk stevedores serving the Port of Cortés and a tour of their dedicated terminal areas. These meetings provided insights into the problems and concerns expressed by some of the Port's major cargo handlers.

These visits and meetings provided valuable opportunities to see and understand the opportunities and potential that the Port of Cortés can provide to the country of Honduras as well as the community involved in the import and export of cargo. By understanding the unique features and opportunities of the Port, the team can more clearly define improvements that will lower the cost of operations and increase productivity. These improvements will offer the potential to reduce the cost of operations within the Port and hence improve the cost structure of both import and export cargo. Such improvements within the Port will also enhance the opportunities for privatization.

The specific facilities visited included the Texaco petroleum installations, the molasses and chemical terminal, the ENP container terminal, the Chiquita operation, the break bulk handling and storage area, the port maintenance facilities and Information technology center, as well as the free zone, and both port gate operations. Also visited were the cabotage berths near the Free Zone. During the site visits,

meetings were carried out with the major ship lines serving the port, including Maersk, Crowley, Seaboard, Chiquita and local stevedores responsible for stevedoring services at the port. Their container storage facilities were also visited. Meetings were conducted with key staff at ENP and the various shipping firms.

During the visits, cargo handling activities were observed over periods totaling 12 days on site. The Port's two Paceco gantry cranes were operating, and the Berth 5, the container berth, was fully occupied by a series of container and ro-ro vessels. Berth 4 was heavily committed to a mix of vessels loading and unloading miscellaneous cargoes, ranging from boxes of fruit and bananas to containers of bananas carried by self loading Chiquita Great White Fleet vessels. Berth 3 was occupied by a mix of break bulk vessels, container vessels, with cargoes handled using shipboard cranes and bulk vessels with cargoes being unloaded to portable hoppers using ships' cranes The port's rented Gottwald tire-mounted harbor crane was utilized for loading or unloading containers and bulk grain. It was noted that the congestion at Berth 3 resulted in the bulk vessels being required to move to anchorage to free the berth for liner vessels. This procedure resulted in considerable delay to the chartered vessels.

Although CPME was not represented during the visits to the Port of Cortes, ENP staff conducted several briefing sessions during which the background of government and CPME objectives were discussed. The concept of privatization as envisioned by CPME, which proposed to privatize the operations and management of the Port of Cortes under a master concession, was briefly discussed. The ENP staff indicated that no_decision had yet been reached by CPME on when to proceed with the privatization program. Initial observation of operations at the port confirms the need for one or more concessions to improve port operations.

5.2 Review and evaluation of present cargo handling options, equipment, and procedures (containers, dry bulk, and break bulk)

5.2.1 Containers

The review and evaluation for container handling considered three areas: defining current procedures, equipment and operations. For clarity, a brief description of current practices or existing conditions is provided, followed by an evaluation, listing areas of concern and opportunities for improvement.

Current Practice - Procedures

Nearly all of the container activity at the Port occurs on a scheduled basis, with vessels arriving either weekly or fortnightly. Two days prior to arrival, the carrier must submit a berthing request, in writing, stating the arrival and departure time as well as equipment needs and the number of lifts to be completed. During discussions with the four major container carriers, it was learned that their practice is for vessels to arrive at anchor, prior to berthing, thus ensuring that the vessel is ready and waiting for the pilot to arrive for movement of the vessel to the assigned berth.

Berth activity is planned, by the Port, on a rolling seven day schedule for Berths 1, 1A, 3, 4 and 5; showing vessel position and duration on berth in three hour increments. This schedule is updated daily and reviewed during the "morning" operations meeting for the planning and assignment of labor and equipment for each vessel. During this meeting, equipment availability is reported by the maintenance department and the Port confirms its ability to supply the equipment requested by the carrier.

The Port's stevedoring and equipment labor work on a shift basis. Information received from the operation department confirms that the "A" shift works from 0700 to 1500 and the "B" shift works from 1430 to 2130. These shifts are scheduled every day, with the labor reporting for work and being paid, whether there is work or not. The "A" shift does not work overtime. The "B" shift works on an overtime basis, as required, to complete vessel operations or until the "A" shift returns the next day.

Upon completion of cargo operations, the vessel must wait for the pilot to arrive, before the vessel can depart.

Evaluation

The vast majority of the containerized cargo moving through the Port arrives on a fixed day schedule. The ship's schedule requires that it complete its cargo exchange and depart on a timely basis. Any delay in this process will impact the vessel's arrival at the next port of call as well as the financial viability of the vessel operation. For this reason the carrier is eager to see the vessel arrive and depart on schedule. Likewise, the Port, with limited resources to work the vessel, is rewarded by servicing each vessel as quickly as possible and discharging it so the berth can be used by the next vessel.

The high proportion of scheduled arrivals at the Port of Cortés must be looked at as a benefit for the Port, simplifying the task of planning and utilization of the berths and equipment. The Port must take steps to reward those carriers that maintain their arrival schedule by providing a berthing "priority." A system should be established to monitor arrival integrity, taking care to accurately record if the Port or the carrier causes a delay in either the berthing or initiation of cargo operations.

This process works best when there is active communication between the Port and the carrier. In many cases, delays are known ahead of time. When the Port can communicate information to the parties that will be affected, including an accurate explanation of the reasons, a sense of cooperation is developed and often, the impact can be reduced. In discussions with the carriers, this was a common concern and offers the opportunity for improvement and requires the Port's timely attention.

Container Handling Equipment

Containers in the Port are handled on a roll-on roll-off (ro-ro) basis as well as the conventional lift-on lift-off (lo-lo) basis. While the lo-lo operation normally provides a faster means of unloading and reloading of the vessel as well as a higher vessel utilization, it does require either-shore based equipment or vessel-based equipment to lift the containers on and off the vessel. Ro-ro operations on the other hand require a minimum quantity of equipment as well as have limited berth needs.

The Port currently has two A-frame-type container handling cranes, both manufactured by PACECO. Crane #1 was installed in 1978 and Crane #2 was installed in 1993. While general information defining operating speeds and dimensions for Crane #1 was not available, limited information was available for Crane #2 and confirmed that it is marginally able to service a Panamax-sized vessel. In addition, when the site visits were carried out in May 2005, the Port had a mobile Gottwald crane on lease, including maintenance and operation. According to information received in January 2007, the Port had terminated the lease of the Gottwald crane, but had leased another, and additionally was in the process of leasing a second one. When the original visits were carried out, the Port also had 37 yard tractors and 47 chasses, used to support cargo operations as well as the warehouse activities. According to the information in January 2007, the Port had 57 tractors and 62 chassis. Containers are stacked within the Port using straddle carriers. On the original visit, the Port had 10 straddle carriers, capable of stacking containers one over two or three high, but as of January 2007 this number had been increased to 14.

Evaluation

Discussions with the carriers using the Port as well as extensive observations of container activity have identified that one of the critical problems affecting productivity is the limited and often intermittent availability of tractors to move the containers to and from the vessel during operation. Carriers are required to use the Port's equipment, such as yard tractors, if available. However, if the Port is unable to fill the equipment order, the carrier is allowed to substitute outside equipment. If, for example, the carrier

requests ten trucks and the Port can only provide eight, the carrier is permitted to provide equipment sufficient to overcome the shortfall. However, all of the carriers "hire" the trucks from outside firms and there is a time lag for filling equipment orders. Historically, the shortage of trucks, primarily due to breakdowns, is most severe on weekends and during the late night shift, adding to the problem of finding replacements in a timely manner. The Port is not able to effectively and consistently provide the number of trucks requested or promised, and the shortfall is often not identified until the last minute. A fleet of 37 trucks should be adequate to supply the demand and also provide back ups to cover breakdowns and routine maintenance work. However, the Port's current truck fleet is of questionable condition and reliability.

Over the short term, the Port should set up a contingency agreement with an outside trucking company to supplement the Port truck fleet, on short notice, when the Port can not provide the agreed number of trucks for operation. In this manner, the Port would be able to better honor the commitments it has made to the carriers and cargo handling productivity will improve. Over the long term the Port must upgrade its maintenance programs to support their equipment or possibly evaluate the economics and set up a program for replacement. In addition, by improving management IT systems, it should be possible to more accurately determine the Port's ability to provide equipment throughout the day, and either avoid making commitments for equipment in excess of the Port's ability to delivery, or at least notify the carriers on a more timely basis of any shortfalls due to equipment downtime or labor not reporting, thus enabling carriers to make their own arrangements.

When the original visit was conducted in May 2005, the Port had a fleet of 47 chasses which were provided with the tractor for lo-lo operation. (Note that a chassis is not required for ro-ro operations.) After the visit in May 2005, it was observed that the chassis design has gone through a number of improvements in recent years to add to the durability of the chassis as well as make it more effective for the easy loading and efficient transfer of containers between the yard and the vessel. Since a "yard" chassis is not used over the road, it is not necessary to incorporate hold-down twist locks. These can be replaced by "guides," strategically located to assist the crane operator in landing the container quickly, without damaging the box. The modern yard chassis also has an "open bottom" near each corner to facilitate the safe and efficient removal and attachment of the inter-box connector (IBC). While it is understood that the Port has ordered additional yard chassis of a modern design, they must continue to replace the older, less efficient chassis as quickly as possible. Continued use of the old style chassis reduces productivity and increases operating costs. In January 2007, it was noted that the Port had increased the fleet of chassis to 62, and that 20 of the 62 chassis in the fleet were already cornerless units, capable of handling 40, 45 and 20-ft containers.

On the visit in May 2005, the Port had a fleet of 10 straddle carriers that were used to ground containers in the Port's storage area as well as to assist the Gottwald crane during the discharge of containers. Four of the units were manufactured by Nelcon and the 6 others by FEL. Four of the units have been out of service due to maintenance problems for some time. The existing units can stack one over two. At the meeting in January 2007, it was commented that the Port has 14 straddle carriers.

Over the long term, the Port should consider alternatives to provide greater storage density. If the Port wishes to continue with straddle carriers, a program to replace the current fleet with larger one-over-three equipment should be considered. This would offer a 50% increase in storage capacity within the same area. An alternative to this is the introduction of rubber-tired gantry cranes (RTG), which also stack containers from the top down but in larger blocks, hence increasing the storage density approximately 35% over that of the straddle carriers. While this is an effective way to dramatically increase storage density, it does require some facility modifications and for that reason would be best considered in conjunction with the Berth 6 expansion.

The two existing Paceco cranes are relatively "slow" (due to their limited operating speed) and can not provide enough capacity to adequately service the container volume moving through the Port while also

allowing sufficient time for an effective preventive maintenance (PM) program. The Port should budget for additional container cranes to be used in conjunction with the existing equipment. To shorten the delivery period, refurbished used equipment should be considered. Since shore-based gantry cranes are superior in productivity and reliability to shipboard cranes, this would allow the Port to service vessels faster and increase overall capacity, without adding more berth capacity. This is not to say that this would replace the Berth 6 expansion but rather that this would provide a short-term increase in throughput capacity.

Container Operations

Approximately 70% of the container volume handled by the Port is conveyed by four carriers; Maersk-Sealand, Seaboard Marine, Crowley Liner Services and Chiquita Great White Fleet. Once the containers are off-loaded they are trucked to separate "terminal" areas that are operated by the individual carrier. With the exception of Chiquita, the Port provides the labor, tractor and chassis to move the containers between the berth and the carrier's terminal. The remaining volume is handled on a case-by-case basis with some of the carriers choosing to store their containers within the Port while others have arranged to store their containers within various separate terminals.

Operation of the shipboard cranes is arranged by the carrier and does not involve Port labor. The Gottwald crane is under lease to the Port and includes labor for operations, as well as maintenance. The two Paceco cranes are operated by Port labor, the operators being supplied from a pool of union members who have received training in the operation of this equipment.

In addition to stevedoring labor provided by the Port, a checker and supervisor (controller) are also provided to record cargo movements and supervise the labor. Both are union members.

Evaluation

Discussions with the carriers identified the shift changeover as a constant source of problems and delays. Frequently, work stops completely for a period of between 30 minutes and an hour. While this has reportedly been the topic of numerous conversations between the Port and its customers, the problem continues.

Cargo production is often stopped or delayed because there is not a truck under the crane. This can be partially overcome by grounding import containers in the back reach, rather than stopping and waiting for the truck to arrive. Once the vessel has sailed, these boxes could be transferred to chasses via the shore crane or using a straddle carrier. In this manner, the vessel could be worked faster and depart sooner, freeing the berth for the next ship.

After the site visit in 2005, it was recommended that the repair work currently underway on Berth 5 be completed as soon as possible. This is a prime location within the Port and affects the productivity of all cargo operations in the Berth 3, 4 and 5 area. In addition, the increased berth length could be used to service the vessels arriving at the Port in a more timely and efficient manner. According to information in January 2007, Berth 5 was no longer under repair.

5.2.2 Dry bulk

At the present time there are no specialized facilities or equipment for loading or unloading dry bulk cargoes at the Port of Cortes. Dry bulk cargoes are handled at Berth 3, with delivery to and from the port by over-the-road trucks and tandem tractor trailers supplied by the cargo receiver or producer. There is

little export of bulk cargo at the present time, except for sugar and ore. Most dry bulk cargo is inbound. Table 5.2-1 lists the bulk cargoes handled at the Port of Cortes for the years 2000 to 2004, according to the data received on the visit in May 2005. Fertilizer materials for farm use, and agricultural commodities for the feeding of the general population, and for animal and fish farm feed, constitute the vast majority of the of dry bulk cargoes. There are also imports of coal and exports of sugar and ore concentrate.

Table 5.2-1
Bulk Cargoes at the Port of Cortes, 2000-2005
(tons)

	2000	2001	2002	2003	2004
IMPORTS					
Fertilizers					
Urea					
Potash					
Phosphates					
CAH					
Amm. Nitrate (May be in bags)					
Total Fertilizers	212,100	196,400	215,200	205,500	205,700
Grains and bulk foodstuffs					
Wheat	168,200	199,400	182,100	143,700	182,600
Corn	152,200	230,000	218,000	225,500	256,900
Sorghum			-	-	-
Soybean Meal			-	-	204,000
Rice	123,700	140,500	136,500	114,800	129,700
Feed Products			-	-	-
Barley & Malt			-	8,300	12,000
Red Beans	3,700	1,000	500	5,100	-
Total grains and bulk foodstuffs	447,800	570,900	537,100	497,400	785,200
Other					
Coal or Petcoke	112,000	124,100	169,500	101,400	126,300
Salt					
Textile Salt					
Cement/Clinker					
Total other	112,000	124,100	169,500	101,400	126,300
Total Imports	771,900	891,400	921,800	804,300	1,117,200
EXPORTS					
Ore Concentrates	92,800	57,300	38,000	36,200	41,500
Raw Sugar	6,700	88,200	27,400	15,000	10,600
Cement, Clinker & Other					
Total Exports	99,500	145,500	65,400	51,200	52,100
TOTAL IMPORTS AND EXPORTS	871,400	1,036,900	987,200	855,500	1,169,300

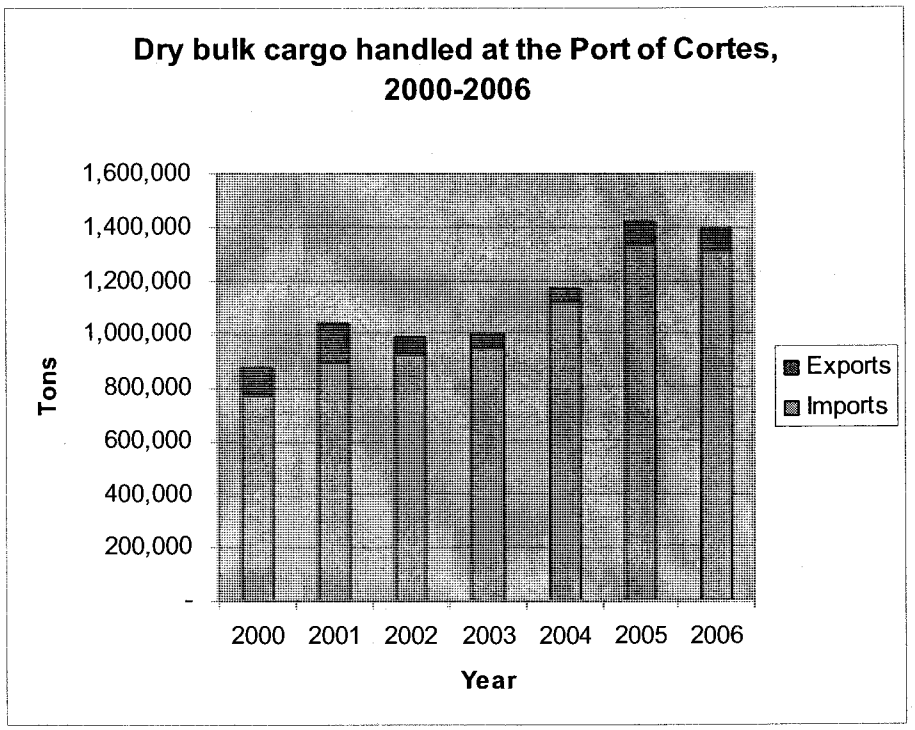


Fig. 5.2-1 Dry bulk cargo handled at the Port of Cortés

During the meeting in January 2007, data was received from ENP for the years 2003 to 2005, and preliminary numbers for 2006. Subsequently, final numbers for 2006 were received. These new figures are summarized in Figure 5.2-1. As can be seen in the figure, the rate of increase in dry bulk cargo handled at the Port of Cortés has increased in recent years. For the period 2000 to 2004, an average growth rate of 7.6 percent per year was observed in dry bulk cargo. For the period 2000 to 2006, the average growth rate was 8.1 per cent per year. In addition, some revisions of previously reported figures were noted, for example an increase of some 143,000 tons in the cargo reported for 2003, mainly due to the inclusion of 136,642 tons of soy flour. These new figures were not included in the forecasts prepared previously, but will be reviewed in a study which is being prepared subsequent to the present technical assistance.

Currently the parcels of dry bulk arrive on small to handysize bulk cargo vessels. Typical dimensions of bulk carriers are shown on Table 5.2-2. They are discharged by ships cranes and clamshell buckets. In some cases, if the vessel's buckets are not large enough for a maximum speed of unloading, the contracting stevedore will substitute his own clamshell bucket. Bucket size in this type of operation runs from 3 to 8 m3, depending on the weight of the commodity being handled, and the capacity of the unloading equipment. Unloading observed during visits to the Port was being carried out working several holds at the same time, or one hold only, as dictated by the cargo situation or by unavailability of truck transport. When the Gottwald crane is available, it can supplement or substitute for the ships cranes or, if a gearless vessel is being unloaded, can be the sole means of discharging the cargo.

Table 5.2-2
Characteristics of Handysize, Handymax and Panamax Vessels

Type	Deadweight tonnage	Length M	Beam m	Draft m
Handysize I	26,000	177	22.9	10.4
Handysize II	37,000	196	25.5	11.4
Handymax	53,000	190	32.3	12.5
Panamax	60,000-70,000	290	32.3	12.1

The ENP role for dry bulk cargo is limited. ENP supplies the pilot and tug for berthing and deberthing, the ships berth, and the wharf and truck scale, and gate control. The actual unloading (or loading) operation is carried out with ship's cranes by a contract stevedore, who supplies the wharf hopper, the mobile equipment needed on board vessel for safe discharge (small dozers, small front loaders, and labor and supervisors for the shipboard work and wharf cleanup. Normally the consignee arranges for the truck transport to destination. Examples of current unloading of a bulk cargo at Berth 3 are shown on Figures 5.2-2 to 4. The vessels shown in the photographs are discharging fertilizer material and soybean meal.

Fig. 5.2-2a Vessel Unloading Bulk Fertilizer to Trucks Using Ships' Gear and Hoppers

In Fig. 5.221a and b, the vessel's crane can be seen unloading bulk fertilizer (potassium chloride) from a small bulk carrier (approximately 26,000 dwt) positioning a stevedore-supplied clamshell bucket over a portable dockside hopper with flow gate control. The capacity of the hopper is sufficient to hold three cycles of the crane and bucket (approximately 18-20 m3). As can be seen in Fig. 5.2-2b, three holds are being worked to three dockside hoppers. A truck is positioned under the hopper to receive the fertilizer. Cycle time for the unloading under free digging is between 1.5 and 2 minutes, with rate declining to 3 minutes or more as cargo is depleted and requires manual cleanup.

It is the responsibility of the receiver or charterer to supply the truck transport, and the distance between the vessel and the receiving point can be from 10 to 30 km.

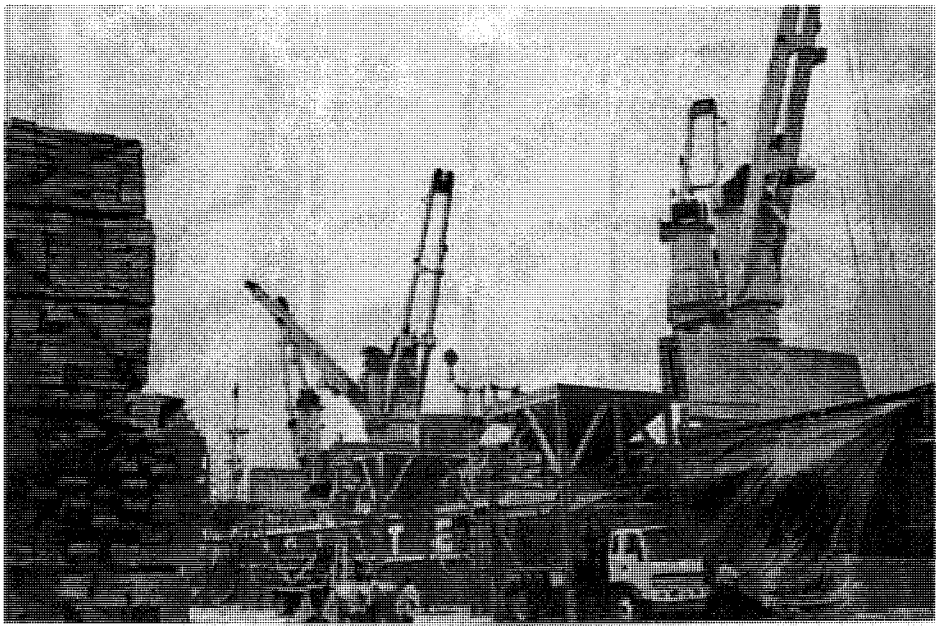


Fig. 5.2.-2b Vessel Discharging Fertilizer to Truck Using Ships' Gear and Hoppers

The availability of truck transport is critical to the unloading. There is no longer rail service to the Port of Cortes, the railroad having been abandoned recently after its last engine was lost, due to collapse of a rail trestle. Thus a shortage of trucks can greatly reduce the vessel unloading and can limit the discharge to one hold at a time.

Since the daily cost of a bulk carrier can exceed $15,000 per day for Handymax and $17,000 for Panamax, and dockage fees can be as much as $4,000 per day, delays are exceedingly costly to vessel and charterer, and impact the entire economy of Honduras by increasing the cost of agriculture production and consumer consumption of commodity based locally produced food products.

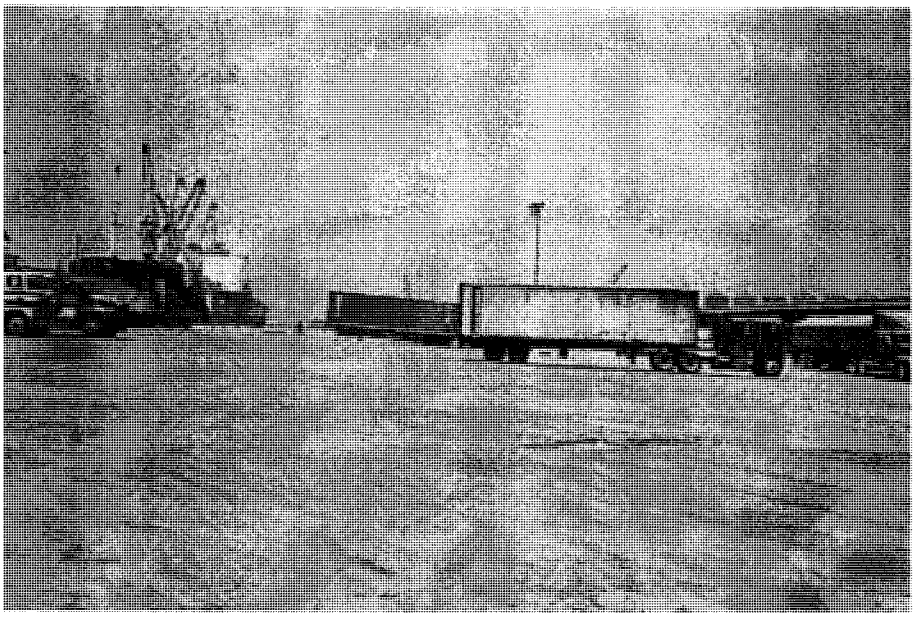


Fig. 5.2-3 Vessel at Berth 3 preparing to discharge fertilizer

In Fig. 5.2-3, a self unloading bulk carrier can be seen in the distance berthed at Berth 3 with a dock side hopper alongside, preparing to discharge fertilizer. The space alongside is adequate for access to and from shipside, but parking of tractor trailers servicing break bulk cargo at Berth 2 limits the working area for the bulk transport.

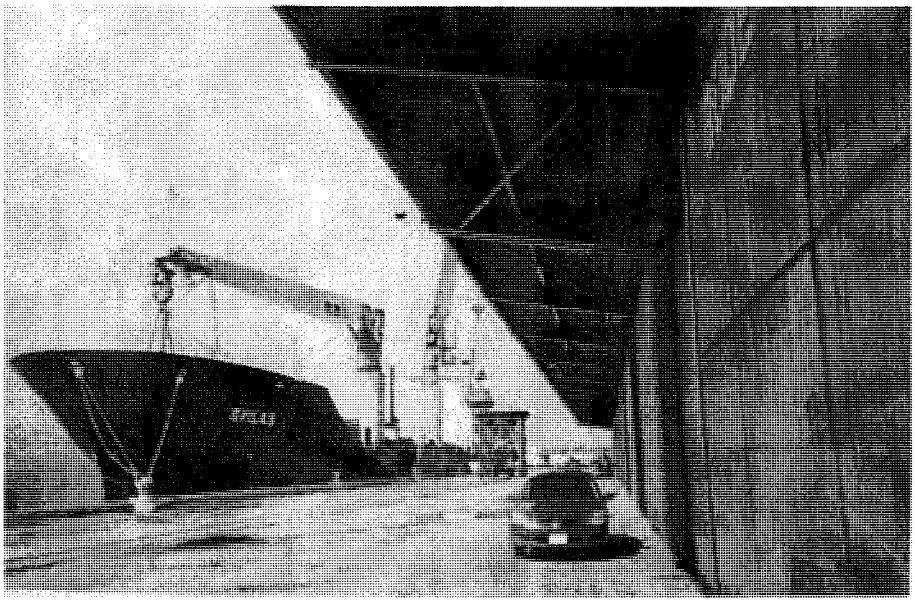


Fig. 5.2-4 Vessel discharging soybean meal

Fig. 5.2-4 shows the chartered vessel "Svilas" discharging soybean meal to a single dockside hopper to a dump truck for delivery to the Cargill distribution terminal located between the Port of Cortes and San Pedro Sula, some 30 km away. At the right of the photo is a transit shed located on the wharf at Berth 3. Prior to containerization, such transit sheds were necessary at ships berths for the collection and distribution of incoming and outgoing break bulk cargo. However, since the advent of containerization, most ports of the world have cleared such warehouses from the working wharf surfaces, and relocated them to port areas where they do not interfere with port traffic.

The role of the stevedore for dry bulk cargo

Labor and equipment, including dock side hoppers, clamshell buckets, and mobile equipment aboard vessel, to aid in unloading, is supplied by the contracting stevedore. The two principal stevedoring companies providing bulk cargo services in the Port of Cortes, both of whom were interviewed for this study, are Maritima Transportes Honduras, and Terminales de Cortes.

Equipment used in the ship hold during operations observed on the site visits consisted of small "bobcat" front loaders and light "John Deere" or similar dozers. The dozers are used to keep the cargo level during discharge, particularly in the case of fertilizers, which can set up and bridge, creating canyons in the ship hold. It is particularly important for safety reasons to keep the cargo level in the hold. Canyons in the bulk cargo can collapse, causing injury or death to workmen in the hold. Once hold bottom is reached, the "bobcats" can complete the hold cleanup without danger of cargo collapse, which could occur were dozers not used during the initial unloading.

5.2.3 Break bulk

Since the advent of containerization, and the use of ro-ro vessels, the volume of break bulk cargo as a percentage of total cargo has declined significantly worldwide. The Port of Cortes break bulk cargo today consists primarily of boxed fruits (bananas, papayas, melons and the like, loading to non-containerized vessels). However, most fresh fruits are shipped in refrigerated containers today, although some unloading ports continue to favor refrigerated break bulk.

Other break bulk cargoes handled at the Port of Cortes are machine parts in cases, construction materials, project cargoes, and some bagged cargoes, and lumber. These cargoes may be either import or export. During the port visits, no loading or unloading using stevedore winged pallets was seen, although most of the cargo in the warehouses was packed on shipping pallets, which require a stevedore pallet, sling, or other support to be loaded or unloaded.

The ENP role in the handling of break bulk cargo is more significant than in the case of dry bulk. Here the ENP supplies not only the tug, pilot, berth and the use of the wharf, but also the warehouse, the checkers and much of the forklift and transport equipment within the port, as well as the labor for operating, protecting, documenting and controlling the inflow and outflow of the cargo. These stevedores are restricted from using their own equipment, unless ENP equipment is unavailable. ENP labor contracts with the port workers union restrict and limit work flexibility, and working hours.

Contract stevedores provide the labor for shipboard work in the cargo holds, ships cranes, checkers and sling men. Such personnel are not covered under the ENP labor union contract.

Carriers and stevedoring companies interviewed indicated that the Port's inability to supply drivers, equipment and wharf and warehouse labor is causing delays in the completion of loading or unloading, thus contributing to berth congestion at the port. The port users also indicated that the Port often did not inform them of shortfalls in equipment orders on a timely basis.

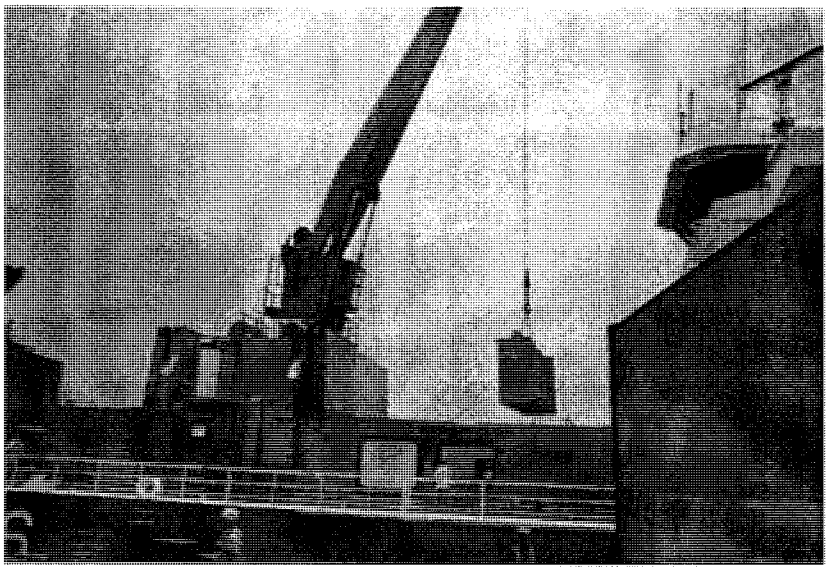


Fig. 5.2-5 Loading of boxed fruit using ships' gear

During the visits to the Port of Cortes, very little break bulk cargo handling was observed. Fig. 5.2-5 shows the loading of boxed bananas and fruit, primarily melons, with ships cranes. The lifting device is loaded by forklift truck directly from the transport carrier which drives onto the wharf and backs into a location where the forklift can reach the back of the truck to transfer the boxed fruit directly to the lifting device. The boxes are stowed manually in the ship hold.

While fresh fruit is sometimes handled as refrigerated break bulk cargo, it should be noted that, according to the ENP port statistics, 100% of melons and 90% of bananas move in refrigerated containers. Thus the volume of break bulk cargo handled in boxes is small. There is a refrigerated warehouse at the port, which can be used for break bulk fruit and other perishables. With use of this warehouse, direct delivery of fruits from plant to vessel is not always required. With this facility, sufficient cargo to meet vessel schedule can be accumulated in advance of vessel arrival of such vessels and free up berthing space.

5.3 Development of concepts for improved container handling efficiency for quicker and lower cost handling

Background

The Port services approximately 30 to 35 container ships on a weekly basis, which is considered high for a two-berth facility. The number of moves per ship varies from a low range of 100 to a high of approximately 400 lifts. The majority of the vessels are worked on Berths 4 and 5, with some being worked on Berth 3. The latter berth is also the principal berth for general and break bulk cargo. The container ships are all smaller than Panamax size, with nearly all being cellular, designed to carry containers and be worked efficiently by a gantry crane. The smaller size of these vessels should facilitate high hourly production rates, assuming efficient preplanning, a concise set of procedures, adequate equipment and trained stevedoring labor.

The ro-ro container volume currently moving through the Port accounts for approximately 20% of the total container throughput. Production is reported to be approximately 40 moves per hour. While this rate can

be affected by delays in the availability of Port-supplied trucks that are used for the shuttle to and from the storage yard, the production is generally limited by the constraints imposed by the vessel.

Production on the lo-lo vessels varies due to a number of factors and is reported to average less than 25 moves per hour. Due to the limited area for container storage immediately behind the berth (the most efficient location for container storage), most of the containers are stored in container yards (CYs) some distance from the berth. While this situation is less than ideal, it can be overcome with an appropriate amount of supervision and an adequate number of trucks to perform the shuttle. This latter point is critical to the increase in production rates and the lowering of overall costs.

Hourly Production Standard

While an hourly production of 25 moves per hour was considered respectable 15 or 20 years ago, it reflects the need for improvement today. A short-term goal should be established to improve hourly production by 10% with a long-term goal to consistently average above 30 moves per hour.

Operational Procedures

A clear set of procedures should be developed and communicated to all members of the union and Port staff assigned to cargo operations. Examples of these procedures would include the proper location for the grounding of hatch covers. When taken off the ship they should be grounded in the back reach, leaving the area between the crane legs free for truck traffic. During the observation of cargo operations, it was noted that congestion that occurred when hatch covers were grounded between the crane legs, causing truck traffic to be delayed and production capacity to be lost.

Equipment Breakdowns

Historically, in ports around the world, one of the major causes of crane breakdowns has always been the spreader. This due in part to the abuse it is subjected to during normal operation. To compensate for this, it is typically the practice to have a spare spreader ready for use and positioned on a chassis for quick movement to the crane. The Paceco cranes are equipped with "quick change" head blocks which were specifically designed to accommodate the fast exchange of spreaders. The defective spreader can then be moved back to the shop for repair. On the site visit in 2005, it was noted that the Port had one spare spreader which would normally be considered adequate for two cranes. However, because of the differences in the control systems on each crane, the spreaders are not interchangeable. If this could not be overcome with some form of "black box" to act as a conversion device, it was recommended that another spreader be purchased as soon as possible. As of January 2007, it was indicated that the Port had 2 spreaders, plus 2 spares, and that modifications had been made so that all were interchangeable.

While observing cargo operations, it was noticed that on each of the Paceco cranes, there was one "flipper" missing from each spreader. Normally there are four flippers on each spreader that can be raised or "flipped" up and out of the way or lowered. (The flippers must be raised before the spreader can enter the cell guides of a ship's below deck storage area.) In their lowered position they act as a "funnel" and assist the operator to "land" the spreader on the container. Without a full complement of flippers, production is slowed and the probability for damage to the container as well as the spreader is increased. This would have been a perfect opportunity to use the spare spreader to replace the damaged spreader and to increase productivity.

Gottwald Crane

When the site visits were carried out in May 2005, the Port was using one mobile Gottwald crane, which was fitted with a number of special features to enhance its effectiveness in handling containers. According to information received in January 2007, the Port had terminated the lease of the Gottwald

crane, but had leased another one, and was in the process of leasing a second one. Since the crane lease includes maintenance and cargo operation, the Port's maintenance department is not burdened with maintenance of this specialized piece of equipment. Due to the cranes high degree of mobility, it can quickly move between berths, as required to support cargo operations. The team assigned to the Gottwald crane reportedly provides a consistent service with a very limited amount of downtime. Certainly this crane provides a value-added service to the Port. However, when the hourly production achieved by the Gottwald crane is compared to that achieved by the Paceco cranes, it can be seen that the gantry cranes produce a higher hourly production. In addition, it is expected that the gantry cranes can improve their hourly rate, while the Gottwald crane is at or very near the maximum that can be achieved with a crane of this type. In other words, from a productivity point of view, a modern gantry crane, similar in design to the Paceco cranes, offers considerably more gains and opportunities than the Gottwald crane. Toward that end, long-term plans to meet container handling growth should include the purchase of additional gantry cranes.

Operator's Cab

The layout of the interior of the operator's cab on the gantry crane plays an important role in the productivity of the operator. To a degree, the ease with which the operator can complete his tasks will affect fatigue and alertness. Due to the high degree of hand – eye coordination coupled with the "continual" nature of the operator's role, productivity can be affected by the efficiencies incorporated in the cab design. Controls that are used frequently must be ergonomically placed for easy access. The seat itself must provide adequate adjustments to "fit" a full variety of operators. It is considered that there are two issues that should be corrected when new cranes are purchased. The twist-locks and flippers are controlled by three separate switches or levers, one for the twist-locks and two for the flippers. Since these must be activated every cycle, they must be conveniently located so they can be activated quickly. Ideally they should be positioned so the operator does not have to take his hand off the primary control levers. The control levers, often referred to as "joy sticks," are used to control the crane's three primary motions; hoist, trolley and gantry. (Hoist is the motion of a crane which raises and lowers a load. Trolley is movement of the trolley, the unit which travels on the bridge rails and carries the hoisting mechanism, perpendicular to the crane runway. Gantry is the motion parallel to the crane rails or runway.) When released, the joy sticks automatically return to the center or stopped position. Since the operator positions the container by effectively controlling its momentum or "swing," it can be very disruptive to be required to release the control to activate the flippers. The second point involves the position of the three spreader lights, which visually "tell" the operator the position of the twist-locks and also indicate when the spreader is correctly positioned to safely allow the twist-locks to be activated. If these lights are positioned on the front wall next to the floor, the operator can see the lights without taking his eyes off the spreader. Currently, these lights are positioned behind the operator, making it necessary for him to turn his head to see which light is illuminated. These are considered to be particularly timely issues since we understand that the Port has plans to replace the existing operator's cab on both of the Paceco cranes. In January 2007, it was indicated that the Port was in the process of bidding for rehabilitation of the older crane.

Discretionary Budget

To assist in the smooth operation of the Port and the timely resolution of problems and equipment breakdown, it is felt that a senior member of the Port staff should have a limited amount of discretionary spending to be able to deal with unexpected problems in a timely manner. This should not replace the traditional budget process and a clear set of controls should be set up to prevent abuse. A thorough audit should be completed before funds can be replaced.

Customer Satisfaction

Quality and customer satisfaction are ever important concerns. The Port of Cortés should implement a

comprehensive program to address these issues. There is a concern among a number of the Port's customers that attitudes and a spirit of improving service at the Port do not meet industry standards. The Port should establish a set of goals and service policies, relating to its customers, the handling of cargo, security, long term development of the Port, relationship with the neighboring community, employees, etc. Once this has been completed, the Port should open a channel of communication with the Port's customers as well as all others affected by the Port's operation. Clearly one of the short-term goals of this communication should be the improvement of customer satisfaction and the development of plans to deal with issues requiring a longer planning horizon.

Additional Cargo Opportunities

A number of the carriers the Consultant surveyed concerning Port operations indicated that they are moving cargo from Nicaragua and El Salvador through the Port of Cortés. It was clear that this is "discretionary" cargo and the Port of Cortés is not the only port that can be used to handle the volume. In order for this cargo to remain at the Port of Cortés, it is critical that service reliability issues be addressed and that additional land be made available for container storage.

5.4 Recommendation of an overall strategy for container handling improvements including equipment, maintenance procedures, labor, information interchange, and administration

Shipboard Cranes

Vessels carrying cargo handling cranes have a disadvantage when compared to vessels without cranes. The shipboard cranes reduce the cargo carrying capacity of the vessel because of their weight and, in the case of a gantry style crane, often restrict the above deck cargo "profile." The cranes position, well above the waterline, can also affect the ships' stability which often has to be adjusted by reducing the vessels cargo capacity. In addition, there are also considerations for initial and ongoing operating costs. Typically, ship board cranes are slower and less productive than modern shore-mounted gantry cranes. Given a choice, most carriers would prefer a container vessel without ship-mounted equipment. History shows that many ships have gone through a conversion to remove their cranes, to increase capacity and reduce operating costs. Once a port has sufficient shore-based equipment to reliably service the vessels calling at that port, carriers either change vessel deployments or remove the shipboard cranes.

In other words, container carriers use vessels with ship-mounted equipment at an increased cost to themselves in order to overcome the limitations of the ports they call. The Port should understand this concept and consider it carefully when making long-term plans for the expansion of the Port in order to improve and expand the services required to its customs.

Gantry Crane Specification

In line with commonly accepted standards throughout the world, a 100-foot rail gauge is recommended and it is assumed this has been planned for Berth 6. This provides for adequate working area under the crane for a multi-crane operation over a single vessel, to be safely completed. The cranes shall be of adequate geometry to accommodate an 18 wide container vessel. While a crane of this outreach is adequate to accommodate the largest vessel in service today, it would be prudent to review this standard prior to ordering new equipment. The following criteria are recommended for the container cranes,

- Capacity (twin lift) 65 LT
- Rail gauge 100 ft
- Outreach from WS rail 178 ft
- Backreach from LS rail 60 ft
- Hoisting height above rail 130 ft
- Clearance between legs 60 ft

- Overall length between bumpers 88.5 ft
- Hoist speed (rated load/empty) 250 / 500 ft/min
- Trolley speed 780 ft/min
- Gantry speed 150 ft/min
- Power supply Cable reel, with fiber optics communications link

While information was not available, it is assumed that the existing container berth area is not "strong" enough to support a crane larger than the Paceco cranes currently on berths 4 and 5. While these cranes will not efficiently handle a ship larger than Panamax class (13 containers wide), they are expected to adequately handle forecast volumes for a number of years. As mentioned in the report, the used market is an excellent resource for a lower cost Panamax size crane. However, acquisition of new cranes will be required for equipment to be purchased by ENP in accordance with Honduran law applicable to governmental purchases The wheel loading as well as the overall weight must not exceed the berth design criteria. The following criteria are recommended as a minimum for a Panamax size crane, but may have to be adjusted to insure that the allowable wheel loading is not exceeded.

- Capacity 40 LT
- Rail gauge 60 ft
- Outreach from WS rail 125 ft
- Backreach from LS rail 60 ft
- Hoisting height above rail 85 ft
- Clearance between legs 55 ft
- Overall length between bumpers 88.5 ft
- Hoist speed (rated load/empty) 200 / 400 ft/min
- Trolley speed 500 ft/min
- Gantry speed 150 ft/min
- Power supply Cable reel, with fiber optics communications link

Gantry Crane Automation

The Port's next purchase of container cranes, as mentioned above, should include a significant increase in operating speeds as well as an appropriate increase in overall geometry. In addition, this new equipment should include sway dampening which automatically assists the operator to control the pendulum effect of the spreader, which can be considerably greater than the operator experiences with the existing cranes.

The crane should also include the capability for semi-automatic operation, allowing the operator to "relax" for a brief period while this feature is used. In addition, the capability for real time monitoring from a remote location should also be included. This offers two advantages. The first being the ability for a remote computer to monitor productivity and compare it with predetermined standards. When performance is outside of acceptable levels, an alarm can be sounded. The second benefit is to facilitate remote monitoring of the equipment by the maintenance staff. If a breakdown or stoppage should occur, the system can be interrogated to insure that the correct tools and parts are dispatched to correct the problem.

Rubber-Tired Gantry Cranes (RTG)

Because of the higher storage density as well as the greater capacity to accommodate peak volumes, the Rubber-Tired Gantry Crane (RTG) would provide the Port of Cortés an opportunity to increase the container storage capacity within the Port without increasing the Port area. This should be considered for the Berth 6 expansion. The following criteria are recommended for the RTGs,

- Capacity 40 LT

- Lift height (4+1) 50 ft
- Span (6 wide + truck lane) 77 ft
- Hoist speed (rated load/empty) 75 / 180 ft / min
- Trolley speed 230 ft / min
- Gantry speed 300 ft / min
- Automatic / guided steering for the gantry motion

Maintenance Procedures

The availability of the equipment necessary to efficiently work a container vessel is reported in a general sense, manually. The system does not track individual units and there is not a history of "availability" by unit that could be used by management to plan for cargo activity. The maintenance department has also confirmed that they have a very limited program of preventive maintenance (PM) and generally wait for equipment to "break" before it is fixed. While this may reduce the amount of planning required (on the part of maintenance department), it leaves cargo operation exposed to a greater risk of problems and unexpected work stoppages which may ultimately delay the vessel sailing and unfavorably impact operating costs for all parties involved.

At the earliest opportunity, a Port-wide system should be established to track each piece of equipment used in the Port to handle cargo. The system should track labor and spare part costs as well as a break down percentage for each unit and the equipment category in general. The system should also have the capability of forecasting labor and parts requirements as well as identifying units that have incurred excessive downtime or maintenance costs. In conjunction with this system a thorough PM program must be established along with a daily review with the operations department to cover the availability of existing equipment as well as the "out of service" time required to fulfill the PM needs.

The challenge of completing the PM schedule may demand that the maintenance department expand their operation beyond the day shift and it may also be necessary to consider purchase of additional equipment. It is assumed that the effective administration of a rigorous PM program will increase the overall availability of equipment and lower the overall cost of equipment maintenance within the Port. The greater reliability of the cargo handling equipment will in turn increase the productivity within the Port and ultimately lower operating costs.

Training Programs

The Port is utilizing a separate organization, "TRAINMAR," which is responsible for training Port staff, including union personnel. TRAINMAR is a UN-affiliated organization originally set up by UNCTAD in 1980 to provide training for the maritime sector. They are currently using a course syllabus that was initially set up by UNCTAD and has more recently been updated to include 30 different one-week courses. The local TRAINMAR is also a member of a larger Central America based organization headquartered in Nicaragua, providing the capability to share training material as well as instructors. TRAINMAR also has training programs for the Port's equipment operators, including straddle carrier and gantry crane operators.

A person wishing to become a crane operator has to work his way through a sequence of positions which starts with work aboard ship handing the cargo lashing, then to a forklift operator, a truck driver, a toploader operator, then a straddle carrier driver and finally a gantry crane operator. Advancement is based on seniority and an opening at the next level. While there are training courses for a number of these positions, there are no formal qualifications or tests to determine that a person is "qualified" to safely and efficiently operate the equipment. While it may be possible for the "average" person to safely operate a forklift or a truck with reasonable efficiency, a unique level of hand-eye coordination is required to safely and efficiently operate a large gantry crane. Not everyone has this ability nor should they be expected to maintain the same level of proficiency through out their working life.

Qualification Testing

The Port should set up a qualification test or exercise that can be used to provide a preliminary assessment of a person's aptitude for becoming a crane operator. This would be followed by a formal training program and then a limited period of apprenticeship. During this later period, the apprentice should be encouraged to practice as often as possible. At the conclusion of the apprenticeship period the operator must have completed a specified number of hours of cargo operation at a production level of at least 25 moves per hour. In addition, he should complete a knowledge and skills test. Existing crane operators could be excused from the qualification process. However, all operators should be expected to re-qualify every five years. It is quite possible that this may conflict with some of the existing union practices and the matter should be discussed with the union, to insure that they fully understand the safety issues involved and the reasons for this new program.

The safety issues involved with operation of the Port's equipment should not be considered lightly, especially in the case of the gantry crane operation. While the gantry cranes have a number of safety features to reduce the risk of accidents, the single most significant safety feature on the crane is the operator. Whether through ignorance, carelessness, fatigue, etc, the operator can damage the crane or the vessel while also exposing the stevedoring crew to risk as well. The introduction of a re-qualification program would assist the Port to insure that its equipment operators still have the knowledge and skills necessary to operate the Port's sophisticated equipment.

Performance Goals

At the same time a program should be developed to monitor and create a productivity history for each crane operator. This program, which has worked well in other locations, can be used as a form of the "carrot and stick" motivational tool. While it is not meant to embarrass operators who under-perform, it should provide a means of measuring individual performance against an accepted standard, such as averaging 25 moves per hour during the entire vessel operation. In addition, a special bonus should be set up for individuals who over-perform. The bonus could range from a ribbon, their name on a plaque or with more significant / consistent accomplishments over longer periods, more meaningful rewards could be considered. Since the productivity of the crane operator is also affected by the efficiency of the entire labor gang, including the truck drivers, this program should acknowledge that this is in part a team effort.

Performance-based Pay

While the majority of the labor used for cargo operations within the Port is union and "provided" by the Port, there are a number of situations and agreements that allow the carriers to provide their own labor. In discussion with a number of the carriers, this is preferable since it offers better control and generally better (faster) production. This is due, in part, to the fact that non-Port labor is generally paid on an incentive basis, based on hourly production or on a job basis and when the job is finished they can leave. It is widely felt that if the Port labor worked under a similar system, productivity would dramatically increase. We understand that the opportunity to discuss this with the union as part of the upcoming contract review is close at hand and should be pursued, in conjunction with input from the carriers to insure compatibility with the other labor groups that work in the Port.

Example

Most of the vessels used by Chiquita are equipped with shipboard cranes and are worked on Berth 3. The containers are off loaded and reloaded with these ship board cranes which are typically less productive than the traditional gantry cranes that are used on Berth 5. Under the terms of the agreement between the Port and Chiquita, Chiquita supplies its own stevedoring labor, trucks and drivers for the handling of these containers. The reason for pointing this out is that Chiquita completes this operation

under a number of disadvantages and still manages to achieve an average of 25 moves per hour, for each crane. The problems that Chiquita has to over come on Berth 3 include, restricted working area between the warehouse and the berth, slow moving ship board cranes, the chassis they use are primarily road chassis not yard chassis and they have a long transfer to their terminal over a very bad (bumpy) road. This can serve as an example to the Port as to what can be accomplished with the right mix of performance goal, pay incentives and management.

Information

The Port is in the final stages of implementation of RF data transfer system which will include handheld units that will be used by Port staff monitoring cargo operations. It is felt that the RF data transfer offers the Port an excellent opportunity to actively monitor cargo productivity on a real time basis. By doing so, the Port can take appropriate actions when production stops or productivity falls below an acceptable level.

Another facet of the operation that the Port should begin gathering performance data for, is the gate. Trucks arriving at the Port should be categorized and the amount of time taken for the truck to complete its task(s) and depart the Port, recorded and charted historically. While the total amount of time the truck stays within the Port is affected by a variety of activities, some controlled by the Port and some by others, the aggregate amount of time will reflect the Port's efficiency. This has become an increasingly important reflection of terminal productivity and, by starting a historic record, the Port will be able to demonstrate its success in shortening the overall time as productivity within the Port improves.

Port Expansion

The Port has developed plans for the construction of Berth 6, to add more berth space as well as container storage area and expansion of related Port services. This development will provide necessary capacity to meet the demands of increased cargo volumes. In conjunction with this development, the Port should also consider two other options to increase cargo storage area. The first is the utilization of existing warehouse space within the Port. A detailed financial review should be completed on the value-added impact of these warehouses, particularly the one next to Berth 3.

Historically, ports have seen a decline in the demand for container freight station (CFS) type warehouse services, as the port matures. In most cases the warehouse space has been removed because it was under utilized and the land could be more effectively used for other cargo handling functions. The second area is expansion of the Ports boundary to incorporate a portion of the neighboring city area. It appears that much of the area just outside the Port boundary, adjacent to the boundary line, is under utilized and its acquisition would be simplified for that reason. Expanding the Port area, especially behind Berths 4 and 5 would enhance the overall efficiency of the Port. An alternative to this would be expansion of the Port area adjacent to the separate terminal areas currently being operated by Maersk-Sealand and Crowley. This latter case would facilitate direct expansion of their terminals as their volume grows.

5.5 Development of concepts for improved general cargo and break bulk handling

Comments on current dry bulk handling

The circumstances existing today at the Port constrain the operations of the contract stevedores. As private contractors, the stevedores are not as restricted in their operations as is ENP by employee union contracts. However, the requirement that all dry bulk cargo be immediately transported out of the port puts severe limitations on the ability to rapidly discharge cargo and clear the berth for the next vessel. Furthermore, port regulation constraints continue to interrupt dry bulk discharge in order to preempt the

berth for higher priority vessels such as banana vessels under contract which require the priority berthing, and for liner container vessels. The inability to rapidly discharge (or load) dry bulk cargoes at the Port of Cortes inflicts both direct and indirect costs upon the importers and the economy of Honduras.

The establishment of a modern dry bulk cargo terminal under a concessionary operator with modern shore-based unloading or loading equipment, conveying systems and adequate storage, would greatly increase the productivity on dry bulk cargoes and reduce the need for storage at the receiver's facilities. A financial and economic analysis should be undertaken to determine the justification of such an investment, both on the direct savings in operations and the benefit to the national economy.

5.5.1 Concepts for improved dry bulk handling

Under present conditions

Until a proper bulk handling berth is provided, one alternative to improve dry bulk handling would be to utilize a floating crane. It would be possible to put out a tender for a floating crane, together with a 2 to 3 year concession for operating rights, with the option to bid for a long-term concession once a new bulk cargo berth is constructed.

It must be recognized that should the construction of a new bulk terminal at the Berth 2 area, there is likely to be interference with activities at Berth 3. This will further reduce the efficiency and productivity at Berth 3. Therefore, the flexibility of a floating crane provided by an experienced bulk operator would help offset the interference by construction. In addition, the floating crane could be useful to help handle construction materials while Berth 2 is being constructed.

Steps required to develop an effective dry bulk cargo solution

1) Agree on a site and confirm its availability and suitability;
2) Prepare a scheme for an adequate berth;
3) Determine the design criteria for the maximum size vessel both at present and in the future;
4) Determine the appropriate equipment for unloading/loading dry bulk from / to vessel;
5) Determine suitable receiving hopper and transfer system from vessel to storage: rate of discharge, conveying system requirements including measurement of cargo discharged, and environmental controls;
6) Determine appropriate facilities for storage of dry bulk receipts and transfer to receivers trucks;
7) Determine traffic patterns for trucks servicing the commodities, including access and egress, with appropriate weigh scales for monitoring volume shipped out;
8) Determine requirements for mobile equipment and trucks to assist cargo handling and terminal operation;
9) Establish management control systems including tariff charges and accounting for cargo and profit and loss; also determine means for integrating the bulk terminal operation with other ENP activities and revenue requirements; and
10) A capacity analysis of the proposed new bulk cargo terminal should be prepared, and compared with the short and long term forecasts of future cargo If a significant deficiency in capacity is found within the first ten years of the forecast, then the feasibility of phased expansion of the terminal should be considered.

5.5.2 Concepts for improved break bulk handling

Although the volume of break bulk handling today is greatly reduced by the use of containers, there remains the need for handling the commodities to and from the containers. These shipments normally are

prepackaged on shipping pallets and may be further packaged by shrink-wrapping to hold the units together. Handling of such parcels at the ENP transit sheds / warehouses was observed to be conducted in an efficient manner with 2-3 ton capacity forklifts, with receipt or delivery to / from over the road tractor trailers and containers.

Further growth in the use of containers for miscellaneous break bulk is expected to continue to reduce the volume of break bulk at Puerto Cortes. Should ENP and CPME pursue the concept of privatization of terminal operations, this would transfer its responsibility to the concessionaire(s), It is recommended that is such event, the use of off site warehouses be considered , in order to free up the limited space within the port.

Regarding the handling of shipload or partial shiploads of break bulk, as in the case of bagged fertilizer in particular, and other large non containerized shipments of bagged goods (chemicals, sugar, or other agricultural products), it is recommended that ENP or the stevedoring companies providing the service of unloading/loading investigate the use of large stevedore pallets (usually 4'x 6' hard wood winged pallets). These pallets are designed to hold two standard shipping pallets, or in the case of bagged cargo, can be loaded / unloaded by hand with 20- 50 kilo bags in the hold or at the port to carry such cargo between vessel and shore using ships cranes, and handled on shore by forklift. No use of such pallets was observed during the site visits. The wings on the stevedore pallets provide a slot for the lifting sling and spreader. Unloading /loading rates of 30-40 tons per hatch per hour can be obtained by this method.

Figure 5.5-1a: Empty Stevedore Pallets

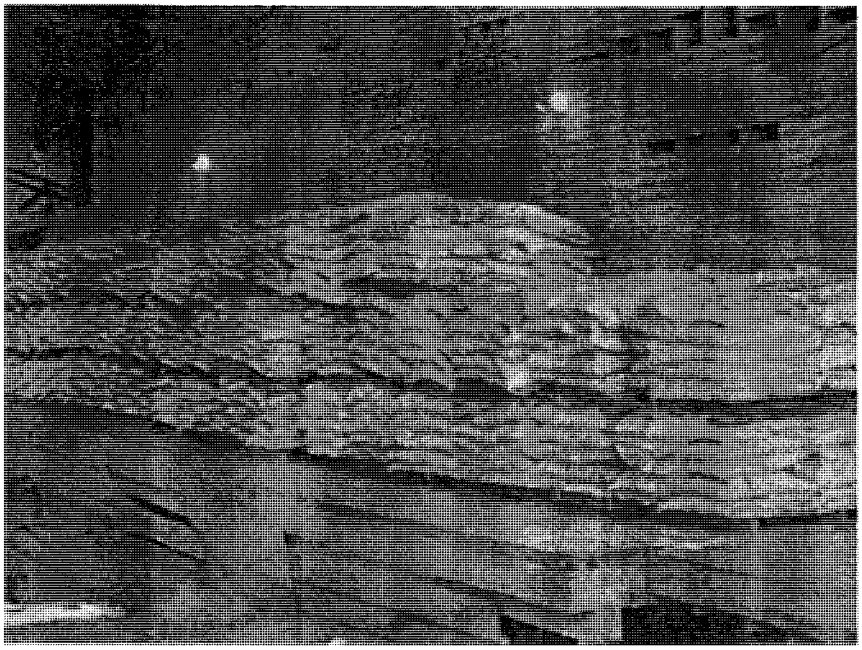


Figure 5.5-1b: Loaded Stevedore Pallets

5.6 Recommendations for operational, management, supervisory, and administration procedures for incorporation into an overall information technology enhancement program

Improve Long Term Planning

During the course of this study, current Port operations and practices were discussed with a number of the major customers as well as members of the Port's staff, in an effort to gain a broader perspective of these issues. One of the most consistently mentioned concerns about the Port has been the influx of new senior and middle management staff, in the period leading up to and following every national election. This practice promotes insecurity among the core management team who consider the prospect of looking for a new position as the national election nears, and the learning curve for new staff after changes in administration. This contrasts to other locations where many of the key positions are filled either by career civil servants, in the case of public administrations, or career employees, in the case of private operations.

Many of the management positions within the Port are highly specialized, requiring a background in port operations, vessels, customs, labor relations, national security, terrorism as well as cargo import and export. A person moving into a Port position without this experience will have to learn, and often make mistakes, as they become knowledgeable in this new field. If this is to be repeated every four years, it is difficult to make long term improvements within the Port, especially where the union is concerned. One can only assume that all parties associated with the Port are aware of this rotation of management and the paralysis it imposes on the Port as the national elections approach,

Clearly, the Port is one the resources that Honduras must develop very cautiously because of the impact that the overall Port efficiency has on the cost of import and export cargo. The Port would benefit from

stronger long term planning and opportunities. Privatization of the Port would offer a number of advantages in this direction and if carried out correctly it would ultimately increase the efficiency as well as the productivity of the Port, lowering the cost impact on cargo movement through the Port.

Timely and Accurate Information

A centralized system should be established to monitor all aspects of the cargo handling process and provide current information as well as a comparison against established goals and historical activity. This could be used by all of the operations-related departments within the Port to measure their progress toward performance targets as well as a measure of improving customer satisfaction. The Port is in the final stages of implementation of handheld radio frequency (RF) data transfer devices, for use throughout the Port. The "real time" ability to gather information offers a dramatic opportunity to reduce the lag time in the reporting process. To be effective, the information must be accurate and current, updated daily. Key areas would include:

- Berth occupancy;
- Vessel waiting time;
- Exception report, to identify cause of extended vessel waiting time;
- Gross and net hourly production for each vessel, clearly distinguished for each handling method;
- Labor (union) cost per cargo unit for each vessel;
- Exception report, to identify the cause and extent of any delay in cargo operation;
- Maintenance reports listing;
  - Breakdown percentage for each individual piece of equipment; cranes, straddle carriers, toploaders, yard tractors, chassis and forklifts;
  - Annual maintenance cost (labor and parts) for each individual piece of equipment;
  - Total usage (annual) for each individual piece of equipment;
  - Exception report, to identify the reason for a unit being out of service for an extended period of time;
  - Exception report, to forecast / plan PM work that requires extended periods of time out of service;
- Gate operation report;
  - Daily volume by category;
  - Volume per hour; and
  - Average time a truck spends in the Port, by category.

This list is not intended to be exhaustive but rather indicative of the information that is considered to be helpful, if available in a timely manner, for the short and long term management of the Port. Some of this information is currently being gathered and presented in a paper format. The process to a paperless work place can sometimes follow a gradual path as team members get used to receiving and responding to electronic data. For some, this is a big change. However, the burden of daily reporting, if done with paper, can be overwhelming and if this information is to be of value it is best disseminated electronically, with longer period and summary reports being prepared on paper. The goal must be kept in sight. The goal is not to gather more information for information sake; the goal is to have timely and accurate information available that can be used by the Port's management to reach informed decisions.

Equipment-mounted Task Screens

Yard tractors shuttling containers between the gantry crane and the storage area are typically assigned to a specific crane and continue in support of that crane until all of the moves have been completed. If the crane encounters a problem or delay, the trucks idle and wait for cargo operations to resume. During this delay, the trucks are not used and their productivity is lost. To overcome this, individual task screens can

be mounted in each piece of equipment and the central yard planning computer assigns tasks to each truck, depending on an agreed set of priorities. Under this system, if a crane has to reposition hatch covers, shift to a new hatch, wait or perform some other task that does not require truck support, the trucks can be temporarily reassigned to another task. Once cargo operations resume, the yard planning computer will redirect a sufficient number of trucks to that crane to efficiently support cargo movements. This application of computer assisted planning can shift trucks from one demand to another to increase overall productivity while often requiring fewer trucks than would have been used under the dedicated approach. Because of the long shuttle distances at the Port of Cortés, the transfer has the potential for imposing delays and lowering productivity. The task screens are seen as a means of overcoming this problem and actually improving productivity.

5.7 Prepare an interim report and presentation of the evaluation of cargo handling and alternative recommendations for improvement

On Thursday December 1, 2005, in the Puerto Cortés conference room, Task 5 was presented and explained to the Port's staff. The presentation was attended by Edgardo Paredes and other members of the Empresa Nacional Portuaria, as well as Richard Olson and Laurence Boorstein from the DMJM Harris team and José Sandoval from Saybe y Asociados. During that presentation a number of comments and questions were raised. These issues have been listed here along with a further clarification.

The Port cranes are from 1978 and 1993 but one was updated four years ago.

This information was reflected in the analysis as well. The DMJM Harris expert talked with members of the operations department, mechanical as well as electrical maintenance and was not able to obtain any detailed information (geometry and operating speeds) about the two Paceco cranes. Reportedly, much of the technical information that was obtained when the cranes were installed, has been lost over the years, due in part to the continued turn over of senior staff, following each national election.

From observation, the DMJM Harris expert believes that the two Paceco cranes are sufficiently large enough to accommodate the ships that are currently calling at the Port. The limited growth in container volume that the Port expects suggests that the size of vessels calling at the Port might not change significantly for a number of years. This leads to the belief that the existing cranes have sufficient outreach and vertical clearance (under the spreader). However, the hourly production appears to be limited, in part, by the slow operating speed of the existing cranes.

If the Port buys a third gantry crane, they may need to reinforce the space between the cranes.

The engineering evaluation of the dock capacity is beyond the scope of this study. However, in light of the extensive work that the DMJM Harris expert has done in other ports, this would be an unusual restriction. It is most common for the berth to be designed with a specific (crane) wheel load capacity. As long as this loading is not exceeded, installation of additional cranes is normally permitted, without modifying the structure of the berth. However, it may be necessary to increase the size of the electrical service to the berth and provide additional storm tie downs. Despite the fact that the structural limitation may be unusual, it would be advisable to conduct the proper engineering evaluations of the dock structure and crane track capacity to ensure there are no problems in this regard.

The banana companies go to the ports of Biloxi, Puerto Barrios and Santo Tomas, where they have to use shipboard cranes anyhow.

The Port of Cortés should be concerned about the Port's overall productivity since this is a key factor in determining the Port's through put capacity as well as the operating cost for the Port. Shipboard cranes, in general, have a lower productivity than shore-based gantry cranes, similar to the two Paceco cranes. In other words, continued use of shipboard cranes will continue to depress the Port's throughput capacity

while also increasing the Port's operating costs. By reducing throughput capacity the Port will hasten the need to go ahead with the berth 6 expansion schedule. By increasing operating costs, the Port will also force carriers to look at other ports rather than expanding services at Port of Cortés. As a medium term objective, the Port should provide adequate equipment and operational incentives to promote the increased utilization of gantry cranes for the handling of containers.

30% of volume is to satellite yards on the Port's perimeter and they use tractors to private yards.

A number of the larger container carriers have demonstrated that they prefer to operator their "own" yards. This allows them to use their own labor and equipment, effectively reducing operating costs while also improving service to their clients.

By the end of 2005, the Port was expected to have two Kalmar reach stackers. In January 2007, it was noted that the Port had two Kalmar reach stacker and one Hyster, all operational and a Caterpillar, which at the time was not. The Port has space problems, which is one reason they use straddle carriers.

Reach stackers are an effective and very versatile piece of equipment. In general, they are less expensive than straddle carriers and RTGs and are easier to maintain. However, since the space for operation is different than any of the existing equipment the Port has, the Port should carefully consider the impact of this new equipment on the yard layout as well as the traffic patterns within the Port. When operational changes like this are made it is common for a Port to complete a computer simulation to insure that the new equipment provides the maximum benefit to the Port.

With the purchase of this equipment the Port should also consider setting up a separate, dedicated operations area for the reach stackers to insure they work efficiently, without posing a safety risk. Adequate spare parts, maintenance equipment as well as maintenance training should also be included with the initial purchase to insure the reliability of this new equipment. A training program should also be established for the operators as well as the support staff to insure that productivity and safety standards are established at the highest levels, before any bad habits can be developed. A sequenced program should be established to identify the purchase of additional reach stackers as well as the phase-out of the existing fleet of straddle carriers.

Berth 5 is no longer under repair.

The on going repair work on Berth 5 was mentioned because of the negative impact this work had on cargo operations. The completion of this work will certainly improve the operational capacity as well as the flexibility to accommodate more vessels on berth.

The intra-Port road shown with a surfacing problem is a Chiquita responsibility.

In discussions with Chiquita, it was the DMJM Harris expert's understanding that while a portion of the road near the Chiquita gate was their responsibility, the majority of the road maintenance was the Port's responsibility. In either case, a smooth paved road surface will speed the flow of truck traffic between the berth and yard area, which in turn will increase productivity and lower operating costs for both the operator and the Port. Repair of this road benefits all who use the Port and the work should be undertaken.

There are eight crane operators, some are better than others.

Selection and training of the crane operators is a critical component in the Port's productivity. It is often a challenge to select qualified people to enter an operator training program. It is not uncommon to encounter the misconception that "anyone" can be a productive crane operator, given adequate training.

Not everyone has the quick reactions and advanced hand-eye coordination required to operate a modern container crane. Nor should everyone who is qualified, be expected to perform efficiently their entire working life.

A system should be established to define minimum levels of performance, as well as a training program to improve this standard. At the same time it is important to recognize operators who consistently exceed this production level while also establishing a program for all operators to "re-qualify" periodically. Since re-qualification may be a sensitive issue with the labor union, it will require sincere discussions of the mutual benefits, as a first step, before implementation.

Puerto Cortés competes with the Guatemalan port of Puerto Barrios, so discretionary cargo can increase or decrease.

The obvious benefit from increased cargo flows is increased revenue for the Port. It also necessitates increased labor (employment) which contributes to the prosperity of the community surrounding the Port. However, another benefit that is not as obvious is the economies of scale that come into play for the Port as well as the carrier. Larger volumes contribute to larger vessels which in turn lowers incremental costs for the carrier. Larger vessels generally contribute to improved productivity during loading and unloading activity, which in turn contribute to lower Port costs and increased through put capacity.

The benefits from increased container volume are shared by the Port, the larger Port community, as well as the Port's users and therefore the Port must aggressively continue in its efforts to attract discretionary cargo. The Port must recognize that improved landside infrastructure such as the road to Guatemala increases the potential for competition with Guatemalan ports for discretionary cargo. Improvements in the road connections across Central America also enhance the potential to capture discretionary cargo from other countries. However, retaining and attracting cargo requires attention to improving service and costs through the Port of Cortes to attract shippers and carriers in a competitive environment.

The Port has intended to install new operator cabs on the Paceco cranes for the last five years.

The efficiency of the crane operator as well as the overall safety of cargo operation can be significantly affected by the layout of the operator's cab. If the Port is unsuccessful in their program to replace the existing operator cabs, it should consider renovation of the existing cabs. This would allow the Port to benefit from the performance improvements that would be realized. In 2007, the Port indicated that bidding was in process for rehabilitation of the older of the two cranes.

The Port should retain the Gottwald crane.

The DMJM Harris expert supports the concept of retaining the Gottwald crane. However, it is considered that additional crane capacity, to handle containerized cargo, should be provided through the installation of additional gantry cranes, similar in design to the existing Paceco cranes. Experience has demonstrated that this style of gantry crane consistently provides superior performance while also reducing damage and improving safety. In January 2007, it was noted that the Port had replaced the Gottwald crane which was working during the 2005 visits with another one, also under lease, and was in the process of arranging for a second one.

Hatch Cover Grounding.

The Port staff stated that it is their practice to ground hatch covers under the crane, near the vessel, so that in the event of a crane breakdown, the ship board crane can return the hatch cover to the ship. When hatch covers are grounded in this location, truck traffic is shifted to the backreach (behind the landside legs) to avoid the congestion of working in the narrow space under the crane.

Fig. 5.7-1 Trucks being worked between crane legs

This picture, taken during the site visit in November 2004, shows an example of this situation. It can be seen from the picture that trucks for both cranes, are being "worked" between the crane legs. It is understood the valid concern is that a vessel may not leave Port without its hatch covers in place. However, the following observations should be considered:

- It would seem that neither the truck drivers nor the gang supervisor is familiar with the procedure of working in the backreach when hatch covers are grounded near the vessel. Further training is suggested.
- In the pictured example, with only one working lane under the crane, we are concerned about the safety risk to dock workers in this confined area.
- With only one traffic lane for two cranes, delays are compounded and crane production is reduced, delaying the vessel departure, reducing through put capacity and increasing operating costs.
- When a hatch cover is grounded far enough away from the vessel to allow the gantry crane to pass, it is doubtful that the ship board crane has the capability to lift the hatch cover at this distance (reach).
- While equipment maintenance is a very real concern within the Port, it was reported that breakdown of the gantry cranes during vessel operation is not common. If this were to occur, there are simple procedures that can be employed to allow the other gantry crane to be utilized to replace the hatch covers. In the event of a power failure, as well as failure of the standby generator, the Gottwald crane could be used. With these alternatives available, it would seem that it would be preferable to standardize operating procedures and ground all hatch covers in the backreach. It is expected that implementation of this procedure would result in measurable

improvements in productivity.

5.8 Develop training program for operators, supervisors, maintenance and support personnel

Improving training is an important element of improving the cargo handling operations of the Port. Training improvements are needed for operators, supervisors, maintenance and support personnel. The Port currently utilizes a training program from TRAINMAR, an UNCTAD-affiliated organization with a Central American branch based in Nicaragua with a branch in Puerto Cortes. This program is primarily oriented to container operations. However, there is a need for extension of training to other areas, to the utilization of additional resources such as training from equipment vendors and other Ports and terminal operators, and for the incorporation of qualifications testing and record-keeping to monitor training of individual staff members. These issues are discussed further below.

5.8.1 Operators

Puerto Cortes operations include a number of specialties involving operators of various equipment types and services. These range from operators working in the container handling area, and require skills in operating container cranes, straddle carriers, yard hustlers, RTG's (rubber tired gantries), and forklift trucks. Workers in the break bulk area primarily operate forklift trucks involved in the handling of packaged cargoes between over the road trailers and /or warehouse , and to and from vessels (including occasionally working in the ship hold). Dry bulk operations involve the use of front end loaders and dozers , and in the future are expected to be capable of operating large rail or crawler mounted ship unloading shore cranes. Also there will be the need to operate high speed belt conveyor and other mechanical systems connected to bulk storage silos and sheds, each with its own operating requirements. Operators of each of these equipment items and systems require training in their use.

5.8.1.1 Container Handling operator training

The port has access to an existing organization, TRAINMAR, which is responsible for training port staff in container crane operation , and requirements for qualification as crane operation. The training programs for Port and stevedoring employees in the container area available from TRAINMAR are from the Portworker development program (PDP) available from the International Labor Organization (ILO). TRAINMAR is an offshoot of UNCTAD.

Listing of the course titles for the sessions offered by TRAINMAR from the Portworker development program (PDP):

C.1.1 Operations of a container terminal
C.1.2 Loading and discharge operations in container ships
C.1.3 Transference operation on the dock in a container terminal
C.1.4 Operation of the container yard
C.1.5 Reception / Delivery operation in a container terminal
C.1.6 Operations of a container station
C.2.1 Construction of container ships
C.2.2 Stowage plans of container ships
C.2.3 Container lashing systems
C.2.4 Work schedules in a container terminal
C.3.1 Construction of containers
C.3.2 Numbering and marking of containers
C.3.3 Container inspection
C.3.4 Filling of containers: 1. Principles
C.3.5 Filling of containers: 2. Work practices

C.4.1 Work safety in container terminals
C.4.2 Work safety aboard container ships
C.5.1 Manipulation of hazardous goods in ports
C.6.1 The container terminal and international trade
C.6.2 Measurement of the performance of a container terminal
C.6.3 Analysis and evaluation of the performance in a container terminal

Port supervisory courses:

S.1.1 The Port Supervisor: Status in the organization
S.1.2 The Port Supervisor: Tasks and obligations
S.1.3 The Port Supervisor: Supervisory skills
S.1.4 The Port Supervisor: Personal attributes
S.2.1 Supervision of the discharge and loading of a container ship
S.2.2 Supervision of the transference on the dock in a container terminal
S.2.3 Supervision of the operations in the container yard
S.2.4 Supervision of the reception / delivery operation in a container terminal
S.2.5 Supervision of a container station

Most of the course titles relate to the container side of the Port activities. From discussions with the training director, it appears that this was a complete list of the material they are teaching. The director explained that courses are given to Port staff, both union and non-union, as well as shipping agent staff who are involved with cargo handling. Training in the use of communications and information technology equipment systems is also essential to management of the container operation.

The use of TRAINMAR provides the capability to share training material as well as instructors with other Ports in Central America. TRAINMAR also has training programs for the Port's equipment operators, including straddle carrier and gantry crane operators.

A person wishing to become a crane operator has to work his way through a sequence of positions which starts with work aboard ship handing the cargo lashing, then to a forklift operator, a truck driver, a toploader operator, then a straddle carrier driver and finally a gantry crane operator. Advancement is based on seniority and an opening at the next level. While there are training courses for a number of these positions, there are no formal qualifications or tests to determine that a person is "qualified" to safely and efficiently operate the equipment. While it may be possible for the "average" person to safely operate a forklift or a truck with reasonable efficiency, a unique level of hand-eye coordination is required to safely and efficiently operate a large gantry crane.

The Port should make use of qualifications testing, first, to evaluation the aptitude of Port employees to operate specific equipment and, second, to evaluate whether their abilities and skills following completion of training for specific positions. The Port should set up qualification tests or exercises that can be used to provide a preliminary assessment of a person's aptitude for becoming a crane operator or for other positions. This would be followed by a formal training program and then a limited period of apprenticeship. In addition, he should complete a knowledge and skills test. Existing crane operators could be excused from the qualification process. However, all operators should be expected to re-qualify every five years. Qualifications and testing should be discussed with the Port union, to ensure their participation in administering and developing the testing and qualifications program and that they fully understand the safety issues involved and the reasons for this new program.

5.8.1.2 Marine boats operator training

The recommended training program for operators of marine equipment, including tugs, pilot boats, and other floating equipment is contained in Section 3.9, Boat operator training. One recommended sources

for such training would be the U.S. Coast Guard. The program includes provision for coordinating with the fire protection staff training because of the importance of tug service equipped with fire fighting pumps in event of fires on vessels, wharves and adjacent buildings. The fire protection training program is contained in Section 4.8.

5.8.1.3 Mobile Equipment operator training

Port operations world wide today depend heavily on the use of mobile equipment, both on the wharf, in the port and even on board vessel . Mobile equipment , both wheeled and track mounted, provide the primary means for moving the cargo between vessel and shore , and to / from storage.
- Rubber tired equipment varies from the smallest to the largest forklift truck, and is essential for moving packaged goods to/ from containers and warehouses, and between wharf and storage shed or over the road transport.
-Specialized container handling equipment such as RTG's and straddle carriers, which are not easily maneuvered and can be unstable if not operated properly, require careful training , and should require certification of drivers before being permitted to operate in the port. Training is needed in safe and efficient operation of such equipment.
- Dry bulk operations utilize both small and large front end loaders and dozers in the unloading/ loading and storage of dry bulk cargo . Training is needed in operation of this equipment as well.

Key to the success of such training is the enforcement by supervisors to see to it that only trained operators are permitted to operate each type of equipment

As always, supervision and proper training of responsibilities is critical to successful operations.
It is recommended that all operators of such equipment be provided with a written certification of their qualification to operate the equipment. Such certification should be issued only by authorized supervisors who have personally observed and verified that the certificate holder is qualified to operate the equipment. These certificates should be reissued every two years, with re-testing and certification. Because eye sight and coordination can change over time, it is important to re-test and certify and require a currently valid certification in order to operate equipment. In addition, in the event the operator is involved in a serious accident, his certificate should be suspended and an investigation made to determine whether the operating certificate should be reinstated.
- For new mobile equipment purchases, the purchase order should require that the supplier provide an initial training program to the responsible supervisors, so that they carry out proper training of the operators for whom they are responsible. By providing this training to supervisors rather than to the multitude of workers, ensures that there will be a continued source of expertise at the port available for training of new workers, and a supervisor who knows the equipment and the operation as well as do his workers.

5.8.2 Training programs for supervisors and support personnel

In addition to the training of supervisors responsible for operations involving the use of mobile equipment, there are a number of other areas where supervisor training is critical.

Training in the use of information technology: All supervisors should have a working knowledge of their responsibilities as key users and providers of information for and from the information systems used by the port day to day, as well as longer term collection of the data necessary to operate the port. Time should be provided for the training and familiarization of the individual supervisor 's role in the use of and accumulation of the port's data information.

"On the job" training of supervisors and support personnel: This can be accomplished with "On the job" training, with incentives given to encourage the further advancement of supervisor knowledge, through certification and pay grade arrangements. Good supervisors, are knowledgeable supervisors, and the

best way to learn is by "doing'. If the port does not now have a director of training, such a role should be established. The role of the director of training's office should be to supervise and issue certifications in the various skills, to organize and maintain on the job training of all segments , and to schedule and arrange training sessions in the various skills.
In the fast moving activity of a port operation, written texts will not replace "Training by doing", except for the fields of information technology, and higher management and support personnel.

Safety training supervisors and support personnel: A major responsibility of a supervisor is the safety of the staff he or she supervises. The ENP and the individual stevedoring companies and shipping agents have a responsibility for maintaining and enforcing safe working practices and safe working conditions. To date, it appears that they are carrying out this responsibility with satisfactory results.
As an aid to the furtherance of safety training of supervisors and other support personnel, a step-by-step plan for enhancing port safety programs is presented, as follows:
1) Review the safety program goals, redefine as necessary
2) Incorporate the goals in the training program
3) Utilize national and international safety standards and guidelines in the program. An example is the US Occupational and Safety and Health Administration (OSHA) standards, many of which are available in both English and Spanish versions
4) Carry out regular scheduled training sessions, including the use of video and supervisor safety handbooks

5.8.3 Training for maintenance personnel

Training for maintenance personnel is addressed in Section 2.7.

5.8.4 Training for support personnel

Training in informational technology (IT) is addressed in Section 1.11.

5.8.5 Planning for effective training

In order to make the most effective use of training resources, the Port needs to consider a number of issues:

Course subjects:

The list of courses offered by TRAINMAR is fairly comprehensive in the container area. However, it would be advisable to incorporate additional courses would be required in the bulk handling area. It is important to design a training program to meet the learners' needs. Each department should assign a staff person who can work with a human resources liaison to properly define training needs, schedules and who will participate. The responsibilities of these staff would include preparing a skills inventory for staff, and identifying when and where training can contribute to better performance.

Sources of training:

In addition to TRAINMAR, there are a number of available sources which could be considered. From the United States, there are operators such as SSA Marine, who can provide expertise in both container and breakbulk handling operations, as well as the Port of New Orleans and various terminal operators from that port.

In addition to training resources of TRAINMAR and terminal operators, training may also be available through equipment vendors. It is recommended that training be considered as part of acquisition programs for new equipment.

Additional training resources for supervisory and executive staff include the American Association of Port Authorities (AAPA), which organizes a program of activities related to human resource training, open to delegations from Latin America and the Caribbean. Most of these courses are offered in the United States. The Central American Maritime Transport Commission (COCATRAM) in Managua, Nicaragua also organizes a number of annual activities in the region. The Inter-American Committee on Ports (CIP) of the Organization of American States offers an annual training program, including security, management, and operations activities for Caribbean countries. The Economic Council for Latin America and Caribbean (ECLAC) organizes a number of activities, including courses on transportation policies and projects organized by ILPES in Santiago, Chile

Location and attendance for training:

One important issue to consider is where the training should take place, i.e. can it be done by bringing a trainer to Port of Cortes or would it be better to send senior managers abroad for training. While "hands on" training in the Port of Cortes would necessarily be limited to equipment which is available there, such training would have the advantage both of making it possible to include line operations staff as well as senior managers, in addition to addressing actual conditions in the port. Training in the Port also can reduce the time off from work required to attend training sessions, which may be especially important for essential staff.

Evaluation of training results.

Testing and evaluation of training results are an important part of training. Certification is important for operators trained to use equipment. It is important to establish objective criteria for measuring and quantifying the success of training. The human resources department should record the training requirements for each position and completion of required training by each nonunion staff member. The Port union would be responsible for training requirements and record-keeping for unionized positions.

Collecting training materials

The various departments need to establish libraries to collect training materials, instructional manuals, equipment information and documentation to facilitate self-study and review.

5.9 Prepare cost estimates and potential sources of supply for the recommended cargo handling enhancements and new programs

5.9.1 Container Handling Equipment Cost

Based on the specific types of container handling equipment recommended previously in Task 5, a cost estimate has been provided for each of these units of equipment.

New gantry cranes

The cost of a new, modern design, high speed container gantry crane of a style similar to the existing Paceco cranes varies in cost depending on speed, capacity, spare parts and training included. However, a budgetary cost of $ 7 million is reasonable. The possible cost for facility modification and electrical service has not been considered.

Used gantry cranes

While the Berth 6 expansion lends itself to the installation of new equipment, the economic viability of installation of used equipment on the existing container berth offers a number of benefits that the Port should consider to expand throughput capacity while minimizing capital costs. As older deep water ports upgrade their equipment to provide post Panamax capability, an ongoing selection of Panamax gantry cranes are available. This latter crane size is very similar to the existing Paceco cranes and should

service the vessels calling at Puerto Cortés for the next ten to twenty years.

The installed cost must include consideration for refurbishment of the used crane to insure it will provide reliable service. Modifications may also be required to allow the new equipment to properly match the Port's berth and electrical service. Additional consideration must be made for transportation as well as spare parts. A budgetary cost of $ 3.5 to $ 5 million is reasonable.

Some US ports may have cranes of these types available for sale from time to time, as indicated on the web site of the American Association of Port Authorities (AAPA), as well as various private sources.

It should be noted that Honduran law does not currently permit ENP to acquire used equipment. However, provided safeguards are put in place, this might be an avenue to obtaining equipment which could enhance productivity at a cost savings over new equipment or if a concessionaire is acquiring the equipment.

New Rubber Tired Gantry Cranes (RTGs)
The modern RTG is widely used through out the world and offers a reliable method to increase density within the container storage area. With the implementation of computerized yard planning tools, accessibility and productivity can be maintained at efficient levels. Referring to the general specification listed earlier, a budgetary cost of $ 2.5 million per unit is reasonable. The possible cost impact of facility modifications has not been considered.

5.9.1.1 Sources of supply for container handling equipment:

Sources of supply for container handling equipment are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

1 Container Cranes

Supplier:	**PACECO**
Address:	3854 Bay Center Pl., Hayward, CA 94545 USA
	Regional office: 3064 C Bienville Blvd, Ocean Springs, MS 3956 USA
Telephone:	1-510-264-9288 (California);1-228-872-1733 (Mississippi)
Fax:	1-510-264-9280 (California);1-228-875-8875 (Mississippi)
E-mail:	E-mail@paceco.com (Corporate); paceco@datasync.com (Regional)
Contact:	Sales Mgr. Chuck Melaney (Regional)
Web:	http://www.pacecocorp.com

Supplier:	**Mi-Jack Products, Inc.** In-Terminal Services
Address:	3111 W.137th Street, Hazel Crest, IL 60429 USA
Telephone:	1-708-596-5000
Fax:	1-708-225-2312

E-mail: johnttroop@interminalservices.com
Contact: John T. Troop
Web: http://www.mi-jack.com

1.1 Electric motors and drives

Supplier: **GE Industrial Systems**
Address: 790 Nw 107th Ave Ste 200
Miami, FL 33172-3158
USA
Telephone 1-305-551-5155; 1-305-551-5176
Fax: 1-305-551-5129
Web: http://www.geindustrial.com

2 Rubber Tired Gantries (RTG)

Supplier: **Kalmar, Inc.**,
Latin America Sales
Address: 5757 Blue Lagoon Dr,
Miami, FL 33126
USA
Telephone: 1-786-388-0330
Fax: 1-305-379-8822
E-mail: Gaston.chipy@kalmarind.com
Contact: Gaston Chipy
Web: http://www.kalmarind.com

Supplier: **Mi-Jack Products, Inc.**
In-Terminal Services
Address: 3111 W.137th Street,
Hazel Crest, IL 60429
USA
Telephone: 1-708-596-5000
Fax: 1-708-225-2312
E-mail: johnttroop@interminalservices.com
Contact: John T. Troop
Web: http://www.mi-jack.com

Supplier: **PACECO**
Address: 3854 Bay Center Pl.,
Hayward, CA 94545
USA

Regional office:
3064 C Bienville Blvd,
Ocean Springs, MS 3956
USA
Telephone: 1-510-264-9288 (California);1-228-872-1733 (Mississippi)
Fax: 1-510-264-9280 (California);1-228-875-8875 (Mississippi)
E-mail: E-mail@paceco.com (Corporate); paceco@datasync.com (Regional)
Contact: Sales Mgr. Chuck Melaney (Regional)
Web: http://www.pacecocorp.com

3 Container Lift Trucks

Supplier: **Kelly Tractor Co. (KTC)**
Address: 8255 NW 58th ,
Miami, FL 33166
USA
Telephone: 1-305-592-5360
Fax: 1-305-477-2024
E-mail: ktccat@kellytractor.com
Contact: Sales
Web: http://www.kellytractor.com/taylor.htm
]
Supplier: **Kalmar, Inc.**,
Latin America Sales
Address: 5757 Blue Lagoon Dr,
Miami, FL 33126
USA
Telephone: 1-786-388-0330
Fax: 1-305-379-8822
E-mail: Gaston.chipy@kalmarind.com
Contact: Gaston Chipy
Web: http://www.kalmarind.com

Supplier: **Mi-Jack Products, Inc.**
In-Terminal Services
Address: 3111 W.137th Street,
Hazel Crest, IL 60429
USA
Telephone: 1-708-596-5000
Fax: 1-708-225-2312
E-mail: johnttroop@interminalservices.com
Contact: John T. Troop
Web: http://www.mi-jack.com

Supplier: **Hyster Company**
Address: 1400 Sullivan Dr,
P.O. Box 7006
Greenville, NC 27835-7006
USA
Telephone: 1-252-758-4978,1-800-HYSTER-1 (1-800-497-8371)
Fax: 1-252-931-7877
E-mail: americasinfo@hyster.com
Contact: Sales
Web: http://www.hysterusa.com

4 Container Freight Station (CFS) Equipment

Supplier: **Yale Materials Corporation**
Address: Latin America Marketing
NACCO Materials Handling Group, Inc.
1400 Sullivan Drive, Caller #12011
Greenville, NC 27834-2011
USA

Telephone:	1-252-931-5846 (Latin America Marketing),1-718-439-7550, 1-800-233-9253,
E-mail:	ayinfo@yale.com
Contact:	Sales Francisco Pinto, Latin America Marketing
Web:	http://www.yale.com

Supplier:	**Hyster Company**
Address:	1400 Sullivan Dr, P.O. Box 7006 Greenville, NC 27835-7006 USA
Telephone:	1-252-758-4978,1-800-HYSTER-1 (1-800-497-8371)
Fax:	1-252-931-7877
E-mail:	americasinfo@hyster.com
Contact:	Sales
Web:	http://www.hysterusa.com

5.9.2 Breakbulk and bulk mobile equipment for cargo handling enhancements

Observation of the existing dry bulk cargo handling procedures, as described in Section 2, demonstrates the desirability of construction of a specialized dry bulk terminal. Cost estimates and sources of supply for equipping such a terminal are shown in Section 5.16. Meanwhile, until a new terminal is constructed, the procurement of additional equipment for safe and rapid discharge or loading of dry bulk cargo and its transport to the user, would result in improving the present limited port capacity through faster dispatch of vessels.

Additional mobile crane equipment

The stevedores now handing the discharge and loading of dry bulk cargo are limited by their dependence upon ships cranes, except when the port's rented Gottwald tire mounted crane is available. The addition of two tire mounted cranes preferably fitted with elevated cab, and high mounted boom, would benefit bulk handling. There is sufficient room on the wharf to accommodate these cranes without interfering with traffic, as demonstrated by the successful use of the Gottwald.

Additional mobile equipment for use in the ship hold

As described in Section 5.2, the safe and rapid unloading of dry bulk cargo, especially fertilizers, and chemicals, benefits from the use of small dozers and front-end loaders in the ship hold. The stevedoring companies would benefit from the procurement of additional such equipment. It would permit the ability to work more holds simultaneously, and especially if additional mobile cranes are provided.

Additional over the road bulk cargo tractor-trailers

The unloading of dry bulk cargoes is being slowed regularly by a shortage of over the road tractor- trailer units, needed for the transport of cargo directly from vessel to inland consignee. Currently, some units are supplied by the consignee, and others hired from local truckers. A fleet of up to date 20+ ton capacity tandem tractor trailers possessed or controlled by ENP, and always available for use for use during dry bulk discharge or loading would minimize the time currently lost waiting for trucks. This fleet could be leased out to others when no ships are scheduled. The tractors can also be used with container chassis and flat bed trailers for hauling containers when not occupied in hauling dry bulk.

Cost estimates and sources of supply are indicated below for the mobile equipment enhancements.

Forklifts: Cost estimates and sources of supply

Supplier Name:	**CDI Equipment, LTD**	**Lee Tractor Co., Inc.**
Address:	926 N. Sam Houston Parkway Houston, TX 77032	10203 Airline Highway St. Rose, LA 70087
Telephone:	1-903-753-4481	1-504-467-6794
Fax:	1-903-758-6320	1-504-467-6799
E-mail:	rreed@casece.com	leetractorsales@bellsouth.net
Contact Name:	Renny Reed	Don Mensen
Web:	http://www.casece.com/dws/dealers/esscorp	NA

Model	**Case 588G**
Size Range	8,000 to <10,000 lbs lift capacity
Manufacturer	Case
Model	588G
ENGINE	
Make and Model	Case 4-390
Gross Power @ rpm - hp (kW)	75 (56) @ 2200
Net Power @ rpm - hp (kW)	73 (54) @ 2200
Peak Torque - lb ft (N-m) @ rpm	201 (273) @ 1200
Number Of Cylinders	4
Displacement - cu in (L)	239 (3.9)
TRANSMISSION	
Transmission Type	Synchromesh
Max Travel Speed, FWD - mph (kph)	25 (40.3)
Max Travel Speed, REV - mph (kph)	30.2 (48.6)
Number Of Speeds - FWD	4
Number Of Speeds - REV	4
Standard Power Shuttle	Yes
BRAKES	
Service Brake Type	Oil (wet) disc
Parking Brake Type	np
Parking Brake Location	np
Front Tire Size - 4WD	19.5Lx24
Rear Tire Size - 4WD	12x16.5
HYDRAULIC SYSTEM	
Main Pump Type	24 (91)
Total Flow - gpm (L/min)	np
PERFORMANCE	
Max Lift At 24 Inch Center - lbs (kg)	8,000 (3629)
Sideshift, L or R - in (mm)	3" (80)
Max Tilt FWD	45Ã‚Â°
Max Tilt REV	15Ã‚Â°
High Mast Max Fork Height - ft/in (mm)	22' 0" (6710)
High Mast Lift Capacity At Max Height - lbs (kg)	4,000 (1814)
High Mast Overall Height, Mast Raised - ft/in (mm)	25' 5" (7750)
High Mast Overall Height, Mast Lowered - ft/in (mm)	10' 5" (3180)
High Mast Rate Of Lift - fpm (m/min)	105 (32)
Low Mast Max Fork Height - ft/in (mm)	15' 0" (4570)
Low Mast Lift Capacity At Max Height - lbs (kg)	8,000 (3629)
Low Mast Overall Height Mast Raised - ft/in (mm)	18' 4" (5590)
Low Mast Overall Height, Mast Lowered - ft/in	10' 5" (3180)
Low Mast Rate Of Lift - fpm (m/min)	105 (32)
DIMENSIONS	
Length With Bucket Down - ft/in (mm)	np
Width Over Tire - ft/in (mm)	7' 4" (2240)
Height To Top Of Cab - ft/in (mm)	np
Wheelbase, 4WD - in (mm)	84.5" (2150)
Ground Clearance, 4WD - in (mm)	12" (300)
Turning Radius At Curb, Brakes Off, 4WD - ft/in (mm)	15' 8.5" (4790)
OPERATING WEIGHTS	
Operating Weight, 4WD - lbs (kg)	16,416 (7446)
SERVICE CAPACITIES	
Fuel Tank - gal (L)	31 (117)
Pricing	**$53,131**

Forklifts: Cost estimates and sources of supply -- continued

Supplier Name:			**Southline Equipment Co.**		
Address:			700 West Cavalcade		
			Houston, TX 77009		
Telephone:			1-713-869-6801		
Fax:			1-713-869-2875		
E-mail:			charris@southline.com		
Contact Name:					
Web:			www.southline.com		
			Clark C30L	**Clark CMP40**	**Clark CMP60**
General Information					
Manufacturer			Clark	Clark	Clark
Model	Manufacturer's designation		C30L	CMP40	CMP60
Load capacity		lbs(kg)	6000 (3000)	8000 (4000)	13,500 (6000)
Load center	Fork face to load CG	in(mm)	24 (500)	24 (500)	24 (600)
Drive unit	Type		LPG	Diesel	Diesel
Operator type			Rider counterbalanced	Rider Counterbalanced	Rider Counterbalanced
Tire type			Pneumatic	Pneumatic	Pneumatic
Wheels (x=driven)	Front/rear		2 x / 2	2x / 2	4x / 2
Basic Dimensions					
Upright1	Maximum fork height, full capacity	in(mm)	170 (4320)	169 (4295)	157 (4000)
	Lift height (preferred triple upright)	in(mm)	189 (4800)	130 (3300)	137 (3500)
	Free lift1	in(mm)	57.7 (1466)	3.9 (100)	4.3 (110)
Upright tilt	Back/forward (see tilt specifications)	degrees	5/6	10/8	10/15
Fork	Std. Fork size (TxWxL)	in(mm)	1.75x4.8x42 (45x122x1070)	2x5x48 (50x122x1220)	2.4 x 6 x 48 (60 x 150 x 1220)
Overall dimensions	Length to fork face1	in(mm)	105.0 (2668)	121.6 (3090)	139 (3530)
	Width over drive axle	in(mm)	48.7 (1237)	61 (1550)	83 (2115)
	Height, upright lowered1	in(mm)	85.8 (2180)	94.7 (2405)	108 (2750)
	Height, upright extended w/ load backrest1	in(mm)	237 (6020)	178 (4520)	186 (4720)
	Height, overhead guard	in(mm)	85.8 (2180)	88.9 (2257)	93 (2360)
Turning radius	Outside	in(mm)	94.7 (2405)	111.4 (2830)	134.3 (3410)
Load center distance	Center of drive axle to fork face1	in(mm)	18.8 (477)	22.4 (570)	24.8 (630)
Right angle stack aisle	Add load length and clearance1	in(mm)	113.5 (2882)	133.8 (3400)	159.1 (4040)
Performance					
Stability	According to ANSI B56.1		Yes	Yes	Yes
Speed3	Travel speed, max w/load	mph(kph)	12.5 (20.1)	11.7 (18.8)	16.3 (26.2)
	Travel speed, max w/o load	mph(kph)	13.2 (21.2)	12.3 (19.9)	17.7 (28.4)
Speed on grade, loaded	5%, loaded3	mph(kph)	10.7 (17.2)	10.1 (16.3)	(3rd Gear) 8.3 (13.3)
	10%, loaded3	mph(kph)	4.1 (6.6)	6.2 (10.0)	(2nd Gear) 5.3 (8.5)
	15%, loaded3	mph(kph)	2.5 (4.0)	2.9 (4.7)	(2nd Gear) 3.3 (5.3)
Lift speed, loaded/empty	Standard upright3	fpm(ms)	102/124 (.52/.63)	86/95 (.44/.48)	83/83 (.42/.42)
	Triple stage upright3	fpm(ms)	98/120 (.50/.61)	86/95 (.44/.48)	
Lower speed,loaded/empty	Standard upright	fpm(ms)	89/89 (.45/.45)		85/85 (.43/.43)
	Triple stage upright	fpm(ms)	85/85 (.43/.43)		
Drawbar pull, maximum	With load3	lbs/N	4700 / 20906	7,577 (33705)	17,875 (79500)
				3,933 (17446)	4,900 (21770)
Gradeability	At 1 mph (1.6 kph) with load3	%	22.8	33.5	45.8 / 21.5
	Maximum with/without load1,3	%	29.4 / 19.2	37.0/21.7	
Weights					
Service weight		lbs(kg)	9786 (4439)	14,061 (6378)	20,101 (9118)
Axle loading	With load, front1	lbs(kg)	14,213 (6447)	18,547 (8413)	29,962 (13591)
	With load, rear1	lbs(kg)	1573 (713)	3,229 (1465)	3,366 (1527)
	Without load, front1	lbs(kg)	4271 (1937)	6,598 (2993)	9,338 (4236)
	Without load, rear1	lbs(kg)	5515 (2502)	7,462 (3385)	10,762 (4882)
Chassis					
Tires	Number, front/rear		2-2	2-2	4-2
	Size, front	in	8.15x15 - 14PR	8.25 x 15 - 14 ply rating	8.25 x 15 - 14 ply rating
	Size, rear	in	6.50x10 - 12PR	7.00 x 12 - 14 ply rating	
Wheelbase		in(mm)	66.9 (1700)	76.8 (1950)	86.6 / 2200
Track	Front/rear	in(mm)	40.5/35.9 (1028/912)	51.0/45.3 (1295/1150)	62.4/58.9 (1584/1495)
Ground clearance	Minimum/at center of wheelbase	in(mm)	5.9/6.5 (150/165)	6.8/9.0 (173/230)	8.1/10.0 / 205/254
Service brake	Type		Drum	Wet Disc	Power Assist Drum & Shoe
Parking brake	Actuation		Foot	Lever	Lever
Steering	Type		Hydrostatic	Hydrostatic	Hydrostatic
Drive Line					
Engine	Manufacturer/model		Mitsubishi / 4G64	Perkins / 1104C.44	Perkins / 1104C-44
	Rated output3,4	HP/kW@rpm	47.5 / 35.4 @ 2250	82.8/61.5 @ 2200	82.8/61.5 @ 2200
	Torque3,4	Lb-ft/Nm@rpm	120 / 163 @ 1400	223/303 @ 1400	223/303 @ 1400
	Speed, max governed	rpm	2650	2400	2400
	Cylinders/displacement	cu. In.-liters	4 / 143 - 2.4	4 / 268-4.4	4 / 268 / 4.4
Transmission	Manufacturer/type, speeds F/R		Clark/Powershift, 1/1	Powershift, 2 / 2	Clark/T12000 Series, 3/3
Hydraulic pressure	For attachments	PSI/Bar	Adjustable	2000 (137)	2030 / 140
Sound level	Avg. at operator's ear per ISO	dB(A)	78	80	83
Pricing			NA	NA	NA

5.9.2.1 Sources of supply for mobile breakbulk and bulk handling equipment:

Sources of supply for mobile breakbulk and bulk handling equipment are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

1 Forklifts

Supplier: **CDI Equipment, Ltd.**
Address: 926 N. Sam Houston Parkway
Houston, TX 77032
USA
Telephone: 1-903-753-4481
Fax: 1-903-758-6320
E-mail: rreed@casece.com
Contact: Renny Reed
Web www.casece.com/dws/dealers/esscorp

Supplier: **Lee Tractor Co., Inc.**
Address: 10203 Airline Highway
St. Rose, LA 70087
USA
Telephone: 1-504-467-6794
Fax: 1-504-467-6799
E-mail: leetractorsales@bellsouth.net
Contact: Don Mensen
Web NA

Manufacturer:

Supplier: **Case Equipment**
CNH America LLC
Address: 7000 Durand Ave
Racine, WI 53406
USA
Telephone: 1-262-636-7055
Web site http://www.casece.com

Supplier: **Clark Equipment Company (Inc)**
Address: 200 Chestnut Ridge Rd
Woodcliff Lake, NJ 07677-7703
USA
Telephone: 1-201-573-0123
E-mail: NA
Contact: NA

2 Front Loaders

Supplier: **Rush Equipment Center**
Address: 10100 N Loop East
Houston, TX 77029
USA

Telephone: 1-713-679-6700
Fax 1-713-674-0305
E-mail: fullere@rush-enterprises.com
Contact: Ed Fuller
Web: http://www.rushequipcenters.com

Supplier: **Brookside Equipment Sales, Inc**
Address: 7707 Mosley Rd.
Houston, TX 77017
USA
Telephone: 1-713-943-7100
Fax: 1-713-943-9102
E-mail: operez@brooksideusa.com
Contact: Octavio Perez
Web: http://www.brooksideusa.com

Supplier: **Sunshine Equipment Co., Inc.**
Address: 2300 Hwy 70E
Donaldsonville, LA 70346
USA
Telephone: 1-225-473-9861
Fax: 1-225-473-3059
Web: http://www.sunequip.com

Supplier: **Duhon Machinery**
Address: 10460 West Airline Highway
St. Rose, Louisiana 70087
USA
Telephone: 1-504-466-5495
Fax: 1-504-466-5539
E-mail: sales@duhonmachinery.com
Contact: Sid Duhon
Web: http://www.duhonmachinery.com

Supplier: **Bobcat of Houston**
Address: 8464 Gulf Freeway
Houston, TX 77017
USA
Telephone: 1-713-645-1234
Fax: 1-281-477-8734
E-mail: mikes@bobcatofhouston.com
Contact: Mike Strittmatter
Web: http://www.bobcatofhouston.com

Manufacturers:

Supplier: **John Deere**
Address: Deere & Company
1 John Deere Place
Moline, IL 61265
USA
Telephone: 1-309-765-8000

Fax:	1-309-765-5671
Web site	http://www.deere.com

Supplier:	**Bobcat Company**
Address:	250 E. Beaton Dr. West Fargo, ND 58078 USA
Telephone:	1-701-241-8700
Web site	http://www.bobcat.com

3 Dozers

Supplier:	**Mustang Tractor & Equipment Co.**
Address:	12800 Northwest Fwy Houston, TX 77040 USA
Telephone:	1-713-460-2000
Fax:	NA
E-mail:	tfisk@mustangcat.com
Contact:	Todd Fisk
Web:	http://mustang.cat.com

Supplier:	**Louisiana Machinery Co.**
Address:	3799 W Airline Hwy Reserve, LA 70084 USA
Telephone:	1-985-536-1121
E-mail:	gweimer@louisianamachinery.com
Contact:	Greg Weimer
Web:	http://louisiana.cat.com

Manufacturer:

Supplier:	**Caterpillar Inc.**
Address:	100 NE Adams St. Peoria, IL 61629 USA
Telephone:	1-309-675-1000
Fax:	1-309-675-1182
Web site	http://www.cat.com

5.10 Evaluation of existing and future projections, by commodity, of the dry bulk market

This forecast for the Port of Cortes, Honduras includes forecasts for all commodity groups imported and exported through the Port. The forecast was prepared by Michael L. Sclar Associates, Inc. in conjunction with DMJM Harris.

The following table, Table 5.10-1, is the forecast summary.

The base data for the forecast are the reported trade data for the Port of Cortes in 2004. The forecast process identified Honduras trade partners for each commodity from UN data for 2003 and applied the partner shares to the Port of Cortes trade for 2004. The Port of Cortes trade by partner was then forecast based on the Global Insight long range forecasts for Central America with the applicable trade partner by commodity.

Each forecast commodity table includes three sections - (a) the UN reported commodity trade data by partner, (b) the Global Insight forecast by partner region, and (c) the calculation of the forecast of Port of Cortes 2004 commodity trade allocated by partner country and forecast by the Global Insight forecast. For some commodities adjustments were made to account for trade through Pacific Coast Honduras ports (petroleum products) and for intra Central America trade that might not be shipped by sea. In addition, some commodities required value-to-tonnage conversion where only the value was reported to the UN. For Petroleum Products, the data reported by Honduras and the data reported by trade partners were combined to develop the base data for the forecast.

The forecast of trade for the Port of Cortes is for moderate growth over the long term with total trade increasing at an average annual growth rate of 2.55 percent. Container trades are forecast to grow at rates above 3 percent (3.8 percent for imports and 3.14 percent for exports). Dry bulk imports are projected to increase at an average rate of 2.27 percent per year.

A supplemental section analyzed Journal of Commerce (JoC) data for Central America-US trade during May 2005 to assess the potential for diversion of trade from neighboring countries to the Port of Cortes. The analysis showed that the Port of Cortes represents the largest port in terms of TEU trade with the US. The next two largest ports are both in Guatemala. Puerto Barrios is primarily a proprietary banana port with services provided by the major fruit companies. The Port of Santo Tomas de Castillo is slightly further away from the Port of Cortes than Puerto Barrios. It is served by liner operators that also serve the Port of Cortes, including Crowley, Maersk-Sealand and Seaboard.

The analysis indicates TEUs from the Port of Santo Tomas de Castillo could be diverted to the Port of Cortes. However, it should be noted that the vessels calling the Port of Cortes also call the Port of Santo Tomas de Castillo on the same day.

One carrier, Seaboard operates an additional loop which calls only the Port of Cortes.

Table 5.10-1: Forecast Summary: Port of Cortes Imports and Exports by Commodity Group, 2004 – 2024

Table 5.10-1
Forecast Summary

Port of Cortes Base																									
Imports	**2003**	**2004**	**Imports**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Petroleum derivatives	1,229,332	1,237,605	Petroleum Products	1,237,605	1,263,426	1,279,893	1,281,078	1,296,315	1,307,091	1,318,027	1,329,868	1,341,306	1,353,147	1,365,448	1,377,221	1,389,021	1,401,869	1,414,538	1,426,719	1,439,231	1,451,955	1,464,927	1,477,637	1,490,171
Other Nutritional Products	200,962	267,927	ANIMAL FEED STUFF	267,927	275,579	281,847	288,454	297,043	304,991	313,116	321,206	329,417	337,706	346,296	355,250	364,525	374,126	383,993	394,074	404,455	415,142	426,222	437,534	449,239
Corn	227,136	256,680	MAIZE UNMILLED	256,680	267,367	274,555	282,735	291,327	299,267	307,425	315,775	324,257	332,922	342,022	351,695	361,768	372,082	382,690	393,497	404,856	416,202	426,087	440,250	452,602
Fertilizers	219,703	230,868	FERTILIZER,EXCEPT GRP272	230,868	230,965	230,894	230,088	230,368	229,979	229,567	229,106	228,499	227,716	226,494	225,470	224,364	223,271	222,038	220,754	219,321	217,692	216,276	214,547	212,732
Wheat	143,658	182,616	WHEAT, MESLIN, UNMILLED	182,616	188,740	193,823	199,595	205,664	211,287	217,038	222,938	228,932	235,057	241,488	248,324	255,445	262,735	270,235	277,877	285,767	293,932	302,337	310,940	319,818
Rice	116,353	131,678	RICE	131,678	136,112	139,777	143,934	148,310	152,361	156,503	160,750	165,084	169,473	174,103	179,024	184,149	189,392	194,784	200,275	205,943	211,803	217,834	224,002	230,369
Mineral coal	89,464	126,474	COAL	126,474	130,024	133,446	137,411	141,835	145,998	150,193	154,448	158,758	163,166	167,530	171,883	176,262	180,666	185,087	189,498	193,855	198,228	202,612	206,949	211,338
	1,007,276	1,198,243	Dry Bulk Imports	1,198,243	1,228,816	1,254,153	1,282,216	1,314,565	1,345,903	1,373,871	1,404,222	1,434,927	1,466,040	1,497,934	1,531,647	1,566,512	1,602,275	1,638,825	1,675,976	1,714,037	1,753,198	1,793,369	1,834,221	1,876,297
Iron and Steel	163,995	127,988	Iron and Steel	127,988	131,065	135,326	137,624	140,600	143,261	145,991	148,784	151,470	154,339	157,643	160,940	163,848	166,911	169,838	172,696	175,454	178,326	181,351	184,347	187,429
Chemical Products	88,831	108,020	Chemical Products	108,020	111,119	113,445	115,767	118,574	121,029	123,460	125,844	128,098	130,236	132,276	134,268	136,096	137,923	139,633	141,209	142,625	144,082	145,408	146,636	147,731
Container Tare Weight	455,145	503,871																						
Domestic Intransit	355,545	317,728																						
Foreign Intransit	310,423	375,029																						
Free Trade Zone	426,412	475,409																						
Container Subtotal	1,547,525	1,672,037	Container Subtotal	1,672,037	1,754,374	1,839,129	1,907,383	1,991,936	2,071,107	2,151,465	2,232,700	2,313,324	2,395,384	2,479,663	2,569,337	2,659,857	2,756,216	2,855,164	2,956,731	3,062,357	3,172,059	3,285,986	3,403,733	3,526,611
	4,036,959	4,343,893	Subtotal	4,343,893	4,498,821	4,621,946	4,724,069	4,861,992	4,986,391	5,112,813	5,241,419	5,369,128	5,499,145	5,632,964	5,772,432	5,915,334	6,065,193	6,217,997	6,373,332	6,533,704	6,699,619	6,871,041	7,046,574	7,228,238
Others	93,721	143,960																						
Other	177,723	210,815																						
Other Total	271,444	354,775	Other Total	354,775	367,428	377,484	385,625	397,069	407,249	417,574	428,076	438,506	449,127	460,056	471,447	483,118	495,357	507,837	520,524	533,622	547,172	561,173	575,509	590,348
Total Imports	4,308,403	4,698,668		4,698,668	4,866,249	4,999,430	5,109,694	5,259,062	5,393,640	5,530,387	5,669,497	5,807,637	5,948,272	6,093,020	6,243,879	6,398,452	6,560,550	6,725,834	6,893,856	7,067,326	7,246,791	7,432,214	7,622,082	7,816,584
					3.6%	2.7%	2.2%	2.9%	2.6%	2.5%	2.5%	2.4%	2.4%	2.4%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.6%	2.6%	2.6%
Exports	**2003**	**2004**	**Exports**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Bananas	271,189	331,834																						
Melons	132,246	102,651																						
Fruit and Nuts	403,435	434,485	Fruit and Nuts	434,485	449,451	464,891	481,597	495,010	507,952	520,120	531,061	542,136	553,457	565,302	575,752	585,615	595,417	604,368	612,861	620,630	627,898	635,154	642,114	648,740
Coffee	141,039	172,312	Coffee	172,312	173,319	174,040	174,223	174,147	173,838	173,569	173,275	172,886	172,640	172,341	171,889	171,390	170,858	170,260	169,701	169,058	168,453	167,829	167,205	166,605
Wood	112,908	123,824	Wood	123,824	131,112	134,724	138,159	141,333	144,452	147,455	150,409	153,483	156,670	160,189	163,410	166,501	169,558	172,585	175,604	178,626	181,617	184,684	187,738	190,868
Vegetable Products	44,960	72,207	Vegetable Products	72,207	73,870	75,436	76,342	77,875	79,367	80,828	82,229	83,571	84,913	86,243	87,506	88,760	90,009	91,245	92,476	93,698	94,921	96,157	97,369	98,514
Container Tare Weight	452,145	493,113																						
Merchandise Other Countries	263,521	331,981																						
Free Trade Zone	324,792	362,570																						
Container Subtotal	1,040,458	1,187,664	Container Subtotal	1,187,664	1,251,386	1,300,720	1,348,169	1,394,657	1,439,661	1,485,139	1,529,840	1,574,766	1,621,523	1,671,050	1,719,236	1,768,734	1,819,839	1,871,030	1,922,655	1,975,923	2,030,288	2,086,209	2,144,024	2,203,593
Sugar/Molasses (Shown as Other in Port Data)	71,405	122,588	Sugar/Molasses	122,588	122,974	123,689	124,490	125,577	126,479	127,390	128,441	129,525	130,623	132,218	133,516	134,718	136,106	137,510	138,960	140,093	141,619	143,153	144,665	146,215
			Subtotal	2,113,080	2,202,111	2,273,501	2,342,979	2,408,599	2,471,769	2,534,501	2,595,254	2,656,367	2,719,837	2,787,342	2,851,312	2,915,718	2,981,789	3,047,018	3,112,458	3,178,027	3,244,797	3,313,167	3,383,116	3,454,638
Other	183,777	200,278	Other	200,278	208,716	215,483	222,068	228,287	234,275	240,220	245,978	251,771	257,786	264,185	270,248	276,382	282,614	288,797	294,999	301,214	307,542	314,024	320,652	327,431
Total Exports	1,996,002	2,313,356	Total Exports	2,313,356	2,410,827	2,488,983	2,565,047	2,636,886	2,706,044	2,774,721	2,841,233	2,908,138	2,977,623	3,051,527	3,121,560	3,192,070	3,264,403	3,335,814	3,407,458	3,479,241	3,552,339	3,627,211	3,703,768	3,782,067
					4.2%	3.2%	3.1%	2.8%	2.6%	2.5%	2.4%	2.4%	2.4%	2.5%	2.3%	2.3%	2.3%	2.2%	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Total Imports Plus Exports	6,306,405	7,012,026	Total Imports Plus Exports	7,012,026	7,277,076	7,488,413	7,674,940	7,895,958	8,099,684	8,305,109	8,510,729	8,715,775	8,925,895	9,144,547	9,365,436	9,590,522	9,824,954	10,061,649	10,301,313	10,546,567	10,799,130	11,059,424	11,325,850	11,600,650
					3.6%	2.9%	2.5%	2.8%	2.6%	2.5%	2.5%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%

Data Sources and Analysis

The forecast analysis is based on several data sources:

- The base data for the forecast is the reported trade from the Port of Cortes for 2004. This data provides the primary source of data on the trade moving through the Port of Cortes. The Port data is reported through the year 2004 and also includes information on cargo handling method. In addition, the reported trade data identifies seaborne trade through other ports in Honduras. The base data is summarized in Table 5.10-2.

- The UN Commodity Trade Statistics Database (UN Comtrade) provided data on Honduras trade by commodity and trade partner. Data from Honduras have been reported through 2003. Data from significant Honduras trade partners, such as the United States, have been reported through 2004. The UN data provided information on the trade partners that participate in Honduras international trade. The UN data was used to calculate the distribution of trade by commodity and trade partner country.

- The trade forecasts were based on Global Insight trade forecasts which are available by commodity group and trade region of origin or destination. Forecasts by commodity group for the region Other Central America, which includes Honduras, provided projected growth by commodity and partner region and were combined with the detailed trade through the Port of Cortes with partner distributions based on the UN trade data to forecast Port of Cortes trade by partner.

In each commodity table (Tables F5.10-8 through 23, which are included in Appendix F), the forecasts were developed in three sections. The first section includes Honduras trade data by partner for 2003, the latest year reported to the UN. The UN trade data provided the trade data by commodity by trade partner. The second section includes the Global Insight forecast by trade partner region for the commodity group. The Global Insight forecasts are included as a ratio to the base year of 2004.The third section forecasts the growth in trade for the commodity by trade partner by combining the partner share of Honduras trade with the Global Insight growth forecast. (The 2003 partner share is applied to the 2004 trade for the Port of Cortes.)

The data for the analysis of divertible trade potential is based on JoC data between the US and 5 countries in Central America (Honduras, Guatemala, Nicaragua, El Salvador and Belize) during the latest month of available data, May 2005. The analysis of the TEU trade by port and carrier is included in Tables 5.10-3 through 6.

Table 5.10-2
Port of Cortes Base

Import		**2003**	**2004**
Total		4,308,403	4,698,668
Derivados de petroleo	Petroleum derivatives	1,229,332	1,237,605
Otros Productos Alimenticios	Other Nutrional Products	200,962	267,927
Maiz	Corn	227,136	258,680
Fertilizantes	Fertilizers	219,703	230,868
Trigo	Wheat	143,658	182,616
arroz	Rice	116,353	131,678
Hierro y acero	Iron and Steel	163,995	127,988
carbon mineral	Mineral coal	99,464	126,474
Productos Quimicos	Chemical Products	88,831	108,020
Otros	Others	93,721	143,960
Tara de Modulos	Container Tare Weight	455,145	503,871
Nacional En Transito	Domestic Intransit	355,545	317,728
Extranjero En Transito	Foreign Intransit	310,423	375,029
Meraderia Zona Libre	Free Trade Zone	426,412	475,409
Subtotal	Subtotal	4,130,680	4,487,853
Other	Other	177,723	210,815

Export		**2003**	**2004**
Total	Total	1,998,002	2,313,358
Bananos	Bananas	271,189	331,834
Café	Coffee	141,039	172,312
madera	Wood	112,908	123,824
Melones	Melons	132,246	102,651
Productos de Hortalizas	Vegetable Products	44,980	72,207
Otros	Other	71,405	122,588
Tare de modulos	Container Tare Weight	452,145	493,113
Mercaderia Otros Paises	Merchandise Other Countries	263,521	331,981
Meraderia Zona Libre	Free Trade Zone	324,792	362,570
Subtotal	Subtotal	1,814,225	2,113,080
Other	Other	183,777	200,278

Divertible TEUs

A sample data set was obtained from the Journal of Commerce for the latest month reported, May 2005. The following two tables show the US TEUs to and from Honduras and its neighboring countries of Nicaragua, Guatemala, El Salvador and Belize.

The Journal of Commerce data are available for the US but not for other major trade partners of the Port of Cortes. As shown in the following two tables the import and export TEUs to and from the US to and from the five countries are predominantly moved through the Port of Cortes.

For imports to the region, the Port of Cortes handled 18,006 TEUs or 41.5 percent of the 43,387 TEUs imported to the region in May 2005. For exports to the region, the Port of Cortes handled 13,949 TEUs or 47.3 percent of the 29,509 TEUs exported from the region.

In both directions, the next largest ports are Porto Barrios in Guatemala and Puerto Santo Tomas de Castilla also in Guatemala. These two ports handled an additional 36.7 percent of US exports to the region and an additional 37.1 percent of US imports from the region. In both directions, these three ports account for approximately 80 percent of the US TEUs to and from the region. Both Porto Barrios and Puerto Santo Tomas are relatively close to the Port of Cortes and with improved land transportation could provide a source of divertible TEUs to the Port of Cortes. The major carriers at Puerto Santo Tomas de Castilla also call at the Port of Cortes. In most cases the same vessels call the Port of Cortes and Puerto Santo Tomas de Castillo on the same day with one exception. Seaboard Marine operates an additional string of vessels that call the Port of Cortes and not Puerto Santo Tomas de Castilla.

Table 5.10-3
Central America Import TEUs by Port
US Trade May 2005

USPORT	Port	Sum Of TEUS	Percent of Total
	ACAJUTLA Total	1415.55	
	BELIZE CITY Total	456.88	
	BIG CREEK Total	0	
	CARTAGENA Total	10	
	CAUCEDO Total	8.78	
	CORINTO Total	10	
	CORN ISL Total	4.75	
	EL BLUFF Total	9.45	
	GUANAJA Total	0	
	GUAYAQUIL Total	2	
	HONG KONG Total	35	
	KINGSTON Total	229.01	
	MANZANILLO Total	10.18	
	PT LIMON Total	117.21	
	PTO BARRIOS Total	8726.2	20.1%
	PTO CABEZAS Total	4.35	
	PTO CASTILLA Total	3132.91	7.2%
	PTO CORTES Total	18006.87	41.5%
	PUNTA MANZANI Total	2151.78	
	QUETZAL Total	1638.18	
	QUEZALTENANGO Total	172.39	
	ROATAN Total	26.02	
	SAN JOSE Total	0	
	STO TOMAS Total	7197.57	16.6%
	TOKYO Total	22	
	Grand Total	43387.08	

Table 5.10-4
Central America Export TEUs by Port
US Trade May 2005

USPORT	Port	Sum Of TEUS	Percent of Total
	ACAJUTLA Total	772.4	
	BALBOA Total	262.1	
	BELIZE CITY Total	788.17	
	BIG CREEK Total	36.48	
	CORINTO Total	75	
	CORN ISL Total	2.36	
	FRENCH HBR Total	22.32	
	GUANAJA Total	4.42	
	HAINA Total	2	
	HALIFAX Total	16	
	HONG KONG Total	2	
	KINGSTON Total	194.45	
	LA CEIBA Total	1	
	OMOA Total	0	
	PT AU PRINCE Total	0	
	PT LIMON Total	46	
	PTO BARRIOS Total	5458.8	18.5%
	PTO CASTILLA Total	263.99	
	PTO CORTES Total	13949.14	47.3%
	PUNTA MANZANI Total	964.48	
	QUETZAL Total	1059.43	
	QUEZALTENANGO Total	2	
	ROATAN Total	50.77	
	SAN ANDRES Total	44.91	
	STO TOMAS Total	5489.54	18.6%
	TEGUCIGALPA Total	2	
	Grand Total	29509.76	

Table 5.10-5
Central America Import TEUs by Selected Port
US Trade May 2005

Port	SLINE	Sum Of TEUS	Major Carriers
PTO BARRIOS	AMPL	634.59	AmericanPresidentLines/GWFleet
PTO BARRIOS	CSAV	2	
PTO BARRIOS	DFFC	3223.84	Dole
PTO BARRIOS	GWFL	4865.77	GreatWhiteFleet
PTO CORTES	AIEI	1527.76	
PTO CORTES	AMPL	1017.15	AmericanPresidentLines/GWFleet
PTO CORTES	CRLS	3881.58	Crowley
PTO CORTES	DFFC	1337.52	Dole
PTO CORTES	GRCG	91.24	
PTO CORTES	GWFL	2533.81	GreatWhiteFleet
PTO CORTES	KING	4	
PTO CORTES	LYKE	2	
PTO CORTES	MEXI	4	
PTO CORTES	MLSL	4567.8	MaerskSealand
PTO CORTES	SBMR	3040.01	Seaboard
STO TOMAS	CCNI	1	
STO TOMAS	CRLS	2643.83	Crowley
STO TOMAS	MLSL	1689.35	MaerskSealand
STO TOMAS	NETS	433.57	Network Shipping Galveston
STO TOMAS	NORD	15.46	
STO TOMAS	NYKL	43.21	
STO TOMAS	PONL	18.12	
STO TOMAS	SBMR	2353.03	Seaboard

Table 5.2-6
Central America Export TEUs by Selected Port
US Trade May 2005

Port	SLINE	Sum Of TEUS	Major Carriers
PTO BARRIOS	AMPL	600.57	AmericanPresidentLinesGWFleet
PTO BARRIOS	DFFC	1434.2	Dole
PTO BARRIOS	GWFL	3424.03	GreatWhiteFleet
PTO CORTES	AIEI	533.07	
PTO CORTES	AMPL	838.74	AmericanPresidentLines/GWFleet
PTO CORTES	CRLS	4438.28	Crowley
PTO CORTES	CSAV	4	
PTO CORTES	DFFC	711.29	Dole
PTO CORTES	GWFL	2001.73	GreatWhiteFleet
PTO CORTES	HAPL	3	
PTO CORTES	LYKE	54.39	
PTO CORTES	MEXI	20	
PTO CORTES	MLSL	2425.33	Maersk Sealand
PTO CORTES	SBMR	2713.16	Seaboard
PTO CORTES	SOLY	178.46	
PTO CORTES	ZZZZ	27.69	
STO TOMAS	CACG	6	
STO TOMAS	CRLS	2939.73	Crowley
STO TOMAS	DFFC	2	
STO TOMAS	GWFL	8.15	
STO TOMAS	HAPL	10.96	
STO TOMAS	MLSL	951.11	Maersk Sealand
STO TOMAS	NETS	8	
STO TOMAS	NYKL	51	
STO TOMAS	PONL	11.23	
STO TOMAS	SBMR	1497.36	Seaboard
STO TOMAS	ZIML	4	

Commodity Forecasts

The tables in Appendix F include the forecast calculations for the major commodities moved through the Port of Cortes.

As noted earlier, the forecast procedure included three steps. First, the Honduras trade by partner for 2003 was identified from the data reported to the UN. In the second step, the forecast growth rates for the commodity group trade by region from Global Insight were computed. In the third step, the 2004 metric tons of the commodity moved through the Port of Cortes were allocated by trade partner in proportion to the UN trade by partner and the allocated metric tons were forecast at the growth rates by region and commodity from Global Insight. The forecasts for the major partner countries were summarized and the remaining tonnages forecast at the weighted average growth rate of the forecasted partner tons.

For selected commodities, where the UN data did not include complete tonnage detail or where the trade partners were determined to likely move through Pacific ports, adjustments were made to compute the forecasts.

The forecast calculations also include an estimated forecast of Port of Cortes trade by trade partner.

5.11 Development of cargo-handling requirements for each commodity group

5.11.1 General Requirements for bulk fertilizers and non agricultural commodity imports

Bulk fertilizers constitute the primary nonagricultural commodities presently unloaded at the Port of Cortes, and consist of the following: muriate of potash, phosphates such as diammonium phosphate and triple super phosphate, plus nitrogen materials -- urea, calcium ammonium nitrate and ammonium nitrate. (Ammonium nitrate is usually shipped in bags rather than bulk because of its explosive hazard, and thus will not be considered here). It is expected that this cargo mix will continue, and may grow over time as requirements for production and exports of Honduran fruits and vegetables to the world market increase.

Ship unloading systems for fertilizers and non agricultural product

At cargo terminals handling large volumes of bulk fertilizer these materials are most easily handled by high speed shore-based gantry-mounted or pedestal-mounted revolver / whirley cranes or horizontal boom trolley cranes with 15 to 20 m3 clamshell buckets. These are supported by lightweight dozers which are placed in the ship hold early in the unloading. This is in order to keep the cargo level as the bucket removes the material, until the hold bottom is reached. Free digging to reach bottom can result in bridging of fertilizers, which can cause a collapse or cave in, and may result in fatalities to workmen working in the hold by hand or operating front loaders. Once the floor is reached, small front loaders placed in the hold can assist in hold clean up. Manpower requirements when working with a shore based crane are minimal, perhaps a maximum of 4 hold men , a signal man , and 2 to 3 dozer / front loader operators, plus wharf cleaners, depending on dust and spill controls at hopper transfer to delivery system.

This operation is best accomplished on a round-the-clock basis, seven days per week. This minimizes berth congestion and saves vessel cost, which can now be at the level of some USD 15,000 to 17,000 per day.

Such a procedure requires a transfer capacity capable of transporting to port storage or load out system at comparable level. Vessels with such cargoes can be discharged with a floating crane with elevated revolver crane such as an AmClyde model 28 or 24. A contractor familiar with bulk unloading may be willing to offer this equipment on an agreement of several years duration. This would be a way to improve bulk unloading speed and capacity during the period while a new bulk terminal, if approved, would be under construction. Such a floating crane, together with a breasting camel (or camels) would be able to work well at the existing Berth 3. In addition to the above, ships gear or ships cranes can be used for unloading bulk fertilizer and other bulk cargo, but not at the speed of the above described systems.

Fig. 5.11-1 Floating Revolving Cranes Working Various Cargoes

Present methods, described in Section 5.2, use ships' gear, or a mobile shore crane. Any of the above systems can also be used for most agricultural commodities.

Conveying systems for bulk fertilizer and other non agricultural commodities.

Regardless of the means of unloading, whether by ships' gear, mobile crane or bulk unloader, there are two other essential requirements: 1) a conveying or transport system from unloader to storage or delivery point which is designed for the peak unloading capacity, and 2) adequate storage and delivery capacity. Dust suppression and spillage controls would be included in such a system, along with a calibrated belt weighing device to provide up to the minute data on production, and a final outturn on amount of cargo received. This would be checked against vessel loading record and draft measurements, to arrive at an agreed volume received. This would be further checked by outturn from storage at completion of shipment to receivers.

Typical conveying systems for rapid and delivery between vessel and storage or transport of fertilizer, ores, cement and other similar materials consist of one single or a series of belt conveyors mounted on a trestle, or inside a building or other enclosure to reduce wind and weather losses. Belt idlers on which the conveyor belt rides, come in several pitches, which are selected by the designer or installer according to the commodities to be transported. Hoppers and transfer points are carefully designed and adjusted to minimize spillage and dust at transfer points. Other conveying systems which are used to transport materials are screw systems and pneumatic or air slide systems. These are more often seen with agricultural commodities, cement, and for short transfer from storage to overland carrier.

Portable conveyor belts can also be utilized for transfer from vessel to storage or to vehicle, barge or rail, where the distance is not great and the need not continuous. These could be suitable for temporary use with a floating crane as described above.

5.11.2 Requirements for bulk agricultural commodities

Bulk agricultural commodities such as are handled presently at the Port of Cortes, including wheat, corn, soybean meal, rice, barley, other feed products, and red beans, can be handled with the same equipment and systems as for bulk fertilizers described above.

They can also be handled by the use of pneumatic systems such as portable units, sometimes known as vacuvators, or by permanently installed systems. Such systems are provided by several companies, such as Fuller, Vacuvator, and others.

They can provide unloading or loading rates of up to 250 to 300 tons per hour. These pneumatic systems are used regularly at port terminals handling agricultural commodities exclusively, but as in the case of the Port of Cortes, where bulk products other than agricultural commodities are handled, the inability to accommodate all types of bulk material can limit their applicability. It would be possible to install both forms of unloading systems, at one berth, but this would take up more space, require more maintenance and capital. If there is need for an exclusive agricultural commodity facility, this would require an additional berth, or two separate unloaders. Based on present volume and future growth this seems inadvisable.

Thus, the flexibility of a clamshell bucket operation with a shore-based crane and a belt conveyor transfer to suitable storage behind the wharf offers the optimum situation for the Port of Cortes at this time.

5.12 Prepare overall conceptual requirements for a bulk terminal including equipment, storage, conveyors, truck loading, weighing, traffic control, etc.

Regardless of the commodities and bulk materials to be handled at a bulk cargo terminal, all such terminals require certain common features and capabilities . Specific criteria for handling bulk fertilizers, miscellaneous bulk and agricultural commodities at the Port of Cortes are presented in this section. Primarily they are the following:

5.12.1 Common criteria for bulk terminals regardless of commodity type

Adequacy of vessel berth or berths

Bulk cargo vessels are primarily ships which have been designed specifically to carry a range of bulk cargoes, with wide hatches and uncluttered holds to permit easy loading and free digging for discharge. Based on the current and projected bulk traffic at the Port of Cortes, it is expected that bulk cargo vessels arriving Cortes will range in the neighborhood of 30,000 dwt to 60,000 dwt, with individual cargoes ranging from 15 - 25,000 tons to 30,000 - 60, 000 tons, with the largest being of the Panamax class. It is unlikely that there will be sufficient demand for the use of larger than Panamax class vessels. Thus the vessel berth at such a new bulk terminal should be designed to safely berth the largest of the above class of vessel, while keeping in mind that long-term requirements may require further expansion. To meet the requirement for a single berth to accommodate the expected bulk traffic at Cortes should be as follows:

Approach channel depth	14 m
Water depth along side	14 m
Length of vessel berthing area	300 to 320 m
Length of berth	300 m

Vessel mooring system: Adequate to hold a 65,000+ dwt vessel (Panamax class) during winds of 80 knots with gusts exceeding 90 knots, and with mooring devices and mooring dolphins designed accordingly. A modern fendering system suitable for vessel size will be needed to protect the vessel's hull and the wharf.

Unloading / loading equipment

As described in section 5.11 above, there are a number of alternative systems for discharging bulk cargo of the types expected at Cortes over the next 10 to 15 years. Due to the amount bulk exports, separate facilities for loading bulk to vessel are not feasible at this time. If such were to develop, a shuttle conveyor system with reclaim from port storage could be installed, elevated to ride over the vessel for loading. Such a system would include a mechanical trimmer. Since this is not a major factor in bulk volume, special facilities for bulk cargo loading will not be further described here.

With regard to equipment for unloading and delivering the bulk cargo to its internal destination, the mix of bulk cargo suggests that the overall concept should provide one single system capable of unloading various types of bulk cargo from vessels, with a conveying system designed accordingly. In addition, at Cortes, with its limited container berthing and crane capacity, selection of a bulk unloading crane should consider its ability to act as an auxiliary crane for containers, project cargoes and other special cargoes when the bulk berth is unoccupied and congestion exists at the container berths. Such flexibility is invaluable during congestion or in event of a container crane breakdown or casualty. Figures 5.12-1a to c show several types of bulk cargo cranes in use elsewhere.

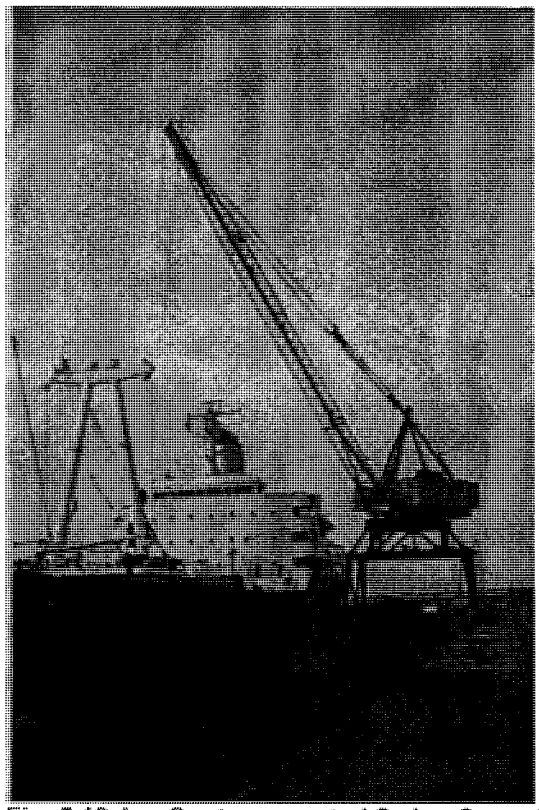


Fig. 5.12-1a Gantry-mounted Swing Crane Unloading to Rail Cars

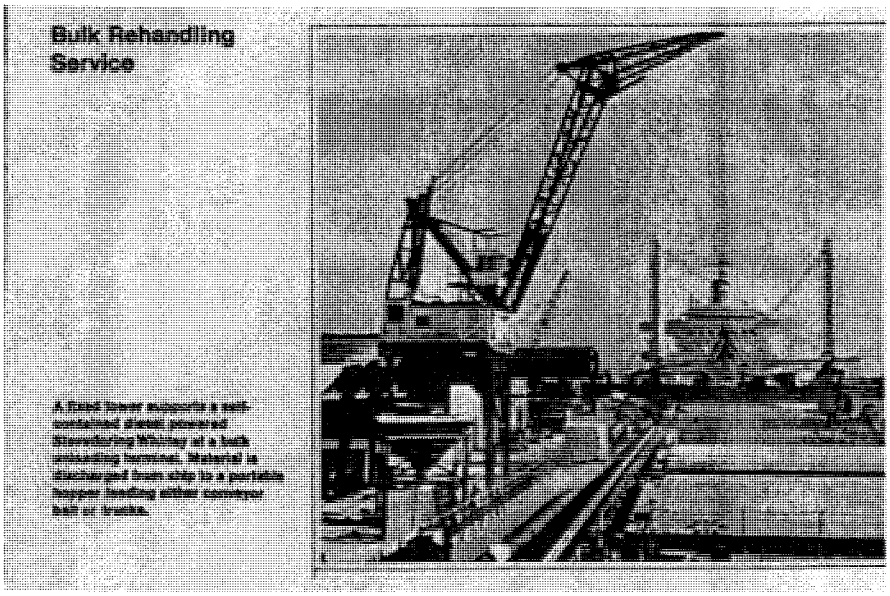


Fig. 5.12-1b Stationary Revolver Crane Unloading to Portable Hopper and Conveyors to Storage

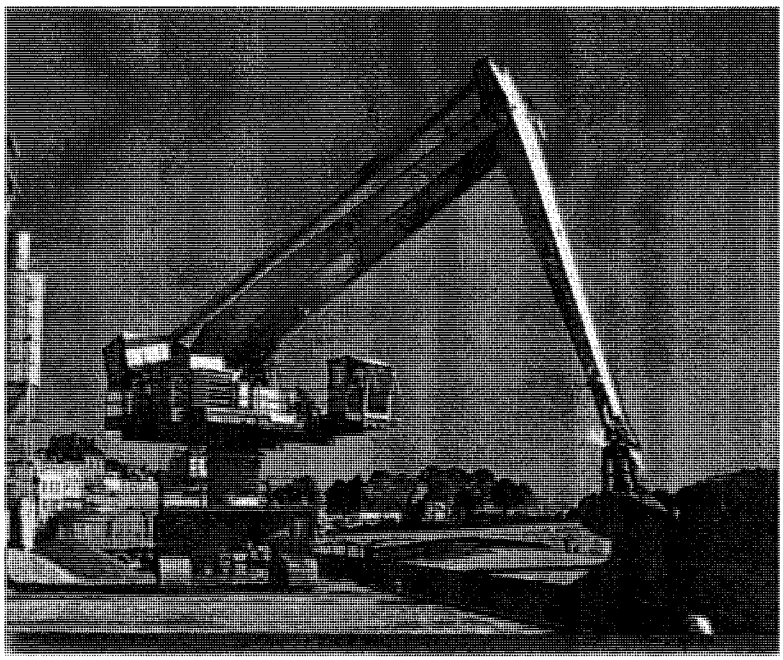


Fig. 5.12-c Crawler-mounted Mobile Crane

Storage Facilities

Storage facilities should provide separate storage for fertilizers and chemicals, with other storage space for agricultural commodities. Where possible, one standard type of storage should be provided, but the corrosive nature of fertilizers and the dust explosion hazards of agricultural commodities must dictate the

selection of storage chosen at the Port of Cortes. In addition, a concrete or asphalt pad should be included in the storage area for bulk ores or other materials capable of outside storage. Storage sheds, domes, tanks or silos must be equipped with reclaim and delivery systems for load out to land transport. This can be done by front loader, or by installed conveyor or screw reclaim. Likewise, truck loading and weighing service should be designed to avoid duplication wherever possible.

Unloading equipment

Unloading equipment should include a shore crane, on crane rails or crawler mount, either new or used, with free digging capability of a minimum average 300 tons per hour on material of minimum 60 lbs per cu. ft. (28 m3, outreach of to 30 m. from edge of wharf .The crane boom must be able to clear ship side. Crane power may be either diesel electric, or shore power, provided there is reliable and adequate shore power. Operator controls should permit one man operation with foot pedal and one or two hand control, for ease of operation without excessive operator fatigue.

The crane unloading will require at least three shielded clamshell buckets , 10 to 120 cu./ m capacity, in order to accommodate materials of differing density (wt. per cu./m). Delivery from crane bucket will be to a hopper sized to accommodate an open 10 m3 bucket, located where crane swing, if a revolver crane, can be limited to about 90 degrees, or below the crane trolley if a boom trolley crane. Hopper size should be constructed to accommodate a 20 m3 open clamshell bucket, and should contain dust suppression and a vibrator to minimize build up or bridging in the hopper. The hopper will be fitted with a gate system capable of controlling product flow to the adjoining conveying system. Most facilities handling grains and meals use exhaust systems and a fine spray of water to help control dust.

Conveying equipment

Provide a conveying system designed to fit a mix of bulk fertilizers, chemicals and possible future imported bulk highway construction materials, together with the imported agricultural materials. It will take the bulk material from the wharf hopper to an integrated storage area behind the wharf. The conveyor length will be determined by the location of the storage area. Based on the mix of cargo, it is recommended that a 36 to 40-inch belt, with vulcanized seams should be provided. The belt should ride on 36-inch to 40-inch idlers of 35 degree angle. This will greatly reduce spillage and product loss, in addition to reduced cleanup labor. The entire length of this conveyor should be covered by prefabricated fiberglass belt covers or by a framed housing. The system must be accessible for maintenance and lubrication by a walkway. A belt weighing system should be installed at an accessible location along the system, to provide continuous data on unloading progress, and serve as a check on amount delivered against later truck scale outturn, as well as vessel manifest and draft calculations. Power for the conveying system should be supplied from the main power source at the port and should be sized for the maximum load of the system. A continuous and reliable source of power is essential.

A critical point in a conveyor system is at transfer points. These transfer points, such as at the transfer from wharf hopper to belt, and from delivery belt to storage facilities, must be carefully designed and tuned (usually by observation) to avoid spillage. Again a fine spray of water at the critical junctures of belts plus exhaust systems will be needed to control dust and to reduce the danger of dust explosions when handling grains and meals.

Storage facilities and capacity

There are a number of ways to provide for storage of the products to be stored at the Port of Cortes. One of the popular storage methods in the United States is dome storage. The domes can be placed in rows, with a shuttle belt or a belt with tripper, so that the transfer from the conveyor delivering from the wharf can be diverted to the specific dome or storage site designated to store the material being unloaded. Agricultural commodities are similarly stored in tanks, silos and domes containing reclaim systems at the base of the tank or silo. Both domes and tanks or silos can be fed from the top, facilitating the use of a shuttle belt or tripper system for delivery from the wharf conveyor.

Alternatively, "A" frame sheds with reinforced sides can be provided for storage of bulk materials, such as fertilizers and other non agricultural materials. In such case, it is preferred to place the sheds perpendicular to a transfer conveyor, with separate conveyors taking their product by transfer points delivering to a separate conveyor delivering through the end of the shed. Conventional shed type bulk warehouses are constructed so that solid or portable divider walls can be installed to separate one product from another in order to avoid contamination.

Reclaim and truck loading from storage

Reclaim to truck or other carrier from domes or sheds can be by front loader to truck loading conveyor and hopper, or a mechanical system, tubular screw or conveyor, installed in the base of the facility.

Silos and tanks do not lend themselves to reclaim by front loader. However, domes and storage sheds provide excellent working area for front loader operation. It is believed that based on the expected volume over the nest 10-15 years, reclaim by medium to large front loaders of the John Deere model 644, or similar type, would be the most flexible and useful to the bulk operation.

Weighing systems

The installation of a belt weighing device as described above, provides an initial and moment to moment record of the cargo discharged. This will not be the final check on the amount of cargo discharged or delivered to the receiver. Depending on the level of accuracy guaranteed by the belt weight supplier , there will inevitably be a difference in quantity between the amount claimed to have been loaded on the vessel, and the amount calculated by draft survey on completion of the unloading. Thus the final weight of cargo determined by truck scale located at the bulk terminal should be the maximum which can be claimed by the terminal operator. Allowable shrinkage in final outturn should not exceed 1/2 percent. Therefore the bulk terminal should have a truck scale, regularly checked and calibrated, within the terminal at the most convenient location for entering and departing trucks, and manned by a certified weigh master. Alternative belt weighing devices and platform truck scales for weighing vehicles are available from a number of manufacturers.

Traffic access and control

As there is no rail service at the Port of Cortes, all Honduras bulk cargo must move by truck, or by barge or cabotage vessel. Truck traffic is by tandem dump or hopper units or standard stern dump trucks. The current truck route consists of an approach to the proposed bulk area by an unimproved road which skirts the city to the north, entering the port by a road at the west end of town, and into the port by Gate 1, behind and over a truck scale located behind Berth 3. Once loaded, the trucks again pass over the truck scale and then must travel by the road which passes directly behind all of the berths to the eastern exit gate at 15th Street. This leads to the divided highway to San Pedro Sula, as well as the old highway, on which some of the receivers are located.

There is a waiting or marshaling area to the west of the town which should be suitable for holding trucks headed to the bulk storage at future Berth 2. The provision of bulk storage facilities in the open area

behind Berth 3 and future Berth 2 would reduce the amount of surge traffic as at present. Since deliveries can be spaced according to receivers' day-to-day needs, rather than dictated by ship unloading requirements, future traffic will be more orderly. Nevertheless, in planning for the new terminal, a provision for traffic access and control must include improvement of the west access road, the location of a truck scale directly at the entrance/ exit from the storage area and the ability to exit by the western Gate 1. A new gate directly to and from the storage area should be established. Every effort must be made to avoid the passage of heavy truck traffic through the main port area or the city. Possibly a route using 6th Street might make for easier access, but this would put traffic directly through a populated area. More needs to be known about the terrain south of the city before this can be considered.

Gate control should be maintained by the bulk storage operator, with weigh in and out, with a log maintained of entry and exit, in order to prevent theft of materials. One of the risks to the terminal operator is the possibility of theft of whole truckloads by drivers or others or of supplies, tools and stored goods by employees. Surveillance cameras are helpful as a supplement to gate control.

Port security requires greater control of access and egress at the port. Back up congestion of trucks should be restricted to the western marshaling area. This would require communication between the port gate and the marshaling area. For traffic control, there must be proper direction signage inside the storage area and lane marking so that drivers can find the proper site for loading. Storage buildings should be numbered with visible signs to assist drivers, and appropriate signs posted along the approaches to the port in order to direct drivers and visitors to the bulk cargo entrance. No private vehicles should be allowed within the storage area or on the berth, except for special circumstances, and a parking area just inside the gate should be provided.

Management, labor, and capital

Many bulk cargo terminals worldwide are operated under concessionary terms, or may be owned and operated as private investments. A concession for such a bulk terminal has been considered for Cortes both in the past, and recently. Because of the capital cost of constructing a new berth and associated facilities at Cortes, we recommend a concept under which ENP or other government entity, with grant or loan assistance would construct the wharf, provide the wharf crane and primary transfer system to the storage area, meanwhile negotiating a contract with local or international operators for provision of the storage facilities and handling equipment under a long term contract for operation and maintenance of the facilities.

Such a contract would include compensation for the capital investment through dockage fees assessed against the vessel, and wharfage fees on a throughput basis against cargo moving through the facility. The operator would recover his costs through a share of the wharfage plus 100% of the handling and storage fees.

ENP would need to be released from obligations to labor unions to handle this cargo, and from the management aspects of running a bulk terminal, while gaining the expertise of an experienced operator. Local interests could make joint venture offers together with international operators, if local stevedores or other experienced Honduran organizations do not feel able to commit to such risk alone.

Many specialized marine terminals around the world have been provided under special arrangements, such as Build Own Operate (BOO) and Build Operate Transfer (BOT). These arrangements normally apply to very large, long-term commitments with large volumes of cargo over many years. In the case of the Port of Cortes, it is believed that there will not be sufficient bulk cargo to attract offers under these arrangements, but until the market is tested, these alternatives should not be overlooked.

An advantage of such a concession would be the incentive of the operator to endeavor to increase throughput by providing services to users without having to go through government procurement

procedures. In addition, in the concession agreement there should be a provision that, when the bulk berth is not occupied or committed to a vessel, the berth may be used as a supplement to the container berths in event of congestion there. As a multi-purpose berth with crane capability, such a berth will have many uses, in addition to its primary purpose for bulk cargo. Under no circumstances, however, should cargoes other than committed bulk vessels be preempted at the bulk berth. The present system of requiring bulk vessels to vacate Berth 3 in favor of container, fruit, or other cargoes can continue if necessary, but not at the new bulk berth. The establishment of a designated bulk berth is expected to minimize this costly practice.

Responsibility for labor, its benefits, its training and supervision would fall on the concessionaire, not on ENP or the vessel charterer or consignee. Capital cost for storage and handling equipment likewise would rest with an experienced concessionaire, as would maintenance and operational management. Provision for an administration building inside or adjacent to the storage area must be included, in order to provide for management, supervisory staff, and emergency medical service. The building should include bathroom, wash room, shower and change facilities for workmen, as they will be dealing with dusty and unpleasant materials.

Data collection is an important aspect of managing a bulk terminal. An example of the type of useful data which should be collected for efficient operation of such a terminal is shown on Table 5.12-1. As shown on this spreadsheet, virtually all necessary data for managing a marine terminal is shown on one sheet, including profit or loss per vessel and per month for the facility. This data is compiled from a daily report submitted by each shift supervisor.

Table 5.12-1
Example of Summary Data for Bulk Terminal

	Vessel No.	Vessel	Date	Commodity	Vessel to Vessel	Vessel to Storage	Customer	Waiting Time (Hours)	Vessel Waiting Time Cost	Load/ Disc Hours	Total Hours at Dock	Total Tons Per Hour	Long-shore Cost	Long-shore Cost Per Ton	Oper. Eng. Cost	Oper. Eng. Cost Per Ton	Equip-ment Cost		Equip-ment Cost Per Ton	Total Direct Cost	Total Direct Cost Per Ton	Indirect Cost Applied	Indirect Cost Per Ton	Total Cost	Total Cost Per Ton	Total Revenue	Total Revenue Per Ton	P/L
	4361	Irenes Trust	Oct. 1-2	Fluid-alloys, Manganese	8690		Samincorp Interlake Almot	70.25	17580	21	24.75	414	6692	0.77	2586	0.3	7245	1)	0.83	16523	1.9	3476	0.4	19999	230	21891	251	1892
	4362	Pacific Master	Oct. 2-4	Bauxite	5018	43137	Reynolds Metals	29.58	7380	59.25	61.75	813	5085	0.11	5491	0.11	2042 19199	1) 2)	0.44	31817	0.66	2007 25882	0.4 0.6	59706	124	87426	182	27720
	4363	Norfejell	Oct. 5-6	Manganese	34188		Caem. Int.	84.08	21018	40.25	42.62	849	4792	0.14	3662	0.07	13886	1)	0.41	22340	0.65	13675	0.4	36015	105	45982	134	9967
	4359	Zenhoren Maru VI	Oct. 6-9	Bausite	5984	43567	Reynolds Metals	134.25	33540	60.08	61.87	784	11068	0.22	6556	0.13	3039 18817	1) 2)	0.44	39480	0.8	2394 26140	0.4 0.6	68014	137	95199	192	27185
LOSS	4364	Irenes Ambition	Oct. 9-10	Urea	9305		ICEC	155.42	68880	33.67	34.97	276	8866	0.95	3465	0.37	11616	1)	1.25	23947	2.57	3722	0.4	27669	297	23797	256	-3872
LOSS	4365	Revero	Oct. 10-11	Bauxite		14299	Ormet	125	30120	15.67	17.28	913	1531	0.11	1532	0.11	5641	2)	3.95	8704	0.61	8579	0.6	17283	121	11821	83	-5462
	4366	Star Mostanger	Oct. 11-12	Manganese	12185	2994	C. Tennant	119.83	29958	11.17	13.97	1359	1928	0.13	1274	0.09	3084 803	1) 2)	0.26	7289	0.47	4874 1796	0.4 0.6	13759	91	25160	166	11401
LOSS	4367	Banta	Oct. 12-13	Bauxite		26179	Ormet	107.08	26760	37.25	39.67	703	5624	0.21	3789	0.14	13410	2)	0.51	22823	0.87	15707	0.6	38530	147	22062	84	-16468
	4368	Amelia Topic	Oct. 13-16	Bauxite		50858	Reynolds Metals	145.75	36420	61.83	64.62	823	5529	0.11	5749	0.11	22259	2)	4.38	33537	0.66	30515	0.6	64052	126	95411	4188	31359
LOSS	4369	Great Faith	Oct. 16-17	Lump Chrome	7012	617	Chromasco Harbison-Walke	166.5	41640	27.42	29.5	278	9064	0.118	2723	0.36	11911 493	1) 2)	1.63	24191	3.17	2805 370	0.4 0.6	27366	359	13380	175	-13986
	4370	Christoffer Oldendo	Oct. 17-19	Coke	19589		Armco Steel	163.5	40860	38.83	41.38	504	5933	0.3	3212	0.16	13396	1)	0.68	22541	1.15	7836	0.4	30377	155	50156	256	19779
LOSS	4371	Coke Barge	Oct. 19	Coke		1347	Philip Bros			3.17	3.17	425	324	0.24	307	0.23	1141	2)	0.85	1772	1.32	808	0.6	2580	192	2491	185	-89
LOSS	4372	Eastern Treasure	Oct. 19-20	Bauxite		27430	Ormet	200.42	50100	33	36.12	831	3526	0.13	2773	0.1	11880	2)	0.43	18179	0.66	16458	0.6	34637	126	23405	85	-11232
LOSS	4372	Burnside	Oct. 21	Bauxite		14217	Ormet	176.5	44100	14.42	16.13	986	1399	0.1	2356	0.174	5191	2)	0.37	8646	0.63	8530	0.6	17476	123	11709	82	-5767
LOSS	4374	Alekos	Oct. 21-22	Bauxite		10857	Ormet	148.17	37020	14.33	16.5	758	2524	0.23	703	0.06	5159	2)	0.48	8386	0.77	6514	0.6	14900	137	9305	86	-5595
	4375	Zadonsk	Oct. 22-23	Chrome Concentrate	18213	1858	Chromasco	111.25	27840	26.75	30.28	750	4036	0.13	2850	0.14	6511 868	1) 2)	0.37	14365	0.71	7285 1115	0.4 0.6	22665	113	33321	166	10656
	4376	Rhine Ore	Oct. 23-24	Iron Ore	13429	5667	U.S. Steel	29.58	7380	16.75	18.97	1140	4528	0.24	1774	0.09	4047 1807	1) 2)	0.31	12156	0.64	5371 3400	0.4 0.6	20927	110	21686	114	759
LOSS	4377	Conalco	Oct. 24	Bauxite		13623	Ormet	39.08	9780	12.33	14.22	1105	907	0.07	1356	0.1	4439	2)	0.33	6702	0.49	8174	0.6	14876	109	11296	83	-3580
	4378	Katerina	Oct. 26	Ferro-Manganese	4840		Derby			12	35.83	403	2741	0.57	1131	0.23	4140	1)	0.86	8012	1.66	1936	0.4	9948	205	21811	451	11863
	4379	Gamzat Tsadasa	Oct. 27-28	Silico & Manganese		984	Cometals			5.25	7	187	926	0.94	527	0.54	1890	2)	1.92	3343	3.4	590	0.6	3933	400	6112	621	2179
LOSS	4380	Stavern	Oct. 28	Bauxite		25867	Ormet			41.83	42.33	618	3913	0.15	4804	0.19	15059	2)	0.58	23776	0.92	15521	0.6	39297	152	22101	85	-17196
LOSS	4381	Eschersheim	Oct. 30-31	Bauxite		22498	Ormet			22.75	24.63	989	2164	0.1	1537	0.07	8190	2)	0.36	11891	0.53	13499	0.6	25390	113	19292	86	-6098
	4352	Harman Oldendorff	Oct. 31-Nov.	Iron Ore	9842		U.S. Steel			11.5	11.5	856	1078	0.11	1109	0.11	3968	1)	0.4	6155	0.63	3938	0.4	10093	103	12640	56	2547
	Prior Month Adjustments												703		307					1010				1010		15979		14969
	TOTALS/AVERAGE				148295	305999		2006.2 86.0 Days	530376	620.5	689.06	732	94881	21	61573	0.14	221131		49	377585	83	242917	53	620502	137	703433	155	82931
	TOTAL TONS				######																							

Average Waiting Time/Vessel (22 vessels) 3.6 days
Average Cost/Ton of Waiting Time 1.17 (@$6,000/day - 25 vessels)
Average Ton/Hour/Day 732 Tons/Hour, 14655 Tons/Day

Waiting time cost for Ormet Vessels (at $6,000/day) = $167,760

Average Direct Cost/Ton 0.83
Average Indirect Cost/Ton 0.53
Total Cost/Ton 1.37
Revenue/Ton 1.55
Equipment Cost/Ton 0.49

1) $345/hr.
2) $360/hr.
3) $330/hr.
4) $800/day
5) $100/day

Equipment cost based on 75% of Est. Replacement Cost plus upkeep

	OTHER SERVICES	Tons		Long-shore Cost	Per Ton	Oper. Eng. Cost	Per Ton	Equipment Cost	Per Ton	Total Direct Cost	Per Ton	Indirect Cost	Per Ton	Total Cost	Per Ton	Total Revenue	Per Ton	P/L
	Alumina Load-out	36925	Ormet	5834	1.58	3042	0.82			8876	0.24	22155	60	31031	84	21422	0.58	-9609
	Caustic Load-in	7878	Ormet	1182	1.5					1182	0.15	4727	60	5909	75	988	13	-4921
	Reclaim to Barge	56640	Various	3424	0.08	4354	0.09			7778	0.17	22656	40	29434	57	30062	54	428
	Reclaim to Rail	2276	Various	224		1343	0.5			1567	0.5	910	40	2477	90	5091	224	2814
	Storage	109065	Various	776	0.7	805	0.07			1581	0.01	16360	15	17941	16	42853	36	24912
	TOTALS	212784		11440	0.05	9544	0.04			20984	10	66808	31	86792	19	101216	48	13424
	MARINE OPERATIONS																	
LOSS	20% Fleeting (30 days) 4)					49972		24000		73972		9994		83966		81030		-2936
	20% Barge Cleaning	37		10818						10818		2164		12982		16380		3398
	Barge Pumping	26																
LOSS	20% Workbarge 5)			1059				3000		4059		812		4871		3760		-1111
				11877		49972		27000		88849		12970		101819		101170		-649
	TOTAL MARINE OPERATIONS											69595 (Trucking		69595		98978		29383
	OTHER INCOME/EXPENSE																	
	TOTALS	667078 3)	Applied Cost Value	118198	0.18	121089	0.18	248131	0.37	487418 248131	0.72	392290 248131	0.59	879708	1.32	1004797	1.51	125089
			Adjust to Book							239287		640421 -189179 over/under applied				-4000 2)		185179
			Book Values	118198		121089		0		239287		451242		690529	1.04	1000797	1.51	310268

1) Excludes barges
2) Excludes ground storage (Includes 67982 tons US Steel cargo @$4,000/month)
3) Excludes storage tons (OBL monthly payment for Oct. was $4,420)

5.12.2 Criteria for a new bulk terminal by commodity group

Specific criteria for nonagricultural commodities

The commodities

The nonagricultural bulk commodities unloaded at Cortes consist primarily of fertilizer materials, coal or petcoke and salt. In the future, additional bulk materials such as cement, ores, and construction materials such as crushed rock for road building and other bulk construction materials may be required, as major highway improvements are already planned for all of Honduras and surrounding countries The equipment and storage and handling systems described above will be appropriate for such commodities for many years in the future.

Specific requirements for miscellaneous bulk

Specific requirements for miscellaneous bulk cargo include the following:
- Wharf crane with capacity to unload bulk cargo from maximum Panamax vessel size at a rate of 6000 to 10,000 tons per day, powered by diesel electric or shore power. A floating crane of similar capacity may be used initially while awaiting construction of the new berth.
- Front loader and light dozer equipment for use in ship hold.
- Wharf hopper suitable for 6 to 10 m clam shell bucket, with conveying system to transfer from hopper to storage at rate slightly in excess of crane unloading capacity.
- Storage system capable of receiving and storing up to 15 different commodities without contamination, and with ground storage area for commodities capable of outside storage.
- Reclaiming and truck loading equipment capable of loading and dispatching an average of 40 trucks of 20+ ton load in a normal work day of 8 hours, and ability to double this with overtime and/or weekends. This assumes that reclaiming of fertilizers will be by front end loaders to truck or truck loading hopper by midsize front end loader of Caterpillar 950H size or equivalent (2.5 – 3.5 m3 bucket capacity).
- Belt weighing scale with capacity exceeding the ability of the belt to transport the product.
- Truck scale located so that trucks can pass over the scale while in transit without undue delay of traffic , and cannot be avoided by outgoing trucks .
- Traffic control direction signs, gate monitoring and record keeping, and road markings to avoid collisions and misdirection. Buildings should be numbered and clearly marked.

Specific criteria for agricultural commodities

The commodities

The agricultural commodities expected to be handled at the new bulk terminal consist of wheat, corn, soybean meals (or soybeans in the future), as shown above.

Specific Requirements for handling bulk agricultural commodities

The bulk terminal and storage facility at Cortes will require the same unloading, storage and handling system as shown above for nonagricultural commodities.

The use of pneumatic unloading for wheat, corn, soybean meal, etc. is not recommended because some of the diverse materials handled at Cortes are not suitable for pneumatic handling, and the volume of bulk agricultural cargoes expected does not justify separate systems. If necessary a portable "vacuvator" system can be acquired initially. If a permanent system is needed, there are several vacuum systems regularly used at agricultural terminals, such as those supplied by Fuller Kenyon.

Stored agricultural commodities have the additional hazard of dust explosions and are better stored in grain tanks, silos or domes. In addition to the dust hazard in handling grains and meals, such commodities are subject to infestation with by insects, mold, and rodents, thus must be protected from these hazards.

Suggested Bulk Terminal Schemes

Alternative Scheme #1

New wharf at berth 2 area, with horizontal boom, rope trolley crane on crane rails, with storage facilities in the existing open area behind the berth. Wharf, conveying and weighing systems, storage facilities, reclaim, truck loading facilities and traffic control and operated under concessionaire management, all as described above.

Alternative Scheme # 2

This is the same as scheme # 1, but substituting a tire-mounted revolver crane in order to reduce cost.

Alternative Scheme #3

This is the same as in scheme #1, but also incorporating the molasses terminal properties and berthing area. This would increase the berthing area and adjacent land, allowing for expansion of the berth in the future, and providing more space for storage and supporting structures.

Alternative Scheme #4

Same as scheme #2, but installing a horizontal boom trolley crane capable of rapidly handling both clamshell bucket work and a container spreader, and to serve as a supplement to the container berths. The berth should be lengthened in the direction of the molasses terminal in order to accommodate larger container vessels.

A floating crane and portable conveyors were also considered to temporarily relieve the operations while a new berth was being built, but were deemed impractical due to the following concerns:

- It is not clear where a floating crane would be located, if all berths are congested and not available, for instance somewhere near the shore using camels without the need of a proper berth.
- Portable conveyors would need several transfers to reach the storage area. There would be a substantial amount of spillage and pollution, exacerbating environmental problems and product loss.
- At present there is no storage at the port. Thus, any portable conveyors would have to connect to a storage system that has yet to be built.
- To build this new storage facility, it must be properly designed in connection with the new bulk berth; such design phase may take six months; then the procurement, fabrication and installation of the storage facility will require another 12 to 15 months.

Rather than utilizing a floating crane and portable conveyors, it is recommended that pending development of a new bulk terminal, temporary improvements be made to the existing operations at Berths 3 and 4, such as:

- Study and improve operating procedures; change shifts to cover full 24 hours per day.
- Invest more into preventive maintenance.
- Improve availability of trucks; purchase additional trucks, which present less spillage and pollution.
- Purchase tire mounted mobile hoppers (with dust hoods and dust collectors) for truck loading to improve unloading of geared vessels, such that three or four cranes on the geared vessel can simultaneously operate. These tire mounted mobile hoppers can later be made rail mounted to operate at the new bulk berth.
- Purchase a second mobile harbor crane to speed up operations unloading non-geared vessels.

5.12.2 Conceptual layouts, equipment, storage, conveyors, truck loading, weighing and traffic control

The Bulk Cargo Summary in Table No. 5.12-2 is based on the following annually unloaded tonnages:

Table No. 5.12-2 Pto Cortés - New Bulk Berth - Cargoes Summary and Projections

COMMODITIES		Existing Berths 3+4			Projection for New Berth YEAR 2014*			Projection for New Berth YEAR 2024*			STORAGE Requirement YEAR 2014					STORAGE Requirement YEAR 2024					TRUCK LOADING YEAR 2014			TRUCK LOADING YEAR 2024		
Fertilizer Imports	Bulk density t/m³	2004 tons	# of ships	Average Cargo	2014 tons	# of ships	Average Cargo	2024 tons	# of ships	Average Cargo			Total capacity tons	% of thru-put	Sto-rage days			Total capacity tons	% of thru-put	Sto-rage days	Annual No. of 20t trucks	No. of trucks per hour	Avg. loading rate t/h	Annual No. of 20t trucks	No. of trucks per hour	Avg. loading rate t/h
Urea	0.7												5,000					5,000				Single shift 2080 hrs/yr			Single shift 2080 hrs/yr	
Potash	1.1												5,000					5,000								
Phosphates	0.8-1.0												5,000					5,000								
Ammonium Nitrate	0.7-0.9												5,000					5,000								
Total Bulk Fertilizer Imports		230,868			226,494	24	9,437	212,732	15	14,182			20,000	8.8%	32			20,000	9.4%	34	11,325	5.4	109	10,637	5.1	102
																					Use one 300 t/h payloader			Use one 300 t/h payloader		
Grains & Animal Feed Imports	Bulk density t/m³	2004 tons	# of ships	Average Cargo	2014 tons	# of ships	Average Cargo	2024 tons	# of ships	Average Cargo	# of silos	Silo cap. tons	Total capacity tons	% of thru-put	Sto-rage days	# of silos	Silo capacity tons	Total capacity tons	% of thru-put	Sto-rage days	Annual No. of 20t trucks	No. of trucks per hour	Avg. loading rate t/h	Annual No. of 20t trucks	No. of trucks per hour	Avg. loading rate t/h
Wheat	0.75	182,616			241,488	23	10,499	319,818	18	17,768	2	6,000	12,000	5.0%		2	6,000	12,000	3.8%			Single shift 2080 hrs/yr			Single shift 2080 hrs/yr	
Corn	0.7-0.9	258,680			342,022	31	11,033	452,802	26	17,415	2	6,000	12,000	3.5%		3	6,000	18,000	4.0%							
Animal Feed	0.65	267,927			346,296	24	14,429	449,239	25	17,970	2	6,000	12,000	3.5%		3	6,000	18,000	4.0%							
Rice	0.72-0.77	131,678			174,103	16	10,881	230,369	13	17,721	1	6,000	6,000	3.4%		2	6,000	12,000	5.2%							
RECYCLING SILOS					-			-			1	6,000	6,000			2	6,000	12,000								
Total Bulk Agricultural Imports		840,901			1,103,909	94	11,744	1,452,228	82	17,710	8		48,000	4.3%	16	12		72,000	5.0%	18	55,195	26.5	531	72,611	34.9	698
																					Use three 300 t/h load-outs			Use four 300 t/h load-outs		
Other Bulk Imports	Bulk density t/m³	2004 tons	# of ships	Average Cargo	2014 tons	# of ships	Average Cargo	2024 tons	# of ships	Average Cargo			Total capacity tons	% of thru-put	Sto-rage days			Total capacity tons	% of thru-put	Sto-rage days	Annual No. of 20t trucks	No. of trucks per hour	Avg. loading rate t/h	Annual No. of 20t trucks	No. of trucks per hour	Avg. loading rate t/h
Coal or Petcoke	0.7	126,474			167,530	16	10,471	211,338	14	15,096			15,000					20,000				2080 hrs/yr			2080 hrs/yr	
Salt	0.64-0.88																									
Total Other Bulk Imports		126,474			167,530	16	10,471	211,338	14	15,096			15,000	9.0%	33			20,000	9.5%	35	8,377	4.0	81	10,567	5.1	102
																					Use one 200 t/h payloader			Use one 200 t/h payloader		
Grand Total all Bulk Imports		**1,198,243**			**1,497,934**	**134**	**11,179**	**1,876,297**	**111**	**16,904**			**83,000**	**5.5%**	**20**			**112,000**	**6.0%**	**22**						
Bulk Exports	Bulk density t/m³	2004 tons	# of ships	Average Cargo	2014 tons	# of ships	Average Cargo	2024 tons	# of ships	Average Cargo	No. of cubi-tones	Cubi-tone capacity tons	Total capacity tons	% of thru-put	Sto-rage days	No. of cubi-tones	Cubi-tone capacity tons	Total capacity tons	% of thru-put	Sto-rage days						
Ore Concentrates	<2.5	41,500			53,000	12	4,417	65,000	13	5,000	600	7.5	4,500	8%	31	700	7.5	5,250	8%	29						
Raw Sugar	0.9	10,600			12,000	6	2,000	15,000	7	2,143	300	7.5	2,250	19%	68	300	7.5	2,250	15%	55						
Total Bulk Exports		**52,100**			**65,000**	**18**	**3,611**	**80,000**	**20**	**4,000**	**900**		**6,750**	**10%**	**38**	**1,000**		**7,500**	**9%**	**34**						
GRAND TOTAL		**1,250,343**			**1,562,934**	**152**	**10,282**	**1,956,297**	**131**	**14,934**																

For unloading and loading use one 36 ton grab crane 1,200 t/h nominal rate with hook to attach cubitones

For bulk unloading ONLY use one 30 ton grab crane 1,000 t/h nominal rate

NOTE: * Annual tonnages of 2004 and projections taken from Table <MI.SAPuertoCortesDraftJune30.xls>

	2004	2014	2024
Total Bulk Fertilizer Impo	100%	98%	92%
Total Bulk Agricultural Im	100%	131%	173%
Total Other Bulk Imports	100%	132%	167%
Grand Total all Bulk Imp	100%	125%	157%
Total Bulk Exports	100%	125%	154%
GRAND TOTAL	100%	125%	156%

1,198,343 tons unloaded at Berths #3 and #4 in 2004, 1,497,934 tons projected for 2014 and 1,876,297 tons projected for 2024. The projected annual tonnages shall be unloaded at a newly dedicated berth, designed for Handymax vessels, or for Panamax vessels.

It is assumed that loading of ore concentrates and sugar in 7.5 ton large buckets ("cubetones"), at present

about 52,000 tons annually, will continue either at an existing berth or at the new bulk berth with annual projections of 65,000 tons for 2014 and 80,000 tons for 2024.

A single grab crane (36 to hook capacity, 1200 t/h nominal unloading rate) is proposed to handle these annual tonnages up to year 2024. This crane may also be equipped with a special hook to transfer the "cubetones"; otherwise transfer via special harbor crane, same as presently performed, will be possible in the future.

It is assumed that up to year 2014 there will be no major change in the average consignment size. Therefore the combined total of 1,562,934 tons would be handled in 152 vessels with 10,282 tons average consignment size. It is further assumed that up to year 2024 there will be a 50% increase in the average cargo size. Therefore the combined total of 1,956,297 tons would be handled in 131 vessels with 14,934 tons average consignment size.

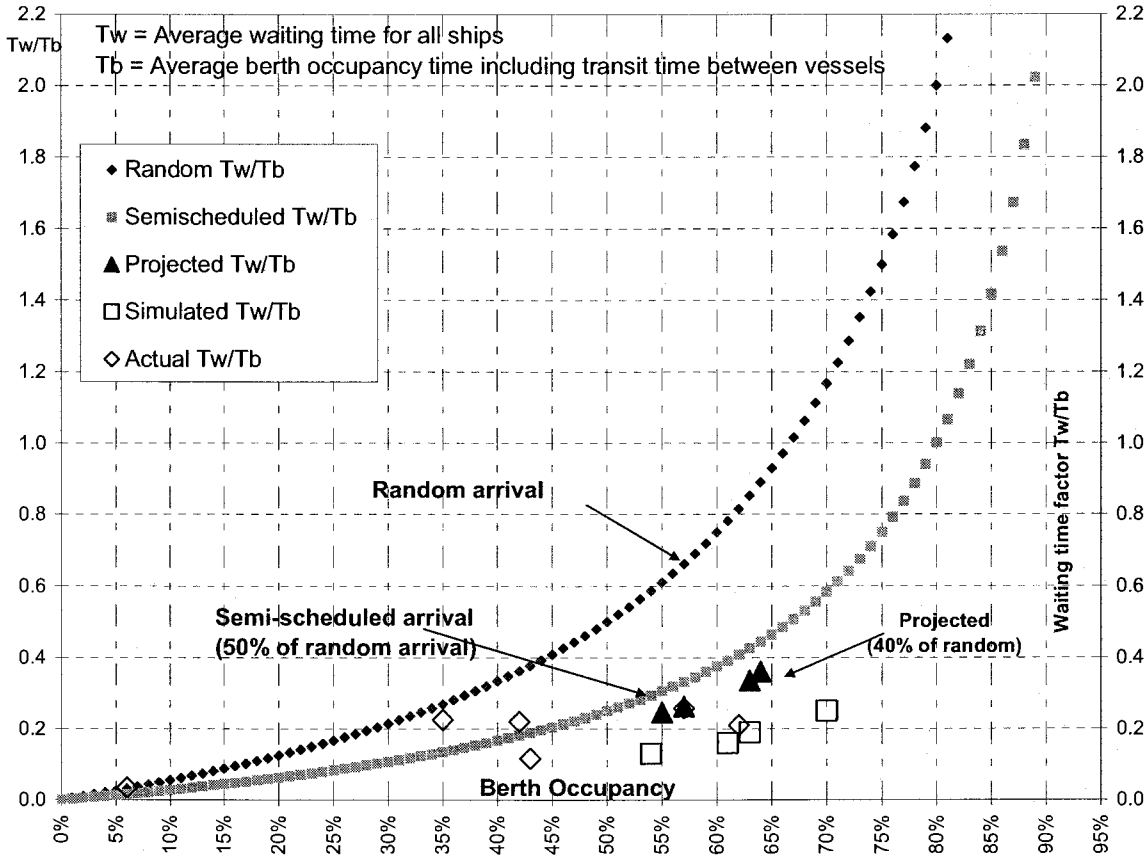
Table No. 5.12-A1 indicates unloading and loading operations in the form of a spreadsheet simulation, with operations broken down into individual time elements, based on actual experience with such operations. As a result of these assumptions in year 2014 the average consignment of 10,282 tons will be unloaded at a daily rate of 7,757 tons in 1.325 days. 152 vessels will occupy the berth for 1.325 x 152 = 201 days, which is 57% of 355 days assumed available at the port per year. The average waiting time for each vessel (as per queuing theory, see Chart Figure B1 and description) is expected to be 0.35 days. Therefore the total time in port for such average consignment and vessel is expected to be 1.67 days.

Table No. 5.12-A1: One Berth - Occupancy Ship Unloading of Bulk Materials and Shiploading of Cubitones

ITEM No.	DESCRIPTION INPUT DATA	TOTALS YEAR 2014	TOTALS YEAR 2024	YEAR 2014: <40,000 DWT Vessels Unloading Bulk		Loading Cubitones			YEAR 2024: <55,000 DWT Vessels Unloading Bulk		Loading Cubitones			EXPLANATIONS
1	**Annual tonnage**	**1.563**	**1.956**	**1.498**	**1.498**	**0.065**	**0.065**	**mill.t**	**1.876**	**1.876**	**0.080**	**0.080**	**mill.t**	**Input**
1a	Average size of cargo	**10,282**	**14,934**	10,855	11,523	4,063	3,250	tons	16,175	17,701	4,444	3,636	tons	Input assumption
1b	Number of holds of vessel			4	4	4	4	holds	5	5	5	5	holds	Input
2a	Crane Grab Capacity			36.0	36.0	36.0	36.0	t	36.0	36.0	36.0	36.0	t	Input
2b	Weight of Grab			17.0	19.0			t	17.0	19.0			t	Input
2c	Volume of Grab			25.0	30.0			m3	25.0	30.0			m3	Input
2d	Bulk density of Material			0.900	0.650			t/m3	0.900	0.650			t/m3	Input
2e	Payload of Grab or Cubitone			19.0	17.0	7.5	7.5	t	19.0	17.0	7.5	7.5	t	#2a - #2b if volume ok
3a	Unloader/loader cycle time			57.0	57.0	90.0	90.0	sec.	58.0	58.0	90.0	90.0	sec.	Input or Calc.
3b	Unloader/loader cycles per hour			63.2	63.2	40.0	40.0	c/h	62.1	62.1	40.0	40.0	c/h	3600 sec/#3a
4	Unloader/loader nominal rate			1,200	1,074	300	300	t/h	1,179	1,055	300	300	t/h	#2ex#3b
5a	Unloader interference factor			1.00	1.00	1.00	1.00	-	1.00	1.00	1.00	1.00	-	No interf.for one crane
5b	Number of Unloaders			1	1	1	1	-	1	1	1	1	-	Input
5c	Nominal rate for no. of unloaders/loaders			1,200	1,074	300	300	t/h	1,179	1,055	300	300	t/h	#5ax#5bx#4
6a	Unavailable time at port (weather, maint.)			10.0	10.0	10.0	10.0	d/y	10.0	10.0	10.0	10.0	d/y	Input
6b	**Overall Port Availibility**			**97%**	**97%**	**97%**	**97%**		**97%**	**97%**	**97%**	**97%**		**(365 d - #6a)/365**
	VESSEL TIME / EVENT													
7	Move to berth and dock			1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	hours	Assumption
8	Customs and Paperwork			1.0	1.0	1.0	1.0	hours	1.0	1.0	1.0	1.0	hours	Assumption
9	Vessel Problems	Unload	Load	1.0	1.0	1.0	1.0	hours	1.0	1.0	1.0	1.0	hours	Assumption
10	Unload/load cargo @ % free digging rate:	65%	75%	13.9	16.5	18.1	14.4	hours	21.1	25.8	19.8	16.2	hours	#1a/(%x#5c)
11	Hatch shifting 3 moves/hold [h]:	0.2	0.2	2.4	2.4	2.4	2.4	h/unl.	3.0	3.0	3.0	3.0	h/unl.	3movesx[h]x#1b/5b
12	Pay loader moves/hold in and out [h]:	0.5	0	4.0	4.0	0.0	0.0	h/unl.	5.0	5.0	0.0	0.0	h/unl.	2 movesx[h]x#1b/5b
13	Machine downtime of # 10,11,12:	5%	5%	1.0	1.1	1.0	0.8	hours	1.5	1.7	1.1	1.0	hours	%x(#10+#11+#12)
14	Vessel shifting 2 moves/hold [h]:	0.0	0.0	0.0	0.0	0.0	0.0	hours	0.0	0.0	0.0	0.0	hours	2 movesx[h]x#1b/5b
15	Downtime due to weather	5%	5%	1.0	1.1	1.0	0.8	hours	1.5	1.7	1.1	1.0	hours	%x(#10+#11+#12)
16	Vessel time/draught survey			1.0	1.0	1.0	1.0	hours	1.0	1.0	1.0	1.0	hours	Assumption
17	Vessel deberthing and transit time			2.0	2.0	2.0	2.0	hours	2.0	2.0	2.0	2.0	hours	Assumption
18	Total berth time per vessel			28.8	31.7	29.0	25.0	hours	38.5	43.7	31.5	27.6	hours	Sum#7 through #17
19	Average transfer rate @ berth time			376	363	140	130	t/h	420	405	141	132	t/h	#1a/#18
20	Average rate/free digging rate			31%	34%	47%	43%		36%	38%	47%	44%		100x(#19/#5c)
21	Operating hours per day			22.5	22.5	22.5	22.5	hours	22.5	22.5	22.5	22.5	hours	Input Assumption
	OUTPUT - DAILY PROJECTIONS:	2014	2024											
22	**Berth occupancy per vessel: Tb**	**1.33**	**1.74**	**1.3**	**1.4**	**1.3**	**1.1**	**days**	**1.7**	**1.9**	**1.4**	**1.2**	**days**	**#18/#21**
22A	**Berth transfer rate**	**7,757**	**8,570**	**8,466**	**8,178**	**3,152**	**2,922**	**t/day**	**9,450**	**9,116**	**3,172**	**2,967**	**t/day**	**#1a/#22**
	OUTPUT - ANNUAL PROJECTIONS:	2014	2024											
23	**Annual tonnage transferred**	**1.563**	**1.956**	**1.498**	**1.498**	**0.065**	**0.065**	**mill.t**	**1.876**	**1.876**	**0.080**	**0.080**	**mill.t**	**Input**
24	Number of vessels un/loaded	152	131	138	130	16	20	vessels	116	106	18	22	vessels	#23/#1a
25	Berth occupancy - hours	4,836	5,479	4,246	4,396	495	534	h/y	4,765	4,940	605	647	h/y	24 hx#22x#24
26	Total Berth occupancy - days	201	228	177	183	21	22	d/y	199	206	25	27	d/y	#22x#24
27	Berth availability - days	355	355	355	355	355	355	d/y	355	355	355	355	d/y	365 - #6a
28	**Berth occupancy percent:**	**57%**	**64%**	**49.8%**	**51.6%**	**5.8%**	**6.3%**		**55.9%**	**58.0%**	**7.1%**	**7.6%**		100x(#26/#27)
29	Waiting time factor Tw/Tb assumed	0.262	0.360					s.chart					s.chart	40% of random
30	Annual waiting time Tw calculated	53	82					d/y					d/y	#29x#26
31	**Avg. waiting time per vessel: Tw**	**0.35**	**0.63**					**days**					**days**	**#30/#24**
32	**Total Vessel Time in Port: Tb+Tw**	**1.67**	**2.37**					**days**					**days**	**#22 + #31**
33	**Port transfer rate - tons per day**	**6,144**	**6,300**											**#1a/#32**

In year 2024 the average consignment of 14,934 tons will be unloaded at a daily rate of 8,570 tons in 1.74 days. 131 vessels will occupy the berth for 1.74 x 131 = 228 days, which is 64% of 355 days assumed available per year. The average waiting time for each vessel is expected to be 0.63 days. Therefore the total time in port for such average vessel is expected to be 2.37 days.

Figure No. B1: One Berth - Waiting Time Factors Tw/Tb at % Berth Occupancy



	Unloading 2014		Unloading 2024		Loading 2014		Loading 2024		Unloadg.+Loadg.		Unloading ONLY	
									2014	**2024**	**2014**	**2024**
Throughput million tpy	1.498	1.498	1.876	1.876	0.065	0.065	0.080	0.080	**1.563**	**1.956**	**1.498**	**1.876**
Average cargo size t	10,855	11,523	16,175	17,701	4,063	3,250	4,444	3,636	**10,282**	**14,934**	**11,179**	**16,904**
Number of Vessels	138	130	116	106	16	20	18	22	**152**	**131**	**134**	**111**
Berth Occupancy %	49.8%	51.6%	55.9%	58.0%	5.8%	6.3%	7.1%	7.6%	**57%**	**64%**	**55%**	**63%**
Waiting Tw days									**0.35**	**0.63**	**0.36**	**0.67**
Berthing Tb days									**1.33**	**1.74**	**1.46**	**2.00**
Projected Tw/Tb									**0.262**	**0.360**	**0.246**	**0.335**
Previous Projects						VENT3	VENT2	VENT5	ECT95	ECT94		KENAI
Berth Occupancy %						6%	35%	43%	42%	62%		57%
Actual Tw/Tb						0.035	0.225	0.117	0.220	0.210		0.258
Berth Occupancy %	54%	61%	63%	70%								
Simulated Tw/Tb	0.130	0.160	0.190	0.250								

Table No. 5.1-2A2 indicates the possibility that the berth will be used for unloading of bulk materials only, without the need to load ships by means of "cubetones". In this case a single grab crane (30 ton hook capacity, 1000 t/h nominal unloading rate) is proposed to handle these annual tonnages up to year 2024. Berth occupancies result in 55% for the year 2014 tonnage and 63% for the annual tonnage to be handled in 2024. Vessel berth times will be 1.46 and 2.0 days for years 2014 and 2024 respectively. Berth transfer rates will be 7,649 tons per day and 8,440 tons per day respectively. Vessel waiting times

will be similar to those calculated for the case of combined unloading and loading (0.36 days and 0.67 days respectively). Therefore the total time in port for each average vessel is expected to be 1.82 days in 2014 and 2.67 days in 2024.

Table No. 5.12-A2: **One Berth - Occupancy Ship Unloading of Bulk Material ONLY**

ITEM	DESCRIPTION	TOTALS		YEAR 2014: <40,000 DWT Vessels			YEAR 2024: <55,000 DWT Vessels			EXPLANATIONS
No.	INPUT DATA	YEAR 2014	YEAR 2024	Unloading Bulk			Unloading Bulk			
1	**Annual tonnage**	**1.498**	**1.876**	**1.498**	**1.498**	**mill.t**	**1.876**	**1.876**	**mill.t**	**Input**
1a	Average size of cargo	**11,179**	**16,904**	10,855	11,523	tons	16,175	17,701	tons	Input assumption
1b	Number of holds of vessel			4	4	holds	5	5	holds	Input
2a	Crane Grab Capacity			30.0	30.0	t	30.0	30.0	t	Input
2b	Weight of Grab			14.0	15.0	t	14.0	15.0	t	Input
2c	Volume of Grab			20.0	25.0	m3	20.0	25.0	m3	Input
2d	Bulk density of Material			0.900	0.650	t/m3	0.900	0.650	t/m3	Input
2e	Payload of Grab or Cubitone			16.0	15.0	t	16.0	15.0	t	#2a - #2b if volume ok
3a	Unloader/loader cycle time			57.0	57.0	sec.	58.0	58.0	sec.	Input or Calc.
3b	Unloader/loader cycles per hour			63.2	63.2	c/h	62.1	62.1	c/h	3600 sec/#3a
4	Unloader/loader nominal rate			1,011	947	t/h	993	931	t/h	#2ex#3b
5a	Unloader interference factor			1.00	1.00	-	1.00	1.00	-	No interf.for one crane
5b	Number of Unloaders			1	1	-	1	1	-	Input
5c	Nominal rate for no. of unloaders/loaders			1,011	947	t/h	993	931	t/h	#5ax#5bx#4
6a	Unavailable time at port (weather, maint.)			10.0	10.0	d/y	10.0	10.0	d/y	Input
6b	**Overall Port Availibility**			**97%**	**97%**		**97%**	**97%**		**(365 d - #6a)/365**
	VESSEL TIME / EVENT									
7	Move to berth and dock			1.5	1.5	1.5	1.5	1.5	hours	Assumption
8	Customs and Paperwork			1.0	1.0	hours	1.0	1.0	hours	Assumption
9	Vessel Problems	Unload	Load	1.0	1.0	hours	1.0	1.0	hours	Assumption
10	Unload/load cargo @ % free digging rate:	65%	75%	16.5	18.7	hours	25.1	29.2	hours	#1a/(%x#5c)
11	Hatch shifting 3 moves/hold [h]:	0.2	0.2	2.4	2.4	h/unl.	3.0	3.0	h/unl.	3movesx[h]x#1b/5b
12	Pay loader moves/hold in and out [h]:	0.5	0	4.0	4.0	h/unl.	5.0	5.0	h/unl.	2 movesx[h]x#1b/5b
13	Machine downtime of # 10,11,12:	5%	5%	1.1	1.3	hours	1.7	1.9	hours	%x(#10+#11+#12)
14	Vessel shifting 2 moves/hold [h]:	0.0	0.0	0.0	0.0	hours	0.0	0.0	hours	2 movesx[h]x#1b/5b
15	Downtime due to weather	5%	5%	1.1	1.3	hours	1.7	1.9	hours	%x(#10+#11+#12)
16	Vessel time/draught survey			1.0	1.0	hours	1.0	1.0	hours	Assumption
17	Vessel deberthing and transit time			2.0	2.0	hours	2.0	2.0	hours	Assumption
18	Total berth time per vessel			31.7	34.1	hours	42.9	47.5	hours	Sum#7 through #17
19	Average transfer rate @ berth time			342	338	t/h	377	373	t/h	#1a/#18
20	Average rate/free digging rate			34%	36%		38%	40%		100x(#19/#5c)
21	Operating hours per day			22.5	22.5	hours	22.5	22.5	hours	Input Assumption
	OUTPUT - DAILY PROJECTIONS:	**2014**	**2024**							
22	**Berth occupancy per vessel: Tb**	**1.46**	**2.00**	**1.4**	**1.5**	**days**	**1.9**	**2.1**	**days**	**#18/#21**
22A	**Berth transfer rate**	**7,649**	**8,440**	**7,700**	**7,598**	**t/day**	**8,491**	**8,389**	**t/day**	**#1a/#22**
	OUTPUT - ANNUAL PROJECTIONS:	**2014**	**2024**							
23	**Annual tonnage transferred**	**1.498**	**1.876**	**1.498**	**1.498**	**mill.t**	**1.876**	**1.876**	**mill.t**	**Input**
24	Number of vessels un/loaded	134	111	138	130	vessels	116	106	vessels	#23/#1a
25	Berth occupancy - hours	4,700	5,336	4,669	4,732	h/y	5,304	5,368	h/y	24 hx#22x#24
26	Total Berth occupancy - days	196	222	195	197	d/y	221	224	d/y	#22x#24
27	Berth availability - days	355	355	355	355	d/y	355	355	d/y	365 - #6a
28	**Berth occupancy percent:**	**55%**	**63%**	**54.8%**	**55.5%**		**62.2%**	**63.0%**		100x(#26/#27)
29	Waiting time factor Tw/Tb assumed	0.246	0.335			s.chart			s.chart	40% of random
30	Annual waiting time Tw calculated	48	75			d/y			d/y	#29x#26
31	**Avg. waiting time per vessel: Tw**	**0.36**	**0.67**			**days**			**days**	**#30/#24**
32	**Total Vessel Time in Port: Tb+Tw**	**1.82**	**2.67**			**days**			**days**	**#22 + #31**
33	**Port transfer rate - tons per day**	**6,138**	**6,321**							**#1a/#32**

A graphic representation is given with Figure No. 5.12-B1, showing the ratio of waiting time over berth

time (Tw/Tb) at increasing berth occupancy levels in percent. The chart is based on statistical equations. The ratio of average waiting time Tw over average berthing time Tb of all vessels over one year is shown as a function of the berth occupancy percentage.

Two equations (Tw/Tb) related to % berth occupancy have been plotted:

- One for random arrival of vessels
- One for semi-scheduled arrival of vessels [values Tw/Tb equal to half of random values]

As can be seen from Figure 5.12-B1, the waiting time factor increases exponentially for both functions as the berth occupancy reaches values beyond 60 to 65%. This means that berth occupancies above 65% will result in significantly higher ship waiting times and higher demurrage costs.

It can also be noted that a higher degree of scheduling of vessel arrivals will lead to less vessel waiting time which would also make higher berth occupancies possible at tolerable vessel waiting times.

The chart shows plotted results of previous computer simulations for various projects. These are identified as "SIMULATED Tw/Tb". Most of these simulations were based on a higher degree of scheduled vessel arrivals. Therefore they show significantly reduced waiting time factors Tw/Tb.

The chart also shows some actual values from actual operations in ports where the Statement of Facts of vessels from arrival to departure for at least one year have been studied. Depending on operations the values for Tw/Tb are sometimes between random and semi-scheduled arrival curves. Most of the time, however, they tend to be below the semi-scheduled arrival curves.

As a result of the above for new projects and future projections we utilize an arrival pattern based on a 40% scheduled arrival pattern [Tw/Tb is equal to 40% of random arrival values]

Storage requirements are proposed as follows:

For fertilizers four covered storage areas (either four separate domes or one longitudinal shed with four separations) with a capacity of 5,000 tons each and a total of 20,000 tons shall be provided. Since projections for fertilizer show a slight decrease, such storage provision will be adequate until year 2024. The total available storage capacity represents a 32 to 34 day storage equivalent for the annual tonnage of year 2014 and 2024 respectively.

For grains and animal feed initially eight storage silos of 6,000 ton capacity each, shall be provided. One out of eight silos shall be retained for circulation of overheated or infested product. The total available storage capacity represents a 16 day storage equivalent for the annual tonnage of year 2014.

For further increase in tonnage up to year 2024 four silos of 6,000 ton capacity shall be added. Two out of twelve silos shall be retained for circulation of overheated or infested product. The total available storage capacity represents an 18 day storage equivalent for the annual tonnage of year 2024.

For coal open storage space shall be provided, with a 15,000 ton initial capacity (up to 2014) and an increased capacity of 20,000 tons in the future (up to 2024). These represent 33 to 35 days equivalent storage.

Storage for "cubetones" may be provided equal to a typical average consignment size, which is assumed to be 4,000 to 5,000 tons for concentrates and 2,000 to 2,500 tons for raw sugar. Handling of "cubetones" is assumed to be by trucks and mobile crane.

A belt conveying system will be required to transfer fertilizer from the berth to the storage domes or shed,

to transfer grains from the berth to the silos and to transfer coal from the berth to the open storage.

Truck loading facilities for 20-ton truck load are proposed as follows:

Reclaiming of fertilizers and truck loading shall be achieved by a payloader. A single 300 t/h payloader will be required to load ~11,000 trucks with 20 tons payload annually up to year 2024. This will result in approximately 5 to 6 trucks per hour in single 8-hour shifts, 5 days a week, 52 weeks per year, which results in a total of 2,080 hours per year.

Three truck loading stations with a nominal loading rate of 300 t/h each will be required to load 1,103,909 tons of grain up to year 2014 into 55,195 trucks or 26.5 trucks per hour in 2080 annual hours at single shift operation. This calculates to 26.5/3 = 8.8 trucks per hour to be loaded at each station, which is a truck every 6.8 minutes. A fourth station shall be added to handle the increased tonnage at 34.9 trucks per hour up to year 2024. This calculates to 34.9/4 = 8.7 trucks per hour to be loaded at each station, which is a truck every 6.9 minutes. These are average performances. Each truck-load-out station shall be designed for 300 t/h feeding rate which results in a design capacity of 15 x 20 ton trucks per hour.

Reclaiming of coal or pet coke and truck loading shall be achieved by a payloader. A single 200 t/h payloader will be required to load 8,377 to 10,567 trucks with 20 tons payload annually. This will be approximately 4 to 5 trucks per hour (years 2014 and 2024 respectively) based on single 8-hour shifts, 5 days a week, 52 weeks per year, which is a total of 2080 hours per year.

Storage Capacity Calculations

The storage sizes based on capacities for the above commodities have been calculated as shown in Table 5.12-CC.

Table 5.12-CC Storage Capacity Calculation

Rectangular Covered Storage - Fertilizer					
Material		Urea	Potash	Phosph.	AmmNitr.
Angle of repose	degr.	25	25	25	25
Bulk Density	kg/m3	700	1100	800	700
Pile Base Height	m	0.00	0.00	0.00	0.00
Pile Top Height	m	10.00	10.00	10.00	10.00
Total Pile Length	m	55.00	43.00	50.00	55.00
Pile Base Width	m	43.00	43.00	43.00	43.00
Pile Top Width	m	0.11	0.11	0.11	0.11
Pile Top length	m	12.11	0.11	7.11	12.11
Base Volume	m3	0	0	0	0
Cone Volume	m3	4,816	4,816	4,816	4,816
Ends Volume	m3	24	24	24	24
Main Volume	m3	2,610	24	1,533	2,610
Total Volume	m3	7,450	4,863	6,372	7,450
Base Capacity	mt	0	0	0	0
Cone Capacity	mt	3,371	5,298	3,853	3,371
Ends Capacity	mt	16	26	19	16
Main Capacity	mt	1,827	26	1,226	1,827
Pile Capacity	**mt**	**5,215**	**5,350**	**5,098**	**5,215**

Round Silos with flat bottom		
Material		Grains
Angle of repose	degr.	35
Bulk Density	kg/m3	700
Bin Diameter	m	24.00
Outlet Diameter	m	24.00
Total Bin Height	m	25.00
Cone Angle with Horiz.	degr.	0
Material Cone Height	m	8.40
Main Height	m	16.60
Lower Cone Height	m	0.00
Material Cone Volume	m3	1,267
Main Volume	m3	7,509
Lower Cone Volume	m3	0
Total Volume	m3	8776
Mat.Cone Capacity	mt	887
Main Capacity	mt	5,256
Lower Cone Capacity	mt	0
Total Capacity	**mt**	**6,143**

Rectangular Open Storage - Coal or Pet.Coke			
Expansion Phase		**2014**	**2024**
Angle of repose	degr.	38	38
Bulk Density	kg/m3	750	750
Pile Base Height	m	0.00	0.00
Pile Top Height	m	15.60	15.60
Total Pile Length	m	85.00	105.00
Pile Base Width	m	40.00	40.00
Pile Top Width	m	0.07	0.07
Pile Top length	m	45.07	65.07
Base Volume	m3	0	0
Cone Volume	m3	6,513	6,513
Ends Volume	m3	21	21
Main Volume	m3	14,084	20,334
Total Volume	m3	20,617	26,867
Base Capacity	mt	0	0
Cone Capacity	mt	4,885	4,885
Ends Capacity	mt	15	15
Main Capacity	mt	10,563	15,250
Pile Capacity	**mt**	**15,463**	**20,151**

For fertilizer storage of 5,000 tons each, the pile base width has been chosen as 43 m and the triangular shaped pile height as 10 m. An average repose angle of 25° was selected. Based on varying bulk densities the pile lengths are 55m for urea, 43m for Potash, 50m for Phosphates and 55m for Ammonium Nitrate. Total inside length of the storage building shall be at least 55m+43m+50m+55m+12m allowance for access = 220m total. The inside width of the building shall be about 50 m to allow access of payloaders. A longitudinal storage shed would have the advantage of higher flexibility over individual circular domes, since varying storage demands can be met by removable separators between the commodities.

6,000 ton grain silos will have 24m diameter inside and a 25m overall height. They will have flat bottoms with reclaiming devices.

Coal storage will have a 40m pile base width, 15.6m pile height and be initially 85m long for 15,000 tons of coal, and 105m long in the future for 20,000 tons storage capacity.

A layout sketch was prepared with a plot plan for the new bulk berth, designed for Handymax vessels up to 229m LOA and 32.3m beam. This berth can also be designed to receive partially loaded Panamax Vessels if a maximum water depth of 14 m is selected. While their maximum LOA is 273m these vessels will have the same beam size of 32.3 m. Therefore the grab unloader reach will remain the same. Only the travel distance of the unloader on the berth will have to be increased from about 180 m for Handymax vessels to about 220 m for Panamax vessels to ensure that the grab bucket can reach all holds of the vessel.

The grab unloader shall be designed such that it will have minimum impact on environmental problems. For the purpose of spillage control the bucket filling volume must be moderately heaped; bucket lips shall be equipped with adequate seals; buckets shall be equipped with hood covers. The cycle time of the bucket starting with digging of product at the vessel's hold, travel to the discharge hopper, emptying of product and return to the ship's hold must be selected moderately to minimize any development of dust. Cycle times close to one minute are considered adequate.

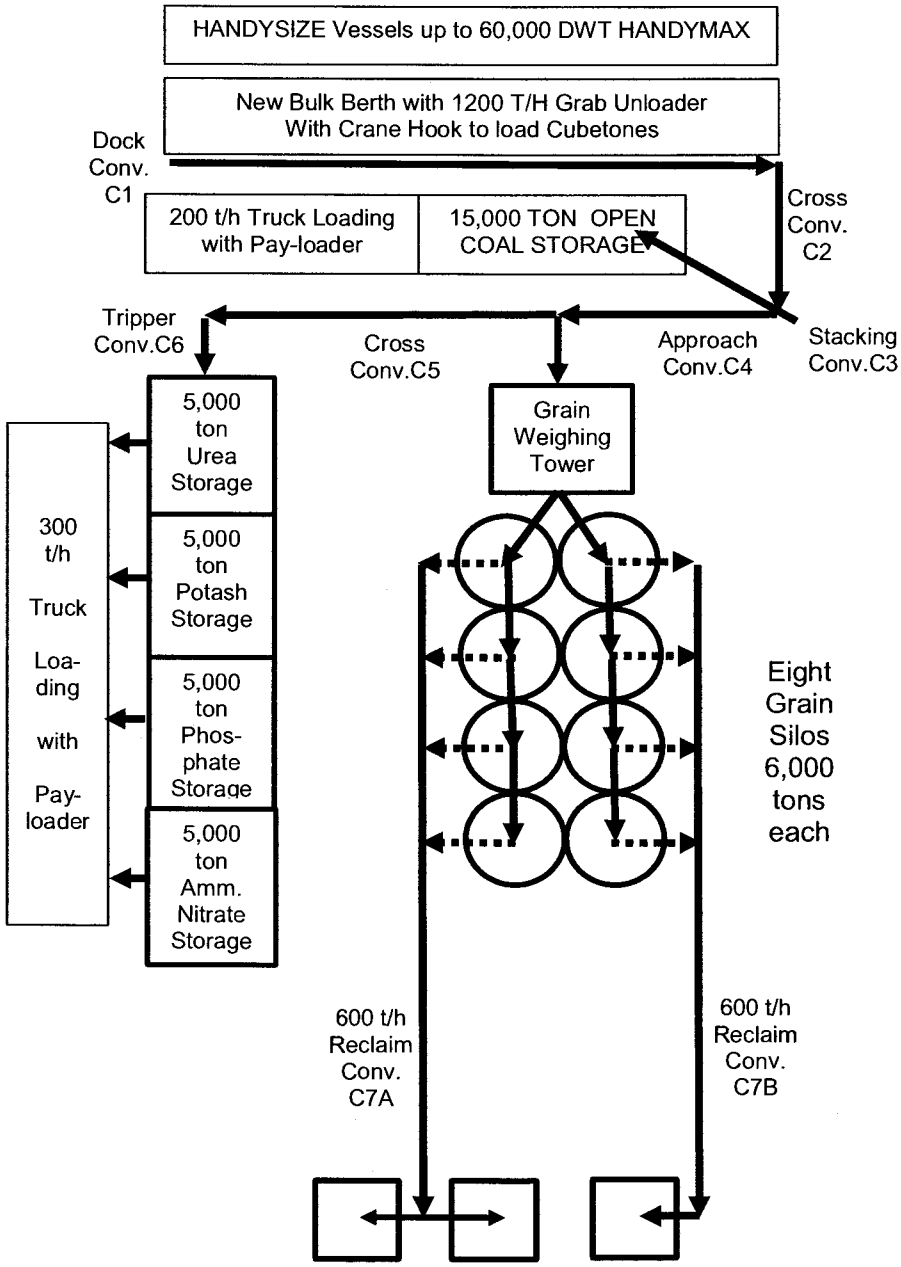
The discharge hopper shall be equipped with a dust hood, allowing approach of the bucket from one side only. Dust collectors shall be arranged around the top of the hopper to catch any fugitive dust that may develop. The hopper shall also be equipped with a hinged spillage plate along the seaside edge of the discharge hopper. This spillage plate will be lowered during unloading, to catch any loss of material between the concrete edge of the berth and the fender line. Spilled material shall be returned from the spillage plate to the hopper via chain conveyors or alike.

The discharge hopper shall be equipped with a belt feeder transferring the unloaded product to the berth conveyor C1. This berth conveyor preferably shall be arranged at the landside edge of the berth. Thus the berth surface area will be available for other operations. It will be possible to load "cubetones" at the berth from trucks to vessel either by a special crane boom and hook attached to the grab unloader or by means of a separate harbor crane performing this operation while the unloader is in parked position. It will also be possible to do other operations at the berth, e.g. loading trucks via mobile hopper from self-unloading vessels, if required.

The unloader nominal rate has been established as 1,200 t/h. The grab crane requires a hook capacity of 36 tons and at 63 cycles per hour the required payload of the grab is 1,200 / 63 = about 19 tons. For heavier materials above 800 kg/m^3, such as coal, phosphate or potash a grab of 25 m^3 is required. For lighter material down to 600 kg/m^3, a grab of 30 m^3 is required. The weight of these clam shell grabs will range from 17 to 19 tons. Therefore the combined grab weight and payload result in about 36 tons, which shall be used as design capacity for the crane.

The cycle time of grab unloaders is determined as "free digging" from the gravity center of the vessel's hold, traveling to the discharge hopper, emptying the bucket content and return to the original point at the vessel. In the beginning the grab unloader will dig from the top of the hold and/or closer to the berth line, which results in shorter cycle times. Such "cream digging" may result in higher unloading rates, up to 20% of the design rate of the unloader. The downstream conveyor system designed for a nominal capacity of 1,200 t/h therefore has to be designed for a "peak rate" of 1,500 t/h.

1.5 MILLION TON EXPANSION OF BULK HANDLING UP TO YEAR 2014 PRELIMINARY FLOW DIAGRAM – NEW BULK BERTH



Three 300 t/h Truck Load-out stations

Coal storage has been arranged directly behind the proposed unloading berth. Initially 15,000 tons storage are required, ultimately 20,000 tons. A fixed stacking boom C3 will build an initial cone shaped pile. A 200 t/h payloader will spread out the initial pile and also be utilized to load trucks directly at the edge of the storage pile. A water spray system has been foreseen to avoid building of fugitive coal dust.

A 420m long approach conveyor will convey the remaining products (agricultural products and fertilizers) to the designated storage areas. All agricultural products will be discharged via chute to a bucket elevator, which will feed the material to a weighing tower. From the weighing tower the product will be re-elevated and distributed via chain conveyors into initially eight (future twelve) storage silos of 6,000 ton capacity each. These silos all have a flat bottom and are equipped with bottom reclaiming devices and a discharge feeder. The silos are equipped with heat tracing systems. In case of infestation the storage system will make recycling of product from one silo to another possible. Bypassing the weighing tower will also be possible.

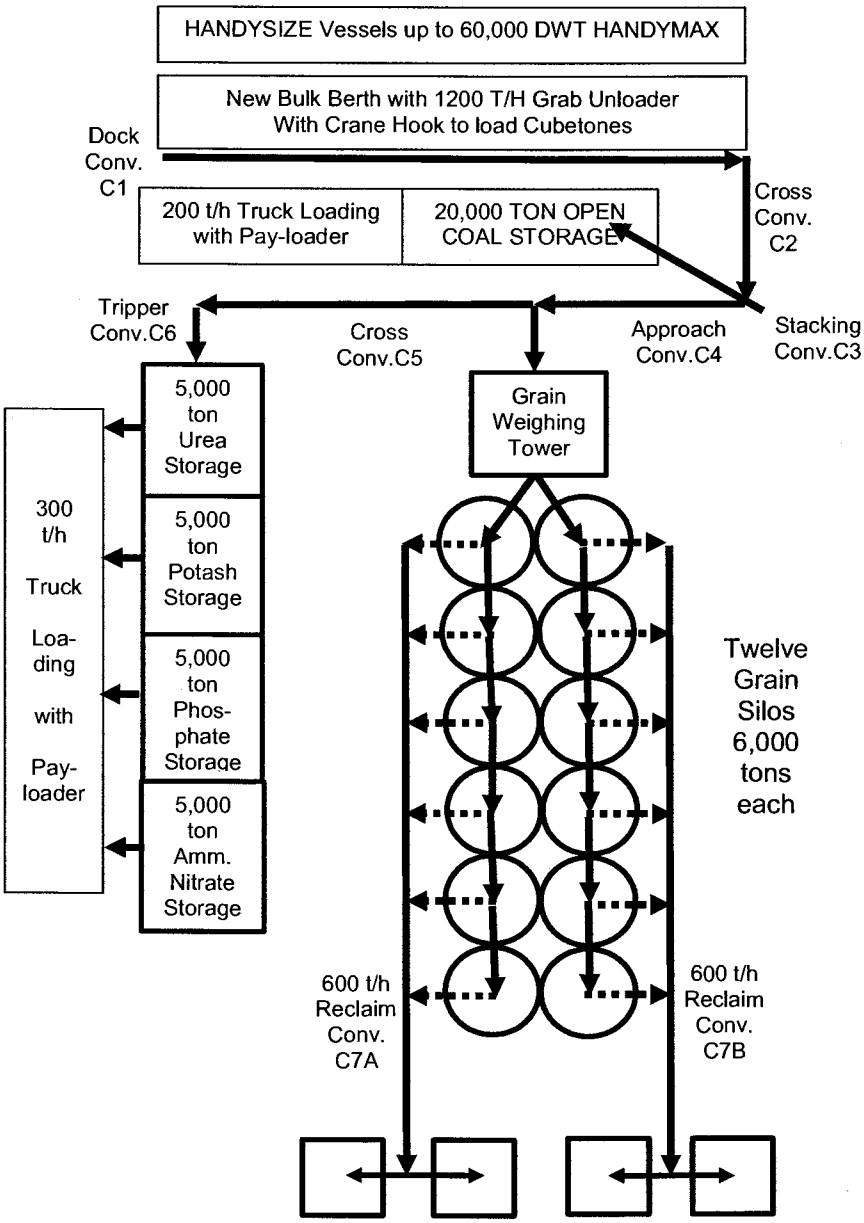
Two 600 t/h reclaiming conveyors are arranged along the silos. Each conveyor feeds product to the 300 t/h truck load-out stations. Initially, three load-out stations are required; ultimately four 300 t/h load-out stations have been provided.

A diverter gate arranged at the discharge end of conveyor C4 will transfer fertilizer products to cross conveyor C5 and on to a tripper conveyor C6 which is arranged in the ceiling of the storage shed and discharges fertilizer products into the compartments of the covered storage shed. The building will be approximately 50 m wide and 220 m long, providing adequate room inside for access of payloaders and direct transfer from storage pile to truck loading.

Two separate platform type truck scales have been included; one scale is weighing all incoming empty trucks while the other truck scale weighs all outgoing trucks.

A layout sketch was prepared with a plot plan for the new bulk berth, designed for Handymax Vessels up to 229m LOA and 32.3m beam, to increase the capacity of the system to accommodate 1.9 million tons up to the year 2024.

USTDA - PORT OF CORTES MODERNIZATION PROJECT
1.9 MILLION TON EXPANSION OF BULK HANDLING UP TO YEAR 2024
PRELIMINARY FLOW DIAGRAM – NEW BULK BERTH



Four 300 t/h Truck Load-out stations

5.13 Evaluate potential operational environmental nuisances and recommend abatement measures

The environmental conditions at the Port, particularly in regard to bulk handling operations, were observed during the site visit in April 2005. In addition to the bulk handling operations, it was noted that there are vehicular emissions in the Port from equipment and trucks, as well as traffic on the access roads through Puerto Cortes.

During the visit, meetings were conducted with staff of the department of health and environment of ENP. The team learned of several previous environmental studies relevant to the port:

- An initial environmental study was carried out in 2000 and a detailed environmental study in 2002, with Canadian funding.
- A study for design and implementation of an environmental management system for Honduras, Guatemala and Belize was to have been carried out with Interamerican Development Bank funding. It was also mentioned that the Honduran Secretariate of Health has carried out a study of noise pollution.
- The department of health and environment is preparing a regulation for handling of hazardous materials.

As a result of the visit, it was also noted that, besides the environmental nuisances associated with spillage and airborne dust from bulk handling operations, there are some additional issues which should be considered by the Port:

- Analysis of alternative access routes for traffic which experiences congestion at peak hours.
- Determination of a baseline for the current environmental conditions at the Port in regard to air pollution and noise.
- Development of an environmental monitoring program for the Port.

The following specific recommendations can be made to improve environmental conditions at the dry bulk handling facility:

1. Grab Ship Unloaders: To prevent emission of dust from this type of machine, it is advisable to specify buckets with sealed lips. These buckets have a groove in one lip, filled with an elastic material that produces a tight closure when the bucket is lifted full. At the discharge end the hopper should be specified with lateral wind protections and rubber covers, so dust still present in the discharged material is contained inside the hopper.
2. Conveyors and Transfer Houses: To prevent emission of dust contained in the material flow, conveyors and transfer houses should be totally enclosed, including chutes and transfer points. An exception should be the wharf conveyor which must remain open to receive the discharge from the ship unloader's hoppers. If wind is a problem, lateral wind-wards could be useful.
3. Grain silos: It is advisable to leave provisions to install dust collector on top of and bottom of each silo; its type should depend mainly on the amount of dust carried by the various types of grains and the size of particles. Dust collectors may be needed at the top of the truck loading bins, so it is advisable to leave provisions to do that after the construction of the silos. The dust content of the above products should be evaluated during the design stage of the terminal in order to decide whether to install dust collector during the completion of the terminal.

4. Cover storage for Urea, Potash, Phosphate and Ammonium Nitrate: Because the reclamation of these products will be carried out by front end loader to trucks, one side of the storage building may have to be totally or partially open. In some similar operations, flexible plastic curtains have been installed, which could be crossed through by the loaders. This protection reduced substantially the emission of dust to the outside. In any case, it is recommended to leave provisions to install dust collection equipment inside this building.
5. Coal Open Storage: Coal could be quite dusty, and therefore its emission from the open pile should be prevented. One inexpensive means of doing this would be to apply a fine water mist with a hose and an appropriate nozzle. It would be best to suppress dust emissions adding, with this simple method, just a minimum percentage of humidity that would be acceptable to the users. If wind is a problem, lateral wind-wards made of tarpaulin could be of help.

5.14 Prepare an interim report and presentation of the evaluation of commodity market demands and alternative concepts for a bulk terminal

The presentation of the Task 5 took place on December 1, 2005, in the Port of Cortes. At the presentation, the interim report was also reviewed. The presentation was attended by Empresa Nacional Portuaria staff, including Mr. Edgardo Paredes, Laurence Boorstein from DMJM Harris and José Sandoval from Saybe y Asociados. The main questions and comments raised at the presentation included the following:

1. The Port staff expressed the view that it would not be advantageous to terminate the lease on the Gottwald crane, which the Port considers is functioning well.
2. It would not be practical to utilize a floating crane temporarily to handle bulk cargoes, as was suggested in the interim report.
3. It would not be advantageous to construct storage facilities for bulk cargoes at the Port in advance of having the handling equipment available.

The report has been amended to incorporate these comments and suggestions by the Port staff.

5.15 Prepare typical equipment and terminal performance and quality specifications and guidelines

General Observations:

Subsequent detailed studies for bulk cargoes should consider, among other things, the following site-specific data:

- Climatic data including temperature range, humidity
- Maximum wind speeds
- Earthquake zone, if any
- Elevation of existing berths above datum
- Tidal range in the port (mean high and mean low water) above datum
- Number of days that may be lost each year due to severe weather; major holidays.
- Detailed drawings/sketches/layouts of the existing port and indication where the new berth shall be located.

It would also be important to consider the total tonnage and number of vessels separately for Berths #3 and #4 and the total time these vessels occupied each berth. This would provide a starting point to analyze the requirements and necessary improvements for a new bulk berth.

The following bulk densities are considered, taken from Conveyor Equipment Manufacturer's Association (CEMA) and converted to metric bulk density expressed in tons per cubic-meter:

Bulk material	Bulk density (t/m3)
Urea	0.7 t/m^3
Potash	1.1 t/m^3
Phosphates	0.8 to 1.0 t/m^3
CAH Ammonium Nitrate	0.7 to 0.9 t/m^3
Wheat including pellets	0.75 t/m^3
Corn	0.7 to 0.9 t/m^3
Soybean Meal	0.65 t/m^3
Beans in bulk	NA
Rice	0.72 to 0.77 t/m^3
Barley & Malt	0.6 to 0.77 t/m^3
Petroleum Coke	0.7 t/m^3
Ore concentrates	up to 2.5 t/m^3
Raw Sugar	0.9 t/m^3

A clamshell bucket operation of a shore-based crane is best suitable for the multiple products. Such crane can be used both for unloading and loading products. In addition to the bucket, such crane could be equipped with a hook to lift the "cubetones", large buckets used for loading raw sugar and concentrates.

From the grab crane and hopper a properly enclosed conveyor system has to be designed to convey the products to the storage areas.

The grab crane could run on rails parallel to the berth or it could be a crawler mounted unit, if such a unit is available for the required reach for Handymax or Panamax vessels. In either case it must discharge into a properly designed hopper, with dust hood and dust collectors, that travels on rails parallel to the dock conveyor, directly feeding this dock conveyor.

In addition to this grab crane with discharge hopper, the new bulk berth shall also be equipped with another three mobile hoppers which can receive materials from the grab cranes mounted on geared vessels. These additional hoppers shall also travel on the same rails parallel to the dock conveyor.

Adequacy of vessel berth or berths

The new berth should be designed for Handymax or Panamax vessels. Although it is not certain that the projected throughput would economically justify the expenses for dredging and berth design to accommodate Panamax vessels, this would provide greater flexibility in chartering and accommodate future growth requirements. The new berth shall rather be designed for Handymax vessels, which can reach up to 55,000 metric DWT or Panamax vessels, which can reach up to 82,000 dwt. The smallest design vessel shall be the smallest one that has previously called at the port, probably around 10,000 dwt. It should be noted that the maximum beam for the two vessel classes is similar, but the Panamax vessels are longer and have a greater draft. If the Port is not initially dredged sufficiently for fully laden Panamax vessels, it could still handle lightloaded Panamax ships.

The following table compares the data for Handymax and Panamax vessels:

Characteristic	Handymax	Panamax
Maximum dwt	55,000 dwt	82,000 dwt
Max. Length Overall	229 Meter	273 Meter
Max. Beam (Breadth)	32.3 Meter	32.3 Meter
Max. Full Load Draft	Limit 12.7 Meter To Accommodate 14m Depth (Maximum 13.3 Meter)	15.0 Meter
Approach Channel Depth	14.0 Meter	16.5 Meter
Water Depth Along Berth	14.0 Meter	16.5 Meter
Length of Berth	240 Meter	290 Meter
Length of Berthing Area	300 Meter	350 Meter

Note: Typical vessel dimensions from Clarkson Ship Register; individual vessels can vary.

Unloading/Loading Equipment

Possible future loading equipment is not likely to require a dedicated shiploader with boom, lowering device and trimmer, since such equipment is not justified for the small annual quantities. Loading of products in 7.5 ton "cubetones" may continue either by special mobile crane or by a hook attachment for the future grab unloader.

Unloading Equipment

The outreach of the crane for a Handymax vessel of 32.3 m breadth and 13.2 m hatch opening shall be at least 23 m over the fenderline. The outreach for a Panamax vessel is also 32.3 m breadth.

Vertical clearance for the boom over the ship's molded depth can only be determined when we know the dock elevation and the tidal range.

Assuming a 50% increase of annual bulk handling, the new berth must be capable to handle 1.5 x 1,169,300 or about 1.8 million tons rounded to the nearest 100,000. This tonnage includes shiploading of "cubetones". At a reasonable berth occupancy of 60 to 65 % of say 355 available days per year a range of 213 to 231 operating days per year is obtained; if this becomes a three shift operation, normally ½ hour is deducted for shift changes (previous crew moves to parking position, next crew performing routine check, greasing bucket hinges and ropes etc.).

Therefore a day will yield 22.5 operating hours and a range of 4,792 to 5,198 operating hours is obtained to handle up to 1.8 million tons per year. Thus the berth rate calculates to a range of 346 to 376 tons per hour; this rate includes all dead time such as vessel approach, hatch opening, customs inspection, paper work, draught check, breakdown during unloading, stoppages due to rain or wind, waiting for trucks or storage space, placing of dozers into hold for clean-up, etc. Only a grab unloader with a 1,000 metric tons per hour free digging rate can achieve an average berth rate of 346 to 376 metric t/h. The daily transfer rate per 22.5 hours results in a range of 7,785 to 8,460 tons per day. This rate may fluctuate between 6,000 to 10,000 tons per day depending on clean-up mode versus free-digging mode.

To achieve 1,000 t/h free digging, assuming that a 60 second unloader cycle time can be achieved, the

bucket capacity must be 1,000/60 = 16.7 tons; at the lowest density range from 0.6 to 0.7 t/m^3 the bucket volume must be about 28 cubic meters. A bucket of this size may weigh about 13 tons; therefore the crane design hook capacity must be 13 t + 16.7 t = about 30 tons hook capacity. This largest bucket must be dedicated for agricultural products. For fertilizers ranging from 0.7 to 1.1 t/m^3 a bucket volume of a maximum of 24 m^3 will be required. A third bucket must be dedicated to Petroleum Coke of 0.7 t/m^3 bulk density; the required volume is 24 m^3 as well.

Conveying Equipment

The belt conveyor system must be designed for the peak digging rate of the grab unloader. This could be 20% above the free digging rate resulting in 1,200 t/h. If the belt conveyors are designed for the lowest density of 0.6 t/m^3, idler troughing angle of 35°, material surcharge angle of 10° and a belt speed not to exceed 2.7 m/s, a belt width of 60 inches is needed.

Storage facilities and capacity

For agricultural products each of five products requires a separate silo. An additional silo shall be provided for recycling of products, to locate and eliminate infestations.

If the annual throughput increases to 1.2 million tons, six silos of 6,700 tons will represent 40,000 tons storage, which is 3.3% of the annual throughput representing 12 days average storage time or 10 days if we discount the recycling silo. Silos include reclaim systems at the bottom.

For fertilizer products each of four to five products may be stored in a separate dome. On the other hand it may be more economical to provide a single longitudinal A-frame storage shed with overhead tripper conveyor and four compartments for the separation of the products plus a fifth compartment for a future product. At an annual throughput of 300,000 tons a storage capacity of up to 5 products x 5,000 = 25,000 tons total (for 30 days) will be sufficient.

Petroleum coke would be stored in the open via a fixed boom stacker. At an annual throughput of 200,000 tons a storage capacity of up to 15,000 tons (for 27 days) will be sufficient.

If the bulk exports increase to 100,000 tons per year, storage space for 7 days of 7.5-ton "cubetones" may be required, which represents about 250 "cubetones". However, for purposes of this analysis, it is assumed that the cubetones can continue to be brought to the Port by truck as the vessel is loaded.

Reclaim and truck loading from storage.

Silos for agricultural products will be equipped with reclaiming feeders; from there the product must be conveyed to three truck loading stations. If trucks are loaded in a single 8-hour shift, five days per week, we obtain 5d x 52w x 8h = 2,080 hours annually to load 1.2 million agricultural products. This represents an average rate of 577 tons per hour. With a 64% loading efficiency the nominal rate is 900 t/h; thus we recommend three truck loading stations designed for 300 t/h each. The average loading rate is 577/3 = 192 t/h. Therefore up to 10 trucks with 20 ton payload shall be loaded each hour at each load-out or about one truck every 6 minutes.

Reclaiming of Fertilizer and Petroleum Coke shall be achieved by payloaders directly into trucks. To load 200,000 tons of Fertilizer in 2,080 hours into trucks, the average payloader rate is about 96 t/h requiring to load 5 trucks of 20 tons each hour.

A CAT payloader type 936E has a bucket capacity of 2.33 tons and if a 60 second cycle time can be

achieved, the nominal capacity results in 140 t/h.

To load 100,000 tons of Petroleum Coke in 2,080 hours into trucks, the average payloader rate is about 48 t/h; if we use the same CAT payloader type 936E at 140 t/h, there will be sufficient spare time for this second payloader, to assist the Fertilizer loading operation.

Specific requirements for miscellaneous bulk

- Wharf crane shall be designed for Handymax or Panamax.
- Wharf hopper to be suitable for 24 to 28 m^3 clam shell bucket; minimum hopper capacity shall be 1.5 x bucket volume; hopper top opening must be designed for at least 1.3 times the opened bucket to avoid spillage.
- Reclaiming and truck loading equipment to load 1.7 million tons per year in 5 days per week x 52 weeks = 260 days per year. Each day 6,540 tons must be loaded. If the truck payload is 20 tons, there will be 327 trucks to be loaded each day within 8 hours.

These general performance criteria and the annual tonnage requirements are reflected in the conceptual layouts and equipment criteria in Section 5.12.

In August 2006, ENP and USTDA reached an agreement for a feasibility study for the dry bulk unloading terminal in the Port of Cortés, which is planned to be carried out in 2007.

5.16 Prepare cost estimates and potential sources of supply for the recommended systems

The budget estimates include all elements related to the bulk handling system, such as grab unloader, conveyors, transfer stations, bucket elevators, chain conveyors, chute-work, grain weighing tower, grain silos, fertilizer storage building, water spray system and truck scales. They also include the electric equipment with Motor Control Centers (MCCs), power distribution, controls. lighting, grounding, etc. Pay loaders have been included for vessel clean-out and for coal and fertilizer operations. The budget also includes a lump sum for initial spare parts, an allowance for landside foundations for conveyors and transfers, a coal storage pad, foundations and tunnels for grain silos as well as foundations for the fertilizer storage building. It also includes allowances for Engineering and for Contingencies.

The initial equipment cost to suit an annual throughput of approximately 1.5 million tons up to year 2014 is about $31.5 million.

To expand the grain silo storage and truck loading system to accommodate 1.9 million ton throughput up to year 2024 requires an additional $2.7 million bringing the total budget to $34.2 million. Budget estimates have a ±20% level of accuracy.

These budget estimates do not include the following items: Marine facilities, berth, dredging, navigational aids, main electric power supply, main water supply, water treatment, administrative and maintenance buildings, truck washing facilities, roads, fences, gates, land acquisition, excavations and backfill, landscaping, custom duties, local taxes, insurances, corporate expenses.

The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

Table No. 5.16-D1 Summary of Estimated Budget Costs

NEW BULK BERTH with 1200 t/h Grab Unloader YEAR 2014

ITEM LIST	No	Conv. Width m	Conv. Length m	Conv. Capacity m.tph	Inst. kW	Inst.Wt. tons	Budget Cost US $	REMARKS Budget Accuracy±20%
Belt Conveyor at Berth	C1	1.6	250	1,200	90	210	$1,020,000	Conveyors designed for unloader peak rate of 1,500 t/h
Cross Conveyor to Coal Storage	C2	1.6	100	1,200	90	90	$500,000	
Fixed Coal Stacking Conveyor	C3	1.6	75	1,200	110	80	$440,000	
Approach Conveyor to Grain Storage	C4	1.6	420	1,200	150	290	$1,410,000	
Cross Conveyor to Fertilizer Storage	C5	1.6	80	1,200	90	80	$450,000	
Fertilizer Tripper Conveyor	C6	1.6	230	1,200	110	170	$870,000	
Grain Reclaim Conveyors [2]	C7	1.2	160	600	120	110	$690,000	
Grab Unloader/Cubetone Loading Crane	1	15m rail gauge		1,200	1,500	900	$6,000,000	25m reach from front rail
Chain Conveyors to Silos (20m)	2		20	1,200	100	10	$120,000	Avg.cost per m: $3,000
Chain Conveyors to Silos (75m)	2		75	1,200	150	38	$450,000	
Chain Conveyors to Silos (50m)	0		0	0	0	0	$0	
Chain Conv.s to truck loading (25+40m)	2		25+40	1,200	100	16	$200,000	Avg.wt. tons/m: 0.250
Bucket Elevator to Weighing (H40m)	1	H=	40	1,200	200	10	$120,000	
Bucket Elevator to Silos(H25m)	1	H=	25	1,200	150	6	$80,000	
Reclaim Bucket Elevators (H20m)	2	H=	20	600	150	10	$120,000	
Chutes, spouts, valves	CH				10	30	$100,000	
Transfer Station C1/C2	TS1				8	40	$100,000	
Transfer Station C2/C4	TS2				8	40	$200,000	
Transfer Station C4/C5	TS3				8	40	$150,000	
Transfer Station C5/C6	TS4				8	40	$150,000	
Central Grain Weighing Tower	TSW				10	25	$300,000	
Transfer towers for chain conv's	TC				25	30	$150,000	
Bulk batch weighing system	BW				5	10	$200,000	
6000 t Silos w.aeration & sweeps	8	24m dia x 25m OA height			160	600	$1,600,000	
Silo unloading chain feeders	8		5	600	160	10	$120,000	
Magnets	8				40	16	$120,000	
Fertilizer Storage Building & Ventilation	1	50m x 220m		4x5,000t	200	500	$2,500,000	
Truck loading systems for Grain	3			4 x 300	60	60	$600,000	
Truck Scales in/out	2				2	20	$80,000	
Water Spray System for Coal Pile	1				100	50	$400,000	
				Misc.Utilities	196	3,531	$19,240,000	
Electric Equipment, MCC's, power distribution, controls, lighting, grounding					4,110 kW total		$2,460,000	
(1) Wheel Loader for vessel clean out							$400,000	CAT 980C
(1) 200 t/h Wheel Loader for coal truck loading							$300,000	CAT 966E
(1) 300 t/h Wheel Loader for fertilizer truck loading							$400,000	CAT 980C
			SUBTOTAL 1				$22,800,000	
Spare Parts percentage of SUBTOTAL 1:						4.0%	$910,000	
Civils: Conveyor and Transfers Foundations							$1,320,000	
Civil Work on Land for Storage Building and Silos							$2,240,000	**see details below**
CIVILS: Marine works - Berth							$0	**by others**
			SUBTOTAL 2				$27,270,000	
Engineering percentage of SUBTOTAL 2:						5.0%	$1,360,000	
			SUBTOTAL 3				$28,630,000	
Contingencies percentage of SUBTOTAL 3:						10.0%	$2,860,000	
			GRAND TOTAL			**rounded**	$31,500,000	

Civil Cost			**Unit Cost**			**Item Cost**	**Remarks**
Site Preparation for Coal Storage 50x120m	6,000	m²	$10			$60,000	
Soil Cement for Coal Storage	6,000	m²	$30			$180,000	
Site Preparation for Silos 50 x 100 m	5,000	m²	$10			$50,000	
Soil Cement for 8 silos	5,000	m²	$30			$150,000	
Tunnels under silos	200	m	$4,000			$800,000	
Site Preparation for Storage Building 50 x 220 m	11,000	m²	$10			$110,000	
Soil Cement for Storage Area	11,000	m²	$30			$330,000	
Storage Building Foundations					LS	$560,000	
			Total Civil Cost:			**$2,240,000**	**entered above**

Budget does NOT Include Marine Facilities, Power Supply, Water Supply, Utilities, Water Treatment, Maintenance and Administrative Buildings, Custom Duties, Local Taxes and Corporate Expenses

BULK MATERIAL HANDLING CONSULTING
PORT DEVELOPMENT • CARGO HANDLING SYSTEMS • OFFSHORE TERMINALS

July 28, 2005
K.Kroeter

USTDA - PORT OF CORTES MODERNIZATION PROJECT

Table No. 5.16-D2 Summary of Estimated Budget Costs

NEW BULK BERTH with 1200 t/h Grab Unloader YEAR 2024

ITEM LIST	No	Conv. Width m	Conv. Length m	Conv. Capacity m.tph	Inst. kW	Inst.Wt. tons	Budget Cost US $	REMARKS Budget Accuracy±20%
Belt Conveyor at Berth	C1	1.6	250	1,200	90	210	$1,020,000	Conveyors designed for unloader peak rate of 1,500 t/h
Cross Conveyor to Coal Storage	C2	1.6	100	1,200	90	90	$500,000	
Fixed Coal Stacking Conveyor	C3	1.6	75	1,200	110	80	$440,000	
Approach Conveyor to Grain Storage	C4	1.6	420	1,200	150	290	$1,410,000	
Cross Conveyor to Fertilizer Storage	C5	1.6	80	1,200	90	80	$450,000	
Fertilizer Tripper Conveyor	C6	1.6	230	1,200	110	170	$870,000	
Grain Reclaim Conveyors [2]	C7	1.2	160	600	120	110	$690,000	
Grab Unloader/Cubetone Loading Crane	1	15m rail gauge		1,200	1,500	900	$6,000,000	25m reach from front rail
Chain Conveyors to Silos (20m)	2		20	1,200	100	10	$120,000	Avg.cost per m: $3,000
Chain Conveyors to silos (75m)	2		75	1,200	150	38	$450,000	
Chain Conveyors to Silos (50m)	2		50	1,200	100	25	$300,000	
Chain Conv.s to truck loading (25+40m)	2		25+40	600	100	16	$200,000	Avg.wt. tons/m: 0.250
Bucket Elevator to Weighing (H40m)	1	H=	40	1,200	200	10	$120,000	
Bucket Elevator to Silos(H25m)	1	H=	25	1,200	150	6	$80,000	
Reclaim Bucket Elevators (H20m)	2	H=	20	600	150	10	$120,000	
Chutes, spouts, valves	CH				10	30	$100,000	
Transfer Station C1/C2	TS1				8	40	$100,000	
Transfer Station C2/C4	TS2				8	40	$200,000	
Transfer Station C4/C5	TS3				8	40	$150,000	
Transfer Station C5/C6	TS4				8	40	$150,000	
Central Grain Weighing Tower	TSW				10	25	$300,000	
Transfer towers for chain conv's	TC				25	30	$150,000	
Bulk batch weighing system	BW				5	10	$200,000	
6000 t Silos w.aeration & sweeps	12	24m dia x 25m OA height			240	900	$2,400,000	
Silo unloading chain feeders	12		5	600	240	15	$180,000	
Magnets	12				60	24	$180,000	
Fertilizer Storage Building & Ventilation	1	50m x 220m		4x5,000t	200	500	$2,500,000	
Truck loading systems for Grain	4			4 x 300	80	80	$800,000	
Truck Scales in/out	2				2	20	$80,000	
Water Spray System for Coal Pile	1				100	50	$400,000	
				Misc.Utilities	211	3,889	$20,660,000	
Electric Equipment, MCC's, power distribution, controls, lighting, grounding					4,420 kW total		$2,600,000	
(1) Wheel Loader for vessel clean out							$400,000	CAT 980C
(1) 200 t/h Wheel Loader for coal truck loading							$300,000	CAT 966E
(1) 300 t/h Wheel Loader for fertilizer truck loading							$400,000	CAT 980C
			SUBTOTAL 1				$24,360,000	
Spare Parts percentage of SUBTOTAL 1:						4.0%	$970,000	
Civils: Conveyor and Transfers Foundations							$1,470,000	
Civil Work on Land for Storage Building and Silos							$2,800,000	**see details below**
CIVILS: Marine works - Berth							$0	**by others**
			SUBTOTAL 2				$29,600,000	
Engineering percentage of SUBTOTAL 2:						5.0%	$1,480,000	
			SUBTOTAL 3				$31,080,000	
Contingencies percentage of SUBTOTAL 3:						10.0%	$3,110,000	
GRAND TOTAL						**rounded**	$34,200,000	

Civil Cost				**Unit Cost**			**Item Cost**	**Remarks**
Site Preparation for Coal Storage 50x150m		7,500	m²	$10			$75,000	
Soil Cement for Coal Storage		7,500	m²	$30			$225,000	
Site Preparation for Silos 50 x 150 m		7,500	m²	$10			$75,000	
Soil Cement for 12 silos		7,500	m²	$30			$225,000	
Tunnels under silos		300	m	$4,000			$1,200,000	
Site Preparation for Storage Building 50 x 220 m		11,000	m²	$10			$110,000	
Soil Cement for Storage Area		11,000	m²	$30			$330,000	
Storage Building Foundations						LS	$560,000	
				Total Civil Cost:			**$2,800,000**	**entered above**

Budget does NOT Include Marine Facilities, Power Supply, Water Supply, Utilities, Water Treatment, Maintenance and Administrative Buildings, Custom Duties, Local Taxes and Corporate Expenses

5.16.1 Sources of supply for bulk handling equipment:

Sources of supply for bulk handling equipment are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

Bulk Material Handling and Storage

Products: Belt and chain conveyors, Bucket elevators, silos

Supplier: **CHIEF Industries, Inc.**
Address: 3942 West Old Highway 30
PO Box 2078
Grand Island, NE 68802-2078

Chief Agri/Industrial Division
P.O. Box 848
Kearney, NE 68848
USA
Telephone: 1-308-389-7200 (Corporate), 1-308 238 2737, 1-308-237-3186 (Agri/Ind)
Fax: 1-308-389-7221 (Corporate), 1-308 237 2650 (Agri/Ind)
E-mail: corporate@chiefind.com; agri@chiefind.com
Contact: Mr. Oscar Coello
Web: http://www.chiefind.com

Products: Mechanical unloaders (continuous or clamshell), bucket elevators

Supplier: **Fuller Bulk Handling / FL Smidth**
Address: Pneumatic Transport
F.L.Smidth Inc.
2040 Avenue C
Bethlehem PA 18017-2188
USA
Telephone: 1-610-264-6055
Fax: 1-610-264-6307
E-mail: michael.gregory@flsmidth.com
Contact: Michael Gregory, District Sales Manager
Web: http://www.fullerbulkhandling.com

Products: Mechanical unloaders (continuous or clamshell)

Supplier: **Heyl & Patterson Inc.**
Address: 2000 Cliff Mine Rd
Park West Two Suite 300
Pittsburgh, PA 15275
USA
Telephone: 1-412-788-9810
Fax: 1-412-788-9822
E-mail: info@heylpatterson.com
Contact: Jerry Spehar

Web: http://www.heylpatterson.com

Products: Complete bulk handling systems, mechanical unloaders (continuous or clamshell), belt and chain conveyors, bucket elevators

Supplier: **ThyssenKrupp Robins, Inc.**
Address: 7730 E. Belleview Ave., # 404,
Greenwood Village, CO 80111-5820
USA
Telephone: 1-303-770-0808
Fax: 1-303-770-4522
E-mail: sales@krupprobins.com; kri@krupprobins.com
Contact: Ingolf Neubecker
Web: http://www.krupprobins.com

Products: Complete handling systems, mechanical unloaders (continuous or clamshell), belt and chain conveyors, bucket elevators

Supplier: **METSO Minerals Materials Handling**
Address: 1500 Corporate Dr Ste 300
Canonsburg, PA 15317
USA
Telephone: 1-412 269 5000
Fax: 1-412 269 5030
E-mail: tim.sexton@metso.com
Contact: Mr. Thimothy Sexton
Web: http://www.metso.com

Products: Complete materials handling systems, belt and chain conveyors, bucket elevators, silos

Supplier: **Roberts & Schaefer Company**
Address: 222 S. Riverside Plaza, Suite 1800
Chicago, IL 60606-3986
USA
Telephone: 1-312-236-7292
Fax: 1- 312-726-2872
E-mail: bobw@eni.com; info@r-s.com
Contact: Robert Williams
Web: http://www.r-s.com

Products: Belt and chain conveyors, bucket elevators, silos

Supplier: **SCAFCO Corporation; Grain Systems**
Address: 6200 E. Main Avenue
PO Box11215
Spokane, WA 99211-1215
USA
Telephone: 1-509-535-1571

Fax:	1-509-535- 9130
E-mail:	mail@scafco.com
Contact:	Sales
Web:	http://www.scafco.com

Products: Materials handling

Supplier:	**EDC, Inc.**
Address:	67 Ramapo Rd. Mahwah NJ 07430 USA
Telephone:	1-201-684-1220
Fax:	1-201-684-1224
E-mail:	info@edcincorp.com
Contact:	Walter R. Herbst, President; Walter J. Herbst, Vice President
Web:	http://www.edcincorp.com

Products: Conveyors

Supplier:	**Continental Conveyor & Equipment Co., Inc.**
Address:	438 Industrial Drive P.O. Box 400 Winfield AL 35594-0400 USA
Telephone:	1-205-487-6492
Fax:	1-205-487-4233
E-mail:	info@continentalconveyor.com
Contact:	Sales
Web:	http://www.continentalconveyor.com

Supplier:	**FMC Corp.**
Address:	Conveyor Equipment Division 1 Link Belt Dr P O Box 1370 Tupelo MS 38802 400 Highpoint Drive Chalfont, PA 18914 USA
Telephone:	1-662-869-5711 (Mississippi), 1-215 822 4556 (Pennsylvania)
Fax:	1-662 869 7401 (Mississippi), 1-215 822 4520 (Pennsylvania)
E-mail:	mhsol.info@fmcti.com; mary.plesh@fmcti.com
Contact:	Deborah Goddard (Mississippi); Mary Plesh (Pennsylvania)
Web:	http://www.fmcconveyors.com

Supplier:	**Hendrik Enterprises, Inc.**
Address:	193 Sprain Brook Rd, Woodbury CT 06798 USA
Telephone:	1-203-263-7025
Fax:	1-203-263-7425

E-mail:	support@thehendrikgroup.com
Contact:	Mr. Henk Hartsuiker
Web:	http://www.thehendrikgroup.com

Appendix A provides sources of supply for additional port-related goods and services and terminal requirements.

A. U.S. SOURCES OF SUPPLY
1 INFORMATION TECHNOLOGY

Sources of supply for IT systems are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

1.1 Computer Hardware

Supplier:	**Dell Inc.**
	Dell Latin America
Address:	One Dell Way
	Round Rock, Texas 78682
	USA
Telephone:	1-512-728-4379 / 1-800-433-9014 (toll free in USA);
	1-512-723-0020; 800-0123 ask for 866-686-9848 (toll free in Honduras)
Fax:	NA
E-mail:	NA
Contact:	Customer Service
Web:	http://www.dell.com

Supplier:	**Hewlett Packard (Latin America)**
Address:	Waterford Building, 9th Floor
	5200 Blue Lagoon Drive
	Miami, FL 33126
	USA
Telephone:	1-305-267-4220
Fax:	1-305-265-5550
E-mail:	NA
Contact:	Customer Service
Web:	http://www.hp.com

Supplier:	**IBM Corporation**
Address:	1133 Westchester Avenue
	White Plains, NY 10604
	USA
Telephone:	1-800-426-4968 (toll free in USA)
Fax:	NA
E-mail:	NA
Contact:	Customer Service
Web:	http://www.ibm.com/products/us

Supplier:	**Psion Teklogix**
Address:	1810 Airport Exchange Blvd., Suite 500
	Erlanger, KY 41018
	USA
Telephone:	1-800-322-3437 (toll free in USA)
Fax:	NA
E-mail:	NA
Contact:	Customer Service
Web:	http://www.psionteklogix.com

Supplier:	**Symbol Technologies, Inc**
Address:	Latin America Headquarters 2730 University Drive Coral Springs, FL 33065 USA
Telephone:	1-954-255-2610
Fax:	1-954-340-9454
E-mail:	NA
Contact:	Customer Service
Web:	http://www.symbol.com

1.2 Software

1.2.1 Financial Software

Supplier: **Microsoft Great Plains Business Solutions**
Address: One Lone Tree Road
Fargo, ND 58104-3911
USA
Telephone: 1-701-281-6500
Fax: NA
E-mail: mbsorder@microsoft.com
Contact: NA
Web: http://www.microsoft.com

Supplier: **Oracle Corp**
Address: 500 Oracle Parkway
Redwood Shores, CA 94065
USA
Telephone: 1-650-506-7000, 1-800-672-2531 (Toll free in USA)
800-0123 then ask for 1-888-900-6500 (Toll free in Honduras)
Fax: 1-650-506-7200 800-ORACLE1 (Toll free in USA)
Fax: NA
E-mail: preguntas_ww@acl e.com
Contact: Sales / Ventas
Web: http://www.oracle.com

Note: J.D. Edwards and PeopleSoft were acquired by Oracle; information on these product lines is also available from Oracle

Supplier: **Lawson Software**
Address: 380 St. Peter Street
St. Paul, MN 55102-1302
USA
Telephone: 1-651-767-7000
Fax:
E-mail: nick.busel@wson.com
Contact: Nick Buse
Web: http://www.lawson.com

Supplier: **Softbrands**
Address: Two Meridian Crossings, Suite 800
Minneapolis, MN 55423
USA
Telephone: 1-612-851-1500
Fax: 1-612-851-1560
E-mail: info@ftbra nds.com
Contact: Sales
Web: http://www.softbrands.com

Supplier:	**SSA Global**
Address:	500 West Madison Street, Suite 1600 Chicago, Illinois 60661 USA
Telephone:	1-312-258-6000
Fax:	1-312-474-7500
E-mail:	support@ssaglobal.com
Contact:	
Web:	http://www.ssaglobal.com

1.2.2 Terminal Operating Systems Software

Supplier:	Navis LLC
Address:	1000 Broadway, Suite 150 Oakland, CA 94607 USA
Telephone:	1-510-267-5000
Fax:	1-510-267-5100
E-mail:	Mbardi@vi s.com
Contact:	Martin Bardi
Web:	http://www.navis.com/home.jsp

Supplier:	**Tideworks Technology**
Address:	1129 SW Klickitat Way Seattle, WA 98134 USA
	Tideworks Technology — Central/South America Torre Edison Plaza Via Ricardo J. Alfaro y Calle 10, El Paical Panama, Republic of Panama
Telephone:	1-206-654-3640 (Washington state), 1-206-382-4470, 507-321-7027 (Panama)
Fax:	1-206-382-0443 (Washington state), 1-206-382-0443 507-430-9839 (Panama)
E-mail:	sales@tideworks.com
Contact:	Sales
Web:	http://www.tideworks.com

Supplier:	**Embarcadero Systems Corporation**
Address:	1701 Harbor Bay Parkway Alameda, CA 94502 USA
Telephone:	1-510-749-7400, 1-866-ESC-0088 (1-866-372-088) (toll free in USA)
Fax:	1-510-749-3800
E-mail:	info@ystem.com
Contact:	Sales
Web:	http://www.embarcaderosystems.com

Supplier:	**Maher Terminal Logistics Systems, Inc.**
Address:	Four Connell Drive Berkeley Heights, NJ 07922 USA
Telephone:	1-908-665-2100
Fax:	1-908-790-5678
E-mail:	Coleman@t ls.com
Contact:	George E. Coleman, Director of Worldwide Marketing
Web:	http://www.mtls.com

1.3 Power Systems

Supplier:	**American Power Conversion Corp. (APC)**
Address:	1332 Fairgrounds Road W. Kingston, RI 02892 Regional office for Honduras: 5301 Blue Lagoon Dr Suite 610 Miami, Florida 33126 USA
Telephone:	1-305-266-5005 x202 (Florida); 1-877-272-2722
Fax:	NA
E-mail:	NA
Contact:	Sales
Web:	http://www.apc.com

Supplier:	**Eaton Corporation**
Address:	Eaton Center 1111 Superior Avenue Cleveland, OH 44114-2584 USA
Telephone:	1-216-523-4400; 1-800-386-1911 (toll free from USA)
Fax:	
E-mail:	customer@ aton.com
Contact:	Customer Service
Web:	http://www.eaton.com

Supplier:	**Liebert Corporation**
Address:	1050 Dearborn Drive Columbus, Ohio 43085 USA
Telephone:	1-614-888-0246
Fax:	1-614-841-6022
E-mail:	info@ebert. com
Contact:	Sales
Web:	http://www.liebert.com

Supplier:	**Tripp Lite**
Address:	1111 W. 35th Street Chicago, IL 60609 USA
Telephone:	1-773-869-1234, 1-773-869-1111
Fax:	1-773-869-1177, 1-773-869-1329
E-mail:	NA
Contact:	Support Specialist
Web:	http://www.tripplite.com

2 MAINTENANCE AND REPAIR

Sources of supply for M & R systems are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

2.1 Maintenance Software

Supplier:	**Datastream**
Address:	50 Datastream Plaza Greenville, SC 29605-3451 USA
Telephone:	1-864-422-5001, 1-800-955-6775 Ext. 5459 or 2534 (toll free in USA)
Fax:	1-864-422-5000, 1-864-236-2651
E-mail:	info@ atastream.net
Contacts:	Cecily Rivington, John M. Sterling III Christel Novella
Web:	http://www.datastream.net
Product:	Datastream 7i

Supplier:	**LookSoftware, Inc.**
Address:	121 Lake Latimer Cove Kennesaw, GA 30144 USA
Telephone:	1-610-685-LOOK (1-610-685-5665)
Fax:	1-610-685-5669
E-mail:	Info@looksoftware.com
Contact:	NA
Web:	http://www.looksoftware.com

Note: Enterprise Asset Manager (EAM) was formerly marketed as MainTracker from Elke and BPCS Plant Maintenance from SSA Global.

Supplier:	**Spear Technologies**
Address:	436 – 14th Street, Suite 200 Oakland, CA 94612 USA
Telephone:	1-510-267-3333
Fax:	1-510-267-3344
E-mail:	Sales@e artechnologies.com
Contact:	Sales
Web:	http://www.speartechnologies.com

Supplier:	**Qqest Asset management Services**
Address:	9350 South 150 East Suite 300 Sandy, Utah 84070 USA
Telephone	1-801-262-1611, 1-800-730-9965 (toll free in USA)
Fax	1-801-281-3566
Contact:	Brandon Gunn, Sales Representative
Web:	http://www.managerplus.com

Product:	Manager Plus
Supplier:	**Maintenance Connection Inc.**
Address:	1947 Galileo Ct. Suite 101 Davis, CA 95616
Telephone:	1-888-567-3434 (toll free in USA)
Fax:	1-888-567-3434 (toll free in USA)
E-mail:	sales@ai ntenanceconnection.com
Contact:	Cary Yokum
Website:	http://www.maintenanceconnection.com
Product:	Maintenance Connection
Supplier:	**Eagle Technology, Inc.**
Address:	10500 N. Port Washington Rd. Mequon, WI 53094 USA
Telephone:	1-262-241-3845, 1-800-388-3268 ext 233 (toll free in USA)
Fax:	1-414-241-5248
E-mail:	eagle@execpc.com
Contact:	Ted Pyle, Regional and International Sales Manager
Web:	http://www.eaglecmms.com
Product:	Proteus IV
Supplier:	**EPAC Software Technologies, Inc.**
Address:	42 Ladd St. East Greenwich, R.I. 02818
Tel	1-407-656-0834
Contact:	Don Scraper, Sales
Website:	http://www.epacst.com
Product:	EPAC CMMS
Supplier:	**eMaint Enterprises, LLC**
Address:	7 Chester Ave. Medford, NJ 08005 USA
Telephone:	1-609-714-1689 ext. 170
E-mail:	matthew.oles@n aint.com
Contac:	Matthew Oles
Website:	http://www.emaint.com
Product:	eMAINT X3

2.2 Maintenance Equipment

2.2.1 Large Industrial Tire Changers

Supplier: **Kwick Way Products Inc.**
Address: 500 57th Street,
Marion, IA 53203
USA
Telephone: 1-319-377-9421 / 1-800-553-5953 X256
Fax: 1-319-377-9421
E-mail: NA
Contact Name: Mitch Malcolm
Web: http://www.kwick-way.com
Brand: Kwick-Way

Supplier: **Eagle Equipment Inc. / Standard Tools & Equipment**
Address: 4810 Clover Road,
Greensboro, NC 27405
USA
Telephone: 1-336-697-7177 / 800-336-2776
Fax: 1-800-590-9841
E-mail: sales@ gleequip.com
Contact Name:
Web: http://www.eagleequip.com
Brand: Corgi

Supplier : **S & J's Discount Tools**
Address: 2892 Prairie Dr.,
Lewis Center, OH 43035
USA
Telephone: 1-877-355-7455
Fax: 1-877-907-0041
E-mail: NA
Contact Name: NA
Web: http://www.sjdiscounttools.com
Brand: Coats

2.2.2 Small Tire Changers

Supplier: **Eagle Equipment Inc.**
Address: 4810 Clover Road,
Greensboro, NC 27405
USA
Telephone: 1-336-697-7177 / 800-336-2776
Fax: 1-800-590-9841
E-mail: sales@ gleequip.com
Contact Name: NA
Web: http://www.eagleequip.com
Brands: Coats, Corgi

Supplier: **Automotive Service Equipment**
Address: 379 Cardinal Circle,
Torrington, CT 06790
USA
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 1-419-831-0245
E-mail: contact@e deals.com
Contact Name: NA
Web: http://www.asedeals.com
Brand: Accuturn

Supplier: **Kwick Way Products Inc.**
Address: 500 57th Street,
Marion, IA 53203
USA
Telephone: 1-319-377-9421 / 1-800-553-5953 X256
Fax: 1-319-377-9421
E-mail:
Contact Name: Mitch Malcolm
Web: http://www.kwick-way.com
Brand: Kwick-Way

Supplier: **S & J's Discount Tools**
Address: 2892 Prairie Dr.,
Lewis Center, OH 43035
USA
Telephone: 1-877-355-7455
Fax: 1-877-907-0041
E-mail: NA
Contact Name: NA
Web: http://www.sjdiscounttools.com
Brand: Coats

Supplier: **America's Pride**
Address: 75 County St.,
Seekonk, MA 02771
USA
Telephone: 1-508-336-9629 / 1-800-348-4244
Fax: 1-800-460-9416
E-mail: websales@ mericasprideonline.com

Contact Name: NA
Web: http://www.americasprideonline.com
Brand: Ranger

Supplier: **Automotive Service Tools**
Address: 4000 Surfside Blvd. Suite 507,
Corpus Christi, TX 74802
USA
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 1-972-291-2655
E-mail: salesrep@ utomotiveservicetools.com
Contact Name: NA
Web: http://www.automotiveservicetools.com
Brand: Coats

2.2.3 Tire Spreader

Manufacturer:

Supplier:	**Branick Industries, Inc.**
Address	4245 Main Ave. PO Box 1937 Fargo, ND 58107-1937 USA
E-mail	sales@ani ck.com
Telephone	1-701-281-8888, 800-437-4394 (toll free in USA)
Fax	1-701-281-5900
Web	http://www.branick.com

Dealers:

Supplier:	**S & J's Discount Tools**
Address:	2892 Prarie Dr., Lewis Center, OH 43035
Telephone:	1-877-355-7455
Fax:	1-877-907-0041
E-mail:	NA
Contact Name:	NA
Web:	http://www.sjdiscounttools.com
Brand:	Branick

Supplier:	**ATS**
Address:	11500 Kilburn Road, Houston, TX 77055 USA
Telephone:	1-713-956-6665 / 1-888-339-6665
Fax:	1-713-956-9565
E-mail:	ats@tiresupply.com
Contact Name:	NA
Web:	http://www.alltiresupply.com
Brand:	Branick

Supplier:	**Mile-X Equipment, Inc.**
Address:	801 N. 2nd Street, Coldwater, OH 45828
Telephone:	1-419-678-3818 / 1-800-837-3818
Fax:	1-419-678-2489
E-mail:	sales@le-x.com
Contact Name:	NA
Web:	http://www.mile-x.com
Brand:	Branick

Supplier:	**Myers Tire Supply**
Address:	7409 Whitepine Road, Richmond, VA 23237 USA
Telephone:	1-804-794-3311/ 1-800-552-4411
Fax:	1-804-794-3461 / 1-804-714-0721
E-mail:	NA
Contact Name:	NA
Web:	http://www.myerstiresupply.com
Brand:	Branick

2.2.4 Air Compressors

2.2.4.1 Diesel Powered Air Compressor

Supplier: **US Diesel Engines LLC.**
Address: 100 W. Southern St. Unit 19,
Brighton, CO 80601
Telephone: 1-303-654-1195 / 1-866-734-3735
Fax: 1-720-294-9776
E-mail: usdieselengines@l. com
Contact Name: NA
Web: http://www.usdieselengines.com
Brand: ETQ

Supplier: **Diesel America West**
Address: P.O. Box 986,
Friday Harbor, WA 98250
USA
Telephone: 1-360-378-4182 / 1-800-343-7351
Fax: 1-360-378-3315
E-mail: dawest@rockisland.com
Contact Name: NA
Web: http://www.daest.com
Brand: Loadstar

Supplier: **Cummins-Wagner**
Address: 717 N. Haven Circle,
Chesapeake, VA 23322
USA
Telephone: 1-757-547-4419
Fax: 1-757-547-3219
E-mail: NA
Contact Name: Randy Beauchamp
Web: http://www.cummins-wagner.com
Brand: Gardner Denver

Supplier: **OESSCO**
Address: 4331 Bainbridge Blvd.
Chesapeake, VA 23324-0097
USA
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: http://www.oessco.com
Brand: Champion

2.2.4.2 Shop Air Compressors (20 HP, 440V, 3PH)

Manufacturers:

Supplier:	**Gardner Denver**
Address:	1800 Gardner Expwy. Quincy, IL 62301 USA
Telephone:	1-217-222-5400, 1-800-682-9868 (toll free)
Fax	1-217-228-8243
Web	http://www.gardnerdenver

Supplier:	**Ingersoll-Rand Co.**
Address:	200 Chestnut Ridge Rd. Woodcliff Lake, NJ 07675 USA
Telephone:	1-201-573-0123, 1-800-847-4041 (toll free)
Fax	1-201-573-3172
Web	http://www.ingersoll-rand.com

Supplier:	**Champion Equipment**
Address:	120 Mushroom Blvd. Rochester, NY 14623 USA
Telephone:	1-585-427-7411
Fax	1-585-427-7483
Web	http://www.championequipment.us

Dealers:

Supplier:	**Cummins-Wagner**
Address:	717 N. Haven Circle, Chesapeake, VA 23322 USA
Telephone:	1-757-547-4419
Fax:	1-757-547-3219
E-mail:	NA
Contact Name:	Randy Beauchamp
Web:	http://www.cummins-wagner.com
Brand:	Gardner Denver

Supplier:	**Automotive Service Tools**
Address:	4000 Surfside Blvd. Suite 507, Corpus Christi, TX 74802 USA
Telephone:	1-860-626-9633 / 1-866-593-0600
Fax:	1-972-291-2655
E-mail:	salesrep@ utomotiveservicetools.com
Contact Name:	NA
Web:	http://www.automotiveservicetools.com
Brand:	Bend Pack Ranger

Supplier: **Automotive Service Equipment**
Address: 379 Cardinal Circle,
Torrington, CT 06790
USA
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 1-419-831-0245
E-mail: contact@e deals.com
Contact Name: NA
Web: http://www.asedeals.com
Brand: BelAire

Supplier: **Green Valley Compressor**
Address: 429 N. Main,
Keller, TX 76248
USA
Telephone: 1-360-378-4182 / 1-800-735-3507
Fax: 1-817-431-2070
E-mail: gv1@ et.net
Contact Name: Troy Stapely
Web: http://www.greenvalleycompressor.com
Brand: Ingersoll Rand

Supplier: **Mile-X Equipment, Inc.**
Address: 801 N. 2nd Street,
Coldwater, OH 45828
USA
Telephone: 1-419-678-3818 / 1-800-837-3818
Fax: 1-419-678-2489
E-mail: sales@ile-x.com
Contact Name: NA
Web: http://www.mile-x.com
Brand: Champion

Supplier: **Industrial Air Compressors**
Address: 6356 Carter Ave.,
Merriam, KS 66203
USA
Telephone: 1-913-671-1830
Fax: 1-913-671-1870
E-mail: info@dustri al-air-compressors.com
Contact Name: NA
Web: http://www.industrial-air-compressors.com
Brand: Belaire

Supplier: **OESSCO**
Address: 4331 Bainbridge Blvd. ,
Chesapeake, VA 23324-0097
USA
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: http://www.oessco.com

Brand:	Champion
Supplier:	**Hydraulic Service Company Inc.**
Address:	3215 Victory Boulevard, Portsmouth, VA 23702 USA
Telephone:	1-757-487-2513
Fax:	1-747-487-4381
E-mail:	websales@ ydraulicservice.com
Contact Name:	Mg Hassell
Web:	http://www.hydraulicservice.com
Brand:	Graco

2.2.5 Lube Equipment

Manufacturers:

Supplier: **Hosetract Industries**
Address: P.O. Box 80008
Fort Wayne, IN 46898-0008
USA
Telephone: 1-260-489-8828, 1-888-489-8828 (toll free)
Fax 1-260-489-6088
Web http://www.hosetract.com

Supplier: **John Dow Industries, Inc.**
Address: 120 E. Tuscarawas Ave.
Barberton, OH 44203
USA
Telephone: 1-330-753-6895, 1-800-433-0708 (toll free in USA)
Fax 1-330-753-6419
Web NA

Supplier: **Lincoln Industrial Corporation**
Address: One Lincoln Way
St. Louis, MO 63120-1578
USA
Telephone: 1-314-679-4200
Fax 1-800-424-5359
Web http://www.lincolnindustrial.com

Supplier: **Graco, Gusmer, Liquid Control, Decker**
Address: 88 11th Ave NE
P.O. Box 1441
Minneapolis, MN 55440-1441
USA
Telephone: 1-612-623-6741, 1-877-844-7226
Fax 1-612-623-6580
Web http://www.graco.com

Dealers:

Supplier: **OESSCO**
Address: 4331 Bainbridge Blvd. ,
Chesapeake, VA 23324-0097
USA
Telephone: 1-757-543-3596
Fax: 1-757-543-6196
E-mail: jay@oessco.com
Contact Name: Jay Rodgers
Web: http://www.oessco.com
Brand: Graco

Supplier: **Mile-X Equipment, Inc.**
Address: 801 N. 2nd Street,
Coldwater, OH 45828

	USA
Telephone:	1-419-678-3818 / 1-800-837-3818
Fax:	1-419-678-2489
E-mail:	sales@ile-x.com
Contact Name:	NA
Web:	http://www.mile-x.com
Brands:	Hosetract, John Dow

Supplier:	**Lube Technology/Willmar International**
Address:	P.O. Box 456,
	Ada, MI 49301
	USA
Telephone:	1-616-676-1792
Fax:	1-616-676-1287
E-mail:	wmogrady@ serv.net
Contact Name:	NS
Web:	http://www.iserv.net/~wmogrady/lube.html
Brands:	Lincoln Automotive

Supplier:	**Hydraulic Service Company Inc.**
Address:	3215 Victory Boulevard,
	Portsmouth, VA 23702
	USA
Telephone:	1-757-487-2513
Fax:	1-757-487-4381
E-mail:	websales@ ydraulicservice.com
Contact Name:	Mg Hassell
Web:	http://www.hydraulicservice.com
Brand:	Graco

2.2.6 Vehicle Lifts

Manufacturers:

Supplier:	**Mohawk Lifts**
Address:	P.O. Box 110 Amsterdam, NY 12010-0110 USA
Telephone:	1-518-842-1431, 1-800-833-2006 (toll free in USA)
Fax	1-518-842-1289
Web	http://www.mohawklifts.com

Supplier:	**Bend-Pak / Ranger**
Address:	1645 Lemonwood Dr. Santa Paula, CA. USA 93060 USA
Telephone:	1-800-253-2363 (toll free in USA)
Fax	1-805-933-9970, 1-800-253-2363 1-805-933-9160
E-mail	sales@ ndpak.com (Sales Department) exportsales@nd pak.com (Export Sales Department)
Web	http://www.bendpak.com

Supplier:	**Rotary Lift**
Address:	2700 Lanier Dr. Madison, IN 47250 USA
Telephone:	1-812-273-1622, 1-800-640-5438 (toll free in USA)
Fax	1-812-273-6502, 800-578-5438 (toll free in USA)
Web	http://www.rotary-lift.com

Dealers:

Supplier:	**OESSCO**
Address:	4331 Bainbridge Blvd. , Chesapeake, VA 23324-0097 USA
Telephone:	1-757-543-3596
Fax:	1-757-543-6196
E-mail:	jay@oessco.com
Contact Name:	Jay Rodgers
Web:	http://www.oessco.com
Brand:	Mohawk

Supplier:	**Eagle Equipment Inc.**
Address:	4810 Clover Road, Greensboro, NC 27405 USA
Telephone:	1-336-697-7177 / 1-800-336-2776 (toll free in USA)
Fax:	1-800-590-9841
E-mail:	sales@ gleequip.com
Contact Name:	NA
Web:	http://www.eagleequip.com

Brands: Bend Pak, Eagle

Supplier: **Automotive Service Equipment**
Address: 379 Cardinal Circle,
Torrington, CT 06790
USA
Telephone: 1-860-626-9633 / 1-800-229-6218
Fax: 1-419-831-0245
E-mail: contact@e deals.com
Contact Name: NA
Web: http://www.asedeals.com
Brand: Bend Pak

Supplier: **Hill Equipment Company**
Address: 1226 Executive Boulevard, Suite 123,
Chesapeake, VA 23320
USA
Telephone: 1-757-548-4808
Fax: 1-757-548-1023
E-mail: NA
Contact Name: John Hill
Web: NA
Brand: Rotary

2.2.7 Hydraulic Oil Filter Cart

Manufacturers:

Supplier:	**Parker Hannifin Corp.**
Address:	8676 E. M-89 Richland, MI 49083 USA
Telephone:	1-269-629-5000, 1-800-272-7537
Fax	1-269-629-5385
Web	http://www.parker.com

Supplier:	**Purolator Facet, Inc.**
Address:	8439 Triad Dr. Greensboro, NC 27409 USA
Telephone:	1-336-668-4444, 1-800-852-4449 (toll free in USA)
Fax:	1-336-668-4452
Web	http://www.purolator-facet.com

Dealers:

Supplier:	**Grainger**
Address:	1401 Sewells Point Road, Norfolk, VA 23502 USA
Telephone:	1-757-855-3153
Fax:	1-757-855-9542
E-mail:	NA
Contact Name:	NA
Web:	http://www.grainger.com
Brand: `	Parker

Supplier:	**Norman Filter Company, L.L.C.**
Address:	9850 S. Industrial Drive, Bridgeview IL 60465 USA
Telephone:	1-708-233-5521
Fax:	1-708-430-5961
E-mail:	sales@rm anfilters.com
Contact Name:	NA
Web:	http://www.normanfilters.com
Brand:	Norman Filter

Supplier:	**PNUCOR**
Address:	452 South Lake Blvd., Richmond, VA 23236 USA
Telephone:	1-804-794-0000
Fax:	1-804-379-9216
E-mail:	vtaylor@pnucor.com
Contact Name:	Vicki Taylor
Web:	http://www.pnucor.com

Brand:	Purolator-Facet
Supplier:	**Hydraulic Service Company Inc.**
Address:	3215 Victory Boulevard, Portsmouth, VA 23702 USA
Telephone:	1-757-487-2513
Fax:	1-757-487-4381
E-mail:	websales@ ydraulicservice.com
Contact Name:	Mg Hassell
Web:	http://www.hydraulicservice.com
Brand:	Norman Filter

2.2.8 Pressure Washers

Manufacturers:

Supplier:	**Niagara National Corporation**
Address:	2160 Hills Ave. Atlanta, GA 30318 USA
Telephone:	1-404-350-2600, 1-800-635-8342 (toll free)
Fax	1-404-350-2615
Web	http://www.niagaranationalcorp

Supplier:	**Jenny Products, Inc.**
Address:	850 N. Pleasant Ave. Somerset, PA 15501 USA
Telephone:	1-814-445-3400
Fax	1-814-445-2280
Web	http://www.steamjenny.com

Supplier:	**Silver Eagle Manufacturing**
Address:	P.O Box7346, Cut-N-Shoot, TX 77306 USA
Telephone:	1-936-264-2219 1-800-342-2822 (toll free in USA)
Fax:	1-936-264-2219
E-mail:	mike@vere aglemanufacturing.com
Contact Name:	NA
Web:	http://www.silvereaglemanufacturing.com
Brand: `	Silver Eagle Manufacturing

Supplier:	**Amazing Machinery**
Address:	2288 Gunbarrel Road, Suite111-151, Chattanooga, TN 37421 USA
Telephone:	1-423-490-0085, 1-800-504-7453 (toll free in USA)
Fax:	1-423-899-9772
E-mail:	salea@na zingmachinery.com
Contact Name:	NA
Web:	http://www.amazingmachinery.com
Brand:	Amazing Machinery

Supplier:	**Hydro Engineering Inc.**
Address:	Salt Lake City, UT 84119
Telephone:	1-800-247-8424 Ext. 121 (toll free in USA)
Fax:	1-801-972-3265 / 1-810-763-6459
E-mail:	dfelice@hydroblaster.com
Contact Name:	Doug Felice
Web:	http://www.hydroblaster.com
Brand:	Hydroblaster

Dealers:

Supplier:	**Acme Cleaning Equipment**
Address:	6839 Picadilly, Houston, TX 77061 USA
Telephone:	1-713-643-4343
Fax:	1-713-643-9880
E-mail:	sales@ cmecleaningequipment.com
Contact Name:	NA
Web:	http://www.acmecleaningequipment.com
Brand:	Niagara

Supplier:	**Hydraulic Service Company Inc.**
Address:	3215 Victory Boulevard, Portsmouth, VA 23702 USA
Telephone:	1-757-487-2513
Fax:	1-757-487-4381
E-mail:	websales@ ydraulicservice.com
Contact Name:	Mg Hassell
Web:	http://www.hydraulicservice.com
Brand:	MY-T-M

Supplier:	**Equipment Trade Service**
Address:	20E Winona Ave. Norwood, PA 19077 USA
Telephone:	1-610-583-7657
Fax:	1-610-583-5479
E-mail:	NA
Contact Name:	Steve
Web:	http://www.etspressurewashers.com
Brand:	Steam Jenny

2.2.9 Street Sweepers

Manufacturers:

Supplier:	**Tennant Co.**
Address:	701 N. Lilac Dr., P.O. Box 1452 Minneapolis, MN 55440 USA
Telephone:	1-763-540-1200, 1-800-553-8033 (toll free in USA)
Fax	1-763-513-2142
Web	http://www.tennantco.com

Supplier:	**TYMCO International, Ltd.**
Address:	225 Industrial E., P.O. Box 2368 Waco, TX 76705-2368 USA
Telephone:	1-254-799-5546, 1-800-258-9626 (toll free in USA)
Fax	1-254-799-2722
Web	http://www.tymco.com

Supplier:	**Schwarze Industries, Inc.**
Address:	1055 Jordan Rd. Huntsville, AL 35811 USA
Telephone:	1-256-851-1200, 1-800-879-7933 (toll free in USA)
Fax	1-256-851-1110
Web	http://www.schwarze.com

Dealers:

Supplier:	**Mid-Atlantic Waste Systems**
Address:	7700 Old Alexandria Ferry Road, Clinton, MD 20735 USA
Telephone:	1-301-856-6840
Fax:	1-301-856-1292
E-mail:	sales@mawaste.com
Contact Name:	David Askew
Web:	http://www.midatlanticwaste.com
Brand: `	Tymco

Supplier:	**Atlantic Machinery Inc.**
Address:	2702 Garfield Avenue, Silver Spring, MD 20910 USA
Telephone:	1-301-585-0800
Fax:	1-301-585-7681
E-mail:	sales@ anticmachinery.com
Contact Name:	Trevor Gardner
Web:	http://www.atlanticmachinery.com
Brand:	Schwarze

Supplier:	**Birsch Industries**
Address:	476 Viking Drive, Suite 102, Virginia Beach, VA 23452 USA
Telephone:	1-757-622-0355
Fax:	1-757-625-7552
E-mail:	buster@rsch.com
Contact Name:	Buster Lankford
Web:	http://www.birsch.com
Brand:	Tennant

2.2.10 Diesel Powered Welders

Manufacturers:

Supplier:	**Eastern Tools & Equipment Inc. (ETQ)**
Address:	1040 S Rockefeller Ave. Ontario, CA 91761 USA
Telephone:	1-909-390-8989
Fax	1-909-390-6068
Web	http://easterntools.com

Supplier:	**Miller Electric Manufacturing Co.**
Address:	1635 W. Spencer St. Appleton, WI 54914 USA
Telephone:	1-920-734-9821, 800-4-A-Miller (800-426-4553) (toll free in USA)
Fax	1-920-735-4134
Web	http://www.millerwelds.com

Supplier:	**The Lincoln Electric Co. Inc.**
Address:	22801 St. Clair Ave. Cleveland, OH 44117 USA
Telephone:	1-216-481-8100, 888-921-9353 (toll free)
Fax	1-216-486-1751
Web	http://www.lincolnelectric.com

Dealers:

Supplier:	**US Diesel Engines LLC**
Address:	100 W. Southern St. Unit 19, Brighton, CO 80601 USA
Telephone:	1-303-654-1195 / 1-866-734-3735
Fax:	1-720-294-9776
E-mail:	usdieselengines@l. com
Contact Name:	NA
Web:	http://www.usdieselengines.com
Brand:	ETQ

Supplier:	**J.W. Godliffe & Sons, Inc.**
Address:	1900E Elizabeth Ave. , P.O. Box 4370, Linden, NJ 07036 USA
Telephone:	1-908-486-8230 / 1-800-419-0580 (toll free in USA)
Fax:	1-908-486-9366
E-mail:	info@berweld.com
Contact Name:	NA
Web:	http://www.cyberweld.com
Brand:	Miller

Supplier:	**J & R Welding Supply**
Address:	270 Milton Ave , Ballston Spa, NY 12020 USA
Telephone:	1-518-885-9685
Fax:	1-518-885-1519
E-mail:	johnnj@ ndrweldingsupply.com
Contact Name:	NA
Web:	http://www.jandrweldingsupply.com
Brand:	Lincoln

2.2.11 Step Vans

Manufacturers:

Supplier:	**Freightliner Corp.**
Address:	2701 N.W. Vaughn St., Suite 300-T Portland, OR 97210-5355 USA
Telephone:	1-503-735-8000, 1-800-385-4357 (toll free in USA)
Fax	1-503-735-8921
Web	http://www.freightliner.com

Supplier:	**Workhorse Custom Chassis**
Address:	600 Central Ave., Suite 220 Highland Park, IL 60035 USA
Telephone:	1-847-681-1550, 1-877-946-7731
Fax	1-847-681-0276
Web	http://www.workhorse.com

Supplier:	**Utilimaster**
Address:	65906-T State Rd. 19 Wakarusa, IN 46573 USA
Telephone:	1-574-862-4561, 800-582-3454 (toll free in USA)
Fax	1-574-862-3349
Web	http://www.utilimaster.com

Dealers:

Supplier:	**Virginia Truck Center**
Address:	740 S.Military Highway, Virginia Beach, VA 23464 USA
Telephone:	1-757-424-3000 ext 139
Fax:	1-757-523-1891
E-mail:	dduck@rgin iatruckcenter.com
Contact Name:	Donald Duck
Web:	http://www.virginiatruckcenter.com
Brand:	Freightliner with Cummins diesel engine and Allison automatic transmission

Supplier:	**Hall Automotive**
Address:	3512 Virginia Beach Blvd., Virginia Beach, VA 23452 USA
Telephone:	1-757-498-2290
Fax:	1-757-498-2310
E-mail:	skipp@ll auto.com
Contact Name:	Skipp Webb
Web:	http://www.hallauto.com
Brand:	Workhorse

Supplier:	**Freedom Ford**
Address:	1020 West Mercury Blvd. Hampton, VA 23666 USA
Telephone:	1-757-838-0222
Fax:	1-757-825-1157
E-mail:	khollop@freedomford.com
Contact Name:	Kathleena Hollopeter
Web:	http://www.freedomautomotive.com
Brand:	Utilimaster

Note: Vehicles are available from dealers noted in Virginia, as well as others in Miami FL, New Orleans LA, Houston TX and throughout the US, depending on client preferences and shipping costs, and export services from dealers or manufacturers.

2.2.12 Automated Trash Trucks & Dumpsters

Manufacturers:

Supplier:	**Heil Enviromental Industries, Ltd.**
Address:	5751-T Cornelison Rd., P. O. Box 8676 Chattanooga, TN 37414-0676 USA
Telephone:	1-423-899-9100, 1-800-824-4345 (toll free in USA)
Fax	1-423-855-3478
Web	http://www.heil.com

Supplier:	**McClain E-Z Pack**
Address:	P.O. Box 607 Galion, OH 44833-0607 USA
Telephone:	1-419-468-2120
Fax	1-419-468-4895
Web	http://www.mcclaingroup.com

Dealers:

Supplier:	**Virginia Truck Center**
Address:	740 S.Military Highway, Virginia Beach, VA 23464 USA
Telephone:	1-757-424-3000 ext 139
Fax:	1-757-523-1891
E-mail:	dduck@rgin iatruckcenter.com
Contact Name:	Donald Duck
Web:	http://www.virginiatruckcenter.com
Brand:	Freightliner with Heil body attachment

Supplier:	**Hall Automotive**
Address:	3512 Virginia Beach Blvd., Virginia Beach, VA 23452 USA
Telephone:	1-757-498-2290
Fax:	1-757-498-2310
E-mail:	skipp@ll auto.com
Contact Name:	Skipp Webb
Web:	http://www.hallauto.com
Brand:	Autocar Xpeditor with E-Z Pack Body

Note: Vehicles are available from dealers noted in Virginia, as well as others in Miami FL, New Orleans LA, Houston TX and throughout the US, depending on client preferences.

2.2.13 Vertical Milling Machine

Manufacturers:

Supplier:	**Ganesh Machinery**
Address:	202621 Plummer Street, Chatsworth, CA 91311 USA
Telephone:	1-818-349-9166 / 1-888-542-6374
Fax:	1-818-349-9166
E-mail:	sales@ganeshmachinery.com
Contact Name:	NA
Web:	http://www.ganeshmachinery.com
Brand:	Ganesh

Supplier:	**Wells-Index**
Address:	701 West Clay Ave. Muskegon, MI 49440-1064 USA
Telephone:	1-231-759-0950
Fax:	1-231-728-7457
E-mail:	mailto:wellsindex@l.com
Contact Name:	Rick Robinson
Web:	http://www.wellsindex.com
Brand:	Wells-Index

Supplier:	**Clausing Industrial, Inc.**
Address:	1819 N. Pitcher St. Kalamazoo, MI 49007 USA
Telephone:	1-269-345-7155
Fax	1-269-345-5945
Web	http://clausing-industrial.com

Dealers:

Supplier:	**Redmond & Son Inc, Machinery**
Address:	900 Great Southwest Pkwy, P.O. Box 4406, Atlanta, GA 30336 USA
Telephone:	1-404-346-7788 / 1-800-428-9898 (toll free in USA)
Fax:	1-404-346-7763
E-mail:	mail@dmond-m achinery.com
Contact Name:	Marvin Smith
Web:	http://www.redmond-machinery.com
Brand:	Clausing/Atlas

2.3 Selected Building Products

Products: Industrial buildings

Supplier: **Washington Group International, Inc.**
Address: 720 Park Blvd.
Boise, ID 83712
USA
Telephone: 1-208-386-5000
Fax: 1-208-386-7186
E-mail: NA
Contact: NA
Web http://www.wgint.com

Products: Telecommunications

Supplier: **Lucent Technologies, Inc.**
600 Mountain Ave.
Murray Hill, NJ 07974-2008
USA
Telephone: 1-908-582-8500, 1-888-4-LUCENT (toll free in USA)
Fax: 1-908-508-2576
E-mail: NA
Contact: Sales
Web: http://www.lucent.com

Supplier: **Cisco Systems, Inc.**
170 W. Tasman Dr.
San Jose, CA 95134
USA
Telephone: 1-650-404-3500, 1-800-533-NETS (toll free in USA)
Fax: 1-408-526-4100
E-mail: NA
Contact: Sales
Web: http://www.cisco.com

Supplier: **Graybar Electric Co., Inc.**
Address: 34 N. Meramec Avenue
St. Louis, MO 63105
USA
Telephone: 1-314-573-9200,1-800-GRAYBAR(1-800-472-9227) (toll free in USA)
Fax: 1-314-573-9455
E-mail: NA
Contact: Sales
Web: http://www.graybar.com

Product: Indoor and outdoor lighting

Supplier: **Holophane**
214 Oakwood Ave.
Newark, OH 43055
USA

Telephone: 1-740-345-9631
Fax: 1-740-349-4426
E-mail: NA
Contact: Sales
Web: http://www.holophane.com

Supplier: **Lithonia Lighting**
Address: 1400 Lester Rd.
Conyers, GA 30012
USA
Telephone: 1-770-922-9000
Fax: 1-770-922-1677
E-mail: NA
Contact: Sales
Web: http://www.lithonia.com

Product: Street, outdoor and area lighting

Supplier: **Unique Solutions Div., Holophane Lighting Corp.**
515-T McKinley Ave.
Newark, OH 43055
Telephone: 1-740-349-4160
Fax: 1-800-346-5923 (toll free in USA)
E-mail: NA
Contact: Unique Solutions
Web: http://www.holophane.com

Product: Electrical control systems and circuit breakers

Supplier: **Eaton Corp., Cutler-Hammer Group**
Address: 1000 Cherrington Pkwy
Moon Township, PA 15108
USA
Telephone: 1-412-893-3300
Fax: NA
E-mail: NA
Contact: Sales
Web: http://www.cutler-hammer.com

Product: Power distribution

Supplier: **GE Industrial Systems**
Address: 1635 Broadway
Fort Wayne, IN 46802
USA
Telephone: 1-260-439-2000,1-770-644-7713
Fax 1-770-644-7713
E-mail: NA
Contact: Sales
Web: http://www.geindustrial.com

Product: Other industrial electrical products

Supplier: GE Industrial Systems
Telephone: 1-305-551-5176
Fax: 1-305-551-5129

Product: Air conditioning

Supplier: **Carrier Corp.**
Address: Carrier Pkwy., A&R Bldg.
Syracuse, NY 13221-4808

Latin America sales:
Carrier Interamerica Corporation – CMS – Sales
3450 NW 115 Ave
Miami FL 33178
USA

Telephone: 1-315-432-6000(New York), 800-227-7437 (toll free)
1-305-590-1000 (Latin America sales / Florida)
Fax: 1-315-432-7583 (New York),
1-305-590-1090 (Latin America sales / Florida)
E-mail: ricardo.e.corrie@carrier.utc.com
Contact: Ricardo E. Corrie
Web: http://www.carrier.com

Product: Security systems

Supplier: **ADEMCO**
Address: 180-T Michael Dr.
Syosset, NY 11791
USA
Telephone: 1-516-921-6704, 1-800-645-7492 (toll free in USA)
Fax 1-516-496-7454
E-mail: NA
Contact: Sales
Web: http://www.ademco.com

Supplier: **Honeywell Security**
Address: 2700 Blankenbaker Pkwy Ste 150
Louisville KY 40299
USA
Telephone: 1-502-297-5700; 1-800-467-5875 (toll free in USA)
Fax: 1-502-666-7021
Web: http://www.security.honeywell.com

Product: Security gates, slide/swing gate operators, access control equipment, systems integration, industrial barrier gates & navigational lights

Supplier: **EDKO, Inc.**
Address: 1019 Airpark Dr.
Sugar Grove, IL 60554
USA

Telephone:	1-630-556-4499, 800-800-EDKO (toll free in USA)
Fax:	1-630-556-4478
E-mail	sales@edko.com
Contact:	Sales
Web:	http://www.edko.com

3 SERVICE BOATS, TUGS AND PATROL BOATS

Sources of supply for service boats are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

3.1 Boats

Supplier:	**John Bludworth Shipyard, LLC**
Address:	3101 Navigation Corpus Christi, TX 78402 USA
Telephone	1-361-887-7981
Fax	1-361-887-6014
E-mail:	gdannaj@u dshipyard.com
Contact:	Gasper D'Anna
Web	http://www.jbludshipyard.com

Supplier:	**Bollinger Shipyards, Inc.**
Address:	P. O. Box 250 Lockport, LA 70374 USA
Telephone:	1-985-532-2554
Fax:	1-985-532-7225
E-mail:	Roberts@ll ingershipyards.com
Contact:	Robert Socha
Web:	http://www.bollingershipyards.com

Supplier:	**Atlantic Marine, Inc.**
Address:	8500 Heckscher Dr. Jacksonville, FL 32226 USA
Telephone:	1-904-251-1507
Fax:	1-904-251-1507
E-mail:	kwilson@atlanticmarine.com
Contact:	Kevin Wilson
Web:	http://www.atlanticmarine.com

Supplier:	**VT Halter Marine, Inc.**
Address:	900 Bayou Casotte Parkway Pascagoula, MS 39581 P.O. Box 1328 Pascagoula, MS 39568 USA
Telephone:	1-228-696-6888
Fax:	1-228-696-6899
E-mail	vthmsales@vthm.com
Contact:	Sales
Web	http://www.vthalter.com

Supplier:	**SAFE Boats International, LLC**
Address:	8800 SW Barney White Rd Port Orchard, WA 98367 USA
Telephone	1-360-674-7161
Fax	1-360-674-7149
E-mail:	NA
Contact:	Sales
Web:	http://www.safeboats.com

3.2 Naval Architecture

Supplier:	**Alion-JJMA Corporation dba John J Mullen Associates**
Address:	4300 King St 400 Alexandria, VA 22302-1503 USA
Telephone:	1-703-933-6687, 703-418-0100
Fax:	NA
E-mail:	moakes@jo nscience.com; contact@alionscience.com
Contact:	Mark Oakes
Web:	http://www.alionscience.com

Supplier:	**AMSEC LLC, M. Rosenblatt & Son**
	Maritime Plaza 1201 M St., SE Washington DC 20003
	2829 Guardian Lane, Virginia Beach VA 23452 USA
Telephone:	1-202-608-8400 (Washington), 1-757-463-6666 (Virginia)
Fax:	1-202-544-5645, 1-757-463-9110 (Virginia)
E-mail:	NA
Contact:	Contracts department
Web:	http://www.amsec.com

Supplier:	**Leary Engineering**
Address:	530 Natchez St Ste 310 New Orleans LA 70130 USA
Telephone:	1-504 522-3483
Fax	1-504-586-0448
E-mail	jleary@learyeng.com
Contact	John Leary, P.E.
Web	http://www.learyeng.com

3.3 Marine Engines

Supplier: **Detroit Diesel**
Address: 13400 Outer Drive, West
Detroit, MI 48239-4001
USA
Telephone: 1-313-592-5000
Fax: NA
E-mail: ddcinfo@detroitdiesel.com
Contact: Sales
Web: http://www.detroitdiesel.com

Supplier: **Caterpillar Inc.**
100 NE Adams St.
Peoria, IL 61629
USA
Telephone: 1-309-578-6298 or 1-800-321-7332 (toll free in USA)
E-mail: CATPower@ cat.com
Contact: Marine Power
Web: http://www.cat.com

Supplier: **Pratt & Whitney**
400 Main Street
East Hartford, CT 06108
USA
Telephone: 1-860-565-4321
E-mail: info@pw.utc. com
Contact: Power Systems
Web: http://www.pw.utc.com

Supplier: **Cummins, Inc.**
500 Jackson St.
P.O. Box 3005
Columbus, IN 47202-3005
USA
Telephone: 1-812-377-5000
Fax: 1-812-377-3334
E-mail: NA
Contact: Marine Sales
Web: http://www.cummins.com

3.4 Marine Electronics

Supplier:	**Motorola, Inc.**
Address:	1303 E. Algonquin Rd. Schaumburg, IL 60196 USA
Telephone:	1-847-576-5000
Fax:	1-847-576-5372
E-mail:	NA
Contact:	Customer Service
Web:	http://www.motorola.com

Supplier:	**Raymarine Inc.**
Address:	21 Manchester Street Merrimack NH 03054 USA
Telephone:	1-603-881-5200 or 1-800-539-5539 (toll free in USA)
Fax:	1-603-864-4756
E-mail:	NA
Contact:	Sales
Web	http://www.raymarine.com

Supplier:	**Sperry Marine** 1070 Seminole Trail Charlottesville, VA 22901 USA
Telephone:	1-434-974-2656; 1-434-974-2000; 1 800-974-2360 (toll free in USA)
Fax:	1-434-974-2259,1-434-974-2360
E-Mail:	sales_commercial@sperry-marine.com
Contact:	Commercial Sales
Web:	http://www.sperrymarine.northropgrumman.com

Supplier:	**Northstar**
Address:	30 Sudbury Road, Acton MA 01720 USA
Telephone:	1 978 897 6600, 1 800 628 4487 (Toll free in USA)
Fax:	1 978 897 7241
E-mail:	sales@tm arine.com
Contact:	Sales
Web	http://www.northstarcmc.com

Supplier:	**Garmin International Inc.** 1200 East 151st Street Olathe, KS 66062-3426 USA
Telephone:	1-913-397-8200
Fax:	1-913-397-8282
E-mail:	NA
Contact:	Sales
Web:	http://www.garmin.com

Supplier:	**KVH**
Address:	50 Enterprise Center Middletown, RI 02842-5279 USA
Telephone:	1-401-847-3327
Fax:	1-401-849-0045
E-mail:	NA
Contact:	Sales
Web:	http://www.kvh.com

Supplier:	**Simrad**
Address:	19210 33rd Ave. W., Suite A Lynwood, WA 98036 USA
Telephone:	1-425-778-8821
Fax:	1-425-771-7211
E-mail:	NA
Contact:	David Parkinson, Sales
Web:	http://www.simradusa.com

Supplier:	**Maretron**
Address:	9034 N. 23rd Ave., Suite 13 Phoenix, AZ 85021 USA
Telephone:	1-602-861-1707
Fax:	1-602-861-1777
E-mail:	sales@maretron.com
Contact:	Sales
Website:	http://www.maretron.com

4 FIRE PROTECTION

Sources of supply for fire protection systems are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

4.1 Fire Protection and Suppression Systems

Product: Sprinkler heads, alarm valves, waterflow and tamper switches, etc.

Supplier: **Reliable Automatic Sprinkler Company, Inc.**
Address: 525 North MacQuesten Parkway
Mt. Vernon NY 10552
USA

Latin America Sales office:
2200 Luna Road
Suite 160
Carrollton, TX 75006
Tel: Fax:

Telephone: 1-972-243-1472 (Texas), 1-919-668-3470 (New York), 1-800-431-1588 (toll free in USA)
Fax: 1-972-243-1428 (Texas), 1-800-848-6051 (toll free in USA)
E-mail: sbernal@li ablesprinkler.com
Contact: Sylvia Bernal, Latin America Sales Representative
Web: http://www.reliablesprinkler.com

Supplier: **Viking Corporation**
Address: 210 North Industrial Park Rd
Hastings, MI 49058
USA
Telephone: 1-269-945-9501,1-800-968-9501 (toll free in USA)
Fax: 1-269-945-9599
E-mail: techsvcs@ kingcorp.com
Contact: Sales
Web: http://www.vikingcorp.com

Product: Sprinkler heads, alarm valves, waterflow and tamper switches, etc., grooved fittings and couplings

Supplier: **Tyco Fire and Building Products**
451 N. Cannon Ave
Lansdale PA 19446

Latin America headquarters:
1802 SW 2nd St.
Pompano Beach FL 33069
USA
Telephone: 1-954-781-0866 (Florida), 1-215-362-0700 (Pennsylvania), 1-800-523-6512 (toll free in USA)
Fax: 1-954-781-9330 (Florida), 1-215-362-4731 (Pennsylvania)
Contact: Sales
Web: http://www.tyco-fire.com

Product: Grooved fittings and couplings, fire protection valves

Supplier: **Victaulic**
Address: 4901 Kesslersville Rd
Easton PA 18040
P.O. Box 31
Easton, PA 18044-0031
USA
Telephone: 1-610-559-3300, 1-800-PICK-VIC, (1-800-742-5842) (toll free in USA)
Fax: 1-610-559-3608, 1-610-250-8817
E-mail: vical@victaulic.com
Contact: Latin America Sales
Web: http://www.victaulic.com

Product: Threaded and flanged pipe fittings

Supplier: **Anvilstar Fire Products Division**
Address: 110 Corporate Dr, Ste 10
P.O. Box 3180
Portsmouth NH 03801
USA
Telephone: 1-708-534-1414,1-603-422-8000
Fax: 1-708-534-5441, 1-603-422-8033
E-mail: NA
Contact: Customer Service
Web: http://www.anvilintl.com

Product: Fire pumps

Supplier: **A-C Fire Pump Systems**
Address: 8200 N. Austin Ave
Morton Grove, IL 60053
USA
Telephone: 1-847-966-3700
Fax: 1-847-966-1914
Web: http://www.acfirepump.com

Supplier: **Patterson Pump**
Address: 2129 Ayersville Rd
P.O. Box 790
Toccoa GA 30577
Telephone: 1-706-866-2101
Fax: 1-706-866-0023
E-mail: fpsales@att ersonpumps.com
Contact: Fire Pump Sales
Web: http://www.pattersonpumps.com

Supplier: **Aurora Pump**
Pentair Pump Group
Address: 800 Airport Rd
North Aurora IL 60542

	USA
Telephone:	1-630-859-7000
Fax	1-630-859-7060 (USA), 630-859-1226 (International)
E-mail:	aurora_info@entairpum p.com
Contact:	Sales
Web:	http://www.aurorapump.com

Supplier:	**Reddy-Buffaloes Pump, Inc.**
Address:	PO Box 557 1 Dixie Drive Baxley GA 31513
Telephone:	1-912-367-6345
Fax:	1-912-367-5024
E-mail:	sales@pu mp.com
Contact	Sales
Web:	http://www.rbpump.com

Product:	Fire alarm systems

Supplier:	**SimplexGrinnell**
Address:	100 Simplex Drive Westminster MA 01441 USA
Telephone:	1-978-731-2500, 1-800-SIMPLEX (toll free in USA)
Fax:	1-978-731-7856
E-mail:	NA
Contact:	Sales
Web:	http://www.simplexgrinnell.com

Product:	**Notifier**
Address:	12 Clintonville Road Northford CT 06472-1653 USA
Telephone:	1-203-484-716,1-800-289-3473 (toll free in USA)
Fax:	1-203-484-7118
E-mail:	NA
Contact:	Sales
Web:	http://www.notifier.com

Supplier:	**Siemens Building Technologies, Inc.** Fire Safety
Address:	8 Fernwood Rd Florham Park, NJ 07932 Latin America: 3371 Executive Way Miramar FL 33025 USA
Telephone:	1-954-433-7328 (Florida), 1-973-593-2600 (New Jersey), 1-800-222-0108 (toll free in USA)
Fax:	1-954-433-7329 (Florida), 1-973-593-6665 (New Jersey)
E-mail:	roger.ariza@siemens.com

Contact: Roger Ariza, Regional Manager, Latin America
Web: http://www.sbt.siemens.com/fis

Product: Fabricated sprinkler piping

Supplier: **GEM Fabrication**
Address: 10230 Statesville Blvd
P.O. Box 309
Cleveland NC 27013
USA
Telephone: 1-704-278-6700,1-800-845-2023 (toll free in the US)
E-mail: gemfab@gemfab.com
Contact Sales
Web: http://www.gemfabrication.com

Product: Fabricated sprinkler piping, ductile iron and PVC underground piping, fittings, valves, hydrants, etc.

Supplier: **Hughes Supply**
Address: 4295 Kearney St
Denver CO 80216
USA
Telephone: 1-303-394-0004,1-303-329-0013
E-mail NA
Contact Sales
Web: http://www.hughessupply.com

Product: Fabricated sprinkler piping

Supplier: **Quality Fabrication and Supply**
Address: 255 Primera Blvd., Suite 230
Lake Mary FL 32746
USA
Telephone: 1-407-585-3222, 1-407-585-3284
E-mail: dgc@ ualityfab.net
Contact: David Capalino, VP, Sales and Marketing
Web: http://www.qualityfab.net

Product: Ductile iron pipe, fittings

Supplier: **USA Pipe and Foundry Company**
Address: 3000 30th Ave N
P. O. Box 10406
Birmingham, AL 35202
USA
Telephone: 1-205-254-7442, 866-DIP-PIPE (toll free in USA)
Fax 1-205- 254-7165
E-mail: NA
Contact: Sales
Web: http://www.uspipe.com

Supplier:	**Griffin Pipe Products**
Address:	1400 Opus Pl, Ste 700 Downers Grove IL 60515 USA
Telephone:	1-630-719-6500
Fax	NA
E-mail:	NA
Contact:	Sales
Web:	http://www.griffinpipe.com
Product:	Underground PVC pipe, fittings

Supplier:	**National Pipe and Plastics, Inc.**
Address:	3421 Old Vestal Rd Vestal NY 13850 USA
Telephone:	1-607-729-9381, 1-800-836-4350 (toll free in USA)
Fax	1-607-729-6130
E-mail:	rjm@tional pipe.com
Contact:	Sales
Web:	http://www.nationalpipe.com
Product:	Valves, fire hydrants

Supplier:	**Kennedy Valve Company**
Address:	1021 East Water St Elmira NY 14902 USA
Telephone:	1-607-734-2211
Fax	1-800-952-4771 (toll free in USA)
E-mail:	NA
Contact:	Sales
Web:	http://www.kennedyvalve.com

Supplier:	**Mueller Company**
Address:	500 West Eldorado St Decatur IL 62525 USA
Telephone:	1-281-590-4600 (Texas),1-217-423-4471 (Illinois), 1-800-423-1323 (toll free in USA)
Fax:	1-419-710-0098
E-mail:	NA
Contact:	Abraham Quijada - International Sales Manager (Texas)
Web:	http://www.muellercompany.com
Product:	Fire Protection and Suppression Systems

Supplier:	**Hiller Systems**
Address:	833 Principal La Chesapeake VA 23320 USA
Telephone:	1-757-549-9123
Fax:	1-757-549-1083
E-mail:	sales@llersystemsinc. com

Contact:	Sales
Web:	http://www.hillersystemsinc.com

Supplier:	**Koetter Fire Protection**
Address:	10351 Olympic Dr Dallas TX 75220 USA
Telephone:	1-214-358-3593, 1-800-441-0394 (toll free in USA)
Fax:	1-214-350-9930
E-mail:	NA
Contact:	Sales
Web	http://www.koetterfire.com

Supplier:	**SimplexGrinnell**
Address:	100 Simplex Drive Westminster MA 01441 USA
Telephone:	1-978-731-2500, 1-800-SIMPLEX (toll free in USA)
Fax:	1-978-731-7856
E-mail:	NA
Contact:	Sales
Web:	http://www.simplexgrinnell.com

4.2 Fire Apparatus

Supplier:	**Seagrave Apparatus LLC**
Address:	105 East 12th St Clintonville WI 54929 USA
Telephone:	1-715-823-2141
Fax:	1-715-823-5768
E-mail:	NA
Contact:	Sales
Web:	http://www.seagrave.com

Supplier:	**American LaFrance**
Address:	8500 Palmetto Commerce Parkway Ladson SC 29456 USA
Telephone:	1-843-486-7400, 1-888-253-8725 (toll free in USA)
E-mail:	customersupport@americanlafrance.com
Contact:	Customer Support
Web:	http://www.americanlafrance.com

Supplier:	**Pierce Manufacturing Inc.**
Address:	2600 American Dr. Appleton, WI 54912 Latin America: Matt Reda 3704 S.E. 45th Place Ocala, FL 34480 USA
Telephone:	1-920-832-3231 (Wisconsin), 1-352-867-7605 (Florida)
Fax:	1-920-832-3084 (Wisconsin), 1-352-867-7605 (Florida)
E-Mail:	mjmdreda@ ol.com (Matt Reda), contactcenter@piercemfg.com
Web:	http://www.piercemfg.com

Supplier:	**Singer Associates**
Address:	7394 Gallerher Rd Gainesville VA 20155 USA
Telephone:	1-800-442-9700 (toll free in USA)
Web:	http://www.singerfire.com

4.3 Fire Protection Engineering

Supplier: **Clark Nexsen**
Address: 6160 Kempsville Ci, Ste 200A
Smithfield Building
Norfolk VA 23502
USA
Telephone: 1-757-455-5800
Fax 1-757-455-5638
E-mail: cborn@clarknexsen.com
Contact: Christopher Born, Director, Fire Protection Engineering
Web: http://www.clarknexsen.com

Supplier: **Aon**
Address: Aon Center
200 East Randolph
Chicago IL 60601
USA
Telephone: 1-312-381-1000
Contact: Fire Protection Engineering Service
Web: http://www.aon.com

Supplier: **Schirmer Engineering Corporation**
Address: Chicago - Corporate HQ
707 Lake Cook Road
Deerfield IL 60015-4997
USA
Telephone: 1-847- 272-8340
Fax: 1-847- 272-2365
E-mail: jimbichau ski@schirmereng.com
Contact: Jim Bichauski
Web: http://www.schirmereng.com

Supplier: **Hughes Associates Inc.**
Address: 3610 Commerce Dr
Baltimore MD 21227-1652
USA
Telephone: 1-410-737-8677
Fax: 1-410-737-8688
E-mail: info@aifire. com
Contact: Sales
Web: http://www.haifire.com

Supplier: **The RJA Group, Inc.**
Address: 600 West Fulton St, Ste 500
Chicago, IL 60661
USA
Telephone: 1-312-879-7200. 1-312- 879-7220
Fax NA
E-mail: NA
Contact: Sales
Web: http://www.rjagroup.com

5 CARGO HANDLING

Sources of supply for cargo handling systems and port-related goods and services are listed below. The U.S. sources of supply shown are some representative vendors and are not to be considered as exclusive sources or an endorsement or preferred supplier.

5.1 Container Cranes

Supplier: **PACECO**
Address: 3854 Bay Center Pl.,
Hayward, CA 94545
USA

Regional office:
3064 C Bienville Blvd,
Ocean Springs, MS 3956
USA
Telephone: 1-510-264-9288 (California);1-228-872-1733 (Mississippi)
Fax: 1-510-264-9280 (California);1-228-875-8875 (Mississippi)
E-mail: E-mail@paceco.com (Corporate); paceco@datasync.com (Regional)
Contact: Sales Mgr. Chuck Melaney (Regional)
Web: http://www.pacecocorp.com

Supplier: **Mi-Jack Products, Inc.**
In-Terminal Services
Address: 3111 W.137th Street,
Hazel Crest, IL 60429
USA
Telephone: 1-708-596-5000
Fax: 1-708-225-2312
E-mail: johnttroop@ nterminalservices.com
Contact: John T. Troop
Web: http://www.mi-jack.com

5.1.1 Electric motors and drives

Supplier: **GE Industrial Systems**
Address: 790 Nw 107th Ave Ste 200
Miami, FL 33172-3158
USA
Telephone 1-305-551-5155; 1-305-551-5176
Fax: 1-305-551-5129
Web: http://www.geindustrial.com

5.2 Rubber Tired Gantries (RTG)

Supplier:	**Kalmar, Inc.**,
	Latin America Sales
Address:	5757 Blue Lagoon Dr,
	Miami, FL 33126
	USA
Telephone:	1-786-388-0330
Fax:	1-305-379-8822
E-mail:	Gaston.chipy@lma rind.com
Contact:	Gaston Chipy
Web:	http://www.kalmarind.com

Supplier:	**Mi-Jack Products, Inc.**
	In-Terminal Services
Address:	3111 W.137th Street,
	Hazel Crest, IL 60429
	USA
Telephone:	1-708-596-5000
Fax:	1-708-225-2312
E-mail:	johnttroop@ nterminalservices.com
Contact:	John T. Troop
Web:	http://www.mi-jack.com

Supplier:	**PACECO**
Address:	3854 Bay Center Pl.,
	Hayward, CA 94545
	USA
	Regional office:
	3064 C Bienville Blvd,
	Ocean Springs, MS 3956
	USA
Telephone:	1-510-264-9288 (California);1-228-872-1733 (Mississippi)
Fax:	1-510-264-9280 (California);1-228-875-8875 (Mississippi)
E-mail:	E-mail@paceco.com (Corporate); paceco@datasync.com (Regional)
Contact:	Sales Mgr. Chuck Melaney (Regional)
Web:	http://www.pacecocorp.com

5.3 Container Lift Trucks

Supplier: **Kelly Tractor Co. (KTC)**
Address: 8255 NW 58th ,
Miami, FL 33166
USA
Telephone: 1-305-592-5360
Fax: 1-305-477-2024
E-mail: ktccat@llytractor.com
Contact: Sales
Web: http://www.kellytractor.com/taylor.htm
]

Supplier: **Kalmar, Inc.**,
Latin America Sales
Address: 5757 Blue Lagoon Dr,
Miami, FL 33126
USA
Telephone: 1-786-388-0330
Fax: 1-305-379-8822
E-mail: Gaston.chipy@lma rind.com
Contact: Gaston Chipy
Web: http://www.kalmarind.com

Supplier: **Mi-Jack Products, Inc.**
In-Terminal Services
Address: 3111 W.137th Street,
Hazel Crest, IL 60429
USA
Telephone: 1-708-596-5000
Fax: 1-708-225-2312
E-mail: johnttroop@ nterminalservices.com
Contact: John T. Troop
Web: http://www.mi-jack.com

Supplier: **Hyster Company**
Address: 1400 Sullivan Dr,
P.O. Box 7006
Greenville, NC 27835-7006
USA
Telephone: 1-252-758-4978,1-800-HYSTER-1 (1-800-497-8371)
Fax: 1-252-931-7877
E-mail: americasinfo@ster.com
Contact: Sales
Web: http://www.hysterusa.com

5.4 Container Freight Station (CFS) Equipment

Supplier:	**Yale Materials Corporation**
Address:	Latin America Marketing NACCO Materials Handling Group, Inc. 1400 Sullivan Drive, Caller #12011 Greenville, NC 27834-2011 USA
Telephone:	1-252-931-5846 (Latin America Marketing),1-718-439-7550, 1-800-233-9253,
E-mail:	ayinfo@le. com
Contact:	Sales Francisco Pinto, Latin America Marketing
Web:	http://www.yale.com

Supplier:	**Hyster Company**
Address:	1400 Sullivan Dr, P.O. Box 7006 Greenville, NC 27835-7006 USA
Telephone:	1-252-758-4978,1-800-HYSTER-1 (1-800-497-8371)
Fax:	1-252-931-7877
E-mail:	americasinfo@ster.com
Contact:	Sales
Web:	http://www.hysterusa.com

5.5 Breakbulk and Bulk Mobile Equipment

5.5.1 Forklifts

Supplier:	**CDI Equipment, Ltd.**
Address:	926 N. Sam Houston Parkway Houston, TX 77032 USA
Telephone:	1-903-753-4481
Fax:	1-903-758-6320
E-mail:	rreed@sece.com
Contact:	Renny Reed
Web	www.casece.com/dws/dealers/esscorp

Supplier:	**Lee Tractor Co., Inc.**
Address:	10203 Airline Highway St. Rose, LA 70087 USA
Telephone:	1-504-467-6794
Fax:	1-504-467-6799
E-mail:	leetractorsales@ll south.net
Contact:	Don Mensen
Web	NA

Manufacturer:

Supplier:	**Case Equipment** CNH America LLC
Address:	7000 Durand Ave Racine, WI 53406 USA
Telephone:	1-262-636-7055
Web site	http://www.casece.com

Supplier:	**Clark Equipment Company (Inc)**
Address:	200 Chestnut Ridge Rd Woodcliff Lake, NJ 07677-7703 USA
Telephone:	1-201-573-0123
E-mail:	NA
Contact:	NA

5.5.2 Front Loaders

Supplier:	**Rush Equipment Center**
Address:	10100 N Loop East Houston, TX 77029 USA
Telephone:	1-713-679-6700
Fax	1-713-674-0305
E-mail:	fullere@sh-enterp rises.com
Contact:	Ed Fuller
Web:	http://www.rushequipcenters.com

Supplier: **Brookside Equipment Sales, Inc**
Address: 7707 Mosley Rd.
Houston, TX 77017
USA
Telephone: 1-713-943-7100
Fax: 1-713-943-9102
E-mail: operez@o oksideusa.com
Contact: Octavio Perez
Web: http://www.brooksideusa.com

Supplier: **Sunshine Equipment Co., Inc.**
Address: 2300 Hwy 70E
Donaldsonville, LA 70346
USA
Telephone: 1-225-473-9861
Fax: 1-225-473-3059
Web: http://www.sunequip.com

Supplier: **Duhon Machinery**
Address: 10460 West Airline Highway
St. Rose, Louisiana 70087
USA
Telephone: 1-504-466-5495
Fax: 1-504-466-5539
E-mail: sales@duhonmachinery.com
Contact: Sid Duhon
Web: http://www.duhonmachinery.com

Supplier: **Bobcat of Houston**
Address: 8464 Gulf Freeway
Houston, TX 77017
USA
Telephone: 1-713-645-1234
Fax: 1-281-477-8734
E-mail: mikest@ bcatofhouston.com
Contact: Mike Strittmatter
Web: http://www.bobcatofhouston.com

Manufacturers:

Supplier: **John Deere**
Address: Deere & Company
1 John Deere Place
Moline, IL 61265
USA
Telephone: 1-309-765-8000
Fax: 1-309-765-5671
Web site http://www.deere.com

Supplier: **Bobcat Company**
Address: 250 E. Beaton Dr.
West Fargo, ND 58078

	USA
Telephone:	1-701-241-8700
Web site	http://www.bobcat.com

5.5.3 Dozers

Supplier:	**Mustang Tractor & Equipment Co.**
Address:	12800 Northwest Fwy Houston, TX 77040 USA
Telephone:	1-713-460-2000
Fax:	NA
E-mail:	tfisk@mustangcat.com
Contact:	Todd Fisk
Web:	http://mustang.cat.com

Supplier:	**Louisiana Machinery Co.**
Address:	3799 W Airline Hwy Reserve, LA 70084 USA
Telephone:	1-985-536-1121
E-mail:	gweimer@ uisianamachinery.com
Contact:	Greg Weimer
Web:	http://louisiana.cat.com

Manufacturer:	
Supplier:	**Caterpillar Inc.**
Address:	100 NE Adams St. Peoria, IL 61629 USA
Telephone:	1-309-675-1000
Fax:	1-309-675-1182
Web site	http://www.cat.com

5.6 Bulk Material Handling and Storage

Products: Belt and chain conveyors, Bucket elevators, silos

Supplier: **CHIEF Industries, Inc.**
Address: 3942 West Old Highway 30
PO Box 2078
Grand Island, NE 68802-2078

Chief Agri/Industrial Division
P.O. Box 848
Kearney, NE 68848
USA
Telephone: 1-308-389-7200 (Corporate), 1-308 238 2737, 1-308-237-3186 (Agri/Ind)
Fax: 1-308-389-7221 (Corporate), 1-308 237 2650 (Agri/Ind)
E-mail: corporate@chiefind.com; agri@chiefind.com
Contact: Mr. Oscar Coello
Web: http://www.chiefind.com

Products: Mechanical unloaders (continuous or clamshell), bucket elevators

Supplier: **Fuller Bulk Handling / FL Smidth**
Address: Pneumatic Transport
F.L.Smidth Inc.
2040 Avenue C
Bethlehem PA 18017-2188
USA
Telephone: 1-610-264-6055
Fax: 1-610-264-6307
E-mail: michael.gregory@ smidth.com
Contact: Michael Gregory, District Sales Manager
Web: http://www.fullerbulkhandling.com

Products: Mechanical unloaders (continuous or clamshell)

Supplier: **Heyl & Patterson Inc.**
Address: 2000 Cliff Mine Rd
Park West Two Suite 300
Pittsburgh, PA 15275
USA
Telephone: 1-412-788-9810
Fax: 1-412-788-9822
E-mail: info@ eylpatterson.com
Contact: Jerry Spehar
Web: http://www.heylpatterson.com

Products: Complete bulk handling systems, mechanical unloaders (continuous or clamshell), belt and chain conveyors, bucket elevators

Supplier: **ThyssenKrupp Robins, Inc.**
Address: 7730 E. Belleview Ave., # 404,
Greenwood Village, CO 80111-5820
USA
Telephone: 1-303-770-0808
Fax: 1-303-770-4522
E-mail: sales@u pprobins.com; kri@upp robins.com
Contact: Ingolf Neubecker
Web: http://www.krupprobins.com

Products: Complete handling systems, mechanical unloaders (continuous or clamshell), belt and chain conveyors, bucket elevators

Supplier: **METSO Minerals Materials Handling**
Address: 1500 Corporate Dr Ste 300
Canonsburg, PA 15317
USA
Telephone: 1-412 269 5000
Fax: 1-412 269 5030
E-mail: tim.sexton@etso. com
Contact: Mr. Thimothy Sexton
Web: http://www.metso.com

Products: Complete materials handling systems, belt and chain conveyors, bucket elevators, silos

Supplier: **Roberts & Schaefer Company**
Address: 222 S. Riverside Plaza, Suite 1800
Chicago, IL 60606-3986
USA
Telephone: 1-312-236-7292
Fax: 1- 312-726-2872
E-mail: bobw@i.co m; info@s. com
Contact: Robert Williams
Web: http://www.r-s.com

Products: Belt and chain conveyors, bucket elevators, silos

Supplier: **SCAFCO Corporation; Grain Systems**
Address: 6200 E. Main Avenue
PO Box11215
Spokane, WA 99211-1215
USA
Telephone: 1-509-535-1571
Fax: 1-509-535- 9130
E-mail: mail@afco.com
Contact: Sales
Web: http://www.scafco.com

Products: Materials handling

Supplier: **EDC, Inc.**
Address: 67 Ramapo Rd.
Mahwah NJ 07430
USA
Telephone: 1-201-684-1220
Fax: 1-201-684-1224
E-mail: info@dci ncorp.com
Contact: Walter R. Herbst, President; Walter J. Herbst, Vice President
Web: http://www.edcincorp.com

Products: Conveyors

Supplier: **Continental Conveyor & Equipment Co., Inc.**
Address: 438 Industrial Drive
P.O. Box 400
Winfield AL 35594-0400
USA
Telephone: 1-205-487-6492
Fax: 1-205-487-4233
E-mail: info@nti nentalconveyor.com
Contact: Sales
Web: http://www.continentalconveyor.com

Supplier: **FMC Corp.**
Address: Conveyor Equipment Division
1 Link Belt Dr
P O Box 1370
Tupelo MS 38802

400 Highpoint Drive
Chalfont, PA 18914
USA
Telephone: 1-662-869-5711 (Mississippi), 1-215 822 4556 (Pennsylvania)
Fax: 1-662 869 7401 (Mississippi), 1-215 822 4520 (Pennsylvania)
E-mail: mhsol.info@fmcti.com; mary.plesh@fmcti.com
Contact: Deborah Goddard (Mississippi); Mary Plesh (Pennsylvania)
Web: http://www.fmcconveyors.com

Supplier: **Hendrik Enterprises, Inc.**
Address: 193 Sprain Brook Rd,
Woodbury CT 06798
USA
Telephone: 1-203-263-7025
Fax: 1-203-263-7425
E-mail: support@thehendrikgroup.com
Contact: Mr. Henk Hartsuiker
Web: http://www.thehendrikgroup.com

5.7 Control Systems

Supplier:	**Rockwell Automation**
Address:	US Bank Center 777 East Wisconsin Avenue Suite 1400 Milwaukee, WI 53202 Allen Bradley and Rockwell Software: Rockwell Automation 1201 South Second Street Milwaukee, Wisconsin 53204-2496 USA
Telephone:	1-414-212-5200 (Corporate Headquarters), 1-414-382-2000 (Allen Bradley and Rockwell software)
Fax	1-414-382-4444 (Allen Bradley and Rockwell software)
E-mail:	NA
Contact:	Sales
Web:	http://www.rockwellautomation.com

Supplier:	**Robertshaw Industrial Products Division**
	1602 Mustang Drive Maryville, TN 37801 USA
Telephone:	1-865-981-3100, 1-800-228-7429 (toll free in USA)
Fax:	1-865-981-3168
E-mail:	NA
Contact:	Sales
Web:	http://www.robertshaw.com

Supplier:	**Honeywell International Inc.**
	101 Columbia Road Morristown, NJ 07962 USA
Telephone:	1-973-455-2000
Fax:	1-973-455-4807
E-mail:	NA
Contact:	Sales
Web:	http://www.honeywell.com

5.8 Marine Terminal Planning and Engineering

Supplier: **DMJM Harris**
Address: 20 Exchange Pl 12th Fl
New York NY 10005-3262
USA
Telephone: 1-212-701-2868
Fax: 1-212-701-2801
E-mail: abbas.sarmad@ mjmharris.com
Contact: Abbas Sarmad, P.E.
Web: http://www.dmjmharris.com

Supplier: **The Louis Berger Group, Inc.**
Address: 100 Halsted Street
East Orange, NJ 07018
USA
Telephone: 1-973-678-1960
Fax: 1-973-672-4284
E-mail: ishafran@uisberger.com
Contact: Isaac Shafran, Senior Vice President
Web: http://louisberger.com

Supplier: **BERGER/ABAM Engineers, Inc.**
Address: 33301 Ninth Avenue South, Suite 300
Federal Way, WA 98003
USA
Telephone: 1-206-431-2300; 1-888/600-2374 (toll free in USA)
Fax: 1-206-431-2250
E-mail: Vk.kumar@ bam.com
Contact: V.K.Kumar
Web: http://www.bergerabam.com

Supplier: **URS Corporation**
Address: 600 Montgomery Street
26th Floor
San Francisco, CA 94111-2728
USA
Telephone: 1-415-774-2700
Fax: 1-1-415-398-1905
E-mail: surface_transportation@scorp. com
Contact: NA
Web: http://www.urscorp.com

Supplier: **CH2M HILL Transportation Services**
Address: 9191 South Jamaica St
Englewood, CO 80112
USA
Telephone: 1-877-741.5221; 1-303-771-0900
Fax: NA
E-mail: transportation@ch2m.com
Contact: Port and Maritime Services
Web: http://www.ch2m.com

Supplier:	**Moffatt & Nichol**
Address:	320 Golden Shore Suite 300 Long Beach, CA 90802 USA
Telephone:	1-562- 590-6500
Fax:	1-562-590-6512
E-mail:	mhorton@moffattnic hol.com
Contact:	Michael Horton
Web:	http://www.moffattnichol.com

Supplier:	**HPA, Inc.**
Address:	22 Cortlandt Street, 33rd Floor New York, NY 10007 USA
Telephone:	1-212-608-3990
Fax:	1-212-566-5059
E-mail:	hpany@ a.com
Contact:	Jonathan Goldstick
Web:	http://www.hpa.com

5.9 Cargo Operations Training

Supplier:	**SSA Marine**
Address:	1131 SW Klickitat Way Seattle WA 98134 USA
Telephone:	1-206-623-0304, 1-800-422-3505
Fax:	1-206-623-0179
E-mail:	info@amari ne.com
Contact:	Sales
Web:	http://www.ssamarine.com

Supplier:	**Port of New Orleans**
Address:	1350 Port of New Orleans Pl PO Box 60046, New Orleans, LA 70160 USA
Telephone:	1-504-522-2551
Fax:	1-504-524-4156
E-mail:	knighttp@ rtno.com
Contact:	Ted Knight
Web:	http://www.portno.com

5.10 Berth Fenders

Supplier:	**Svedala Industries Inc. Svedala-Trellex**
	Metso Minerals Industries Inc.
Address:	3588 Main Street,
	Keokuk, IA 52632
	USA
Telephone:	1-319-524-8430
Fax:	1-319-524-7290
E-mail:	Larry.kester@et so.com
Contact:	Larry Kester
Web:	NA

Supplier:	**Maritime International, Inc.**
Address:	100 E Vermilion,
	Lafayette, LA 70501
	USA
Telephone:	1-337-237-1611
Fax:	1-337-237-6770
E-mail:	info@ aritime-international.co
Contact:	John Deats
Web:	http://www.maritime-international.com

5.11 Bollards

Supplier:	**Blue Water Marine Division**
	International Marine and Specialty Supply
Address:	P.O. Box 266599
	Houston, TX 77207-6599
	7509 Wynlea St.,
	Houston, TX 77061
	USA
Telephone:	1-713-645-0192
Fax:	1-713-643-2292
E-mail:	oilcovery-bluewater@prl dnet.att.net
Contact:	Steve Jannik, Patricia Valle
Web:	NA

Supplier:	**Maritime International, Inc.**
Address:	204 Ida Rd.
	Broussard LA 70518
	USA
Telephone:	1-337-837-7160
Fax:	1-337-837-3610
E-mail:	sales@a ritime-international.com, info@aritime-i nternational.com
Contact:	John Deats
Web:	http://www.maritime-international.com

Supplier:	**J.C. MacElroy Company, Inc.**
Address:	91 Ethel Road West
	P.O. Box 850,
	Piscataway, NJ 08855
	USA
Telephone:	1-732-572-7100
Fax:	1-732-572-7112
E-mail:	info@ acelroy.com
Contact:	Sales
Web:	http://www.macelroy.com

Supplier:	**Anchor Marine & Industrial Supply Co., Inc.**
Address:	P.O. Box 58645
	Houston, TX 77258-8645
	USA
	6545 Lindbergh
	Houston, Texas 77087
	USA
Telephone:	1-713-644-1183, 1-800-233-8014 (toll free in USA)
Fax:	1-713-644-1185
E-mail:	sales@ chormarinehouston.com
Contact:	Sales
Web:	http://www.anchormarinehouston.com

5.12 Rail

5.12.1 Crane Rail, Railroad Rail

Supplier:	**Birmingham Rail Division** **Birmingham Rail & Locomotive Co**
Address:	P. O. Box 530157 Birmingham, AL 35253-0157 USA
Telephone:	1-205-424-7245(RAIL); 1-800-241-2260;
Fax:	1-205-424-7436
E-mail:	bhamrail@ l.com; jtingle@birminghamrail.com
Contact:	Jane Tingle
Web:	http://www.bhamrail.com

Supplier:	**L.B.Foster Co.**
Address:	International Sales, 7015 Fairbanks-North Houston Rd. Houston, TX 77040 USA Sales, Crane Systems L. B. Foster Company 125 Windsor Drive, Ste. 122 Oak Brook, IL 60523 USA
Telephone:	1-713-466-2700, 1-713-466-2766 (Texas) 1-630-954-1450 X 105 (Illinois)
Fax:	1-713-466-2706 (Texas); 1-630-954-1429 (Illinois)
E-mail:	vmiller@ bfosterco.com, sfisher@ fosterco.com, glippard@ bfosterco.com, lruemler@ osterco.com.
Contact:	Chip Miller, Sales Manager, Crane Systems (Illinois), Lia Turner, International District Sales Manager (Houston) Sam Fisher, Sr. VP; Greg Lippard, VP; Laurie Ruemler
Web:	http://www.lbfoster.com

Supplier:	**Atlantic Track and Turnout Co.** Crane Runway Division
Address:	St. Clair Industrial Park, RD#3, St. Clair, PA 17970 USA
Telephone:	1-570-429-1462
Fax:	1-570-429-2273
E-mail:	frankj@atlantictrack.com
Contact:	Frank J. Jroski
Web:	http://www.atlantictrack.com

5.12.2 Crane Rail Accessories

Supplier:	**Cavotec Gantrex USA Inc.**
Address:	Corporate Sales Office 275 Curry Hollow Road Pittsburgh, PA 15236 USA Latin America Sales: 14300 Cornerstone Village Dr, Suite 111 Houston, TX 77014
Telephone:	1-412-655-1400; 1-800-242-6873 (Corporate Sales, Pittsburgh); 1-281-893-0027 (Latin America Sales, Houston)
Fax:	1-412-655-3814 (Corporate Sales, Pittsburgh); 1-281-893-4512 (Latin America Sales, Houston)
E-mail:	mark.veydt@vote c.com, tom.berringer@vote c.com or art.avlon@votec. com (Corporate sales) kendell.short@cavotec.com or sergio.bozzetti@vo tec.com (Latin America Sales)
Contact:	Kendall Short or Sergio Bozzetti, Latin America Sales, Houston
Web:	http://www.gantrex.com

Supplier:	**Atlantic Track and Turnout Co.** Crane Runway Division
Address:	St. Clair Industrial Park, RD#3, St. Clair, PA 17970 USA
Telephone:	1-570-429-1462
Fax:	1-570-429-2273
E-mail:	frankj@atlantictrack.com
Contact:	Frank J. Jroski
Web:	http://www.atlantictrack.com

5.12.3 Crane Rail Welding Systems

Supplier:	**Orgo-Thermit, Inc.**
Address:	3500 Colonial Drive North, Manchester, NJ 08733 USA
Telephone:	1-732-657-5781
Fax:	1-732-657-5899
E-mail:	info@gothermit.com
Contact:	Sales office
Web:	http://www.orgothermit.com

Supplier:	**Cavotec Gantrex USA Inc.**
Address:	Corporate Sales Office 275 Curry Hollow Road Pittsburgh, PA 15236 USA Latin America Sales: 14300 Cornerstone Village Dr, Suite 111 Houston, TX 77014
Telephone:	1-412-655-1400; 1-800-242-6873 (Corporate Sales, Pittsburgh); 1-281-893-0027 (Latin America Sales, Houston)
Fax:	1-412-655-3814 (Corporate Sales, Pittsburgh); 1-281-893-4512 (Latin America Sales, Houston)
E-mail:	mark.veydt@vote c.com, tom.berringer@vote c.com or art.avlon@votec. com (Corporate sales) kendell.short@cavotec.com or sergio.bozzetti@vo tec.com (Latin America Sales)
Contact:	Kendall Short or Sergio Bozzetti, Latin America Sales, Houston
Web:	http://www.gantrex.com

Supplier:	**Holland Industrial Maintenance**
Address:	1000 Holland Drive, Crete, IL 60417-2120 USA
Telephone:	1-708-672-2300
Fax:	1-708-672-0119
E-mail:	bsikora@hollandco.com; webmail@hollandco.com
Contact:	Bruce W. Sikora, National Sales Manager
Web:	http://www.hollandco.com

5.12.4 Panzerbelt and Cable Horns

Supplier:	**Cavotec Gantrex USA Inc.**
Address:	Corporate Sales Office 275 Curry Hollow Road Pittsburgh, PA 15236 USA Latin America Sales: 14300 Cornerstone Village Dr, Suite 111 Houston, TX 77014
Telephone:	1-412-655-1400; 1-800-242-6873 (Corporate Sales, Pittsburgh); 1-281-893-0027 (Latin America Sales, Houston)
Fax:	1-412-655-3814 (Corporate Sales, Pittsburgh); 1-281-893-4512 (Latin America Sales, Houston)
E-mail:	mark.veydt@vote c.com, tom.berringer@vote c.com or art.avlon@votec. com (Corporate sales) kendell.short@cavotec.com or sergio.bozzetti@vo tec.com (Latin America Sales)
Contact:	Kendall Short or Sergio Bozzetti, Latin America Sales, Houston
Web:	http://www.gantrex.com

Supplier:	**Atlantic Track and Turnout Co.** Crane Runway Division
Address:	St. Clair Industrial Park, RD#3, St. Clair, PA 17970 USA
Telephone:	1-570-429-1462
Fax:	1-570-429-2273
E-mail:	frankj@atlantictrack.com
Contact:	Frank J. Jroski
Web:	http://www.atlantictrack.com

5.13 Epoxy and Cementitious Grout

Supplier:	**Five Star Products, Inc.**
Address:	750 Commerce Drive Fairfield, CT 06825 USA
Telephone:	1-203-336-7900
Fax:	1-203-336-7930
E-mail:	sales@est arproducts.com
Contact:	Sales
Web:	http://www.fivestarproducts.com

Supplier:	**Conesco, Inc.**
Address:	1551 Pioneer Road, Salt Lake City, UT 84104 USA
Telephone:	1-801-972-8777
Fax:	1-801-972-8315
E-mail:	info@nescoinc. com
Contact:	Sales
Web:	http://www.conescoinc.com

Supplier:	**Texas Resins Corporation**
Address:	1400 S. Sherman #118 Richardson, TX 75081 USA
Telephone:	1-972-480-8775
Fax:	1-972-480-8337
E-mail:	sales@texasresins.com
Contact:	Sales
Web:	http://www.texasresins.com

5.14 Concrete Additives

Supplier:	**Grace Construction Products**
Address:	62 Whittemore Avenue Cambridge, MA 02140-1692 USA
Telephone:	1-617-876-1400; 1-877-423-6491
Fax:	1-617-498-4311; 1-877-423-6492
E-mail:	concrete@grace.com
Contact:	Sales
Web:	http://www.graceconstruction.com

Supplier:	**Sika Corporation**
Address:	201 Polito Avenue Lyndhurst, NJ 07071 USA
Telephone:	1-201-933-8800
Fax:	1-201-933-6225
E-mail:	Chilinski.jim@ ka.corp.com
Contact:	Jim Chilinski
Web:	http://www.sika.com

Supplier:	**Degussa Admixtures, Inc.**
Address:	23700 Chagrin Boulevard Cleveland, OH 44122
Telephone:	1-216-839-7500
Fax:	1-216-839-8821
E-mail:	askdai@ egussa.com
Contact:	Sales
Web:	http://www.degussaadmixtures.com

5.15 Coatings

Supplier:	**Carboline Company**
Address:	350 Hanley Industrial Court, St. Louis, MO 63144-1599 USA
	Carboline distributor for Central America: StonCor Mexico Av. Vasconcelos No. 152 INT2C, Col. Santa Eugracia, San Pedro Garza Garcia, NL 66260, Mexico
Telephone:	314-644-1000 (Missouri); 5281-8625-4550 (Mexico)
Fax:	314-644-4617 (Missouri); 5281-8626-4580 (Mexico)
E-mail:	carbolineUSA@carboline. com (USA); mexico@ ncor.com (Mexico)
Contact:	Sales Department
Web:	http://www.carboline.com

Supplier:	**Ameron International**
Address:	1200 Bluegrass Lakes Parkway, Suite 100 Alpharetta GA 30004 USA
Telephone:	1-678-393-0653 ext. 304; 1-800-926-3766 ext. 304 (toll free in USA)
Fax:	1-678-566-2698
E-mail:	marketing@ameroncoatings.com
Contact:	Marketing
Web:	http://www.ameroncoatings.com

Supplier:	**The Sherwin – Williams Company, International Division**
Address:	Orlando, FL USA
Telephone:	1-407-658-0132
Fax:	1-407-658-8340
E-mail:	sw2488@ erwin.com; globalsales@ erwin.com
Contact:	Jose Perez
Web:	http://www.sherwin-williams.com

Supplier:	**Industrial Coating Enterprises, Inc.**
Address:	951 Buckeye Ave Bldg C Newark, OH 43056 USA
Telephone:	1-740- 344-3797,1-740-398-6190
Fax:	1-740-344-3797
E-mail:	sales@dcoatings. com
Contact:	Sales
Web:	http://www.indcoatings.com

5.16 Drilled Shafts

Supplier:	**A.H. Beck Foundation Company, Inc.**
Address:	5123 Blanco Road San Antonio TX 78216 USA
Telephone:	1-210-342-5261
Fax:	1-210-342-4965
E-mail:	ahbeck@b eck.com
Contact:	A.H. Beck III, President, B.N. Langford, Vice President
Web:	NA

Supplier:	**Case Atlantic Company**
Address:	13065 40th Street North, Clearwater, FL 33762-4219 USA
Telephone:	1-727-572-7740
Fax:	1-727-571-1393
E-mail:	nbosborn@casefoundation.com
Contact:	Nigel Osborn, President, Larry Blough, Vice President
Web:	http://www.casefoundation.com

Supplier:	**Treviicos Corp., South**
Address:	4701 W. Hillsborough Ave 2nd Floor Tampa, FL 33614 USA
Telephone:	1-727-723-0322
Fax:	1-727-723-3661
E-mail:	bkouri@treviicos.com; info@treviicos.com
Contact:	Bud Khouri, Area Mgr
Web:	http://www.treviicos.com

Supplier:	**McKinney Drilling Company**
Address:	1130 Annapolis Rd Suite 103 Odenton, MD 21113 USA
Telephone:	1-410-874-1235
Fax:	1-410-551-1236
E-mail:	NA
Contact:	Robert C. Banks, President, Jack A. Raines, Vice President
Web:	http://www.mckinneydrilling.com

Supplier:	**Texas Shafts, Inc.**
Address:	P.O. Box 79218 Fort Worth, TX 76179-0218 USA
Telephone:	1-817-439-2000
Fax:	1-817-439-2105
E-mail:	txshafts@bell. net; rpool@xashafts. com
Contact:	Ty Savage, President, Roger Pool, Vice President
Web:	http://texashafts.com

Supplier:	**N.L. Schutte Foundation Drilling, Inc.**
Address:	10606 Spangler Road Dallas, TX 75220 P.O. Box 541865 Dallas, TX 75354-1865 USA
Telephone:	1-972-556-0330
Fax:	1-972-556-0968
E-mail:	nls@indspri ng.com
Contact:	Clayton Stephens, VP, James Bailey, Chief Estimator
Web:	http://www.Contractors.Com/NLschuttefoundationdrLg

5.17 Light Towers

Supplier:	**Holophane**
Address:	214 Oakwood Ave, Newark, OH 43055 USA
Telephone:	1-740-349-4436
Fax:	1-740-349-4438
E-mail:	customerservice@holophane.com
Contact:	International sales
Web:	http://www.holophane.com

Supplier:	**Lithonia Lighting**
Address:	1400 Lester Rd Conyers GA 30012
Telephone:	1-770-922-9000
Fax:	1-770-922-1677
Web:	http://www.lithonia.com

Supplier:	**GE Supply**
Address:	9100 Purdue Road, Suite 400, Indianapolis, IN 46268 USA
Telephone:	1-317-554-3701; 1-800-243-7313
Fax:	1-317-554-3847
E-mail:	
Contact:	National Sales Center
Web:	http://www.gesupply.com

Supplier:	**Cooper Lighting**
Address:	1121 Highway 74 South Peachtree City, GA 30269 USA
Telephone:	1-770-486-4800
Fax:	NA
E-mail:	NA
Contact:	International Sales
Web:	http://www.cooperlighting.com

5.18 Electrical Controls and Substation

Supplier:	**GE Supply**
Address:	7602 Woodland Drive Suite 200 Indianapolis, IN 46278 USA
Telephone:	1-317-554-3701; 1-800-243-7313
Fax:	1-513-774-2221
E-mail:	NA
Contact:	National Sales Center, Bart Runner, Branch Manager
Web:	http://www.gesupply.com

Supplier:	**Cutler-Hammer US - Miami**
Address:	7975 NW 154th Street, Suite 410, Miami Lakes, FL 33016 USA
Telephone:	1-305-512-3200
Fax:	1-305-512-8079
E-mail:	NA
Contact:	Sales
Web:	http://www.ch.cutler-hammer.com

Supplier:	**Siemens Energy & Automation, Inc.**
Address:	186 Wood Avenue South, Iselin, NJ 08830 USA
Telephone:	1-732-603-5839, 1-732-452-2300
Fax:	1-732-906-3851, 1-732-767-1713
E-mail:	NA
Contact:	International Business Unit
Web:	http://www.sea.siemens.com

5.19 Piping Systems

Supplier:	**Puget Sound Pipe and Supply Company**
Address:	7816 South 202nd Street, Kent, WA 98032 USA
Telephone:	1-253-796-9350
Fax:	1-253-796-9355
E-mail:	r.new@pip e.com; puget@ spipe.com
Contact:	Rich Newton
Web:	http://www.pugetpipe.com

Supplier:	**Pacific Pipe Company**
Address:	2000 Powell St, Emeryville, CA 94608-1804 USA
Telephone:	1-510-452-0122
Fax:	1-510-763-7838
E-mail:	NA
Contact:	Sales
Web:	http://www.pacificpipe.com

Supplier:	**Kelly Pipe Co., LLC**
Address:	11680 Bloomfield Avenue, P.O. Box 2827, Santa Fe Springs, CA 90670 USA
Telephone:	1-562-868-0456
Fax:	1-562-863-4695
E-mail:	NA
Contact:	Sales
Web:	http://www.kellypipe.com

5.20 Welding Electrodes

Supplier:	**The Lincoln Electric Company**
	Lincoln Electric Latin America
Address:	Beacon Station at Grand Park
	9960 N.W. 116 Way, Suite #8
	Medley, FL 33178
	USA
Telephone:	1-305-888-3203
Fax:	1-305-888-3224
E-mail:	norm_sted@ incolnelectric.com
Contact:	Norm M. Sted, Regional Manager Central America and Caribbean
Web:	http://www.lincolnelectric.com

Supplier:	**J.W. Harris Co., Inc.**
Address:	4501 Quality Place,
	Mason, OH 45040
Telephone:	1-513-754-2000; 1-800-733-4533 (Toll free in USA)
Fax:	1-513-754-8700
E-mail:	Rwood@WHarri s.com; salesinfo@jwharris.com; internationalj@ wharris.com
Contact:	Rhonda Wood
Web:	http://www.jwharris.com

Supplier:	**Thermadyne Holdings Corporation**
Address:	16052 Swingley Ridge Road, Suite 300
	St. Louis, MO 63017
	USA
	Thermadyne-Caribbean (serving South Florida and Caribbean)
	9907 Northwest 20th Street
	Pembroke Pines, FL 33024
	USA
Telephone:	1-636-728-3000 (St Louis); 1-954-442-9983 (Florida)
Fax:	1-954-602-1430 (Florida)
E-mail:	NA
Contact:	Sales
Web:	http://www.thermadyne.com

5.21 Steel Plate

Supplier: **Mittal Steel**
Address: Mittal Steel USA Flat Products
Sales and Marketing
1 South Dearborn
Chicago, IL 60603

Burns Harbor Facility
P.O. Box 248
Chesterton, IN 46304
USA
Telephone: 1-312-899-3300 (Flat products); 219-787-7414 (Burns Harbor plate)
Fax: NA
E-mail: spixley@ ntlsteel.com
Contact: Shelby Pixley – Manager of Plate Sales, Burns Harbor Plate
Web: http://www.mittalsteel.com

Supplier: **Oregon Steel Mills**
Address: 1000-T S.W. Broadway, Suite 2200
Portland, OR 97205

Plate and Coil Sales
14400 N Rivergate Blvd
Portland, OR 97203
USA
Telephone: 1-503-240-5240 (plate and coil sales) or 1-800-468-8913 (toll free in USA)
1-503-223-9228, 1-800-547-9451 (toll free in USA)
Fax: 1-503-240-5291 (plate and coil sales), 1-503-240-5232
E-mail: NA
Contact: Mike Buckentin
Web: http://www.oregonsteel.com

Supplier: **United States Steel Plate Products**
Address: United States Steel Corporation
Plate in Coils Sales
3010 Highland Parkway Suite 575
Downers Grove, IL 60515

Telephone: 1-630-990-5200 1-800-447-4338
Contact: George Thompson, General Manager – Service Center
Web: http://www.ussteel.com

5.22 Navigation Aids and Buoys

Supplier:	**Tideland Signal Corporation**
Address:	4310 Directors Row P.O. Box 52430, Houston, TX 77052 USA
Telephone:	1-713-681-6101; 800-231-2778
Fax:	1-713-681-6233
E-mail:	samerica-sales@ela ndsignal.com
Contact:	Sales
Web:	http://www.tidelandsignal.com

Supplier:	**Automatic Power, Inc.**
Address:	213 Hutcheson Street P.O. Box 230738, Houston, TX 77223 USA
Telephone:	1-713-228-5208 or 1-757-253-2817
Fax:	1-713-228-3717 or 1-757-220-8166
E-mail:	sales@tom aticpower.com; APIAtlantic@l.com
Contact:	Ira Krams
Web:	http://www.automaticpower.com

Supplier:	**EDKO, Inc.**
Address:	1019 Airpark Dr. Sugar Grove, IL 60554 USA
Telephone:	1-630-556-4499, 800-800-EDKO (toll free)
Fax:	1-630-556-4478
E-mail:	sales@ko. com
Contact:	Sales
Web:	http://www.edko.com

5.23 Rebar Couplers

Supplier:	**ERICO Solon, USA**
Address:	34600 Solon Road, Solon, OH 44139 USA
Telephone:	1-440-248-0100
Fax:	1-440-248-0723
E-mail:	NA
Contact:	Sales
Web:	http://www.erico.com

Supplier:	**Bar-Lock (MBT) Coupler Systems**
Address:	4204 Meririan Street, Suite 220 Bellingham, WA 98226 P.O. Box 28280, Bellingham, WA 98228-0280 USA
Telephone:	1-360-738-1891, 1-800-755-4888
Fax:	1-360-738-1887
E-mail:	sales@barlock.com
Contact:	Sales
Web:	http://www.barlock.com

5.24 Epoxy Anchors

Supplier:	**Five Star Products, Inc.**
Address:	750 Commerce Drive Fairfield, CT 06825 USA
Telephone:	1-203-336-7900
Fax:	1-203-336-7930
E-mail:	sales@est arproducts.com
Contact:	Sales
Web:	http://www.fivestarproducts.com

Supplier:	**ITW Ramset/Red Head**
Address:	1300 North Michael Drive, Wood Dale, IL 60191 USA
Telephone:	1-630-350-0370
Fax:	1-630-350-7985
E-mail:	postmaster@w-ramset.c om
Contact:	Sales
Web:	http://www.ramset-redhead.com

Supplier:	**Drillco National Group**
Address:	P.O. Box 2182, Long Island City, NY 11102 USA
Telephone:	1-718-726-9801or 1-800-391-0052 (toll free in USA)
Fax:	1-718-956-3759
E-mail:	info@ill codevices.com
Contact:	Sales
Web:	http://www.drillcogroup.com

5.25 Pipe Piles

Supplier:	**Florida Pipe and Steel, Inc.**
Address:	6685 Forest Hill Blvd. Suite #207 West Palm Beach, Florida 33413 USA
Telephone:	1-561-642-181, 1-800-823-3436
Fax:	1-561-642-7478
E-mail:	Steel4sale@aol.com
Contact:	Vince Bianco, President
Web:	http://www.steel4sale.com

Supplier:	**American Steel Pipe** Division of American Cast Iron Pipe Company
Address:	1501 31st Avenue North, Birmingham, AL 35207 P.O. Box 2727, Birmingham, Alabama 35202-2727 USA
Telephone:	1-205-325-7744
Fax:	1-205-325-8194
E-mail:	jnoland@i pco.com
Contact:	Jon Noland, Division Manager, General Sales
Web:	http://www.acipco.com/steel

5.26 Dredging Contractors

Supplier:	**Great Lakes Dredge & Dock Company**
Address:	2122 York Road Oak Brook, IL 60523 USA
Telephone:	1-630-574-3000
Fax:	1-630-574-2909
E-mail:	NA
Contact:	International Division
Web:	http://www.gldd.com

Supplier:	**Weeks Marine, Inc.**
Address:	4 Commerce Drive Cranford, NJ 07016-3598 Dredging: 304 Gaille Drive Innwoods Business Park Covington, LA 70433 USA
Telephone:	1-908-272-4010 (New Jersey); 1-985-875-2500 (Louisiana)
Fax:	1-908-272-4740 (New Jersey) 1-985- 875-2572 (Louisiana)
E-mail:	dredging@eeksma rine.com
Contact:	Brion Lindholm, Senior Vice President Eric Ellefsen, Vice President Business Manager
Web:	http://www.weeksmarine.com

Supplier:	**C.F. Bean LLC**
Address:	1055 St. Charles Ave. Suite 520 New Orleans, LA 70130 USA
Telephone:	1-504-587-8701, 1-504-587-8600
Fax:	1-504-587-8717
E-mail:	ataylor@b ean.com; marketing@be an.com
Contact:	Jim Bean, CEO Ancil Taylor, Vice President
Web:	http://www.cfbean.com

Supplier:	**Dredge America, Inc.**
Address:	9555 NW Highway N Kansas City, MO 64153 USA
Telephone:	1-816-330-3100 (Missouri); 1-904.223.5777 (Florida)
Fax:	1-816-330-3103 (Missouri)
E-mail:	dan@ redgeamerica.com; info@ redgeamerica.com
Contact:	Dan McDougal, President
Web:	http://www.dredgeamerica.com

Product:	Engineering of Dredging
Supplier:	**Gahagan & Bryant Associates, Inc.**
Address:	3802 W. Bay to Bay Blvd. #B-22 Tampa, FL 33629-6826 USA
Telephone:	1-813-831-4408
Fax:	1-813-831-4216
E-mail:	jfbryant@gba-inc.com cmbryant@gba-inc.com gbryant@gba-inc.com
Contact:	J. Frank Bryant, President Clay Bryant, Vice President Grady Bryant, Vice President
Web:	http://www.gba-inc.com

APPENDIX B – APPENDICES ON EXISTING IT SYSTEMS

1 Data Network of ENP
2 Wharf Sector Network
3 Organization Chart of Empresa Nacional Portuaria, Port of Cortes, Honduras, C.A.
4 Wireless network
5 Fiber optics diagram
6 Fiber optics installation route

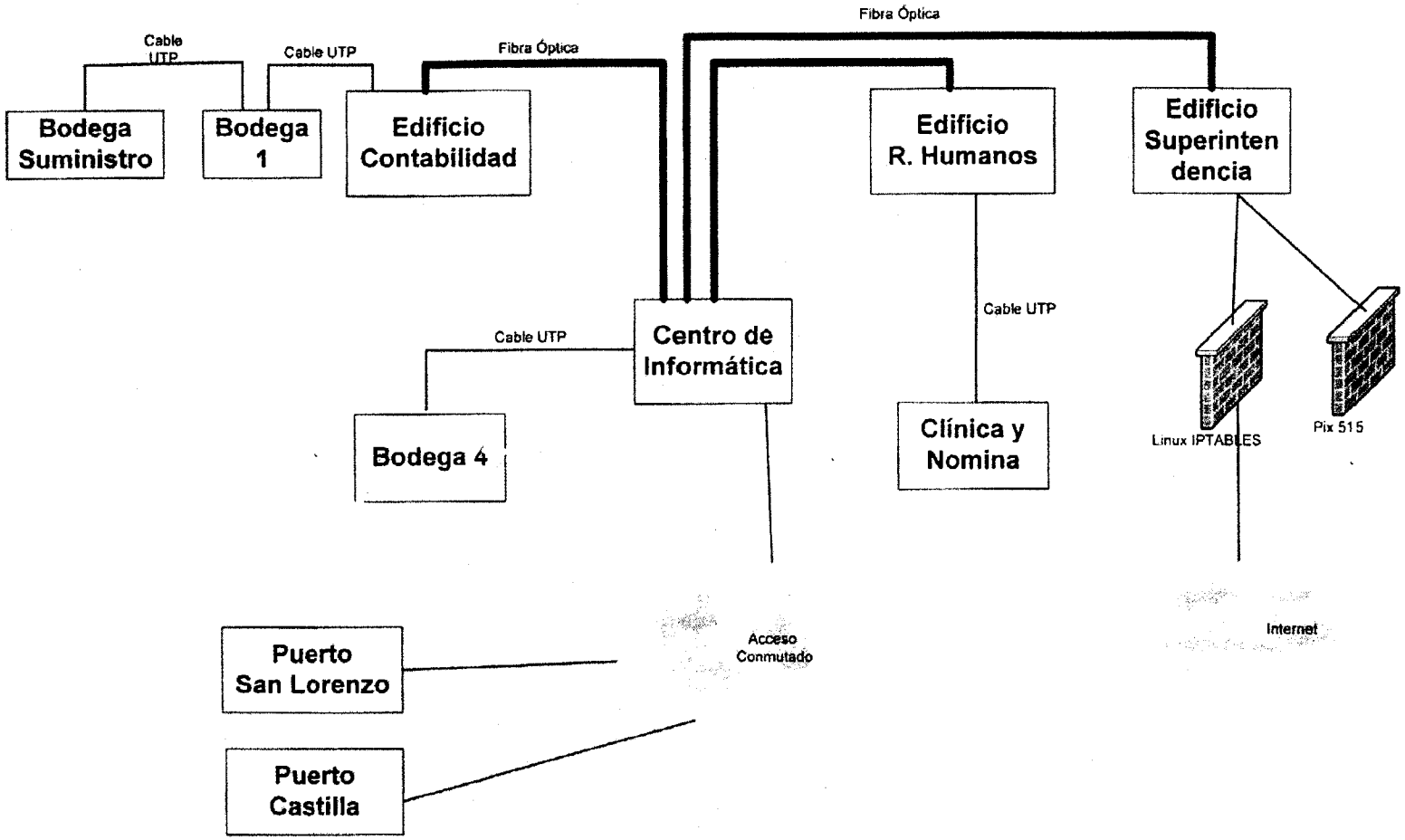
1 Red de Datos = Data Network of ENP

Bodega suministro = Supply Warehouse
Bodega 1 = Warehouse 1
Edificio Contabilidad = Accounting Bldg
Edificios R. Humanos = HR Bldg
Edificio Superintendency = Superintendency Bldg
Centro Informatica = Information Systems Center
Bodega 4 = Warehouse 4
Clínica y Nomina = Clinic
Puerto San Lorenzo = Port of San Lorenzo
Puerto Castilla = Port of Castilla

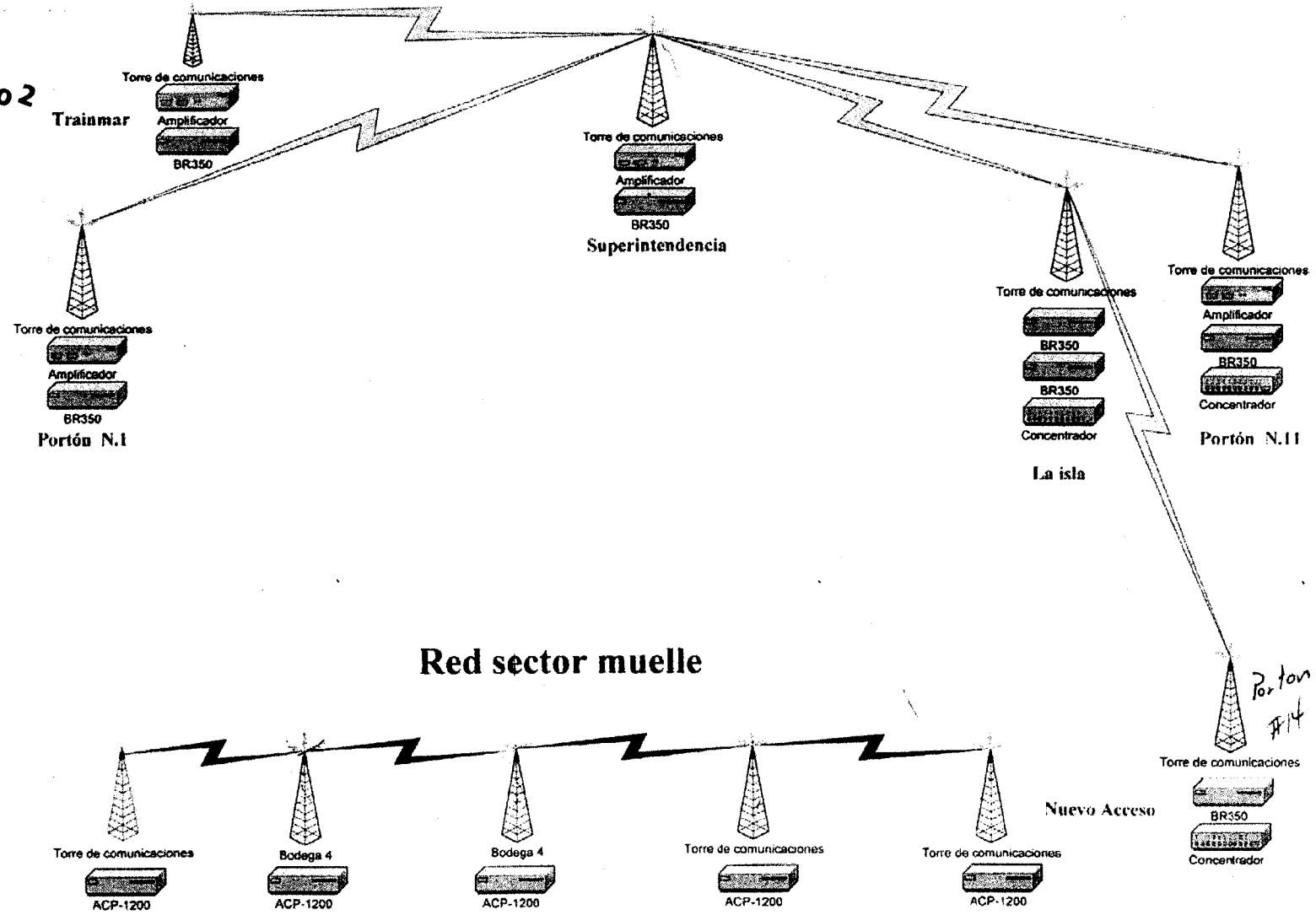
2 Wharf Sector Network

Red de Datos ENP

Anexo 1



Anexo 2



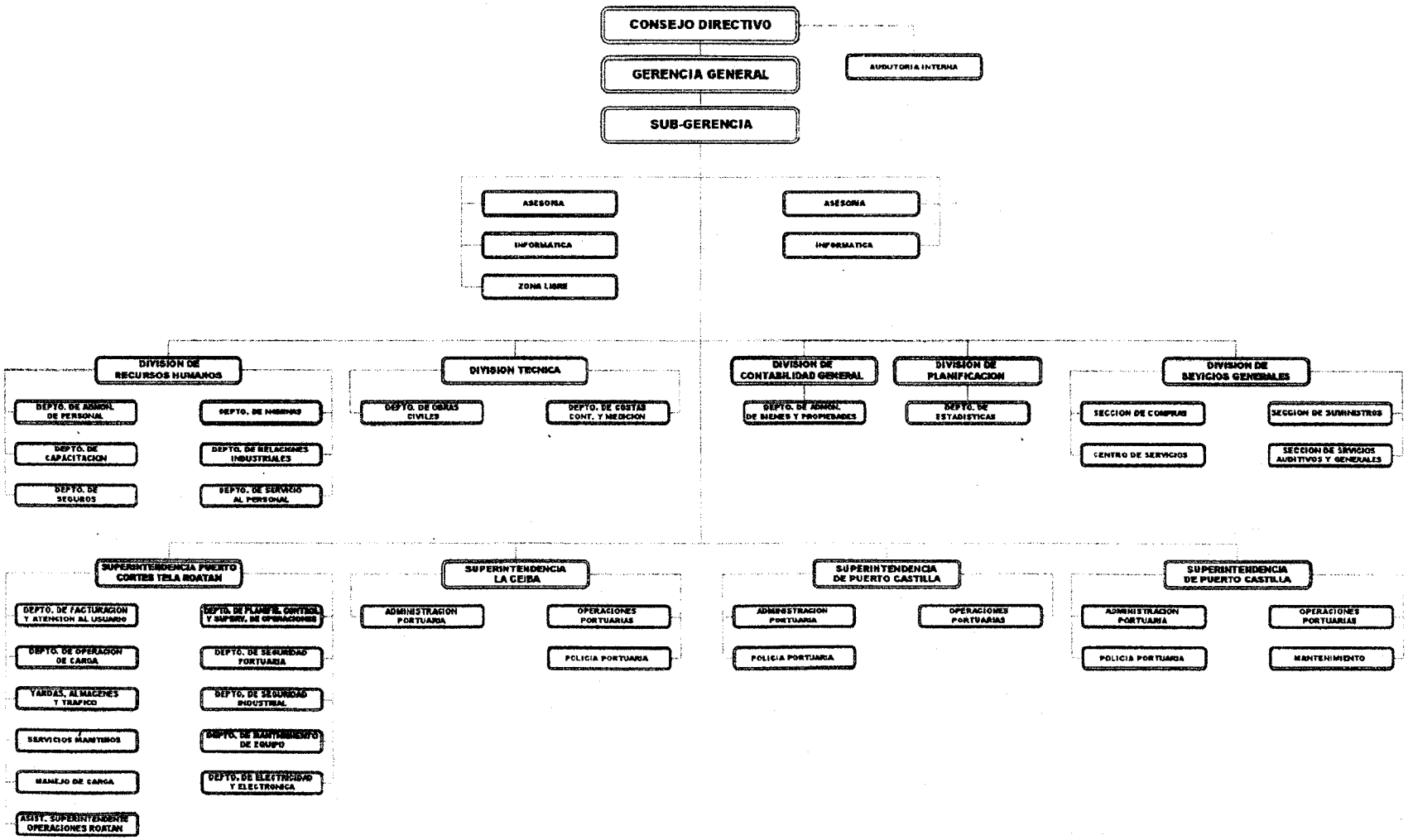
D. Michael Fox

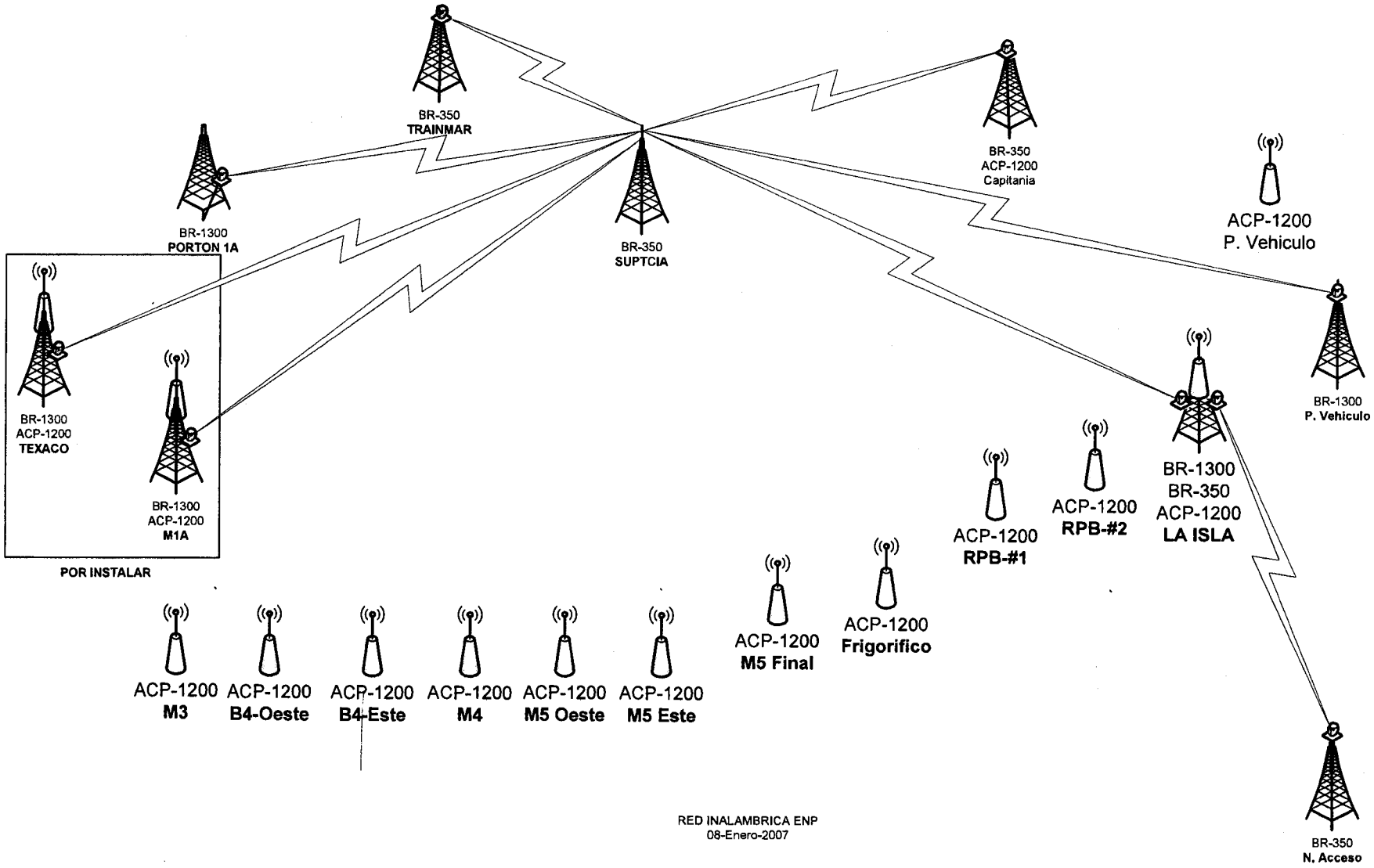
Anexo 3

EMPRESA NACIONAL PORTUARIA

PUERTO CORTES, HONDURAS, C.A.

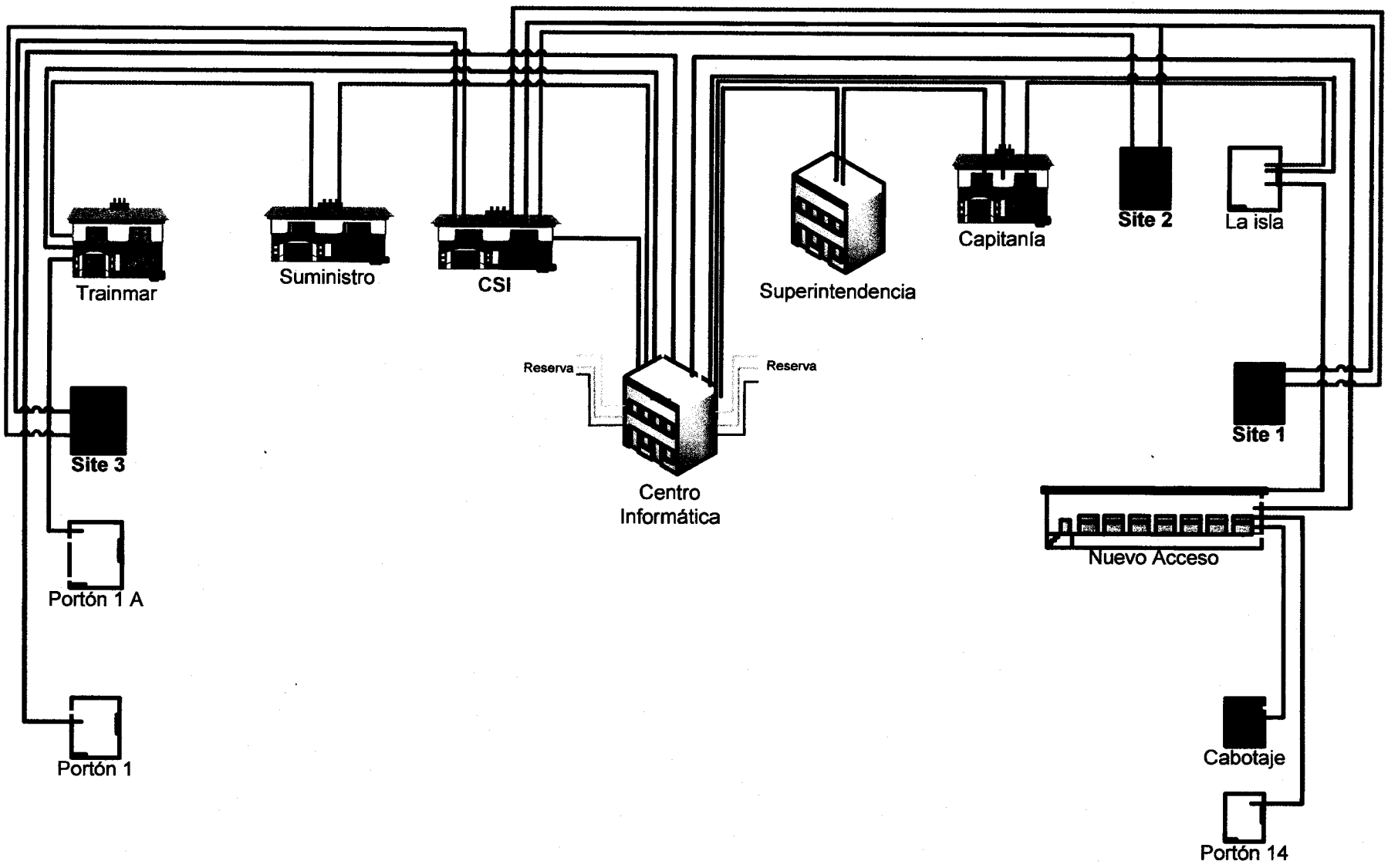
ORGANIGRAMA

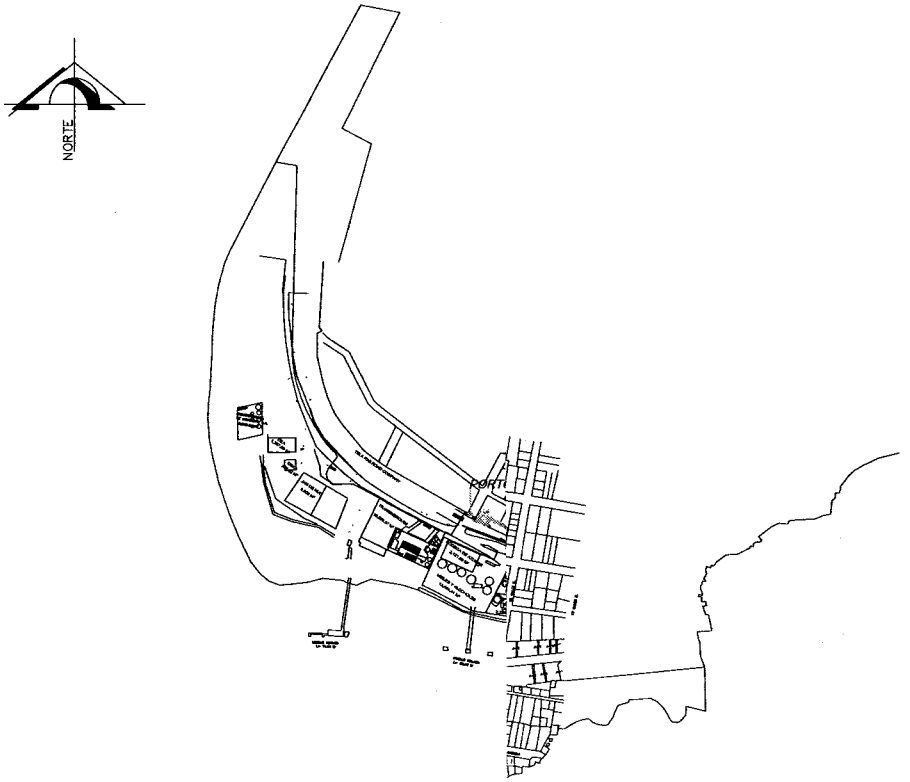




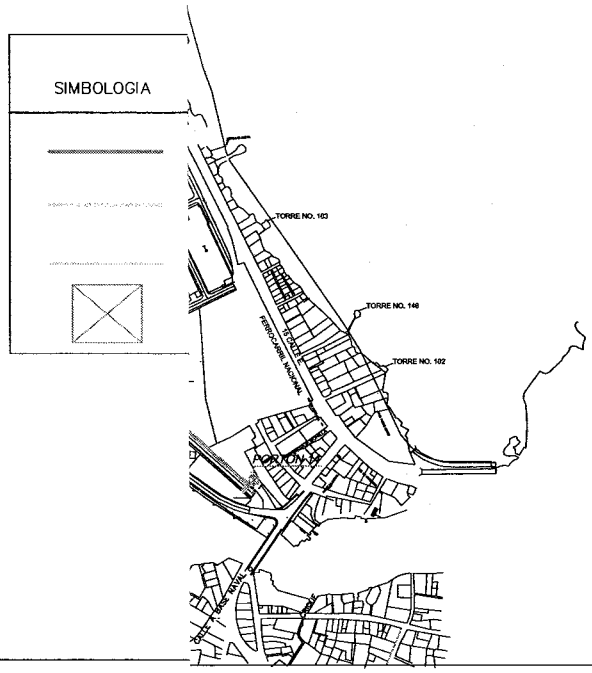
RED INALAMBRICA ENP
08-Enero-2007

DIAGRAMA FIBRA ÓPTICA ENP





LAGUNA DE ALVARADO



EMPRESA NACIONAL PORTU
PUERTO CORTES, HONDURAS,

ibujo :
RCELA PINEDA
ISION TECNICA

escala:
1:6000
fecha:
SEPTIEMBRE/ 2006

hoja # :
de : 1

C. COMPARISON OF MAINTENANCE MANAGEMENT SYSTEMS

Further to the discussion of the maintenance management system (MMS), a comparison of 6 U.S. vendors of MMS software is provided below. The evaluation includes a sheet of general information on the supplier and the key characteristics of their software followed by a side-by-side comparison of the key features and characteristics of the software in order to make it easier to choose the preferred vendor. The comparison focused on the following:

Asset Management:

- Subsystems: Does the software have the ability to create unit hierarchy with graphical trees for rolling up costs, and also to create secondary hierarchies for meter updates, regulatory tracking, etc.
- Location Transfer: Does it have the ability for Maintenance to transfer assets intra-department with electronic notification (email) being sent to Accounting of the transfer? PM Schedules assigned to the asset should automatically change during the transfer.
- Hour meters: Are hierarchies attached to meters so that one update affects parent and children. Are PM Work Orders created automatically off the meter updates?
- Equipment Location and Status: Does the software maintain a continuous timeline, with history, of operational location and asset status to allow future reporting of asset performance by location?
- Equipment Specifications: Doe the software allow "static" information to be assigned to each asset which describes the dimensions, capabilities, components, etc. of each asset? Is the specification template for each asset based on templates created by asset type?

Work Orders:

- Does the corrective WO: Close, re-open, create "Parent / Child" relationship, with work order status particularly reasons for delay (contractor delay, parts delay, deferral/hold delay)? Have the ability to assign a default cost account for expenses to the work order, which can be overridden by the clerk as necessary?
- Does the Preventative WO: Create, update / alter, work orders through hour meter updates or by using the calendar, with multiple meters possible (hour, odometer, fuel, volume)?
- Specials: Does the software create "Special" work orders to facilitate operations, e.g. accidents, operational incidents, etc.?
- Costing information: Does the software allow users to conveniently view costs (Purchases, Inventory Issues, and Labor Costs) attached to work orders by work order or specific task on the work order.

Purchasing:

- Vendor History: Does the software allow the user to view vendor sales and quote history, and do so by vendor or item.
- Does the software create quotes for stock items, and special orders not assigned an inventory number and not carried in inventory to work orders?
- Does the software create requisitions for stock items, and special orders not carried in actual inventory, to work orders?

Inventory:

- Inventory Bin Location: Does it allow users to create, find and verify quantities and locations for inventory items by bin location?
- Inventory Search by business unit? Does it allow users to find and verify quantities and locations for inventory items?

- Inventory Transfers: Does it allow users to transfer intra-departmentally with a paper trail, and allow for receipts (some form of documentation), etc.
- Inventory Re-Order: Does it allow the system to create an Automated Re-Order Requisition(s) for mass or single line approval, by stock person, before the requisition is sent for approvals by supervisors and report for inventory?
- Inventory Usage / History: Does it allow system type reporting of inventory usage and historical statistical information?

Language:

- Is the user interface currently available in Spanish?

Compatibility of Data:

- Can the data accumulated in the MMS be easily used by the existing accounting and financial management system?
- What database configurations are available from the supplier?

Service:

- Where is the closest support office to PTO Cortes?

Client Base

- How many systems have been supplied to clients?

Cost of software:

- For comparison purposes the number of concurrent users was considered to be 15.
- Other costs such as implementation, service, and extending the number of licenses while not included in the comparison should be investigated after narrowing down the choices based on other considerations.

Company: Datastream Systems Inc.

Website: http://www.datastream.net/products/datastream7i.asp

Demo Availability:

Sales Contact Information:
Christel Novella
Sr. Account Manager
1-800-955-6775 Ext. 2534
Cell: 864-979-7833
Fax: 864-236-2651

Product: Datastream 7i

Approximate number of users: 29,000

Service Office:
Mexico-Datastream Systems de México
Blvd. Manuel Ávila Camacho #14
Piso 10, Oficina 1001
Col. Lomas de Chapultepec
Delegación Miguel Hidalgo CP 11000
México D.F
Phone: 1 800 022 3121

Brief System Description:

Datastream 7i™ is Datastream's principal software product. It is widely-deployed and designed for asset performance management. Its design is modular and allows flexible reporting and graphing capabilities for analyzing key metrics, forecasting performance and maintenance issues, and taking preventive measures on equipment and facilities to optimize performance.

Datastream 7i is a Web-architected asset management system, which enables users to:

- Access software through a standard Internet browser from anywhere and at any time
- Minimizes network traffic
- Eliminates some expensive hardware purchases

Datastream 7i is built on open Internet standards such as Java and XML and can be integrated with other organizational and operational systems.

Datastream also allows companies to use Microsoft SQL Server. Datastream 7i for SQL Server features include:

- A suite of asset management features—asset hierarchy management, audit trails, and preventive maintenance scheduling.
- The ability to view and manage assets across multiple organizations and in multiple languages and currencies
- Advanced modules—such as the Work module, the Equipment module, the Materials module, and the Projects module to allow users to implement programs specific to their organization's requirements

- Graphical User Interface (GUI) based system administration to minimize the strain on IT resources
- Analysis and reporting capabilities to help users obtain business insight from asset data collected.
- A secure environment built upon reliable and field-proven technology

Following is a brief description of some of the key modules:

Asset Management: This module allows, maintaining, structuring and standardizing physical information of mechanical, electrical, or civil assets. The assets can be tracked by position, past location, and maintenance history. Depreciation and warranty information can also be tracked. Key performance indicators and cost histories can be produced from the data accumulated. Screens are user friendly and input of information can be learned by data input personnel quickly.

Work Management. The work management module assists in managing, planning, and monitoring the resources necessary to complete work. Work requests can be manually generated by request or automatically generated by the system in the case of preventive maintenance (PM). PM's can be set up based fixed calendar dates, meter readings, or changing frequencies depending on thresholds. On completion of a work order labor hours, material costs, actions taken, and free form comments can be added. Key indicators associated with costs and performance can be reported based on accumulated data.

Purchasing Management: The Purchasing Management module automates and controls processes required for purchasing expenditures. Requisitions can be created manually or automatically when inventory drops below minimum stock levels. The following can be created in this module:

1) Requests for quotations from suppliers
2) Purchase orders for immediate needs
3) Blanket purchase orders
4) Vouchers for invoices received from suppliers
5) Standard contracts for purchase of materials

Materials Management: This module tracks and controls reservations, requisitions, allocations, issues, receipts, and repairs for all parts and materials needed for work orders.

Budget Management: The Budget management module automates the budget establishment process including the supervision, control, and analysis of the expenditures associated with all maintenance work. It links the financial structure of the organization with the organizational and physical assets. Analysis of expenditures serves as input to critical indicators used in assessing the organization's performance.

Additional modules are further described elsewhere in this report.

Company: Qqest Asset Management Services

Website: www.managerplus.com

Demo Availability: CD available from vendor

Sales Contact Information:
Brandon Gunn
Sales Representative
9350 South 150 East Suite 300
Sandy, Utah 84070
800-730-9965
Fax 801-281-3566

Product: Manager Plus

Approximate number of users: 4,000

Brief System Description:
ManagerPlus is a server based system designed to optimize equipment and facilities asset performance through accumulation of data and reporting. The system creates work orders automatically; reports allow analyzing trends and focusing on recurrent problems. In the equipment area ManagerPlus is designed to handle multiple preventive maintenance schedules for materials handling equipment, rolling stock, and their subsystems (engines, tires, hydraulics, etc). Purchase orders can be manually entered or automatically generated when inventory goes below minimum stock levels.

Modules Include:

Asset Manager

Preventive Maintenance: Automatically creates work orders when preventive maintenance is due either by hour meter or calendar periodicity.

Scheduling: Monitor maintenance by odometer, hours, days, calendar dates, days of the week, tire depth, or fuel and oil consumption.

Repair Histories: Produces complete repair histories for each vehicle, including parts and labor. Reviews repair costs in a variety of ways—geographic location, department, type, ID number, etc.

Fuel Oil Tracking: Detects early signs of equipment and vehicle fatigue and monitors performance based on fuel and/or oil consumption. Fuel per mile/hour and oil per mile/hour reports can be printed to help pinpoint and prevent potential problems.

Tool Tracking: The date and time of assignment of tools and return information are tracked.

Work Orders: Creates work orders for routine maintenance. For unscheduled maintenance, ManagerPlus provides work description and parts entry system. Classifies work orders by the type of work performed. Once completed, the inventory, history, and budget files are updated automatically.

Tire Tracking: Track purchase date, original cost of tire, re-treading and history of repairs, and tire depth. Tires can be identified by position and location on vehicle.

Sub Assets: Track maintenance and service schedules on engines and other components of your major assets.

Asset Depreciation: Track the depreciation on assets using the Straight Line Depreciation method.

Warranty Tracking: Track the warranty information on equipment, tools and vehicles.

Inventory + Expense Manager

Parts Inventory: Tracks following information:

- Inventory status, eliminate stock-outs or surpluses with the reorder and overage functions.
- Shows detailed list of all purchases.
- Automatically generates a purchase order with the quantity needed to bring stock back to the normal stocking level.

Alternate Parts: Produces alternate parts lists that can be used when specific parts are unavailable.

Expense Tracking: Analyzes projected budget versus actually showing the variance on a monthly basis.

Purchase Orders: Purchase orders can be entered or they can be automatically generated. Purchase orders automatically update inventory quantities, as well as expenses.

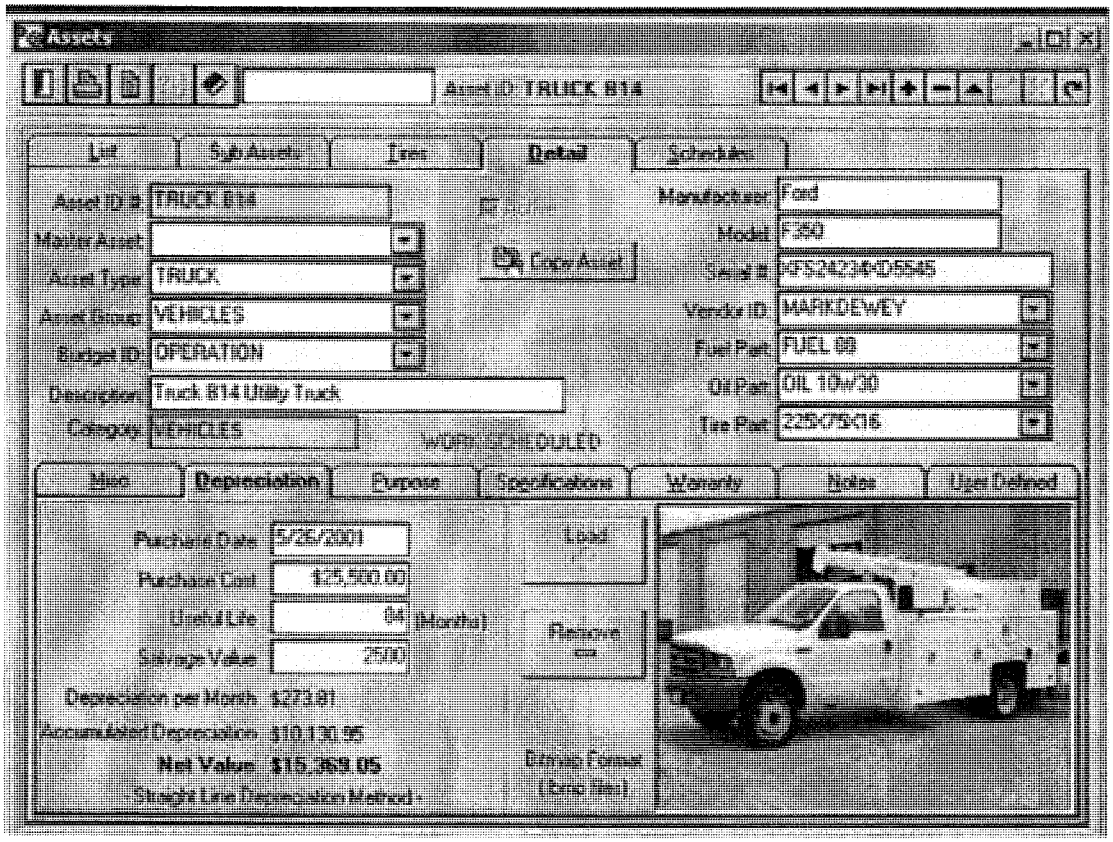
Additional Features + Options

Fuel Tracking Importer: Imports date, time, gallons, driver, milers/hours and downtime information from a fuel tracking system. The module provides several reports, including Vehicle Billing (shows fuel usage by vehicle) and Department Billing (shows departmental fuel usage).

Reports: Provides a variety of reports to analyze inventory, maintenance, budgets, accounting, labor, repair histories, work orders, expenses, chemical logs, etc.

Data Importer + Exporter: Transfer data in to or out of a spreadsheet, report or database program.

Sample Asset Screen:


Assets
Asset ID: TRUCK 814
List
Sub Assets
Tires
Detail
Schedules
Asset ID #: TRUCK 814
Master Asset:
Asset Type: TRUCK
Asset Group: VEHICLES
Budget ID: OPERATION
Description: Truck 814 Utility Truck
Category: VEHICLES
Copy Asset
Manufacturer: Ford
Model: F350
Serial #: KFS24234XD5545
Vendor ID: MARKDEWEY
Fuel Part: FUEL 89
Oil Part: OIL 10w30
Tire Part: 225X75X16
WORK SCHEDULED
Misc
Depreciation
Purpose
Specifications
Warranty
Notes
User Defined
Purchase Date: 5/26/2001
Purchase Cost: $25,500.00
Useful Life: 84 (Months)
Salvage Value: 2500
Depreciation per Month: $273.81
Accumulated Depreciation: $10,130.95
Net Value: $15,369.05
- Straight Line Depreciation Method -
Load
Remove
Bitmap Format
(Jpmp files)

Company: Maintenance Connection Inc.

Website: www.maintenanceconnection.com

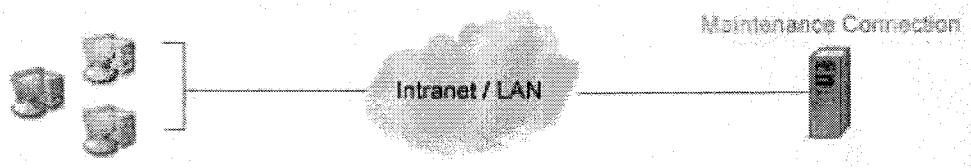
Demo Availability: www.maintenanceconnection.com

Sales Contact Information:
Cary Yokum
1947 Galileo Ct. Suite 101
Davis, CA 95616
888-567-3434
Fax: 1-888-567-3434

Product: Maintenance Connection

Approximate number of users:

Brief System Description:



You use a Computer with Intranet / LAN Access:

When at the Office:
- LAN users
- VPN users

When Traveling:
- VPN users

When at Home:
- VPN users

The Intranet / LAN is used to access our services.

Maintenance Connection runs on your own computer network (Intranet / LAN).

Interfacing with other systems can be done without using the Internet.

Maintenance Connection provides the following:

- CMMS / EAM Software
- Installation / Setup
- Reporting / Analysis
- Software Upgrades
- Customization
  - Online Help
  - Online Technical support

Features

- Multi-Site Asset Tracking
- Multi-Site Work Orders
- Work Order Scheduling / Work Manager
- Preventive Maintenance
- Predictive Maintenance
- Procedure Library (300+ Procedures)
- Multiple Stockroom Inventory Tracking
- Generate Purchase Orders
- Project Management
- Contract Management
- Accounts / Budgeting
- Hierarchical Classifications
- Document Library / HTML
- Document Editor
- Access Groups / Security
- Integrated Report Writer
- Print, Email, or Fax Reports
- Rules Manager

Modules

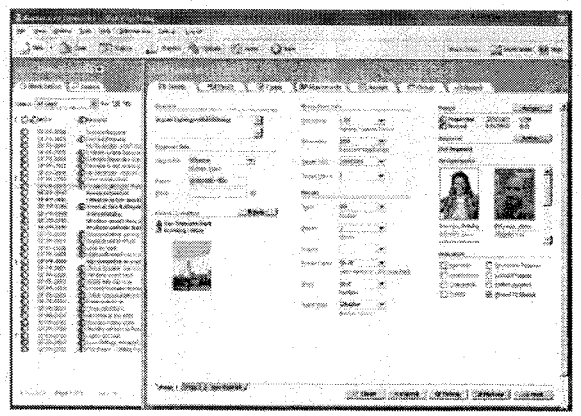
- Assets
- Work Orders
- Purchase Orders
- Preventive Maintenance
- Predictive Maintenance
- Inventory
- Procedures
- Tasks
- Projects
- Repair Centers
- Shops
- Labor
- Crafts
- Requesters
- Training
- Accounts
- Categories
- Tools
- Failures
- Classifications
- Specifications
- Companies
- Stock Rooms
- Tool Rooms
- Contacts
- Documents
- Bulletins
- Access Groups
- Members

Core Applications

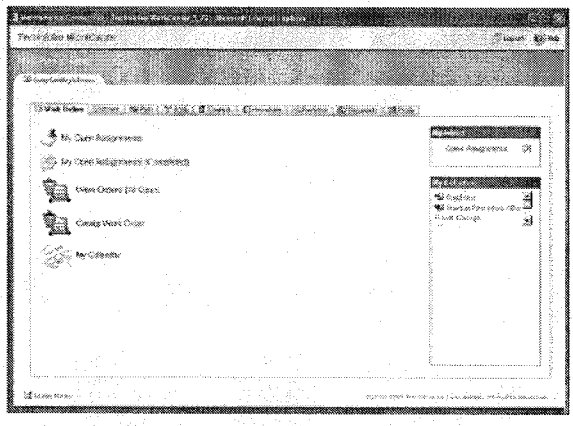
- Maintenance, Repair and Operation WorkCenter
- Technician WorkCenter
- Reporter

Add-Ons

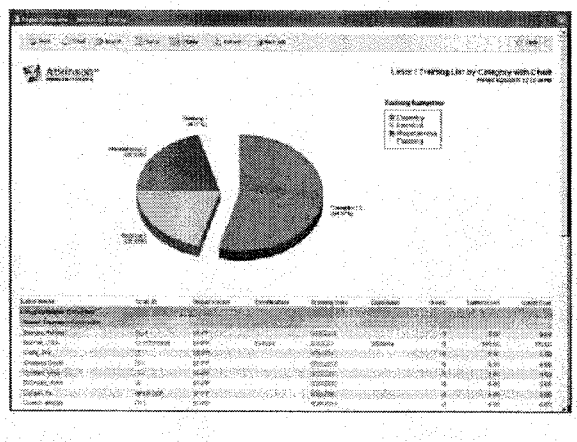
- Service Requester
- Maintenance Connection Mobile



MRO WorkCenter
Maintenance, Repair and Operation WorkCenter is the core Maintenance Connection application. It is designed for maintenance and operations managers to track work order progress, schedule work orders, manage purchase orders and inventory, and track asset maintenance costs. The MRO WorkCenter application also has built-in access to the Maintenance Reporter application. Use this application to develop a scheduled preventive maintenance program; the system will either create the PM work orders automatically when they are due or notify you to create them. MRO WorkCenter contains a suite of over 30 modules to complement and refine your current maintenance management processes.



Technician WorkCenter
The Technician WorkCenter provides a streamlined view of only the maintenance information that a technician would need to see. Upon logging in to Maintenance Connection, he or she will be presented with a list of the work orders which have been assigned to them and a calendar of work to be completed in the future. They have the ability to create new work orders and mark completed the work that has been assigned to them. See the next page for our mobile handheld option called Maintenance Connection Mobile.



Reporter
Maintenance Reporter is the application that gives access to only the reports feature of the MRO WorkCenter. It is designed for executives or those who may not want access to the MRO WorkCenter, but would like to download data and reports on demand. Each report may be customized and copied to create groups of your own commonly requested reports. Reports may be displayed with charts and graphs to give a visual representation of the data queried. At the time of implementation, our professional maintenance consultant can help you define the KPI reports that will give you snapshots of how your maintenance department is performing.

Company: Eagle Technology, Inc.

Website: www.eaglecmms.com

Demo Availability: www.eaglecmms.com

Sales Contact Information:
Ted Pyle
Regional & International Sales Manager
10500 N. Port Washington Rd.
Mequon, WI 53094
800-388-3268 ext 233

Product: Proteus IV

Approximate number of users: 3000

Service Office:
Eagle Technology, Mexico, SA de CV
Sta Genoveva #1228
Col. La Purisima
67129 Guadalupe, N.L. Mexico
Tel +52(81)8394-9064

Brief System Description:

ProTeus CMMS is available in three major levels:

- ProTeus Expert is a maintenance management software tool for smaller companies with one to four CMMS users.
- ProTeus Professional is designed for larger operations with between four and eight CMMS users. It is a full featured CMMS that supports a variety of optional interface modules.
- ProTeus Enterprise is designed for large multi-site environments that have a large amount of data to track. It supports networks using either a MS SQL Server or Oracle database, and an unlimited number of users.

Key Features:

- Languages: ProTeus IV is available in several languages, including English, German, Hungarian, Spanish, Portuguese, and Chinese. It supports networked solutions that allow each site to operate in their preferred local language.

- Currency: ProTeus IV allows each global site to operate in their local currency for receipt of parts, labor costs and equipment purchases. At the same time, a central office can view costs in the defined "base currency" (US dollars, Euros, or other) for any individual global site or it can totalize all costs worldwide.

- Database Structure: ProTeus IV allows a company to choose the most effective database solution to match their work structure. A company can choose to have multiple sites access a single database. Alternatively, each global site can have a separate database, and the central office can be given authority to view information from all the sites.

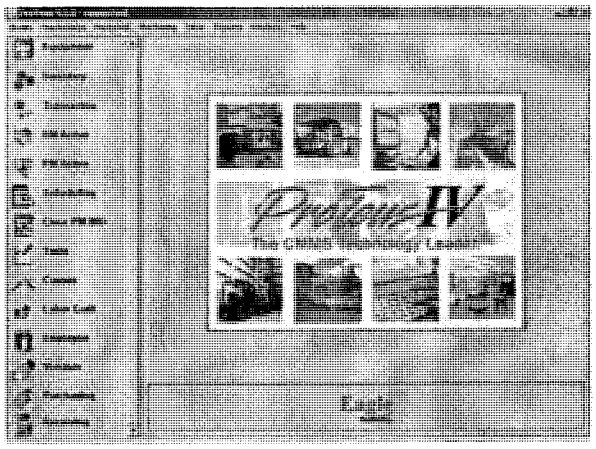
- Databases Supported

Oracle 8i and 9i databases.
MS SQL Server 2000.
Microsoft Desktop Engine 2000 (MSDE 2000)

- Operating Systems Supported
  Server environment:
  Windows 2000/2003 servers.
  Operating systems supported by Oracle databases.
  Workstation environment:
  Windows 2000 Pro/ XP Pro.

Modular design includes the following:

1. Asset Management
2. Materials Management
3. Work Order Management
4. Scheduling Management
5. Purchasing Management
6. Budget Management
7. Report Management
8. Administrative Utilities



Company: EPAC Software Technologies, Inc.

Website: www.epacst.com

Demo Availability: www.epacst.com/buyNOW.htm

Sales Contact Information:
Don Scraper
42 Ladd St.
East Greenwich, R.I. 02818
Tel 1-407-656-0834

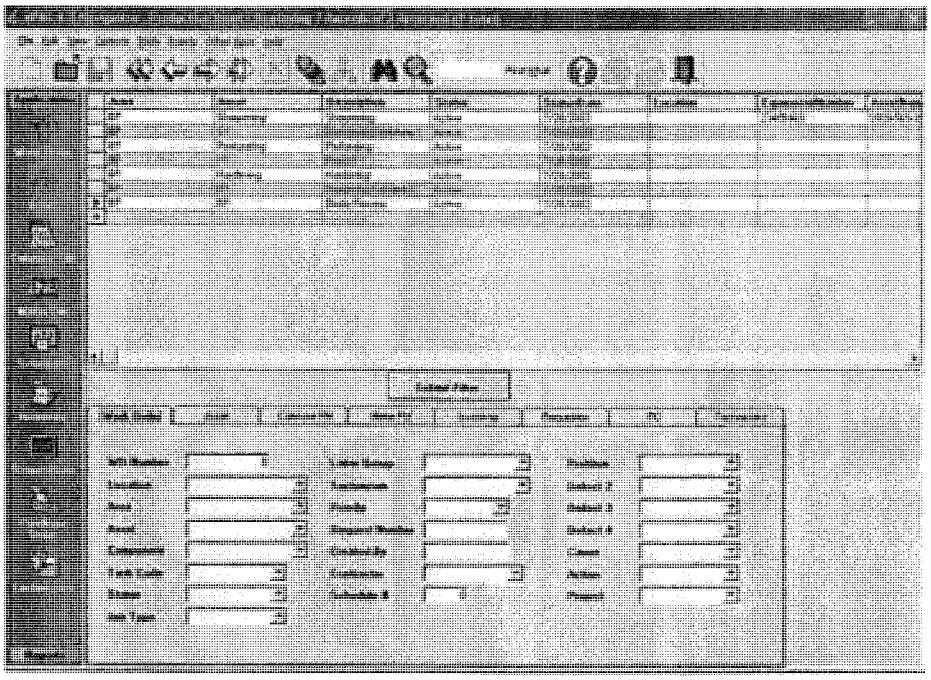
Product: EPAC CMMS

Approximate number of users: 500

Brief System Description:

ePAC is a client/server based Maintenance Management System available on either a MS Access database, MS SQL Server database, or Oracle. The Graphical User Interface (GUI) is developed in Visual Basic. Operating Systems include Windows 95,98,2000, NT, Novell, Citrix.

The ePAC user interface is similar to Microsoft Outlook, the main menu bar, table grid and record layout can all be seen on one screen.



ePAC is designed for maintaining both facilities and equipment. It is capable of storing and retrieving information such as fault/cause code analysis, parts usage, and downtime analysis and can produce packaged reports or the use the well established Crystal Reports to realize benefits in the areas of equipment uptime, inventory usages and labor productivity.

ePAC incorporates the following modules:

1. Assets
2. PM Planning and Scheduling
3. Inventory
4. Requisitions and purchasing
5. Security
6. Work Orders
7. Work Order Scheduling
8. Service Requests
9. Mobile Solutions
10. General – queries, report editing, label changes, barcodes, copy functions

Additional Features:

1. Consistency of forms
2. Hot keys for keyboard utilization
3. User defined grids for data arrangements

ePac software is being used by the Egyptian Navy port operation.

Company: eMaint Enterprises, LLC

Website: www.emaint.com

Demo Availability: www.emaint.com

Sales Contact Information:
Matthew Oles
7 Chester Ave.
Medford, NJ 08005
Ph: 609-714-1689 ext. 170
matthew.oles@emaint.com

Product: eMAINT X3

Approximate number of users: 1000

Brief System Description:

eMaint X3 is Web-architected, with a flexible GUI (Graphical User Interface) designed to be accessed via any standard Internet browser. The standard browser interface also provides portability over various hardware platforms, including PDAs and mobile PCs, while the GUI can also be 'personalized' to adapt to specific application requirements.

It is a work order management tool as well as an asset management system that can be used to schedule and plan maintenance, track assets, manage work orders and work requests, control parts inventory, prevent equipment failure and reduce equipment downtime.

eMaint X3 is also fully configurable, allowing it to interface with business systems and processes. During setup and implementation, the screens, fields, lists, reports and next action step options can be personalized to meet specific operational and organizational goals.

X3 Deployment Options:
eMaint X3 the option to run 'Online' as a hosted application, virtually eliminating the associated hardware costs of a new application, or may be installed and implemented internally, where the application is accessed via LAN Network, WAN or Intranet.

The ***Online Edition*** can be accessed anywhere the Internet is available. The eMaint system is maintained on secure servers and hosted from the eMaint web site. Data accumulated through the use of the system also resides on eMaint servers and system administration functions such as data back-ups and system upgrades are automatically accomplished by eMaint. Technical support can be obtained via phone and e-mail. There are no capital expenditures, no hardware to purchase, no software or software updates to install and maintain, and no IT administrative requirements. Data is secure and accessible using any web browser including wireless PDA and/or cell phone interfaces

The ***Enterprise Edition*** is the same Web-architected maintenance and asset management system as the on-line version, but instead resides on an internal server and is accessible via company LAN/WAN/Intranet. In this deployment, a company purchases and owns the software licenses, maintains the system and performs daily backups as with other in-house applications. eMaint installs the application

on the server and configures the system to organizational process and workflow requirements.

The following functionality is incorporated in the system:

- Manage work orders and work requests
- Manage assets and equipment
- Manage and track inventory
- Schedule preventive maintenance
- Automatically generate PM work orders
- Charge parts and labor against work orders
- Access equipment and parts histories
- Track maintenance contacts
- Create reports
- E-mail Pm and CM work orders to those who perform the work
- Register multiple users on one account
- Export data
- Configure screens, lists, and reports to business needs

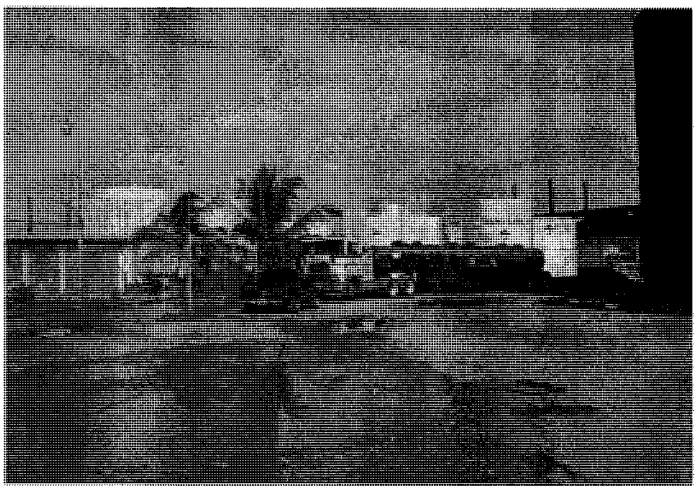
APPENDIX E: INVENTORY OF PORT BUILDINGS

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Transquimica, 27,180.76 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Tank farm	G
DISTRIBUTION OF ENVIRONMENT	26 metal tanks with chemical solvent products, 1 terminal of liquid products	G
STRUCTURE	Terminal made of concrete and structure Metal and zinc shed	P G
WALLS	Blocks and steel	
FORM AND STYLE	Industrial open air Rectangular terminal	G F
FINISHINGS		
FALSE CEILING	Interlocking wood in the terminal	P
PAINT	Peeling in the terminal (P); blue antirust in the galley (F)	
DOORS	Wood doors	P
FLOOR	Hard concrete in the terminal and hall of	P
WALLS	block and panelit	P
ELECTRICAL INSTALLATIONS	Explosion-proof outlets Exterior with ducts	G
SANITARY INSTALLATONS	In good condition	G
EQUIPMENT	1 AC	F

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

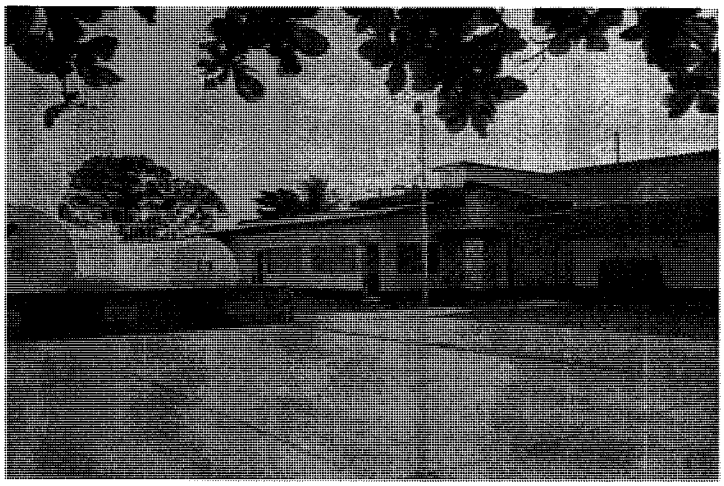


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: INVERQUIM, 10,560.37m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Tank farm and offices in very good condition	VG
DISTRIBUTION OF ENVIRONMENT	32 steel tanks, offices and lockers	VG
STRUCTURE	Wood-roofed structure covered with tile-type fibercement reinforced with steel & concrete	G
WALLS	Block walls	
FORM AND STYLE	Vertical face with block	VG
FINISHINGS		
FALSE CEILING	Panelit	G
PAINT	Water paint in offices and rust paint on tanks	G
DOORS	Wood and glass	VG
FLOOR	Terrazzo floor (M) base of tanks concrete (B)	
WALLS	Block walls in offices, panelit in hall	
ELECTRICAL INSTALLATIONS	Build-in and outside exterior in tubes	P
SANITARY INSTALLATONS	Excellent condition	
EQUIPMENT	1 Central AC, fire extinguishers and pump	MB

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

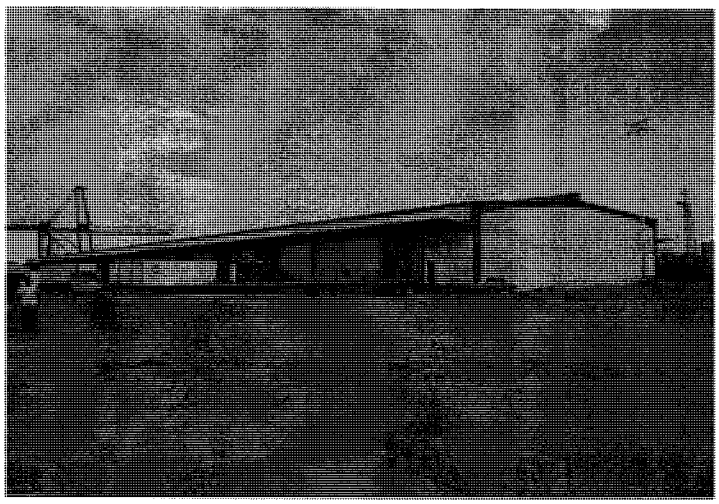


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Warehouse #4, 5,109.75 m²

	DESCRIPCION	CONDITION
PHYSICAL CHARACTERISTICS	A vessel with strong structure, double-height, 24 entrances, 12 in back	G
DISTRIBUTION OF ENVIRONMENT	Open two divisions, divided by a metallic, grill-type wall	G
STRUCTURE	Metal and covered with aluzinc	G
WALLS	Concrete and steel	VG
FORM AND STYLE	Flat, industrial-style facade, rectangular form	VG
FINISHINGS		
FALSE CEILING	does not have	
PAINT	Oil-base	F
DOORS	Metal curtains	G
FLOOR	hard concrete	G
WALLS	Prefabricated concrete walls, block and prefab.	
ELECTRICAL INSTALLATIONS	visible	F
SANITARY INSTALLATONS		P
EQUIPMENT	2 AC	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED	Cafeteria "Piloto", 281.31 m²	
	DESCRIPCION	**CONDITION**
PHYSICAL CHARACTERISTICS	Medium-size cafeteria with 3 kitchens, tables for 24 people	G
DISTRIBUTION OF ENVIRONMENT	Open space environment	G
STRUCTURE	Reinforced concrete, aluzinc roof, metal structure	G
WALLS	Block wall	G
FORM AND STYLE	Modern style with glass doors and windows	G
FINISHINGS		
FALSE CEILING	Fiberglass	G
PAINT	bone white antirust	G
DOORS	glass	G
FLOOR	ceramic	VG
WALLS	Concrete block	G
ELECTRICAL INSTALLATIONS	Built-in and exterior with ducts	G
SANITARY INSTALLATONS	Faucets drip	F
EQUIPMENT	2AC y 3 fans	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	Parking shed Administracion	
	DESCRIPCION	**CONDITION**
PHYSICAL CHARACTERISTICS	Open shed with columns @ 5 m	G
DISTRIBUTION OF ENVIRONMENT	Open space with space marked for one car	F
STRUCTURE	Zinc laminated (galvanized) metal painted tile	G
WALLS	Concrete foundation	VG
FORM AND STYLE		
FINISHINGS		
FALSE CEILING		
PAINT	bone white antirust	G
DOORS		
FLOOR	hard concrete	G
WALLS		
ELECTRICAL INSTALLATIONS		
SANITARY INSTALLATONS		
EQUIPMENT		

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Administration, 449.41 m²

	DESCRIPCION	CONDITION
PHYSICAL CHARACTERISTICS	Reinforced concrete building, subgrade flagstone. First floor block. 3-story building, rear part in repairs.	G
DISTRIBUTION OF ENVIRONMENT	First floor offices with access from outside. Second and third floors offices.	VG
STRUCTURE	Reinforced concrete structure.	VG
WALLS	Concrete block.	G
FORM AND STYLE	Modern style with windows and balcony and for sun.	G
FINISHINGS		
FALSE CEILING	plaster	VG
PAINT	oil-based paint	F
DOORS	Glass exterior, glass and wood interior doors	G
FLOOR	Terrazzo and tile	VG
WALLS	Polished	VG
ELECTRICAL INSTALLATIONS	Built-in	VG
SANITARY INSTALLATONS	Built-in	VG
EQUIPMENT	AC 19	VG

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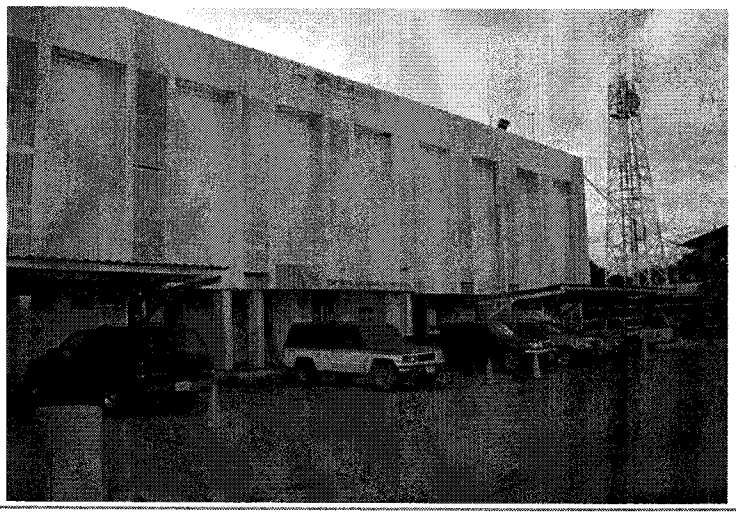
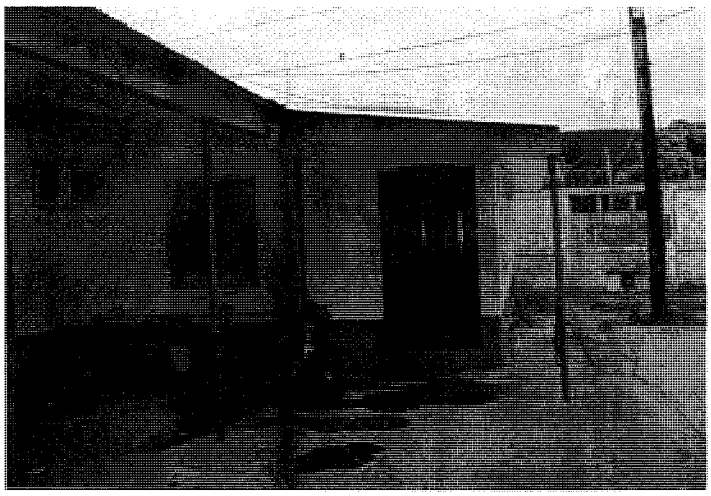


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Time takers and cargo supervisors, 101.58 m²		
	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Small building with access by a 2 - 5 m wide corridor	F
DISTRIBUTION OF ENVIRONMENT	Open vestibule with view of desks building: two groups of time takers and cargo supervisors	F
STRUCTURE	Reinforced concrete, metal tubes in corridor, wood-roofed structure	F
WALLS	Block walls	F
FORM AND STYLE	Simple form	F
FINISHINGS		
FALSE CEILING	Panelit	F
PAINT	Oil-based	F
DOORS	Wood	F
FLOOR	Terrazo inside and hard concrete outsie	F
WALLS	Block walls	
ELECTRICAL INSTALLATIONS	Built-in and exterior some with ducts	P
SANITARY INSTALLATONS	Clean	F
EQUIPMENT	4 AC y 1 public telephone	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Warehouse 1,150.98 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	has 6 accesses in principal façade and 6 in back Principally a covered hall to receive trucks approximately 30 m long	F
DISTRIBUTION OF ENVIRONMENT	Double height warehouse, interior offices of two levels. Baths building.	G
STRUCTURE	Metal, H column, concrete pedestal	G
WALLS	Reinforced concrete	
FORM AND STYLE	Industrial	
FINISHINGS		
FALSE CEILING	Plaster interior offices	VG
PAINT	Office B y warehouse R	
DOORS	Metal exterior, metal curtain, inteior glass	G
FLOOR	hard concrete	G
WALLS	offices panelit, waterproofing and warehouse prefab. C	F
ELECTRICAL INSTALLATIONS	Extension with ducts	F
SANITARY INSTALLATONS	Operational, some dirty	F
EQUIPMENT	AC and extinguishers	VG

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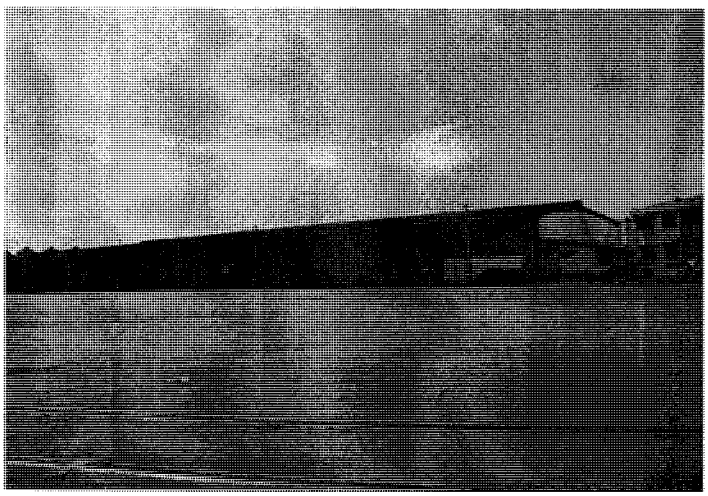

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENTT TO BE ANALYZED: Shed (supervision of forklift, crane and straddle carrier		
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	In general, the bldg is in precarious condition 1 floor	P
DISTRIBUTION OF ENVIRONMENT	Low, small and uncomfortalbe building The floor of the shed is lower than the ground outside and water enters when it rains.	P
STRUCTURE	Reinforced concrete, wood-roof with cover of standard metal sheet	P
WALLS	Block wall	P
FORM AND STYLE	Small building	P
FINISHINGS		
FALSE CEILING	panelit, inside offices but rotten	P
PAINT	water-based	P
DOORS	wood	P
FLOOR	hard concrete	F
WALLS	porous	P
ELECTRICAL INSTALLATIONS	built-in	G
SANITARY INSTALLATONS	Without sanitary cover	P
EQUIPMENT	3 AC	P

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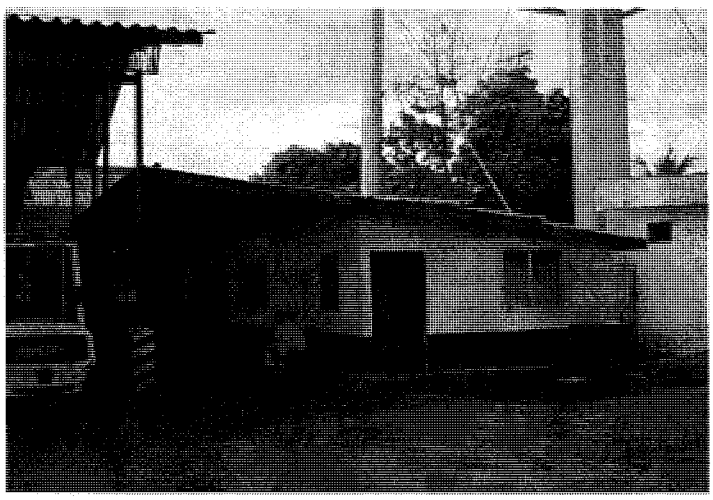

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	Preventive maintenance shop, 582.20 m²	
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	Open air shed with office and bath	F
DISTRIBUTION OF ENVIRONMENT	Ideal space for maintenance of machines	G
STRUCTURE	Shed, metal structure	G
WALLS	Concrete	F
FORM AND STYLE	Industrial	
FINISHINGS		
FALSE CEILING	Does not have	
PAINT	hall B office M	
DOORS	Metal and wood	P
FLOOR	Concrete and paving stone	P
WALLS	Block	P
ELECTRICAL INSTALLATIONS	External	P
SANITARY INSTALLATONS	Faucets do not leak but walls are dirty and odorous	P
EQUIPMENT		

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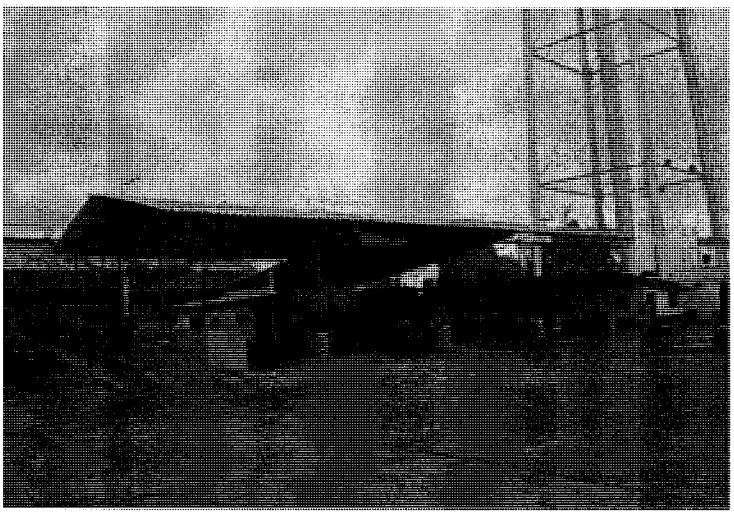
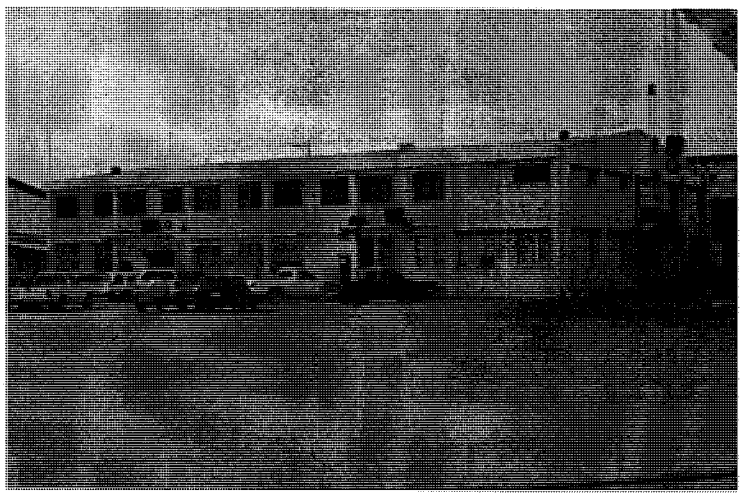


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: General Accounting Building		
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	2-story building Lower story windows celocia Upper story sliding polarized windows	F
DISTRIBUTION OF ENVIRONMENT	Entrance through reception followed by stair to second level gymnasium, cont.. INCAFE	F
STRUCTURE	Reinforced concre armado losa de entrepiso, covered by zinc sheet	F
WALLS	Some interior walls are cracked	P
FORM AND STYLE	Rectangular form, vertical form with blocks cisados	F
FINISHINGS		
FALSE CEILING	Plaster so	
PAINT	Oil-base PB M DA B	
DOORS	Glass and wood	F
FLOOR	PB terrazo PA ceramic	
WALLS	exr.block cisado, int panelit plywood LM and block	
ELECTRICAL INSTALLATIONS	built-in and exterior	
SANITARY INSTALLATONS	Lower story deteriorated tile M Upper story R	
EQUIPMENT	9 A.C.	

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

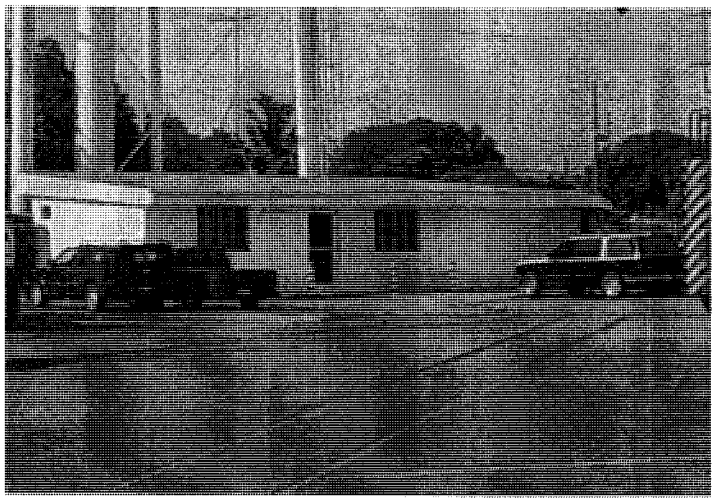


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Electric shop

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Building in fair condition	F
DISTRIBUTION OF ENVIRONMENT	Eating area, electric shop, sleeping area, baths Store room, lockers, shop, office, hall soon to be built	G
STRUCTURE	Reinforced concrete, metal, zinc laminate (galvanized)	F
WALLS	Block and reinforced concrete	G
FORM AND STYLE	Straight facade	G
FINISHINGS		
FALSE CEILING	glass fiber ceiling	F
PAINT	oil-based	G
DOORS	glass and wood	G
FLOOR	ceramic in office; terrazzo in shop	G
WALLS	Exterior block; interior panelit	G
ELECTRICAL INSTALLATIONS	Exterior with its ducts in good condition	G
SANITARY INSTALLATONS	In good condition	G
EQUIPMENT	3 A.C.	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	DEA ,1,267.69 m² next to gate #6	
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	Building with outside stairs, dirty	F
DISTRIBUTION OF ENVIRONMENT	2 levels port police, corridor, social service, firefighters cubicle 2nd office DEA	F
STRUCTURE	Metal structure and reinforced concrete, covered with fiber cement laminate	F
WALLS	Cisado block walls	F
FORM AND STYLE	Straight facades	
FINISHINGS		
FALSE CEILING	panelit	G
PAINT	oil-based	F
DOORS	glass and wood	G
FLOOR	first level terrazzo, second level ceramic	G
WALLS	block and panelit	F
ELECTRICAL INSTALLATIONS	built-in and external with duct	G
SANITARY INSTALLATONS	Operating First floor precarious, second level better but some are out	F
EQUIPMENT	9 A.C.	F

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DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Shop hall adjacent to Superintendancy

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Open air halls	VG
DISTRIBUTION OF ENVIRONMENT	4 modules for 47 ventilators	VG
STRUCTURE	metal with zinc laminate nc	VG
WALLS		
FORM AND STYLE	Industrial	
FINISHINGS		
FALSE CEILING		
PAINT	red and green antirust	VG
DOORS		
FLOOR	hard concrete	VG
WALLS		
ELECTRICAL INSTALLATIONS		
SANITARY INSTALLATONS		
EQUIPMENT	extinguishers	VG

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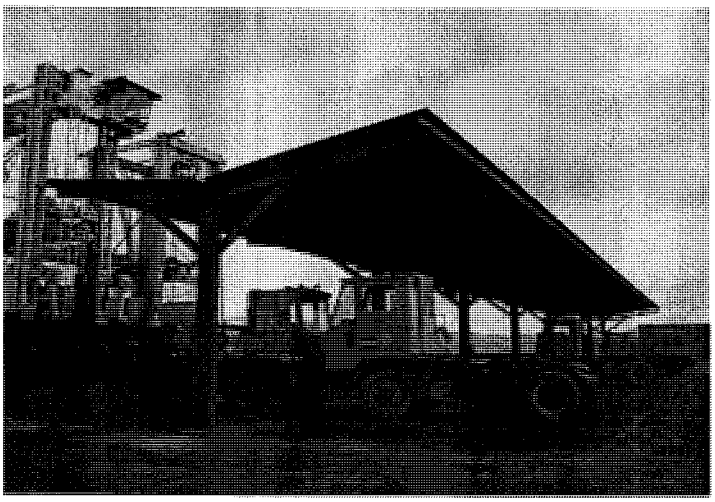

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Shed for fuel pump attendants		
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	One galley for two pumps	F
DISTRIBUTION OF ENVIRONMENT	Open air	F
STRUCTURE	Metal tube with zinc sheet structure	F
WALLS		
FORM AND STYLE		
FINISHINGS		
FALSE CEILING		
PAINT		
DOORS		
FLOOR		
WALLS		
ELECTRICAL INSTALLATIONS	with duct	B
SANITARY INSTALLATONS		
EQUIPMENT		

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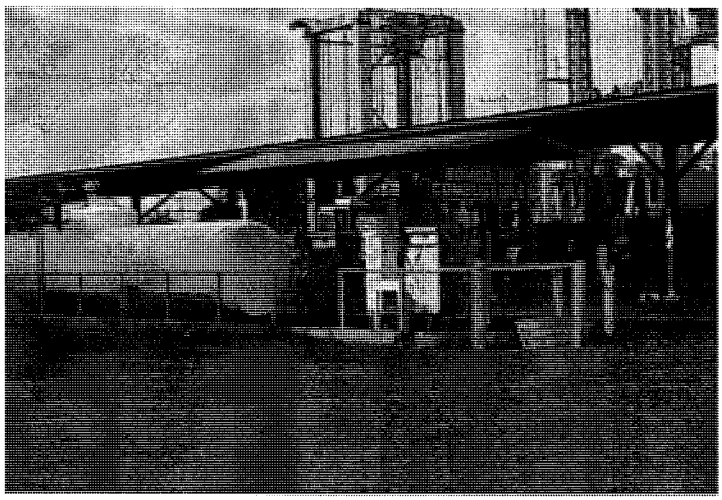

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	Office of containers Superintendancy	
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	2-story building made of containers	G
DISTRIBUTION OF ENVIRONMENT	consists of 20 offices, 10 and 10 on each floor	G
STRUCTURE	Metal and the containers serve as structure	G G
WALLS		
FORM AND STYLE	Industrial	
FINISHINGS		
FALSE CEILING	panelit ceiling	G
PAINT	green, white and blue antirust	VG
DOORS	wood	VG
FLOOR	wood	F
WALLS	panelit interior, machimbre type	VG
ELECTRICAL INSTALLATIONS	external, some with ducts and others without	F
SANITARY INSTALLATONS	All working	F
EQUIPMENT	20 AC	F VG

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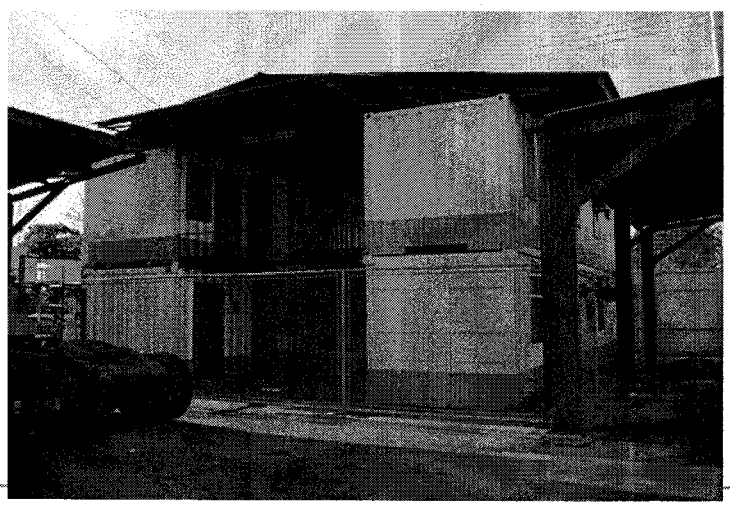

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Superintendancy, 482.34 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	3-story building with the main entrance tampada by a galley	G
DISTRIBUTION OF ENVIRONMENT	3-story office-type buidling	VG
STRUCTURE	Reinforced concrete structure	VG
WALLS	block walls with a series of columns type sun block on the windows in the façade	G
FORM AND STYLE	modern style	G
FINISHINGS		
FALSE CEILING	false of ceiling of fiberglass	VG
PAINT	oil-based	G
DOORS	exterior glass; interior glass and wood	VG
FLOOR	terrazzo with marble and parts ceramic	F
WALLS	internal panelit	G
ELECTRICAL INSTALLATIONS	built-in	G
SANITARY INSTALLATONS	function well but the dividers are bad	F
EQUIPMENT	Central AC 2S	F VG

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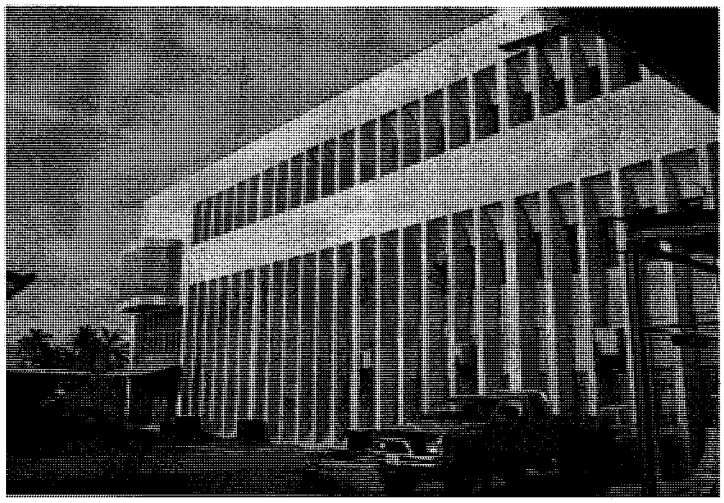

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	Mechanical shop open shed Maintenance, 1,405.00 m²	
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	Open air, only interior walls serve as store rooms, which are dirty	G
DISTRIBUTION OF ENVIRONMENT	The vehicles to be repaired remain in open air. There are only offices and store rooms. Extension of the front part is missing.	G
STRUCTURE	Metal with sheet of fiber cement. standard	G G
WALLS		VG
FORM AND STYLE	Industrial	G
FINISHINGS		
FALSE CEILING	panelit	P
PAINT	red antirust	G
DOORS	wood	F
FLOOR	hard concrete	G
WALLS	Blocks cisado y waterproof panelit	G
ELECTRICAL INSTALLATIONS	Segido floor panel W, not finished. External with duct	P
SANITARY INSTALLATONS	Precarious.	P
EQUIPMENT		VG

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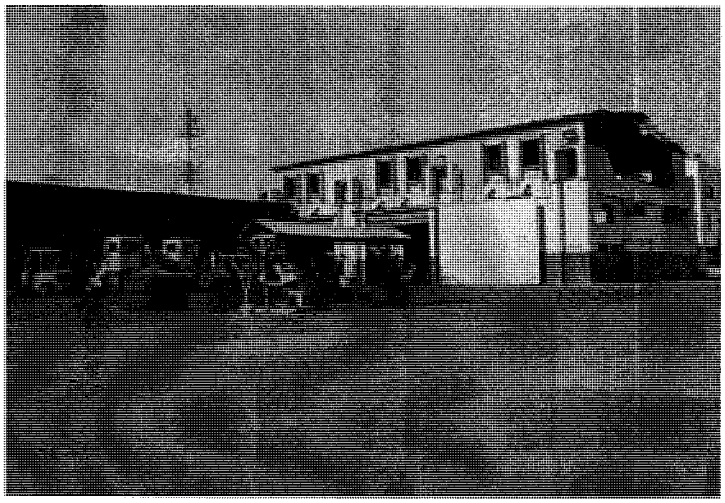

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALZYED: Maintenance and mechanical shop		
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	2-story building -	F
DISTRIBUTION OF ENVIRONMENT	Open space with heights for trucks five entrances. Double height with first floor.	F
STRUCTURE	Reinforced concrete with metal roof structure, zinc sheet	G G
WALLS	Steel block	VG
FORM AND STYLE	rectangular smooth façade	G
FINISHINGS		
FALSE CEILING	misura flagstone	VG
PAINT	oil-based	P
DOORS	sliding metal doors and inside wood and glass	VG
FLOOR	hard concrete, intermediate level ceramic	F
WALLS	exterior block Rep. and polished, smoothed inter block	F
ELECTRICAL INSTALLATIONS	segido floor panel W not finished Ext. ducts, others not	P
SANITARY INSTALLATONS	Mistreated but function well	F
EQUIPMENT	4 AC	VG

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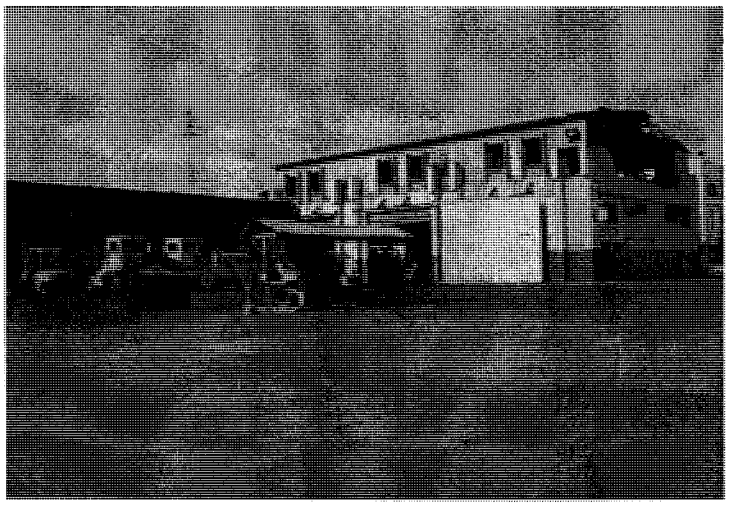

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	Bank installations 327.09 m²	
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS	Rectangular building	G
DISTRIBUTION OF ENVIRONMENT	Has 3 banks: :Occidente,Atlantida,BGA,/CACEENDA LTD./Medical Clinic	G
STRUCTURE	Reinforced steel (sic) and structure of wood roof and zinc laminate	F
WALLS	Stone	VG
FORM AND STYLE	Square form with simple facades	G
FINISHINGS		
FALSE CEILING	Fiberglass	G
PAINT	Oil-based exterior. R. interior MB	
DOORS	Glass	VG
FLOOR	In banks ceramic BGA terrazo CL terrazo	VG
WALLS	brick cinselado exterior./interior polished	G
ELECTRICAL INSTALLATIONS	Built-in installations, some outside and without duct	F
SANITARY INSTALLATONS	Operation and clean; some leak	G
EQUIPMENT	7 A.C.	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:	Human Resources, 256.11 m²	
	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Building with neat exterior with problems in in the rainwater downspouts one floor	G
DISTRIBUTION OF ENVIRONMENT	Office building, entrance, reception, offices and bathrooms. Good working atmosphere.	VG
STRUCTURE	Reinforced concrete structure, roof of wood structure	VG
	covered with aliciba laminate.	G
WALLS	walls of polished brick	G
FORM AND STYLE	Rectangular form and clean façade	G
FINISHINGS		
FALSE CEILING	fibreglass	VG
PAINT	oil-based	VG
DOORS	interior wood, exterior glass	VG
FLOOR	terrazo	G
WALLS	polished walls (MB)	
ELECTRICAL INSTALLATIONS	built-in and some external with plastic ducts	G
SANITARY INSTALLATONS	some faucets leak water	G
EQUIPMENT	7 AC	VG

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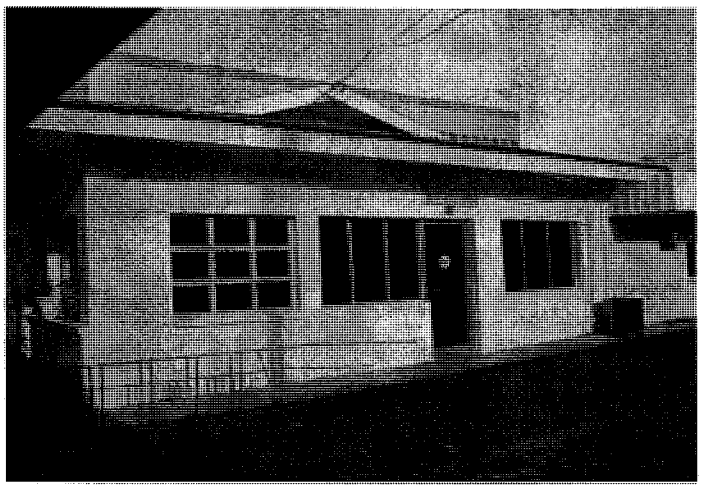

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: DEA, 366.92 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	One floor a dos aguas	P
DISTRIBUTION OF ENVIRONMENT	2 areas: 1.) Office, 2 sleeping areas, storeroom, kitchenette 2.) Dog kennel with 10 chain link fence cages in poor condition	P
STRUCTURE	Wood-roof structure, covered with advesto	F
WALLS	Blocks and concrete, beams and columns of reinforced concrete	F
FORM AND STYLE	Rectangular floor and straight facades of cisado block and painted (paint is lacking)	F
FINISHINGS		
FALSE CEILING	panelit	P
PAINT	water-based paint	
DOORS	wood	P
FLOOR	interior terrazo (R) y hard red concrete (M)	P
WALLS	block	
ELECTRICAL INSTALLATIONS	built-in and exterior with ducts	F
SANITARY INSTALLATONS	faucets are missing, palaneas don't go down and urinal overflows	P
EQUIPMENT	No extinguishers 3 AC	F

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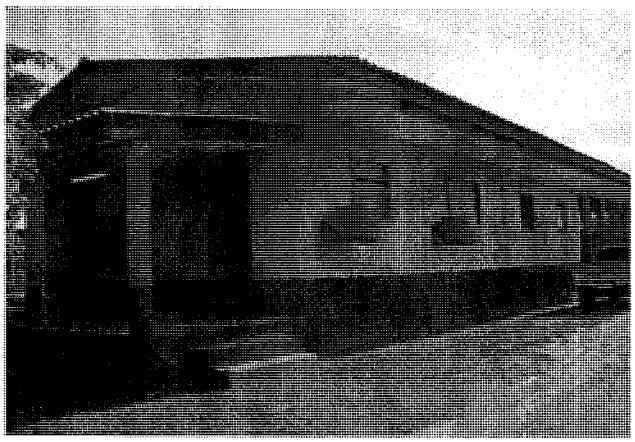
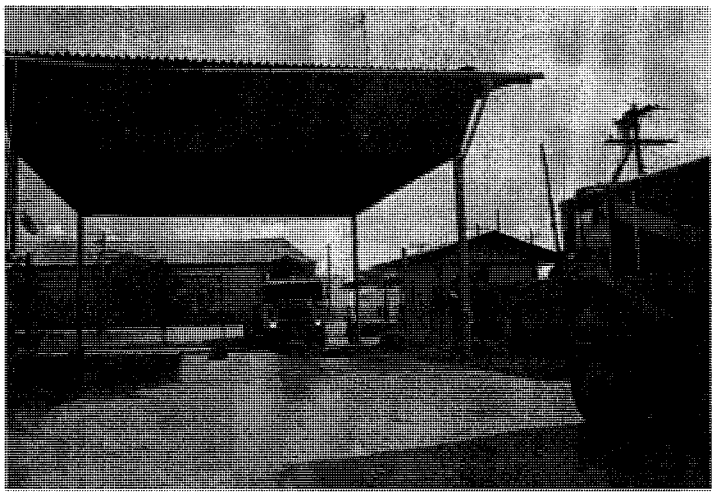


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: GATE 1 AND cont.

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	The building is uncared for.	P
DISTRIBUTION OF ENVIRONMENT	2 booths, on gate, on hallway	P
STRUCTURE	Hall of metal structure and troquelada sheet Booths of block, concrete and steel structure of wood and covered with advesto	P
WALLS	Booths of block and reinforced concrete	F
FORM AND STYLE	Rectangular form	
FINISHINGS		
FALSE CEILING	panelit	F
PAINT	water-based	P
DOORS	wood	P
FLOOR	Hard concrete, terrazzo in acccounting	P
WALLS	block	F
ELECTRICAL INSTALLATIONS	external with duct	F
SANITARY INSTALLATONS	In poor condition	P
EQUIPMENT	2 AC	F

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

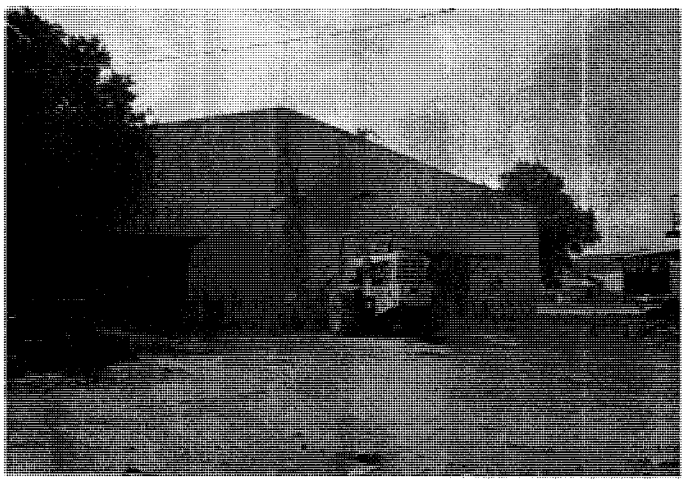


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: SUGAR WAREHOUSE, 2,121.83 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Industrial vessel	F
DISTRIBUTION OF ENVIRONMENT	Warehouse in poor condition Molasses tank	P G
STRUCTURE	Metal structure Painting is missing	F
WALLS	Reinforced concrete	F
FORM AND STYLE	Industrial	F
FINISHINGS		
FALSE CEILING		
PAINT	No	P
DOORS		
FLOOR	Hard concrete	F
WALLS		
ELECTRICAL INSTALLATIONS	With ducts	
SANITARY INSTALLATONS	In fair conditon	F
EQUIPMENT	3 Extinguishers 1 AC	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Straddle carrier shop

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Shop without hall because it is for straddle carriers	F
DISTRIBUTION OF ENVIRONMENT	Composed of an office / storeroom Container - storeroom Cubicle for lunch	P
STRUCTURE	Metal, wood and block	P
WALLS	Blocks in the lunchroom	P
FORM AND STYLE		
FINISHINGS		
FALSE CEILING	Panelit	G
PAINT	water-based	P
DOORS	wood	P
FLOOR	Hard concrete	P
WALLS	Block	P
ELECTRICAL INSTALLATIONS	External with ducts	G
SANITARY INSTALLATONS	Clean and operational	G
EQUIPMENT	2 AC	F

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:

Office of the car yard:

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Cade-type building of Dole, 2 levels	F
DISTRIBUTION OF ENVIRONMENT	Only functions as an office on the second level (reception and offices)	F
STRUCTURE	Wood	P
WALLS	Stone and concrete	F
FORM AND STYLE	Office-type of Dole	F
FINISHINGS		
FALSE CEILING	Panelit	F
PAINT	oil-based	F
DOORS	wood	F
FLOOR	wood	F
WALLS	Panelit	F
ELECTRICAL INSTALLATIONS	Built-in	G
SANITARY INSTALLATONS	Clean and not leaking	G
EQUIPMENT	3 AC	F

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

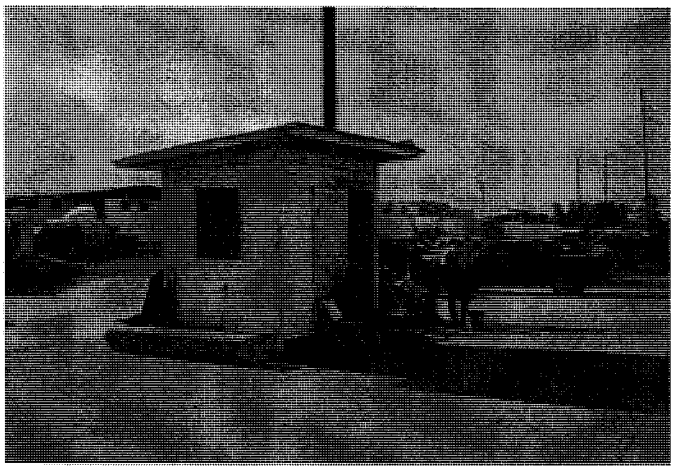
DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:

BOOTH IN THE CAR YARD

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	2 small booths	F
DISTRIBUTION OF ENVIRONMENT	Distributions in each gate	G
STRUCTURE	Wood Wood and zinc roof	G
WALLS		
FORM AND STYLE	Rectangular	
FINISHINGS		
FALSE CEILING	None	
PAINT	Oil-based	
DOORS	woood	F
FLOOR	wood	P
WALLS	wood	F
ELECTRICAL INSTALLATIONS		
SANITARY INSTALLATONS		
EQUIPMENT		

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

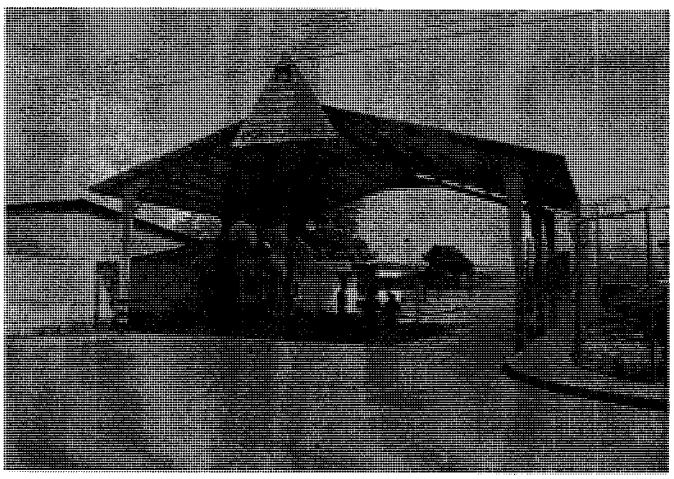


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Gate 3

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Double height hall	G
DISTRIBUTION OF ENVIRONMENT	Booth for guard and gate	G
STRUCTURE	Hall with metal structure and covered with sheet of fiber cement.. Concrete booth	G
WALLS	Wall of the booth is blocks	F
FORM AND STYLE	Industrial	G
FINISHINGS		
FALSE CEILING	panelit	G
PAINT	oil-based	F
DOORS	wood	F
FLOOR	terrazo in the booth	F
WALLS	cisado blocks	F
ELECTRICAL INSTALLATIONS		F
SANITARY INSTALLATONS	1 bath and sink dirty and leaking	P
EQUIPMENT	Emergency lights	G

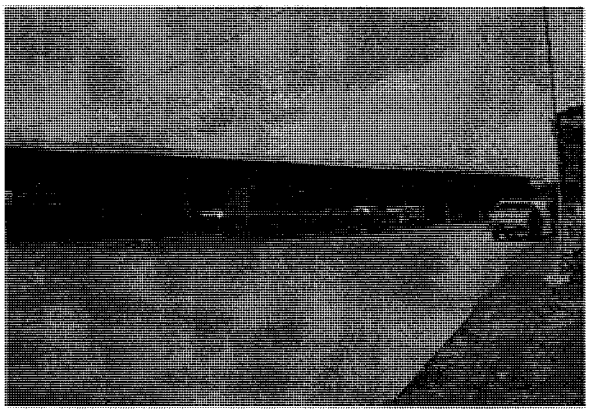
Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Welding, mechanical and carpentry shop		
	DESCRIPTION	**CONDITION**
PHYSICAL CHARACTERISTICS		F
DISTRIBUTION OF ENVIRONMENT	There are 3 shops in the structure	G
STRUCTURE	Metal	G
WALLS	Concrete and steel	F
FORM AND STYLE	Industrial	G
FINISHINGS		
FALSE CEILING		
PAINT	red antirust	G
DOORS	wood	F
FLOOR	hard concrete	F
WALLS	some block walls which compose the interior offices	F
ELECTRICAL INSTALLATIONS	external installations, some with ducts	F
SANITARY INSTALLATONS		F
EQUIPMENT		

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED

Office of civil works, 282.22 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Old building	F
DISTRIBUTION OF ENVIRONMENT	Civil works offices Topography offices	P
STRUCTURE	Structure with wood roof covered with zinc	F
WALLS	Block walls reinforced with steel	F
FORM AND STYLE	Form in rectangular floor	F
FINISHINGS		
FALSE CEILING	panelit	F
PAINT	oil-based	P
DOORS	wood	F
FLOOR	terrazo	F
WALLS	blocks	F
ELECTRICAL INSTALLATIONS	Built-in	G
SANITARY INSTALLATONS		G
EQUIPMENT	7 AC	G

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

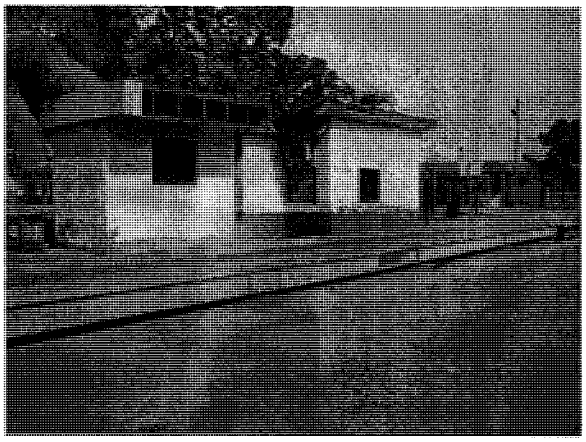
DESCRIPTION OF PORT INSTALLATIONS

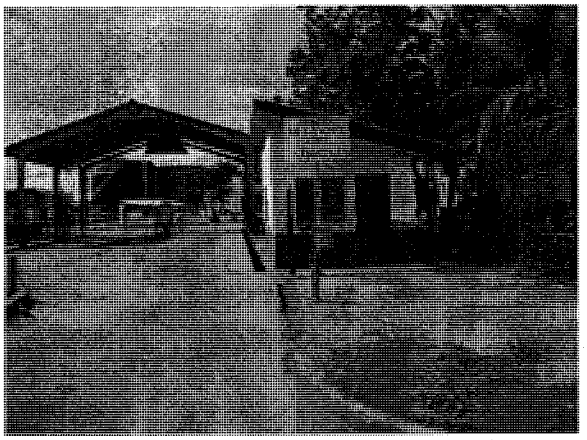
NAME OF ELEMENT TO BE ANALYZED:

Offices of weigh scales, GATE 3

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Old building, whose alreso of the roof has been hit by a truck	P
DISTRIBUTION OF ENVIRONMENT		
STRUCTURE	Structure with wood roof	P
WALLS	Reinforced concrete and block walls	
FORM AND STYLE		
FINISHINGS		
FALSE CEILING	panelit	P
PAINT	water-based	P
DOORS	wood	P
FLOOR	terrazo	F
WALLS	block	F
ELECTRICAL INSTALLATIONS	Some exterior do not have a duct	P
SANITARY INSTALLATONS		P
EQUIPMENT		

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor





DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: FOOD BUFFET, 106.52 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Building designed for food sale	VG
DISTRIBUTION OF ENVIRONMENT	Comprises food store, kitchen, bathroom and office	VG
STRUCTURE	Reinforced concrete and roof of bovedia slab	VG
WALLS	Reinforced concrete	G
FORM AND STYLE	Modern	G
FINISHINGS		
FALSE CEILING	does not have	
PAINT	oil-based	G
DOORS	glass and wood	G
FLOOR	terrazo	G
WALLS	Cisado block	G
ELECTRICAL INSTALLATIONS	External and built-in	G
SANITARY INSTALLATONS	In good condition	G
EQUIPMENT	2 AC	

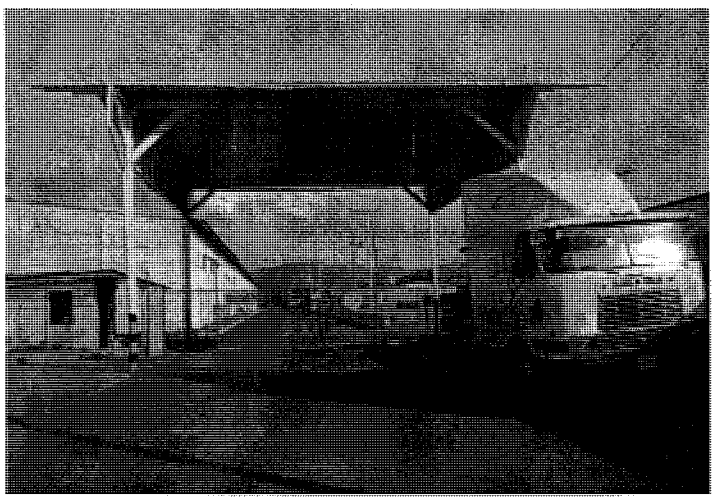
Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:: Gate 4

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Gate covered by a galley and its booth at one side in the free zone	F
DISTRIBUTION OF ENVIRONMENT	The gate links to the free zone	G
STRUCTURE	The galley has its metal structure with sheet troquelada. The booth is of reinforced concrete with	G
	a wood roof structure covered with zinc.	F
WALLS	Reinforced concrete	G
FORM AND STYLE	Industrial	
FINISHINGS		
FALSE CEILING	panelit in the booth	F
PAINT	booth water-based(M) galley antirust (B)	
DOORS	wood in booth	F
FLOOR	terrazo in booth	F
WALLS	cisado block in booth	F
ELECTRICAL INSTALLATIONS	Exterior and built-in	F
SANITARY INSTALLATONS	dirty but working	F
EQUIPMENT		

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

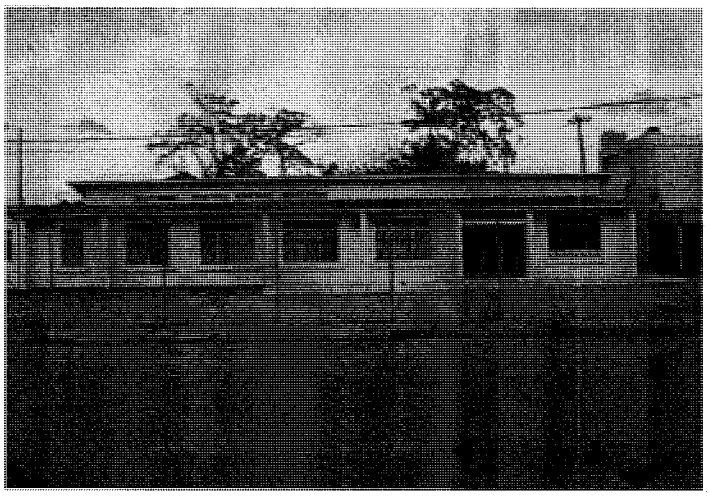


DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: PUBLIC LIBRARY

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Outside of Port property. One-story building with glass windows with concrete sacks around.	G
DISTRIBUTION OF ENVIRONMENT	Books section and reading room.	G
STRUCTURE	Reinforced concrete and beam roof.	G
WALLS	Reinforced concrete	G
FORM AND STYLE	Modern	G
FINISHINGS		
FALSE CEILING	tongue and groove lumber	F
PAINT	water-based	F
DOORS	wood and glass	G
FLOOR	terrazo	G
WALLS	blocks	G
ELECTRICAL INSTALLATIONS	built-in and exterior without ducts (some)	F
SANITARY INSTALLATONS	some leak	F
EQUIPMENT	AC	

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor



DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Seawall toll booth

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Booths with fixed glass windows and metal doors	VG
DISTRIBUTION OF ENVIRONMENT	There are five booths covered with a galley	VG
STRUCTURE	Toll booths, reinforced concrete structure.	VG
WALLS	Reinforced concrete	VG
FORM AND STYLE	Industrial	VG
FINISHINGS		
FALSE CEILING		
PAINT	oil-based	VG
DOORS	metal	VG
FLOOR	hard concrete	VG
WALLS	block	VG
ELECTRICAL INSTALLATIONS	built-in and external	VG
SANITARY INSTALLATONS	completely operational	VG
EQUIPMENT	AC in each booth	VG

Abbreviations : **VG:**Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: Tank near the Office of the Electrical Shop		
DESCRIPTION		**CONDITION**
PHYSICAL CHARACTERISTICS		
DISTRIBUTION OF ENVIRONMENT		
STRUCTURE	Metal	VG
WALLS	Reinforced concrete	VG
FORM AND STYLE	Industrial	VG
FINISHINGS		
FALSE CEILING		
PAINT		
DOORS		
FLOOR		
WALLS		
ELECTRICAL INSTALLATIONS		
SANITARY INSTALLATONS		
EQUIPMENT		

Abbreviations : **VG**:Very Good; **G**: Good F: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: HON - TAI, 7,503.27 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Industrial structure	VG
DISTRIBUTION OF ENVIRONMENT		
STRUCTURE	Metal; H beams and channels covered by sheet tronquelada	VG
WALLS	Reinforced concrete	VG
FORM AND STYLE	Industrial	
FINISHINGS		
FALSE CEILING	vista structure	G
PAINT	oil-based	G
DOORS	metal curtains and metal doors	G
FLOOR	hard concrete	G
WALLS	blocks and panels	G
ELECTRICAL INSTALLATIONS	with ducts	VG
SANITARY INSTALLATONS	all working	G
EQUIPMENT	AC	

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: GUARD BOOTH

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Composed of 3 booths and one gate	G
DISTRIBUTION OF ENVIRONMENT	One booth for the guard on duty for shift One booth for the chief guard One booth for electrical installation and bathroom	G G G
STRUCTURE	Wood guard booth, concrete and slab rood booth for electrical installation (B). Chief guard booth: concrete; wood roof and sheets of fiber cement	F G G
WALLS	Reinforced concrete	VG
FORM AND STYLE	Rectangular floors and facade	F
FINISHINGS		
FALSE CEILING	Chiefs booth, panelit	G
PAINT	water and oil-based	G
DOORS	wood and glass	G
FLOOR	ceramic and wood	G
WALLS	blocks and wood	G
ELECTRICAL INSTALLATIONS	Built-in and external	G
SANITARY INSTALLATONS	handwashing sink leaks, others good	F
EQUIPMENT	1 AC	G

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED: PORT CAPTAINCY, 178.44 m²

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	3 story building with form similar to boat	G
DISTRIBUTION OF ENVIRONMENT		
STRUCTURE	Structure of reinforced concrete	G
WALLS	Reinforced concrete	G
FORM AND STYLE	Modern	G
FINISHINGS		
FALSE CEILING	exterior panelit (m) and interior concrete slab (b)	
PAINT	water and oil-based	F
DOORS	wood and glass	G
FLOOR	terrazo	G
WALLS		
ELECTRICAL INSTALLATIONS	Built-in and external; repair work not yet finished No meter	F
SANITARY INSTALLATONS	4 bathrooms (B) and one clasurado	F
EQUIPMENT	3 A.C,	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:

PROJECT SUPERVISION

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Small building of only one bay with glass windows	F
DISTRIBUTION OF ENVIRONMENT	Consists of 3 offices	G
STRUCTURE	Wood structure	F
WALLS	Wood	F
FORM AND STYLE	Rectangular form	F
FINISHINGS		
FALSE CEILING	Panelit	G
PAINT	water-based	F
DOORS	metal	F
FLOOR	wood	F
WALLS	panelit (leaks)	F
ELECTRICAL INSTALLATIONS	Built-in	G
SANITARY INSTALLATONS	Good and clean (without contador)	G
EQUIPMENT	1 AC	VG

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:

TOLL BOOTH GATE 11

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS	Consists of 2 symmetric modules of booths on 2 levels	G
DISTRIBUTION OF ENVIRONMENT	Adjacent to the car yard	G
STRUCTURE	Structure of reinforced concrete, over the booths there is a galley of metal structure	G
WALLS	reinforced concrete	G
FORM AND STYLE	Modern style with redondia	G
FINISHINGS		
FALSE CEILING		
PAINT	oil-based	P
DOORS	wood	P
FLOOR	hard concrete and terrazo	F
WALLS	panelit (leaks water)	F
ELECTRICAL INSTALLATIONS	External with ducts	F
SANITARY INSTALLATONS	work well	G
EQUIPMENT	3 AC	G

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

DESCRIPTION OF PORT INSTALLATIONS

NAME OF ELEMENT TO BE ANALYZED:

OFFICE OF THE WEIGH SCALE

	DESCRIPTION	CONDITION
PHYSICAL CHARACTERISTICS		
DISTRIBUTION OF ENVIRONMENT	Lies below the same galley as gate 11 and in the same complex	F
STRUCTURE	Reinforced concrete	F
WALLS	Reinforced concrete	F
FORM AND STYLE	Rectangular	
FINISHINGS		
FALSE CEILING	the same slab	
PAINT	oil-based	P
DOORS	wood - windows bad	P
FLOOR	terrazo	F
WALLS	block	F
ELECTRICAL INSTALLATIONS	outlets are missing / cables without ducts	P
SANITARY INSTALLATONS		G
EQUIPMENT	1 AC	G

Abbreviations : **VG**:Very Good; **G**: Good **F**: Fair **P**: Poor

Table F5.10-8
Forecast Calculations
Soybean Meal/Animal Feed Stuff

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
267,927

Partner	Commodity Code	Commodity Description	Trade Value		NetWeight (kg)	
World	S3-081	ANIMAL FEED STUFF	59,770,080	100.00%	202,557,200	81.48%
USA	S3-081	ANIMAL FEED STUFF	39,675,290	69.37%	140,505,200	85.13%
Nigeria	S3-081	ANIMAL FEED STUFF	1,954,356	10.51%	21,285,000	12.80%
El Salvador	S3-081	ANIMAL FEED STUFF	2,505,537	5.72%	11,592,810	
Guatemala	S3-081	ANIMAL FEED STUFF	6,616,246	5.23%	10,595,800	
Nicaragua	S3-081	ANIMAL FEED STUFF	1,393,512	3.08%	6,239,415	
Panama	S3-081	ANIMAL FEED STUFF	1,437,532	1.48%	2,998,500	
Ecuador	S3-081	ANIMAL FEED STUFF	940,489	1.27%	2,563,250	
Costa Rica	S3-081	ANIMAL FEED STUFF	1,104,051	1.22%	2,469,929	
Peru	S3-081	ANIMAL FEED STUFF	1,327,045	1.00%	2,026,765	1.23%
Brazil	S3-081	ANIMAL FEED STUFF	465,151	0.61%	1,227,562	0.74%
Chile	S3-081	ANIMAL FEED STUFF	138,754	0.13%	256,906	
France	S3-081	ANIMAL FEED STUFF	370,695	0.12%	247,468	
Netherlands	S3-081	ANIMAL FEED STUFF	151,951	0.09%	183,698	
Canada	S3-081	ANIMAL FEED STUFF	122,700	0.06%	112,616	
Mexico	S3-081	ANIMAL FEED STUFF	207,960	0.04%	89,621	
Spain	S3-081	ANIMAL FEED STUFF	1,082,311	0.04%	72,246	
Colombia	S3-081	ANIMAL FEED STUFF	28,533	0.01%	20,937	
Argentina	S3-081	ANIMAL FEED STUFF	25,533	0.01%	20,578	
Uruguay	S3-081	ANIMAL FEED STUFF	97,755	0.01%	20,000	
Other Asia, nes	S3-081	ANIMAL FEED STUFF	28,104	0.01%	10,937	
Venezuela	S3-081	ANIMAL FEED STUFF	57,182	0.00%	10,125	
Madagascar	S3-081	ANIMAL FEED STUFF	9,630	0.00%	2,812	
Germany	S3-081	ANIMAL FEED STUFF	15,337	0.00%	2,062	
Italy	S3-081	ANIMAL FEED STUFF	12,399	0.00%	2,000	
Denmark	S3-081	ANIMAL FEED STUFF	1,479	0.00%	546	
Areas, nes	S3-081	ANIMAL FEED STUFF	546	0.00%	473	

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
US	OCL	C311D	0.522182	0.546666663	0.608802287	0.758472271	0.846062774	0.890498185	0.925638258	0.949789	1.093701	1
OCL	OCL	C311D	0.546841	2.579751195	0.748891652	0.647828269	0.672011691	0.691585633	0.824883896	0.969121	1.029834	1
PE	OCL	C311D	0.850868	0.47591015	0.781839066	0.372807839	0.459873957	0.441226456	0.828189106	0.843884	0.932762	1
NE	OCL	C311D	0.315373	0.381856426	1.106925193	1.410594538	1.578809568	1.150935764	0.526931305	0.927215	0.916932	1
SP	OCL	C311D	0.006515	0.003361043	0.010637702	0.054320061	0.324251048	0.542674046	0.504072464	0.804651	0.930914	1
CRB	OCL	C311D	0.025302	0.160823681	0.513770914	0.788241098	0.544221364	0.380827971	0.292479622	0.753076	0.931634	1
FR	OCL	C311D	0.008189	0.020234348	0.013973172	0.079014214	0.184771604	0.369287074	0.862947235	0.80411	0.955429	1
CL	OCL	C311D	0.266254	0.359537018	0.172315689	1.594897086	1.479585753	0.377624689	0.472048683	0.786195	0.874799	1
MX	OCL	C311D	0.013558	0.310793507	0.50067789	0.445862991	1.026701314	0.927804768	0.991262758	0.898241	0.940478	1
CA	OCL	C311D	0.013178	0	0.569000053	0.576880502	0.698065488	1.20381106	0.51892382	1.032602	0.922909	1
BE	OCL	C311D	0.047483	0.172580506	0.245963913	1.488647155	0.983812484	0.42286109	1.165026332	0.750799	0.927998	1
BZ	OCL	C311D	131.8061	4.57764134	509.923254	1.432079816	5.549501151	2.050652341	1.36812464	0.946534	0.899207	1
CH	OCL	C311D	0.348568	0	0.188371655	0	0.471070466	0.706558613	0.753675085	1.055126	0.926687	1
GF	OCL	C311D	27.78475	18.97457627	41.33898305	32.18983051	12.7220339	9.657627119	0.338983051	0.847458	0.925424	1
CO	OCL	C311D	2.151337	1.043052838	2.999347684	3.933463796	3.585779517	2.681017613	0.791258969	0.881931	0.958904	1
OWW	OCL	C311D	1.802589	0.27739251	0.970673786	27.68932039	2.079981507	1.202034212	20.94036061	0.416069	0.946371	1
VZ	OCL	C311D	0.001573	0.003080807	0.005423342	0.004371516	0.006200609	0.000531488	0.007284058	0.811657	0.946169	1
KO	OCL	C311D	0	0	0	0.637076999	1.127513487	0.490436488	0.882295243	0.818538	0.933301	1
AU	OCL	C311D	0.151515	1.135984848	0.946590909	0.75719697	0.719318182	0	0.378787879	0.757197	0.938636	1
WAF	OCL	C311D	0.058752	0.407445538	0.335118561	0.206159093	0	0	0.444572744	0.757894	0.943032	1
DE	OCL	C311D	0	9.216291161	3.118197574	3.152859619	0.866204506	0	0	1.004853	1.039861	1
IL	OCL	C311D	0	0	0	0	3.980088496	0	0	0.995575	1.035398	1
AR	OCL	C311D	1.0814	0	1.1432449	0.674086329	0	0	2.319147202	0.806282	0.922513	1
IT	OCL	C311D	0.437666	0	0.002085114	0	0	#VALUE!	0	1.042036	0.916554	1

OriginCode	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
US	1.026725	1.04906	1.071749	1.102143	1.130428	1.159626	1.188838	1.218643	1.248875	1.280155	1.313033
OCL	1.031079	1.058031	1.086192	1.120513	1.152399	1.18486	1.217093	1.249642	1.28259	1.316563	1.351899
PE	1.07318	1.133972	1.207797	1.279907	1.347787	1.418824	1.488624	1.557263	1.631023	1.707986	1.787545
NE	1.044496	1.088039	1.133551	1.185849	1.23448	1.280963	1.325432	1.368355	1.410783	1.452385	1.493977
SP	1.047424	1.086866	1.12498	1.173934	1.219924	1.265791	1.310919	1.355688	1.400205	1.44615	1.491793
CRB	1.027016	1.048267	1.075097	1.103462	1.127499	1.152595	1.17577	1.199326	1.222789	1.245959	1.270575
FR	1.052658	1.081578	1.108946	1.146304	1.178388	1.20926	1.238195	1.265987	1.29307	1.319855	1.344774
CL	1.055112	1.096814	1.147475	1.196515	1.243228	1.290984	1.336848	1.384203	1.433184	1.483558	1.535458
MX	1.059315	1.113396	1.174613	1.235472	1.291511	1.349132	1.407016	1.464488	1.523726	1.583023	1.644522
CA	1.031733	1.077882	1.129434	1.184703	1.23673	1.287518	1.337489	1.386511	1.43556	1.483686	1.531917
BE	1.049858	1.080722	1.110809	1.150306	1.185617	1.219805	1.250971	1.28231	1.312656	1.343003	1.373349
BZ	1.001023	1.015093	1.032745	1.059094	1.091839	1.126119	1.161167	1.198772	1.237657	1.2791	1.321054
CH	1.058728	1.111101	1.180268	1.252639	1.320109	1.390124	1.462495	1.538259	1.615624	1.694591	1.775254
GF	1.057627	1.098305	1.135593	1.183051	1.227119	1.269492	1.310169	1.350847	1.389831	1.430508	1.469492
CO	1.019569	1.055447	1.091324	1.125897	1.155251	1.185258	1.213307	1.240052	1.268102	1.295499	1.323549
OWW	1.031438	1.055479	1.088766	1.124364	1.153491	1.182154	1.209894	1.238095	1.265372	1.293111	1.320851
VZ	1.013906	1.047392	1.076854	1.102869	1.120587	1.139422	1.157819	1.173754	1.189881	1.207102	1.225684
KO	1.053948	1.105934	1.163806	1.218735	1.265817	1.312898	1.357038	1.400687	1.444335	1.487984	1.5282
AU	1.066667	1.101515	1.136742	1.182197	1.225	1.266288	1.304924	1.342045	1.379167	1.415909	1.45
WAF	1.034568	1.057066	1.085072	1.121876	1.154376	1.185686	1.216531	1.246764	1.275957	1.306695	1.337413
DE	1.020104	1.039168	1.058232	1.07799	1.09636	1.114731	1.133102	1.151127	1.169497	1.188582	1.206932
IL	1.030973	1.05531	1.079646	1.106195	1.132743	1.159292	1.183628	1.207965	1.232301	1.25885	1.285398
AR	1.037485	1.07017	1.108572	1.152863	1.195328	1.238323	1.282402	1.327344	1.372972	1.420999	1.469861
IT	1.038846	1.081528	1.124836	1.173878	1.21975	1.263684	1.305719	1.34713	1.387894	1.428032	1.466878

OriginCode	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	1.347524	1.383329	1.42043	1.458498	1.49816	1.539199	1.581842	1.625853	1.671407
OCL	1.388141	1.425487	1.463615	1.5024	1.542153	1.582781	1.624679	1.667303	1.711274
PE	1.88953	1.956078	2.045063	2.138696	2.230975	2.328585	2.430842	2.535713	2.644229
NE	1.533341	1.571841	1.609047	1.644401	1.678496	1.711288	1.743415	1.773412	1.803472
SP	1.537436	1.583275	1.62833	1.673217	1.718193	1.761607	1.803217	1.844104	1.885108
CRB	1.292789	1.315478	1.335577	1.355384	1.37471	1.39269	1.410189	1.426057	1.441248
FR	1.368547	1.390911	1.411493	1.430773	1.449691	1.468682	1.482795	1.49685	1.510886
CL	1.588877	1.644617	1.701466	1.759837	1.819357	1.879828	1.942205	2.004938	2.069091
MX	1.707566	1.77189	1.836836	1.902535	1.969551	2.037209	2.10577	2.175611	2.246865
CA	1.579938	1.627958	1.675531	1.722868	1.770096	1.816931	1.863687	1.910152	1.956855
BE	1.400673	1.42912	1.453984	1.478978	1.502935	1.5259	1.547268	1.566131	1.5837
BZ	1.364799	1.409823	1.456639	1.505244	1.556152	1.606084	1.662574	1.71911	1.778972
CH	1.858766	1.939031	2.022993	2.108556	2.195062	2.282228	2.371184	2.460893	2.550603
GF	1.505085	1.542373	1.576271	1.610169	1.642373	1.674576	1.70678	1.733898	1.764407
CO	1.350946	1.377691	1.403783	1.429224	1.454012	1.477495	1.500326	1.52381	1.546641
OWW	1.349052	1.377254	1.404993	1.43227	1.460006	1.486362	1.512714	1.539066	1.564956
VZ	1.243649	1.260749	1.276845	1.291234	1.304767	1.316736	1.327732	1.339087	1.349884
KO	1.567435	1.60667	1.643943	1.680726	1.716037	1.749877	1.783718	1.816577	1.848946
AU	1.481439	1.512121	1.539773	1.565909	1.590152	1.614015	1.636364	1.656818	1.676515
WAF	1.367196	1.397627	1.427476	1.457245	1.485212	1.513337	1.542217	1.568925	1.596784
DE	1.225303	1.243674	1.262392	1.280763	1.299133	1.317851	1.336568	1.355633	1.375043
IL	1.309735	1.338283	1.362832	1.389381	1.415929	1.442478	1.469027	1.497788	1.526549
AR	1.519704	1.570303	1.62164	1.673701	1.726869	1.779411	1.833408	1.886723	1.941931
IT	1.504452	1.540754	1.57643	1.610634	1.645218	1.677057	1.709544	1.739486	1.770054

C. Forecast Calculation by Trade Partner

267,927	World	S3-081	ANIMAL FEED S	59,770,080	100.00%	202,557,200	2004	2005	2006	2007	2008
	USA	S3-081	ANIMAL FEED S	39,675,290	69.37%	140,505	185,849	190,816	194,967	199,184	204,833
	Nigeria	S3-081	ANIMAL FEED S	1,954,356	10.51%	21,285	28,154	29,128	29,761	30,549	31,585
	El Salvador	S3-081	ANIMAL FEED S	2,505,537	5.72%	11,593	15,334	15,811	16,224	16,656	17,182
	Guatemala	S3-081	ANIMAL FEED S	6,616,246	5.23%	10,596	14,015	14,451	14,828	15,223	15,704
	Nicaragua	S3-081	ANIMAL FEED S	1,393,512	3.08%	6,239	8,253	8,510	8,732	8,964	9,248
	Panama	S3-081	ANIMAL FEED S	1,437,532	1.48%	2,999	3,966	4,073	4,158	4,264	4,377
	Ecuador	S3-081	ANIMAL FEED S	940,489	1.27%	2,563	0	0	0	0	0
	Costa Rica	S3-081	ANIMAL FEED S	1,104,051	1.22%	2,470	3,267	3,369	3,457	3,549	3,661
	Peru	S3-081	ANIMAL FEED S	1,327,045	1.00%	2,027	2,681	2,877	3,040	3,238	3,431
	Brazil	S3-081	ANIMAL FEED S	465,151	0.61%	1,228	1,624	1,625	1,648	1,677	1,720
			ANIMAL FEED STUFF				263,143	270,659	276,815	283,304	291,740
							4,764	4,920	5,032	5,150	5,303
							287,927	275,579	281,847	288,454	297,043

Partner	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
USA	210,089	215,516	220,945	226,484	232,103	237,916	244,026	250,437	257,091	263,986	271,061	278,432	286,059	293,984	302,164	310,630
Nigeria	32,500	33,382	34,250	35,102	35,923	36,789	37,654	38,492	39,349	40,189	41,027	41,815	42,607	43,420	44,172	44,956
El Salvador	17,671	18,169	18,663	19,162	19,667	20,190	20,730	21,286	21,859	22,443	23,038	23,647	24,270	24,913	25,567	26,241
Guatemala	16,151	16,606	17,058	17,514	17,976	18,453	18,947	19,455	19,978	20,513	21,056	21,613	22,183	22,770	23,367	23,964
Nicaragua	9,511	9,779	10,045	10,313	10,585	10,866	11,157	11,456	11,765	12,079	12,399	12,727	13,063	13,408	13,760	14,123
Panama	4,472	4,571	4,663	4,757	4,850	4,942	5,039	5,127	5,217	5,297	5,376	5,452	5,524	5,593	5,656	5,716
Ecuador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Costa Rica	3,765	3,871	3,976	4,083	4,190	4,302	4,417	4,535	4,657	4,782	4,908	5,038	5,171	5,308	5,447	5,591
Peru	3,613	3,804	3,985	4,175	4,373	4,579	4,792	5,012	5,244	5,483	5,728	5,981	6,243	6,517	6,798	7,069
Brazil	1,773	1,829	1,885	1,946	2,010	2,077	2,145	2,216	2,289	2,365	2,444	2,527	2,611	2,700	2,791	2,889
ANIMAL FEED STUFF	299,545	307,526	315,471	323,535	331,676	340,113	348,908	358,016	367,449	377,137	387,038	397,233	407,730	418,613	429,722	441,218
	5,445	5,590	5,735	5,881	6,029	6,183	6,343	6,508	6,680	6,856	7,036	7,221	7,412	7,610	7,812	8,021
	304,991	313,116	321,206	329,417	337,706	346,296	355,250	364,525	374,128	383,963	394,074	404,455	415,142	426,222	437,534	449,239

Table F5.10-9
Forecast Calculations
Corn

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
256,680

Partner	Commodity Code	Commodity Descr	Trade Value		NetWeight (kg)
World	S3-044	MAIZE UNMILLED	32,518,550	100.00%	224,922,100
USA	S3-044	MAIZE UNMILLED	30,708,590	99.37%	223,507,500
Guatemala	S3-044	MAIZE UNMILLED	674,283	0.25%	566,187
Mexico	S3-044	MAIZE UNMILLED	1,080,172	0.20%	455,562
Nicaragua	S3-044	MAIZE UNMILLED	39,134	0.14%	319,062
Argentina	S3-044	MAIZE UNMILLED	16,369	0.03%	73,855
Areas, nes	S3-044	MAIZE UNMILLED	3	0.00%	4

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	OCL	C1A	0.4964772	0.549301587	0.563248692	0.565176971	0.65437084	0.789025497	0.863634	0.904105	0.941205	1	1.033593	1.061433	1.09304	1.126276	1.15707	1.188561	1.220873	1.2537	1.287239	1.322459	1.359806	1.398888	1.439814	1.479987	1.521732	1.564941	1.609654	1.655683	1.702795	1.751416
CA	OCL	C1A	0.2554442	0.696651301	1.482867799	2.439518388	2.50070907	2.498990595	2.010237	1.115114	1.023861	1	1.039851	1.070938	1.108626	1.144687	1.176505	1.208653	1.242697	1.278113	1.31625	1.356275	1.404929	1.453327	1.501669	1.550127	1.598173	1.646948	1.695562	1.744443	1.793264	1.843235
AR	OCL	C1A	0	5.749779436	62.09248508	122.13554	48.5878118	34.63763138	43.50206	1.032034	1.103348	1	1.016448	1.05913	1.109235	1.1563	1.200291	1.245357	1.292853	1.341124	1.390867	1.444259	1.500883	1.558967	1.617794	1.677346	1.737216	1.797621	1.857532	1.917819	1.977162	2.037545
OCL	OCL	C1A	1.7619351	2.293742305	2.885481712	0.911145881	1.42505138	1.128567321	1.042323	1.012134	0.949144	1	1.03379	1.061581	1.093188	1.126284	1.155797	1.187941	1.219931	1.253433	1.285738	1.320808	1.358181	1.39706	1.436778	1.477525	1.518931	1.561617	1.605649	1.650879	1.697069	1.744706
SA	OCL	C1A	1.1289451	0	0.113202429	0.09495249	0.93463069	1.036068857	1.080431	1.028363	0.9523	1	1.028024	1.050624	1.076312	1.103012	1.127436	1.152278	1.17775	1.203659	1.230268	1.258462	1.288587	1.319942	1.352014	1.384881	1.418253	1.452682	1.488178	1.524651	1.561903	1.600373
FR	OCL	C1A	0.3128054	0.312802274	0	0.834139397	2.16500847	0.312802274	0	0.835808	1.103057	1	1.041921	1.069668	1.097816	1.131004	1.159825	1.187773	1.214847	1.241921	1.269068	1.299504	1.331004	1.362445	1.392139	1.42096	1.448908	1.475108	1.499564	1.523144	1.543231	1.565065
SP	OCL	C1A	1.6016189	0	1.863043144	0.64625471	2.41085603	0.545912482	0	0.814404	1.103345	1	1.031782	1.048796	1.064756	1.084619	1.101569	1.117119	1.132782	1.147681	1.162016	1.176859	1.191396	1.205396	1.218004	1.229124	1.238741	1.24737	1.254049	1.258394	1.260967	1.263205
MX	OCL	C1A	6.483279	16.07090808	36.5831484	7.297181313	1.32507559	9.066126987	13.73305	1.007217	1.103287	1	1.03004	1.049069	1.066615	1.087096	1.104165	1.119195	1.133327	1.145421	1.157417	1.169219	1.181215	1.191944	1.201697	1.20989	1.216522	1.222374	1.226763	1.229984	1.231347	1.232225
VZ	OCL	C1A	0.3243982	0	0.98924084	1.037903363	2.0109271	1.200102442	0	1.092197	1.069489	1	1.018952	1.047635	1.071197	1.094246	1.110978	1.127027	1.14393	1.159467	1.176029	1.193102	1.211712	1.22981	1.246713	1.262763	1.277446	1.292812	1.306812	1.3203	1.334984	1.349326
CL	OCL	C1A	0.4262652	0.426255862	0.414859975	0.753777195	0.47372819	0.024681158	0.144296	0.644607	0.905159	1	1.029239	1.05035	1.073198	1.096284	1.114679	1.13219	1.146723	1.16444	1.1797	1.193157	1.208123	1.22233	1.234865	1.245938	1.255567	1.264038	1.270591	1.275757	1.279175	1.281844
OEL	OCL	C1A	0	0	0	0.361770733	2.73427554	0	0	0.774012	1.001329	1	1.001329	1.024593	1.054836	1.079429	1.101031	1.122633	1.143902	1.165172	1.186109	1.208707	1.231971	1.254902	1.277169	1.298107	1.317714	1.33586	1.351945	1.3669	1.379529	1.391493
CO	OCL	C1A	0.5494127	0.549412852	0	0	0.76484535	0	0	0.743291	1.103352	1	1.005496	1.013256	1.020584	1.029973	1.027481	1.02802	1.02705	1.024787	1.02274	1.020907	1.019075	1.015734	1.011639	1.006143	0.999246	0.991271	0.981595	0.971549	0.960341	0.948809
IT	OCL	C1A	0	0.439662136	2.28470904	1.849138618	2.31964999	0	0.000514	1.042341	1.103268	1	1.047196	1.081755	1.11635	1.156453	1.193974	1.230292	1.266069	1.301373	1.335967	1.371177	1.407398	1.442682	1.476761	1.508773	1.539242	1.569186	1.596363	1.622201	1.644573	1.66678
VT	OCL	C1A	0	0	0	2.760781618	1.52878899	0	0	1.072393	1.103281	1	1.04054	1.075289	1.118724	1.161196	1.197876	1.238416	1.278956	1.321427	1.355211	1.392857	1.432431	1.469111	1.506756	1.542471	1.574322	1.605212	1.6361	1.665056	1.691119	1.71525
JA	OCL	C1A	0	0	0	0	4.04165196	0	0	1.010413	0.951465	1	1.032827	1.059831	1.090364	1.122306	1.151763	1.181963	1.212849	1.244264	1.276385	1.310272	1.346453	1.384045	1.42252	1.461878	1.501941	1.54324	1.585775	1.629545	1.674197	1.720261
NZ	OCL	C1A	0	0	0	0	4.04359761	0	0	1.010899	0.949136	1	1.033748	1.06144	1.092927	1.125949	1.156306	1.187308	1.219199	1.251494	1.284676	1.319635	1.356774	1.395527	1.435007	1.475537	1.516793	1.55926	1.60302	1.64807	1.694009	1.741402

C. Forecast Calculation by Trade Partner

256,680	World	S3-044	MAIZE UNMILLED	32,518,550	100.00%	224,922	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024				
	USA	S3-044	MAIZE UNMILLED	30,708,590	99.37%	223,508	257,053	265,888	272,845	280,969	289,513	297,429	305,523	313,829	322,267	330,889	339,942	349,565	359,589	369,852	380,409	391,166	402,273	413,767	425,599	437,709	450,207				
	Guatemala	S3-044	MAIZE UNMILLED	674,283	0.25%	566	651	673	691	712	733	753	774	794	816	837	860	884	910	936	962	989	1,017	1,046	1,075	1,105	1,136				
	Mexico	S3-044	MAIZE UNMILLED	1,080,172	0.20%	456	524	540	550	559	570	579	586	594	600	606	613	619	625	630	634	637	640	643	644	645	646				
	Nicaragua	S3-044	MAIZE UNMILLED	39,134	0.14%	319	367	379	390	401	413	424	436	448	460	472	485	498	513	527	542	557	573	589	608	623	640				
	Argentina	S3-044	MAIZE UNMILLED	16,369	0.03%	74	85	87	90	94	98	102	106	110	114	118	123	127	132	137	142	148	153	158	163	168	173				
	Areas, nes	S3-044	MAIZE UNMILLED	3	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
						224,922	256,680	267,367	274,565	282,735	291,327	299,287	307,425	315,775	324,257	332,922	342,022	351,695	361,768	372,082	382,690	393,497	404,656	416,202	428,087	440,250	452,802				

Table F5.10-10
Forecast Calculation
Fertilizer

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
230,868

Partner	Commodity Code	Commodity Description	Trade Value		NetWeight (kg)
World	S3-562	FERTILIZER,EXCEPT GRP272	43,277,090	100.00%	231,745,500
USA	S3-562	FERTILIZER,EXCEPT GRP272	14,929,460	39.16%	90,761,560
Canada	S3-562	FERTILIZER,EXCEPT GRP272	4,146,291	13.76%	31,882,080
Russian Federation	S3-562	FERTILIZER,EXCEPT GRP272	6,789,156	13.35%	30,934,890
Ukraine	S3-562	FERTILIZER,EXCEPT GRP272	4,276,855	11.78%	27,292,880
Belgium	S3-562	FERTILIZER,EXCEPT GRP272	3,109,898	4.48%	10,378,580
Latvia	S3-562	FERTILIZER,EXCEPT GRP272	1,274,994	3.50%	8,100,000
Trinidad and Tobago	S3-562	FERTILIZER,EXCEPT GRP272	1,251,398	2.63%	6,092,792
Estonia	S3-562	FERTILIZER,EXCEPT GRP272	731,110	2.46%	5,711,800
Guatemala	S3-562	FERTILIZER,EXCEPT GRP272	758,239	1.95%	4,519,237
Chile	S3-562	FERTILIZER,EXCEPT GRP272	1,149,921	1.62%	3,762,736
France	S3-562	FERTILIZER,EXCEPT GRP272	600,968	0.98%	2,270,875
Germany	S3-562	FERTILIZER,EXCEPT GRP272	594,060	0.87%	2,025,848
El Salvador	S3-562	FERTILIZER,EXCEPT GRP272	392,301	0.79%	1,827,750
Dominican Rep.	S3-562	FERTILIZER,EXCEPT GRP272	502,724	0.60%	1,402,000
Mexico	S3-562	FERTILIZER,EXCEPT GRP272	959,308	0.50%	1,168,440
South Africa	S3-562	FERTILIZER,EXCEPT GRP272	236,544	0.34%	778,625
Norway	S3-562	FERTILIZER,EXCEPT GRP272	122,159	0.22%	516,687
Denmark	S3-562	FERTILIZER,EXCEPT GRP272	133,715	0.17%	383,943
Israel	S3-562	FERTILIZER,EXCEPT GRP272	468,567	0.12%	272,870
Netherlands	S3-562	FERTILIZER,EXCEPT GRP272	70,830	0.12%	272,280
Japan	S3-562	FERTILIZER,EXCEPT GRP272	48,454	0.10%	225,749
Brazil	S3-562	FERTILIZER,EXCEPT GRP272	93,399	0.09%	207,433
Jamaica	S3-562	FERTILIZER,EXCEPT GRP272	38,233	0.08%	192,601
China	S3-562	FERTILIZER,EXCEPT GRP272	47,921	0.08%	180,276
Spain	S3-562	FERTILIZER,EXCEPT GRP272	234,792	0.06%	145,609
Turkey	S3-562	FERTILIZER,EXCEPT GRP272	18,628	0.04%	90,300
Peru	S3-562	FERTILIZER,EXCEPT GRP272	18,636	0.03%	79,046
Colombia	S3-562	FERTILIZER,EXCEPT GRP272	41,537	0.02%	50,218
Switzerland	S3-562	FERTILIZER,EXCEPT GRP272	14,691	0.02%	50,000
Nicaragua	S3-562	FERTILIZER,EXCEPT GRP272	9,814	0.02%	36,991
Italy	S3-562	FERTILIZER,EXCEPT GRP272	75,184	0.01%	28,316
Saint Lucia	S3-562	FERTILIZER,EXCEPT GRP272	5,250	0.01%	25,500
Iceland	S3-562	FERTILIZER,EXCEPT GRP272	7,139	0.01%	21,085
Finland	S3-562	FERTILIZER,EXCEPT GRP272	3,388	0.01%	20,000
Panama	S3-562	FERTILIZER,EXCEPT GRP272	104,161	0.01%	17,062
Costa Rica	S3-562	FERTILIZER,EXCEPT GRP272	19,308	0.00%	10,448
Areas, nes	S3-562	FERTILIZER,EXCEPT GRP272	48	0.00%	7

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
RU	OCL	C3512	0.039362828	0.039362828	0.112510698	0	27.02%	1	0.799664	0.905885	1.001777	1	1.005996	1.002801	1.001193	1.001734	0.998318	0.995456	0.989723	0.983276	0.978475	0.967918	0.959747	0.950273	0.941228	0.931155	0.920867	0.910127	0.900844	0.890451	0.879096	0.867361
BE	OCL	C3512	0.785436188	0.375702993	0.719163457	1	78.38%	1	0.391701	0.857916	1.01229	1	1.007453	0.997424	0.986337	0.986038	0.98161	0.974737	0.966017	0.956455	0.944976	0.934022	0.922298	0.909817	0.896172	0.881841	0.866654	0.851133	0.833874	0.815781	0.796133	0.777147
CA	OCL	C3512	0.763149717	0.907642608	1.24761948	1	101.00%	1	1.235185	1.215598	0.982765	1	1.018978	1.029282	1.044294	1.061108	1.072431	1.083997	1.095228	1.104997	1.113189	1.11465	1.118254	1.122057	1.123613	1.123415	1.122389	1.118942	1.114416	1.10722	1.099425	1.090071
OCL	OCL	C3512	0.498514915	2.903998132	0.590282724	1	72.74%	1	0.62463	0.958673	1.011603	1	0.995246	0.985633	0.97702	0.970787	0.962255	0.953397	0.943647	0.933412	0.922435	0.910814	0.8996	0.887818	0.875903	0.863674	0.851118	0.838142	0.825048	0.811268	0.797072	0.782986
VZ	OCL	C3512	0.942798029	0.041812294	0.625420743	2	150.58%	2	0.463668	1.126436	1.031383	1	0.969332	0.940923	0.915565	0.888997	0.861056	0.834034	0.808867	0.779873	0.753133	0.725878	0.700769	0.676443	0.652291	0.62868	0.605547	0.582843	0.560123	0.537848	0.515591	0.494186
NE	OCL	C3512	6.374263987	19.49114251	12.60001756	5	138.41%	3	0.923822	0.763133	0.975234	1	1.015125	1.011925	1.007496	1.009631	1.009413	1.006384	1.000948	0.994205	0.986417	0.976264	0.966751	0.955918	0.943565	0.930298	0.91533	0.899909	0.882899	0.864341	0.844438	0.824638
CO	OCL	C3512	0.581994332	0.750724487	0.684622026	1	64.65%	1	0.452822	0.937623	0.999999	1	0.965945	0.915055	0.874728	0.836176	0.799268	0.764443	0.729994	0.696409	0.664332	0.633862	0.605039	0.577005	0.550201	0.524618	0.499918	0.476135	0.453465	0.431233	0.409899	0.389516
CSW	OCL	C3512	0	0	1.02410338	4	276.21%	1	8.45549	0.903828	1.007305	1	1.008758	1.01507	1.019808	1.030008	1.036957	1.043737	1.047689	1.051648	1.054735	1.056109	1.059088	1.060257	1.062948	1.064288	1.065752	1.066617	1.067768	1.068078	1.067519	1.06663
GF	OCL	C3512	10.16644152	17.75467336	18.0285015	4	147.76%	9	4.141786	0.843119	0.937723	1	1.007537	1.003338	0.997924	0.98721	0.98299	0.986794	0.978334	0.968789	0.957126	0.944864	0.932461	0.918555	0.904066	0.888335	0.87178	0.854687	0.83661	0.817233	0.796771	0.77644
CRB	OCL	C3512	3.027829782	0.832681556	0.830032544	1	75.72%	1	1.201408	1.111983	0.948536	1	0.9987	0.994599	0.992208	0.988953	0.980746	0.972469	0.963441	0.953486	0.942032	0.92591	0.911743	0.897684	0.88207	0.865511	0.848593	0.830421	0.811764	0.791556	0.771359	0.750614
JA	OCL	C3512	1.882061895	0.893891836	0.01498493	1	156.89%	1	0.008334	0.967199	1.019868	1	0.998229	0.986788	0.985551	0.986074	0.982324	0.978845	0.975323	0.971581	0.965866	0.957228	0.948423	0.939196	0.929639	0.919933	0.909699	0.898488	0.887373	0.875346	0.863583	0.851816
PO	OCL	C3512	0.482059018	1.114431656	3.76509651	1	90.60%	0	0.393207	0.629304	0.995216	1	1.026567	1.039087	1.053408	1.075785	1.096718	1.115079	1.131901	1.147942	1.162233	1.176973	1.191569	1.205384	1.217589	1.228504	1.239947	1.249864	1.257007	1.263203	1.266236	1.269771
US	OCL	C3512	0.958587857	1.096178294	1.121374989	1	109.55%	1	1.130494	0.867309	1.13197	1	0.967398	0.981808	0.971165	0.966001	0.958408	0.952141	0.947061	0.941944	0.936417	0.930132	0.924517	0.919262	0.914651	0.910203	0.905828	0.901294	0.896789	0.892351	0.887864	0.883239
CL	OCL	C3512	0.062815933	1.387612051	0.43189324	2	68.73%	1	1.113567	0.870877	0.909468	1	1.022855	1.041891	1.054761	1.066441	1.075521	1.084706	1.091195	1.095483	1.098471	1.101785	1.105519	1.108374	1.110898	1.112842	1.113828	1.113732	1.112858	1.110098	1.106305	1.101839
SP	OCL	C3512	0.056973474	0.101601322	0.171710876	0	57.02%	11	0.872539	0.811568	1.025842	1	1.015946	1.019214	1.018069	1.021881	1.022378	1.021312	1.017684	1.012817	1.005837	0.998921	0.99129	0.98284	0.972866	0.962080	0.950217	0.937524	0.923356	0.906742	0.889291	0.87149
CH	OCL	C3512	0.144051784	0.152555431	0.20989094	1	45.95%	0	0.456476	0.542363	1.120617	1	1.0292	1.026827	1.044251	1.06135	1.071636	1.081783	1.090377	1.098948	1.103326	1.104316	1.102474	1.09496	1.065628	1.075143	1.063201	1.049694	1.033542	1.016832	0.999556	0.981892
MX	OCL	C3512	6.007827789	40.30088986	42.87237751	48	405.95%	6	4.489237	3.714876	1.148248	1	1.005059	1.005908	1.012702	1.009046	1.002511	0.995938	0.985637	0.972234	0.957981	0.94155	0.920942	0.909648	0.892036	0.873648	0.854337	0.834435	0.813499	0.79105	0.768563	0.745929
IS	OCL	C3512	0.424959947	0.384998702	0.39997644	1	66.42%	0	0.828734	0.907834	0.994228	1	0.998714	0.992176	0.984031	0.975434	0.961519	0.945524	0.929628	0.910777	0.891843	0.873047	0.853904	0.834389	0.814777	0.79468	0.774371	0.753899	0.732506	0.710576	0.688048	0.665788
SZ	OCL	C3512	1.571601217	1.983110829	1.760551134	3	242.67%	10	5.044813	1.076851	1.025951	1	1.005886	1.00729	1.008361	1.00729	1.005752	1.003612	1.000401	0.996589	0.993044	0.988897	0.984014	0.978262	0.97231	0.965755	0.958665	0.951241	0.943215	0.934319	0.925158	0.915858
UK	OCL	C3512	2.454143273	1.845444091	1.751680691	1	162.35%	1	1.150714	1.065076	1.025178	1	1.018817	1.00943	1.006616	1.012514	1.017101	1.01886	1.0184	1.01683	1.012636	1.006805	1.001681	0.99563	0.988243	0.979774	0.968558	0.958087	0.945424	0.929514	0.912968	0.897112
OWW	OCL	C3512	24.375	142.1743207	136.5842391	42	20896.74%	6	403.288	5.923913	0.997011	1	0.997011	0.97269	0.968576	0.969565	0.966576	0.963451	0.957473	0.94837	0.936141	0.927038	0.914946	0.905707	0.893614	0.881386	0.872283	0.857085	0.844973	0.83288	0.820652	0.80866
TW	OCL	C3512	0.780608053	1.202659296	0.498618062	1	78.81%	1	0.60133	0.954919	1.000056	1	1.007395	0.988085	0.987787	0.984145	0.97604	0.968402	0.958075	0.947468	0.93602	0.922555	0.908325	0.893628	0.879099	0.864234	0.848528	0.831964	0.815119	0.797546	0.78001	0.762251
BZ	OCL	C3512	0.18069367	0.218500364	0.203736144	0	38.44%	0	0.486296	0.771283	0.884696	1	1.002801	1.014492	1.035957	1.047247	1.054341	1.05962	1.06283	1.064189	1.064819	1.065304	1.066699	1.066764	1.065474	1.063437	1.06032	1.056306	1.051734	1.045871	1.038819	1.03147
IT	OCL	C3512	0.586590274	0.670554532	0.637748402	1	119.02%	1	1.504092	0.879715	1.037992	1	1.002012	0.993725	0.981311	0.973808	0.96269	0.949628	0.933327	0.916104	0.897926	0.880499	0.863174	0.845406	0.82699	0.808574	0.789714	0.770786	0.751279	0.731737	0.711309	0.691767
FN	OCL	C3512	0.890638188	1.406338817	49.49229179	3	299.55%	3	1.520799	1.013866	1.103264	1	1.007407	0.998277	0.987081	0.976899	0.968478	0.957713	0.945224	0.932219	0.91887	0.905521	0.891224	0.876583	0.862286	0.846783	0.831195	0.815261	0.798361	0.780725	0.762553	0.74438
ID	OCL	C3512	0.240977518	0.053865563	0.028350298	0	4.82%	1	0.677572	0.876024	0.928132	1	1.017747	1.025989	1.040002	1.055368	1.066425	1.075525	1.083832	1.087914	1.086525	1.088453	1.090437	1.087177	1.087829	1.087829	1.087887	1.076092	1.078218	1.079069	1.078182	1.079523
SA	OCL	C3512	1.416477834	2.332365634	2.136582581	1	82.78%	1	0.943939	0.944802	0.954767	1	0.992936	0.979802	0.971675	0.96222	0.94947	0.936014	0.920675	0.903923	0.886073	0.867987	0.848803	0.829659	0.811181	0.791644	0.772774	0.753433	0.733778	0.713892	0.693017	0.672617
FR	OCL	C3512	1.423851078	1.36784611	0.469744259	1	60.19%	0	0.257429	0.757795	1.075034	1	1.014475	1.004554	0.997755	0.995892	0.991624	0.983439	0.973088	0.96132	0.947896	0.934249	0.919424	0.903730	0.886222	0.868372	0.849279	0.830361	0.808481	0.78649	0.762604	0.740119
PE	OCL	C3512	0	1.164	1.706666667	3	172.80%	1	1.493333	1.034687	0.976107	1	0.998933	0.996587	0.995093	0.990507	0.985067	0.979093	0.971733	0.964053	0.956373	0.948373	0.93984	0.93088	0.921813	0.912427	0.902813	0.892587	0.88224	0.87136	0.860373	0.84928
AR	OCL	C3512	1.315265721	1.135295363	0.711412238	5	157.21%	2	1.228245	0.880373	1.001694	1	0.989625	0.97925	0.969934	0.958501	0.946856	0.934999	0.92293	0.910862	0.899005	0.88738	0.875291	0.863223	0.851386	0.839297	0.827228	0.81516	0.803091	0.790599	0.778107	0.765827
MA	OCL	C3512	0	0	5.196487713	0	0.00%	2	0	0.803403	0.948016	1	0.978843	0.943289	0.923913	0.904537	0.879017	0.854442	0.829395	0.803875	0.777863	0.751418	0.725425	0.699433	0.673913	0.648393	0.622873	0.597826	0.572306	0.547259	0.522684	0.498582
NO	OCL	C3512	0.037188546	14.13127557	0	1	148.75%	2	0	1.067311	1.050206	1	0.985498	0.971737	0.956861	0.939011	0.922848	0.905189	0.888062	0.870956	0.853477	0.83637	0.820007	0.803844	0.787282	0.770919	0.755299	0.738936	0.723689	0.70807	0.692451	0.677203
OWL	OCL	C3512	0	0.046860356	0.062480475	1	110.90%	0	0.968447	0.781006	0.921587	1	0.975164	0.960637	0.945173	0.927523	0.907998	0.888941	0.868322	0.846923	0.825367	0.803187	0.78288	0.762418	0.741487	0.719931	0.698376	0.676684	0.655254	0.633396	0.611996	0.590597
SG	OCL	C3512	57.18390805	161.882069	57.32183908	53	12735.63%	21	12.84368	1.140425	0.954023	1	1	1	1	1	1	1	1	1	0.988506	0.988506	0.988506	0.988506	0.988506	0.988506	0.977011	0.977011	0.977011	0.977011	0.977011	0.965517
KO	OCL	C3512	0.476190476	0.408163285	0.544217687	1	108.84%	1	1.156463	1.020408	0.948299	1	1.009524	1.019728	1.027891	1.034694	1.041497	1.047619	1.053061	1.057823	1.063265	1.068027	1.072789	1.077551	1.081633	1.085714	1.089116	1.091837	1.094558	1.096599	1.098639	1.1
OWE	OCL	C3512	0.03548616	0.425833925	108.5876608	1	81.62%	0	1.312988	0.965224	1.021647	1	0.996097	0.986515	0.977644	0.971966	0.964159	0.955642	0.948416	0.93648	0.926189	0.914833	0.903633	0.892477	0.880767	0.869056	0.856636	0.844216	0.831086	0.817601	0.803762	0.789922
AU	OCL	C3512	0	0	0	0	168.27%	2	0	0.882212	1.004808	1	0.980769	0.961538	0.939904	0.920673	0.899038	0.877404	0.858173	0.838942	0.817308	0.798077	0.778846	0.759615	0.742788	0.723558	0.704327	0.6875	0.670673	0.651442	0.634615	0.617788
OID	OCL	C3512	0.640542577	0	0	4	0.00%	0	0	0.970234	1.007159	1	0.995102	0.984928	0.975509	0.968726	0.959307	0.949887	0.939714	0.928787	0.917106	0.905049	0.892992	0.880558	0.868124	0.855313	0.842125	0.828561	0.814996	0.800678	0.785607	0.771289
RO	OCL	C3512	2.688453145	0.837049453	0.317688731	0	0.00%	0	0	0.724775	0.967596	1	1.020324	1.031686	1.037414	1.051473	1.061236	1.069958	1.072753	1.074221	1.075944	1.076891	1.078411	1.079217	1.078603	1.076948	1.074524	1.072172	1.069126	1.06619	1.060039	1.055062
OPG	OCL	C3512	0	0	0	4	0.00%	0	0	0.973581	1.028733	1	1.006867	1.010073	1.014279	1.017836	1.020173	1.022146	1.023066	1.023417	1.023427	1.023061	1.022246	1.020561	1.018632	1.016138	1.012942	1.008977	1.004443	0.998729	0.992261	0.985631
CSE	OCL	C3512	0	0	0	4	0.00%	0	0	0.969828	1.015086	1	0.99569	0.987069	0.978448	0.971983	0.963362	0.954741	0.946121	0.935345	0.924569	0.911638	0.900862	0.890086	0.877155	0.866379	0.853448	0.840517	0.827586	0.8125	0.799569	0.784483
ONF	OCL	C3512	0	0	3.060606663	1	0.00%	0	0	0.917145	1.015573	1	1.00084	0.995976	0.992135	0.992094	0.989119	0.984614	0.978689	0.972031	0.964173	0.956219	0.948456	0.939887	0.930517	0.921023	0.910942	0.900508	0.889036	0.876978	0.863716	0.851133
PG	OCL	C3512	0	0	0	0	353.85%	0	0	0.884625	1.006479	1	0.993438	0.964889	0.948916	0.947213	0.944597	0.934588	0.927361	0.915972	0.906256	0.899161	0.890015	0.882175	0.869881	0.860183	0.849323	0.838816	0.82104	0.808331	0.78877	0.774774
IL	OCL	C3512	0.657894737	0	0.657894737	2	197.37%	0	0	0.986842	1.019737	1	0.993421	0.986842	0.980263	0.973684	0.960526	0.953947	0.940789	0.934211	0.921053	0.914474	0.901316	0.888158	0.875	0.861842	0.855263	0.842105	0.828947	0.815789	0.796053	0.782895
GR	OCL	C3512	0	0	2.008361077	0	377.56%	0	0	0.943902	1.015244	1	0.989633	0.973781	0.957926	0.943902	0.926218	0.907926	0.887803	0.866463	0.844512	0.821951	0.780380	0.776218	0.753658	0.730486	0.707318	0.684755	0.661584	0.638415	0.615244	0.592073
AT	OCL	C3512	0	0	0	4	0.00%	0	0	0.914032	1.006917	1	1.016708	1.029044	1.044488	1.061258	1.077075	1.092885	1.107708	1.12253	1.138364	1.151186	1.166008	1.18083	1.195652	1.211462	1.226285	1.242086	1.257905	1.272727	1.287549	1.30336

C. Forecast Calculation by Trade Partner

230,868	World	S3-562	FERTILIZER,EXCE	43,277,090	1	231,746	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	USA	S3-562	FERTILIZER,EXCE	14,929,460	0.391643247	90,762	90,418	89,278	88,773	87,811	87,344	86,657	86,091	85,631	85,169	84,669	84,101	83,593	83,118	82,701	82,299	81,903	81,493	81,086	80,684	80,281	79,861
	Canada	S3-562	FERTILIZER,EXCE	4,146,291	0.137573676	31,882	31,761	32,384	32,691	33,166	33,702	34,062	34,429	34,786	35,096	35,356	35,403	35,517	35,638	35,687	35,681	35,649	35,539	35,395	35,167	34,919	34,622
	Russian Fe	S3-562	FERTILIZER,EXCE	6,789,156	0.133486475	30,935	30,818	31,002	30,907	30,855	30,871	30,797	30,678	30,501	30,302	30,093	29,829	29,577	29,285	29,007	28,696	28,379	28,048	27,762	27,442	27,092	26,730
	Ukraine	S3-562	FERTILIZER,EXCE	4,276,855	0.117770917	27,293	27,190	27,456	27,626	27,728	28,005	28,104	28,379	28,488	28,594	28,678	28,715	28,796	28,828	28,901	28,937	28,977	28,998	29,032	29,041	29,025	29,001
	Belgium	S3-562	FERTILIZER,EXCE	3,109,898	0.044784386	10,379	10,339	10,416	10,313	10,219	10,195	10,149	10,078	9,988	9,869	9,770	9,667	9,536	9,407	9,266	9,118	8,961	8,800	8,622	8,435	8,231	8,036
	Latvia	S3-562	FERTILIZER,EXCE	1,274,994	0.034952135	8,100	8,069	8,118	8,093	8,079	8,083	8,054	8,033	7,986	7,934	7,879	7,810	7,745	7,668	7,595	7,514	7,431	7,344	7,269	7,185	7,094	6,999
	Trinidad ar	S3-562	FERTILIZER,EXCE	1,251,398	0.026290875	6,093	6,070	6,062	6,037	6,022	6,003	5,953	5,903	5,848	5,787	5,718	5,620	5,534	5,449	5,354	5,253	5,151	5,040	4,927	4,805	4,682	4,556
	Estonia	S3-562	FERTILIZER,EXCE	731,110	0.024646865	5,712	5,690	5,690	5,690	5,660	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690	5,690
	Guatemala	S3-562	FERTILIZER,EXCE	758,239	0.019509662	4,519	4,502	4,481	4,437	4,399	4,371	4,332	4,292	4,248	4,202	4,153	4,101	4,050	3,997	3,943	3,888	3,832	3,773	3,714	3,652	3,589	3,525
	Chile	S3-562	FERTILIZER,EXCE	1,149,921	0.016236501	3,763	3,748	3,834	3,906	3,954	3,998	4,032	4,066	4,090	4,106	4,116	4,130	4,144	4,155	4,164	4,171	4,175	4,175	4,172	4,161	4,147	4,130
	France	S3-562	FERTILIZER,EXCE	600,968	0.009799004	2,271	2,262	2,295	2,273	2,257	2,253	2,243	2,225	2,201	2,175	2,144	2,114	2,080	2,045	2,005	1,964	1,921	1,879	1,829	1,779	1,725	1,674
	Germany	S3-562	FERTILIZER,EXCE	594,060	0.008741693	2,026	2,018	2,033	2,025	2,014	2,013	2,004	1,992	1,974	1,955	1,932	1,907	1,882	1,854	1,825	1,793	1,759	1,725	1,688	1,649	1,608	1,567
	El Salvador	S3-562	FERTILIZER,EXCE	392,301	0.007888885	1,828	1,821	1,812	1,795	1,779	1,768	1,752	1,736	1,718	1,700	1,680	1,658	1,638	1,617	1,595	1,573	1,550	1,526	1,502	1,477	1,451	1,426
	Dominican	S3-562	FERTILIZER,EXCE	502,724	0.00604974	1,402	1,397	1,395	1,389	1,386	1,381	1,370	1,358	1,346	1,332	1,316	1,293	1,273	1,254	1,232	1,209	1,185	1,160	1,134	1,106	1,077	1,048
	Mexico	S3-562	FERTILIZER,EXCE	959,308	0.00504191	1,168	1,164	1,170	1,171	1,179	1,175	1,167	1,159	1,147	1,132	1,115	1,096	1,078	1,059	1,038	1,017	994	971	947	921	895	868
	South Afric	S3-562	FERTILIZER,EXCE	236,544	0.003359828	779	776	770	760	754	746	736	726	714	701	687	673	658	644	629	614	599	584	569	554	538	522
	Norway	S3-562	FERTILIZER,EXCE	122,159	0.002229545	517	515	507	500	493	483	475	466	457	448	439	431	422	414	405	397	389	380	373	364	356	349
						2,319	228,558	228,683	228,386	227,785	228,081	227,678	227,300	226,814	226,213	225,437	224,228	223,214	222,119	221,038	219,815	218,546	217,127	215,711	214,112	212,400	210,804
						231,746	2,310	2,311	2,308	2,302	2,305	2,301	2,297	2,292	2,286	2,278	2,266	2,256	2,245	2,234	2,222	2,209	2,194	2,180	2,164	2,147	2,128
							230,868	230,995	230,694	230,088	230,386	229,979	229,597	229,105	228,499	227,716	226,494	225,470	224,364	223,271	222,036	220,754	219,321	217,892	216,278	214,547	212,732

Table F5.10-11
Forecast Calculation
Wheat

A. 2003 UN Honduras Trade Data

Port of Cortes 2004	Partner	Commodity Code	Commodity Di	Trade Value		NetWeight (kg)
182,616	World	S3-041	WHEAT, MES	27,185,990	100.00%	147,638,400
	USA	S3-041	WHEAT, MES	27,139,790	99.99%	147,629,900
	Germany	S3-041	WHEAT, MES	29,800	0.00%	5,437
	Netherland	S3-041	WHEAT, MES	16,300	0.00%	2,937
	Areas, nes	S3-041	WHEAT, MES	66	0.00%	118

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	OCL	C1A	0.496477	0.549301587	0.583248692	0.555176971	0.65437084	0.789025497	0.863634	0.904105	0.941205	1	1.033593	1.061433	1.09304	1.126276	1.15707	1.188561	1.220873	1.2537	1.287239	1.322459	1.358896	1.398888	1.438814	1.479887	1.521732	1.564941	1.609654	1.655683	1.702795	1.751416
CA	OCL	C1A	0.255444	0.696651301	1.482867799	2.439518388	2.50070907	2.496990595	2.010237	1.115114	1.023681	1	1.039851	1.070938	1.108626	1.144887	1.176505	1.208553	1.242697	1.278113	1.31625	1.356275	1.404929	1.453327	1.501669	1.550127	1.598173	1.646948	1.695562	1.744443	1.793264	1.843235
AR	OCL	C1A	0	5.749776436	62.09248506	122.135541	48.5878118	34.63763136	43.60206	1.032034	1.103346	1	1.018448	1.05913	1.109235	1.1563	1.200291	1.245357	1.292653	1.341124	1.390867	1.444259	1.500883	1.558967	1.617794	1.677346	1.737216	1.797621	1.857532	1.917819	1.977162	2.037546
OCL	OCL	C1A	1.761935	2.293742305	2.885461712	0.911145681	1.42505138	1.128567321	1.042323	1.012134	0.949144	1	1.03379	1.061581	1.093188	1.126284	1.156797	1.187941	1.219931	1.252433	1.285738	1.320808	1.358181	1.39706	1.436778	1.477525	1.518931	1.561617	1.605649	1.650879	1.697069	1.744705
SA	OCL	C1A	1.126945	0	0.113202429	0.09495249	0.93463069	1.036068857	1.089431	1.028363	0.9523	1	1.029024	1.060624	1.093312	1.103012	1.127438	1.152278	1.17775	1.203659	1.230288	1.258462	1.288587	1.319942	1.352014	1.384881	1.418253	1.452682	1.488178	1.524651	1.561903	1.600373
FR	OCL	C1A	0.312805	0.312802274	0	0.834139387	2.16500647	0.312802274	0	0.835808	1.103057	1	1.041921	1.069868	1.097816	1.131004	1.159625	1.187773	1.214847	1.241921	1.269866	1.299564	1.331004	1.362445	1.392139	1.42096	1.448908	1.475108	1.499564	1.523144	1.543231	1.585065
SP	OCL	C1A	1.601619	0	1.863043144	0.84625471	2.41065903	0.545912482	0	0.914404	1.103345	1	1.031762	1.048796	1.064758	1.084619	1.101569	1.117119	1.132762	1.147651	1.162016	1.176859	1.191398	1.205395	1.218004	1.229124	1.239741	1.24737	1.254049	1.258394	1.260967	1.263205
MX	OCL	C1A	6.463279	16.07090608	36.5831454	7.297181313	1.32507559	9.066126987	13.73305	1.067217	1.103287	1	1.03004	1.049059	1.066615	1.087096	1.104165	1.119185	1.133327	1.145421	1.157417	1.169219	1.181215	1.191944	1.201697	1.20989	1.216522	1.222374	1.226763	1.229884	1.231347	1.232225
VZ	OCL	C1A	0.324398	0	0.98924364	1.037903363	2.0109271	1.200102442	0	1.092197	1.069489	1	1.018862	1.047635	1.071197	1.094246	1.110976	1.127027	1.14363	1.159467	1.176029	1.193102	1.211712	1.22981	1.246713	1.262763	1.277446	1.292812	1.306812	1.3203	1.334984	1.349326
CL	OCL	C1A	0.426265	0.426255862	0.414859975	0.753777195	0.47372819	0.024681158	0.144298	0.644607	0.905189	1	1.029239	1.05035	1.073198	1.096284	1.114679	1.13219	1.148723	1.16444	1.1797	1.193157	1.208123	1.22233	1.234865	1.245938	1.255567	1.264038	1.270591	1.275757	1.279175	1.281844
OEL	OCL	C1A	0	0	0	0.361770733	2.73427554	0	0	0.774012	1.001329	1	1.001329	1.024593	1.054836	1.079429	1.101031	1.122633	1.143902	1.165172	1.186109	1.206707	1.231971	1.254902	1.277189	1.296107	1.317714	1.33566	1.351945	1.3869	1.379529	1.391493
CO	OCL	C1A	0.549413	0.549412652	0	0	0.76484535	0	0	0.743291	1.103352	1	1.005496	1.013256	1.020584	1.025973	1.027481	1.02802	1.02705	1.024787	1.02274	1.020907	1.019075	1.015734	1.011639	1.006143	0.999246	0.991271	0.981895	0.971549	0.960341	0.948809
IT	OCL	C1A	0	0.439862135	2.28470604	1.849138618	2.31984999	0	0.000514	1.042341	1.103268	1	1.047156	1.081755	1.11635	1.156453	1.193974	1.230292	1.266069	1.301373	1.335967	1.37177	1.407398	1.442882	1.476761	1.508773	1.539242	1.568186	1.596383	1.622201	1.644573	1.66678
VT	OCL	C1A	0	0	0	2.760781618	1.52878899	0	0	1.072392	1.103281	1	1.04054	1.075289	1.118724	1.161198	1.197876	1.236416	1.278956	1.321427	1.365211	1.392857	1.432431	1.469111	1.506756	1.542471	1.574322	1.605212	1.6361	1.665056	1.691119	1.71525
JA	OCL	C1A	0	0	0	0	4.04165196	0	0	1.010413	0.951485	1	1.032827	1.059831	1.090364	1.122309	1.151783	1.181963	1.212649	1.244264	1.276385	1.310272	1.346453	1.384045	1.42252	1.461878	1.501941	1.54324	1.585775	1.629545	1.674197	1.720261
NZ	OCL	C1A	0	0	0	0	4.04359761	0	0	1.010899	0.949136	1	1.033748	1.06144	1.092927	1.125948	1.156306	1.187308	1.219199	1.251494	1.284676	1.319635	1.356774	1.395527	1.435007	1.475537	1.516793	1.55926	1.60302	1.64807	1.694009	1.741402

C. Forecast Calculation by Trade Partner

							2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
182,616	USA	S3-041	WHEAT, MESLIN, UNMILLED	27,139,790	99.99%	147,630	182,605	186,740	193,823	199,595	205,664	211,287	217,038	222,938	228,932	235,057	241,488	248,324	255,445	262,735	270,235	277,877	285,767	293,932	302,337	310,940	319,818
							11	11	11	11	12	12	12	13	13	14	14	14	15	15	16	16	16	17	17	18	18
							182,616	188,751	193,835	199,607	205,676	211,300	217,050	222,951	228,946	235,070	241,502	248,339	255,459	262,751	270,251	277,893	285,783	293,949	302,354	310,958	319,837

Table F5.10-12
Forecast Calculation
Rice

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
131,678

Partner	Commodity Code	Commodity Description	Trade Value		NetWeight (kg)
World	S3-042	RICE	23,147,430	100.00%	130,947,800
USA	S3-042	RICE	22,475,600	98.19%	128,578,800
Andorra	S3-042	RICE	251,164	0.95%	1,250,000
Japan	S3-042	RICE	156,427	0.35%	461,750
Guatemala	S3-042	RICE	152,930	0.27%	350,312
Australia	S3-042	RICE	97,016	0.19%	244,000
Nicaragua	S3-042	RICE	10,038	0.03%	40,480
Costa Rica	S3-042	RICE	3,426	0.02%	20,738
Areas, nes	S3-042	RICE	823	0.00%	1,520

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	OCL	C1A	0.4964772	0.549301587	0.563248892	0.565176971	0.654370841	0.789025497	0.863634	0.904105	0.941206	1	1.033593	1.061433	1.09304	1.126276	1.15707	1.188561	1.220873	1.2537	1.287239	1.322459	1.358896	1.398888	1.438814	1.479887	1.521732	1.564941	1.609654	1.655663	1.702795	1.751416
CA	OCL	C1A	0.2554442	0.696651301	1.482867799	2.439516388	2.500709069	2.498990595	2.010237	1.115114	1.023861	1	1.039851	1.070938	1.108626	1.144887	1.176505	1.206553	1.242697	1.278113	1.31625	1.358275	1.404929	1.453327	1.501669	1.550127	1.598173	1.646948	1.695562	1.744443	1.793264	1.843235
AR	OCL	C1A	0	5.749776436	82.09248508	122.135541	48.5878118	34.63763136	43.50206	1.032034	1.103348	1	1.018448	1.05913	1.109235	1.1563	1.200291	1.245357	1.292653	1.341124	1.390867	1.444259	1.500683	1.558987	1.617794	1.677346	1.737216	1.797621	1.857532	1.917819	1.977162	2.037545
OCL	OCL	C1A	1.7619351	2.293742305	2.835481712	0.911145681	1.425051376	1.128567321	1.042323	1.012134	0.949144	1	1.03379	1.061581	1.093188	1.126284	1.156797	1.187941	1.219931	1.252433	1.285738	1.320808	1.358181	1.39706	1.436778	1.477525	1.518931	1.561517	1.605649	1.650879	1.697069	1.744706
SA	OCL	C1A	1.1269451	0	0.113202429	0.09495249	0.934630687	1.036088857	1.080431	1.028363	0.9523	1	1.029024	1.050624	1.076312	1.100012	1.127438	1.152278	1.17775	1.203859	1.230288	1.258462	1.288587	1.319942	1.352014	1.384681	1.418283	1.452682	1.488178	1.524651	1.561903	1.600373
FR	OCL	C1A	0.3128054	0.312802274	0	0.834139397	2.185008474	0.312802274	0	0.835808	1.103057	1	1.041921	1.089868	1.097816	1.131004	1.159825	1.187773	1.214547	1.241921	1.269868	1.299564	1.331004	1.362445	1.392139	1.42096	1.448908	1.476108	1.499564	1.523144	1.543231	1.565085
SP	OCL	C1A	1.6016189	0	1.863043144	0.64625471	2.410859033	0.545912482	0	0.914404	1.103345	1	1.031782	1.048796	1.064758	1.084619	1.101569	1.117119	1.132762	1.147651	1.162016	1.176859	1.191398	1.205395	1.218004	1.229124	1.238741	1.24737	1.254049	1.258394	1.260967	1.263205
MX	OCL	C1A	6.483279	16.07090608	36.5831464	7.297181313	1.325075588	9.066126967	13.73306	1.007217	1.103287	1	1.03004	1.049059	1.066615	1.087096	1.104165	1.119185	1.133327	1.145421	1.157417	1.169219	1.181215	1.191944	1.201697	1.20989	1.216522	1.222374	1.226763	1.229884	1.231347	1.232225
VZ	OCL	C1A	0.3243982	0	0.96924364	1.037903363	2.010927096	1.200102442	0	1.092197	1.069489	1	1.018952	1.047635	1.071197	1.094246	1.110975	1.127027	1.14393	1.159467	1.176029	1.193102	1.211712	1.22981	1.246713	1.262763	1.277446	1.292612	1.306612	1.3203	1.334964	1.349326
CL	OCL	C1A	0.4262652	0.426255662	0.414859975	0.753777195	0.473728194	0.924681158	0.144296	0.544607	0.905159	1	1.029239	1.05035	1.073198	1.098284	1.114679	1.13219	1.148723	1.16444	1.1797	1.193157	1.208123	1.22233	1.234685	1.245938	1.255587	1.264038	1.270591	1.275757	1.279175	1.281844
OEL	OCL	C1A	0	0	0	0.361770733	2.734275536	0	0	0.774012	1.001329	1	1.001329	1.024593	1.054836	1.079429	1.101031	1.122633	1.143902	1.165172	1.188109	1.208707	1.231971	1.254902	1.277169	1.298107	1.317714	1.33566	1.351945	1.3669	1.379529	1.391493
CO	OCL	C1A	0.5494127	0.549412652	0	0	0.78484535	0	0	0.743291	1.103352	1	1.005496	1.013256	1.020584	1.025973	1.027481	1.02802	1.02705	1.024787	1.02274	1.020907	1.019075	1.015734	1.011639	1.006143	0.999246	0.991271	0.981695	0.971549	0.960341	0.948809
IT	OCL	C1A	0	0.439662135	2.28470604	1.849139818	2.319649995	0	0.000514	1.042341	1.103288	1	1.047156	1.081755	1.11635	1.156453	1.193974	1.230292	1.266089	1.301373	1.335967	1.37177	1.407398	1.442662	1.476761	1.508773	1.539242	1.569186	1.596383	1.622201	1.644573	1.66578
VT	OCL	C1A	0	0	0	2.760781618	1.528786994	0	0	1.072393	1.103281	1	1.04054	1.075289	1.118724	1.161196	1.197876	1.236416	1.278956	1.321427	1.355211	1.392857	1.432431	1.469111	1.506756	1.542471	1.574322	1.605212	1.6361	1.665056	1.691119	1.71925
JA	OCL	C1A	0	0	0	0	4.041651958	0	0	1.010413	0.951485	1	1.032827	1.059831	1.090364	1.122309	1.151783	1.181963	1.212849	1.244264	1.276385	1.310272	1.346453	1.384045	1.42252	1.461878	1.501941	1.54324	1.585775	1.629545	1.674197	1.720261
NZ	OCL	C1A	0	0	0	0	4.04359761	0	0	1.010899	0.949136	1	1.033748	1.06144	1.092927	1.125949	1.156306	1.187308	1.219199	1.251494	1.284676	1.319635	1.356774	1.395527	1.435007	1.475537	1.516793	1.55926	1.60302	1.64807	1.694009	1.741402

C. Forecast Calculation by Trade Partner

131,678	World	S3-042	RICE	23,147,430	100.00%	130,948	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	USA	S3-042	RICE	22,475,600	98.19%	128,579	129,296	133,639	137,239	141,326	145,623	149,605	153,676	157,854	162,098	166,435	170,989	175,829	180,871	185,033	191,343	196,754	202,341	208,122	214,073	220,165	226,451
	Andorra	S3-042	RICE	251,164	0.95%	1,250	1,257	1,310	1,345	1,380	1,422	1,458	1,493	1,527	1,561	1,596	1,634	1,673	1,713	1,750	1,786	1,821	1,854	1,885	1,915	1,940	1,967
	Japan	S3-042	RICE	156,427	0.35%	462	484	480	492	506	521	535	549	563	578	593	608	625	643	661	679	697	717	736	757	777	799
	Guatemala	S3-042	RICE	152,930	0.27%	350	352	364	374	385	397	408	418	430	441	453	465	476	492	506	520	535	550	566	582	598	615
	Australia	S3-042	RICE	97,016	0.19%	244	245	254	260	268	276	284	291	299	307	315	324	333	342	352	362	372	383	393	404	416	427
	Nicaragua	S3-042	RICE	10,038	0.03%	40	41	42	43	44	46	47	48	50	51	52	54	55	57	58	60	62	64	65	67	69	71
	Costa Rica	S3-042	RICE	3,426	0.02%	21	21	22	22	23	23	24	25	26	26	27	28	28	29	30	31	32	33	33	34	35	36
	Areas, nes	S3-042	RICE	823	0.00%	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						130,948	131,676	136,110	139,776	143,932	148,308	152,360	156,501	160,748	165,063	169,471	174,101	179,022	184,146	189,390	194,782	200,273	205,940	211,801	217,832	224,000	230,366
							2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
							131,678	136,112	139,777	143,934	148,310	152,361	156,503	160,750	165,064	169,473	174,103	179,024	184,149	189,392	194,784	200,275	205,943	211,803	217,834	224,002	230,369

Table F5.10-13
Forecast Calculations
Coal

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
126,474

2002	Export	Colombia	Honduras	H2-2701	Coal; briquettes,	4004333	128,791	Weight in kilograms
2003	Export	Colombia	Honduras	H2-2701	Coal; briquettes,	3360125	122,233	Weight in kilograms

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CO	OCL	C2D	0.084644	0.122067	0.109238	0.17472	0.432033774	0.591661	0.916848	0.601894	0.857931	1
US	OCL	C2D	0.042806	0.028135	0.059462	0.064691	0.057055286	0.055547	0.0321009	0.14111	0.850642	1
CA	OCL	C2D	0.084035	0.138287	0.058081	0.188071	0.058870842	0.187281	0.5175902	0.880938	0.911081	1

OriginCode	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CO	1.028065	1.055126	1.086475	1.121454	1.154369	1.187537	1.221182	1.25526	1.290117	1.324623
US	1.126443	1.129965	1.124782	1.137937	1.148866	1.158866	1.168898	1.178831	1.186996	1.201086
CA	1.158661	1.274552	1.329519	1.372376	1.408133	1.445598	1.480867	1.514532	1.548357	1.580515

OriginCode	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CO	1.359041	1.393662	1.428483	1.463436	1.49832	1.533085	1.56734	1.602008	1.636293	1.670996
US	1.211984	1.223146	1.235138	1.247994	1.261315	1.275201	1.289784	1.305729	1.321974	1.339547
CA	1.61065	1.639587	1.667668	1.693946	1.718806	1.741798	1.763497	1.784193	1.802846	1.820234

C. Forecast Calculation by Trade Partner

126,474

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
126,474	130,024	133,446	137,411	141,835	145,998	150,193	154,448	158,758	163,166	167,530

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
171,883	176,262	180,866	185,087	189,498	193,895	198,228	202,612	206,949	211,338

Table F5.10-14
Forecast Calculations
Petroleum Products

A. 2003 UN Honduras Trade Data

Period	Trade Flow	Reporter	Partner	Commodity Code	Commodity Description	Trade Value	NetWeight (kg)	Value/NetWeight	Unit	Trade Quantity
2003	Export	USA	Honduras	H2-2710	Petroleum oils, other than crude	214,590,224	1,479,932,579		Volume in litres	1033474304
2003	Export	Ecuador	Honduras	H2-2710	Petroleum oils, other than crude	22,225,958	184,866,432	0.12	Weight in kilograms	184866432
			Neth. Antil	S3-334	PETROLEUM PRODUCTS	61,532,860	15,442,520	3.98		
			Venezuela	S3-334	PETROLEUM PRODUCTS	62,069,680	14,957,400	4.15		
			Greece	S3-334	PETROLEUM PRODUCTS	8,349,656	3,988,250	2.09		
			Aruba	S3-334	PETROLEUM PRODUCTS	11,427,970	3,043,812	3.75		
2003	Export	El Salvador	Honduras	H2-2710	Petroleum oils, other than crude	7,217,272	10,995,112	0.66	Weight in kilograms	10995112
2003	Export	Guatemala	Honduras	H2-2710	Petroleum oils, other than crude	3,643,134	8,826,542	0.41	Weight in kilograms	8826542
2003	Export	Nicaragua	Honduras	H2-2710	Petroleum oils, other than crude	445,956	1,258,265	0.35	Weight in kilograms	1258265
2003	Export	Bulgaria	Honduras	H2-2710	Petroleum oils, other than crude	316,625	933,500	0.34	Weight in kilograms	933500
2003	Export	Mexico	Honduras	H2-2710	Petroleum oils, other than crude	442,263	771,812	0.57	Weight in kilograms	771812
2003	Export	Romania	Honduras	H2-2710	Petroleum oils, other than crude	159,305	533,750	0.30	Weight in kilograms	533750
2003	Export	Peru	Honduras	H2-2710	Petroleum oils, other than crude	148,147	501,000	0.30	Weight in kilograms	501000
2003	Export	Colombia	Honduras	H2-2710	Petroleum oils, other than crude	408,142	478,437	0.85	Weight in kilograms	478437
2003	Export	Netherlands	Honduras	H2-2710	Petroleum oils, other than crude	213,929	420,375	0.51	Weight in kilograms	420375
2003	Export	China	Honduras	H2-2710	Petroleum oils, other than crude	98,779	305,625	0.32	Weight in kilograms	305625
2003	Export	Greece	Honduras	H2-2710	Petroleum oils, other than crude	54,716	158,523	0.35	Weight in kilograms	158523
2003	Export	Croatia	Honduras	H2-2710	Petroleum oils, other than crude	24,912	85,000	0.29	Weight in kilograms	85000
2003	Export	Costa Rica	Honduras	H2-2710	Petroleum oils, other than crude	56,527	80,600	0.70	Weight in kilograms	80600
2003	Export	Argentina	Honduras	H2-2710	Petroleum oils, other than crude	59,880	72,699	0.82	Weight in kilograms	72699
2003	Export	Algeria	Honduras	H2-2710	Petroleum oils, other than crude	17,041	60,691	0.28	Weight in kilograms	60691
2003	Export	Brazil	Honduras	H2-2710	Petroleum oils, other than crude	32,330	51,163	0.63	Weight in kilograms	51163
2003	Export	Panama	Honduras	H2-2710	Petroleum oils, other than crude	75,623	48,300	1.57	Weight in kilograms	48300
2003	Export	Italy	Honduras	H2-2710	Petroleum oils, other than crude	21,304	13,312	1.60	Weight in kilograms	13312
2003	Export	Estonia	Honduras	H2-2710	Petroleum oils, other than crude	3,153	12,500	0.25	Weight in kilograms	12500
2003	Export	Germany	Honduras	H2-2710	Petroleum oils, other than crude	13,000	5,875	2.21	Weight in kilograms	5875
2003	Export	Rep. of Korea	Honduras	H2-2710	Petroleum oils, other than crude	9,963	4,644	2.15	Weight in kilograms	4644
2003	Export	United Kingdom	Honduras	H2-2710	Petroleum oils, other than crude	9,681	3,687	2.63	Weight in kilograms	3687
2003	Export	Belgium	Honduras	H2-2710	Petroleum oils, other than crude	6,707	1,437	4.67	Weight in kilograms	1437
2003	Export	Tunisia	Honduras	H2-2710	Petroleum oils, other than crude	1,489	1,062	1.40	Weight in kilograms	1062
2003	Export	China, Hong Kong SAR	Honduras	H2-2710	Petroleum oils, other than crude	9,604	0		Volume in litres	605
2003	Export	Chile	Honduras	H2-2710	Petroleum oils, other than crude	4,804,240	0		No Quantity (all quantities	0
							1,727,854,904	0.15		
					Note US Weight is Estimated	179,086,002	247,922,325	0.72		

B. Global Insight Long Term Forecast Partner Region

OriginC	DestCo	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	OCL	C353	0.494809848	0.444789	0.624551868	0.660449077	0	0	0.39	0.414303197	0.973754426	1	1.020038	1.032892	1.032658	1.044366	1.052471	1.060723	1.069764	1.078473	1.08753	1.09706	1.108206	1.115395	1.125518	1.135564	1.145257	1.155288	1.165585	1.176146	1.188561	1.196882
CRB	OCL	C353	0.71650529	1.176209	0.715673616	1.489010403	1	1	1.16	1.10414036	1.083206683	1	1.036881	1.057131	1.081692	1.103115	1.120998	1.138121	1.154055	1.169261	1.183981	1.195897	1.207454	1.217887	1.226982	1.234348	1.240371	1.244855	1.247561	1.248978	1.248662	1.247095
OWL	OCL	C353	0.708468858	0.958781	0.634880821	1.01112071	1	1	0.95	1.029622625	1.039551514	1	1.042416	1.075224	1.106667	1.138882	1.16991	1.201099	1.232315	1.263911	1.296204	1.3281	1.35939	1.390457	1.421345	1.451206	1.480312	1.508757	1.536061	1.562686	1.58809	1.612686
GR	OCL	C353	0.61747008	0.60041	0.834909882	1.043432733	1	1	0.76	1.043407499	1.028553971	1	1.056746	1.09328	1.137425	1.178526	1.215584	1.250144	1.284327	1.318728	1.352426	1.385881	1.41551	1.443706	1.469958	1.493755	1.515387	1.536234	1.550784	1.564147	1.574231	1.582975
PE	OCL	C353	0.299336424	0.50278	0.370565985	0.174907485	0	1	1.37	1.075443313	1.062655785	1	1.039979	1.068099	1.09771	1.126934	1.153084	1.178982	1.204272	1.229519	1.254425	1.27653	1.299435	1.322047	1.343766	1.364355	1.384054	1.402772	1.419838	1.436412	1.451514	1.465934
CH	OCL	C353	0	0.604963	0.893036583	0.607980933	1	1	1.14	0.951240057	1.256036492	1	1.019419	1.018038	1.035514	1.052769	1.061905	1.076952	1.094774	1.114599	1.135074	1.156345	1.177409	1.197492	1.217959	1.237987	1.257702	1.278903	1.295388	1.313559	1.331025	1.347417
OCL	OCL	C353	1.185215204	2.323185	1.710488144	2.3513842	2	3	3.11	1.021529936	1.025293434	1	1.029641	1.047245	1.061667	1.080182	1.095294	1.110215	1.125096	1.139697	1.15429	1.168159	1.181384	1.194135	1.206719	1.218477	1.228346	1.239723	1.249264	1.258316	1.266411	1.273879
BLT	OCL	C353	0	0	0.016382172	0	3	1	0.00	1.023950216	1.022333423	1	1.023953	1.037453	1.04793	1.060479	1.07031	1.079894	1.089303	1.098423	1.10773	1.116616	1.124517	1.131778	1.138692	1.145106	1.150532	1.155681	1.160094	1.164038	1.167181	1.169782
FR	OCL	C353	0.22082669	0.14612	0.619047281	0.687618223	3	3	3.36	1.047504503	1.025210898	1	1.047516	1.069907	1.100053	1.129361	1.155389	1.178565	1.201306	1.224163	1.246371	1.26882	1.287245	1.304532	1.319877	1.333688	1.34627	1.355693	1.362915	1.369104	1.372316	1.375116
SA	OCL	C353	0	2.134547	0	0	1	1	1.04	1.040269262	0.993875962	1	1.027947	1.037184	1.059648	1.076535	1.093266	1.11041	1.129207	1.148606	1.168626	1.190935	1.210009	1.228166	1.250204	1.269711	1.290426	1.309946	1.327698	1.34584	1.360918	1.376225
CO	OCL	C353	1.520853295	0.690127	1.328570187	0.363056983	4	6	5.84	1.06647153	1.063154967	1	1.047995	1.062312	1.123523	1.161383	1.19551	1.229615	1.262952	1.296085	1.328127	1.355714	1.384921	1.413258	1.440406	1.465976	1.490236	1.512468	1.53237	1.550571	1.56669	1.580774
RU	OCL	C353	57.32166999	57.32167	0	0	0	26	20.28	1.031932898	1.000210397	1	1.052731	1.084454	1.12542	1.165546	1.204622	1.243278	1.282984	1.32563	1.369748	1.415547	1.459244	1.502731	1.546429	1.589286	1.631093	1.673109	1.713235	1.753782	1.791807	1.829832
UK	OCL	C353	0.006191812	3.049954	3.260945981	1.093862088	1	0	0.04	1.022285304	0.99624223	1	1.050048	1.071265	1.101095	1.130689	1.157341	1.181878	1.20488	1.227832	1.249342	1.270428	1.288176	1.304476	1.319027	1.331726	1.341562	1.350718	1.356806	1.360329	1.361593	1.362108
SG	OCL	C353	0	0	0	161.2833295	173	181	0.00	1.09676361	1.025989228	1	1.019448	1.01105	1.010066	1.005604	0.995313	0.98832	0.985135	0.985541	0.989518	0.994509	0.997694	1.000557	1.004838	1.008587	1.012163	1.01603	1.019269	1.023134	1.026668	1.030489
OWW	OCL	C353	3.43727145	7.408388	1.992234112	0.236448991	1	0	4.57	1.036855088	1.030725939	1	1.025666	1.032153	1.049802	1.06338	1.070826	1.07991	1.089332	1.100042	1.111634	1.123699	1.133837	1.143361	1.152747	1.160815	1.16791	1.174032	1.178591	1.182316	1.184477	1.185473
KO	OCL	C353	0	0	0	0	2	2	0.00	1.106259082	1.034006409	1	1.03057	1.02827	1.039049	1.04861	1.052561	1.06371	1.07734	1.09465	1.115361	1.135936	1.153787	1.169095	1.185196	1.198681	1.21029	1.220628	1.22834	1.23515	1.239913	1.242349
BZ	OCL	C353	0	0	0	1.212687357	0	3	0.00	1.109333107	1.08384	1	1.035334	1.054349	1.062415	1.106098	1.126117	1.148437	1.168315	1.18561	1.20382	1.218649	1.233435	1.247099	1.259325	1.270226	1.279937	1.288079	1.294577	1.29985	1.303434	1.305696
MX	OCL	C353	6.251988373	0.795441	0.659030056	0.743907266	0	0	0.43	1.071114003	1.059209905	1	1.041363	1.065318	1.097504	1.124924	1.147268	1.169103	1.189796	1.209916	1.228797	1.243484	1.259052	1.273651	1.287233	1.298727	1.308793	1.317389	1.324163	1.329872	1.334065	1.337075
IT	OCL	C353	0.814969409	0.192537	0.002597088	0	4	0	0.00	1.114389271	1.060646166	1	1.038063	1.050615	1.072161	1.09023	1.10503	1.11674	1.128547	1.140756	1.152016	1.163487	1.170889	1.17793	1.182366	1.186308	1.188688	1.189804	1.186597	1.184098	1.177587	1.172035
SP	OCL	C353	0	0.795513	0.054573659	0.013864817	0	2	2.20	1.056647726	1.035659461	1	1.052844	1.079674	1.109458	1.136681	1.160027	1.181151	1.20129	1.221124	1.238837	1.258006	1.272372	1.285176	1.298213	1.305485	1.312664	1.318152	1.320597	1.32053	1.317745	1.313805
TW	OCL	C353	0	0	0	1.412786771	3	0	0.00	1.127620743	1.069274755	1	1.001198	0.977831	0.97124	0.966447	0.955662	0.951467	0.953285	0.961653	0.974236	0.969215	1.003595	1.017375	1.034152	1.04973	1.065308	1.080887	1.095866	1.110845	1.125823	1.139005
SZ	OCL	C353	0	0	0	2.618362826	3	3	5.34	1.035738694	1.022253403	1	1.051923	1.078884	1.112611	1.145652	1.17532	1.202293	1.229265	1.255564	1.282536	1.308159	1.330413	1.350642	1.370198	1.387055	1.402564	1.416049	1.427513	1.436953	1.443695	1.449764
PD	OCL	C353	0	0	0	1.91205202	2	1	0.00	1.03412972	1.007158927	1	1.031275	1.041756	1.066982	1.087136	1.106735	1.125825	1.142655	1.159788	1.17565	1.192125	1.202608	1.209509	1.216455	1.220375	1.22208	1.222549	1.219353	1.215006	1.206314	1.197409
TK	OCL	C353	0	0	0	2.438076626	2	0	0.03	1.030509798	1.025696103	1	1.023637	1.037842	1.051165	1.066553	1.079555	1.092407	1.10597	1.119357	1.13299	1.148288	1.158547	1.170223	1.181755	1.192451	1.202336	1.211722	1.220331	1.228447	1.235719	1.242415
NE	OCL	C353	0.430462969	6.766425	0.521029048	0.281064843	0	12	26.29	0.987793252	0.983591109	1	1.041796	1.059296	1.065121	1.111331	1.134894	1.155586	1.174972	1.194076	1.211846	1.230018	1.244491	1.257827	1.268867	1.276511	1.284624	1.290241	1.293417	1.294795	1.294172	1.292441
OWE	OCL	C353	1.86995469	1.265184	1.177083126	1.681173533	1	1	1.29	1.022747296	1.02691388	1	1.030087	1.047992	1.062598	1.081563	1.097097	1.112432	1.12774	1.142763	1.157747	1.171936	1.185536	1.198658	1.211608	1.223717	1.234912	1.245603	1.255433	1.264767	1.273107	1.280797
VZ	OCL	C353	0	0	0	0.030188013	1	1	173.62	1.140983317	1.085391473	1	1.038591	1.063871	1.089676	1.117716	1.141654	1.166581	1.19202	1.217936	1.244135	1.267897	1.292047	1.315774	1.338971	1.360826	1.381605	1.401324	1.419543	1.436861	1.452891	1.46772
CA	OCL	C353	82.2753971	70.90127	0.802851126	0.856982059	1	2	1.54	1.210404525	1.202748257	1	1.06065	1.100103	1.147012	1.19035	1.228431	1.264284	1.297566	1.328077	1.355759	1.375329	1.395469	1.413238	1.427494	1.438007	1.445521	1.449349	1.449606	1.447035	1.441435	1.433122
AR	OCL	C353	0.090126828	37.43824	4.56486864	0	197	80	209.72	1.140101843	1.151773241	1	1.030733	1.059619	1.096553	1.132441	1.16367	1.194809	1.225226	1.255824	1.286603	1.315443	1.344915	1.373935	1.4021	1.429003	1.454914	1.479699	1.502636	1.524582	1.544615	1.563742
WAF	OCL	C353	0	0	0	4.376378842	0	0	0.00	1.09409471	1.074342004	1	1.048125	1.077215	1.113699	1.148222	1.178493	1.207634	1.235699	1.262891	1.288441	1.309271	1.33046	1.350418	1.368221	1.383767	1.397465	1.408804	1.417064	1.423683	1.427531	1.429634
PH	OCL	C353	0	15.11637	18.73784068	9.962177863	9	15	23.68	1.2112972	1.095420555	1	0.991595	0.957852	0.934924	0.911934	0.895969	0.879117	0.866387	0.85965	0.858536	0.858167	0.856375	0.853408	0.85242	0.850318	0.847723	0.845127	0.841913	0.839318	0.836351	0.832767
BE	OCL	C353	1.989254224	2.972812	592.7277347	3.989200884	639	1,084	2.55	1.003684411	0.995807394	1	1.057045	1.08525	1.122856	1.158049	1.188794	1.216872	1.242663	1.268835	1.292974	1.317749	1.337314	1.365736	1.371363	1.385339	1.398519	1.406302	1.412654	1.417356	1.419134	1.419515
GF	OCL	C353	19.66263982	18.07472	11.67695749	11.25100671	13	15	11.14	1.073825503	1.04986443	1	1.053244	1.081432	1.120358	1.157942	1.191499	1.223714	1.254686	1.285459	1.314541	1.344519	1.367338	1.389262	1.408501	1.426398	1.441163	1.453691	1.461745	1.469351	1.470694	1.472931

C. Forecast Calculation by Trade Partner

										2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1,214,682	USA	Honduras	H2-2710	Petroleum oils, other than crude	214,590,224	1,479,932,579	1,151,388	94.8%		1,151,388	1,174,460	1,169,259	1,168,969	1,202,470	1,211,801	1,221,303	1,231,713	1,241,740	1,252,169	1,263,184	1,273,671	1,284,252	1,295,908	1,307,474	1,318,634	1,330,185	1,342,040	1,354,199	1,366,192	1,378,076
1,237,605	Ecuador	Honduras	H2-2710	Petroleum oils, other than crude	22,225,958	184,886,432	0	0.0%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0		Neth. Antil	S3-334	PETROLEUM PRODUCTS	61,532,860	15,442,520	15,443	1.3%		15,443	16,012	16,325	16,704	17,035	17,311	17,575	17,822	18,056	18,284	18,488	18,648	18,807	18,948	19,061	19,154	19,224	19,265	19,287	19,282	19,258
0		Venezuela	S3-334	PETROLEUM PRODUCTS	62,069,860	14,957,400	14,957	1.2%		14,957	15,535	15,913	16,302	16,718	17,076	17,449	17,830	18,217	18,609	18,984	19,326	19,681	20,028	20,384	20,665	20,960	21,233	21,492	21,731	21,953
0		Greece	S3-334	PETROLEUM PRODUCTS	8,349,656	3,988,250	3,988	0.3%		3,988	4,215	4,360	4,536	4,700	4,848	4,986	5,122	5,259	5,394	5,527	5,645	5,758	5,863	5,957	6,044	6,123	6,185	6,238	6,278	6,313
0		Aruba	S3-334	PETROLEUM PRODUCTS	11,427,970	3,043,812	3,044	0.3%		3,044	3,156	3,218	3,292	3,356	3,412	3,484	3,513	3,559	3,604	3,640	3,675	3,707	3,735	3,757	3,775	3,789	3,797	3,802	3,801	3,796
	El Salvador	Honduras	H2-2710	Petroleum oils, other than crude	7,217,272	10,995,112	10,995	0.9%		10,995	11,321	11,515	11,673	11,877	12,043	12,207	12,371	12,531	12,692	12,844	12,989	13,130	13,268	13,397	13,517	13,631	13,736	13,835	13,924	14,006
	Guatemala	Honduras	H2-2710	Petroleum oils, other than crude	3,643,134	8,826,542	8,827	0.7%		8,827	9,068	9,244	9,371	9,534	9,668	9,799	9,931	10,060	10,188	10,311	10,428	10,540	10,651	10,755	10,851	10,942	11,027	11,107	11,178	11,244
	Nicaragua	Honduras	H2-2710	Petroleum oils, other than crude	445,956	1,258,265	1,258	0.1%		1,258	1,288	1,305	1,319	1,334	1,347	1,359	1,371	1,382	1,394	1,405	1,415	1,424	1,433	1,441	1,448	1,454	1,460	1,465	1,469	1,472
	Bulgaria	Honduras	H2-2710	Petroleum oils, other than crude	316,625	933,500	934	0.1%		934	972	994	1,025	1,050	1,071	1,091	1,111	1,129	1,147	1,161	1,175	1,189	1,202	1,212	1,222	1,230	1,236	1,241	1,245	1,248
	Mexico	Honduras	H2-2710	Petroleum oils, other than crude	442,263	771,812	772	0.1%		772	790	801	809	818	826	833	841	848	855	862	868	874	879	884	888	892	895	898	901	903
	Romania	Honduras	H2-2710	Petroleum oils, other than crude	159,305	533,750	534	0.0%		534	555	569	586	602	615	629	643	656	670	681	694	708	717	728	739	749	758	767	775	782
	Peru .	Honduras	H2-2710	Petroleum oils, other than crude	148,147	501,000	501	0.0%		501	525	542	563	582	599	616	633	649	665	679	694	708	722	734	747	758	768	777	785	792
	Colombia	Honduras	H2-2710	Petroleum oils, other than crude	408,142	478,437	478	0.0%		478	498	510	525	539	552	564	576	588	600	611	622	633	643	653	662	671	679	687	694	701
	Netherlands	Honduras	H2-2710	Petroleum oils, other than crude	213,929	420,375	420	0.0%		420	438	445	456	467	477	486	494	502	509	517	523	529	533	537	540	542	544	544	544	543
	China	Honduras	H2-2710	Petroleum oils, other than crude	98,779	305,625	306	0.0%		306	312	311	316	322	325	329	335	341	347	353	360	366	372	378	384	390	398	401	407	412
	Greece	Honduras	H2-2710	Petroleum oils, other than crude	54,716	158,523	159	0.0%		159	168	173	180	187	193	198	204	209	214	220	224	229	233	237	240	243	246	248	250	251
							1,214,002	99.9%		1,214,002	1,239,331	1,255,464	1,256,647	1,271,593	1,282,164	1,292,890	1,304,506	1,315,728	1,327,341	1,339,407	1,350,965	1,362,531	1,376,134	1,387,562	1,399,510	1,411,783	1,424,264	1,436,989	1,449,457	1,461,751
										23,603	24,095	24,409	24,432	24,722	24,928	25,136	25,362	25,580	25,806	26,041	26,265	26,490	26,735	26,977	27,209	27,448	27,690	27,938	28,180	28,419
										1,237,605	1,263,426	1,279,893	1,281,078	1,296,315	1,307,091	1,318,027	1,329,868	1,341,908	1,353,147	1,365,448	1,377,221	1,389,021	1,401,869	1,414,538	1,426,719	1,439,231	1,451,955	1,464,927	1,477,637	1,490,171

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Table F5.10-15
Forecast Calculation
Iron and Steel Imports

A. 2003 UN Honduras Trade Data

Port of Cortes 2004					
127,968	World Total	273,267,420	100.0%	172,774,961	100.0%
	Ukraine Total	70,723,064	25.9%	70,723,064	40.9%
	Guatemala Total	60,993,625	22.3%	0	0.0%
	El Salvador Total	23,035,333	8.4%	0	0.0%
	USA Total	17,743,302	6.5%	17,743,302	10.3%
	Brazil Total	16,601,319	6.1%	16,601,319	9.6%
	Costa Rica Total	16,463,505	6.0%	0	0.0%
	Belgium Total	13,911,918	5.1%	13,911,918	8.1%
	Australia Total	8,901,718	3.3%	8,901,718	5.2%
	Cuba Total	7,372,742	2.7%	7,372,742	4.3%
	Venezuela Total	6,716,902	2.5%	6,716,902	3.9%
	Rep. of Korea Total	4,113,011	1.5%	4,113,011	2.4%
	Germany Total	3,675,405	1.3%	3,675,405	2.1%
	Japan Total	3,023,479	1.1%	3,023,479	1.7%
	United Kingdom Total	2,991,937	1.1%	2,991,937	1.7%
	Russian Federation Total	2,569,135	0.9%	2,569,135	1.5%
	Lao People's Dem. Rep. Total	2,376,920	0.9%	2,376,920	1.4%
	Mexico Total	2,266,053	0.8%	2,266,053	1.3%
	Nicaragua Total	2,022,445	0.7%	2,022,445	1.2%
	Uganda Total	1,205,500	0.4%	1,205,500	0.7%
	Poland Total	989,448	0.4%	989,448	0.6%
	Kenya Total	982,000	0.4%	982,000	0.6%
	Spain Total	801,567	0.3%	801,567	0.5%
	Italy Total	594,616	0.2%	594,616	0.3%
	Netherlands Total	594,091	0.2%	594,091	0.3%
	Turkey Total	492,187	0.2%	492,187	0.3%
	Dominican Rep. Total	434,250	0.2%	434,250	0.3%
	France Total	379,381	0.1%	379,381	0.2%
	India Total	289,669	0.1%	289,669	0.2%
	Czech Rep. Total	194,953	0.1%	194,953	0.1%
	Sweden Total	139,813	0.1%	139,813	0.1%
	Latvia Total	124,798	0.0%	124,796	0.1%
	Other Asia, nes Total	114,253	0.0%	114,253	0.1%
	Trinidad and Tobago Total	108,199	0.0%	108,199	0.1%
	China Total	101,310	0.0%	101,310	0.1%
	South Africa Total	97,347	0.0%	97,347	0.1%
	Chile Total	53,721	0.0%	53,721	0.0%
	Panama Total	43,655	0.0%	43,655	0.0%
	Albania Total	7,000	0.0%	7,000	0.0%
	Thailand Total	6,875	0.0%	6,875	0.0%
	Ireland Total	4,562	0.0%	4,562	0.0%
	Andorra Total	4,062	0.0%	4,062	0.0%
	Areas, nes Total	2,419	0.0%	2,419	0.0%
	Canada Total	1,937	0.0%	1,937	0.0%

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003
OCL	OCL	C371	0.441415295	0.972222453	1	0.69560704	0.824311556	0.695783	1.068679	0.94717	0.995854
VZ	OCL	C371	0.58821873	0.214537811	0	0.23226293	0.312784471	0.331325	0.598623	1.148649	1.116595
CSW	OCL	C371	0.04842073	0	0	0.41433342	0.576510994	0.378746	0.529438	1.074409	1.126892
RU	OCL	C371	1.711790564	1.711773404	1	1.3051665	1.97776739	2.292468	1.446556	0.971792	0.98019
KO	OCL	C371	0.233844095	0.152148872	0	0.73427747	0.950686947	0.532039	0.877287	0.870561	0.871102
BZ	OCL	C371	1.342945531	1.051407574	0	1.84294314	1.273875523	1.149896	0.628585	0.885037	1.021753
JA	OCL	C371	0.394303235	0.368577567	0	2.56343233	2.386495325	3.184086	1.358583	0.987295	0.916755
US	OCL	C371	1.218298425	1.38064147	1	1.50360376	1.226130667	0.822701	0.955863	0.881915	1.095485
TK	OCL	C371	0.211750852	0.355562937	1	2.92611537	3.091522708	1.650881	3.388807	0.801573	0.913325
BE	OCL	C371	0.628317828	1.187573433	1	0.79477199	0.986586371	0.77976	0.878091	1.078898	1.057852
CRB	OCL	C371	0.5205719	2.390882405	3	2.71734344	3.05865968	3.146457	1.631788	1.132235	1.106638
CH	OCL	C371	0.079605401	0.057606184	0	0.08576767	0.179089893	0.12914	0.229469	0.388087	0.446403
SP	OCL	C371	0.346035511	0.646131534	1	0.65287728	0.345387127	0.465936	0.478815	1.057223	1.052272
GF	OCL	C371	2.25046541	1.568563019	3	1.67129153	1.444848903	1.146008	1.365758	1.030501	0.971887
SA	OCL	C371	0.936333885	0.62095817	1	0.96744106	0.775229312	0.778293	0.751194	0.762283	0.985718
BLT	OCL	C371	0	0	1	1.43796028	1.189918813	0.720357	2.690922	1.002901	0.992742
MX	OCL	C371	1.739436096	1.829638423	2	1.09776186	0.862258704	0.777892	0.781284	1.168256	1.168919
RO	OCL	C371	0.673758745	0.037711316	0	2.62230186	0.758558556	0.176266	0.240483	0.959821	1.001116
SK	OCL	C371	2.941587579	0.067633013	2	1.35787762	3.331535741	1.673913	0.403569	0.83741	1.022806
PO	OCL	C371	0.866183235	0.69084931	2	1.87593917	0.167843321	0.317891	0.803955	0.991835	1.043925
AT	OCL	C371	0.001458074	1.31573E-05	0	0.42866976	0.989561321	1.089847	1.114894	0.951795	1.084751
NE	OCL	C371	17.84906658	6.669548976	8	2.8841187	4.785371706	1.501898	0.919267	0.978432	1.041725
CO	OCL	C371	0.292372781	0.23182575	8	10.3151398	23.4929416	24.54522	2.181726	0.821712	1.022107
IT	OCL	C371	2.321169092	4.060919308	1	4.55023574	2.210885404	0.768438	0.846316	1.107099	1.046542
CZ	OCL	C371	2.26992263	6.309182712	5	5.47315607	8.120479319	2.466018	1.459002	1.097411	1.105994
OWL	OCL	C371	0.998180396	0.547785891	1	1.06540507	2.877676172	1.698297	1.165092	1.047619	0.982927
TW	OCL	C371	2.118103288	0.724819412	4	3.06865567	1.762563032	3.983432	0.724519	0.91265	0.847445
FR	OCL	C371	5.807515315	23.46524203	18	13.9726912	18.16314621	11.07107	2.416856	1.098191	1.048765
SW	OCL	C371	2.021541153	8.097535459	1	0.6694565	1.960064965	0.135678	2.255527	1.085461	1.056288
OWW	OCL	C371	27.38395824	4.620674825	10	83.5920749	49.00293232	1.182847	6.020174	0.943719	1.035892
IN	OCL	C371	0	0	0	2.5598501	0.650171755	0.844483		1.034735	0.960821
GR	OCL	C371	2.642113057	4.935377623	2	4.74869356	1.404917531	2.262826	1.430373	0.951872	1.014936
FN	OCL	C371	0.115357619	0.230680143	1	1.00308637	1.195304275	1.072998	0.443863	0.96673	1.102688
CA	OCL	C371	15.04669265	10.23996986	10	7.38190573	6.898758236	78.05537	0.399075	1.098898	1.090725
AR	OCL	C371	368.3738461	62.06748583	35	78.542497	19.82861145	0.285796	0.002037	1.1379	1.056535
OWE	OCL	C371	11.8655866	19.19818788	0	0	3.77229354	0	0	0.943091	1.005217
HU	OCL	C371	0.777786664	23.33328602	2	3.67643719	0	0	0	0.919092	1.001419
UK	OCL	C371	15.60947099	28.0334471	20	11.1741468	15.85674081	1.078621	1.503496	1.050341	0.975256
EM	OCL	C371	0	0	0	3.98396765	0	0	0	0.980992	1.040025
CL	OCL	C371	104.6862019	1368.078773	47	0.64854188	42.72162194	0.35901	1.354944	0.903334	0.958638
PE	OCL	C371	2.008656497	0.476355568	3	10.3507142	5.784218585	4.81556	0.984063	0.964083	1.00416
ID	OCL	C371	0.445531915	0	0	15.8434043	5.090212766	0.424255	3.181489	0.911915	0.846809
IS	OCL	C371	1.165406427	4.176039698	6	3.63834216	0	0	0.731333	1.110113	1.094991
DE	OCL	C371	2.269221322	0.243920413	7	4.09826598	2.439449767	1.266484	0.902481	1.292803	1.258168
SZ	OCL	C371	2.840331492	38.1	123	122.198133	25.93535912	9.116232	4.586188	1.146409	1.084841
AU	OCL	C371	3.863013699	1.817351598	2	3.86753425	0.228310502	0	0	0.97032	1.011416
NO	OCL	C371	56.27027027	42.86486486	27	5.35135135	42.86486486	0	2.675676	0.918919	1.027027

OriginCode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OCL	1	1.015229	1.030498	1.038916	1.053395	1.065229	1.078504	1.0921	1.104413	1.117287	1.130861
VZ	1	0.995128	0.999755	0.999177	1.002052	0.998158	0.995874	0.992979	0.987363	0.981218	0.973126
CSW	1	1.033633	1.062812	1.114241	1.14623	1.17705	1.208794	1.242167	1.27521	1.311414	1.353722
RU	1	0.99568	0.977977	0.970767	0.970704	0.97098	0.973707	0.978661	0.983038	0.990319	1.001452
KO	1	1.004984	0.986791	0.976689	0.972692	0.971552	0.974834	0.980575	0.985567	0.991402	0.998729
BZ	1	1.008712	1.022734	1.036247	1.051122	1.059443	1.069655	1.078836	1.085775	1.092208	1.098317
JA	1	0.998172	0.975585	0.959713	0.949964	0.94164	0.93844	0.938135	0.937577	0.93876	0.942617
US	1	1.014862	1.049928	1.034091	1.041936	1.047207	1.051411	1.056094	1.060052	1.064967	1.071969
TK	1	1.011855	1.016804	1.030752	1.051366	1.07068	1.090064	1.111119	1.130582	1.150243	1.172504
BE	1	1.01209	1.005296	1.004688	1.014292	1.022187	1.026808	1.028435	1.029442	1.029107	1.032714
CRB	1	1.015252	1.041861	1.059164	1.08403	1.099318	1.116174	1.130339	1.141455	1.150466	1.154242
CH	1	1.060545	1.090514	1.124583	1.161375	1.188828	1.216543	1.239702	1.260956	1.278626	1.291725
SP	1	1.022609	1.027723	1.038443	1.060725	1.080748	1.098086	1.11385	1.126049	1.141458	1.157898
GF	1	1.006533	0.993431	0.989577	0.996119	1.002195	1.006442	1.009036	1.010228	1.010644	1.013825
SA	1	1.022314	1.033165	1.04741	1.065958	1.081576	1.097342	1.112645	1.125962	1.139039	1.153062
BLT	1	1.034772	1.066702	1.088449	1.117065	1.143406	1.167532	1.189543	1.209784	1.229464	1.252145
MX	1	1.031207	1.083494	1.141283	1.197099	1.237451	1.2836	1.324854	1.360402	1.390316	1.402449
RO	1	1.026766	1.049106	1.081472	1.124999	1.167411	1.213169	1.262276	1.312499	1.367187	1.428571
SK	1	1.00413	0.99042	0.993887	1.00654	1.025022	1.044205	1.063117	1.084257	1.106059	1.132468
PO	1	1.047767	1.076863	1.120204	1.176023	1.235804	1.294239	1.353297	1.412871	1.473272	1.542345
AT	1	1.023091	1.028355	1.044441	1.064591	1.08481	1.108184	1.133606	1.158365	1.182503	1.208282
NE	1	1.016148	1.017881	1.020254	1.031363	1.040316	1.045451	1.048756	1.049959	1.050377	1.052922
CO	1	1.03021	1.057769	1.089432	1.126032	1.157964	1.190565	1.223581	1.255413	1.288307	1.322606
IT	1	1.006763	0.997308	0.99618	1.00531	1.013072	1.016467	1.022477	1.02534	1.027799	1.033262
CZ	1	1.014918	1.007634	1.016179	1.041482	1.067161	1.091515	1.114259	1.13669	1.160599	1.187417
OWL	1	0.993868	1.004715	1.007789	1.010918	1.008757	1.008698	1.003384	0.997917	0.993349	0.990166
TW	1	0.985902	0.950007	0.92149	0.901485	0.889498	0.884153	0.883252	0.882797	0.884269	0.888065
FR	1	1.014885	1.01241	1.015359	1.027798	1.03785	1.044393	1.050289	1.054057	1.057379	1.062901
SW	1	1.005111	0.991882	0.986194	0.992814	0.99904	1.002898	1.004768	1.005522	1.005745	1.006249
OWW	1	1.008041	0.988857	0.979787	0.974352	0.96794	0.961841	0.957579	0.95363	0.951108	0.952164
IN	1	1.023637	1.031925	1.048818	1.065243	1.07992	1.097384	1.117971	1.137765	1.158423	1.179682
GR	1	1.013226	1.028315	1.036818	1.048154	1.057371	1.067508	1.077823	1.087091	1.097355	1.108385
FN	1	1.02025	1.030392	1.034077	1.04787	1.061557	1.072822	1.082052	1.09037	1.097846	1.108514
CA	1	1.026356	1.073239	1.125887	1.176381	1.208882	1.245945	1.276356	1.298847	1.314242	1.309681
AR	1	0.991278	0.979436	0.972242	0.970586	0.968485	0.967976	0.968231	0.967212	0.967212	0.969058
OWE	1	1.012975	1.026292	1.033636	1.048667	1.057685	1.070021	1.08279	1.094323	1.106542	1.119448
HU	1	1.024273	1.051171	1.07445	1.100639	1.125053	1.151384	1.178353	1.2044	1.231583	1.260328
UK	1	1.004522	0.991553	0.988398	0.998075	1.001877	1.005631	1.006276	1.009812	1.010495	1.013311
EM	1	1.025694	1.055277	1.078671	1.101955	1.124475	1.148326	1.172382	1.195516	1.219674	1.244549
CL	1	1.004531	1.028698	1.049262	1.066922	1.080283	1.09469	1.107006	1.118533	1.125479	1.131869
PE	1	1.011788	1.031202	1.053113	1.070725	1.086118	1.102344	1.114409	1.124116	1.135071	1.147138
ID	1	1.062563	1.114881	1.181702	1.252553	1.318936	1.391489	1.468723	1.548936	1.632128	1.721489
IS	1	1.01276	1.025992	1.038989	1.053166	1.056711	1.059783	1.059783	1.056947	1.051985	1.041824
DE	1	1.030459	1.066814	1.077377	1.093834	1.106573	1.119627	1.127487	1.134119	1.140015	1.148612
SZ	1	1.025414	1.041989	1.050276	1.066298	1.080663	1.09116	1.100552	1.107182	1.113812	1.123204
AU	1	1.015962	1.011416	1.013699	1.022831	1.031963	1.038813	1.043379	1.047945	1.052511	1.059361
NO	1	1	1.027027	1.027027	1.054054	1.054054	1.081081	1.081081	1.108108	1.108108	1.135135

OriginCode	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
OCL	1.144756	1.157009	1.169781	1.181375	1.192044	1.202661	1.212326	1.222047	1.230963	1.239362
VZ	0.966327	0.959389	0.952803	0.945022	0.938291	0.927944	0.917871	0.907567	0.898884	0.885111
CSW	1.396088	1.433987	1.474118	1.513284	1.552503	1.589913	1.630386	1.67347	1.717	1.76237
RU	1.013061	1.021862	1.03106	1.039378	1.047079	1.055296	1.062944	1.071134	1.078415	1.085574
KO	1.007721	1.015592	1.024287	1.032364	1.039671	1.047635	1.054236	1.061036	1.066798	1.071266
BZ	1.101161	1.105844	1.110985	1.114482	1.116822	1.119284	1.119687	1.119681	1.1188	1.116364
JA	0.948031	0.952702	0.958565	0.964371	0.969983	0.97669	0.9829	0.990051	0.99696	1.003482
US	1.079121	1.085707	1.092786	1.100345	1.10749	1.115244	1.123136	1.131137	1.139081	1.147289
TK	1.193998	1.211473	1.228764	1.244217	1.258097	1.270157	1.281617	1.292702	1.301999	1.310828
BE	1.033277	1.028508	1.022172	1.013236	1.002446	0.991741	0.978719	0.964969	0.949347	0.933585
CRB	1.157996	1.161836	1.165903	1.167216	1.166663	1.165465	1.16116	1.155199	1.147628	1.138156
CH	1.305028	1.314817	1.323681	1.331055	1.337096	1.341997	1.344804	1.346116	1.345465	1.343138
SP	1.171575	1.179813	1.18636	1.190112	1.191649	1.193009	1.191234	1.187398	1.182073	1.175854
GF	1.015118	1.010989	1.006488	0.999273	0.990837	0.981984	0.971408	0.960514	0.947434	0.934463
SA	1.165767	1.175023	1.184093	1.190863	1.198113	1.201289	1.203958	1.206351	1.207019	1.206722
BLT	1.272869	1.287243	1.300876	1.310223	1.317243	1.323336	1.328293	1.332068	1.332686	1.33234
MX	1.418632	1.441225	1.467118	1.489409	1.510525	1.530958	1.547116	1.560396	1.571827	1.579099
RO	1.491071	1.550222	1.610491	1.668526	1.725446	1.784598	1.841517	1.899553	1.955356	2.010044
SK	1.159338	1.175623	1.195574	1.211656	1.227137	1.242961	1.25604	1.273433	1.285898	1.297991
PO	1.608164	1.668232	1.727402	1.783901	1.836945	1.890909	1.942756	1.994388	2.042455	2.089641
AT	1.235817	1.262357	1.289984	1.317218	1.343967	1.371884	1.398635	1.426067	1.452746	1.478361
NE	1.053397	1.048287	1.04111	1.031461	1.019108	1.006829	0.992139	0.97682	0.95963	0.9422
CO	1.356929	1.388898	1.420263	1.449846	1.477665	1.505875	1.531047	1.558064	1.579152	1.601796
IT	1.036713	1.035284	1.032981	1.028265	1.021931	1.01531	1.008677	0.997744	0.986714	0.975586
CZ	1.211173	1.229784	1.249688	1.264199	1.277831	1.292972	1.305744	1.318364	1.328711	1.338332
OWL	0.987216	0.981849	0.975122	0.966721	0.956779	0.946713	0.93506	0.92312	0.910716	0.897676
TW	0.894688	0.901669	0.910616	0.91986	0.929547	0.940818	0.951411	0.962914	0.973933	0.983975
FR	1.066467	1.06477	1.061261	1.055452	1.047399	1.039518	1.029063	1.018148	1.00522	0.992249
SW	1.009484	1.00554	1.00108	0.993706	0.985062	0.976795	0.966745	0.956283	0.943695	0.930814
OWW	0.953141	0.951675	0.949955	0.947768	0.944814	0.942526	0.938851	0.936114	0.932224	0.928549
IN	1.201374	1.221961	1.243148	1.263518	1.283048	1.303418	1.322155	1.341349	1.359557	1.376973
GR	1.119159	1.127988	1.137134	1.144871	1.151637	1.158071	1.163305	1.16836	1.172701	1.17648
FN	1.116937	1.116821	1.11999	1.117604	1.113392	1.108374	1.102057	1.094897	1.085281	1.074983
CA	1.308414	1.313735	1.321021	1.323899	1.325139	1.324759	1.319944	1.312088	1.302205	1.288393
AR	0.971796	0.973006	0.974406	0.975381	0.975807	0.977017	0.975826	0.977017	0.976507	0.975807
OWE	1.132766	1.144573	1.156861	1.16812	1.178486	1.188852	1.198168	1.20773	1.216448	1.224686
HU	1.288077	1.314478	1.340738	1.365791	1.38978	1.41384	1.436267	1.458836	1.480483	1.501703
UK	1.014761	1.011845	1.008191	1.002304	0.994539	0.987201	0.97773	0.967491	0.955717	0.943942
EM	1.269526	1.292558	1.316102	1.33811	1.358893	1.379773	1.39912	1.418364	1.436585	1.454192
CL	1.139305	1.146276	1.153944	1.159754	1.16475	1.169978	1.173115	1.175787	1.177414	1.178343
PE	1.158924	1.166909	1.177764	1.185134	1.191374	1.197892	1.202191	1.208351	1.210234	1.213147
ID	1.818298	1.920213	2.029574	2.146809	2.272128	2.406596	2.547021	2.696383	2.852979	3.018596
IS	1.032372	1.022921	1.013941	1.002836	0.990548	0.977788	0.963138	0.947306	0.930057	0.911626
DE	1.153525	1.151069	1.147138	1.138787	1.12847	1.117907	1.104888	1.090887	1.074429	1.057234
SZ	1.128729	1.128729	1.127072	1.122099	1.114917	1.107182	1.097238	1.086188	1.072928	1.059116
AU	1.063927	1.061644	1.057078	1.052511	1.043379	1.034247	1.022831	1.011416	1	0.986301
NO	1.135135	1.135135	1.162162	1.162162	1.162162	1.189189	1.189189	1.189189	1.189189	1.216216

C. Forecast Calculation by Trade Partner

						2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
127,968	World Total	273,267,420	100.0%	172,775	100.0%										
	Ukraine Total	70,723,064	25.9%	70,723	40.9%	52,390	54,152	56,729	58,375	60,051	61,666	63,329	65,077	66,808	68,705
	Guatemala Tot	60,993,625	22.3%	0	0.0%	0	0	0	0	0	0	0	0	0	0
	El Salvador To	23,035,333	8.4%	0	0.0%	0	0	0	0	0	0	0	0	0	0
	USA Total	17,743,302	6.5%	17,743	10.3%	13,144	13,339	13,800	13,592	13,695	13,784	13,820	13,681	13,933	13,898
	Brazil Total	16,601,319	6.1%	16,601	9.6%	12,298	12,406	12,577	12,744	12,927	13,029	13,155	13,267	13,353	13,432
	Costa Rica Tot	16,463,505	6.0%	0	0.0%	0	0	0	0	0	0	0	0	0	0
	Belgium Total	13,911,918	5.1%	13,912	8.1%	10,306	10,430	10,380	10,354	10,453	10,534	10,580	10,599	10,609	10,606
	Australia Total	8,901,718	3.3%	8,902	5.2%	6,584	6,746	6,781	6,887	7,020	7,152	7,308	7,475	7,639	7,798
	Cuba Total	7,372,742	2.7%	7,373	4.3%	5,462	5,545	5,690	5,785	5,921	6,004	6,096	6,173	6,234	6,283
		235,748,526	86.3%	135,254	78.3%	100,193	102,618	105,938	107,737	110,066	112,150	114,287	116,473	118,576	120,621
						27,795	28,467	29,388	29,887	30,534	31,111	31,704	32,311	32,894	33,517
						127,988	131,085	135,326	137,624	140,600	143,261	145,991	148,784	151,470	154,339

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Ukraine Total	70,922	73,141	75,127	77,229	79,282	81,336	83,296	85,416	87,673	89,954	92,331
Guatemala Tot	0	0	0	0	0	0	0	0	0	0	0
El Salvador To	0	0	0	0	0	0	0	0	0	0	0
USA Total	14,090	14,164	14,270	14,363	14,483	14,557	14,659	14,762	14,868	14,972	15,080
Brazil Total	13,482	13,542	13,600	13,663	13,706	13,735	13,765	13,770	13,769	13,756	13,729
Costa Rica Tot	0	0	0	0	0	0	0	0	0	0	0
Belgium Total	10,643	10,649	10,599	10,534	10,442	10,331	10,221	10,086	9,945	9,784	9,621
Australia Total	7,968	8,149	8,324	8,506	8,686	8,862	9,046	9,223	9,404	9,580	9,749
Cuba Total	6,304	6,324	6,345	6,368	6,375	6,372	6,365	6,342	6,309	6,268	6,216
	123,408	125,989	128,266	130,664	132,953	135,192	137,351	139,599	141,968	144,313	146,725
	34,235	34,951	35,582	36,247	36,883	37,504	38,103	38,726	39,383	40,034	40,703
	157,643	160,940	163,848	166,911	169,836	172,696	175,454	178,326	181,351	184,347	187,429

Table F5.10-16
Forecast Calculations
Chemical Product Imports

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
108,020

Period	Trade Flow	Reporter	Partner	Commodity Code	Commodity Descript	Trade Value	NetWeight (kg)	Unit	Trade Quantity
2003	Import	Honduras	World	S3-522	INORGANIC CHEM.	9,078,823	40,268,700	Weight in kilograms	40,268,705
2003	Import	Honduras	USA	S3-522	INORGANIC CHEM.	3,727,460	24,835,490	Weight in kilograms	24,835,484
2003	Import	Honduras	Nicaragua	S3-522	INORGANIC CHEM.	1,530,768	5,770,203	Weight in kilograms	5,770,203
2003	Import	Honduras	Guatemala	S3-522	INORGANIC CHEM.	967,948	3,328,486	Weight in kilograms	3,328,486
2003	Import	Honduras	Mexico	S3-522	INORGANIC CHEM.	1,440,311	1,830,924	Weight in kilograms	1,830,924
2003	Import	Honduras	El Salvador	S3-522	INORGANIC CHEM.	256,084	1,435,901	Weight in kilograms	1,435,901
2003	Import	Honduras	Colombia	S3-522	INORGANIC CHEM.	184,065	927,213	Weight in kilograms	927,213
2003	Import	Honduras	Peru	S3-522	INORGANIC CHEM.	220,360	825,996	Weight in kilograms	825,996
2003	Import	Honduras	Chile	S3-522	INORGANIC CHEM.	118,809	404,937	Weight in kilograms	404,937
2003	Import	Honduras	Netherlands	S3-522	INORGANIC CHEM.	127,302	254,991	Weight in kilograms	254,991
2003	Import	Honduras	China	S3-522	INORGANIC CHEM.	118,470	166,313	Weight in kilograms	166,313
2003	Import	Honduras	Germany	S3-522	INORGANIC CHEM.	110,871	145,508	Weight in kilograms	145,508
2003	Import	Honduras	Costa Rica	S3-522	INORGANIC CHEM.	73,365	104,213	Weight in kilograms	104,213
2003	Import	Honduras	China, Hong Kong SAR	S3-522	INORGANIC CHEM.	39,222	71,471	Weight in kilograms	71,471
2003	Import	Honduras	Jamaica	S3-522	INORGANIC CHEM.	13,600	40,937	Weight in kilograms	40,937
2003	Import	Honduras	Brazil	S3-522	INORGANIC CHEM.	31,866	34,665	Weight in kilograms	34,665
2003	Import	Honduras	India	S3-522	INORGANIC CHEM.	776	21,421	Weight in kilograms	21,421
2003	Import	Honduras	United Kingdom	S3-522	INORGANIC CHEM.	26,832	20,000	Weight in kilograms	20,000
2003	Import	Honduras	Venezuela	S3-522	INORGANIC CHEM.	20,201	15,312	Weight in kilograms	15,312
2003	Import	Honduras	Belgium	S3-522	INORGANIC CHEM.	3,256	10,125	Weight in kilograms	10,125
2003	Import	Honduras	Panama	S3-522	INORGANIC CHEM.	8,566	9,464	Weight in kilograms	9,464
2003	Import	Honduras	Canada	S3-522	INORGANIC CHEM.	6,222	4,971	Weight in kilograms	4,971
2003	Import	Honduras	Italy	S3-522	INORGANIC CHEM.	19,460	3,851	Weight in kilograms	3,851
2003	Import	Honduras	Sweden	S3-522	INORGANIC CHEM.	2,116	2,062	Weight in kilograms	2,062
2003	Import	Honduras	Areas, nes	S3-522	INORGANIC CHEM.	3,902	1,876	Weight in kilograms	1,876
2003	Import	Honduras	Japan	S3-522	INORGANIC CHEM.	1,575	1,000	Weight in kilograms	1,000
2003	Import	Honduras	France	S3-522	INORGANIC CHEM.	17,500	1,000	Weight in kilograms	1,000
2003	Import	Honduras	Swaziland	S3-522	INORGANIC CHEM.	1,528	179	Weight in kilograms	179
2003	Import	Honduras	Argentina	S3-522	INORGANIC CHEM.	2,501	132	Weight in kilograms	132
2003	Import	Honduras	Spain	S3-522	INORGANIC CHEM.	3,895	70	Weight in kilograms	70

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
US	OCL	C3511B	0.674	0.838202954	0.666878	0.755387159	0.724170804	0.794038122	1	1	0.9613831	1
OCL	OCL	C3511B	0.476	1.412369634	0.645428	1.055679195	1.142876073	1.07285835	1	1	0.98787656	1
CH	OCL	C3511B	0.041	0.180206877	0.485229	0.454892511	0.66826666	0.494677153	1	1	0.896034593	1
PE	OCL	C3511B	0.281	0.586012094	0.530946	0.576641365	0.745874822	0.675538039	1	1	0.938117182	1
VZ	OCL	C3511B	0.61	0.796951896	0.416211	0.84131253	0.649969447	0.439253274	1	1	1.057774166	1
BU	OCL	C3511B	0.116	0.757942233	0.149222	0.35886346	0.107406393	0.201066103	1	1	1.090832954	1
NE	OCL	C3511B	0.105	0.069070305	1.351322	0.041611517	0.026478612	0.019622449	1	1	1.116260364	1
MX	OCL	C3511B	1.079	1.026848144	1.103948	0.956571347	1.168890617	1.273604986	1	1	1.039536742	1
CO	OCL	C3511B	0.287	1.151723437	0.39804	0.803697163	0.780569259	0.857022704	1	1	0.888646256	1
SP	OCL	C3511B	0.745	0.451436722	0.620467	0.147055024	0.148523108	0.119610664	0	1	1.074859064	1
CL	OCL	C3511B	0.032	0.342034117	0.710881	0.06393163	0.728850554	0.491272346	1	1	0.847143592	1
CRB	OCL	C3511B	2.239	14.01669604	10.16715	7.386071134	14.74676581	3.778387118	1	1	0.963546082	1
ONF	OCL	C3511B	0.436	0	0	0	0.73427887	0.564101134	2	1	0.980331216	1
IS	OCL	C3511B	0.884	0.666400386	0.891973	1.25330674	1.521629256	1.521682702	1	1	1.033888344	1
BZ	OCL	C3511B	4.966	0.203160694	0.262067	0.299450348	0.808298592	0.978150369	1	1	0.965362815	1
BE	OCL	C3511B	0.371	4.352178802	3.93195	4.190589221	3.297439762	3.162480203	3	1	1.138376971	1
GF	OCL	C3511B	2.394	2.191128959	2.00223	2.052071966	1.567611168	1.241415157	1	1	1.019979899	1
AR	OCL	C3511B	0.785	0.650142128	0.719528	0.786527603	1.233731355	0.987555498	1	1	0.999586451	1
UK	OCL	C3511B	0.234	0.37030486	0.729277	2.399324774	0.718375692	1.13267111	2	1	1.117444903	1
TW	OCL	C3511B	0.964	1.375786331	5.108201	2.087435467	1.472395462	1.006904011	0	1	1.027178791	1
OSF	OCL	C3511B	0	0	0	0	0.874564781	0.954929695	1	1	0.982264814	1
OWW	OCL	C3511B	0.308	0.834515632	0.492682	1.895326443	0.968588945	0	0	1	1.065047827	1
CA	OCL	C3511B	3.077	3.31214774	4.021316	1.489760163	1.749940041	1.245293201	0	1	1.023743854	1
SW	OCL	C3511B	0	0	0.111688	0.08862528	0.714916646	0.487994526	1	1	1.1428527	1
PO	OCL	C3511B	21.52	7.190244058	14.31358	2.727012044	6.635920474	0	0	1	1.093385586	1
JA	OCL	C3511B	3.621	3.901051625	4.843042	4.989825184	4.63828189	0.573374761	0	1	1.101031139	1
WAF	OCL	C3511B	1.409	0.141603923	0.562927	1.43886855	1.52642122	0.987704635	0	1	1.031981764	1
RU	OCL	C3511B	0.084	0.063847936	0	0	3.722585925	0	0	1	1.014602637	1
ID	OCL	C3511B	0	0.006678688	2.178651	1.355439792	1.535697589	0.547518867	1	1	0.880585053	1
PG	OCL	C3511B	0.881	1.000349871	0.559853	1.119235883	0.559852928	1.259184102	2	1	1.054859702	1
IT	OCL	C3511B	9.809	1.339046432	0.817467	0.443751948	0.155733873	1.269009037	1	1	1.054378311	1
FR	OCL	C3511B	0.142	0.374074777	0.11283	0.332226229	1.369001518	1.138546214	2	1	1.142911368	1
KO	OCL	C3511B	0.642	0.606654489	0.807601	0.605654489	1.926932256	2.037084634	1	1	0.948228383	1
HU	OCL	C3511B	0	0	1.522849	2.551137488	1.483283877	0	0	1	0.996043521	1
SG	OCL	C3511B	0	0	0	1.137647555	2.801664975	0	0	1	1.016652914	1
SA	OCL	C3511B	8.585	12.23967828	8.280429	5.059517426	0	0	0	1	0.983914209	1
DE	OCL	C3511B	0	12.06896552	0	5.172413793	0	0	0	1	1.189655172	1
GR	OCL	C3511B	2579	1809.5	989.7	819.8	679.8	150	10	1	1	1

OriginCode	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
US	1.01475	1.021357	1.026411	1.0363	1.041917	1.045907	1.049709	1.051676	1.051532	1.050837
OCL	1.03579	1.062052	1.088174	1.117785	1.144611	1.171877	1.198481	1.224258	1.249555	1.273215
CH	1.111291	1.223763	1.351212	1.489734	1.62957	1.776686	1.926831	2.0815	2.236974	2.391345
PE	1.053037	1.108303	1.166893	1.223264	1.281052	1.341173	1.398597	1.454893	1.513385	1.57326
VZ	0.99432	0.995777	0.993809	0.989662	0.980398	0.971993	0.962643	0.950631	0.938365	0.924195
BU	1.029893	1.049023	1.061201	1.078799	1.09176	1.105276	1.109982	1.112653	1.116761	1.119427
NE	1.02489	1.043156	1.057001	1.075193	1.090433	1.101633	1.108074	1.11016	1.111497	1.110729
MX	1.039484	1.070417	1.10194	1.135567	1.167312	1.202611	1.239208	1.277206	1.31636	1.350149
CO	1.129096	1.179049	1.211553	1.24266	1.272392	1.305248	1.335965	1.366155	1.398035	1.428206
SP	1.048218	1.072164	1.089167	1.11163	1.132751	1.151709	1.166707	1.178387	1.188916	1.199658
CL	1.050197	1.085745	1.124278	1.16699	1.209785	1.253987	1.297976	1.341411	1.385465	1.427292
CRB	1.034466	1.057353	1.080518	1.107081	1.131884	1.160976	1.191783	1.224678	1.257543	1.282498
ONF	1.038537	1.077494	1.118085	1.155741	1.194465	1.234527	1.274112	1.313544	1.355287	1.396523
IS	1.037749	1.056504	1.076295	1.09358	1.104945	1.114246	1.120689	1.123954	1.125962	1.125269
BZ	1.059136	1.108378	1.161846	1.21048	1.258014	1.305704	1.352017	1.397233	1.442606	1.485566
BE	1.025292	1.046695	1.064886	1.085	1.101382	1.113714	1.120657	1.124292	1.126376	1.128516
GF	1.00625	1.015498	1.022322	1.031695	1.038334	1.043708	1.046486	1.046939	1.046443	1.044411
AR	1.028692	1.061837	1.101039	1.128932	1.153004	1.17747	1.199265	1.218739	1.239046	1.258188
UK	1.031596	1.056567	1.078983	1.100921	1.117593	1.130963	1.140062	1.145718	1.149767	1.150808
TW	0.971578	0.927339	0.899247	0.872191	0.846562	0.825804	0.809587	0.794667	0.78234	0.769621
OSF	1.031235	1.05349	1.07546	1.100352	1.122816	1.145706	1.167944	1.189421	1.210604	1.23044
OWW	1.003354	0.994559	0.988284	0.979296	0.964868	0.950006	0.933283	0.914457	0.895631	0.876266
CA	1.035556	1.053034	1.074889	1.097494	1.116471	1.137616	1.159911	1.182096	1.204611	1.219001
SW	1.013167	1.025162	1.032409	1.044849	1.055207	1.062236	1.066777	1.06856	1.069047	1.067834
PO	1.071624	1.130623	1.200344	1.271968	1.347002	1.424329	1.497101	1.570127	1.644013	1.719429
JA	1.025198	1.031037	1.043636	1.049508	1.048962	1.049099	1.050498	1.050806	1.051386	1.049269
WAF	1.025109	1.048283	1.079436	1.109898	1.138392	1.165608	1.188644	1.209263	1.229571	1.248947
RU	1.021686	1.027005	1.031688	1.040826	1.048327	1.055237	1.061193	1.066285	1.072149	1.07685
ID	1.118814	1.235223	1.365324	1.505777	1.648768	1.802311	1.962408	2.128899	2.302277	2.484138
PG	1.02687	1.02827	1.037926	1.0543	1.068715	1.076272	1.083759	1.089497	1.094115	1.100343
IT	1.025242	1.030695	1.032798	1.039342	1.043394	1.045263	1.044484	1.041602	1.03794	1.03459
FR	1.026381	1.048681	1.068229	1.091099	1.109983	1.124502	1.13475	1.141488	1.146707	1.148036
KO	1.020195	1.022765	1.02919	1.035616	1.038553	1.042409	1.047549	1.051404	1.055076	1.056645
HU	1.023937	1.041345	1.059545	1.078932	1.096538	1.114936	1.132344	1.149159	1.165381	1.180811
SG	1.034992	1.05586	1.07715	1.094857	1.108769	1.124157	1.139334	1.153035	1.166526	1.178331
SA	1.023056	1.028954	1.034853	1.039678	1.040214	1.040761	1.039142	1.035925	1.031099	1.021984
DE	1.034483	1.051724	1.086207	1.103448	1.137931	1.155172	1.172414	1.189655	1.206897	1.224138
GR	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3

OriginCode	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	1.049659	1.047577	1.046631	1.04512	1.04272	1.039066	1.036613	1.034468	1.031694	1.028809
OCL	1.296412	1.317523	1.337956	1.356865	1.374426	1.390506	1.406696	1.420329	1.433166	1.444561
CH	2.546522	2.698204	2.845689	2.990796	3.133376	3.27164	3.404341	3.53255	3.654683	3.770916
PE	1.632888	1.690048	1.74676	1.801934	1.855523	1.908516	1.96371	2.013246	2.062409	2.10981
VZ	0.910166	0.894603	0.876999	0.85796	0.837435	0.816066	0.794628	0.770686	0.747209	0.7236
BU	1.119656	1.115388	1.109847	1.101987	1.091773	1.079905	1.068876	1.054053	1.038	1.020887
NE	1.106863	1.098716	1.086208	1.071864	1.05323	1.033691	1.013394	0.989208	0.964328	0.938746
MX	1.385279	1.419977	1.46187	1.481684	1.511038	1.539091	1.566963	1.588641	1.61103	1.63128
CO	1.458657	1.486687	1.513204	1.5381	1.561514	1.583316	1.605815	1.623037	1.639891	1.65491
SP	1.20601	1.208456	1.20881	1.206016	1.200684	1.194146	1.187377	1.175156	1.16184	1.14717
CL	1.468537	1.508968	1.549186	1.58765	1.624652	1.661396	1.69951	1.73339	1.767418	1.800056
CRB	1.308229	1.333391	1.354564	1.372237	1.389084	1.403737	1.416682	1.422694	1.428633	1.431519
ONF	1.439916	1.477108	1.513961	1.549873	1.584471	1.618021	1.653482	1.684875	1.716319	1.746505
IS	1.120442	1.112207	1.101588	1.088071	1.072254	1.054913	1.037381	1.016529	0.994883	0.972496
BZ	1.525593	1.562769	1.596857	1.627491	1.655622	1.682366	1.708523	1.728442	1.747658	1.764312
BE	1.124695	1.117345	1.106794	1.092556	1.075684	1.058156	1.039921	1.017478	0.993919	0.969546
GF	1.038343	1.031436	1.021986	1.010081	0.996398	0.981771	0.96736	0.949684	0.931291	0.912325
AR	1.275386	1.289689	1.302162	1.312558	1.3208	1.327407	1.334205	1.336677	1.33882	1.339372
UK	1.146895	1.139282	1.128508	1.114176	1.096825	1.078572	1.05915	1.035718	1.011373	0.986435
TW	0.75671	0.744513	0.734648	0.724791	0.71435	0.704485	0.696185	0.687555	0.679708	0.671139
OSF	1.249724	1.266999	1.283679	1.298996	1.313073	1.325829	1.33886	1.349389	1.35929	1.367852
OWW	0.858188	0.836442	0.814887	0.792515	0.769709	0.746919	0.724947	0.701948	0.678725	0.655518
CA	1.232732	1.245203	1.254317	1.260133	1.26421	1.266219	1.266998	1.262601	1.258724	1.252308
SW	1.062627	1.053123	1.041117	1.026001	1.008802	0.990607	0.972319	0.950299	0.927501	0.904081
PO	1.787676	1.850029	1.911744	1.96919	2.0202	2.068088	2.116995	2.158733	2.19566	2.226478
JA	1.04425	1.037285	1.030456	1.021715	1.010926	0.999317	0.988391	0.975348	0.962476	0.948409
WAF	1.265041	1.277613	1.288685	1.297368	1.303758	1.308075	1.312634	1.313877	1.314602	1.314084
RU	1.079242	1.079333	1.078833	1.076059	1.071831	1.066967	1.063466	1.056374	1.048691	1.039553
ID	2.667201	2.849195	3.034462	3.220397	3.406665	3.594604	3.789354	3.977226	4.1665	4.355607
PG	1.103422	1.106431	1.104611	1.103352	1.100063	1.097614	1.090057	1.084179	1.072423	1.063956
IT	1.028436	1.019944	1.009582	0.997585	0.983873	0.969639	0.955282	0.938376	0.920614	0.902306
FR	1.145663	1.139685	1.130195	1.11729	1.101253	1.084266	1.066616	1.0446	1.021826	0.998292
KO	1.055811	1.05324	1.051404	1.047549	1.041491	1.034514	1.027905	1.018909	1.009363	0.997981
HU	1.194659	1.206528	1.217804	1.227498	1.236004	1.243126	1.251039	1.256182	1.260732	1.264095
SG	1.189081	1.197723	1.205734	1.212901	1.218803	1.223651	1.229132	1.232293	1.235245	1.237142
SA	1.010168	0.99571	0.980161	0.962466	0.944236	0.925469	0.906166	0.884718	0.863271	0.841287
DE	1.224138	1.224138	1.224138	1.206897	1.206897	1.189655	1.189655	1.172414	1.155172	1.12069
GR	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4

C. Forecast Calculation by Trade Partner

108,020	World	S3-522	INORGANIC CHEM.ELEMENT	9,078,823	40,268,700	100.0%	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	USA	S3-522	INORGANIC CHEM.ELEMENT	3,727,460	24,835,490	61.7%	66,621	67,603	68,044	68,360	69,039	69,413	69,679	69,932	70,057	70,054
	Nicaragua	S3-522	INORGANIC CHEM.ELEMENT	1,530,768	5,770,203	14.3%	15,478	16,032	16,439	16,843	17,302	17,717	18,139	18,551	18,950	19,341
	Guatemala	S3-522	INORGANIC CHEM.ELEMENT	967,948	3,328,486	8.3%	8,929	9,922	10,926	12,064	13,301	14,550	15,863	17,202	18,565	19,973
	Mexico	S3-522	INORGANIC CHEM.ELEMENT	1,440,311	1,830,924	4.5%	4,911	5,172	5,443	5,731	6,008	6,292	6,587	6,869	7,146	7,433
	El Salvador	S3-522	INORGANIC CHEM.ELEMENT	256,084	1,435,901	3.6%	3,852	3,830	3,836	3,828	3,812	3,776	3,744	3,708	3,662	3,614
	Colombia	S3-522	INORGANIC CHEM.ELEMENT	184,065	927,213	2.3%	2,487	2,562	2,607	2,639	2,683	2,715	2,749	2,761	2,767	2,778
	Peru	S3-522	INORGANIC CHEM.ELEMENT	220,360	825,996	2.1%	2,216	2,271	2,311	2,342	2,382	2,416	2,441	2,455	2,460	2,463
	Chile	S3-522	INORGANIC CHEM.ELEMENT	118,809	404,937	1.0%	1,086	1,129	1,163	1,197	1,233	1,268	1,306	1,346	1,387	1,430
	Netherlands	S3-522	INORGANIC CHEM.ELEMENT	127,302	254,991	0.6%	684	772	806	829	850	870	893	914	934	956
	China	S3-522	INORGANIC CHEM.ELEMENT	118,470	166,313	0.4%	446	466	478	486	496	505	514	521	526	530
	Germany	S3-522	INORGANIC CHEM.ELEMENT	110,871	145,508	0.4%	390	410	424	439	456	472	489	507	524	541
	Costa Rica	S3-522	INORGANIC CHEM.ELEMENT	73,365	104,213	0.3%	280	289	296	302	309	316	325	333	342	352
				8,875,813	40,030,175	99.4%	107,380	110,460	112,773	115,081	117,872	120,312	122,729	125,098	127,339	129,465
							640	658	672	686	702	717	731	745	759	771
							108,020	111,119	113,445	115,767	118,574	121,029	123,460	125,844	128,098	130,236

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
USA	70,008	69,929	69,790	69,727	69,627	69,467	69,223	69,060	68,917	68,746	68,540
Nicaragua	19,707	20,066	20,393	20,709	21,002	21,274	21,523	21,773	21,984	22,183	22,360
Guatemala	21,351	22,756	24,091	25,410	26,704	27,977	29,213	30,398	31,541	32,633	33,669
Mexico	7,727	8,020	8,301	8,579	8,850	9,113	9,374	9,645	9,888	10,129	10,362
El Salvador	3,560	3,506	3,446	3,378	3,305	3,226	3,143	3,061	2,969	2,878	2,787
Colombia	2,784	2,785	2,774	2,760	2,741	2,715	2,688	2,659	2,622	2,582	2,539
Peru	2,461	2,453	2,434	2,407	2,375	2,334	2,290	2,245	2,192	2,137	2,080
Chile	1,467	1,505	1,542	1,577	1,609	1,641	1,672	1,702	1,726	1,750	1,772
Netherlands	977	998	1,017	1,035	1,052	1,068	1,083	1,098	1,110	1,122	1,132
China	535	538	539	538	538	536	533	530	524	518	512
Germany	557	573	589	605	620	634	648	663	677	690	703
Costa Rica	359	366	373	379	384	388	392	396	398	399	400
	131,493	133,492	135,280	137,106	138,806	140,373	141,781	143,228	144,546	145,767	146,856
	784	795	806	817	827	836	846	853	861	869	875
	132,276	134,288	136,096	137,923	139,633	141,209	142,625	144,082	145,408	146,636	147,731

Table F5.10-17
Forecast Calculations
Container Imports

A. 2003 UN Honduras Trade Data

	2004 Port of Cortes
Container Tare Weight	503,871
Domestic Intransit	317,728
Foreign Intransit	375,029
Free Trade Zone	475,409
Total	1,672,037

Year	Direction	Reporter	Partner	Comcode	Commodity Description	Value	
			World Total			1,694,192,100	
			USA Total			638,319,160	37.7%
2003	Import	Honduras	**Japan Total**			126,663,460	7.5%
2003	Import	Honduras	**Guatemala Total**			102,515,150	6.1%
2003	Import	Honduras	**Mexico Total**			101,147,140	6.0%
2003	Import	Honduras	**Panama Total**			87,610,470	5.2%
2003	Import	Honduras	**El Salvador Total**			77,092,881	4.6%
2003	Import	Honduras	**Costa Rica Total**			61,039,870	3.6%
2003	Import	Honduras	**Brazil Total**			57,952,580	3.4%
2003	Import	Honduras	**Spain Total**			49,856,879	2.9%
2003	Import	Honduras	**Germany Total**			35,495,734	2.1%
2003	Import	Honduras	**China Total**			31,709,820	1.9%
2003	Import	Honduras	**Sweden Total**			30,946,097	1.8%
			Ukraine Total			26,579,681	1.6%
			Colombia Total			22,933,818	1.4%
2003	Import	Honduras	**Rep. of Korea Total**			20,028,216	1.2%
2003	Import	Honduras	**Venezuela Total**			19,938,639	1.2%
2003	Import	Honduras	**Other Asia, nes Total**			17,819,374	1.1%
2003	Import	Honduras	**Italy Total**			15,546,997	0.9%
			China, Hong Kong SAR				
2003	Import	Honduras	**Total**			13,328,196	0.8%
2003	Import	Honduras	**Canada Total**			13,255,465	0.8%
			France Total			11,641,793	0.7%
			Finland Total			9,191,675	0.5%
			Belgium Total			9,069,000	0.5%
			Malaysia Total			7,361,031	0.4%
2003	Import	Honduras	**Nicaragua Total**			7,172,548	0.4%
2003	Import	Honduras	**Australia Total**			7,021,447	0.4%
2003	Import	Honduras	**Chile Total**			6,962,629	0.4%
2003	Import	Honduras	**United Kingdom Total**			6,314,084	0.4%
2003	Import	Honduras	**Argentina Total**			6,178,641	0.4%
2003	Import	Honduras	**Thailand Total**			5,385,835	0.3%
			Russian Federation				
2003	Import	Honduras	**Total**			5,298,615	0.3%
2003	Import	Honduras	**India Total**			4,743,033	0.3%
			Lao People's Dem. Rep.				
2003	Import	Honduras	**Total**			4,584,827	0.3%
2003	Import	Honduras	**Switzerland Total**			4,213,754	0.2%
			Peru Total			3,768,754	0.2%
2003	Import	Honduras	**Netherlands Total**			2,852,283	0.2%
			Indonesia Total			2,799,818	0.2%
			Israel Total			2,536,717	0.1%
2003	Import	Honduras	**Pakistan Total**			2,379,219	0.1%
			Cuba Total			2,369,453	0.1%
2003	Import	Honduras	**Norway Total**			2,344,200	0.1%
2003	Import	Honduras	**Austria Total**			2,292,061	0.1%
			Trinidad and Tobago				
2003	Import	Honduras	**Total**			2,180,620	0.1%
2003	Import	Honduras	**Uruguay Total**			1,987,982	0.1%
2003	Import	Honduras	**Areas, nes Total**			1,746,402	0.1%
2003	Import	Honduras	**Denmark Total**			1,707,434	0.1%

2003 Import	Honduras	Ireland Total	1,595,047	0.1%	
2003 Import	Honduras	Philippines Total	1,402,774	0.1%	
2003 Import	Honduras	Andorra Total	1,384,922	0.1%	
		Czech Rep. Total	1,366,373	0.1%	
2003 Import	Honduras	Turkey Total	972,359	0.1%	
		Dominican Rep. Total	891,567	0.1%	
		Ecuador Total	880,659	0.1%	
2003 Import	Honduras	Kenya Total	838,475	0.0%	
2003 Import	Honduras	Neth. Antilles Total	709,411	0.0%	
2003 Import	Honduras	Antigua and Barbuda Total	693,919	0.0%	
2003 Import	Honduras	South Africa Total	635,935	0.0%	
		United Arab Emirates Total	584,944	0.0%	
2003 Import	Honduras	Lebanon Total	489,512	0.0%	
2003 Import	Honduras	Jamaica Total	471,419	0.0%	
2003 Import	Honduras	Albania Total	426,545	0.0%	
		Greece Total	407,334	0.0%	
2003 Import	Honduras	Poland Total	395,399	0.0%	
2003 Import	Honduras	New Zealand Total	338,894	0.0%	
2003 Import	Honduras	Saudi Arabia Total	328,334	0.0%	
2003 Import	Honduras	Afghanistan Total	310,691	0.0%	
		Uganda Total	292,032	0.0%	
2003 Import	Honduras	Bahamas Total	243,374	0.0%	
2003 Import	Honduras	Aruba Total	243,142	0.0%	
2003 Import	Honduras	Armenia Total	241,165	0.0%	
2003 Import	Honduras	Pitcairn Total	231,253	0.0%	
2003 Import	Honduras	Bolivia Total	229,898	0.0%	
2003 Import	Honduras	Singapore Total	226,069	0.0%	
		Portugal Total	212,603	0.0%	
2003 Import	Honduras	Azerbaijan Total	205,366	0.0%	
2003 Import	Honduras	Bangladesh Total	195,808	0.0%	
2003 Import	Honduras	Egypt Total	193,614	0.0%	
		Anguilla Total	190,211	0.0%	
2003 Import	Honduras	Jordan Total	180,194	0.0%	
2003 Import	Honduras	Angola Total	174,725	0.0%	
2003 Import	Honduras	Belize Total	154,642	0.0%	
2003 Import	Honduras	Bosnia Herzegovina Total	150,987	0.0%	
		Romania Total	149,943	0.0%	
		Guyana Total	147,982	0.0%	
2003 Import	Honduras	Swaziland Total	122,952	0.0%	
2003 Import	Honduras	Samoa Total	99,929	0.0%	
		Bahrain Total	85,247	0.0%	
2003 Import	Honduras	Bermuda Total	75,925	0.0%	
		Bulgaria Total	74,563	0.0%	
2003 Import	Honduras	Viet Nam Total	71,713	0.0%	
		Morocco Total	53,343	0.0%	
2003 Import	Honduras	US Misc. Pacific Isds Total	47,677	0.0%	
2003 Import	Honduras	Brunei Darussalam Total	46,472	0.0%	
2003 Import	Honduras	Bhutan Total	45,453	0.0%	
2003 Import	Honduras	Mauritius Total	43,958	0.0%	
2003 Import	Honduras	Latvia Total	42,942	0.0%	
2003 Import	Honduras	Central African Rep. Total	42,441	0.0%	
2003 Import	Honduras	Barbados Total	41,457	0.0%	
2003 Import	Honduras	Burundi Total	37,948	0.0%	
2003 Import	Honduras	Cocos Isds Total	37,679	0.0%	
2003 Import	Honduras	Eritrea Total	31,001	0.0%	
		Faeroe Isds Total	30,449	0.0%	
2003 Import	Honduras	Benin Total	30,394	0.0%	
Period	Trade Flow	Reporter	Slovakia Total	29,504	0.0% NetWeight (kg)
2003 Import	Honduras	Mauritania Total	27,377	0.0%	
2003 Import	Honduras	Iceland Total	23,004	0.0%	

2003 Import	Honduras	**Paraguay Total**	21,346	0.0%
2003 Import	Honduras	**Sudan Total**	21,145	0.0%
2003 Import	Honduras	**Ethiopia Total**	19,667	0.0%
		Zimbabwe Total	18,560	0.0%
2003 Import	Honduras	**Saint Pierre and Miquelon Total**	16,443	0.0%
		Djibouti Total	14,865	0.0%
2003 Import	Honduras	**Botswana Total**	14,829	0.0%
2003 Import	Honduras	**Iran Total**	12,906	0.0%
		Tuvalu Total	12,521	0.0%
		Lesotho Total	12,518	0.0%
		Greenland Total	11,635	0.0%
		Dominica Total	11,379	0.0%
		Br. Indian Ocean Terr. Total	11,362	0.0%
2003 Import	Honduras	**Cameroon Total**	10,700	0.0%
2003 Import	Honduras	**United Rep. of Tanzania Total**	10,381	0.0%
2003 Import	Honduras	**Estonia Total**	10,309	0.0%
		Namibia Total	9,687	0.0%
2003 Import	Honduras	**Marshall Isds Total**	8,444	0.0%
		Mali Total	8,372	0.0%
2003 Import	Honduras	**Sri Lanka Total**	8,072	0.0%
2003 Import	Honduras	**Algeria Total**	7,933	0.0%
2003 Import	Honduras	**Gabon Total**	6,869	0.0%
2003 Import	Honduras	**New Caledonia Total**	6,739	0.0%
		Togo Total	5,842	0.0%
2003 Import	Honduras	**Kuwait Total**	5,675	0.0%
		Croatia Total	5,431	0.0%
2003 Import	Honduras	**Iraq Total**	5,012	0.0%
		Madagascar Total	4,513	0.0%
2003 Import	Honduras	**C+¦te d'Ivoire Total**	4,400	0.0%
2003 Import	Honduras	**Christmas Isds Total**	4,249	0.0%
2003 Import	Honduras	**Serbia and Montenegro Total**	3,727	0.0%
2003 Import	Honduras	**Tokelau Total**	3,500	0.0%
2003 Import	Honduras	**Cambodia Total**	3,435	0.0%
2003 Import	Honduras	**Free Zones Total**	3,300	0.0%
		Georgia Total	3,193	0.0%
2003 Import	Honduras	**Cape Verde Total**	2,809	0.0%
2003 Import	Honduras	**Kyrgyzstan Total**	2,788	0.0%
2003 Import	Honduras	**Cayman Isds Total**	2,527	0.0%
2003 Import	Honduras	**Dem. People's Rep. of Korea Total**	2,219	0.0%
2003 Import	Honduras	**Rwanda Total**	2,106	0.0%
2003 Import	Honduras	**Guinea Total**	1,833	0.0%
2003 Import	Honduras	**Fr. South Antarctic Terr. Total**	1,812	0.0%
2003 Import	Honduras	**Uzbekistan Total**	1,757	0.0%
		Yemen Total	1,642	0.0%
2003 Import	Honduras	**Liberia Total**	1,611	0.0%
2003 Import	Honduras	**Kazakhstan Total**	1,568	0.0%
2003 Import	Honduras	**Malta Total**	1,512	0.0%
2003 Import	Honduras	**Ghana Total**	1,371	0.0%
2003 Import	Honduras	**Hungary Total**	1,371	0.0%
2003 Import	Honduras	**Belarus Total**	1,253	0.0%
2003 Import	Honduras	**Congo Total**	1,253	0.0%

2003 Import	Honduras	**Cook Isds Total**	1,253	0.0%
		Cyprus Total	1,253	0.0%
		Montserrat Total	1,187	0.0%
		TFYR of Macedonia		
2003 Import	Honduras	**Total**	1,138	0.0%
		Zambia Total	1,138	0.0%
2003 Import	Honduras	**Vanuatu Total**	1,014	0.0%
		Malawi Total	863	0.0%
		Fiji Total	715	0.0%
2003 Import	Honduras	**Grenada Total**	674	0.0%
		Wallis and Futuna Isds		
		Total	674	0.0%
		Haiti Total	672	0.0%
		N. Mariana Isds Total	629	0.0%

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
US	OCL	1	1.046316571	1.091718458	1.122537446	1.170862717	1.215599054	1.260268366	1	1.348337308	1.391438993	1.436814304	1.484223054	2	158.7%	1.642011736	1.698461911	1.757539985	1.820234126	1.885361255	1.95293464	2.023169152
OCL	OCL	1	1.05797096	1.101822697	1.144468345	1.190341529	1.234295098	1.279038035	1	1.369211243	1.416084124	1.46457747	1.514039176	2	161.8%	1.671537366	1.726597105	1.783328704	1.841697069	1.90222362	1.964683659	2.02960844
SG	OCL	1	1.053458757	1.138490242	1.180643771	1.243563665	1.308190169	1.359954947	1	1.438184195	1.468102544	1.497131139	1.518976846	2	154.4%	1.542638653	1.536719543	1.526134436	1.502465066	1.45884077	1.410348185	1.360009599
CH	OCL	1	1.183844105	1.314869946	1.467475423	1.831507414	1.792507771	1.960748067	2	2.319746825	2.515214053	2.71308167	2.926048308	3	335.0%	3.571869723	3.801411533	4.0368236	4.275703341	4.520749137	4.767468462	5.018004499
KO	OCL	1	1.07158176	1.11793538	1.167770336	1.215318207	1.256279669	1.296436402	1	1.371081728	1.405907932	1.436424686	1.465341204	1	151.6%	1.537611637	1.556292958	1.571768762	1.583852377	1.594904824	1.603515396	1.610286409
CO	OCL	1	1.118287193	1.180574356	1.23381386	1.288738607	1.339501813	1.393387839	1	1.499744748	1.555802868	1.613852827	1.674762925	2	180.2%	1.867222987	1.933206535	2.000139448	2.067457625	2.136355713	2.207495853	2.281300761
BZ	OCL	1	1.059333103	1.109370906	1.169654301	1.233687631	1.297932742	1.366258448	1	1.514683307	1.595590069	1.68150267	1.776902886	2	199.5%	2.118222309	2.248162813	2.393562158	2.55110433	2.723626041	2.911646778	3.119269576
SP	OCL	1	1.050134719	1.079719761	1.105938334	1.145791646	1.187479267	1.228551415	1	1.311187324	1.352351268	1.398319681	1.443072111	1	153.2%	1.577020962	1.822211251	1.68688447	1.71583144	1.762019682	1.807960401	1.856027676
MX	OCL	1	1.076516233	1.143780472	1.221728158	1.300852707	1.374167542	1.452287526	2	1.612062887	1.69382008	1.769201456	1.854191053	2	203.9%	2.138119585	2.237189151	2.34184236	2.449242446	2.560900462	2.678551404	2.801502841
OWW	OCL	1	1.054488918	1.110581126	1.165922885	1.229336165	1.289260479	1.353283903	1	1.492498375	1.568069839	1.647497241	1.735737197	2	192.9%	2.033672389	2.145224336	2.263213028	2.388130546	2.520492565	2.658841517	2.805931444
CA	OCL	1	1.059899465	1.123376546	1.192867531	1.267341125	1.333560278	1.399190534	1	1.523225409	1.580563036	1.622225393	1.670493887	2	176.8%	1.811102675	1.853902012	1.892210971	1.927482568	1.960914503	1.994396916	2.026069166
CL	OCL	1	1.035829463	1.065002799	1.095594918	1.130504704	1.163998259	1.197825878	1	1.282355636	1.294620689	1.328951145	1.365611384	1	144.1%	1.479720995	1.518527893	1.558115163	1.597650072	1.637697584	1.678024449	1.719384679
TW	OCL	1	1.037040233	1.048324283	1.071722375	1.095511813	1.117763972	1.141775217	1	1.190213936	1.21592868	1.24120898	1.268463223	1	132.8%	1.359268085	1.390738743	1.422996524	1.45594176	1.490270957	1.524996186	1.559674102
JA	OCL	1	1.03741965	1.057366782	1.084651302	1.114079799	1.134096209	1.15434068	1	1.194891696	1.213421509	1.230990239	1.250376365	1	129.4%	1.31528948	1.336421013	1.358088661	1.379495369	1.401175405	1.422934913	1.44492942
GF	OCL	1	1.045797006	1.065053391	1.128002909	1.183634522	1.239817387	1.295943158	1	1.406309125	1.460503282	1.517338872	1.571967318	2	167.7%	1.727503699	1.776071137	1.822636962	1.866888842	1.910119251	1.947699968	1.987022328
BE	OCL	1	1.028885475	1.055926968	1.065533303	1.122393506	1.157992222	1.191437854	1	1.254160758	1.283945259	1.317523858	1.348348005	1	140.5%	1.431941854	1.457388484	1.482318405	1.505447075	1.527824533	1.548033895	1.568438411
IT	OCL	1	1.045152854	1.066478362	1.090315305	1.125664862	1.159885168	1.19256881	1	1.256077372	1.287311031	1.321417024	1.354279602	1	141.8%	1.44924769	1.480185697	1.511115891	1.541369407	1.572073264	1.600825841	1.631045675
FR	OCL	1	1.022042279	1.054722185	1.091810857	1.136784381	1.180421479	1.222929786	1	1.307693111	1.349786707	1.394688508	1.439169809	1	152.9%	1.574489953	1.620377782	1.668276358	1.713014862	1.760408793	1.807332787	1.855828974
VZ	OCL	1	1.014749435	1.033832711	1.051607069	1.070133654	1.081900496	1.09518263	1	1.118015362	1.128013642	1.137002607	1.148241565	1.160359461	1.173431186	1.185935639	1.197936884	1.210642419	1.221987978	1.233665048	1.245797686	1.258037831
PE	OCL	1	1.042789537	1.086200838	1.13213508	1.17721401	1.220371153	1.2644475	1	1.351231358	1.39703768	1.447850244	1.500743922	1.552794117	1.607205841	1.662039546	1.717445206	1.774761008	1.832169809	1.89206268	1.953491361	2.017448239
RU	OCL	1	1.006532575	1.002138857	1.001762262	1.004523363	1.004747421	1.00415318	1	1.000348058	0.998776236	0.996901933	0.995387307	0.99234315	0.989778837	0.986130871	0.982173255	0.977971232	0.974986801	0.971294281	0.966607723	0.96168767
AR	OCL	1	1.022132195	1.044665835	1.075744673	1.10634053	1.132641817	1.1588895	1	1.208771677	1.233078433	1.258844918	1.286210765	1.313408441	1.34138284	1.368911733	1.396443659	1.42314447	1.44954457	1.476262613	1.502167124	1.528723946
IN	OCL	1	1.034739587	1.071334735	1.081848745	1.114091016	1.144203431	1.163349548	1	1.186632112	1.193308298	1.200934377	1.207641677	1.213830525	1.215213792	1.211390887	1.206831542	1.200629386	1.185830079	1.158092151	1.127705951	1.097310487
AT	OCL	1	1.04820279	1.087857476	1.132729196	1.179633166	1.226555162	1.279300059	1	1.397252345	1.481414848	1.533705775	1.609484389	1.689098539	1.775711966	1.868374129	1.967396887	2.073151367	2.186679441	2.308651763	2.437415872	2.576117758
FN	OCL	1	1.039533903	1.054034803	1.071917172	1.098274371	1.123469659	1.145169044	1	1.184458339	1.202679597	1.22297006	1.241631098	1.257215819	1.271752977	1.282201743	1.290578473	1.29767303	1.302396668	1.304444611	1.303731085	1.30246074
NE	OCL	1	1.024052884	1.049164171	1.076768595	1.116564118	1.152607358	1.185972758	1	1.247439171	1.276015241	1.307331486	1.33828521	1.367499286	1.395360622	1.422820775	1.447895789	1.471468203	1.49392668	1.515413094	1.534652258	1.554392639
NZ	OCL	1	1.06004853	1.109566089	1.168574759	1.232526956	1.293384697	1.356400879	1	1.482168645	1.54687979	1.617842731	1.689406652	1.763207731	1.840032244	1.918305908	1.998355091	2.079289635	2.162404408	2.246789263	2.33076066	2.415616933
SW	OCL	1	1.047550923	1.065526119	1.084390256	1.11021819	1.13665544	1.158100338	1	1.192476691	1.207088002	1.223221036	1.236244395	1.243508708	1.248056797	1.246904623	1.242703165	1.236928823	1.225149822	1.21101918	1.193054155	1.174090371
ID	OCL	1	1.115498964	1.219455534	1.340111811	1.471010503	1.594143194	1.722699642	2	1.990767585	2.129261418	2.270754919	2.418472606	2.57112952	2.728297339	2.886781373	3.04728769	3.210611707	3.373907495	3.539112748	3.703511802	3.870336271
UK	OCL	1	1.025583237	1.052776484	1.08244688	1.124183253	1.163655981	1.202856954	1	1.262346989	1.321546624	1.362815521	1.404267101	1.445305648	1.486927519	1.527472293	1.667396456	1.607914399	1.647422048	1.686050262	1.723396953	1.76158538
MA	OCL	1	1.04619345	1.093509155	1.11653822	1.155440978	1.191064809	1.217150321	1	1.252118937	1.264451474	1.277842229	1.289047211	1.299164999	1.303397146	1.30057263	1.295739824	1.28860446	1.272178497	1.241259579	1.207431658	1.172893306
CRB	OCL	1	1.031296501	1.05786493	1.085937814	1.116193679	1.140387219	1.166182553	1	1.212841065	1.234057605	1.249967398	1.267290202	1.284756192	1.301685695	1.316334845	1.330083121	1.342452222	1.352365578	1.360999621	1.368876912	1.37547253
TH	OCL	1	1.025918329	1.054822742	1.055551237	1.069566986	1.079607686	1.081602458	1	1.073535488	1.067507528	1.064651235	1.060433492	1.056866798	1.050803727	1.041237204	1.031642878	1.020705385	1.002991117	0.976123984	0.94787853	0.919382261
NO	OCL	1	1.078207656	1.164217356	1.253113099	1.350061994	1.459863126	1.572649331	2	1.800621713	1.919186624	2.043875326	2.169767904	2.298397592	2.427705255	2.559435109	2.693057135	2.830474086	2.989187994	3.10978766	3.251612101	3.397413911
CSW	OCL	1	1.034208941	1.081640108	1.113087286	1.145254336	1.17617686	1.207999691	1	1.274414301	1.310568344	1.352607505	1.394824085	1.432813567	1.47311527	1.51249652	1.551988959	1.589773227	1.630718776	1.67430693	1.718471181	1.764535462
OWL	OCL	1	1.03443236	1.070441088	1.107074875	1.146614329	1.179151499	1.2122022	1	1.27428079	1.305110835	1.336081368	1.370265208	1.405012015	1.44031181	1.475341828	1.510566588	1.546756814	1.583193033	1.821035393	1.660132718	1.700629212
PH	OCL	1	1.026286166	1.056861345	1.057022987	1.070790328	1.078907909	1.074412964	1	1.044935031	1.023404472	1.000624715	0.977553547	0.953305872	0.924385656	0.8907685	0.856551068	0.821508347	0.780988667	0.732461037	0.684330961	0.63793309
DE	OCL	1	1.027145575	1.066196036	1.105603919	1.157139106	1.207101311	1.25646837	1	1.357651831	1.408200267	1.461351171	1.513834174	1.565217752	1.617108862	1.668341095	1.719138512	1.768215615	1.818139663	1.867363854	1.914373486	1.961874558
SZ	OCL	1	1.039668583	1.069142377	1.100593058	1.141645145	1.181520426	1.218011371	1	1.284966567	1.317669236	1.351024517	1.382177554	1.411536838	1.442514675	1.469492728	1.495659298	1.521098118	1.545758758	1.568835013	1.589582	1.610880101
IS	OCL	1	1.075505263	1.128485652	1.186604125	1.250122651	1.310342472	1.370105867	1	1.490304892	1.550614172	1.612874789	1.676259359	1.740528021	1.806665171	1.871861223	1.937800827	2.003999854	2.070107168	2.137112206	2.204480423	2.274032347
PO	OCL	1	1.10009586	1.193420167	1.301459006	1.431260128	1.569904559	1.720193693	2	2.049623229	2.230646193	2.426386014	2.631459209	2.846897976	3.073187687	3.312086886	3.558079528	3.817689611	4.080393672	4.35764817	4.644029477	4.942848155
SA	OCL	1	1.048210058	1.083457495	1.125195644	1.166318168	1.205741138	1.246416575	1	1.325174586	1.365517977	1.406792176	1.446182844	1.485083847	1.528376352	1.565678239	1.605461022	1.645025071	1.682046106	1.719997616	1.756589486	1.792716406
TK	OCL	1	1.031550352	1.050611979	1.084381913	1.123643216	1.163676802	1.205581633	1	1.29979903	1.349753713	1.40480318	1.460320386	1.51407908	1.571257437	1.62867672	1.687490435	1.744841398	1.805393773	1.868384639	1.931586686	1.998295711
GR	OCL	1	1.042574424	1.054070364	1.087303669	1.124039978	1.157604304	1.190313015	1	1.257410359	1.292073025	1.331817983	1.370384617	1.409535327	1.450010769	1.489905136	1.53054091	1.572128365	1.614155948	1.656265951	1.698121607	1.741644005
HK	OCL	1	1.065699872	1.102875205	1.150413901	1.202224041	1.251526043	1.304926413	1	1.420198324	1.482896691	1.547395287	1.616574195	1.689613716	1.766626278	1.846664342	1.93062596	2.018553234	2.109359094	2.20444949	2.302551342	2.404034934
PG	OCL	1	1.055764377	1.092902504	1.130631585	1.160919815	1.229092818	1.276141819	1	1.371034486	1.418710994	1.470011754	1.520835849	1.57109228	1.622031189	1.672405537	1.722112218	1.772778492	1.822066427	1.871255155	1.917760543	1.965827382
OEL	OCL	1	1.008772856	1.028261926	1.049572141	1.069036311	1.086195204	1.102650932	1	1.133545864	1.148963212	1.16565228	1.182601264	1.199276357	1.216164428	1.232982384	1.249440442	1.265640521	1.281361468	1.297387437	1.31277017	1.328252209
OID	OCL	1	1.055923658	1.0782458	1.108220331	1.140444365	1.165333079	1.189231631	1	1.232991223	1.251728008	1.263163076	1.276850983	1.288473855	1.298144016	1.305190207	1.311609213	1.314682588	1.31583668	1.316075837	1.314601999	1.312457005
AU	OCL	1	1.043099135	1.062506646	1.085097264	1.118660977	1.151166874	1.17969809	1	1.230909723	1.255468349	1.281766099	1.305856583	1.325791282	1.344791728	1.359673048	1.372459645	1.384528468	1.393646261	1.400726032	1.405490499	1.409775613
PK	OCL	1	1.132918898	1.248538995	1.385979926	1.528626038	1.676239164	1.837121132	2	2.192995724	2.394340373	2.607753221	2.838690157	3.090963919	3.359055387	3.64345656	3.947897537	4.271660498	4.611590925	4.973518781	5.353540773	5.759084468
RO	OCL	1	1.024291929	1.039745096	1.056427392	1.082618148	1.10572022	1.129727618	1	1.172637037	1.19605864	1.221325431	1.247592621	1.27229075	1.296887384	1.320109165	1.342561269	1.366080059	1.388538165	1.410948213	1.431986654	1.452918762
WAF	OCL	1	1.017590992	1.026504933	1.04323866	1.067799201	1.085335751	1.103969424	1	1.141165311	1.158932229	1.177541118	1.196609958	1.215216706	1.234798839	1.254274556	1.274104006	1.292734216	1.312059707	1.331643773	1.349931925	1.369361843
OWE	OCL	1	1.068392314	1.140111153	1.193939546	1.26461231	1.336222715	1.401944304	1	1.521448819	1.576888377	1.632047565	1.684233329	1.735374273	1.782083869	1.825315559	1.866061251	1.905282904	1.938091555	1.962188065	1.983665095	2.004744729
ONF	OCL	1	1.031110346	1.059200773	1.087139034	1.121261256	1.151870388	1.184067385	1	1.247634643	1.280072366	1.313913593	1.348202417	1.381913671	1.416500053	1.451714748	1.48720281	1.522959646	1.559447737	1.595272026	1.630768355	1.667214382
IL	OCL	1	1.058634108	1.116673212	1.172830851	1.244074736	1.313174029	1.382698995	1	1.521053598	1.590816831	1.665193489	1.740644688	1.816895237	1.894324983	1.97182425	2.061004788	2.131540938	2.211728377	2.293427251	2.374254351	2.458569147
BU	OCL	1	1.029893277	1.048023121	1.061201167	1.078798994	1.09175951	1.105277989	1	1.112653242	1.11678075	1.119426572	1.119555073	1.115397988	1.109846521	1.101986573	1.091773037	1.079904774	1.068876274	1.0540525	1.038000081	1.020886969
BLT	OCL	1	1.041035477	1.074069516	1.096990806	1.127837566	1.157098732	1.184392457	1	1.234484853	1.258193096	1.285099471	1.310566936	1.33029642	1.349921103	1.365887159	1.380170834	1.392785071	1.405856655	1.418105531	1.427606963	1.437011961
CZ	OCL	1	1.051227697	1.074755698	1.109258577	1.154806957	1.202967224	1.252066716	1	1.350725717	1.402929955	1.460081762	1.51623547	1.572744476	1.632463241	1.690013989	1.74867875	1.810415029	1.872668822	1.937567443	2.00220769	2.069403934
SK	OCL	1	1.020422355	1.039347691	1.053900704	1.095594832	1.124088613	1.169018058	1	1.244441291	1.278214086	1.328696175	1.382454647	1.429833793	1.497027819	1.546182893	1.611442379	1.862556289	1.730374426	1.79908462	1.882484579	1.966938585
VT	OCL	1	1.091979115	1.18125936	1.252423831	1.349724712	1.447205479	1.533533164	2	1.696067151	1.772071029	1.850004628	1.92789457	2.005674558	2.076785735	2.13658017	2.197280266	2.251575071	2.287516548	2.295779997	2.292611046	2.284449986
HU	OCL	1	1.091871968	1.162138019	1.239916156	1.337776539	1.43756222	1.542235274	2	1.763052734	1.876214946	1.99580851	2.114784158	2.240726639	2.366156699	2.499486172	2.632760065	2.767929334	2.906086785	3.048592745	3.186635249	3.334786444
OSF	OCL	1	1.037927426	1.054675876	1.068290519	1.090287262	1.107431588	1.125195945	1	1.167863945	1.189127036	1.214392163	1.243543611	1.273259398	1.305244593	1.339339057	1.375861396	1.414785792	1.456288027	1.499705488	1.544694095	1.593175592
OPG	OCL	1	1.035665666	1.055546732	1.086904116	1.113335233	1.137981785	1.164336519	1	1.21652799	1.244984987	1.272532752	1.299369115	1.323332179	1.350338472	1.376323518	1.400922987	1.423398493	1.444204844	1.4662786	1.488075473	1.509262982
SI	OCL	1	1.018932874	1.028645193	1.043843964	1.064789771	1.086673224	1.108433735	1	1.155397099	1.179493484	1.208384559	1.236169166	1.262724367	1.288296041	1.313621834	1.338701746	1.364398361	1.389478272	1.415170688	1.440004918	1.465945414
OMO	OCL	1	1.055136031	1.097838419	1.149367149	1.198307211	1.241564203	1.286030625	1	1.375670828	1.420986081	1.468482613	1.515495528	1.562537234	1.609390224	1.656754982	1.701265164	1.74619675	1.791706933	1.837628822	1.881705833	1.927203305
EM	OCL	1	0.964826646	0.937809811	0.921849368	0.909937424	0.895835892	0.885167788	1	0.870494387	0.864294681	0.860316074	0.854529493	0.847767486	0.841038859	0.832009509	0.823220561	0.813162811	0.803316605	0.793442061	0.782576409	0.771407412
OEF	OCL	1	1.016241027	1.032905853	1.048070341	1.069476244	1.087011272	1.105964102	1	1.142609493	1.161562322	1.181186553	1.201755986	1.222839286	1.245182855	1.268314092	1.291561595	1.315185432	1.340385872	1.364147243	1.387908614	1.411985052
CSE	OCL	1	1.033985412	1.072369017	1.110472832	1.148934917	1.185519327	1.221677607	1	1.292634131	1.33054042	1.369913451	1.408914043	1.447194827	1.485593598	1.524196829	1.562458065	1.600449018	1.639552353	1.677544789	1.716084868	1.755236769
KY	OCL	1	1.040821686	1.076220644	1.11294969	1.15551719	1.194435802	1.233114244	1	1.310997791	1.350683238	1.391985267	1.434358918	1.477388465	1.522034594	1.567272002	1.612925137	1.657968696	1.703732769	1.750328293	1.797579714	1.845727203

C. Forecast Calculation by Trade Partner

				2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1,672,037	USA Total	638,319,150	37.7%	629,972	659,150	687,752	707,167	737,485	765,793	793,934	822,529	849,414	876,567	905,152	935,019	966,152	999,561	1,034,421	1,069,963	1,107,201	1,146,696	1,187,724	1,230,294	1,274,540
	Japan Total	126,663,460	7.5%	125,007	129,885	132,179	135,589	139,268	141,770	144,301	146,847	149,370	151,686	153,882	156,306	158,970	161,754	164,420	167,062	169,771	172,447	175,157	177,877	180,628
	Guatemala Tot	102,515,150	6.1%	101,176	107,040	111,476	115,791	120,432	124,879	129,406	133,946	138,529	143,272	148,178	153,182	158,328	163,672	169,117	174,688	180,427	186,333	192,457	198,776	205,345
	Mexico Total	101,147,140	6.0%	99,824	107,463	114,177	121,958	129,857	137,175	144,974	152,892	160,923	169,085	176,610	185,094	194,126	203,574	213,237	223,324	233,773	244,494	255,640	267,385	279,658
	Panama Total	87,810,470	5.2%	86,465	91,477	95,269	98,956	102,923	106,723	110,592	114,471	118,389	122,441	126,634	130,911	135,307	139,876	144,529	149,290	154,195	159,242	164,475	169,876	175,490
	El Salvador Tot	77,092,881	4.6%	76,085	80,495	83,832	87,077	90,567	93,911	97,315	100,729	104,176	107,742	111,432	115,195	119,063	123,084	127,178	131,368	135,684	140,125	144,730	149,482	154,422
	Costa Rica Tot	61,039,870	3.6%	60,242	63,734	66,376	68,945	71,708	74,356	77,051	79,754	82,484	85,307	88,229	91,208	94,271	97,454	100,696	104,013	107,431	110,947	114,593	118,356	122,267
	Brazil Total	57,952,580	3.4%	57,195	60,588	63,450	66,898	70,560	74,235	78,143	82,249	86,632	91,259	96,173	101,629	107,592	114,088	121,037	128,583	136,899	145,910	155,777	166,531	176,406
	Spain Total	49,856,879	2.9%	49,205	51,672	53,127	54,418	56,379	58,430	60,451	62,483	64,517	66,542	68,604	71,006	73,163	75,397	77,597	79,821	82,117	84,427	86,700	88,961	91,326
	Germany Total	36,495,734	2.1%	35,032	36,636	38,011	39,516	41,465	43,433	45,399	47,332	49,265	51,164	53,155	55,068	56,933	58,759	60,517	62,219	63,850	65,393	66,914	68,231	69,608
	China Total	31,709,820	1.9%	31,296	37,049	41,143	45,925	51,058	56,097	61,362	66,778	72,597	78,714	84,906	91,571	98,108	104,824	111,776	118,966	126,333	133,809	141,478	149,199	157,039
	Sweden Total	30,946,097	1.8%	30,541	31,994	32,543	33,119	33,908	34,715	35,370	35,888	36,420	36,866	37,359	37,757	37,979	38,117	38,082	37,954	37,778	37,418	36,966	36,438	35,858
	Ukraine Total	26,579,681	1.6%	26,232	26,403	26,288	26,278	26,351	26,357	26,341	26,299	26,241	26,200	26,151	26,111	26,031	25,984	25,868	25,764	25,654	25,576	25,479	25,356	25,227
	Colombia Total	22,933,816	1.4%	22,634	25,311	26,721	27,926	29,169	30,318	31,538	32,732	33,945	35,214	36,528	37,906	39,316	40,782	42,263	43,756	45,271	46,795	48,354	49,964	51,635
	Rep. of Korea T	20,028,216	1.2%	19,766	21,181	22,097	23,083	24,022	24,832	25,626	26,368	27,101	27,790	28,393	28,964	29,479	29,975	30,393	30,762	31,068	31,307	31,525	31,696	31,829
	Venezuela Tota	19,938,639	1.2%	19,678	19,968	20,344	20,693	21,058	21,290	21,551	21,801	22,000	22,197	22,374	22,595	22,833	23,091	23,337	23,573	23,823	24,046	24,276	24,516	24,756
	Other Asia, nes	17,819,374	1.1%	17,586	18,720	19,531	20,504	21,620	22,673	23,799	24,970	26,248	27,577	28,973	30,525	32,170	33,920	35,765	37,727	39,802	41,998	44,326	46,759	49,346
	Italy Total	15,546,997	0.9%	15,344	16,036	16,364	16,729	17,272	17,797	18,298	18,782	19,273	19,752	20,275	20,780	21,265	21,762	22,237	22,712	23,166	23,650	24,121	24,563	25,026
	China, Hong Kc	13,328,196	0.8%	13,154	15,572	17,293	19,303	21,461	23,578	25,791	28,068	30,514	33,085	35,688	38,489	41,237	44,059	46,981	50,003	53,100	56,242	59,465	62,711	66,006
		1,536,524,162	90.7%	1,516,431	1,600,175	1,667,973	1,729,875	1,806,561	1,878,362	1,951,241	2,024,917	2,098,038	2,172,460	2,248,896	2,329,318	2,412,321	2,499,712	2,589,452	2,681,567	2,777,362	2,876,856	2,980,180	3,088,969	3,198,411
				155,606	164,199	171,156	177,508	185,377	192,745	200,223	207,784	215,287	222,924	230,767	239,019	247,536	256,504	265,712	275,165	284,995	296,204	305,806	316,764	328,200
				1,672,037	1,764,374	1,839,129	1,907,383	1,991,938	2,071,107	2,151,465	2,232,700	2,313,324	2,395,384	2,479,663	2,568,337	2,659,857	2,756,216	2,855,164	2,956,731	3,062,357	3,172,059	3,285,986	3,403,733	3,526,611

Table F5.10-18
Forecast Calculations
Fruit and Nuts Exports

A. 2003 UN Honduras Trade Data

Port of Cortes 2004

		Partner	Commodity Code	Commodity Description	Trade Value		NetWeight (kg)
Bananas	331,834	World	S3-057	FRUIT,NUTS EXCL.OIL NUTS	167,251,200	100.00%	702,202,200
Melons	102,651	USA	S3-057	FRUIT,NUTS EXCL.OIL NUTS	137,688,300	82.16%	576,917,500
Total	434,485	Netherlands	S3-057	FRUIT,NUTS EXCL.OIL NUTS	12,820,940	7.44%	52,272,410
		El Salvador	S3-057	FRUIT,NUTS EXCL.OIL NUTS	3,457,171	4.79%	33,669,510
		Belgium	S3-057	FRUIT,NUTS EXCL.OIL NUTS	10,996,560	4.04%	28,380,860
		Guatemala	S3-057	FRUIT,NUTS EXCL.OIL NUTS	660,164	0.56%	3,924,100
		Germany	S3-057	FRUIT,NUTS EXCL.OIL NUTS	859,575	0.55%	3,852,225
		France	S3-057	FRUIT,NUTS EXCL.OIL NUTS	241,311	0.17%	1,211,625
		Iran	S3-057	FRUIT,NUTS EXCL.OIL NUTS	229,824	0.08%	592,812
		China, Hong Kong SAR	S3-057	FRUIT,NUTS EXCL.OIL NUTS	79,764	0.04%	308,230
		Spain	S3-057	FRUIT,NUTS EXCL.OIL NUTS	56,534	0.04%	306,476
		United Kingdom	S3-057	FRUIT,NUTS EXCL.OIL NUTS	62,764	0.03%	212,636
		Nicaragua	S3-057	FRUIT,NUTS EXCL.OIL NUTS	11,261	0.03%	184,890
		Uruguay	S3-057	FRUIT,NUTS EXCL.OIL NUTS	31,919	0.02%	121,925
		Afghanistan	S3-057	FRUIT,NUTS EXCL.OIL NUTS	18,343	0.01%	64,921
		China	S3-057	FRUIT,NUTS EXCL.OIL NUTS	10,800	0.01%	64,800
		Costa Rica	S3-057	FRUIT,NUTS EXCL.OIL NUTS	16,682	0.01%	58,476
		Dominican Rep.	S3-057	FRUIT,NUTS EXCL.OIL NUTS	1,840	0.00%	21,964
		Mexico	S3-057	FRUIT,NUTS EXCL.OIL NUTS	1,679	0.00%	16,800
		Sudan	S3-057	FRUIT,NUTS EXCL.OIL NUTS	760	0.00%	10,000
		Seychelles	S3-057	FRUIT,NUTS EXCL.OIL NUTS	879	0.00%	8,000
		Areas, nes	S3-057	FRUIT,NUTS EXCL.OIL NUTS	175	0.00%	2,054

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
OCL	US	C1C	0.577034446	0.638124958	0.638698846	1	70.68%	1	0.742121	0.763126	0.806926	1	1.037328	1.072059	1.107518	1.138331	1.1696	1.199743	1.224995	1.251927	1.279296	1.31057	1.337712	1.36392	1.39019	1.414374	1.437408	1.459072	1.479599	1.499646	1.518642	1.53666
OCL	GF	C1C	1.065554801	1.096897197	0.859093058	1	72.72%	1	0.700437	0.74746	0.760498	1	1.003751	1.025692	1.062282	1.075727	1.089279	1.094709	1.067891	1.083471	1.088328	1.078887	1.086551	1.084119	1.041154	1.0271	1.012846	0.99593	0.978082	0.961673	0.946364	0.931618
OCL	BE	C1C	0.075748068	0.384722424	0.691948673	1	75.04%	1	0.772081	0.653886	0.742231	1	1.034804	1.086633	1.151558	1.188187	1.214326	1.241931	1.265964	1.289694	1.315478	1.326042	1.337308	1.343132	1.348093	1.351681	1.355472	1.358022	1.354657	1.356659	1.360001	1.363886
OCL	OCL	C1C	0.370365927	0.645197287	0.361898048	0	67.14%	1	0.807058	0.769011	0.793821	1	1.03171	1.068274	1.112082	1.143962	1.171715	1.198582	1.222778	1.246436	1.270839	1.291013	1.310159	1.327522	1.344309	1.359164	1.373351	1.385845	1.39708	1.409055	1.420964	1.432509
OCL	UK	C1C	0.385902813	0.442665917	0.567835875	1	75.32%	1	0.694181	0.703897	0.738197	1	1.019412	1.044454	1.113588	1.158783	1.194071	1.230998	1.266898	1.300216	1.334027	1.350703	1.363997	1.368785	1.401261	1.415405	1.428398	1.438052	1.446913	1.456038	1.470877	1.484963
OCL	CA	C1C	0.641860168	0.643519861	0.723394053	1	56.36%	1	0.793533	0.776013	0.717506	1	1.112987	1.157346	1.272226	1.343103	1.411592	1.475306	1.531729	1.58822	1.638731	1.676028	1.718807	1.753139	1.781852	1.805544	1.828056	1.840526	1.850245	1.858145	1.862256	1.864981
OCL	IT	C1C	0.447808618	0.272216855	0.344270699	1	56.47%	1	0.752923	0.68473	0.770027	1	1.00519	1.030772	1.065775	1.082157	1.091464	1.101365	1.109491	1.114663	1.119550	1.113329	1.110144	1.108018	1.102124	1.097087	1.091919	1.086119	1.078436	1.0731	1.068345	1.064181
OCL	SW	C1C	0.673893613	0.858994468	0.787325875	1	95.14%	1	0.577443	0.671083	0.751462	1	1.03374	1.063698	1.146013	1.19139	1.225291	1.262015	1.296717	1.328928	1.363747	1.382114	1.40898	1.433235	1.453348	1.467175	1.482446	1.497358	1.510072	1.525001	1.541294	1.557756
OCL	PG	C1C	0.270255172	0.3163355	0.457257672	1	32.02%	1	0.736634	0.66287	0.739347	1	1.037836	1.096282	1.173377	1.217805	1.249613	1.276451	1.301693	1.32119	1.342327	1.346555	1.351269	1.353044	1.351522	1.346363	1.344571	1.341482	1.338647	1.338743	1.33834	1.338213
OCL	FR	C1C	0.366829476	0.233119079	0.2058246	0	46.14%	0	0.438864	0.852199	0.758085	1	1.027012	1.072964	1.130382	1.173875	1.20024	1.224042	1.246591	1.264462	1.286374	1.290377	1.2965	1.30094	1.302768	1.304455	1.304963	1.302721	1.299429	1.298349	1.299674	1.303437
OCL	IL	C1C	0.327842373	0.287292637	0.509960341	1	21.05%	1	0.576064	0.678503	0.728554	1	1.042258	1.108008	1.189652	1.24014	1.276711	1.312283	1.34032	1.365913	1.396	1.414526	1.429603	1.442895	1.454961	1.466355	1.478619	1.48353	1.487351	1.496286	1.501258	1.505368
OCL	FN	C1C	0.746409629	0.857077833	0.892693958	1	77.92%	1	0.748343	0.685207	0.770621	1	1.020788	1.053893	1.098646	1.126591	1.150597	1.173766	1.19672	1.21789	1.239084	1.248242	1.257221	1.266529	1.274498	1.281991	1.289323	1.295374	1.300295	1.307126	1.315438	1.324268
OCL	SZ	C1C	0.835843056	0.600899431	0.496215105	1	65.47%	1	0.649625	0.6768	0.721665	1	1.016971	1.053951	1.10822	1.132574	1.144749	1.156167	1.164676	1.172031	1.179029	1.172911	1.158014	1.160863	1.150675	1.139823	1.12652	1.114692	1.099158	1.085262	1.073303	1.061625
OCL	AU	C1C	0.939466639	0.892554039	0.783045233	1	65.87%	1	0.58354	0.814229	0.724827	1	1.0397	1.094255	1.157793	1.19362	1.225708	1.251389	1.277947	1.301303	1.327414	1.335851	1.353155	1.361853	1.372886	1.376862	1.381702	1.383531	1.38679	1.384473	1.392119	1.392261
OCL	NE	C1C	0.262636045	0.442955027	0.436389518	0	55.24%	1	0.675515	0.675198	0.770212	1	1.006338	1.040929	1.092336	1.120293	1.138543	1.156526	1.172455	1.186026	1.200899	1.201457	1.20497	1.205207	1.203962	1.201755	1.198583	1.191418	1.18338	1.177742	1.173688	1.170095
OCL	PO	C1C	0.686074674	1.032906182	0.541091886	1	60.69%	0	0.576575	0.851968	0.734208	1	1.029919	1.057833	1.114901	1.140103	1.155755	1.176478	1.211407	1.230449	1.244274	1.260486	1.271511	1.303463	1.30064	1.311245	1.317485	1.321533	1.322447	1.323213	1.332233	1.342933
OCL	CZ	C1C	1.133903977	0.996170315	0.845360184	1	63.32%	1	0.863887	0.886999	0.867775	1	1.018993	1.036377	1.055609	1.070992	1.085787	1.099476	1.111613	1.124015	1.136179	1.148969	1.160139	1.170813	1.181037	1.190406	1.199179	1.20719	1.214838	1.221915	1.228869	1.235423
OCL	SP	C1C	2.151902154	1.97969026	1.799977455	2	222.23%	2	0.984099	0.680038	0.728058	1	1.055153	1.130941	1.210726	1.259134	1.295427	1.334736	1.369164	1.401351	1.434733	1.45156	1.468589	1.479606	1.491672	1.498367	1.504769	1.506705	1.51446	1.516786	1.527212	1.530418
OCL	RU	C1C	1.302245827	1.302232532	1.485855949	1	77.03%	1	0.094158	0.483646	0.734313	1	1.074542	1.151266	1.207043	1.251019	1.280969	1.304501	1.309431	1.31864	1.344923	1.344727	1.340832	1.352472	1.350416	1.344669	1.338137	1.356993	1.352211	1.345351	1.338401	1.326478
OCL	NO	C1C	0.817876007	0.752635658	0.836894881	1	47.26%	1	0.413878	0.637955	0.724607	1	1.032137	1.063829	1.117145	1.153868	1.177292	1.198301	1.220832	1.240938	1.265325	1.274978	1.288906	1.301856	1.312868	1.32192	1.329692	1.334086	1.335671	1.337887	1.348133	1.35143
OCL	HU	C1C	0.443304233	0.479482051	0.174816055	0	36.01%	1	0.380684	0.496435	0.768564	1	1.018674	1.040798	1.09605	1.076445	1.092958	1.106757	1.127501	1.151741	1.166184	1.16554	1.167518	1.173405	1.180672	1.188216	1.197553	1.202337	1.20781	1.212916	1.214572	1.219355
OCL	SK	C1C	1.400480424	1.178262299	0.567140191	1	64.29%	1	0.683781	0.86999	0.867784	1	1.01893	1.038376	1.059627	1.070898	1.085788	1.099483	1.111815	1.124007	1.13616	1.148993	1.160143	1.170811	1.181038	1.190363	1.199168	1.207187	1.214647	1.221906	1.228844	1.235422
OCL	CH	C1C	0	0	0	0	0.00%	0	0.235343	0.647069	0.767483	1	1.108641	1.229647	1.359858	1.481059	1.579909	1.668821	1.753979	1.830472	1.900928	1.947698	1.984044	2.030592	2.05987	2.080327	2.096998	2.107004	2.113345	2.117691	2.120622	2.121889
OCL	OWE	C1C	0.60300679	0.713893265	0.462300665	1	57.79%	0	0.592746	0.553531	0.737788	1	1.041509	1.077701	1.119969	1.150594	1.173626	1.195393	1.215388	1.23164	1.245507	1.244748	1.246013	1.244242	1.240952	1.235363	1.228287	1.219436	1.208555	1.198178	1.187801	1.177677
OCL	GR	C1C	0.842744771	0.376574055	0.6776656	1	42.07%	0	0.846326	0.753033	0.794285	1	1.03371	1.071297	1.117402	1.150855	1.160246	1.20812	1.233318	1.258192	1.283692	1.303249	1.325531	1.34397	1.361897	1.377891	1.393201	1.406721	1.418977	1.432089	1.445075	1.45784
OCL	ONF	C1C	0.77997051	0.124372745	0.828605437	1	229.84%	1	0	0.890025	0.867778	1	1.018928	1.036396	1.055606	1.070995	1.085624	1.099472	1.111929	1.124017	1.136206	1.148011	1.160132	1.170805	1.181027	1.190407	1.19917	1.207201	1.214671	1.221917	1.228882	1.235453
OCL	DE	C1C	1.181293723	1.206587353	0.855871551	1	157.17%	1	0.833868	0.667081	0.743174	1	1.033884	1.085197	1.152598	1.198153	1.229362	1.264795	1.299712	1.328731	1.358734	1.373268	1.391425	1.40777	1.422585	1.436532	1.448583	1.457585	1.464468	1.473362	1.483862	1.494364
OCL	RO	C1C	4.15433266	1.843709496	0.281362065	3	52.99%	1	2.189197	0.742778	0.785222	1	1.032946	1.072626	1.11923	1.152863	1.182674	1.211574	1.238074	1.264089	1.290539	1.31301	1.334226	1.353878	1.372199	1.388474	1.403772	1.418089	1.430369	1.443363	1.456274	1.468695
OCL	OMD	C1C	0.067901524	0.017882153	0.090146136	3	22.32%	0	0.174434	0.878924	0.7303	1	1.05189	1.107622	1.169123	1.222934	1.269056	1.31326	1.353617	1.390132	1.426006	1.44715	1.470851	1.49199	1.509927	1.525302	1.539756	1.550289	1.559255	1.568866	1.578473	1.586725
OCL	OWW	C1C	0.099761391	136.9672724	0.004053922	2	42.17%	0	0.904305	0.889972	0.887633	1	1.018926	1.036353	1.055602	1.071002	1.085757	1.099445	1.111848	1.124038	1.136226	1.148552	1.160181	1.170784	1.181031	1.190441	1.19921	1.207229	1.214806	1.221878	1.229383	1.235456
OCL	TK	C1C	5.297129857	5.200208218	3.568671182	10	1532.89%	7	1.787106	0.890003	0.887764	1	1.018941	1.036385	1.055615	1.070997	1.0858	1.09948	1.111815	1.124022	1.136185	1.148997	1.160148	1.170822	1.18105	1.190414	1.199183	1.207197	1.214841	1.221923	1.228875	1.235436
OCL	CSW	C1C	0.379570331	7.136330067	20.83550666	27	256.60%	1	6.793803	0.564114	0.810055	1	1.034375	1.066997	1.101537	1.116265	1.128884	1.14323	1.147072	1.15411	1.152396	1.137217	1.125203	1.113392	1.099745	1.085908	1.071307	1.057418	1.04282	1.028863	1.01708	1.005809
OCL	CRB	C1C	2.064053077	7.557245742	12.21954889	36	815.12%	2	0.82929	0.882657	0.74462	1	1.057745	1.094791	1.142239	1.195451	1.2296	1.247105	1.260337	1.265542	1.288921	1.26109	1.254665	1.249849	1.2389	1.228116	1.215023	1.201969	1.188943	1.172126	1.156933	1.141776
OCL	AR	C1C	0.021145043	0	0	0	27.28%	1	0.744121	0.528235	0.773895	1	1.050846	1.087258	1.133263	1.185181	1.219898	1.251828	1.281499	1.308923	1.335656	1.349484	1.3628	1.372207	1.378732	1.382865	1.383345	1.382517	1.378049	1.374155	1.370144	1.366762
OCL	NZ	C1C	1.395979794	0	1.348424187	2	102.25%	0	0.611012	0.889982	0.887765	1	1.018863	1.036359	1.055566	1.070967	1.085731	1.099468	1.111769	1.123993	1.136141	1.148993	1.160114	1.170749	1.180985	1.190356	1.199165	1.207164	1.214566	1.221863	1.228855	1.235362
OCL	SI	C1C	0.250466688	0.207111945	0.386227084	4	1310.36%	1	1.0985	0.890002	0.887775	1	1.018935	1.036372	1.055615	1.070993	1.085763	1.09948	1.111819	1.124004	1.138175	1.14899	1.160138	1.17081	1.181019	1.190389	1.199171	1.207182	1.214847	1.221916	1.228862	1.235421
OCL	CL	C1C	0.005725409	0	1.145788922	0	357.98%	1	0.52439	0.735314	0.697163	1	1.042082	1.053447	1.066816	1.089717	1.097504	1.100996	1.112962	1.1251	1.135921	1.136727	1.138207	1.13157	1.127448	1.122068	1.115596	1.107294	1.097905	1.08903	1.080385	1.072369
OCL	EM	C1C	0.064797463	0.068420643	0.230358945	1	38.16%	0	0.475133	0.647903	0.722214	1	1.051824	1.093628	1.133487	1.16794	1.200735	1.230719	1.256595	1.278651	1.300058	1.310004	1.323627	1.33588	1.34662	1.356134	1.364990	1.372856	1.37891	1.386048	1.393614	1.402047
OCL	MX	C1C	0.027822537	0.421649823	0.569966699	1	7.93%	1	0.732302	0.890858	0.697175	1	1.071436	1.116339	1.240842	1.299925	1.354173	1.407025	1.455795	1.50478	1.550542	1.582662	1.617467	1.647553	1.674509	1.698356	1.72113	1.739392	1.754753	1.770115	1.783435	1.796648
OCL	OPG	C1C	0.652783508	2.581105169	3.352346996	3	275.91%	1	1.720737	0.890077	0.887701	1	1.019014	1.036245	1.055556	1.071004	1.085859	1.099525	1.111705	1.123886	1.136087	1.148641	1.160131	1.170826	1.180927	1.190434	1.199049	1.207071	1.214468	1.221825	1.228758	1.235294

C. Forecast Calculation by Trade Partner

434,485	World	S3-057	FRUIT,NUTS EXCL.OIL NUTS	167,251,200	100.0%	702,202,200	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	USA	S3-057	FRUIT,NUTS EXCL.OIL NUTS	137,688,300	82.2%	576,917,500	356,968	370,290	382,868	395,345	408,345	417,507	427,910	437,281	446,895	456,665	457,828	477,517	486,873	496,250	504,863	513,105	520,839	528,155	535,322	542,103	548,535
	Netherlands	S3-057	FRUIT,NUTS EXCL.OIL NUTS	12,820,940	7.4%	52,272,410	32,343	32,548	33,667	35,330	36,234	36,828	37,406	37,921	38,360	38,641	38,869	38,973	38,960	38,940	38,869	38,766	38,534	38,274	38,042	37,961	37,845
	El Salvador	S3-057	FRUIT,NUTS EXCL.OIL NUTS	3,457,171	4.8%	33,669,510	20,833	21,493	22,255	23,168	23,832	24,410	24,970	25,474	25,967	26,475	26,896	27,294	27,656	28,006	28,315	28,611	28,871	29,105	29,355	29,503	29,843
	Belgium	S3-057	FRUIT,NUTS EXCL.OIL NUTS	10,996,560	4.0%	28,380,860	17,561	18,172	19,082	20,222	20,865	21,324	21,809	22,231	22,648	23,101	23,286	23,484	23,586	23,673	23,736	23,803	23,812	23,789	23,824	23,882	23,951
	Guatemala	S3-057	FRUIT,NUTS EXCL.OIL NUTS	660,164	0.6%	3,924,100	2,428	2,505	2,594	2,700	2,778	2,845	2,910	2,969	3,026	3,086	3,135	3,181	3,223	3,264	3,300	3,335	3,365	3,392	3,421	3,450	3,478
	Germany	S3-057	FRUIT,NUTS EXCL.OIL NUTS	859,575	0.5%	3,852,225	2,364	2,392	2,445	2,532	2,564	2,575	2,585	2,593	2,594	2,595	2,567	2,542	2,513	2,492	2,468	2,414	2,374	2,331	2,292	2,256	2,221
	France	S3-057	FRUIT,NUTS EXCL.OIL NUTS	241,311	0.2%	1,211,625	750	770	804	854	882	900	918	935	948	964	967	972	975	977	978	978	977	974	973	974	975
	Iran	S3-057	FRUIT,NUTS EXCL.OIL NUTS	229,824	0.1%	592,812	367	381	402	430	447	458	469	478	485	492	494	496	496	496	495	493	492	491	491	491	491
	China, Hong Kong SAR	S3-057	FRUIT,NUTS EXCL.OIL NUTS	79,764	0.0%	308,230	191	211	235	259	282	301	318	335	349	363	371	380	387	393	397	400	402	403	404	404	405
	Spain	S3-057	FRUIT,NUTS EXCL.OIL NUTS	56,534	0.0%	306,476	190	200	214	230	239	246	253	260	266	272	275	278	281	283	284	285	286	287	288	290	290
	United Kingdom	S3-057	FRUIT,NUTS EXCL.OIL NUTS	62,764	0.0%	212,636	132	134	138	147	152	157	162	167	171	176	178	180	182	184	186	188	188	190	192	194	195
				167,158,907	1	701,648,384	434,142	449,097	464,525	481,217	494,819	507,561	519,710	530,842	541,709	553,030	564,856	575,298	585,153	594,947	603,891	612,378	620,141	627,403	634,653	641,608	648,228
						Other	343	354	367	380	390	401	410	419	428	437	446	454	462	470	477	483	489	495	501	506	512
						Total	434,485	449,451	464,891	481,597	495,010	507,962	520,120	531,061	542,136	553,467	565,302	575,752	585,615	595,417	604,368	612,861	620,630	627,896	635,154	642,114	648,740

Table F5.10-19
Forecast Calculations
Coffee Exports

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
172,312

Partner	Commodity Code	Commodity Description	Trade Value		NetWeight (kg)
World	S3-071	COFFEE,COFFEE SUBSTITUTE	182,613,800	100.00%	147,955,200
Germany	S3-071	COFFEE,COFFEE SUBSTITUTE	58,135,200	30.23%	44,729,560
USA	S3-071	COFFEE,COFFEE SUBSTITUTE	21,962,610	13.11%	19,395,150
Belgium	S3-071	COFFEE,COFFEE SUBSTITUTE	15,108,160	7.87%	11,848,520
Japan	S3-071	COFFEE,COFFEE SUBSTITUTE	11,088,840	6.17%	9,124,218
Netherlands	S3-071	COFFEE,COFFEE SUBSTITUTE	11,501,340	5.94%	8,781,883
France	S3-071	COFFEE,COFFEE SUBSTITUTE	10,425,750	5.53%	8,181,953
Spain	S3-071	COFFEE,COFFEE SUBSTITUTE	6,993,740	3.89%	5,758,785
Italy	S3-071	COFFEE,COFFEE SUBSTITUTE	6,166,552	3.27%	4,838,273
Lao People's Dem. Rep.	S3-071	COFFEE,COFFEE SUBSTITUTE	5,666,414	3.10%	4,588,621
United Kingdom	S3-071	COFFEE,COFFEE SUBSTITUTE	5,271,947	2.54%	4,197,574
Sweden	S3-071	COFFEE,COFFEE SUBSTITUTE	4,543,514	2.54%	3,759,812
Rep. of Korea	S3-071	COFFEE,COFFEE SUBSTITUTE	4,284,369	2.35%	3,478,375
Portugal	S3-071	COFFEE,COFFEE SUBSTITUTE	2,933,913	1.63%	2,409,062
Denmark	S3-071	COFFEE,COFFEE SUBSTITUTE	3,109,556	1.61%	2,363,937
Finland	S3-071	COFFEE,COFFEE SUBSTITUTE	2,653,909	1.46%	2,154,812
Switzerland	S3-071	COFFEE,COFFEE SUBSTITUTE	2,237,480	1.20%	1,773,937
Nicaragua	S3-071	COFFEE,COFFEE SUBSTITUTE	1,298,752	1.20%	1,772,750
Albania	S3-071	COFFEE,COFFEE SUBSTITUTE	1,600,343	0.87%	1,287,760
Canada	S3-071	COFFEE,COFFEE SUBSTITUTE	1,597,216	0.85%	1,277,552
El Salvador	S3-071	COFFEE,COFFEE SUBSTITUTE	898,196	0.57%	849,401
Malaysia	S3-071	COFFEE,COFFEE SUBSTITUTE	995,136	0.54%	802,750
Australia	S3-071	COFFEE,COFFEE SUBSTITUTE	1,015,541	0.53%	786,625
Norway	S3-071	COFFEE,COFFEE SUBSTITUTE	960,459	0.49%	722,937
Hungary	S3-071	COFFEE,COFFEE SUBSTITUTE	677,610	0.36%	529,750
Czech Rep.	S3-071	COFFEE,COFFEE SUBSTITUTE	567,045	0.31%	463,000
Ireland	S3-071	COFFEE,COFFEE SUBSTITUTE	566,011	0.30%	442,875
South Africa	S3-071	COFFEE,COFFEE SUBSTITUTE	491,485	0.28%	409,250
Russian Federation	S3-071	COFFEE,COFFEE SUBSTITUTE	388,486	0.23%	344,062
Guatemala	S3-071	COFFEE,COFFEE SUBSTITUTE	285,783	0.12%	180,484
Other Asia, nes	S3-071	COFFEE,COFFEE SUBSTITUTE	210,410	0.11%	166,789
Morocco	S3-071	COFFEE,COFFEE SUBSTITUTE	136,082	0.08%	114,675
Poland	S3-071	COFFEE,COFFEE SUBSTITUTE	122,699	0.07%	97,148
Israel	S3-071	COFFEE,COFFEE SUBSTITUTE	115,070	0.06%	96,523
Jordan	S3-071	COFFEE,COFFEE SUBSTITUTE	90,337	0.05%	78,449
Austria	S3-071	COFFEE,COFFEE SUBSTITUTE	96,587	0.05%	76,449
China, Hong Kong SAR	S3-071	COFFEE,COFFEE SUBSTITUTE	90,194	0.05%	74,750
China	S3-071	COFFEE,COFFEE SUBSTITUTE	71,279	0.04%	57,294
Central African Rep.	S3-071	COFFEE,COFFEE SUBSTITUTE	75,486	0.04%	57,296
Christmas Isds	S3-071	COFFEE,COFFEE SUBSTITUTE	50,325	0.03%	38,226
Romania	S3-071	COFFEE,COFFEE SUBSTITUTE	24,007	0.01%	19,113
Br. Indian Ocean Terr.	S3-071	COFFEE,COFFEE SUBSTITUTE	24,460	0.01%	19,113
Venezuela	S3-071	COFFEE,COFFEE SUBSTITUTE	4,597	0.00%	1,500
Areas, nes	S3-071	COFFEE,COFFEE SUBSTITUTE	29	0.00%	86

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003
OCL	US	C311F	0.523130306	0.578722421	0.650580939	1	79.03%	1	0.8705114	0.7764772	0.8460654
OCL	OCL	C311F	0.464391046	1.515118016	0.526041233	1	73.05%	1	0.9885476	0.9987579	0.8556655
OCL	GF	C311F	1.464428153	1.691306633	1.512219052	1	121.39%	1	1.3117782	0.977172	0.8017273
OCL	JA	C311F	0.724226715	0.712041033	0.683169875	1	87.79%	1	1.045499	1.0583592	0.8088174
OCL	IT	C311F	0.76957854	0.936566838	0.7905319	1	90.25%	1	1.0135296	0.9763037	0.8255252
OCL	CA	C311F	1.094030071	1.044907132	1.128263211	1	119.23%	1	1.2341451	1.0080636	0.7939896
OCL	FR	C311F	2.233516719	1.880561725	1.466414978	1	131.80%	1	1.0798882	0.9736593	0.7975498
OCL	NE	C311F	0.953272769	1.58087284	0.910831903	1	85.82%	1	0.7810296	0.9603638	0.8268808
OCL	BE	C311F	0.51734687	0.840141573	0.997716632	1	127.73%	1	1.3777832	1.024922	0.8049099
OCL	SP	C311F	0.806756609	1.253464775	0.942392081	1	86.33%	1	1.0164294	0.9240801	0.8078699
OCL	SZ	C311F	1.006907475	1.002804592	0.935985507	1	103.75%	1	1.0779584	0.9081694	0.7605836
OCL	FN	C311F	1.312984762	1.697889698	1.526811943	2	160.36%	2	1.3436815	1.0213319	0.856463
OCL	CRB	C311F	0.323762076	0.849165681	0.566636856	1	83.33%	1	0.6506971	0.8808599	0.8443366
OCL	UK	C311F	2.128015247	2.73929324	2.507159532	2	200.76%	2	1.4281723	1.1359412	0.8216946
OCL	SW	C311F	1.68037161	1.031395057	1.004834208	1	128.22%	1	0.8695638	1.0626114	0.7964931
OCL	AU	C311F	2.019126475	2.652670037	1.788312641	2	152.37%	1	1.1853821	0.9983387	0.7862322
OCL	KO	C311F	0.905025893	1.119794874	1.45847276	1	116.60%	1	1.1214368	1.125188	0.8105682
OCL	SI	C311F	0.959127819	1.31794327	1.199769894	1	89.04%	1	1.0162808	1.1671123	0.8487598
OCL	PG	C311F	0.958907068	0.959103626	0.897987431	1	112.32%	1	1.000004	1.0099659	0.8167678
OCL	DE	C311F	0.810622394	1.848018539	0.90288309	1	130.41%	1	1.3488822	1.0659304	0.7980864
OCL	OWW	C311F	1.88015222	1.927785349	1.303812661	1	83.74%	1	2.8365394	0.9727623	0.7965906
OCL	NO	C311F	1.607792389	1.478456262	1.661177166	2	206.70%	2	1.6764867	1.0626045	0.7907831
OCL	AT	C311F	0.652009243	0.882229612	0.749275771	1	75.04%	1	0.8679592	0.9678834	0.7751333
OCL	SO	C311F	0.672659812	1.176556957	1.409896278	1	88.53%	0	0.5988909	1.1723317	0.7832248
OCL	OMO	C311F	1.033168119	1.639863109	1.135082728	1	57.12%	1	0.7903898	1.0985822	0.7882617
OCL	SA	C311F	0.701681993	0.690065868	0.635272869	1	93.39%	1	0.9542864	0.9442842	0.763248
OCL	EM	C311F	1.28276442	1.129816431	1.119751291	1	51.96%	1	0.8978093	1.0587197	0.7935191
OCL	PO	C311F	2.928464181	4.89789062	3.198547946	3	221.74%	2	1.4638512	0.9402635	0.7502362
OCL	RU	C311F	1.129663815	1.129663815	0.141689582	0	38.22%	0	0.6062289	0.9394192	0.7740917
OCL	MX	C311F	0.116166745	0.15095445	0.281210923	0	57.47%	1	0.6675732	0.7570783	0.7621247
OCL	CZ	C311F	4.959156583	4.379817591	2.431704894	2	149.69%	3	1.9896611	0.989814	0.790726
OCL	VZ	C311F	0.410644646	0.25582839	0.278885758	1	106.31%	1	1.5132728	1.0472183	0.6943716
OCL	OWE	C311F	1.344879803	1.19864149	1.442422069	1	139.56%	1	0.5594409	1.0262933	0.7828885
OCL	OPG	C311F	1.183727006	0.948245703	1.095305812	1	67.76%	1	0.9290526	0.9344503	0.7570388
OCL	HU	C311F	0.700780744	0.423145028	0.244912315	1	363.12%	2	1.2689952	0.8935528	0.7958886
OCL	IS	C311F	1.561775643	2.156212669	2.421436908	2	205.65%	2	1.7940314	1.0973319	0.8025289
OCL	ONF	C311F	0.850811333	0.978306153	0.66453337	0	83.44%	1	0.7220776	1.0252574	0.7698451
OCL	SK	C311F	4.411186735	5.230392008	3.679817865	3	178.30%	2	1.8576498	0.9968271	0.7594651
OCL	PK	C311F	0.310762347	0.180969139	0.169527973	0	13.83%	0	0.3022235	1.0347189	0.7651117
OCL	CO	C311F	0.020032083	0.242330058	0.846861841	1	57.48%	0	0.2603369	0.7349709	0.7059029
OCL	IL	C311F	2.088468142	1.293651126	1.609752857	1	227.17%	4	1.7311885	1.0144257	0.7794258
OCL	ID	C311F	0.110524424	1.651335219	1.635805711	1	89.15%	0	0.6493517	0.8869875	0.7765566
OCL	TW	C311F	0.616418203	2.397801138	0.261033739	1	53.40%	1	1.0638524	1.1366818	0.8857317
OCL	NZ	C311F	0.255499767	0.283885294	0.584709353	1	89.38%	0	0.7244164	0.9210104	0.7736498
OCL	OEL	C311F	0.433072636	0.539920104	1.608607286	1	134.42%	1	0.472402	1.0895178	0.892196
OCL	OID	C311F	2.388227009	2.74617055	6.048768179	4	360.29%	1	0.6748049	1.0855684	0.8016902
OCL	CBW	C311F	1.011744866	0.636987472	0.431789436	0	64.43%	2	0.5825254	0.9976528	0.8089502
OCL	GR	C311F	0.333354706	0.775647602	1.429459095	1	77.65%	0	0.5409877	0.9487048	0.8082985
OCL	HK	C311F	0.718051831	1.882918832	0.369863811	1	131.50%	2	2.2669576	1.1483538	0.8221605
OCL	RO	C311F	0.41770307	3.467465993	0	0	115.60%	1	0.8937038	0.884585	0.7790517
OCL	MA	C311F	0.725592584	0.714820112	0.803989714	0	75.26%	1	1.1286371	1.118935	0.790296
OCL	CL	C311F	1.766006935	20.09530901	2.583953835	5	288.12%	3	2.4906786	0.858175	0.7864865
OCL	OSF	C311F	0	0	0	1	80.87%	1	0.7301405	0.6668202	0.6668202
OCL	BLT	C311F	3.141645685	2.443640898	0.872817855	1	137.13%	1	0.6234414	1.0034913	0.8042394
OCL	OEF	C311F	0.277217742	0	0.277217742	1	25.20%	1	0.453628	1.1940726	0.8082157
OCL	BZ	C311F	7.508481422	9.042407108	17.60056543	5	296.71%	3	2.0466862	0.6477383	0.8097738
OCL	BU	C311F	0	3.051002616	0	1	82.82%	1	1.6560593	0.8282476	0.7737576
OCL	PE	C311F	24.00597152	12.34726588	5.462103813	2	422.26%	0	0.2296739	0.7604318	0.9104272
OCL	TK	C311F	0	0	0	0	252.83%	1	0	1	1
OCL	WAF	C311F	3.485254692	0	4.557640751	6	0.60%	0	0	1.1394102	0.8981233
OCL	PH	C311F	0	0	0	4	0.00%	0	0	1	0.8642384
OCL	AR	C311F	114.9813734	131.2618026	47.61373391	56	5104.72%	15	0.8583691	0.8583691	0.8025751
OCL	OWL	C311F	37.08064516	99.16129032	91.09677419	46	1208.87%	0	0	0.8064516	0.9112903

OriginCode	DestCode	2004	2005	2006	2007	2008	2009	2010	2011	2012
OCL	US	1	1.0610878	1.0702108	1.0714764	1.0732652	1.0755162	1.0771657	1.0783755	1.0797622
OCL	OCL	1	1.0315139	1.0467183	1.0604767	1.0749129	1.0878643	1.1009651	1.113577	1.1263031
OCL	GF	1	0.9966154	0.9987043	1.0013463	1.0012968	0.9988495	0.9964172	0.9937148	0.9904686
OCL	JA	1	1.0106465	1.0334187	1.0383481	1.0459723	1.0558836	1.0635592	1.0704517	1.0740652
OCL	IT	1	0.9888049	0.9845497	0.9796334	0.9716921	0.9613213	0.9509526	0.9402343	0.9293967
OCL	CA	1	1.0303175	1.0157119	1.042492	1.040524	1.0394914	1.0372116	1.03317	1.0296921
OCL	FR	1	0.9885726	0.984187	0.9823229	0.9773364	0.97012	0.9633139	0.9573832	0.9504646
OCL	NE	1	0.9859785	0.9821607	0.9790307	0.9743002	0.9677407	0.9615179	0.9558928	0.9500956
OCL	BE	1	0.9884165	0.9849793	0.9792256	0.9712092	0.9612551	0.9531117	0.9444259	0.9356991
OCL	SP	1	0.9958797	1.0068336	1.0073393	1.0034977	0.9966434	0.9936521	0.9871715	0.980289
OCL	SZ	1	1.0043578	1.0204447	1.0413834	1.0499646	1.0529493	1.0582714	1.0584096	1.0616347
OCL	FN	1	0.9967612	0.996407	0.9968291	0.9953365	0.9920743	0.9881551	0.9835922	0.9795506
OCL	CRB	1	1.0151326	1.0234741	1.0278812	1.0383548	1.045006	1.0471975	1.0483463	1.0475899
OCL	UK	1	0.9848494	0.9746684	0.9697391	0.9645711	0.9580718	0.9533623	0.9477987	0.9423963
OCL	SW	1	0.9970748	1.0039223	1.0101755	1.0142619	1.0157011	1.0181854	1.0210519	1.0222397
OCL	AU	1	1.0023045	1.0093234	1.0103424	1.0077064	1.0067738	1.0021158	0.999483	0.9966701
OCL	KO	1	1.0209592	1.0533789	1.0703022	1.0860651	1.1053436	1.1158266	1.1268096	1.1321993
OCL	SI	1	1.0239377	1.0153668	1.0254149	1.0304646	1.0474025	1.0559348	1.0608478	1.0657335
OCL	PG	1	1.0035584	1.01181	1.0210966	1.0163914	1.0119039	1.0047472	0.9967533	0.9885476
OCL	DE	1	1.0089323	1.0261822	1.041185	1.054143	1.0645688	1.0769827	1.0901444	1.1005919
OCL	OWW	1	1.0205806	1.0448613	1.0668199	1.0862513	1.1107197	1.1352498	1.1662618	1.1930524
OCL	NO	1	0.9906795	0.9789033	0.9717346	0.9683414	0.9649412	0.9442705	0.9366736	0.9271809
OCL	AT	1	1.036603	1.0673092	1.0879521	1.1176013	1.1389017	1.1587405	1.1787146	1.1987601
OCL	SO	1	1.0058866	1.0165898	1.0169987	1.0183108	1.0208612	1.0182479	1.0137603	1.0114993
OCL	OMO	1	1.0426324	1.0828682	1.12126	1.1629882	1.2018947	1.2378219	1.2701337	1.3010819
OCL	SA	1	1.0337631	1.0275897	1.0444785	1.0403147	1.0755249	1.1022659	1.1080508	1.1171916
OCL	EM	1	1.0166617	1.0206943	1.019868	1.0218736	1.0240603	1.0236779	1.0194119	1.0142738
OCL	PO	1	1.0307325	1.0473219	1.0847414	1.0890676	1.1070437	1.1178669	1.1426003	1.1532669
OCL	RU	1	1.047069	1.0872826	1.1035978	1.1178832	1.1238424	1.1253131	1.111472	1.1044883
OCL	MX	1	1.0423578	1.0741612	1.1515093	1.193426	1.2334053	1.272695	1.3046558	1.3462342
OCL	CZ	1	1.0211757	1.0389742	1.0453856	1.0765395	1.0958822	1.1122991	1.1202727	1.1236757
OCL	VZ	1	1.0636389	1.0911653	1.1155036	1.1464934	1.1813649	1.2135864	1.2481426	1.2829159
OCL	OWE	1	1.0127021	1.0103012	1.0047421	1.0031581	1.0007073	0.9989639	0.9989639	0.9986351
OCL	OPG	1	1.062105	1.0501019	1.0871837	1.0895371	1.0846554	1.0721869	1.0543765	1.0399754
OCL	HU	1	1.0060761	1.0060097	1.0075679	1.0038082	0.9971742	0.9695336	0.9645611	0.9813229
OCL	IS	1	1.0264772	1.0327878	1.0441739	1.05727	1.0711397	1.0862036	1.0978612	1.1083768
OCL	ONF	1	1.0254214	1.0365219	1.0363433	1.039249	1.0410654	1.0368234	1.0262025	1.0111416
OCL	SK	1	1.0217934	1.1035454	1.1135512	1.1150894	1.1113429	1.1084493	1.1063629	1.1017179
OCL	PK	1	1.0424209	1.0683425	1.1203976	1.1599665	1.208137	1.2476452	1.2879807	1.3272765
OCL	CO	1	1.0931823	1.1418889	1.1649489	1.1903148	1.222579	1.2531181	1.2833186	1.3111289
OCL	IL	1	1.0224628	1.0546309	1.0892789	1.1125525	1.1302699	1.1475436	1.1604568	1.1736694
OCL	ID	1	1.1124696	1.2124236	1.3013021	1.3814724	1.4989899	1.5901916	1.6766649	1.7605673
OCL	TW	1	1.0258492	1.0539918	1.0720381	1.1051393	1.1304433	1.1582974	1.1639937	1.2066603
OCL	NZ	1	1.0254672	1.0306434	1.0256224	1.0350785	1.030954	1.0261918	1.0201874	1.0129924
OCL	OEL	1	1.065155	1.0694053	1.0877173	1.1035278	1.1211368	1.1386373	1.1556731	1.1707646
OCL	OID	1	1.0068666	1.0138506	1.0171958	1.0239342	1.0267621	1.0266208	1.0236277	1.0180739
OCL	CBW	1	1.0982353	1.1461764	1.2186352	1.2718786	1.3424682	1.4172138	1.4761186	1.5391194
OCL	GR	1	1.0077584	1.0189792	1.0412285	1.0503334	1.0541806	1.0582706	1.0586553	1.0664247
OCL	HK	1	0.9633743	0.9436731	0.9254925	0.9136869	0.8975784	0.8957797	0.8817929	0.8671182
OCL	RO	1	1.0284687	1.077536	1.0981345	1.1177614	1.1377769	1.1484648	1.1609988	1.1713953
OCL	MA	1	1.0206843	1.0606227	1.080977	1.1006711	1.1227858	1.1461107	1.1759289	1.2070635
OCL	CL	1	1.0424423	1.0534252	1.056982	1.0794682	1.0945844	1.1090841	1.1301191	1.1507818
OCL	OSF	1	1	1	1	1	1	1	1	1
OCL	BLT	1	0.9965087	0.9965087	1.0072319	1.0134663	1.0159601	1.0187032	1.0214404	1.023192
OCL	OEF	1	1.0282258	1.0481351	1.0499992	1.0594758	1.0700605	1.0756048	1.0771169	1.0763609
OCL	BZ	1	1.0743134	1.0811763	1.0807764	1.0936695	1.1033926	1.1142973	1.1235884	1.1306562
OCL	BU	1	1.0322561	1.0736704	1.1307799	1.1547515	1.179163	1.2063182	1.2275601	1.2423714
OCL	PE	1	1.0540624	1.0881135	1.1148369	1.1401011	1.1607717	1.179805	1.1998163	1.21773
OCL	TK	1	1	1	1	1	1.5	1.5	1.5	1.5
OCL	WAF	1	0.997319	0.9892761	0.9731903	0.9524666	0.9517426	0.9356868	0.919571	0.9008043
OCL	PH	1	1.0331126	1.0496689	1.0629139	1.0761589	1.0860927	1.0993377	1.1125828	1.1258278
OCL	AR	1	1.0343348	1.0343348	1.0343348	1.0720614	1.0815451	1.0944206	1.1072961	1.1158798
OCL	OWL	1	1.0645161	1.1048387	1.1370968	1.1774194	1.2016129	1.2258065	1.2419355	1.266129

OriginCode	DestCode	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
OCL	US	1.0821063	1.0882881	1.0902454	1.0928421	1.0946177	1.0962598	1.0975667	1.099573	1.1007522	1.1015267	1.1021718	1.1027686
OCL	OCL	1.1398608	1.154569	1.1685992	1.1830264	1.1979212	1.2130095	1.2284176	1.2442783	1.2604485	1.2772159	1.2944375	1.3124148
OCL	GF	0.9873766	0.9833513	0.979087	0.9741648	0.9690068	0.9636219	0.9580144	0.951635	0.9453787	0.9390917	0.9325191	0.9263996
OCL	JA	1.0765523	1.077864	1.0786472	1.0785731	1.0773501	1.0748054	1.0711948	1.0667241	1.0621451	1.0672016	1.051725	1.0467645
OCL	IT	0.9187528	0.9074173	0.8959733	0.8844093	0.8734105	0.8620899	0.8506382	0.8393413	0.8276498	0.8166899	0.8057001	0.7948555
OCL	CA	1.0258356	1.0220394	1.0200431	1.0160818	1.0115302	1.0061319	1.0005702	0.9942276	0.9879718	0.981408	0.9738386	0.9665799
OCL	FR	0.9451808	0.9383077	0.9318236	0.9253275	0.9188709	0.9126921	0.9065552	0.9002981	0.8946321	0.8893418	0.8843781	0.8797581
OCL	NE	0.9456332	0.9402317	0.935581	0.9306993	0.9256702	0.9200678	0.916775	0.9108561	0.9062323	0.9020772	0.8980337	0.8943902
OCL	BE	0.9317876	0.9261599	0.9190754	0.9115645	0.9042296	0.8972696	0.8925049	0.8858862	0.8796479	0.8749644	0.8693491	0.8641081
OCL	SP	0.9740795	0.9608552	0.9590502	0.9507684	0.9448316	0.9354893	0.9282062	0.9197151	0.91665	0.9088973	0.9087997	0.8983466
OCL	SZ	1.0651851	1.06803	1.069129	1.069764	1.0689036	1.0680903	1.0670052	1.065014	1.0625131	1.0602466	1.0584106	1.0566258
OCL	FN	0.9749963	0.969268	0.963465	0.9570756	0.9503802	0.9438437	0.9365723	0.9296742	0.9226779	0.9157261	0.9087574	0.9021183
OCL	CRB	1.045391	1.0424172	1.03965	1.0358136	1.0315319	1.0265664	1.021363	1.0147502	1.0073625	0.9989864	0.9893131	0.9799742
OCL	UK	0.9374401	0.9314674	0.9258962	0.9201016	0.9145009	0.908929	0.9039623	0.8981603	0.8930119	0.8882035	0.8833351	0.8788323
OCL	SW	1.0250339	1.0260544	1.0298021	1.0316801	1.0334815	1.0348174	1.0367178	1.0384457	1.0404473	1.0429475	1.0456427	1.0486297
OCL	AU	0.9959997	0.9931207	0.995261	0.9931565	0.9938402	0.9913481	0.9893421	0.9876057	0.9883007	0.9856029	0.9871037	0.9849964
OCL	KO	1.1369343	1.1404468	1.1435036	1.145726	1.148925	1.1474497	1.1476645	1.1477465	1.1482178	1.1484821	1.1482321	1.1486943
OCL	SI	1.0704404	1.0724606	1.0734077	1.0730065	1.0760595	1.0770957	1.0765541	1.0754164	1.0067036	1.0816072	1.0844418	1.0460055
OCL	PG	0.9818726	0.9728315	0.9640844	0.9551495	0.9447101	0.9343866	0.924041	0.915172	0.9074359	0.9006927	0.8927527	0.8862224
OCL	DE	1.1115212	1.1221277	1.1331567	1.1445909	1.1557418	1.1670680	1.1773571	1.1868668	1.1964743	1.2060016	1.2154446	1.2249602
OCL	OWW	1.224435	1.2528863	1.2805225	1.3066678	1.3363786	1.3640148	1.3915919	1.4200741	1.4480702	1.4752076	1.5026124	1.5309763
OCL	NO	0.9201796	0.9111992	0.9033399	0.8952382	0.8865465	0.8778394	0.8690987	0.859788	0.8506314	0.841748	0.8367414	0.8272095
OCL	AT	1.220207	1.2422439	1.2642695	1.2864228	1.308868	1.331759	1.3561898	1.3797987	1.4047287	1.4302354	1.4558756	1.4827556
OCL	SO	1.0102869	1.0101387	1.0106282	1.011069	1.0122446	1.0134031	1.0151273	1.0176597	1.0195546	1.021391	1.0229536	1.0254007
OCL	OMO	1.3330368	1.3631821	1.3917608	1.4194832	1.4454296	1.4699761	1.4930837	1.5176963	1.5399141	1.5614976	1.5822636	1.6029159
OCL	SA	1.1444785	1.1515757	1.1580869	1.1679038	1.1781414	1.184292	1.1904325	1.1989672	1.2057339	1.2127259	1.2195076	1.2270405
OCL	EM	1.0107725	1.0066607	1.0029178	0.9998189	0.9956333	0.9909984	0.9859676	0.9830498	0.976649	0.9740683	0.9692724	0.9646843
OCL	PO	1.1601005	1.180374	1.1910088	1.2234844	1.2221561	1.2340873	1.2412887	1.2475812	1.2507619	1.2519464	1.2595416	1.2687262
OCL	RU	1.1116098	1.1076498	1.0980598	1.1009935	1.0927439	1.0818212	1.0677656	1.0786883	1.0608259	1.0419217	1.022083	0.9985983
OCL	MX	1.3863797	1.4221006	1.4562899	1.4874649	1.5159829	1.5413391	1.5666317	1.5881479	1.6074556	1.6298149	1.6607752	1.6726799
OCL	CZ	1.1318313	1.1388478	1.1391728	1.1503261	1.1504876	1.1563934	1.1601047	1.1723135	1.1739299	1.1808484	1.1845675	1.1872564
OCL	VZ	1.3148119	1.3437617	1.3697653	1.3968725	1.4230239	1.4486698	1.474026	1.4989752	1.5243068	1.5497606	1.5726406	1.5956191
OCL	OWE	0.9978182	0.9961246	0.9962342	0.9966131	0.9970511	0.9976182	0.9986256	0.9992927	1.0001096	1.0010361	1.0016338	1.0024608
OCL	OPG	1.0259786	1.0091761	0.9672722	0.9654753	0.9420626	0.9176311	0.8922403	0.8685228	0.8420308	0.8154094	0.7880214	0.7604823
OCL	HU	0.973658	0.9044529	0.955454	0.9480001	0.9426104	0.9383293	0.933563	0.9256313	0.9181108	0.9065782	0.8962684	0.8870037
OCL	IS	1.1193714	1.1304047	1.1430665	1.1568912	1.1680916	1.1795049	1.1899547	1.1988709	1.2067421	1.2158483	1.2246017	1.2327715
OCL	ONF	0.9953406	0.9786351	0.9619159	0.9448678	0.9267507	0.907784	0.8880636	0.868165	0.8480197	0.8276826	0.8065877	0.7860628
OCL	SK	1.0947275	1.0877067	1.0845143	1.0887271	1.0789852	1.0736489	1.067482	1.0564101	1.0426685	1.0275045	1.0131868	0.9987969
OCL	PK	1.3676481	1.4098811	1.4534634	1.4977116	1.5411572	1.584432	1.6273653	1.6713915	1.7151957	1.7589829	1.801899	1.8444556
OCL	CO	1.3413074	1.3711249	1.3902747	1.4117305	1.4367207	1.4643072	1.491938	1.5191297	1.5474839	1.5754963	1.5986786	1.623842
OCL	IL	1.1902423	1.2083174	1.2222673	1.2358848	1.2513592	1.2665282	1.282985	1.2964279	1.3104254	1.3275706	1.3409004	1.3662079
OCL	ID	1.8479252	1.9396235	2.0366898	2.1347967	2.2307799	2.3257985	2.4196777	2.5148591	2.6062256	2.6958651	2.7831808	2.8686886
OCL	TW	1.2327383	1.2540212	1.2706415	1.2837878	1.2926148	1.2985485	1.3032662	1.3097763	1.3113476	1.3114947	1.3099255	1.3090428
OCL	NZ	1.010456	1.0107668	1.0110254	1.0108701	1.0111289	1.0111289	1.0110772	1.0112842	1.0111807	1.0111289	1.0106113	1.0100631
OCL	OEL	1.1848872	1.1976282	1.2062679	1.2144826	1.2242166	1.2329376	1.2410398	1.2473977	1.253812	1.2566508	1.2621392	1.2656276
OCL	OID	1.0135571	1.0055168	0.9967721	0.987734	0.9757592	0.9645519	0.9511122	0.9384364	0.9231762	0.9070965	0.8897236	0.8717061
OCL	CBW	1.5726676	1.6028429	1.6333796	1.6650605	1.6943323	1.7245076	1.75131	1.7781726	1.7687165	1.7593208	1.7529964	1.7477564
OCL	GR	1.0577071	1.0566171	1.054437	1.0518799	1.0482615	1.0450115	1.0414209	1.0373173	1.0334701	1.0307771	1.0282768	1.026417
OCL	HK	0.8527701	0.836705	0.8197808	0.8027899	0.7854026	0.767617	0.7503636	0.7336358	0.7174402	0.7011768	0.6849134	0.6694433
OCL	RO	1.1735328	1.1853867	1.1947143	1.2095803	1.2146327	1.2180334	1.2187136	1.2251263	1.224348	1.2226001	1.2209483	1.2202682
OCL	MA	1.2329189	1.2577841	1.2816591	1.3041039	1.3248982	1.3438222	1.361756	1.3806799	1.3987237	1.4164375	1.4329409	1.4497745
OCL	CL	1.1706999	1.190618	1.2075577	1.2248697	1.243867	1.2624721	1.2807148	1.2987714	1.316828	1.3338538	1.3503351	1.3667163
OCL	OSF	1	1	1	1	1	1	1	1	1	1	1	1
OCL	BLT	1.0249377	1.0239401	1.0239401	1.0249377	1.0249377	1.0255859	1.0249377	1.0249377	1.0221945	1.0187032	1.0169576	1.0134663
OCL	OEF	1.0743448	1.0695565	1.062752	1.0544355	1.0446069	1.0336181	1.0211694	1.0093246	0.9959677	0.9821069	0.9674899	0.952873
OCL	BZ	1.1359144	1.1393376	1.1401454	1.1389338	1.1361066	1.1312601	1.1252019	1.1175263	1.1090468	1.0997577	1.0895607	1.0787561
OCL	BU	1.2565004	1.2576286	1.2645033	1.2637315	1.261116	1.2593723	1.255449	1.2493461	1.238884	1.2279861	1.217524	1.205626
OCL	PE	1.233608	1.2465071	1.2609096	1.2723932	1.2847956	1.2958199	1.3054662	1.3132761	1.3201654	1.3266775	1.3283523	1.3330271
OCL	TK	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2
OCL	WAF	0.8820375	0.8632708	0.847185	0.8284182	0.8096515	0.7908847	0.769437	0.7506702	0.7292225	0.7104558	0.689008	0.6675603
OCL	PH	1.1390728	1.1556291	1.1721854	1.1887417	1.205298	1.2218543	1.2384106	1.2549669	1.2715232	1.2880795	1.3046358	1.3245033
OCL	AR	1.1287554	1.1373391	1.1459227	1.1502146	1.1587983	1.1630901	1.167382	1.1716738	1.1759657	1.1759657	1.1802575	1.1802575
OCL	OWL	1.2822581	1.2983871	1.3145161	1.3225806	1.3306452	1.3387097	1.3467742	1.3467742	1.3548387	1.3548387	1.3629032	1.3629032

C. Forecast Calculation by Trade Partner

	Partner	Commodity Code	Commodity Description	Trade Value			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
172,312	World	S3-071	COFFEE,COFFEE SUBSTITUTE	182,613,800	100.0%	147,955											
	Germany	S3-071	COFFEE,COFFEE SUBSTITUTE	58,135,200	30.2%	44,730	52,093	51,917	52,050	52,163	52,161	52,036	51,906	51,766	51,596	51,435	51,226
	USA	S3-071	COFFEE,COFFEE SUBSTITUTE	21,962,610	13.1%	19,395	22,588	23,968	24,174	24,203	34,243	24,294	24,331	24,358	24,389	24,443	24,582
	Belgium	S3-071	COFFEE,COFFEE SUBSTITUTE	15,108,160	7.9%	11,849	13,585	13,382	13,362	13,284	13,176	13,041	12,930	12,812	12,707	12,641	12,564
	Japan	S3-071	COFFEE,COFFEE SUBSTITUTE	11,088,840	6.2%	9,124	10,626	10,739	10,981	11,034	11,125	11,217	11,302	11,375	11,413	11,440	11,454
	Netherlands	S3-071	COFFEE,COFFEE SUBSTITUTE	11,501,340	5.8%	8,762	10,228	10,084	10,045	10,013	9,965	9,898	9,834	9,774	9,717	9,672	9,618
	France	S3-071	COFFEE,COFFEE SUBSTITUTE	10,425,750	5.5%	8,182	9,629	9,420	9,378	9,360	9,313	9,244	9,179	9,123	9,087	9,097	8,941
	Spain	S3-071	COFFEE,COFFEE SUBSTITUTE	6,993,740	3.9%	5,758	6,707	6,679	6,783	6,756	6,730	6,684	6,666	6,621	6,575	6,533	6,483
	Italy	S3-071	COFFEE,COFFEE SUBSTITUTE	6,166,552	3.3%	4,838	5,632	5,569	5,546	5,518	5,473	5,415	5,356	5,298	5,235	5,175	5,111
	Lao People's Dem. Rep.	S3-071	COFFEE,COFFEE SUBSTITUTE	5,666,414	3.1%	4,589	5,344	5,454	5,584	5,696	5,806	5,936	6,067	6,232	6,376	6,543	6,665
	United Kingdom	S3-071	COFFEE,COFFEE SUBSTITUTE	5,271,947	2.9%	4,198	4,889	4,815	4,788	4,741	4,715	4,687	4,681	4,633	4,607	4,583	4,554
	Subtotal					Subtotal	141,202	142,027	142,618	142,768	142,705	142,453	142,232	141,991	141,672	141,471	141,226
						Other	31,110	31,292	31,422	31,455	31,441	31,386	31,337	31,284	31,214	31,169	31,115
						Total	172,312	173,319	174,040	174,223	174,147	173,838	173,569	173,275	172,886	172,640	172,341

Partner	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
World										
Germany	51,004	50,748	50,479	50,168	49,906	49,574	49,248	48,920	48,578	48,259
USA	24,827	24,685	24,725	24,762	24,792	24,837	24,864	24,881	24,896	24,910
Belgium	12,468	12,387	12,287	12,172	12,108	12,019	11,933	11,870	11,784	11,723
Japan	11,462	11,461	11,448	11,421	11,383	11,335	11,287	11,234	11,178	11,123
Netherlands	9,569	9,518	9,466	9,416	9,366	9,316	9,269	9,226	9,185	9,147
France	8,679	8,617	8,756	8,687	8,638	8,579	8,525	8,474	8,427	8,383
Spain	6,432	6,377	6,337	6,281	6,226	6,168	6,148	6,096	6,075	6,025
Italy	5,047	4,982	4,919	4,856	4,781	4,728	4,663	4,601	4,538	4,477
Lao People's Dem. Rep.	6,843	6,994	7,142	7,290	7,437	7,569	7,739	7,884	8,030	8,162
United Kingdom	4,525	4,498	4,471	4,443	4,416	4,391	4,366	4,342	4,316	4,296
Subtotal	140,656	140,446	140,010	139,536	139,062	138,536	138,040	137,528	137,016	136,525
Other	31,034	30,944	30,848	30,743	30,639	30,523	30,413	30,301	30,188	30,080
Total	171,689	171,390	170,858	170,280	169,701	169,058	168,453	167,829	167,205	166,606

Table F5.10-20
Forecast Calculations
Wood Exports

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
123,824

World Total	50,570,020	141,930,530	100.0%
USA Total	20,899,370	52,597,670	37.1%
Jamaica Total	8,821,751	28,250,271	19.9%
Trinidad and Tobago Total	4,719,370	15,559,865	11.0%
El Salvador Total	3,442,125	10,693,453	7.5%
Saint Vincent and the Grenadines T	1,379,865	5,473,249	3.9%
Cuba Total	939,155	4,505,335	3.2%
Barbados Total	1,517,824	3,674,954	2.6%
Saint Lucia Total	1,007,798	3,280,448	2.3%
Nicaragua Total	478,707	2,252,990	1.6%
Germany Total	893,842	2,041,690	1.4%
Antigua and Barbuda Total	542,468	1,807,624	1.3%
Spain Total	921,674	1,550,197	1.1%
Panama Total	554,554	1,171,520	0.8%
Grenada Total	343,534	1,115,409	0.8%
France Total	465,863	1,043,182	0.7%
Mexico Total	406,538	945,312	0.7%
Dominican Rep. Total	662,264	894,627	0.6%
Ireland Total	447,128	697,991	0.5%
Guatemala Total	152,087	566,275	0.4%
Costa Rica Total	244,130	485,376	0.3%
Aruba Total	147,194	390,625	0.3%
Belgium Total	217,854	361,030	0.3%
Netherlands Total	202,840	334,009	0.2%
Russian Federation Total	263,576	313,276	0.2%
United Kingdom Total	59,565	283,745	0.2%
Colombia Total	147,038	270,822	0.2%
Venezuela Total	139,787	257,890	0.2%
Italy Total	74,585	255,101	0.2%
Japan Total	58,712	167,019	0.1%
Thailand Total	42,144	99,450	0.1%
Areas, nes Total	2,518	95,252	0.1%
Neth. Antilles Total	25,106	95,117	0.1%
Albania Total	25,582	75,128	0.1%
Andorra Total	37,128	87,474	0.0%
Br. Indian Ocean Terr. Total	50,309	58,019	0.0%
Chile Total	16,830	50,250	0.0%
Other Asia, nes Total	21,304	40,476	0.0%
Finland Total	7,333	29,429	0.0%
Haiti Total	9,449	24,687	0.0%
Bahamas Total	163,156	20,249	0.0%
Israel Total	9,878	17,851	0.0%
Cayman Isds Total	8,093	16,187	0.0%

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
OCL	US	C331	0.739539	0.850231	0.63	0.56	0.701828	0.651102	0.6134	0.600637	0.767314	1	1.069072	1.087286	1.097368	1.10128	1.112391	1.125523	1.140424	1.158578	1.180313	1.212432	1.239111	1.263135	1.28701	1.311858	1.338674	1.363024	1.390462	1.419907	1.450586	1.484264
OCL	OCL	C331	0.6433707	0.5081504	0.61	0.87	0.652864	0.630542	0.810596	0.819788	0.875223	1	1.049387	1.071068	1.088721	1.105524	1.124732	1.145281	1.166684	1.189642	1.214459	1.243494	1.270689	1.297125	1.323899	1.351208	1.378808	1.407527	1.436941	1.467538	1.499049	1.532227
OCL	CRB	C331	0.1036611	0.049287	0.36	2.90	0.346485	0.361069	1.228109	0.901595	0.932114	1	1.050807	1.092621	1.137281	1.187241	1.228886	1.264701	1.298997	1.330931	1.36175	1.389497	1.41781	1.446391	1.474717	1.502379	1.529855	1.556667	1.581919	1.606104	1.628995	1.650266
OCL	CO	C331	0.033725	0.784118	1.15	0.12	1.832864	1.011736	0.940296	0.740163	0.808555	1	1.046244	1.108579	1.144139	1.154813	1.172078	1.191729	1.207954	1.226178	1.243589	1.255162	1.262365	1.271	1.280323	1.28826	1.296317	1.304178	1.311348	1.319168	1.326105	1.333735
OCL	BZ	C331	0	0	0.00	0.00	0.11056	0.312985	0.132211	0.737027	0.873779	1	1.111479	1.130426	1.14292	1.166076	1.189738	1.218196	1.244022	1.270065	1.295814	1.315203	1.331523	1.345182	1.356671	1.365023	1.371263	1.376012	1.379341	1.380943	1.382189	1.382122
OCL	OWW	C331	0.3195034	1.257772	0.07	0.22	0.493777	0.836999	0.931402	0.665427	0.861865	1	0.989424	0.996596	1.001588	0.992964	0.990703	0.991288	0.99539	0.996455	0.998736	0.996189	0.994557	0.993405	0.992092	0.989923	0.987221	0.984252	0.980839	0.976768	0.973158	0.969488
OCL	IT	C331	0.972869	0.893338	0.91	1.18	1.2473	1.110707	0.719527	0.780448	0.849768	1	1.013472	1.046543	1.085631	1.102257	1.114997	1.131532	1.145551	1.161065	1.174666	1.183971	1.194451	1.206459	1.220792	1.233731	1.245418	1.255006	1.264246	1.273737	1.283421	1.292122
OCL	MX	C331	0.2931839	1.110657	1.12	1.26	1.523706	1.332722	1.388093	0.947421	1.006749	1	1.049454	1.084868	1.160595	1.195942	1.231231	1.268686	1.295267	1.334472	1.371386	1.396592	1.423048	1.444755	1.46217	1.474502	1.485501	1.492376	1.495584	1.502375	1.507833	1.513249
OCL	FR	C331	0.0419779	0.4202	0.69	1.13	1.250079	1.218622	1.12404	0.735402	0.83314	1	1.020621	1.054077	1.093214	1.113414	1.130984	1.152667	1.174961	1.195423	1.219148	1.235665	1.254392	1.273861	1.294056	1.313535	1.333298	1.35213	1.371173	1.391163	1.412941	1.433877
OCL	UK	C331	0	2.639136	8.23	2.70	4.682199	21.72958	0	0.745288	0.858115	1	1.005105	1.020157	1.056283	1.069764	1.079974	1.098298	1.114006	1.129665	1.142408	1.147362	1.151963	1.156152	1.161257	1.164529	1.167016	1.167277	1.166865	1.167408	1.168194	1.169063
OCL	CA	C331	23.539555	11.52285	0.51	2.48	1.576971	0.836808	0.575038	0.744167	0.898523	1	1.061715	1.09485	1.163468	1.199779	1.234571	1.270882	1.303603	1.333287	1.357587	1.378987	1.402319	1.4251	1.44581	1.465001	1.483363	1.501588	1.519674	1.537899	1.555985	1.573243
OCL	SP	C331	1.9065934	0.51862	0.68	0.92	0.838828	0.930403	0	0.694292	0.817918	1	1.017094	1.061508	1.098748	1.113095	1.125611	1.147283	1.164072	1.181777	1.199939	1.211386	1.225427	1.239011	1.256868	1.270299	1.284493	1.29594	1.314866	1.327534	1.348443	1.361874
OCL	VZ	C331	1.9611246	1.713988	1.22	3.43	4.77907	3.065255	4.630857	1.367754	0.727352	1	1.122006	1.139882	1.1706	1.181881	1.21017	1.238285	1.269696	1.314995	1.351614	1.378862	1.391184	1.403679	1.417737	1.430927	1.448282	1.467893	1.488546	1.512669	1.534363	1.551718
OCL	IL	C331	1.0585002	0	0.00	1.14	1.568119	0	0	0.676286	0.82077	1	1.035532	1.097958	1.141343	1.153514	1.159011	1.168826	1.177267	1.183353	1.187868	1.191009	1.189046	1.186101	1.182568	1.177464	1.17393	1.165293	1.154888	1.149588	1.140558	1.128779
OCL	BE	C331	0	0	0.04	1.22	0	1.239954	0.310371	0.732109	0.856487	1	1.017222	1.05243	1.092997	1.107922	1.120551	1.13739	1.150402	1.166475	1.183697	1.195943	1.207424	1.218523	1.230769	1.243016	1.254879	1.265565	1.27478	1.285496	1.296594	1.308075
OCL	TW	C331	0.0008288	5.474099	8.68	3.31	0.082884	0	0	0.84915	0.909953	1	1.033154	1.062892	1.091173	1.121426	1.150021	1.183174	1.212598	1.239121	1.262329	1.280564	1.297555	1.312889	1.325321	1.335682	1.343556	1.35143	1.355574	1.357846	1.358889	1.358889
OCL	OWL	C331	0	0	0.00	2.33	0	0	0	0.732422	0.822266	1	1.056641	1.080078	1.097656	1.109375	1.128953	1.146484	1.166016	1.185547	1.208984	1.238281	1.263672	1.287109	1.310547	1.333984	1.357422	1.380859	1.404297	1.429688	1.455078	1.484375
OCL	SZ	C331	28.626289	9.525773	0.28	8.50	27.54897	5.780928	1.319588	0.675258	0.798969	1	1.012887	1.058701	1.103093	1.123711	1.136598	1.157216	1.175258	1.195878	1.218495	1.229381	1.244845	1.257732	1.275773	1.291237	1.309278	1.322165	1.337629	1.350515	1.365979	1.381443
OCL	GF	C331	46.607407	37.73333	22.19	184.21	1.259259	0.118519	0.059259	0.740741	0.837037	1	1.007407	1.044444	1.088889	1.103704	1.111111	1.125926	1.133333	1.148148	1.155556	1.162963	1.162963	1.17037	1.177778	1.177778	1.185185	1.185185	1.185185	1.192593	1.192593	1.192593

C. Forecast Calculation by Trade Partner

123,824	World Total	141,931	100.0%	123,824	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	USA Total	52,598	37.1%	45,868	45,888	49,057	49,893	50,356	50,535	51,045	51,848	52,331	53,164	54,162	55,636	56,860	57,962	59,058	60,198	61,337	62,546	63,805	65,158	66,564	68,109
	Jamaica Tot	28,250	19.9%	24,646	24,646	25,898	26,929	28,030	29,261	30,287	31,170	32,015	32,803	33,562	34,246	34,944	35,648	36,346	37,028	37,708	38,366	38,988	39,585	40,149	40,673
	Trinidad and	15,560	11.0%	13,575	13,575	14,265	14,832	15,438	16,117	16,682	17,168	17,634	18,067	18,486	18,862	19,247	19,635	20,019	20,395	20,769	21,132	21,474	21,803	22,113	22,402
	El Salvador	10,693	7.5%	9,329	9,329	9,790	9,992	10,157	10,314	10,493	10,685	10,884	11,098	11,330	11,601	11,855	12,101	12,351	12,606	12,863	13,131	13,406	13,691	13,985	14,295
	Saint Vincen	5,473	3.9%	4,775	4,775	5,007	5,398	5,457	5,568	5,681	5,817	5,940	6,065	6,188	6,280	6,358	6,423	6,478	6,518	6,548	6,570	6,586	6,594	6,600	6,600
	Cuba Total	4,505	3.2%	3,931	3,931	4,130	4,295	4,470	4,667	4,830	4,971	5,106	5,231	5,352	5,462	5,573	5,685	5,796	5,905	6,014	6,119	6,218	6,313	6,403	6,486
	Barbados To	3,675	2.6%	3,206	3,206	3,249	3,355	3,481	3,534	3,575	3,628	3,673	3,723	3,766	3,796	3,830	3,868	3,914	3,956	3,993	4,024	4,053	4,064	4,115	4,143
	Saint Lucia T	3,280	2.3%	2,862	2,862	3,003	3,105	3,322	3,423	3,524	3,631	3,707	3,819	3,925	4,003	4,073	4,135	4,185	4,220	4,251	4,271	4,280	4,300	4,315	4,331
	Nicaragua T	2,253	1.6%	1,966	1,966	2,065	2,148	2,235	2,334	2,415	2,486	2,553	2,616	2,677	2,731	2,787	2,843	2,899	2,953	3,007	3,060	3,109	3,157	3,202	3,244
	Germany To	2,042	1.4%	1,781	1,781	1,794	1,860	1,940	1,966	1,979	2,006	2,019	2,045	2,058	2,071	2,071	2,085	2,098	2,098	2,111	2,111	2,111	2,124	2,124	2,124
	Antigua and	1,808	1.3%	1,577	1,677	1,657	1,723	1,794	1,872	1,938	1,994	2,049	2,099	2,148	2,191	2,236	2,281	2,326	2,369	2,413	2,455	2,495	2,533	2,569	2,603
		130,138	91.7%	113,535	113,535	120,218	123,530	126,679	129,590	132,450	135,203	137,911	140,730	143,663	146,679	149,832	152,666	155,470	158,245	161,014	163,784	166,526	169,339	172,139	175,009
					10,289	10,894	11,194	11,480	11,743	12,003	12,252	12,497	12,753	13,018	13,310	13,578	13,835	14,089	14,340	14,591	14,842	15,091	15,345	15,599	15,859
					123,824	131,112	134,724	138,159	141,333	144,452	147,455	150,409	153,483	156,670	160,189	163,410	166,501	169,558	172,585	175,604	178,626	181,617	184,684	187,738	190,868

Table F5.10-21
Forecast Calculations
Vegetable Oils

A. 2003 UN Honduras Trade Data

Port of Cortes 2004	Partner	Commodity Code	Commodity Description	Trade Value		NetWeight (kg)
72,207	World	S3-422	FIXED VEG.FAT,OILS,OTHER	55,648,450	100.00%	122,646,000
	Mexico	S3-422	FIXED VEG.FAT,OILS,OTHER	23,267,500	45.06%	55,270,070
	El Salvador	S3-422	FIXED VEG.FAT,OILS,OTHER	13,044,910	18.41%	22,583,220
	Colombia	S3-422	FIXED VEG.FAT,OILS,OTHER	5,839,500	11.21%	13,750,000
	USA	S3-422	FIXED VEG.FAT,OILS,OTHER	3,801,964	7.33%	8,989,421
	Guatemala	S3-422	FIXED VEG.FAT,OILS,OTHER	4,218,407	7.12%	8,737,565
	US Misc. Pacific Isds	S3-422	FIXED VEG.FAT,OILS,OTHER	2,307,500	5.30%	6,500,000
	Nicaragua	S3-422	FIXED VEG.FAT,OILS,OTHER	2,072,690	3.26%	3,995,000
	Venezuela	S3-422	FIXED VEG.FAT,OILS,OTHER	930,745	1.62%	1,984,500
	Costa Rica	S3-422	FIXED VEG.FAT,OILS,OTHER	364,622	0.68%	836,125
	Areas, nes	S3-422	FIXED VEG.FAT,OILS,OTHER	410	0.00%	48

B. Global Insight Long Term Forecast Partner Region

OriginCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
OCL	OCL	C311E	0.323925629	0.622154105	0.280988475	1	54.31%	1	1.001731	0.865595	0.936385	1	1.02819	1.052824	1.078957	1.10755	1.134661	1.161961	1.189457	1.214345	1.240155	1.265866	1.291274	1.316573	1.341957	1.367282	1.392576	1.41768	1.443311	1.469026	1.494754	1.52111
OCL	MX	C311E	0.040273174	0.214422633	0.301034124	0	35.16%	0	0.501743	0.553936	0.781435	1	1.016333	1.031662	1.061219	1.080608	1.098545	1.115371	1.130411	1.144402	1.157115	1.168879	1.176991	1.184296	1.190563	1.195691	1.199924	1.202944	1.20508	1.206429	1.206206	1.20554
OCL	NE	C311E	1.3794494	0.871577176	0.188876632	0	87.85%	1	0.786609	0.662635	0.914331	1	1.008839	1.034158	1.017782	1.031276	1.045666	1.059884	1.073918	1.08664	1.100589	1.113752	1.127655	1.142238	1.157037	1.172471	1.188448	1.205046	1.221905	1.239974	1.256615	1.279429
OCL	CRB	C311E	3.07687342	24.49932756	3.491069988	2	680.41%	1	2.883211	0.597074	0.864544	1	1.03693	1.074506	1.070095	1.098526	1.128355	1.155172	1.180241	1.203265	1.225859	1.247055	1.267416	1.28724	1.306525	1.325434	1.344182	1.362553	1.380225	1.397366	1.412996	1.428318
OCL	UK	C311E	77.04546469	74.89537912	35.33856686	1	180.79%	1	0.773718	0.624898	0.905573	1	1.000693	1.013915	0.99933	1.010864	1.022397	1.035494	1.048292	1.060421	1.073443	1.085349	1.097031	1.109978	1.123744	1.138106	1.153211	1.169432	1.186026	1.204554	1.223826	1.244512
OCL	US	C311E	0.64196683	0.812488449	0.613704234	1	62.44%	0	2.158189	1.089921	0.708148	1	1.055897	1.068967	1.03441	1.029648	1.026619	1.023249	1.01974	1.016648	1.015532	1.023364	1.02467	1.027091	1.030461	1.033726	1.037025	1.041334	1.045482	1.049605	1.053193	1.056644
OCL	GF	C311E	0.214630714	0	3.857258709	0	355.80%	0	0	0.889494	0.969129	1	1.00198	1.003506	1.005713	1.009362	1.013214	1.017114	1.020991	1.023888	1.026881	1.029815	1.032307	1.033989	1.036028	1.037889	1.039892	1.041037	1.042814	1.044506	1.046118	1.048372
OCL	CA	C311E	0	0	0	0	0.00%	0	0.13766	0.523107	0.828958	1	1.057325	1.091658	1.126281	1.164841	1.205407	1.245695	1.284635	1.324399	1.364053	1.405329	1.445977	1.486737	1.52738	1.568256	1.609471	1.650952	1.692748	1.735032	1.776453	1.818695
OCL	SP	C311E	0	0	0.176902728	0	0.00%	0	0	0.576202	0.865171	1	1.030009	1.085073	1.09707	1.116649	1.130735	1.147972	1.160222	1.171443	1.185024	1.194879	1.200947	1.205378	1.211377	1.214241	1.217375	1.220256	1.228597	1.232776	1.243222	1.247906
OCL	PG	C311E	0	0	0.805634362	3	0.00%	0	0	0.723776	0.921215	1	1.02468	1.046512	1.067394	1.08543	1.104414	1.122449	1.13906	1.155197	1.171334	1.186996	1.202183	1.216421	1.23066	1.244423	1.258187	1.272425	1.286087	1.304699	1.319411	1.335074
OCL	CL	C311E	0	0.442871884	0	1	0.00%	0	1.294938	0.576678	0.616898	1	1.055243	1.103859	1.107348	1.147821	1.187383	1.226185	1.266322	1.305884	1.346649	1.388017	1.429703	1.472827	1.517206	1.562581	1.609289	1.657844	1.707721	1.759334	1.812086	1.866699
OCL	JA	C311E	0.009009764	0	0.030233835	0	0.00%	0	2.2828	0.664452	0.911628	1	1.019266	1.060461	1.047171	1.065781	1.085047	1.10385	1.121591	1.138675	1.15149	1.165449	1.178732	1.19136	1.20465	1.21727	1.228566	1.240531	1.252489	1.26511	1.277075	1.289698
OCL	NO	C311E	0	0	0	3	0.00%	0	0	0.67395	0.884327	1	1.014261	1.030407	1.016172	1.029922	1.041358	1.0504	1.062724	1.074429	1.091866	1.108764	1.127815	1.149934	1.171811	1.192449	1.213384	1.233727	1.252913	1.271856	1.299142	1.323763

C. Forecast Calculation by Trade Partner

72,207	World	S3-422	FIXED VEG.FAT,OILS,OTHER	55,848,450	100.0%	122,646	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Mexico	S3-422	FIXED VEG.FAT,OILS,OTHER	23,267,500	45.1%	55,270	32,540	33,457	34,259	35,109	36,040	36,928	37,810	38,672	39,515	40,355	41,191	42,018	42,841	43,667	44,491	45,314	46,131	46,865	47,602	48,639	49,497
	El Salvador	S3-422	FIXED VEG.FAT,OILS,OTHER	13,044,910	18.4%	22,583	13,296	13,513	13,717	14,110	14,367	14,506	14,830	15,030	15,216	15,385	15,530	15,649	15,746	15,829	15,888	15,954	15,994	16,022	16,040	16,037	16,029
	Colombia	S3-422	FIXED VEG.FAT,OILS,OTHER	5,839,500	11.2%	13,750	8,095	8,167	8,372	8,239	8,348	8,465	8,581	8,694	8,797	8,910	9,016	9,129	9,247	9,366	9,491	9,621	9,755	9,881	10,038	10,189	10,349
	USA	S3-422	FIXED VEG.FAT,OILS,OTHER	3,801,964	7.3%	8,989	5,292	5,488	5,687	5,663	5,814	5,972	5,114	6,246	6,368	6,488	6,600	6,706	6,813	6,915	7,015	7,114	7,211	7,305	7,396	7,478	7,559
	Guatemala	S3-422	FIXED VEG.FAT,OILS,OTHER	4,218,407	7.1%	8,738	5,144	5,149	5,216	5,141	5,200	5,259	5,327	5,393	5,455	5,522	5,583	5,643	5,710	5,781	5,855	5,932	6,016	6,101	6,196	6,296	6,402
	US Misc. Pacific Isds	S3-422	FIXED VEG.FAT,OILS,OTHER	2,307,500	5.3%	6,500	3,827	4,041	4,091	3,959	3,940	3,929	3,916	3,902	3,891	3,886	3,916	3,921	3,931	3,943	3,956	3,969	3,985	4,001	4,017	4,030	4,045
	Nicaragua	S3-422	FIXED VEG.FAT,OILS,OTHER	2,072,690	3.3%	3,995	2,352	2,357	2,360	2,365	2,374	2,383	2,392	2,401	2,408	2,415	2,422	2,428	2,432	2,437	2,441	2,446	2,449	2,453	2,457	2,460	2,466
				54,552,471	97.7%	119,825	70,546	72,171	73,701	74,586	76,084	77,542	78,969	80,338	81,649	82,960	84,259	85,496	86,719	87,939	89,147	90,350	91,541	92,738	93,946	95,130	96,346
							1,661	1,699	1,735	1,756	1,791	1,825	1,859	1,891	1,922	1,953	1,983	2,013	2,041	2,070	2,099	2,127	2,155	2,183	2,212	2,239	2,268
							72,207	73,870	75,436	76,342	77,875	79,367	80,828	82,229	83,571	84,913	86,243	87,508	88,760	90,009	91,245	92,476	93,696	94,921	96,157	97,369	98,614

Table F5.10-22
Forecast Calculations
Sugar and Molasses

A. 2003 UN Honduras Trade Data

Port of Cortes 2004
122,588

Partner	Commodity Code	Commodity Description	Trade Value	NetWeight (kg)		
World	S3-061	SUGARS,MOLASSES,HONEY	14,781,170	57,213,700	100.0%	
USA	S3-061	SUGARS,MOLASSES,HONEY	10,603,250	45,593,220	79.7%	
Haiti	S3-061	SUGARS,MOLASSES,HONEY	816,153	4,704,000	8.2%	
Uruguay	S3-061	SUGARS,MOLASSES,HONEY	828,434	1,893,125	3.3%	
Canada	S3-061	SUGARS,MOLASSES,HONEY	921,250	1,600,500	2.8%	
Nicaragua	S3-061	SUGARS,MOLASSES,HONEY	859,898	1,302,312	2.3%	
China	S3-061	SUGARS,MOLASSES,HONEY	483,451	1,104,750	1.9%	
Colombia	S3-061	SUGARS,MOLASSES,HONEY	243,000	1,000,000	1.7%	
El Salvador	S3-061	SUGARS,MOLASSES,HONEY	23,792	8,250	0.0%	
Areas, nes	S3-061	SUGARS,MOLASSES,HONEY	772	6,174	0.0%	
Costa Rica	S3-061	SUGARS,MOLASSES,HONEY	1,167	1,375	0.0%	

B. Global Insight Long Term Forecast Partner Region

OrignCode	DestCode	ComCode	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
OCL	US	C311C	0.629921635	1	1	1.0396541	0.8789135	0.727956	0.642049	0.71589	0.904023	1	0.995058	0.999955	1.003168	1.008346	1.012876	1.018583	1.024898	1.032132	1.039964	1.052761	1.062442	1.071632	1.082206	1.092946	1.104011	1.112992	1.124784	1.136714	1.148743	1.161078
OCL	CA	C311C	0.121293066	0	1	0.9275606	0.7333102	1.519641	0.688822	0.879303	0.914988	1	1.037705	1.033637	1.068207	1.077174	1.085062	1.093489	1.102396	1.111535	1.11739	1.124198	1.133719	1.140612	1.148583	1.158189	1.164038	1.167129	1.174551	1.181455	1.187308	1.193223
OCL	ONF	C311C	2.641927304	2	14	2.1850923	2.9445255	17.88501	0	1.215386	0.910989	1	1.029776	1.033243	1.06962	1.089172	1.106152	1.123323	1.138161	1.150847	1.162984	1.17361	1.186378	1.196892	1.207905	1.217797	1.227255	1.233694	1.241913	1.249559	1.256635	1.263056
OCL	KO	C311C	0.049760971	0	0	0.3873621	0.4912833	0.36491	0.944527	1.034815	0.677214	1	1.035563	1.088476	1.123706	1.159916	1.202191	1.236792	1.269958	1.299691	1.326382	1.352087	1.379466	1.403531	1.428749	1.453565	1.478566	1.49641	1.525776	1.552467	1.579311	1.607627
OCL	BU	C311C	0	1	0	2.479459	1.5808403	6.119528	0	1.014585	0.894635	1	1.03709	1.083334	1.129305	1.16016	1.201214	1.248054	1.2898	1.321749	1.354093	1.362847	1.388957	1.403332	1.417127	1.431062	1.442967	1.452172	1.454573	1.454975	1.454291	1.452672
OCL	CRB	C311C	0.464305527	3	2	1.7076489	2.5691272	1.968961	1.450836	1.110225	0.975159	1	1.030303	1.044943	1.062865	1.091203	1.111062	1.125652	1.142696	1.157177	1.169324	1.181639	1.195413	1.20675	1.220045	1.233252	1.246568	1.255335	1.269013	1.282343	1.294659	1.306919
OCL	RU	C311C	0.174193282	0	0	1.15527	0.8483871	0.284017	2.113769	0.986619	0.888672	1	1.068314	1.136961	1.183944	1.234406	1.278058	1.321996	1.353419	1.38211	1.440582	1.486665	1.52372	1.574993	1.612372	1.646212	1.67564	1.741215	1.761537	1.779588	1.795443	1.805624
OCL	UK	C311C	1.308955721	1	1	1.275979	1.4772458	1.275016	0.76174	0.997039	0.953996	1	1.012938	1.017995	1.037087	1.050005	1.060672	1.074041	1.087256	1.099379	1.110602	1.11849	1.127245	1.132735	1.140137	1.146743	1.153141	1.153308	1.15952	1.166773	1.174339	1.182271
OCL	CL	C311C	2.337021733	2	4	1.7126553	2.3816073	1.583296	0.041032	1.035576	0.86798	1	1.009881	1.004495	0.995534	1.013993	1.018098	1.020499	1.03702	1.055867	1.073001	1.091092	1.103029	1.113004	1.12615	1.138987	1.151709	1.160254	1.173054	1.18551	1.197457	1.209978
OCL	TW	C311C	5.481472571	0	0	0	0	0.987491	0.989966	0.989966	0.90746	1	1.019224	1.047536	1.072578	1.113745	1.149054	1.18908	1.22628	1.262397	1.297114	1.330912	1.365998	1.397661	1.429745	1.460657	1.491763	1.518856	1.548724	1.57793	1.6088	1.633792
OCL	HE	C311C	119.9192064	211	439	589.18962	1191.3286	378.7596	0.769541	0.790541	0.859977	1	0.994681	1.02142	1.060523	1.079643	1.089563	1.101064	1.112708	1.123834	1.135135	1.142754	1.152099	1.155118	1.159718	1.163025	1.165758	1.160437	1.162306	1.165469	1.169781	1.174238
OCL	CH	C311C	53.02007252	0	0	0	0	4.917845	0	1.352407	0.872562	1	1.005302	1.029756	1.062279	1.096123	1.118611	1.138287	1.155154	1.170143	1.185368	1.195889	1.206578	1.216462	1.224559	1.230711	1.236251	1.242375	1.246217	1.249678	1.252692	1.255326
OCL	PE	C311C	8.219979221	9	6	16.214356	9.9904885	1.436251	2.014429	2.296003	0.918597	1	1.041847	1.056883	1.064868	1.086455	1.11066	1.131913	1.167422	1.204826	1.240815	1.27734	1.303995	1.325804	1.358673	1.388423	1.416349	1.443589	1.474234	1.504915	1.535116	1.56863
OCL	FR	C311C	0.020248653	0	29	0.5466326	93.936659	57.82554	0.506135	0.919167	0.882983	1	0.993318	1.017211	1.055441	1.07087	1.077107	1.085094	1.093832	1.099947	1.107318	1.110558	1.113819	1.112947	1.113716	1.113919	1.110797	1.106589	1.108346	1.107318	1.10995	1.112923
OCL	DEF	C311C	0	0	1	2.646378	0.4436557	1.314982	0	1.134179	0.918573	1	1.029636	1.04538	1.053685	1.070251	1.085697	1.100039	1.113671	1.124992	1.133916	1.141036	1.150258	1.156624	1.163297	1.168307	1.174839	1.176591	1.181507	1.185848	1.18953	1.193347
OCL	SI	C311C	0	0	3	0	0	3.52137	0	0.968376	0.926376	1	1.017633	1.035651	1.05579	1.074808	1.093315	1.111356	1.129017	1.147214	1.165874	1.185439	1.204203	1.222763	1.241856	1.260116	1.278521	1.29716	1.315214	1.333496	1.351476	1.369617
OCL	OCL	C311C	0.394600393	0	1	1.1282747	5.3699815	0.670052	0.815359	0.933369	0.920948	1	1.019573	1.039897	1.059977	1.078171	1.09744	1.115269	1.132863	1.150407	1.168728	1.187807	1.205824	1.223749	1.241856	1.25912	1.276468	1.29428	1.311351	1.328375	1.34511	1.361911
OCL	PG	C311C	4.350683547	2	1	6.461204	0.9037163	2.412633	2.366379	0.927853	0.875907	1	1.019168	1.038543	1.058203	1.06936	1.07856	1.08874	1.097063	1.104357	1.111631	1.118365	1.121868	1.123551	1.129849	1.133044	1.136357	1.137314	1.143862	1.151789	1.157735	1.164041
OCL	RO	C311C	0	0	0	2.3143793	0	0.585365	0	0.73957	0.883801	1	1.048924	1.126112	1.176937	1.224726	1.272136	1.315472	1.360042	1.40265	1.438443	1.478203	1.517081	1.558237	1.591053	1.618887	1.641864	1.674968	1.695878	1.715225	1.733925	1.753432
OCL	GF	C311C	1.297581776	1	8	11.403166	1.2619165	0.958649	0.98795	1.078296	0.955563	1	1.017794	1.044086	1.082174	1.100841	1.113526	1.129469	1.147497	1.164543	1.181457	1.196174	1.211896	1.223252	1.237431	1.251567	1.266395	1.272174	1.285855	1.300434	1.315805	1.331401
OCL	SZ	C311C	1.097782585	1	1	0.8136724	0.7408599	0.900406	0.99232	0.894997	0.915167	1	0.989102	1.007139	1.035343	1.044051	1.044727	1.047729	1.051731	1.054867	1.056625	1.05676	1.056676	1.052765	1.050162	1.047107	1.043862	1.033258	1.029557	1.02642	1.024878	1.02285
OCL	BE	C311C	0.452838808	0	1	0.5450766	0.4907033	0.022562	0.011993	1.051196	0.946143	1	1.013622	1.030131	1.047362	1.061389	1.070546	1.084033	1.097339	1.109924	1.123881	1.136311	1.147857	1.154218	1.163586	1.17235	1.184709	1.185792	1.195309	1.207037	1.219088	1.229823
OCL	MX	C311C	1.669456837	6	1	0.00454	0.0280152	0.266178	0	0.764528	0.881339	1	1.015248	1.003344	1.042067	1.042433	1.041556	1.042278	1.044094	1.047559	1.048036	1.048856	1.051911	1.052077	1.054148	1.056008	1.056754	1.0551	1.057636	1.060659	1.063018	1.066007
OCL	SP	C311C	0.0087698	1	0	2.9958451	0.6571146	0.013797	0	0.917059	0.855486	1	1.011342	1.063649	1.118183	1.147198	1.164767	1.188212	1.209074	1.228973	1.249126	1.265076	1.280419	1.286977	1.302395	1.311509	1.321231	1.320873	1.336168	1.346245	1.364221	1.374904
OCL	AU	C311C	4.028639029	3	1	2.0642661	1.3849684	1.384968	1.298368	0.965701	0.957376	1	1.009657	1.018981	1.028638	1.036963	1.045288	1.05328	1.060639	1.068598	1.07659	1.084582	1.092241	1.099567	1.107226	1.114219	1.120679	1.128205	1.134865	1.141192	1.147852	1.153846
OCL	VZ	C311C	18.01257146	6	12	5.5066005	0	0	0.199031	1.293704	0.731008	1	1.064875	1.098858	1.128401	1.166545	1.206741	1.247077	1.293704	1.345198	1.392349	1.437027	1.477775	1.516706	1.556486	1.601672	1.646568	1.687735	1.737966	1.791428	1.844399	1.899782
OCL	OEL	C311C	0	0	0	0	3.7240869	0	0	0.931025	0.921502	1	1.019691	1.039314	1.058247	1.07598	1.093222	1.110005	1.126284	1.142678	1.159966	1.177768	1.194351	1.210746	1.227114	1.242958	1.258615	1.274614	1.28983	1.304884	1.319559	1.334204
OCL	CO	C311C	0.003763898	0	0	0	0	2.3332179	0	1.35477	0.955865	0.88703	1.08593	1.063437	1.07174	1.084372	1.109379	1.132181	1.158821	1.185372	1.213744	1.243758	1.263006	1.28294	1.311003	1.338615	1.369886	1.396429	1.431132	1.466806	1.498009	1.533043
OCL	KY	C311C	0	0	3	3.8405284	0	0	0	0.910132	0.918038	1	1.018598	1.037452	1.05627	1.074193	1.091678	1.108729	1.125299	1.1421	1.159278	1.177121	1.193868	1.210314	1.226714	1.242565	1.258234	1.274119	1.289347	1.304407	1.319077	1.333736
OCL	OWW	C311C	0	0	0	0	3.5044358	0	0	0.901108	0.875594	1	1.006587	1.028685	1.049135	1.049295	1.063035	1.078402	1.101483	1.11926	1.140352	1.158552	1.178376	1.196216	1.216223	1.236411	1.257563	1.273593	1.29577	1.317585	1.340364	1.364409
OCL	IL	C311C	6.818409314	0	3	0	3.7286324	0	0	0.932232	0.923959	1	1.019133	1.040385	1.061715	1.080681	1.098993	1.116584	1.13351	1.150701	1.168524	1.187449	1.204929	1.222157	1.239483	1.256375	1.273291	1.289608	1.306156	1.322672	1.338395	1.354223
OCL	DE	C311C	0.007818934	0	0	0.0058881	3.7444351	0	0	0.937581	0.927552	1	1.018022	1.037575	1.057697	1.076234	1.093632	1.110656	1.127245	1.143893	1.161115	1.178972	1.195902	1.212487	1.229169	1.245388	1.2614	1.277444	1.293033	1.308586	1.323818	1.339104
OCL	BLT	C311C	0	61	86	3.7002664	0	0	0	0.925067	0.921773	1	1.018465	1.0373	1.056505	1.074082	1.090993	1.107366	1.123298	1.139432	1.156083	1.173401	1.189606	1.205632	1.221618	1.237046	1.252257	1.267873	1.282601	1.297217	1.311464	1.325638
OCL	MA	C311C	0.448191775	0	0	0	0	0.5171444	0	0.493011	1.20967	0.98152	1.008159	1.025978	1.032536	1.041619	1.050403	1.061873	1.075708	1.090093	1.097119	1.103597	1.112254	1.11748	1.124278	1.130017	1.133736	1.13763	1.143231	1.14656	1.15327	1.158225
OCL	CSW	C311C	0	0	0	4.7281725	0	0	0	1.182045	0.97296	1	1.060864	1.108715	1.153933	1.194051	1.240449	1.292032	1.332698	1.378277	1.409117	1.436684	1.469977	1.497273	1.526749	1.55677	1.585154	1.612993	1.634828	1.656115	1.679315	1.702786

C. Forecast Calculation by Trade Partner

122,588 World	S3-061	SUGARS,MOLASSES,HONEY	14,781,170	57,213,700	100.0%	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
USA	S3-061	SUGARS,MOLASSES,HONEY	10,603,250	45,593,220	79.7%	97,690	97,207	97,685	98,001	98,505	98,947	99,485	100,122	100,829	101,594	102,844	103,790	104,667	105,720	106,770	107,850	108,728	108,880	111,045	112,220	113,425
Haiti	S3-061	SUGARS,MOLASSES,HONEY	816,153	4,704,000	8.2%	10,079	10,384	10,532	10,710	10,998	11,198	11,347	11,517	11,663	11,796	11,910	12,049	12,163	12,297	12,430	12,568	12,652	12,790	12,925	13,049	13,172
Uruguay	S3-061	SUGARS,MOLASSES,HONEY	828,434	1,893,125	3.3%	4,056	4,179	4,239	4,310	4,426	4,507	4,567	4,635	4,694	4,743	4,793	4,849	4,895	4,949	5,002	5,058	5,092	5,147	5,202	5,251	5,301
Canada	S3-061	SUGARS,MOLASSES,HONEY	921,250	1,600,500	2.8%	3,429	3,559	3,545	3,683	3,694	3,721	3,750	3,780	3,812	3,832	3,855	3,888	3,911	3,939	3,965	3,992	4,002	4,028	4,052	4,072	4,092
Nicaragua	S3-061	SUGARS,MOLASSES,HONEY	859,898	1,302,312	2.3%	2,760	2,845	2,902	2,958	3,011	3,062	3,112	3,161	3,210	3,261	3,314	3,365	3,415	3,465	3,513	3,562	3,612	3,659	3,707	3,753	3,800
China	S3-061	SUGARS,MOLASSES,HONEY	483,451	1,104,750	1.9%	2,367	2,439	2,473	2,515	2,583	2,630	2,665	2,705	2,739	2,768	2,797	2,830	2,855	2,888	2,919	2,952	2,971	3,004	3,035	3,065	3,094
Colombia	S3-061	SUGARS,MOLASSES,HONEY	243,000	1,000,000	1.7%	2,143	2,327	2,279	2,266	2,333	2,377	2,425	2,463	2,540	2,601	2,665	2,706	2,749	2,809	2,868	2,935	2,992	3,066	3,143	3,210	3,285
El Salvador	S3-061	SUGARS,MOLASSES,HONEY	23,792	8,250	0.0%	18	18	18	19	19	19	20	20	20	21	21	21	22	22	22	23	23	23	23	24	24
Areas, nes	S3-061	SUGARS,MOLASSES,HONEY	772	6,174	0.0%	13	13	14	14	14	14	14	15	15	15	15	16	16	16	16	17	17	17	17	18	18
Costa Rica	S3-061	SUGARS,MOLASSES,HONEY	1,167	1,375	0.0%	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
			14,781,167	57,213,706	100.0%	122,568	122,974	123,689	124,490	125,577	126,479	127,390	128,441	129,525	130,623	132,218	133,516	134,716	136,108	137,510	138,960	140,093	141,619	143,153	144,665	146,215