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**CAPACITY OF U. S. PORT FACILITIES
FOR EXPORTING FERTILIZERS**

Prepared for the

Agency for International Development

by

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INTRODUCTION

Fertilizer is one of the major inputs the U. S. Agency for International Development uses in its technical assistance program to help developing countries increase food production to keep pace with expanding populations. In recent years, AID has greatly expanded its financing of U. S. fertilizers for use by developing countries. As a result, AID is the largest "purchaser" of fertilizers for export in the U. S. At times, quantities needed could not be furnished.

The magnitude of AID fertilizer purchases is seen in the following comparison: In fiscal year 1966-67, AID financed purchases of 2.0 million metric tons of fertilizers; in 1967-68, 3.4 million metric tons; and in 1968-69, 2.1 million metric tons.

The scheduling of production, shipping, storage, bagging, and loading of fertilizer involves many different firms and agencies, and consequently requires a great deal of coordination. This is particularly true since large quantities frequently must be moved in relatively short periods of time. Foreign and domestic government agencies, domestic fertilizer manufacturers, foreign and domestic ship owners, ship brokers, stevedoring firms, fertilizer traders, banks, railroads, trucking firms, and ports are all involved in this complex marketing situation. Because of the complexity, there is a need to coordinate, where possible, AID's needs with the ability of U. S. industry to deliver the material at a time when these materials can be produced, packaged, and shipped to developing countries most economically and efficiently.

Objectives

The purpose of this study is to evaluate the capabilities of U. S. port facilities, both public and private, for exporting bulk and bagged fertilizers to developing countries, including capabilities for bagging fertilizers at these ports.¹ This study is a subpart of a larger contractual study for AID which is concerned with packaging, handling, and distribution of fertilizers for less developed countries.

Source of Data

Data for this study were obtained by personal interview with port authorities, stevedoring firms, and private fertilizer companies. The study includes public and private facilities which have the capability

1. This report covers only those facilities handling granular fertilizers; it does not include facilities handling liquid or gaseous fertilizers. The authors made every attempt to contact all firms within the conterminous United States which had facilities for exporting fertilizers. The authors recognize, however, that there may be omissions. Throughout, the term "tons" refers to short tons (2,000 pounds) unless otherwise specified.

to handle bulk and/or bagged fertilizer for export.¹ As such, it represents an inventory of both handling and bagging facilities that can be used for exporting U. S. fertilizers.

The study covers the following subject areas: dock (or port) facilities, bulk fertilizer handling facilities and loading capacities, bagged fertilizer handling facilities and loading capacities, bagging equipment and rate of bagging, storage facilities for bulk and bagged fertilizers, charges, problems encountered in handling bulk and bagged fertilizers, and future plans for expansion. In each section, summary information is presented for the East Coast, the Gulf Coast, and the West Coast. However, since each port is different in its handling capabilities, equipment, operation, etc., a detailed description of each of the 62 ports visited is presented in the appendix.²

1. A number of firms had facilities for receiving inbound materials. However, if these same firms could not use such facilities for exporting material, they were excluded from the study.

2. One of the facilities, the Savannah Multi-Product Bulk Terminal, at Garden City, Georgia, is currently under construction and is not scheduled to be operative until May 1971. Data for this facility are shown in the appendix, but the facility is not included in computations and tables shown in the text.

FACILITIES FOR HANDLING AND LOADING FERTILIZERS AT U. S. PORTS

Location and Operation of Facilities

There are 13 port facilities capable of exporting fertilizers on the East Coast. The facilities are quite evenly distributed along the coast from Jacksonville, Florida, in the south to Baltimore, Maryland, in the north. Five facilities are located north of Cape Hatteras, while the remainder lie south of this point.

There is considerable variation in ownership and operation of facilities. Six firms lease publicly owned facilities (either state or municipal) and conduct business for the general public. The remaining 7 facilities are privately owned: 2 are operated solely for private use; 2 are operated mainly for private use but will handle fertilizer for other firms on contract; and 3 are operated for public use.

Thirty-two port facilities were enumerated on the Gulf Coast. One of the facilities was under construction at the time of interview--Seaboard Coast Line (East Tampa Bay Facility). Walsh Stevedoring at Gulfport was damaged severely by Hurricane Camille. Moreover, a number of firms in the Tampa area specialize in handling either rock phosphate or phosphoric products.

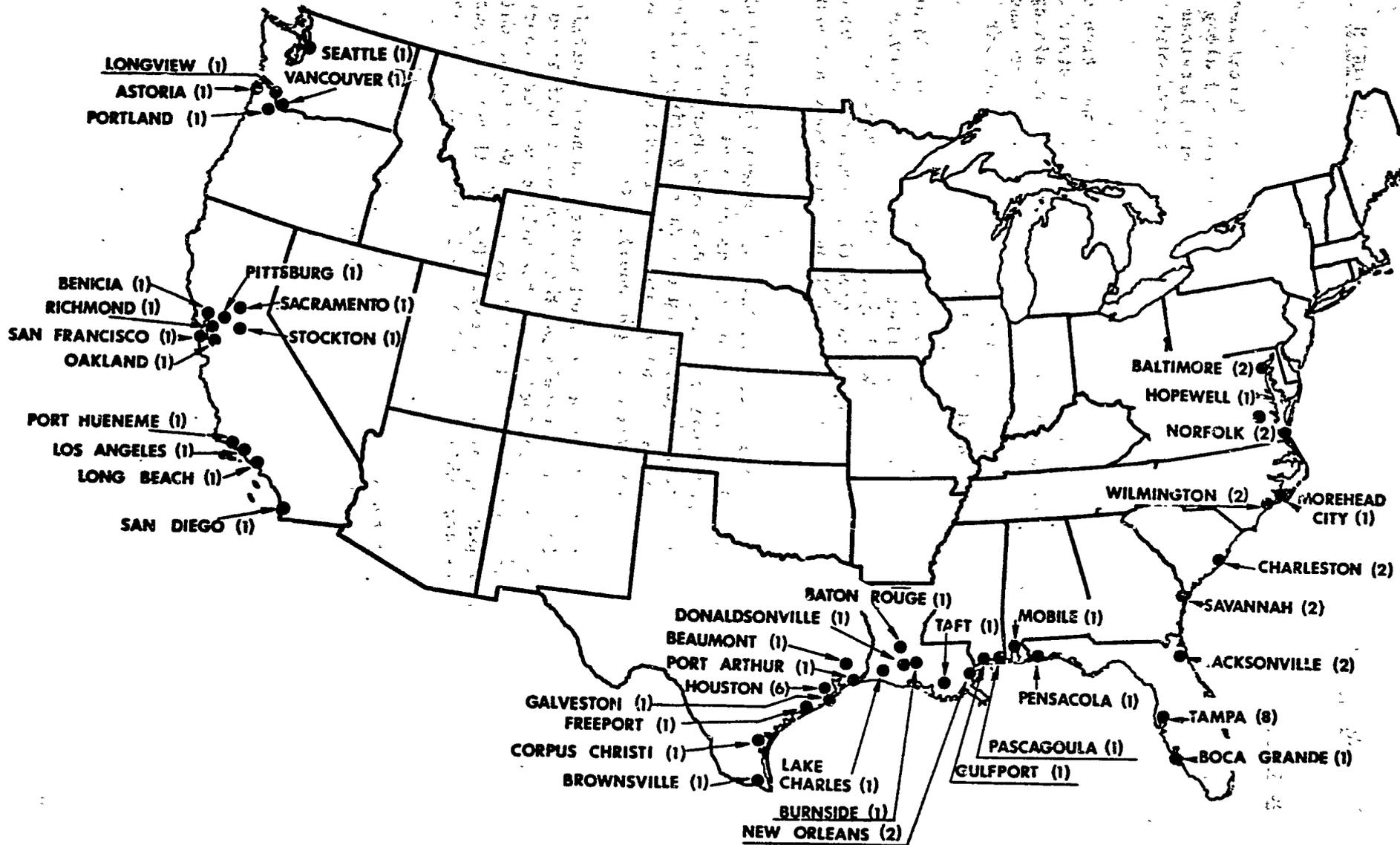
Nineteen of the 32 firms on the Gulf are privately owned, while the remaining 13 are publicly owned. Four of the privately owned facilities are operated solely for their own use, 2 are used mainly for private use but will handle other firms' material on contract, 2 private firms operate exclusively under contract, and 11 operate for public use. All publicly owned facilities are available for public use.

In contrast to the Gulf or the East Coast, chemical fertilizer companies on the West Coast do not rely on their own dock facilities but use public facilities or private facilities for public use for exporting fertilizers. There is a total of 16 facilities on the West Coast which either export or have the capability for exporting fertilizers. Fourteen of the facilities are publicly owned while 2 are privately operated for public use.

Table 1 shows the distribution of ports by type of ownership and type of business, and figure 1 the location of the facilities.

FIGURE I.

LOCATION OF PORT FACILITIES INCLUDED IN STUDY¹



1. THE NUMBER IN PARENTHESES INDICATES THE NUMBER OF FACILITIES AVAILABLE FOR EXPORTING AT EACH LOCATION.

Table 1. Port Ownership and Type Business by Region

<u>Type of Firm</u>	<u>East Coast</u>	<u>Gulf Coast</u>	<u>West Coast</u>	<u>Total</u>
	- - - - - No. of Firms - - - - -			
Privately owned - for private use only	2	4	0	6
- for private use mainly	2	2	0	4
- for public use	3	11	2	16
- under contract	0	2	0	2
Publicly owned - for public use	6	13	14	33
Total	13	32	16	61

Type of Fertilizer Handled

A classification of East Coast port facilities by type of fertilizer handled reveals that 3 firms handle bulk material exclusively, 4 handle bagged material only, and 6 handle both bagged and bulk material (see table 2). Of the 10 East Coast firms handling bagged material, 7 have bagging facilities either at the dock or at plants located nearby.

Bulk materials (including rock phosphate) are the only products handled by 12 Gulf Coast firms while 8 firms handle bagged material exclusively. Twelve Gulf firms handle both bulk and bagged material. Of the 20 facilities capable of exporting bagged fertilizers, 19 have bagging facilities.

Four of the 16 West Coast facilities have equipment for handling bagged fertilizer only; the other 12 can export either bulk or bagged materials.

Table 2. Type of Fertilizer Material Handled by Region

<u>Type of Fertilizer</u>	<u>East Coast</u>	<u>Gulf Coast</u>	<u>West Coast</u>	<u>Total</u>
	- - - - - No. of Firms - - - - -			
Bulk only	3	12	0	15
Bagged only	4	8	4	16
Bulk and bagged	6	12	12	30
Total	13	32	16	61

Depth of Channel at Dock

Depth of channel at dockside can restrict the amount of fertilizer loaded per vessel as well as size of vessel that can be docked. Depth of water averages slightly over 33 feet mean low tide on the East Coast but ranges from 25 feet at Hopewell, Virginia, to 40 feet at Baltimore, Maryland. All East Coast ports, with the exception of Hopewell, indicate that depth of water does not restrict the quantity of fertilizer normally loaded on vessels.

On the Gulf, depth of water at dockside averages 35.6 feet mean low tide and ranges from 29 feet at Gulfport, Mississippi, to 50 feet at Taft, Louisiana. A number of firms in the Tampa area indicate that depth of water creates problems, particularly on the larger bulk carriers and on the older, narrow beam vessels.

On the West Coast, depth of channel at dock varies from a low of 30 feet at mean low-low tide at Sacramento, California, to 45 feet at Seattle, Washington. Depth of water at dock does not restrict quantity of fertilizer normally loaded on vessels at any West Coast port.

Docking and Preparation of Vessel for Loading

Most ports indicate that vessels are usually ready to load once they have docked. The preparation of the ship is as follows: On foreign flag or U. S. general cargo vessels, U. S. longshoremen must open the hatches once the vessel has docked. On foreign flag vessels, the ship's crew may open the hatches before the arrival of the vessel at the dock. However, once the vessel has docked, only U. S. longshoremen open the hatches. The vessel is cleared for loading either in the harbor or at the dock by the National Cargo Bureau.

On the East Coast, ships are either towed to the dock or assisted by 1 or 2 tugs. Time required for docking varies from 15 minutes to 2 hours and averages about 40 minutes. Time required to prepare the ship for loading, i.e., open hatches, rig derricks, clean holds, lay dunnage, etc., ranges from none to 2 hours but averages 45 minutes for all East Coast ports. Most ports indicate that the ships are usually ready to load as soon as the hatches are opened.

In all but 5 cases on the Gulf Coast, ships are either towed to the dock or are assisted by tugs. Docking time averages almost 1 hour per vessel and ranges from 15 minutes to 3 hours. Most ports indicate that vessels are normally ready to load as soon as they are docked and the hatches are opened. An occasional vessel may require up to 2 hours to prepare for loading.

On the West Coast, the most common method of docking is for the vessel to use its own power with tug assist. Time required for docking averages about 45 minutes but varies from 30 minutes to 1 and one-half hours. Time required to prepare vessel for loading varies from none to 2 hours or more. At most ports, however, the vessel is ready to load once it has docked.

Loading of Vessels

The maximum amount of fertilizer that can be loaded at any one port depends upon depth of channel at dockside and in the channel itself plus the size of ship (length and draft) that the dock can accommodate. From the data in the appendix, it is apparent that most U. S. ports can accommodate much larger vessels than are typically used for exporting fertilizers. The limiting factor in exporting fertilizers to developing countries is more likely to be the size of vessel the foreign port can accommodate rather than size of vessel U. S. ports can handle.

Most East Coast ports can load only 1 vessel at a time with fertilizer, although 1 port can load 9 vessels simultaneously; 1 port, 6; and 2 ports, 4. Ports that load only 1 vessel at a time are usually those handling only bulk material. The average amount of fertilizer loaded per vessel ranges from less than 8,000 to 20,000 tons. The average for all East Coast ports is approximately 12,500 tons, while the maximum amount of fertilizer that could be loaded per vessel ranges from 10,000 to 40,000 tons with an average for all ports of slightly over 21,000 tons.

Although the average number of vessels that can be loaded simultaneously on the Gulf Coast is 2, 18 firms can load only 1 at a time. One port can load 9 vessels simultaneously and another can load 8. The quantity of fertilizer material normally loaded per vessel averages 12,100 tons and ranges from 3,000 to 30,000 tons, while the maximum quantity that could be loaded per vessel averages slightly under 25,000 tons and ranges from 5,000 to 65,000 tons.

The amount of fertilizer loaded per vessel on the West Coast varies from 1,000 to 20,000 tons and averages 11,300 tons. Most West Coast ports indicated that vessels are often only partially loaded with fertilizer. The maximum amount of fertilizer that could be loaded per vessel ranges from 4,000 to 68,000 tons with an average of about 32,000 tons.

All but 2 ports on the West Coast have facilities for loading 2 or more vessels with bagged materials simultaneously, but only 1 vessel with bulk fertilizers. Even though West Coast ports typically have facilities for loading more than 1 vessel at a time, most ports load only 1 at a time.

Table 3 shows the normal and maximum quantity of fertilizer loaded per vessel by region.

Table 3. Normal and Maximum Quantity of Fertilizer

	<u>Loaded Per Vessel by Region</u>		
	<u>East Coast</u>	<u>Gulf Coast</u>	<u>West Coast</u>
	<u>Tons</u>		
Normal quantity loaded:			
Average	12,528	12,100	11,300
Range	7,716-20,000	3,000-30,000	1,000-20,000
Maximum quantity loaded:			
Average	21,104	24,900	32,640
Range	10,000-40,000	5,000-65,000	4,000-68,000

Method of Loading

The number of hatches loaded simultaneously with bagged fertilizer depends upon availability of labor, length of dock, and number of hatches. Most vessels carrying fertilizer to developing countries are equipped with 5 hatches. Where length of dock is limited, the number of hatches that can be loaded simultaneously is restricted, and in some cases, the ship itself must be moved before loading of all hatches can be completed. In the case of bulk fertilizer, usually only 1 hatch is loaded at a time, since most ports have only 1 bulk loader. If the bulk ship loader has a trimmer on the end of the spout, trimming of the vessel is automatic with loading. If no trimmer is available, bulldozers are used. Rate of loading AID material also depends upon what is called for in the charter party contract.

Only 1 hatch is usually loaded at a time at each of the 9 East Coast ports loading bulk material. One port can load 2 hatches with bulk material simultaneously. For bagged fertilizers, most ports can load 4 or 5 hatches at a time. A number of ports indicate that up to 6 or 7 hatches can be loaded simultaneously, depending on the type of vessel and length of dock. Occasionally, if gangs are available, 2 gangs might work the same hatch to speed up rate of loading.¹

All Gulf Coast ports handling bulk material normally load only 1 hatch at a time. However, Phillips Chemical, Pasadena, Texas can load 2 hatches if needed. For bagged fertilizer, most firms load 4 or 5 hatches simultaneously, but a few firms can load as many as 8 depending on the number of hatches on the vessel.

1. A gang consists of longshoremen assigned to loading a hatch. Number of longshoremen per gang varies from 4 to 10 for bulk fertilizer loading and from 13 to 24 men for bagged fertilizer.

For bulk fertilizers, all West Coast ports can load only 1 hatch at a time. For bagged fertilizers, most ports load 5 hatches simultaneously.

Time Required to Load 10,000 Tons of Fertilizer

Because of differences in type and capacity of bulk loading equipment, rate of loading bulk material varies substantially among ports, depending to a great extent on whether a belt conveyor system or a crane clamshell is used. Also, bulk carriers are easier to load and require only about half as much time to load as do general cargo vessels with tween decks. Since the bulk carrier is designed for carrying bulk materials, it has no decks to dismantle before commencing loading. On a general cargo carrier with tween decks, the supporting beams and flooring between the decks must be removed before the vessel can be loaded and then replaced as each deck is completed. Most vessels carrying bulk fertilizers to developing countries apparently are of the general cargo type in contrast to the modern bulk carriers which transport fertilizers, potash, rock phosphates, and other bulk materials between the U. S. and developed countries. A common complaint by ports and stevedoring firms is that many of the vessels used for transporting either bulk or bagged fertilizers are old, often in need of repairs, and the ship's gear often breaks down or is not satisfactory.

The amount of time required to load 10,000 tons of bulk material varies from 4 to 70 hours at East Coast ports. The average time is 41 hours, with 5 ports reporting 50 hours or more. Time required to load 10,000 tons of bagged material ranges from 40 to 90 hours and averages 69 hours for the 10 ports reporting (see table 4).

The amount of time required to load 10,000 tons of bulk material at Gulf Coast facilities varies from 3 to 180 hours, averaging 42 hours. Nine firms report that 50 or more hours are required to load this volume, while 8 report it takes 20 hours or less. Sixty-seven hours is the average amount of time required to load 10,000 tons of bagged fertilizer, ranging from 40 to 160 hours.

On the West Coast, the ports of San Diego, Long Beach, and Los Angeles are more specialized with respect to loading bulk fertilizers than other ports. Estimated time required for loading 10,000 tons of bulk fertilizer at these ports is 24 hours or less. At other ports, time required varies from 20 to 66 hours. Average time required to load 10,000 tons of bagged fertilizer is 87 hours on the West Coast but varies from 40 to 112 hours.

Table 4. Time Required to Load 10,000 Tons of Fertilizer

	<u>East Coast</u>	<u>Gulf Coast</u>	<u>West Coast</u>
	- - - - - Hours - - - - -		
Bulk fertilizer - average	40.9	42.5	43.3
- range	4 - 70	3 - 180	20 - 66
Bagged fertilizer - average	69.1	67.5	87.0
- range	40 - 100	40 - 160	40 - 112

FERTILIZER HANDLING AND BAGGING PROCEDURES

Bulk Fertilizer Handling

U. S. ports differ greatly in their capacity to handle and load bulk fertilizers. Differences result from many factors such as: (1) type and capacity of loading equipment; (2) newness and degree of automation; (3) how fertilizer is transported to the dock; (4) speed at which material can be discharged from rail cars, barges, or trucks to the bulk loader; (5) whether the bulk loader is movable or stationary; (6) availability of bulk storage; and (7) method of trimming vessels. On the newest and most sophisticated systems, investment in bulk handling facilities, including storage and reclaiming equipment, runs as high as \$18 million or more.

In general, systems using a traveling bulk loader or gantry with a mechanical trimmer at the end of the spout and with automatic car dumping facilities for emptying bulk rail hopper cars are the most efficient, while those using a stationary bulk loader or a stationary crane and clamshell, rail boxcars, or trucks are the least efficient.

Movement of Material to Port--The most common mode of transporting bulk fertilizers from point of manufacture to port (or dock) on the East Coast is by rail. Seven firms use this method. However, material frequently arrives in boxcars because of the scarcity of hopper cars. Shipment by truck is the second most common mode and is used by 4 firms, while barge shipments are used at 3 ports. Except for the Morehead City facility, barge shipments are not important. At 2 East Coast firms, the fertilizer plants are located at dockside which allows them to use conveyor belt systems from plant to ship for loading. A number of ports use more than 1 mode of transportation, with 2 ports using rail, truck, and barge. Since all East Coast bulk handling facilities have storage facilities, both direct loading and loading from storage are used.

Rail is also the most common mode of shipping bulk fertilizer from point of production to dock on the Gulf Coast. Fourteen firms ship bulk material by rail directly from plant to dock. Barge shipments are used by 7 firms and truck shipments by 4 firms. Five fertilizer plants are located close enough to dock facilities to move bulk material from plant to dock using conveyor belts.

Although 11 of the 24 ports on the Gulf handling bulk material have substantial storage space, direct movement of material from rail, truck, or barge to vessel is more common than loading from storage. This situation, however, is biased somewhat by the Tampa area where a large volume of the export capacity is operated by railroads or where unusually good working relationships exist between the railroads and the export firms.

Twelve West Coast ports are capable of handling bulk fertilizer material. At 6 ports bulk fertilizer moves directly from rail or truck to ship while at the remaining 6 it goes through storage. At 1 port, facilities are available for either method. Significantly, 2 of the 3

ports with the most efficient systems in terms of rate of loading (Long Beach and San Diego) go directly from rail to ship. Each uses bottom dump hopper rail cars for storage, accumulating cars until the total amount to be loaded is at the rail marshalling yard.

Systems and Rates of Loading¹ --The most common means of transferring bulk material from dock to vessel involves the use of hopper pits, conveyor belts, and ship loader or spout. A large degree of variation exists between ports in the facilities employed and, consequently, loading rates. Except for Jacksonville and Morehead City, most bulk loading facilities on the East Coast have loading rates of 150 to 400 tons per hour. The 2 exceptions are relatively new and have loading rates of 1,250 and 3,000 tons per hour. The Morehead City facility uses a traveling ship loader and trimmer while the Jacksonville facility uses a stationary ship loader. Both are completely automated, utilizing either direct loading or loading from storage, electronic belt scales, and automatic sampling.

Bulk material loading from storage at most East Coast docks is also slow except at the new facilities. Most firms reclaim stored material with payloaders, placing the material into hoppers and conveyor belts. At Jacksonville, upright silos are used for storage. The material flows from storage by gravity into the conveyor belt. The Morehead City facility uses a bucket wheel reclaimer to deliver the material from storage back into the system.

Five firms use electronic belt scales for determining weight. The remaining firms use a variety of procedures including bills of lading, certified truck and rail weights, and draft surveys.

Loading rates vary widely among Gulf Coast firms. Where dumping pits, automatic rail car dumpers, car positioners, conveyor belts, and traveling boat loaders are used, rates reach 3,000 tons per hour. On less sophisticated systems, loading rates frequently fall between 750 and 1,500 tons per hour. Fifteen firms report rates of less than 750 tons, while 5 have rates falling as low as 100 tons per hour or less.

Electronic belt scales are used for weight determination by 11 firms, draft surveys along with certified rail weights are used by 5 firms, while the remaining firms use batch weights, beam scales, truck weights, or rail bills of lading.

All West Coast ports which load out bulk fertilizer use a conveyor belt system and bulk loader or gantry to move the material from dock area to ship.

Rate of loading varies from 100 tons per hour at the Port of Oakland to 1,000 tons per hour at the Port of San Diego for rail-to-ship movement. Rate of loading at the Port of Oakland is slow because the material goes from rail car to pit to conveyor belt to steel tank to conveyor belt to bulk loader rather than from rail to bulk loader directly. Benicia Port Terminal Company and the ports of Los Angeles

1. For details on bulk loading by individual ports, see appendix.

and Long Beach, California, have automated bulk handling equipment capable of handling from 500 to 700 tons per hour. However, at other ports rate of loading is much less, ranging from only 150 to 350 tons per hour.

At San Diego, the bulk loader is fully automated and has a capacity of 2,000 tons of bulk material per hour. However, fertilizer material is loaded at an average rate of 1,000 tons per hour, the difference being due to rate of unloading rail hopper cars. If trucks are used instead of rail cars, rate of loading drops to 300 tons per hour.

Most West Coast bulk handling facilities do not have automatic electronic belt scales built into the conveyor belt system. The typical method of determining amount of fertilizer loaded is to weigh rail cars light and heavy or use certified bills of lading for rail cars or trucks. Some ports use a draft survey of the vessel to determine or verify quantity loaded although this is not common.

Bagged Fertilizer Handling

Systems and Rates of Loading--Bagged material for export may either be bagged at the port or bagged elsewhere and shipped to the port. Four East Coast firms report loading only material that is bagged at dock, 3 firms load only prebagged material (have no bagging facilities at port), and 3 firms load both prebagged and on-site bagged material. Prebagged fertilizer is usually transported to the dock by rail and is stored until the vessel arrives.

Most fertilizer bagged at East Coast ports arrives by rail and is put into bulk storage at the port unless the fertilizer is produced at a nearby plant. The bulk material is subsequently transferred from storage to bagging machines by front-end payloaders, hoppers, and belt conveyors (either stationary or portable). Once bagged, the fertilizer is then palletized and placed in storage until the vessel arrives. Most ports bag as much material as possible before arrival of vessel so that ship loading is continuous. Frequently, due to a shortage of storage space for bagged fertilizer, bagging continues as the vessel is being loaded, the last material being delivered directly from bagger to vessel. Only 5 East Coast firms have more than 5,000 tons of storage for bagged fertilizer materials.

Loading rates for bagged fertilizer range from 27.5 to 50 tons per hour per hatch on the East Coast and average approximately 35 tons per hour. Although loading rates of bagged material vary between ports, the amount of variation is small compared with that found in loading bulk fertilizers. Loading rate of bagged fertilizer per hour per hatch apparently varies by the quality of labor, size of gang (number of long-shoremen loading each hatch), physical arrangement of dock and storage, and terms in labor contracts. The overall loading rate for bagged material depends, too, on the number of hatches being worked and the number of gangs employed. Frequently on the East Coast not all hatches

can be worked at one time because of inability to secure gangs. This is particularly true if the fertilizer dock is in an area of general cargo docks, since most longshoremen prefer to handle goods other than fertilizers.

Weight verification on prebagged material is usually determined by rail bills of lading or truck weights in addition to a bag count as the material is placed on board ship. For material bagged at the dock, the weight is determined by automatic scales which are a part of the bagging machine plus a check weight which is obtained by periodic weighing of bags on a platform scale. The bags are also counted as they are loaded. This same procedure is used on the Gulf and West Coasts for weight verification.

On the Gulf, material bagged at the port is typically put into storage before it is loaded rather than moving directly from bagging machine to ship. Nineteen of the 20 firms loading bagged material report that bagged fertilizer is put into storage and then transferred to the vessel rather than moving directly from bagging machine to ship. Four firms move bags directly from bagging machine to vessel along with loading from storage. Prebagged material is frequently loaded directly from boxcars or trucks onto the vessel.

Loading rates for bagged fertilizers on the Gulf Coast average slightly more than 41 tons per hour per hatch, irrespective of the route of movement. For all ports taken together, there appear to be 2 typical loading rates--ports loading 40 - 45 tons per hour per hatch and those loading 30 - 35 tons. A 70 ton-per-hour rate is achieved by Occidental Chemical where conveyor belts and a reverse banana loader are used. Loading is directly from bagging machines. This setup, however, permits loading only 1 hatch at a time.

Seven West Coast ports have facilities for bagging fertilizer at the port while 6 ports normally receive fertilizer prebagged and prepalletized from a nearby plant. In these cases, since distance from port to plant is short, the prebagged, prepalletized fertilizer is usually transported to port by truck, although rail boxcars are also used. Occasionally, loose bags are shipped by rail to the port where they are palletized. Prebagged material is normally placed in storage before being loaded onto the vessel. Rate of delivery of prebagged material by truck or rail, even when the plant is close to the port, is usually not fast enough to ensure a continuous loading operation for 5 hatches.

Rate of loading on the West Coast varies from 15 tons per hour per hatch at Long Beach, California, to 50 - 75 tons at Portland, Oregon. A typical rate for all West Coast ports would be 20 to 25 tons per hour per hatch. Where prebagged fertilizer is loaded directly onto the vessel (bypassing storage), the rate drops to 10 - 15 tons per hour per hatch. The higher rate of loading at Portland, Oregon, is due to the loading procedure used. Specifically, by using a specially made metal platform partitioned into quadrants which accommodates 2 to 4 pallets per lift of ship's gear, the port is able to load 2 to 4 times as much fertilizer per lift as the conventional one-pallet-per-lift procedure.

Bag Damage--The amount of damage to bags in loading once the material has been palletized is minimal regardless of what port the material is exported from. On the whole, bag damage ranges from less than one-tenth of 1 percent to 1 percent of the total loaded per vessel.

With prebagged fertilizer, extra bags are normally supplied by the shipper so that torn bags can be replaced. The material is either rebagged if a bagger is available at the port or an outer bag is placed over the torn bag. Where the fertilizer plant is near the port, damaged bags are returned to the plant for rebagging. Where the plant is distant from the port, extra empty bags plus extra bagged material are usually sent by the manufacturer to cover bags damaged in transit or in loading.

From the authors' personal observations, it would appear that very few bags are damaged in loading. The bags do not break easily even when they fall off a pallet from a height of 10 feet or more. About the only damage observed was where bags ripped at the seam (were defective) or where a prong of the forklift had penetrated the bag. No port nor any stevedoring company interviewed complained of bags tearing. If anything, they felt the fertilizer was being "overpackaged" rather than "underpackaged."

Bagging Capacity

Only 7 of the 10 East Coast firms handling bagged material have facilities for bagging fertilizers. One firm, Shipyard River Terminals, Charleston, has bagging machines but does not load bagged material at the dock. In addition to these 7, North Carolina State Ports at Morehead City has completed engineering plans for construction of bagging facilities and anticipates operation by March or April 1970. Plans call for installation of 3 baggers with a capacity of 60 tons per hour per machine.

The total number of bagging machines at the 7 East Coast ports is 26 (see table 5). The number of machines per location ranges from 2 to 6. Most bagging machines have a capacity of 25 to 35 tons per hour, although 1 East Coast firm reports 50 tons per hour per machine. Average capacity for all East Coast firms is 33.5 tons per hour. Because of the small number of observations, it is not possible to differentiate rate of bagging by type of material or by type of bag. However, most firms indicated that heat seal, tipper tie, and bar loop closures either reduce bagging rate or require additional man power.

Table 5. Number of Bagging Machines by Region

	<u>East Coast</u>	<u>Gulf Coast</u>	<u>West Coast</u>	<u>Total</u>
Number of machines	26	42	11	79
Range	2 - 6	1 - 4	1 - 2	--
Number of firms with bagging machines	7	19	7	33

There appears to be no consistent pattern on the East Coast between type of bag and method of closure used by type of fertilizer. A number of firms simply use the type of bag and closure specified in AID contracts. The most common types of bags are jute with a polyethylene liner and polypropylene with a polyethylene liner. Most firms seal outer bags by sewing. Three firms use heat sealing equipment and 2 use bar loops for sealing the inner bags.

Nineteen Gulf Coast firms have facilities for bagging. In all, there are 42 machines with the number per location ranging from 1 to 4 machines. Rate of bagging varies from 20 to 50 tons per hour but averages 32 tons per hour per bagger, irrespective of type of material, closure, or bag. Bagging rates appear to be more directly related to age (or capacity) of machine, size of work crew, and physical arrangement of facilities rather than to type of material, type of bag, or type of closure.

Bar loop inner bag closures are used at 7 facilities, tipper tie at 6, and heat seal at 1. The most frequently reported outer closure is machine sewn. Of the 11 facilities bagging urea, all report use of a burlap or jute outer bag with polyethylene liner. Mixed fertilizers, triple superphosphate, and diammonium phosphate are usually bagged in either a burlap-polyethylene bag or a polypropylene-polyethylene bag. One firm uses plastic reinforced paper bags for both ammonium sulfate and potash.

Seven West Coast ports have equipment for bagging fertilizers. Of the 7, only 4 are used for bagging material for export. The others (all located in Oregon and Washington) are used to bag inbound bulk material for use in the Pacific Northwest--a deficit fertilizer region. Even though these ports use their equipment for bagging inbound materials, presumably this equipment could also be used for bagging fertilizers for export if required.

The main ports on the West Coast where fertilizer is bagged for export are San Diego, Oakland, and Los Angeles. The Port of Stockton also has bagging equipment but as yet has not bagged for export. Each of the above ports with bagging equipment has 2 bagging machines. Bagging capacity ranges from 16.5 to 32 tons per bagger per hour or from 300 to 500 tons per 8-hour day. At San Diego, rate of bagging urea is 10 tons per hour lower than for other fertilizers. A burlap or jute bag with a polyethylene liner and a tipper tie is used for urea at San Diego and Los Angeles, whereas the Port of Oakland sews both the outer and inner bags. All other types of fertilizer bagged at the 3 ports involve sewing as the method of closure.

The ports of Portland, Oregon, and Seattle and Vancouver, Washington, have only 1 bagger each. Rate of bagging is slow--from 6-1/2 to 10 tons per hour per machine. Paper bags are used at these ports, whereas the 3 California ports are equipped to use burlap or jute bags with a polyethylene liner.

FERTILIZER STORAGE FACILITIES

All 9 East Coast firms handling bulk fertilizer have covered storage facilities. The amount of bulk fertilizer that can be stored at any one port ranges from 10,000 to 125,000 tons and averages approximately 55,000 tons per firm (see table 6). Firms handling bagged fertilizer have storage capacities ranging from 200 to 20,000 tons, averaging slightly over 7,500 tons. A number of firms have additional storage facilities away from dockside that could be used for bagged fertilizer storage. However, this space is frequently used for other cargo and, thus, the space that could be available for fertilizer cannot be specified. Normally, storage space for bagged fertilizer at dockside at most ports is transit storage that is made available for many types of cargoes. Hence, the amount of storage available at any one port at any one time varies and depends upon requirements for cargoes other than fertilizer. Usually, ports desire as fast a turnover of cargo in storage as possible.

Table 6. Storage Capacity by Region¹

	<u>East Coast</u>	<u>Gulf Coast</u>	<u>West Coast</u>
	----- Tons -----		
Bulk - total	547,500	817,400	124,000
- average	54,750	48,082	12,400
- range	10,000 - 125,000	200 - 170,000	5,000 - 30,000
Bagged - total	75,950	411,800	602,900
- average	7,595	20,590	37,680
- range	200 - 20,000	3,000 - 150,000	5,000 - 155,000

1. Total storage capacity includes space at dock as well as adjacent areas.

On the Gulf Coast, covered storage for bulk material is available at 17 of the 24 firms handling bulk. Bulk storage at the dock and in adjacent areas amounts to 817,400 tons or 48,000 tons per location. On a per-location basis, bulk storage availability ranges from 200 to 170,000 tons. Storage for bagged fertilizers is available at all firms loading bags and totals 411,800 tons. Amount of storage available per firm ranges from 1,000 to more than 150,000 tons but averages about 20,000 tons per firm. Fifteen Gulf Coast firms have storage facilities for less than 15,000 tons of bagged material.

Only 10 ports on the West Coast have storage facilities for bulk fertilizer. Amount of storage space available ranges from 5,000 to 30,000 tons. All West Coast ports have storage available for bagged fertilizer ranging from 5,000 to 155,000 tons. Most ports also indicate that substantial additional temporary storage space is available for bagged fertilizer if required. Usually, such space would be used for other cargo.

It should be noted that in all estimates for general cargo ports presented in this section, the amount of storage space available for bagged fertilizer may be expanded or contracted depending on the volume of other cargo moving through the port. Once bagged, fertilizer requires no special equipment for handling or for storage. Since general cargo ports want a rapid rate of turnover of cargo in transit storage, many have no permanent facilities allocated to bagged fertilizers but make transit storage space available as required. Most general cargo ports do not want to store fertilizer at dockside except on a temporary basis.

FERTILIZER HANDLING AND BAGGING CHARGES

Information obtained on handling and loading charges for 1968-69 was so limited that no definite patterns could be observed, particularly if one attempts to break down total charges into components such as wharfage, handling, trimming, etc. At many ports, charges for loading either bulk or bagged fertilizers and charges for bagging apparently are negotiated on each individual shipment and depend upon such factors as (1) quantity to be loaded, (2) type of fertilizer, (3) type of bag, (4) type of bag closure, and (5) how much business the stevedoring firm has or wants.

Costs presented in this section represent average 1968-69 costs stevedoring firms or ports charge (1) to bag fertilizers or (2) to load bulk or bagged materials. The data show wide variation in charges for presumably the same job. However, this is not borne out by the relatively small variation in bids submitted to AID on given tenders. Thus, either certain charges must be absorbed by shippers, fertilizer manufacturers, or ports to increase their competitive positions in bidding or, alternatively, the negotiated charges are different from the average charges reported here.

East Coast

Bulk loading charges were obtained from only 5 firms on the East Coast. Loading charges ranged from \$0.60 to \$4.05 per ton for bulk fertilizers. Too few estimates were obtained to establish a typical bulk loading charge for East Coast ports. Two firms offer reduced rates for larger volumes, one reported that all rates are negotiated, and another indicated that rates vary by type of bulk material loaded. In the case of the firm reporting the \$4.05 rate, bulk material is loaded by shore crane and clamshell.

Too few bagging and bag loading charges were also obtained to establish typical charges for the East Coast. Bag loading charges ranged from \$4.80 to \$7.38 per ton. Bagging costs ranged from \$1.75 to \$4.25 per ton. Only 2 items appeared to follow a pattern--wharfage at \$0.50 per ton and handling at \$1.25 per ton. One firm indicated that heat sealing increases bagging charges by \$0.25 per ton and another firm adds \$1.00 per ton for bar loop closure.

Gulf Coast

Information on handling, loading, and bagging charges was also quite limited on the Gulf although less so than on the East and West Coasts. Loading charges for bulk fertilizer were obtained from 15 firms and ranged from \$0.90 to \$3.00 per ton with most falling between \$1.25 and \$1.50 per ton. Itemization of charges is not possible in most cases. Wharfage charges ranged from \$0.25 to \$0.50 per ton and trimming from \$0.27 to \$0.48. Most firms reporting charges above \$1.50 per ton include trimming the vessel as a part of the total charge.

Bag loading charges were reported by 13 Gulf firms and averaged \$5.28 per ton, ranging from \$3.52 to \$6.95. Cost of bagging, irrespective of type of material, bag, or bag closure, averaged \$4.93 per ton and varied between \$2.90 and \$6.60. The average charge for bagging urea was \$5.62 per ton; for triple superphosphate, \$4.18; for diammonium phosphate, \$4.16; and for mixed fertilizers, \$4.82. Bags using bar loop and tipper tie closures averaged about \$5.20 per ton compared with \$4.40 per ton for machine sewing only. Cost of bags, which is over and above charges for bagging, averaged \$6.88 per ton and ranged from \$6.00 to \$8.00. Based on average charges for all 3 items--bags, bagging, and loading of vessel--total costs amounted to \$17.03 per ton.

West Coast

Bulk loading charges were obtained from 9 West Coast firms and ranged from less than \$1.00 to \$3.00 per ton. The \$3.00 rate includes manual trimming, whereas the lower rate includes mechanical trimming. Most West Coast ports report charges within the range of \$1.50 to \$2.50 per ton for loading bulk fertilizers.

Charges for loading bagged fertilizers ranged from \$5.66 to over \$8.00 per ton. Total charges including loading, bagging, palletizing, wharfage, and handling, but not including the cost of bags, range from less than \$10.00 per ton to \$12.00 per ton with most falling between \$11.00 and \$12.00 per ton.

Wharfage charges on bulk material ranged from \$0.10 to over \$2.00 per ton--3 firms charged \$0.10 per ton, 5 charged \$0.45 to \$0.50, and 4 charged over \$1.00 per ton. However, these costs may be misleading since all firms did not include the same items in their charges. Wharfage on bagged material ranged from \$0.75 to \$1.00 per ton although this also depended on volume exported. Four firms charged \$3.00 or more per ton for wharfage on bagged material, but this included unspecified handling charges.

FERTILIZER EXPORT CAPACITYEast Coast

Volume of fertilizer materials handled during 1968 was obtained at only 10 of the 13 East Coast firms interviewed. The total amount handled by the 10 firms was 1,897,693 tons or about 190,000 tons per firm. The estimated maximum capacity for firms responding totaled 3,835,000 tons (only 9 firms replied to this question) which averages slightly over 425,000 tons per port. Based on average capacities in 1968, East Coast ports operated at less than 45 percent of their estimated maximum export capacity for fertilizers.

Gulf Coast

Total quantity of material loaded in 1968 as reported by 22 Gulf Coast firms was 17,145,409 tons including rock phosphate.¹ Seven firms were either not in operation or did not load out any material during 1968, while 3 firms did not provide this information. The average quantity of material loaded at all Gulf Coast locations reporting was approximately 780,000 tons while the average for Tampa area firms was 1,833,100 tons per firm compared with 177,200 tons for non-Tampa Gulf Coast ports.

Estimated maximum load-out capacity as reported by 25 Gulf Coast firms is 37,983,000 tons, with the Tampa area accounting for 31,040,000 tons. The maximum quantity of material that can be loaded averages about 1,519,000 tons per firm. Tampa area firms average 3,449,000 tons while the 16 remaining Gulf firms average about 434,000 tons. Based on data reported by all Gulf Coast firms in operation in 1968, they were operating at an average of approximately 60 percent of their maximum capacity, Tampa firms were operating at 70 percent, whereas the remainder were operating at almost 33 percent.

West Coast

Only 10 of the 16 West Coast ports exported any fertilizer in 1968. Total volume handled amounted to slightly over 1,600,000 tons. However, almost 93 percent of the total was exported from the 3 California ports of San Diego, Long Beach, and Los Angeles. On the other hand, estimated maximum capacity for the 13 ports giving specific estimates totaled over 6.7 million tons. Based on average capacities, West Coast firms were operating at less than 25 percent of estimated maximum capacity in 1968. The ports of San Diego, Long Beach, and Los Angeles are each capable of handling well over a million tons of material a year. (No specific estimate could be obtained.)

1. Not all this material is exported to other countries; part of the rock phosphate is shipped to other parts of the U. S.

CONCLUDING COMMENTS

Problems

A variety of problems was mentioned by East Coast firms interviewed, including those associated with the nature of material (e.g., urea); lack of coordination of arrival of material at port and arrival of vessel; special bag closures; maintenance of obsolete equipment and lack of volume to justify replacement; low quality of stevedore labor; inability to secure gangs when needed; and inability to secure hopper rail cars for moving bulk material.

The most frequently mentioned problem on the Gulf Coast concerned labor and union contracts. Numerous complaints were registered relative to the hygroscopic nature of urea and the problem of caking of ammonium sulfate and, occasionally, mixed fertilizers. Other frequently mentioned problems include obsolete equipment causing slow loading rates; inadequate storage or dock space; shortage of rail cars; insufficient lead time to accumulate material for loading; uncertain arrival of vessels; lack of information on specifications to be met as stated in charter party; and the slippery nature of polypropylene bags. Some firms also indicated that vessels normally used for shipping fertilizers are old, hard to load, and frequently have faulty gear.

The main complaint at West Coast ports was lack of business in relation to capacity to handle fertilizer or in relation to what had been handled in previous years. Most ports indicated they would welcome increased fertilizer business. Another problem frequently mentioned was lack of storage space for bulk fertilizers. One port mentioned difficulty in obtaining rail cars; however, most indicated this created no problem.

The coordination problem of getting fertilizer to the port in time to avoid demurrage on the ship or rail cars is supposedly overcome by the fact that the vessel must give 10 days' notice, then 2 days' notice, and then 24 hours' notice prior to its arrival. This notice should allow time for the rail cars to be at the port before the ship's arrival, thus avoiding demurrage on either the vessel or the cars. In reality it often does not work this way. Delays in arrival of vessels are commonplace at most ports. This in turn causes scheduling problems for fertilizer production and shipments to ports, storage problems at ports, and sometimes demurrage charges on rail cars or storage charges at ports.

Future Plans

Four East Coast firms plan to either add or expand bulk loading facilities and 2 firms indicated they plan to add bagging and/or bag loading facilities. Other plans call for new piers, additional bulk storage, channel improvements, and containerization facilities.

Eight Gulf Coast firms plan to add or increase bulk loading facilities and 3 firms plan to add additional bagging facilities. Additional storage space for both bagged and bulk material is planned at 6 locations, while 3 firms hope to increase pier lengths. Two facilities will be closed during 1970--Seaboard Coast Line's Port Tampa and Seddon Island facilities--while another firm, Tampa Stevedoring, expects to be condemned within a year or two. Seaboard Coast Line's East Tampa Bay bulk facility is scheduled to open in April 1970. The estimated capacity of this plant is 10 million tons of bulk material per year.

Several West Coast firms indicated they would put in storage facilities and/or bagging facilities if business warrants such an investment. On the whole, however, little or no expansion of present facilities is expected due to the present over-capacity situation now existing.

Observations

With the exception of a few new or newer bulk loading facilities, most U. S. bulk fertilizer handling facilities have low loading rates. Bagging and bag loading facilities appear to be no better on the whole, although there are exceptions. However, until some major breakthrough in technology is developed, such as mechanization of ship loading, there appears little hope for improving bagged material loading.

Another major observation concerns the apparent excess capacity of loading and handling facilities despite the general obsolescence found at many locations. Except for the areas engaged in shipment of phosphate products, most locations seem to have a very variable situation--no business at times and too much at others.

Some observations resulting from contacts with the fertilizer exporting firms include: (1) the amount of fertilizer materials exported from most ports in 1968 was small relative to their estimated capacities and probably smaller than in 1967 or earlier years; (2) the ports themselves are highly competitive and are generally desirous of a greater volume of fertilizer exports; (3) most ports would be willing to expand handling facilities, bagging facilities, or bulk loading facilities if the volume of business warranted such an expansion; and (4) each port facility tends to be an entity unto itself and is different from each other facility.

Given the complexity of the total operation involved in shipping AID fertilizers to developing countries, it is obvious that coordination and timing are extremely critical if all costs are to be minimized. In this regard, the authors were frequently told that it would be very helpful if AID could improve long-range planning or exercise greater control to allow firms more time to assemble, bag, or otherwise ship material so that fertilizer exports would be more evenly distributed throughout the year.

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EAST COAST PORTS

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Name: Ramsay, Scarlett and Company, Inc. (Baltimore Stevedoring Company)

Location: Baltimore, Maryland

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34 feet

Size of Ship Handled - Average: 10,000 long tons

- Maximum: 10,000 - 12,000 long tons

Number of Ships Loaded Simultaneously: 4

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 maximum: 7

Quantity of Fertilizer Exported Annually - 1968: 5,000 tons

Maximum Capacity: Not available

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to ship	Forklift, pallet, ship's gear	30 long
Rail to storage to ship	Forklift, pallet, ship's gear	30 long

Comments: Material arrives in rail cars already bagged, cars are moved into covered pier which holds 28 cars, bags are unloaded and palletized, then moved by forklift to dock for loading or to storage for later loading.

Method of Determining Weight: Rail bills of lading

Time Required to Load 10,000 Tons: 65 - 70 hours

BAGGING FACILITIES

Bag Damage: Damage to bags runs less than 1 percent. Bags damaged by railroads are returned to railroads for handling. Bags damaged by stevedoring firm are usually taped and loaded.

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bagged</u>
At dock (tons)	1,000
In nearby areas (tons)	0
Length of time stored (days)	15
Days free time	5*
Charges (dollars per ton)	\$1.00 per month

*Excluding Saturday, Sunday, and holidays.

CHARGES

<u>Item</u>	<u>Bagged</u> <u>(Per Long Ton)</u>
Stevedoring (palletizing, loading, and stowing)	\$6.75
Wharfage	.62
Handling	(Paid by railroad)
Clerking, checking	.75
Dunnage	.15
Total	\$8.27

LABOR

Length of Work Week: 7 days

Length of Work Day: 9 hours

Overtime Policy: Work one hour overtime everyday; Saturday, Sunday, and holidays are overtime. If second 9-hour shift is used, all time is overtime.

Wage Rates: Stevedores - straight time \$4.25
- overtime \$6.375

FUTURE PLANS

New general cargo pier being constructed by Maryland Port Authority.

PROBLEMS

Stevedores dislike handling triple superphosphate--dusty.

MISCELLANEOUS

Policies to Prevent Demurrage: Maintain close communication between shipper and buyer.

Source of Material: Not available

Months Most Material Shipped: Volume not large enough to establish typical pattern.

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: Data reported herein applies to operation at Pier 6, although the firm may load out of any number of piers in the Baltimore area.

Name: Rukert Terminals Corporation

Location: Baltimore, Maryland

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 40 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 24,000 tons

Number of Ships Loaded Simultaneously: 2

Number of Hatches Loaded Simultaneously:

Bulk - usual: Not available maximum: Not available

Bagged - usual: 4 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: 158,000 tons

Maximum Capacity: 300,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, belt conveyor, spout	200
Truck to ship	Hopper pit, belt conveyor, spout	200

Comments: Bulk material is dumped out of boxcars or hopper cars or trucks into hopper pit into conveyor belt system, to spout to ship's hold.

Method of Determining Weight: Cars and trucks are light and heavy weighed.

Time Required to Load 10,000 Tons: 4 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to ship (prebagged)	Forklift, pallet, ship's gear	40
Truck to ship (prebagged)	Forklift, pallet, ship's gear	40
Storage to ship	Forklift, pallet, ship's gear	40
Bagging machine to ship	Forklift, pallet, ship's gear	40

Comments: Prebagged material is palletized from boxcars and trucks, moved by forklift to storage or shipside. Material from bagging machines is palletized and also moved to storage or shipside by forklift. All bagged material is loaded onto vessel by ship's gear.

Method of Determining Weight: Cars and trucks are light and heavy weighed. Automatic bagging machines and periodic check weighing are used on material bagged on site.

Time Required to Load 10,000 Tons: 5 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	25	As specified	Sewn or	*
Ammonium sulfate	25	in contract	bar loop	*
Triple superphosphate	25		as specified	*
Diammonium phosphate	25		in contract	*
Mixed fertilizers	25			*
Potash	25			*

*\$1.75 per net ton for sewn bags, \$2.75 per net ton for bar loop.

Number of Bagging Machines: 3

Route of Fertilizer Movement: Bulk material is received by rail or truck, and is delivered either to storage or directly to bagging machines. Bagged material is moved either to storage or directly to shipside for loading. Forklifts, pallets, and ship's gear are used in vessel loading.

Method of Determining Weight: Automatic bagging machines (Inglett and Corley). Every tenth bag check weighed on platform scales.

Bag Damage: Damage to bags in loading onto vessel runs between 0.25 and 0.5 percent. Damaged bags are rebagged and brought up to correct weight.

Portion of Bagged Material Loaded That is Bagged at This Facility: 50 percent

	<u>STORAGE</u>	
	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	50,000	20,000
In nearby areas (tons)	Available - quantity not specified	Available - quantity not specified
Length of time stored (days)	Up to 90	Up to 90
Days free time	Not available	Not available
Charges (dollars per ton)	\$0.50 per month or fraction	\$0.50 per month or fraction

	<u>CHARGES</u>	
	<u>Bulk</u> <u>(Per Ton)</u>	<u>Bagged</u> <u>(Per Ton)</u>
Total charge for loading	\$0.60 per net ton*	\$5.95 per gross ton*

*Itemization of charges not available.

LABOR

Length of Work Week: 5 days

Length of Work Day: Not available

Overtime Policy: Used only if authorized

Wage Rates: \$3.50 per man hour straight time

FUTURE PLANS

None indicated.

PROBLEMS

Both bulk and bagged urea create handling problems due to nature of material.

MISCELLANEOUS

Policies to Prevent Demurrage: Responsibility of shipper

Source of Material: Not available

Months Most Material Shipped: Fall, winter, and spring

Ideal Shipping Period: Fertilizer can be loaded year-round.

Name: Elizabeth River Terminals, Inc.

Location: Norfolk, Virginia

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

Size of Ship Handled - Average: 20,000 tons

- Maximum: 40,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 2

Bagged - usual: 4 maximum: 4

Quantity of Fertilizer Exported Annually - 1968: Not available

Maximum Capacity: 500,000 - 700,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, shiploader, trimmer	250 - 400
Truck to ship	Hopper pit, conveyor belt, shiploader, trimmer	250 - 400
Barge to ship	Barge unloader, hopper pit, conveyor belt, shiploader, trimmer	250 - 400
Storage to ship	Payloader, hopper, conveyor belt, shiploader, trimmer	250 - 400

Comments: Bulk material received from trucks, boxcars or hopper cars, or barges, delivered to conveyor system over electronic load cell (Ramsey) belt weighers, to shiploading conveyor boom to spout into ship trimmer. Material can be diverted to storage where it is reclaimed by payloaders and placed back into the same conveyor system.

Method of Determining Weight: Terminal's own truck scales, railroad scales, and Ramsey electronic belt scales

Time Required to Load 10,000 Tons: 3 - 4 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to ship	Forklift, pallet, dock crane	37.5 - 50
Storage to ship	Forklift, pallet, dock crane	37.5 - 50

Comments: Most bagged material is loaded directly from bagging machines as bagged storage is very limited. Bags are palletized at bagging machine, moved onto dock (or storage) by forklift, loaded onto vessel by dock crane.

Method of Determining Weight: Bagged weights determined by bagging scales and platform scales.

Time Required to Load 10,000 Tons: 5 - 6 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	25	Jute, paper,	Sewn, heat	Not available
Ammonium sulfate	25	or poly-	sealed, tape-	Not available
Triple superphosphate	25	propylene as	over, or bar	Not available
Diammonium phosphate	25	specified	loop as	Not available
Mixed fertilizers	25		specified	Not available

Number of Bagging Machines: Up to 6 bagging machines available.

Route of Fertilizer Movement: Bulk material is moved directly from rail, truck, and barge or from storage to bagging machines. Bags are palletized and moved directly to shipside or to storage to await arrival of vessel.

Method of Determining Weight: Automatic scales on bagging machines and check weigh periodically with platform scales

Bag Damage: Damage to bags runs less than 0.5 percent. Paper bags have higher damage rate. Damaged bags are returned for rebagging.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	100,000	200
In nearby areas (tons)	25,000	0
Length of time stored (days)	Varies	A few days at most
Days free time	Not available	Not available
Charges (dollars per ton)	Not available	Not available

CHARGES

Charges depend on commodity, quantity handled, and type of vessel.

LABOR

Length of Work Week: 7 days

Length of Work Day: Not available

Overtime Policy: For account of party ordering, or for account of vessel, charterer, or shipper when ordered by Port Authority to relieve port congestion.

Wage Rates: Not available

FUTURE PLANS

Plan additional berth primarily for bulk loading, unloading, and storage.

PROBLEMS

Congestion in port, heat sealing and other special closures, fertilizer-producing facilities too distant from port, and the need for more volume to maintain heavy investment.

MISCELLANEOUS

Policies to Prevent Demurrage: Vessel not accepted in berth until cargo is ready and vessel passed by National Cargo Bureau. Rail shipments ordered into terminal in accordance with ship requirements.

Source of Material: Phosphate products from Aurora, North Carolina; complete fertilizers from Norfolk, Virginia; ammonium sulfate from Hopewell, Virginia, and Pittsburg, Pennsylvania; and urea from Tunis, North Carolina.

Months Most Material Shipped: Varies

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: Terminal is a subsidiary of Smith-Douglass.

Name: Smith-Douglass Division, Borden Chemical Company

Location: Norfolk, Virginia

Type of Facility: Private

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet

Size of Ship Handled - Average: Not available

- Maximum: 10,000 - 12,000 tons; 450-foot vessel length

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bagged - usual: 4 - 5 maximum: 6

Quantity of Fertilizer Exported Annually - 1968: 30,000 tons

Maximum Capacity: 60,000 - 80,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear	30
Bagging machine to ship	Forklift, pallet, ship's gear	30

Comments: Bagged fertilizers are loaded simultaneously from storage and from bagging machine.

Method of Determining Weight: Semi-automatic scales on bagging machines

Time Required to Load 10,000 Tons: 10 days (80 hours)

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Charge (Per Ton)</u>
Mixed fertilizers	35	Jute, poly- ethylene liner	Sewn	Not available
Mixed fertilizers	30	Polypropylene	Heat sealed	Not available

Number of Bagging Machines: 3

Route of Fertilizer Movement: Bulk material is moved from plant storage to bagging machines by conveyor belt system. Bags are palletized and moved to storage or to dock by forklift.

Method of Determining Weight: Semi-automatic scales on bagging machines, check weigh one bag every 15 minutes on platform scale.

Bag Damage: Loss from bag damage ranges from 0.25 percent for polypropylene to 0.50 to 1.00 percent for jute.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 per

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	30,000*	1,000 - 1,500
In nearby areas (tons)	0	Available quantity not specified
Length of time stored (days)	Not available	Less than 2 weeks
Days free time	Not available	Not available
Charges (dollars per ton)	Not available	Not available

*Most of this storage is used for domestic material.

CHARGES

Not available.

LABOR

Length of Work Week: 5 days

Length of Work Day: Not available

Overtime Policy: Not available

Wage Rates: Not available

FUTURE PLANS

None indicated.

PROBLEMS

Coordination of export shipments with domestic needs.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Only handle their own material produced at plant near dock.

Months Most Material Shipped: July - February

Ideal Shipping Period: July - December

Comments on Dock Ownership, Leasing, Etc.: Dock is owned and operated by Smith-Douglass. They also own the Elizabeth River Terminal.

Name: Allied Chemical Corporation

Location: Hopewell, Virginia

Type of Facility: Private

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 25 feet

- in Channel: 23 feet

Size of Ship Handled - Average: 475 feet - 525 feet vessel length

- Maximum: 16,465 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 384,392 tons

Maximum Capacity: 450,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Plant storage to ship	Dragline, conveyor belt, hopper, stationary shiploader	300

Comments: Most bulk material is transferred directly to warehouse from plant. Draglines are used to pull material from storage to conveyor belts feeding into hoppers. Material discharges onto main conveyor belt (covered) and moves to stationary loading tower for delivery into vessel. Occasionally some material is stored in a second warehouse located in the plant area. Material from this storage is trucked to first warehouse and put into conveyor belt system.

Method of Determining Weight: Ramsey electronic scale

Time Required to Load 10,000 Tons: 55 hours - varies by type of vessel

STORAGE

	<u>BULK</u>
At dock (tons)	44,500
In nearby areas (tons)	30,000
Length of time stored (days)	Not available
Days free time	Not applicable
Charges (dollars per ton)	Not applicable

CHARGES

Not available.

LABOR

Length of Work Week: 5 days

Length of Work Day: Not available

Overtime Policy: Used as necessary

Wage Rates: Not available

FUTURE PLANS

None indicated.

PROBLEMS

Maintenance of outdated mechanical equipment and no bagging or bag loading facilities.

MISCELLANEOUS

Policies to Prevent Demurrage: Maintain direct contact with fertilizer broker and shipping company.

Source of Material: Only handle their own material which is produced at plant located on James River

Months Most Material Shipped: Varies according to contracts.

Ideal Shipping Period: Fall and spring

Name: North Carolina State Ports Authority

Location: Morehead City, North Carolina

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: No (bagging facilities will be available by March or April 1970).

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet MLW

Size of Ship Handled - Average: 8,000 - 20,000 tons

- Maximum: 23,000 tons

Number of Ships Loaded Simultaneously: 1 bulk and up to 3 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 5 maximum: 8

Quantity of Fertilizer Exported Annually - 1969: 366,000 tons*

Maximum Capacity: Not available

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Barge to storage	Self-unloading barge, conveyor belt	1,000
Storage to ship	Bucketwheel reclaimer, conveyor belt, traveling shiploader, trimmer	3,000
Barge to ship	Self-unloading barge, conveyor belt, traveling shiploader, trimmer	500 - 1,000

*Tonnage is for 1969 through November 1. Facility opened in August 1968.

Comments: All bulk material arrives in self-unloading barges and is transferred to covered conveyor belt system. Material can go either to storage or directly to vessel. Material in storage is reclaimed by bucketwheel reclaimer, placed back onto conveyor belt system and moved to traveling shiploader (1,000 feet travel). Shiploader has boom that can be raised, lowered, extended, or retracted and is also equipped with rotating and telescoping slinger (trimmer).

Method of Determining Weight: Merrick electronic belt scale

Time Required to Load 10,000 Tons: 4 - 5 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship (prebagged)	Forklift, pallet, ship's gear	30 - 40
Bagging machine to ship	Forklift, pallet, ship's gear	120*

Comments: *This is an estimated rate as bagging machines will not be ready for operation until March or April 1970. Currently, all bagged material loaded is bagged elsewhere. Bags arrive by rail or truck, are palletized and moved into transit sheds by forklift. In loading, bags are transferred to dock by forklift and placed onto vessel by ship's gear.

Method of Determining Weight: Truck weights determined by port's truck scale and rail bills of lading.

Time Required to Load 10,000 Tons: 72 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Triple superphosphate	60*	Jute, poly-ethylene liner	Sewn	Not available
Diammonium phosphate	60*	Jute, poly-ethylene liner	Sewn	Not available
Mixed fertilizers	60*	Variable	Sewn	Not available

*Estimated

Number of Bagging Machines: 3

Route of Fertilizer Movement: Bulk material will be transferred to bagging machines using same routes for bulk loading. Bagging machines will be located on the dock near the conveyor belt system and will receive material from the main conveyor belt. Bags will be palletized and moved by forklift to either shipside or to transit shed for later loading.

Method of Determining Weight: Automatic scales on bagging machines and periodic check with platform scale

Bag Damage: Not enough experience

Portion of Bagged Material Loaded That is Bagged at This Facility: Currently, none

<u>STORAGE</u>		
	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	106,000	1,000
In nearby areas (tons)	0	5,000
Length of time stored (days)	Up to 60	Less than 17
Days free time	12	12
Charges (dollars per ton)	Not available	Not available

<u>CHARGES*</u>		
<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not available	Not available
Wharfage	\$0.40	\$0.50
Handling	1.25	1.25
Bagging	XXX	Not applicable
Bags	XXX	Not applicable

*Charges are negotiated on large quantities.

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours

Overtime Policy: Used as needed

Wage Rates: Foreman, Clerks - \$5.20 per hour straight time; \$7.80 per hour overtime
 Skilled labor - \$4.90 per hour straight time; \$7.35 per hour overtime
 Common labor - \$3.90 per hour straight time; \$5.85 per hour overtime

FUTURE PLANS

Bagging facilities will be operational by March or April 1970. Additional bulk unloading pier for barges and bulk rail unloading facilities are planned. Main conveyor system is constructed so that an additional 60-inch belt and shiploader can be added if need warrants. Long-range plans include three more 106,000-ton warehouses.

PROBLEMS

Do not have rail unloading facilities for bulk.

MISCELLANEOUS

Policies to Prevent Demurrage: This is left up to Texas Gulf Sulphur, the shipping company, and the fertilizer broker.

Source of Material: All bulk material is from Texas Gulf Sulphur at Aurora, North Carolina.

Months Most Material Shipped: Not sufficient experience

Ideal Shipping Period: Not sufficient experience

Comments on Dock Ownership, Leasing, Etc.: All bulk facilities at dock are owned and operated by State of North Carolina, but leased for 20 years to Texas Gulf Sulphur. Bagging facilities will be constructed by TGS and leased to the State.

Name: North Carolina State Ports Authority

Location: Wilmington, North Carolina

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 38 feet

Size of Ship Handled - Average: 10,000 tons

Number of Ships Loaded Simultaneously: 6

Number of Hatches Loaded Simultaneously:

Bagged - usual: Up to 5

maximum: Depends on number of hatches on vessel

Quantity of Fertilizer Exported Annually - 1968: 226 tons

Maximum Capacity: Not available

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Forklift, pallet, ship's gear, dock crane	40
Truck to storage to ship	Forklift, pallet, ship's gear, dock crane	40

Method of Determining Weight: Rail and truck weights

Time Required to Load 10,000 Tons: 50 - 65 hours

STORAGE

	<u>Bagged</u>
At dock (tons)	1,000
In nearby areas (tons)	5,000
Length of time stored (days)	Not available
Days free time	Not available
Charges (dollars per ton)	Not available

CHARGES

Not available.

LABOR

Not available.

FUTURE PLANS

Port has no plans for expanding fertilizer handling facilities.

COMMENTS

Although the port has handled small quantities of fertilizer in the past, they specialize in general cargo and would prefer not to handle fertilizer. Storage or transit shed space is limited and fertilizer storage is at the expense of general cargo. This port handled 850,000 tons of cargo from 541 ships and 102 barges during 1968. They do receive technical grade urea from Trinidad and have specialized storage and handling facilities for this.

Name: Almont Shipping Company (A Seacor Enterprise)*

Location: Wilmington, North Carolina

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 32 feet MLW

Size of Ship Handled - Average: 10,000 - 15,000 metric tons

- Maximum: 25,000 metric tons

Number of Ships Loaded Simultaneously: 2

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 4 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: None exported. Imported approximately 150,000 tons.

Maximum Capacity: Bulk - 250,000 metric tons

Bagged - 120,000 metric tons

*This facility is currently set up to import or unload bulk material from barges and deep sea vessels. They are in process of building a bulk loading system to be finished by April 1970. All loading rates are based on anticipated capacity.

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Payloader, hopper, conveyor belt, shiploader	250 - 300 metric
Truck to ship	Portable hopper, conveyor belt, shiploader	250 - 300 metric
Barge to ship	Elevator, hopper, conveyor belt, shiploader	250 - 300 metric
Rail to storage to ship	Payloader, hopper, conveyor belt, shiploader	250 - 300 metric
Truck to storage to ship	Payloader, hopper, conveyor belt, shiploader	250 - 300 metric

Comments: Bulk material arriving in rail cars will be unloaded by front-end loader, placed into hopper, and moved by conveyor belt to shiploader. Trucks will dump directly into hopper and material will move to shiploader in same fashion as above. Barged material will be discharged by drag-chain elevator onto conveyor belt to shiploader. Same procedure will be used when material is placed in storage, except different conveyor belt is used. Payloaders will move material out of warehouses onto conveyor belts to shiploader.

Method of Determining Weight: Will install electronic belt scale.

Time Required to Load 10,000 Tons: 36 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to ship	Forklift, pallet, ship's gear	25 - 35 metric
Rail to ship (prebagged)	Forklift, pallet, ship's gear	25 - 35 metric
Truck to ship (prebagged)	Forklift, pallet, ship's gear	25 - 35 metric

Comments: Bags will be palletized from bagging machine, moved by forklift to dock, and loaded by ship's gear. Prebagged material will be unloaded on dock by forklift, then loaded onto vessel by ship's gear. Prebagged material is portion bagged across river from dock. Almost facilities are spread out on opposite shores of Cape Fear River.

Method of Determining Weight: Automatic weight scale on bagging machine

Time Required to Load 10,000 Tons: 90 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	30 metric	Would depend on	Sewn	Not available
Ammonium sulfate	35 metric	contract specifi-	Sewn	Not available
Triple superphosphate	35 metric	cations and type	Sewn	Not available
Diammonium phosphate	35 metric	of material--	Sewn	Not available
Mixed fertilizers	35 metric	paper or poly-	Sewn	Not available
Potash	35 metric	ethylene-lined jute	Sewn	Not available

Number of Bagging Machines: 4

Route of Fertilizer Movement: Bulk material arriving by rail, truck, and barge will move through belt conveyor system to bagging machines. Bulk material in storage will be transported to bagging machine by payloader and portable conveyor belt.

Method of Determining Weight: Automatic weight scale on bagging machine.
Check weigh one in forty bags on platform scale.

Bag Damage: No experience

Portion of Bagged Material Loaded That is Bagged at This Facility: None at present, but will be 100 percent when facility is operational.

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (metric tons)	50,000	1,200
In nearby areas (metric tons)	32,000	1,000
Length of time stored (days)	Not available	Not available
Days free time	Not available	Not available
Charges (dollars per metric ton)	\$0.45 per month	\$1.00 per month

CHARGES

<u>Item</u>	<u>Bulk</u> <u>(Per Metric Ton)</u>	<u>Bagged</u> <u>(Per Metric Ton)</u>
Total (estimate)*	\$2.00 - 3.00	\$10.00

*Itemization of charges is not available. Bulk charge includes all loading and handling while bagged charge includes all charges except bags.

LABOR

Length of Work Week: Up to 7 days

Length of Work Day: 8 hours

Overtime Policy: If work warrants, a second 10-hour shift is used.

Wage Rates: Longshoremen - \$4.00 per hour straight time, \$6.00 per hour overtime

Warehouseman - \$3.00 per hour straight time

FUTURE PLANS

Facility currently consists of two docks (one on each side of Cape Fear River) designed to receive inbound material. Plans call for construction of bulk loading system to handle outbound traffic; to be completed by April 1970.

PROBLEMS

Depth of channel at dock (32 feet); quantity and quality of labor;

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Anticipate that most material will originate in the Wilmington area.

Months Most Material Shipped: No experience

Ideal Shipping Period: June - December

Name: Shipyard River Terminals

Location: Charleston, South Carolina

Type of Facility: Private, but do contract work

Fertilizer Handled: Bulk

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 32 feet MLW

Size of Ship Handled - Average: 10,000 tons

- Maximum: 30,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 15,000 tons

Maximum Capacity: Not available

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to storage to ship	Payloader, hopper, truck, dock crane, clamshell	150 - 200
Truck to storage to ship	Payloader, hopper, truck, dock crane, clamshell	150 - 200

Comments: All bulk material arriving by rail or truck is discharged in storage shed. Material is then loaded onto trucks by payloader, hauled to dock, dumped into hopper, picked up by dock crane with 7-ton clamshell and put on vessel.

Method of Determining Weight: Rail bills of lading and truck weights

Time Required to Load 10,000 Tons: 70 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	50	Paper or	Sewn	\$2.00
Ammonium sulfate	50	burlap with	Sewn	2.00
Triple superphosphate	50	polyethylene	Sewn	2.00
Diammonium phosphate	50	liner	Sewn	2.00
Mixed fertilizers	50		Sewn	2.00
Potash	50		Sewn	2.00

Number of Bagging Machines: 4

Route of Fertilizer Movement: Bagging machines are located in storage shed. Bulk material is transferred from rail cars to bagging machine by payloader, hopper, and conveyor belt; from truck to hopper to bagging machine; from storage to bagging machine by payloader. Bagged material is transferred to storage or to rail cars by hand trucks for subsequent shipment to State docks for loading.

Method of Determining Weight: Automatic scales on bagging machines. Check weigh one in ten bags on platform scale.

Bag Damage: Not available

Portion of Bagged Material Loaded That is Bagged at This Facility: No bagged material loaded at this dock.

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	30,000	5,000
In nearby areas (tons)	0	10,000
Length of time stored (days)	30	30
Days free time	5	5
Charges (dollars per ton)	\$0.40 per month	\$0.40 per month

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$2.00	Not applicable
Wharfage	.40	Not applicable
Handling	.90	\$0.90
Bagging	XXX	(See page 58)
Bags	XXX	Not available
Forwarding	.15	.15
Total:	\$4.05*	\$1.05**

*Includes storage and trimming costs not listed separately in above items.

**This is cost of transferring bagged material to State dock.

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours

Overtime Policy: Not available

Wage Rates: Longshoremen - \$5.71 per hour straight time, \$7.71 per hour overtime.

FUTURE PLANS

Would install bulk loading conveyor system if volume could be increased.

PROBLEMS

No problems experienced as long as material is free flowing.

MISCELLANEOUS

Policies to Prevent Demurrage: Entire operation is coordinated with supplier, shipping company, and railroads.

Source of Material: Urea, ammonium sulfate, diammonium phosphate, and potash come from various unspecified sources. Triple superphosphate and mixed fertilizers are produced by Swift, Agrico, Columbia Nitrogen, and Etiwan Fertilizer Company in Charleston area.

Months Most Material Shipped: October - November

Ideal Shipping Period: July - September

Comments on Dock Ownership, Leasing, Etc.: Shipyard River Terminal is owned by Etiwan Fertilizer Company.

Name: South Carolina State Ports Authority

Location: Charleston, South Carolina

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet MLW

Size of Ship Handled - Average: Not available

- Maximum: 10,000 tons

Number of Ships Loaded Simultaneously: 9

Number of Hatches Loaded Simultaneously:

Bagged - depends on number of hatches on vessel

Quantity of Fertilizer Exported Annually - 1968: 30,000 tons

Maximum Capacity: 100,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Forklift, pallet, ship's gear	Not available

Comments: Bagged material arrives in boxcars, is palletized and moved into storage by forklift. In loading, pallets are moved to dock by forklift and loaded onto vessel by ship's gear.

Method of Determining Weight: Rail bills of lading

Time Required to Load 10,000 Tons: 7 - 10 days

BAGGING FACILITIES

Bag Damage: Bag damage is described as "nil." Broken or damaged bags are returned to manufacturer.

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGEBagged

At dock (tons) 20,000
 In nearby areas (tons) 0
 Length of time stored (days) Less than 30
 Days free time 15
 Charges (dollars per ton) \$0.90 per month

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not available
Wharfage	\$0.50
Handling	1.25
Bagging	Not applicable
Bags	Not applicable
Total	Not available

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours

Overtime Policy: Paid by State if needed to make ready for ship. Paid by customer if loading exceeds normal 8-hour day.

Wage Rates: Not available

FUTURE PLANS

Adding container port facilities. No specific plans indicated for handling fertilizers.

PROBLEMS

None indicated.

MISCELLANEOUS

Policies to Prevent Demurrage: Shipping company takes care of ship's arrival, fertilizer broker schedules arrival of material, State handles and loads.

Source of Material: Not available

Months Most Material Shipped: May - October

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: This facility is owned and operated by the State of South Carolina. All workers are State employees and are nonunion.

Name: Georgia Ports Authority, Garden City Terminal*
(Savannah Multi-Product Bulk Terminal)

Location: Garden City, Georgia (Savannah, Georgia)

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 36 feet

- in Channel: 36 feet

Size of Ship That Will be Able to be Handled - Average: 22,000 tons

- Maximum: 25,000 tons

Number of Ships Loaded Simultaneously: 1 (Facility will be able to load one vessel and unload one simultaneously.)

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour) Estimated Capacity</u>
Barge to ship	Bulk unloader, conveyor belt, Slewin Bridge bulk loader, trimmer	1,500
Rail to storage to ship	Hopper pit, conveyor belt, stacker-reclaimer, Slewin Bridge bulk loader, trimmer	1,500

*This bulk handling facility is currently under construction and is scheduled to be operative in May 1971.

Comments: The facility when completed will use a Slew-in Bridge loader for loading vessels. The loader will have a 45-inch conveyor belt and will be capable of loading 1,500 tons per hour of 100-pound material. Material from barges will be unloaded by a traveling bulk unloader with clamshell and transferred directly to vessel. Material arriving by rail or truck can be loaded directly but would normally be expected to be placed in storage. The arm of the Slew-in Bridge loader will move 400 feet without having to reposition vessel.

Method of Determining Weight: Automatic belt scales will be built into conveyor belt system.

Estimated Time Required to Load 10,000 Tons: 7 hours

STORAGE

Anticipated capacity for storing bulk fertilizer is 30,000 to 40,000 tons.

CHARGES

Not yet determined.

ANTICIPATED LABOR

Length of Work Week: 7 days if needed

Length of Work Day: 2 shifts per day, 11 hours per shift. Expect to use state labor instead of longshoremen.

Wage Rates: \$4.00 per hour straight time; \$6.00 per hour overtime

FUTURE PLANS

This facility is scheduled to be operative by May 1971. It will be the first facility in the United States to use the Slew-in Bridge loader.

MISCELLANEOUS

Source of Material: Expect material to come from fertilizer plants in Georgia, South Carolina, Florida, and North Carolina.

Name: Southern Shipping Company

Location: Savannah, Georgia

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 32 feet

Size of Ship Handled - Average: Not available

- Maximum: 15,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - depends on number of hatches on vessel

Quantity of Fertilizer Exported Annually - 1968: 25,000 tons

Maximum Capacity: Bulk - 250,000 tons or
bagged - 75,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to storage to ship	Payloader, hopper, conveyor belt, shiploader, trimmer	150

Comments: Material is moved from rail cars to storage by payloader, from storage to ship by payloader, hopper, conveyor belt, and shiploader. Trimmer trimmed on vessel.

Method of Determining Weight: Draft, survey and rail bills of lading

Time Required to Load 10,000 Tons: 6 days

BAGGED FERTILIZER LOADING

Route of Movement:

Transfer Equipment

Rate of Transfer
(Tons Per Hour
Per Hatch)

Storage to ship

Forklift, pallet, ship's gear

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Comments: Bags are palletized at bagging machine and transferred to bulk storage area and to dock by forklift for stockpiling prior to loading.

Method of Determining Weight: Weight is determined during bagging process. Clerk used to count number of pallets loaded.

Time Required to Load 10,000 Tons: Depends on number of gangs worked

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Ammonium sulfate	25	Jute, poly- ethylene liner	Sewn	Not available

Number of Bagging Machines: 4

Route of Fertilizer Movement: Bulk material arrives by rail, transferred to storage by payloader, moved from storage to bagging machine by payloader, hopper, and portable conveyor belt.

Method of Determining Weight: Exact-o-weight scales on bagging machines. Platform scales used to check weigh bags.

Bag Damage: Damage to bags is described as "nil." All broken or damaged bags are sent back for rebagging.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	25,000	0*
In nearby areas (tons)	0	Available - amount not specified
Length of time stored (days)	Not available	Not available
Days free time	Not available	Not available
Charges (dollars per ton)	(Included in total figure listed below)	

*Bagged material may be stored temporarily in bulk storage area.

CHARGES*

<u>Item</u>	<u>Bulk</u> <u>(Per Ton)</u>	<u>Bagged</u> <u>(Per Ton)</u>
Clerking	-	\$ 0.30
Total	\$3.73	\$13.00**

*Itemization of charges is not available.

**Includes wharfage, handling, bagging, clerking, one month storage, but not bags.

LABOR

Length of Work Week: 7 days

Length of Work Day: Not available

Overtime Policy: Can be worked if gangs are available. Overtime is for account of party ordering overtime.

Wage Rates: Not available

FUTURE PLANS

None indicated.

PROBLEMS

None indicated.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Ammonium sulfate from Columbia Nitrogen, Augusta, Georgia

Months Most Material Shipped: Not available

Ideal Shipping Period: Not available

Name: Jacksonville Bulk Terminal, Inc.
(Subsidiary of Occidental Chemical Corporation)

Location: Jacksonville, Florida

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34 feet

Size of Ship Handled - Average: 12,000 - 15,000 long tons

- Maximum: 28,500 long tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 1,207,000 tons

Maximum Capacity: 1,500,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, stationary shiploader	1,250
Rail to storage to ship	Hopper pit, conveyor belt, stationary shiploader	1,250

Comments: Hopper cars discharge material into hopper pit located in an open-end building. Material moves by covered conveyor belt to either storage silos or directly to stationary bulk loading tower.

Method of Determining Weight: Merrick electronic belt scale

Time Required to Load 10,000 Tons: 8 hours

STORAGE

	<u>Bulk</u>
At dock (tons)	28,000
In nearby areas (tons)	0
Length of time stored (days)	Not available
Days free time	Not available
Charges (dollars per ton)	Not available

CHARGES

<u>Item</u>	<u>Bulk</u> <u>(Per Ton)</u>
Stevedoring	Not available
Wharfage	Not available
Handling	Not available
Total	Varies by quantity loaded: \$1.22 per ton for 5,000 - 10,000 tons \$1.06 per ton for 10,000 - 15,000 tons \$.94 per ton for 15,000 tons and over

LABOR

Length of Work Week: 7 days

Length of Work Day: 8 hours

Overtime Policy: Anything over 8 hours per day or 40 hours per week is overtime.

Wage Rates: Not available

FUTURE PLANS

None indicated.

PROBLEMS

Diammonium phosphate and monoammonium phosphate must be loaded directly from rail cars.

MISCELLANEOUS

Policies to Prevent Demurrage: Interore had representative stationed at dock. Continuous coordination among shipping company, fertilizer trader, and fertilizer producer.

Source of Material: Not available

Months Most Material Shipped: Varies throughout year

Ideal Shipping Period: Fertilizer can usually be loaded year-round.

Name: Wilson and Toomer Fertilizer Company.
(Division of Emhart Corporation)

Location: Jacksonville, Florida

Type of Facility: Private, but do contract work

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet MLW

Size of Ship Handled - Average: 7,000 metric tons

- Maximum: 12,000 metric tons

Number of Ships Loaded Simultaneously: 1 bulk or 1 bagged.

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 4 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: 30,000 metric tons

Maximum Capacity: 150,000 metric tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, shiploader	175
Plant to ship	Conveyor belt, shiploader	175
Plant storage to ship	Payloader, hopper, conveyor belt, shiploader	175

Comments: Bulk material is moved directly from fertilizer mills to hopper to conveyor belt to ship, or from plant storage to hopper, by front-end loader, to conveyor belt to ship.

Method of Determining Weight: Batch weigh own material. Use rail bills of lading on contractual material.

Time Required to Load 10,000 Tons: 5 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to ship	Forklift, pallet, ship's gear	30
Plant storage to ship	Forklift, pallet, ship's gear	30

Comments: Since storage is limited, some material is bagged before ship's arrival. In actual loading, bags are taken directly from bagging machines and from storage.

Method of Determining Weight: Not available

Time Required to Load 10,000 Tons: 10 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Triple superphosphate	30	Burlap, poly-ethylene liner	Sewn	\$4.00
Diammonium phosphate	30	Burlap, poly-ethylene liner	Sewn	4.00
Mixed fertilizers	25	Polypropylene, polyethylene liner	Heat seal	4.25

Number of Bagging Machines: 2

Route of Fertilizer Movement: Own material moves from storage to bagging machine, or from plant to bagging machine by conveyor belt. Bags are moved from bagging machine to shipside or to storage by forklift and pallet. Contractual bulk material moves from rail to bagging machine, using hopper cars, hopper pit, and conveyor belt.

Method of Determining Weight: Automatic scales on bagging machines, check weigh bags with platform scale.

Bag Damage: Damage to bags is estimated at 0.25 percent. Damaged bags are not considered to be much of a problem.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	10,000	4,000
In nearby areas (tons)	0	0
Length of time stored (days)	Not available	Not available
Days free time	Not available	Not available
Charges (dollars per ton)	Not available	Not available

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not available	\$3.00
Wharfage	Not available	.30
Handling	Not available	1.50
Bagging	XXX	4.00 - 4.25
Bags	XXX	Not available
Total	Not available	\$8.80 - 9.05

LABOR

Length of Work Week: 7 days

Length of Work Day: 8 hours

Overtime Policy: Used only to meet charter requirements, or when charterer or ship owner pays.

Wage Rates: Plant scale workers - \$1.85 - 2.00 per hour straight time
Longshoremen - \$4.00 per hour straight time

FUTURE PLANS

None indicated.

PROBLEMS

Shortage of stevedore labor. Frequently use fertilizer plant labor to help load ships.

MISCELLANEOUS

Policies to Prevent Demurrage: Try to arrange for 30 days' advance notice of arrival of ship.

Source of Material: Own material is produced at plant located at the dock. No information given for contractual material.

Months Most Material Shipped: Not available

Ideal Shipping Period: June - October

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Name: Seaboard Coast Line Railroad Company
(Boca Grande Facility)

Location: Boca Grande, Florida

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 31 feet

- in Channel: 31 feet

Size of Ship Handled - Average: 10,000 - 12,000 tons

- Maximum: 15,000 - 18,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 2,170,000 tons including
rock phosphate

Maximum Capacity: 2,000,000 tons including
rock phosphate

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, gantry, loading chute	800 - 950 for bulk carrier 400 - 600 for general cargo vessel
Rail to storage to ship	Hopper pit, conveyor belt with tipper, storage with sloping floors, gantry, loading chute	800 - 950 for bulk carrier 400 - 600 for general cargo vessel

Comments: Bottom drop rail hopper cars are assembled in a marshalling yard until the amount of material to be shipped is at the port. The facility can unload only one rail car at a time. Rail car is moved to hopper pit in shed. Men open bottom dump hoppers, material falls by gravity to pit to a 30-inch conveyor belt to gantry to loading chute to ship's hold. The vessel must be moved since dock is only 275 feet long. Bulldozers are used to move material in hold if ship is to be trimmed. If material goes into storage first, it moves from rail car to hopper pit to conveyor belt to storage. The conveyor belt has a tripper which allows material to be placed in storage at various points. The storage has sloping floors. Material moves by gravity from storage to conveyor belt to gantry to loading chute to ship's hold.

Method of Determining Weight: Automatic electronic belt scales

Time Required to Load 10,000 Tons: Bulk carrier - 15 hours; general cargo vessel with tween decks - 25 hours

STORAGE:

Bulk

At dock (tons)	30,000
In nearby areas (tons)	0
Length of time stored (days)	Up to 10
Days free time	Not available
Charges (dollars per ton)	Not available

CHARGES

Total charges for bulk are \$1.36 per net ton for rock phosphate from mine to aboard vessel, including transportation from mine but excluding trimming of vessel. Cost of trimming is 27 cents per net ton for rock phosphate and 48 cents per net ton for diammonium phosphate or triple superphosphate. Charge for fertilizer is \$2.18 per net ton from plant to aboard vessel, including transportation to facility but excluding trimming of vessel.

LABOR

Length of Work Week: Up to 7 days

Length of Work Day: 1 shift up to 24 hours. No international long-shoremen labor used at port, only company employees.

Overtime Policy: When a vessel is being loaded, work up to 24 hours per day at time and a half for overtime after 8 hours.

Wage Rates: Elevator operators - \$3.03 per hour for straight time including fringe benefits
 Laborers - \$2.84 per hour for straight time including fringe benefits

FUTURE PLANS

This facility was built in 1893. If business warrants, may expand facility.

PROBLEMS

Only problem is that the facility can dump only one hopper rail car at a time, whereas the conveyor system could handle more than one car at a time.

MISCELLANEOUS

Policies to Prevent Demurrage: Since this facility and the two other facilities at Tampa are owned and run by Seaboard Coast Line Railroad Company, vessels are assigned to where berth space is available at either Tampa or Boca Grande to avoid demurrage on rail cars.

Source of Material: Tampa area and new rock phosphate mines south of Tampa

Months Most Material Shipped: Year-round

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: Private facility operated for public use.

Name: Pate Stevedoring Company (Fillette, Green and Company), Garrison Terminals

Location: Tampa, Florida

Type of Facility: Public

Fertilizer Handled: Bagged (handle inbound bulk shipments)

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet

Size of Ship Handled - Average: 7,600 GRT

- Maximum: 10,400 GRT

Number of Ships Loaded Simultaneously: 3

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 maximum: 12

Quantity of Fertilizer Exported Annually - 1968: 200,900 tons

Maximum Capacity: 300,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to ship (prebagged)	Forklift and/or tractor-	25 metric
Truck to ship (prebagged)	drawn trailer, pallet,	50 metric
Storage to ship	ship's gear and/or dock	40 - 50 metric
Bagging machine to ship	crane	30 - 35 metric

Comments: Only very small quantity of prebagged material is loaded. Prebagged rail shipments are unloaded, palletized, and held in storage sheds for ultimate delivery to shipside. Loading performed by ship's gear or dock cranes individually or together. Material bagged here is palletized from bagging machine and moved to storage or shipside by forklifts or tractor-drawn trailers. Loading performed by ship's gear and/or dock cranes.

Method of Determining Weight: Accept rail or truck weights for prebagged material. Own bagged material is controlled by automatic baggers and periodic check with Toledo dial scales.

Time Required to Load 10,000 Tons: 5 - 6 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Metric Ton)</u>
Triple superphosphate	30 metric	Burlap or poly-	Sewn	\$4.82*
Diammonium phosphate	30 metric	propylene with	or heat	4.82*
Mixed fertilizers	30 metric	polyethylene liner	seal	4.82*

*Rate includes all costs except bags, i.e., receiving bags, receiving bulk material, bagging, pallets, palletizing, storage, handling to shipside, and wharfage.

Number of Bagging Machines: 4 (The firm also has four additional bagging machines that are used for domestic bagging. These machines could be used to bag for export if needed. Capacity is 25 to 30 metric tons per hour per machine.)

Route of Fertilizer Movement: Bulk material is received by rail or truck and is delivered either to storage or directly to bagging machines. Bags are palletized at bagging machine and moved either to bag storage or to shipside by forklift or tractor-drawn trailer. Bags are loaded onto vessel by ship's gear or dock cranes and hand stowed by ILA labor.

Method of Determining Weight: Automatic bagging machines (Inglett and Corley). Bags are check weighed from bagging machine with Toledo dial or beam scales.

Bag Damage: Over past 10 years, bag damage has ranged from 0.25 to 0.50 percent. When bagged at terminal, damaged bags are rebagged to specification if proper empty bags are furnished.

Portion of Bagged Material Loaded That is Bagged at This Facility: 99 percent

	<u>STORAGE</u>	
	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	30,000*	10,000
In nearby areas (tons)	0	5,000
Length of time stored (days)	Perpetual stock at all times	10 - 30
Days free time	Not available	Not available
Charges (dollars per ton)	\$0.50 per month	\$0.50 per month for dock storage \$0.75 per month for nearby storage

*Bulk space limited to 3,000 tons for accumulation of material for bagging. Balance of space is used for storage of inbound bulk.

<u>Item</u>	<u>CHARGES</u>		
	<u>Bagged at Terminal (Per Long Ton)</u>	<u>Prebagged (Per Long Ton) Rail</u>	<u>Truck</u>
Stevedoring (f.o.b. stowed, excluding dunnage)	\$4.85	\$4.85	\$4.85
Wharfage	--	\$0.35 net ton	\$0.35 net ton
Handling	--	2.15 net ton	1.41 net ton
Dunnage	Not available	Not available	Not available
Total	\$4.85*	\$7.35	\$6.61

*See "Bagging Facilities" section on previous page for bagging charge and explanation.

LABOR

Length of Work Week: 7 days

Length of Work Day: 8 hours

Overtime Policy: Overtime is for account of party ordering same.

Wage Rates: Not available

FUTURE PLANS

Considering additional bagging capacity and construction of a limited bulk loading facility. Both, however, are subject to a feasibility study.

PROBLEMS

Lack facilities for bulk loading and need additional storage if bulk material is exported. Dock congestion occasionally is problem for bags. Uncoated calcium nitrate and ammonium sulfate, because of their hygroscopic nature, create some handling problems. Biggest problems are (1) insufficient lead time to prepare orders, (2) uncertain arrival of vessels, and (3) chronic shortage of rail cars for delivery of bulk material for bagging.

MISCELLANEOUS

Policies to Prevent Demurrage: Vessels handled on first-come first-serve basis. Close contact and coordination maintained with vessel owner or agent to arrange timely berthing and loading. Rail cars are ordered from point of production as material is needed for bagging.

Source of Material: Ground phosphate rock - Noralyn, Florida
Triple superphosphate and run-of-pile triple superphosphate - Brewster, Pierce, and Rockland, Florida
Diammonium phosphate and mixed fertilizers - Nichols, Bonnie, Bartow, Ridgewood, and Royster, Florida

Months Most Material Shipped: March - June

Ideal Shipping Period: Can ship year-round

Name: International Minerals and Chemicals Phosphate Terminal Company

Location: Tampa, Florida

Type of Facility: Private; also load for other chemical companies under special contracts

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 36 feet

- in Channel: 34 feet

Size of Ship Handled - Average: Fertilizer - 12,000 tons; rock phosphate - 24,000 tons

- Maximum: Fertilizer - 32,000 tons; rock phosphate - 44,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: Fertilizer - 371,000 tons;
rock phosphate - 4,457,000 tons

Maximum Capacity: Fertilizer - 500,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Long Tons Per Hour)</u>
Truck to storage to ship (diammonium phosphate)	Hopper pit, conveyor belt, payloader, automatic scales, traveling gantry, spout	800 for bulk carrier 400 for general cargo vessel
Rail to ship (triple superphosphate)	Hopper pit, conveyor belt, traveling gantry, automatic scales, spout	800 for bulk carrier 400 for general cargo vessel
Rail to ship (rock phosphate)	Hopper pit, conveyor belt, traveling gantry, automatic scales, spout	1,400

Comments: Diammonium phosphate is brought to dock by truck. Triple superphosphate is brought by rail. Diammonium phosphate trucks dump over separate hopper pit to conveyor belt to storage. From storage large front-end payloaders (7-1/2 to 10 cubic yards) take material to large hoppers to conveyor belt system to automatic scales to traveling gantry with telescoping boom and spout to hold of ship. Bulldozers are placed in hold and used to trim vessel. Triple superphosphate follows same route except that it goes directly from rail to conveyor belt system to traveling gantry to telescoping boom and spout to ship's hold. Material falls by gravity from gantry to ship's hold. Mechanical trimmers are not used.

Method of Determining Weight: Automatic electronic Merrick belt scales. Also draft survey each vessel.

Time Required to Load 10,000 Tons: Bulk carrier - 12.5 - 13 hours
General cargo vessel with tween decks - 25 hours

STORAGE

	<u>Bulk</u>
At dock (tons) - for diammonium phosphate	43,000
In nearby areas (tons)	50,000
Length of time stored (days)	35 - 40

CHARGES

Not available.

LABOR

Length of Work Week: 7 days

Length of Work Day: 3 shifts per day, 8-hour shifts

Wage Rates: Chemical workers - \$3.00 per hour straight time plus 7 cents per hour differential for evening shift and 14 cents per hour differential for night shift; \$4.50 per hour for overtime.

FUTURE PLANS

During the last year doubled handling capacity of conveyor belt system. There are no plans for the future.

PROBLEMS

Weather--rainy period is summer months. Run-of-pile triple superphosphate causes problems because it is hard to get out of rail cars.

MISCELLANEOUS

Policies to Prevent Demurrage: IMC coordinates arrival of vessel, production of product, and shipping of product to port. Also use other private ship brokerage firms.

Source of Material: Diammonium phosphate - Bonnie, Florida, 30 miles from Tampa. Transport charge - 95 cents per ton trucked.

Months Most Material Shipped: September and June

Ideal Shipping Period: Winter when less rain

Comments on Dock Ownership, Leasing, Etc.: Private company for company use, plus load for other fertilizer companies under special contracts.

Name: Tampa Stevedoring, Inc.

Location: Tampa, Florida

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet

- in Channel: 30 feet

Size of Ship Handled - Average: 10,000 - 12,000 tons

- Maximum: 15,000 tons

Number of Ships Loaded Simultaneously: 2 if total length of the 2 vessels does not exceed 1,050 feet

Number of Hatches Loaded Simultaneously:

Bagged - usual: 4 - 5 maximum: 8

Quantity of Fertilizer Exported Annually - 1968: 165,000 tons

Maximum Capacity: 240,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Pallet, forklift, ship's gear	45 on older vessels; 56 on new vessels with modern gear

Comments: Bulk material is bagged at dock warehouse. Bagged material is palletized and put in storage until vessel arrives. Forklifts take pallets to shipside where ship's gear is used to lift it into hold where it is hand stowed. Each gang consists of 20 men--12 in hold; ship hand stowing material, 4 on deck of vessel, 2 on dock plus 2 forklift operators. Two sizes of pallets are used--one which holds thirty-six 50-kilogram bags of fertilizer and one which holds 40 bags. Longshoremen open hatches on American flag vessels.

Method of Determining Weight: Automatic scales on baggers plus count pallets and broken bags when loading ship.

Time Required to Load 10,000 Tons: 46.5 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Triple superphosphate or diammonium phosphate	32	Burlap with poly- ethylene liner or polypropylene with polyethylene liner	Sewn	\$2.90
Triple superphosphate or diammonium phosphate	22	Burlap with poly- ethylene liner or polypropylene with polyethylene liner	Bar loop polyethylene liner, sew burlap or polypropylene	3.50

Number of Bagging Machines: 4; only use 3 at one time

Route of Fertilizer Movement: Bulk fertilizer transported to facility by bottom drop rail hopper cars. Fertilizer falls by gravity to hopper pit to portable 36-inch conveyor belts to floor. Then front-end payloaders are used to take material from floor storage to hopper to bagging machine.

Method of Determining Weight: Automatic scales on bagging machine plus check weigh every 40th bag. State and private firm also check weigh bags.

Bag Damage: Burlap with polyethylene liner - 100 bags out of 200,000 bags loaded
Polypropylene bag with polyethylene liner - 4 to 5 bags out of 200,000 bags loaded

Portion of Bagged Material Loaded That is Paged at This Facility: 99 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	Up to 14,000 - 15,000
In nearby areas (tons)	0
Length of time stored (days)	10 - 14
Days free time	Up to 25 depending on quantity stored
Charges (dollars per ton)	\$0.50 per 30-day period after free time expires

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$4.35
Wharfage	.35
Handling (receive, bag, put in storage on pallets)	4.80
Bags	(\$0.41 - .42 per bag)
Total	\$9.50 - 10.00

LABOR

Length of Work Week: 5 days

Length of Work Day: One shift of 8 hours from 8 a.m. until 12 noon and 1 p.m. until 5 p.m.; all other time is overtime at time and a half.

Wage Rates: Baggers and warehouse workers - \$3.25 per hour straight time plus 53 cents per hour for fringe benefits; time and a half for overtime plus 53 cents per hour for fringe benefits

Longshoremen - \$4.60 per hour straight time plus \$1.46 fringe benefits plus \$1.38 per hour overhead; time and a half for overtime of basic wage

FUTURE PLANS

None; expect area to be condemned by Port Authority in future for new construction.

PROBLEMS

Obtaining copy of charter party contract on vessel to know how much the contract calls to be loaded per weather working day, etc. Would like more lead time from AID and more time to get materials bagged, receive bags, etc. Normally, have only two weeks to one month's knowledge to get fertilizer, bags, and bag the fertilizer. Hence, this does not allow any room for problems of getting bags, etc. Lastly, run-of-pile triple superphosphate causes problems because it is hard to get out of rail cars.

MISCELLANEOUS

Policies to Prevent Demurrage: Keep in close contact with supplier and let him know how many tons to ship each day for bagging.

Source of Material: Diammonium phosphate and triple superphosphate - Bartow, Florida

Months Most Material Shipped: January - August

Ideal Shipping Period: Does not matter.

Comments on Dock Ownership, Leasing, Etc.: Private facility for public use. Have contract with Transammonia for bagging AID materials.

Name: U. S. Phosphoric Products, Division of Tennessee Corporation
(Cities Service Oil Company - parent company)

Location: Tampa, Florida

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet

- in Channel : 30 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 21,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 5 maximum: 8

Quantity of Fertilizer Exported Annually - 1968: Bulk - 190,000 tons
bagged - 140,000 tons

Maximum Capacity: 2,500,000 tons of bulk
materials

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Plant storage to ship	Hopper pit, conveyor belt, Jeffrey bulk loader	500

Comments: Bulk material is transported from storage to dock in covered bottom dump hopper rail cars to dump pit to conveyor belt to traveling Jeffry bulk loader to spout and ship's hold. The facility has automatic belt scales on conveyor belt, but these are used to determine approximately how much is loaded in each hold. Rail cars are weighed light and heavy to determine amount loaded. Each fertilizer plant, i.e., diammonium phosphate, triple superphosphate, etc., has its own storage facility as a part of the plant.

Method of Determining Weight: Weigh rail cars light and heavy.

Time Required to Load 10,000 Tons: 20 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Plant to storage to ship	Flatbed truck, pallet, forklift, ship's gear	40

Comments: Fertilizer is bagged at bagging plant and is taken on a conveyor belt to a 40-foot flatbed truck where it is palletized (thirty-six 50-kilogram bags per pallet) and taken to covered storage at dock. Up to 5,000 tons is accumulated in storage before arrival of vessel. The remainder comes directly from bagging machine to dock by truck. This part of the operation is done by company employees. The stevedoring company loads the vessel using forklifts to take material from storage to shipside. Ship's gear lifts pallets from dock into hold where it is hand stowed. One gang of men consists of 18 men. On bagging line there is a meter which automatically counts bags.

Method of Determining Weight: Automatic scales on bagging machine and weigh each bag on scale and count number of bags loaded.

Time Required to Load 10,000 Tons: 10 days (1,000 tons per day)

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Triple superphosphate or diammonium phosphate	33 - 35	10-oz. jute with polyethylene liner	Sewn	Not available
Triple superphosphate or diammonium phosphate	25	Jute with poly- ethylene liner or polypropylene with polyethylene liner	Tipper tie and sewn	Not available
Mixed fertilizers	25	Polypropylene with poly- ethylene liner	Tipper tie and sewn	Not available

Number of Bagging Machines: 2 (Bag 800 tons per day. Only use one bagger at a time. Baggers are movable from plant to plant.)

Route of Fertilizer Movement: Fertilizer is bagged at plant. It is taken from storage to bagger using payloader to hopper to conveyor belt to bagging machine.

Method of Determining Weight: Automatic scales on bagger plus weigh each bag on separate scale

Bag Damage: 1 percent in transferring to storage to ship. Damaged bags are sent back to plant for rebagging.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	5,000
In nearby areas (tons)	125,000	0
Length of time stored (days)	1 week - 2 months	1 week

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not available	Not available
Wharfage	Not available	\$0.35
Bags	XXX	\$6.20 - 7.28
Total	\$1.26 from rail to ship	Not available

LABOR

Length of Work Week: 7 days

Length of Work Day: Three 8-hour shifts per day. Use plant labor to put material in warehouse; use stevedores to load vessel.

Wage Rates: \$2.43 per hour for plant labor with time and a half for overtime.

FUTURE PLANS

Hope to modify bulk loader to expand capacity to be able to load 1,000 tons per hour. Considering putting in storage elevators at dockside for bulk materials in order to handle both trucks and rail cars. Also considering adding storage facilities for 5,000 additional tons of bagged materials.

PROBLEMS

Obtaining sufficient rail hopper cars to transfer bulk materials from plant storage to shiploader. For bagged materials there is a problem of insufficient covered storage at dock. Also have had trouble with mixed fertilizers in polypropylene bags being slippery and hard to stack; bags fall off pallets. The most serious problem is that the company does not receive a copy of the vessel's charter party agreement and, therefore, are not aware of what the contract specifies to be done to fulfill contract. Also on AID shipments, have had trouble with accepting weight certificates showing amount loaded that company can use to obtain credit at bank on AID shipments.

MISCELLANEOUS

Policies to Prevent Demurrage: Obtain vessel ETA from shipping agent and try to order rail cars accordingly.

Source of Material: Tampa, Florida

Months Most Material Shipped: Year-round

Ideal Shipping Period: Can load material year-round, although summer months are less desirable because of rain.

Comments on Dock Ownership, Leasing, Etc.: Private facility with fertilizer plant and dock. The dock has published tariff for public use.

Name: Eastern Associated Terminals (Ohio River Terminal)

Location: Tampa, Florida

Type of Facility: Private; under contract to handle only four companies' rock phosphate shipments to Canada and Mexico.

Fertilizer Handled: Rock phosphate only

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34 feet

- in Channel: 34 feet

Size of Ship Handled - Average: 25,000 tons

- Maximum: 40,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Rock Phosphate Exported Annually - 1968: June 1968 - December 1968 - 300,000 tons

Maximum Capacity: 4,000,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Rail car dumper, hopper pit, conveyor belt, telescoping traveling gantry	3,000
Rail to storage to ship	Rail car dumper, hopper pit, conveyor belt, stacker-reclaimer, telescoping traveling gantry	3,000

Comments: Specially built hopper rail cars, on which the whole top of the car is hinged to open, are rotated by a car dumper. The cars have a special swivel joint coupling which makes it unnecessary to unhook each car as it is dumped. The material falls by gravity into a hopper pit which can hold 500 tons of material. The material goes from pit by conveyor belt to telescoping traveling gantry to ship's hold or alternatively to covered storage. From storage a mechanical stacker-reclaimer feeds it to conveyor belt to gantry. Time requirement to dump car is two minutes including positioning car.

Method of Determining Weight: Merrick electronic belt scales

Time Required to Load 10,000 Tons: 6 hours

STORAGE

	<u>Bulk</u>
At dock (tons)	170,000
In nearby areas (tons)	0
Length of time stored (days)	0 - 7
Days free time	Not available
Charges (dollars per ton)	Not available

CHARGES

Not available.

LABOR

Length of Work Week: 7 days, but partial work crew only on Saturday and Sunday.

Length of Work Day: One shift of 8 hours. The facility is fully automated. Use company personnel rather than longshoremen for loading ships.

Wage Rates: Not available

FUTURE PLANS

None. This is a new fully automated facility. Facility is under contract to four companies to ship rock phosphate to Canada and Mexico. Not interested in handling bulk fertilizers.

PROBLEMS

None. Getting rail cars on time sometimes is a problem but not serious since mines are within a 35-mile radius of Tampa.

MISCELLANEOUS

Comments on Dock Ownership, Leasing, Etc.: Private facility for contract handling of rock phosphate only.

Name: Seaboard Coast Line Railroad Company (Port Tampa Facility)

Location: Tampa, Florida

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34 feet

- in Channel: 34 feet

Size of Ship Handled - Average: 12,000 - 15,000 tons

- Maximum: 26,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 2,971,000 tons including rock phosphate

Maximum Capacity: 3,000,000 tons including rock phosphate

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, traveling gantry, bulldozers	400 - 600 for general cargo vessel 1,200 for bulk carrier

Comments: Bottom drop hopper cars are brought to hopper pit by a car puller. Three cars are dumped simultaneously. Material falls by gravity into eight hopper pits onto a series of horizontal and inclined conveyor belts over a Merrick belt scale to traveling loading chute to hold of vessel. There are two loading chutes at the facility, but only one is used at a time. Material is dropped into loading chute by tipping belt rather than using a belt tripper. On fertilizer materials loaded into general cargo vessels, bulldozers are normally used to trim vessel. Automatic sampling equipment is available at the facility for sampling either rock phosphate or chemical bulk fertilizers. Chemically produced fertilizers account for 1 to 5 percent of the total volume handled at the port.

Method of Determining Weight: Merrick electronic belt scales on conveyor belt

Time Required to Load 10,000 Tons: 10 - 11 hours for bulk carrier
16 - 25 hours for general cargo vessel

STORAGE

None.

CHARGES

Total charges for rock phosphate from mine to aboard ship are \$1.36 per net ton plus 27 cents per net ton if trimmed. Chemical fertilizers (diammonium phosphate and triple superphosphate) - \$2.18 per net ton from plant to hold of ship plus 48 cents per net ton for trimming with bulldozers in hold.

LABOR

Length of Work Week: 7 days

Length of Work Day: Three shifts of 8 hours each. For company employees such as elevator operators, there are three straight-time shifts. For long-shoremen who work both in the rail car dump shed and in loading the vessel, straight time consists of work time between 8 a.m. and 5 p.m. with one hour for lunch. All other time including Saturday, Sunday, and holidays is overtime.

Wage Rates: Company employees - \$3.29 per hour straight time including fringe benefits with time and a half for overtime
 Longshoremen - \$4.00 per hour straight time plus \$1.46 per hour for fringe benefits; \$6.00 per hour overtime plus \$1.46 per hour for fringe benefits

FUTURE PLANS

This facility will be phased out starting April 1970 due to obsolescence of handling equipment. A new facility on East Tampa Bay capable of handling 3,000 tons per hour is now being constructed and will replace this facility.

PROBLEMS

Obsolete equipment makes loading too slow. Run-of-pile triple superphosphate causes unloading problems because the material sets up and is hard to get out of rail cars.

MISCELLANEOUS

Policies to Prevent Demurrage: Materials such as diammonium phosphate, triple superphosphate, and rock phosphate which are produced within a 35-mile radius of the facility are shipped by bottom drop hopper cars to the port. The port can handle approximately 750 cars in its marshalling yard. To load 10,000 tons of material, 150 to 170 cars are required. Once the ETA of the vessel is known, train movement is expedited from mine or plant to port. Rail cars are at port before vessel arrives. It requires approximately eight days to process a vessel once the ETA is firm. However, the authorities feel they are at the mercy of shipping companies in making and coordinating plans. Bulk hopper rail cars are allowed six days free time including Saturday and Sunday at the port for rock phosphate and seven days excluding Saturday and Sunday for diammonium phosphate and triple superphosphate. After free time expires, demurrage charges are \$5 per day per car.

Source of Material: Tampa area, within 35-mile radius of facility

Months Most Material Shipped: Year-round

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: This facility is owned by Seaboard Railroad Company and operated for public use.

Name: Seaboard Coast Line Railroad Company (Seddon Island Facility)

Location: Tampa, Florida

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34 feet

- in Channel: 34 feet

Size of Ship Handled - Average: 20,000 net tons

- Maximum: 43,000 net tons (The facility can accommodate a 700-foot vessel with a 100-foot beam.)

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 3,700,000 tons including rock phosphate

Maximum Capacity: 4,000,000 tons including rock phosphate

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, traveling gantry	Bulk carrier - 1,500
Rail to ship	Hopper pit, conveyor belt, traveling gantry, bulldozers	General cargo vessel with tween decks - 400 to 600

Comments: Bottom dump rail cars are brought to hopper pit by rail car puller. Three bottom-drop-type hopper cars are dumped simultaneously. The bulk material (fertilizer or rock phosphate) falls by gravity into hopper pits to a series of horizontal and inclined 42-inch conveyor belts over a Merrick belt scale to a traveling gantry to a loading boom and loading spout and falls by gravity into the ship's hold. The bulk loader is not equipped with a trimmer. If ship is to be trimmed, bulldozers are used. Loading is stopped while the ship is being trimmed.

Method of Determining Weight: Merrick electronic belt scales

Time Required to Load 10,000 Tons: 7 - 10 hours for a bulk carrier;
16 - 25 hours for a general cargo vessel

STORAGE

None.

CHARGES

Total charges for bulk are \$1.36 per net ton for rock phosphate from mine to aboard ship plus 27 cents per net ton if trimmed; chemical fertilizers, \$2.18 per net ton from plant to hold of ship plus 48 cents per net ton for trimming with bulldozer.

LABOR

Length of Work Week: 7 days

Length of Work Day: 2 shifts, 12 hours per shift; 8 hours straight time and 4 hours overtime when loading ship

<u>Wage Rates:</u> Elevator operators	- \$3.09 per hour straight time including fringe benefits with time and a half for overtime
Laborers at car dump	- \$2.89 per hour straight time including fringe benefits with time and a half for overtime
Longshoremen	- \$4.00 per hour straight time plus \$1.46 per hour for fringe benefits with time and a half for overtime

FUTURE PLANS

This facility will be phased out starting in April 1970 and will be replaced with a new bulk loading facility at East Tampa Bay. The facility will be kept on standby to take care of extra heavy movement periods if needed.

PROBLEMS

None.

MISCELLANEOUS

Policies to Prevent Demurrage: The port has a rail car marshalling yard capable of holding 700 hopper rail cars. After the ship's ETA is known, the necessary number of hopper cars are assembled in the marshalling yard before the arrival of the vessel so that all material is at the port to be loaded on a continuous basis.

Source of Material: Within a 35-mile radius of port

Months Most Material Shipped: All year

Ideal Shipping Period: Other than summer rainy months

Comments on Dock Ownership, Leasing, Etc.: The port is owned and operated by the Seaboard Coast Line Railroad Company. Stevedores (longshoremen) are hired by the day to load vessels.

Name: Seaboard Coast Line Railroad Company (East Tampa Bay Facility*)

Location: Tampa, Florida

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34 plus feet MLW

- in Channel: 34 feet MLW

Size of Ship Handled - Average: None to date

- Maximum: Will be able to handle ships up to
65,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: None

Maximum Capacity: 10,000,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship direct	Rotary car dumper, conveyor belt, shiploader	3,000
Rail to storage to ship	Rotary car dumper, conveyor belt, stacker-reclaimer, shiploader	3,000

*This facility is currently under construction, to be completed by April 1970. All loading rates are based on anticipated capacity.

Comments: All bulk material will arrive by special hinged-roof hopper cars, dumped by rotary car dumper and car positioner into hoppers, through 54-inch belt conveyors to either storage or directly to ship. Stored material is placed in storage and reclaimed by two mechanical stacker-reclaimers. All material is transported to vessel over belt conveyors to belt tripper to traveling shiploader to ship's hold.

Method of Determining Weight: Two Merrick electronic belt scales

Time Required to Load 10,000 Tons: 3 - 3.75 hours

STORAGE

	<u>Bulk</u>
At dock (tons)	148,000
In nearby areas (tons)	0
Length of time stored (days)	Not available
Days free time	Not available
Charges (dollars per ton)	Not available

CHARGES

<u>Item</u>	<u>Bulk</u>	
	<u>Rock Phosphate (Per Ton)</u>	<u>Diammonium Phosphate and Triple Superphosphate (Per Ton)</u>
All charges, from mines to f.o.b. vessel, except trimming	\$1.36	\$2.18
Trimming (if required or requested)	.27	.48

LABOR

Length of Work Week: 7 days

Length of Work Day: Three 8-hour shifts

Overtime Policy: If required, overtime costs are assumed by Seaboard. Any time exceeding normal 8-hour shift, Saturday, Sunday, and holidays are considered overtime.

Wage Rates:* Elevator engineers - \$3.09 - 3.29 per hour straight time including fringe benefits
 Laborers .. \$2.89 per hour straight time including fringe benefits
 ILA laborers - \$4.00 per hour straight time plus \$1.46 fringe benefits
 \$6.00 per hour overtime plus \$1.46 fringe benefits

FUTURE PLANS

Since facility is still under construction, there are no definite plans for expansion. At a later date, facility may be expanded to handle two vessels, and belt speed may be increased to load 4,000 tons per hour.

PROBLEMS

No experience.

MISCELLANEOUS

Policies to Prevent Demurrage: Constant communications will be maintained with the ship's agents and the suppliers to coordinate arrival of material. Since the facility is owned by a railroad, many of the problems associated with shipment of material are eliminated. Moreover, with the volume of storage available and the rate of loading, they do not anticipate any great problems with demurrage.

*Wage rates listed above are based on rates paid at other Seaboard facilities and are subject to negotiation with two different unions prior to initial operation.

Source of Material: All material originates in the Bartow, Florida, area.

Months Most Material Shipped: No experience

Ideal Shipping Period: Will be able to load year-round

Comments on Dock Ownership, Leasing, Etc.: The facility is owned and operated by Seaboard Coast Line Railroad. Material from a number of major phosphate producers will be handled at this dock.

Name: Pensacola Port Authority

Location: Pensacola, Florida

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: No (Portable bagging machines could be moved in if need arose.)

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

- in Channel: 33 feet

Size of Ship Handled - Average: 3,000 long tons

Number of Ships Loaded Simultaneously: 2

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 3 maximum: 4

Quantity of Fertilizer Exported Annually - 1968: 870 long tons

Maximum Capacity: 24,000 long tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Portable hopper, portable conveyor belt	50 long

Comments: Bulk material arrives in bottom drop hopper cars. Cars are positioned alongside ship at dock. Portable hoppers and conveyor belts are used to load directly into the ship's hold.

Method of Determining Weight: Rail bills of lading

Time Required to Load 10,000 Tons: 180 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Forklift, pallet, ship's gear	30 - 35 long
Truck to storage to ship	Forklift, pallet, ship's gear	30 - 35 long

Comments: Bags are palletized when they arrive at dock and moved into storage by forklift. For vessel loading, bags and pallets are reclaimed by forklift and moved to shipside for loading with ship's gear.

Method of Determining Weight: Truck weights and rail bills of lading

Time Required to Load 10,000 Tons: 95 - 110 hours

Bag Damage: Nil

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (long tons)	1,500	2,000
In nearby areas (tons)	0	0
Length of time stored (days)	Not available	Less than 15
Days free time	Not available	15
Charges (dollars per ton)	Not available	\$0.10 first 7 days \$0.15 second 7 days \$.75 per month thereafter

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>	
		<u>Ammonium Nitrate</u>	<u>Other Fertilizers</u>
Stevedoring	Not available	\$ 7.50 - 8.00	\$4.70
Wharfage	Not available	.35	.35
Handling	Not available	2.45	1.85
Bagging	XXX	Not applicable	Not applicable
Bags	XXX	Not applicable	Not applicable
Total	Not available	\$10.30 - 10.80	\$6.90

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours, one shift

Overtime Policy: Use as needed, 1-1/2 times regular wage

Wage Rates: Warehouse workers - \$2.50 per hour straight time
 Forklift operators - \$2.75 per hour straight time
 Longshoremen - \$4.25 per hour straight time (\$8.50 per hour straight time for loading ammonium nitrate)

FUTURE PLANS

Additional 90,000 square feet of warehouse storage to be completed by June 1970. If business warranted, would add bagging facilities at dock.

PROBLEMS

Volume of business is too low to warrant additional facilities for handling fertilizer.

MISCELLANEOUS

Source of Material: Ammonium nitrate from Monsanto, Luling, Louisiana, and Escambia Chemical, Pace, Florida

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: Dock is owned and operated by the City of Pensacola. Pate Stevedore Company, Walsh Stevedoring Company, Inc., and Pensacola Stevedoring Company handle fertilizer shipments.

Name: Walsh Stevedoring Company, Inc.

Location: Mobile, Alabama

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 40 feet

Size of Ship Handled - Average: 10,000 - 12,000 tons

- Maximum: Not available

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: Not available maximum: Not available

Bagged: Depends on number of hatches on vessel

Quantity of Fertilizer Exported Annually - 1968: None

Maximum Capacity: Not available

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt	100
Barge to ship	Dock crane, clamshell, hopper, conveyor belt	200
Storage to ship	Fayloader, hopper, conveyor belt	Not available

Comments: Bulk material arrives in gate-type hopper cars or barges. Rail cars are positioned over hopper pit where material falls into conveyor belt system, moving directly to ship. Material arriving by barge is unloaded by dock crane and clamshell, placed into hopper and conveyor belt system to ship.

Method of Determining Weight: Rail weights and draft surveys on barges and vessels

Time Required to Load 10,000 Tons: 10 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear	40

Method of Determining Weight: Automatic scales on bagging machines and check weigh bags

Time Required to Load 10,000 Tons: Not available

BAGGING FACILITIES

Number of Bagging Machines: 2 with 25-ton per hour capacity

Route of Fertilizer Movement: Bulk material is received by rail or barge, moved to bagging machines through hoppers and conveyor belts. Bags are palletized and moved to storage for later loading.

Method of Determining Weight: Automatic scales on bagging machines, check weigh bags on platform scales.

Bag Damage: Estimated at 0.5 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: Not available

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	200	10,000
In nearby areas (tons)	0	Available - quantity depends on volume of other cargo
Length of time stored (days)	Not available	Not available
Days free time	Not available	Not available
Charges (dollars per ton)	\$0.50 per month	\$0.50 per month

CHARGES

Not available.

LABOR

Length of Work Week: 5 days

Length of Work Day: Not available

Overtime Policy: If authorized by customer, men work.

Wage Rates: Not available

FUTURE PLANS

None.

PROBLEMS

Indicated that bulk created handling problems, but did not specify.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Not available

Months Most Material Shipped: Winter

Ideal Shipping Period: Fertilizer can be loaded year-round.

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	20 - 30	Burlap, poly- ethylene liner	Bar loop and sewn	\$6.50
Ammonium phosphate	30 - 40	Burlap, poly- ethylene liner	Sewn	4.05
Mixed fertilizers	30 - 40	Burlap, poly- ethylene liner	Sewn	4.05

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk material is received by rail, truck, and barge. Moved through conveyor system to bagging machines, palletized at bagging machine, and moved to storage by forklift.

Method of Determining Weight: Automatic scales on bagging machines, check weigh one out of every 20 bags on platform scale.

Bag Damage: Estimated at 0.5 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: 40 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	26,000
In nearby areas (tons)	0
Length of time stored (days)	Not available
Days free time	10, including Saturday, Sunday, and holidays
Charges (dollars per ton)	*

*After free time, 7.5 cents per ton for first 7 days, 10 cents per ton second 7 days, and 60 cents per ton for next 30 days.

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>	
	<u>Urea</u>	<u>Other Materials</u>
Stevedoring	\$ 3.40 - 3.70	\$ 3.15 - 3.70
Wharfage	.28	.25
Bagging	6.50	4.05
Bags	6.20 - 7.00	6.20 - 7.00
Pallet rent	.12	.12
Total	\$16.50 - 17.60	\$13.77 - 15.12

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours

Overtime Policy: Used only when authorized by fertilizer company or ship owner.

Wage Rates: Not available

FUTURE PLANS

Additional dock space added in May 1969. Also adding two more bagging machines and three more hopper bins. Anticipate barging bulk material from Triad Chemical for bagging at this facility.

PROBLEMS

None indicated.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Major share of material comes from Coastal Chemical Corporation.

Months Most Material Shipped: June - January

Ideal Shipping Period: June - January

Name: Walsh Stevedoring Company, Inc.

Location: Gulfport, Mississippi

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 29 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 15,000 tons

Number of Ships Loaded Simultaneously: Up to 5

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 maximum: 7

Quantity of Fertilizer Exported Annually - 1968: 175,000 tons

Maximum Capacity: 200,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear	45

Method of Determining Weight: Automatic scales on bagging machines

Time Required to Load 10,000 Tons: 45 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	20	Burlap, poly- ethylene liner	Tipper tie and sewn	\$6.50
Diammonium phosphate	30	Burlap, poly- ethylene liner	Sewn	3.80

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk material arrives by rail and by barge, moved directly to bagging machines (or to temporary storage area near bagging machines). Bags are palletized and moved to storage for subsequent loading.

Method of Determining Weight: Automatic scales on bagging machine, check weigh bags periodically.

Bag Damage: Estimated at 0.25 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	12,000 - 15,000
In nearby areas (tons)	0
Length of time stored (days)	Not available
Days free time	15*
Charges (dollars per ton)	\$0.50 per month

*If over 5,000 tons, 30 days.

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$4.50
Wharfage and handling	.62
Bagging	\$3.80 - 6.50
Bags	Not available
Total	\$8.92 - 11.62

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours

Overtime Policy: Paid by customer

Wage Rates: \$4.00 per hour straight time

FUTURE PLANS

New storage shed and pier completed in May 1969.

PROBLEMS

Could handle larger volume.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Not available

Months Most Material Shipped: Fall and winter

Ideal Shipping Period: Fall and winter

Comments on Dock Ownership, Leasing, Etc.: Facility is currently not operational due to hurricane damage.

Name: Atlantic and Gulf Stevedores, Inc.

Location: Desire Street Wharf, New Orleans, Louisiana

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 39 - 42 feet

Size of Ship Handled - Average: 8,000 - 10,000 tons

- Maximum: 15,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: Not available

maximum: Not available

Bagged - usual: 4

maximum: 8

Quantity of Fertilizer Exported Annually - 1968: 750,000 tons

Maximum Capacity: 2,500,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, spout	400
Barge to ship	Dock crane, clamshell	100

Method of Determining Weight: Scale weights of rail cars, loaded and empty; and draft survey on barges.

Time Required to Load 10,000 Tons: 48 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear	45
Bagging machine to ship	Forklift, pallet, ship's gear	45
Rail to ship (prebagged)	Forklift, pallet, ship's gear	45

Method of Determining Weight: Automatic scales on bagging machines.
Rail bills of lading on prebagged material.

Time Required to Load 10,000 Tons: 64 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	45	Jute, poly- ethylene liner	Tipper tie and sewn	\$4.00*
Diammonium phosphate	45	Jute, poly- ethylene liner	Tipper tie and sewn	4.00*
Mixed fertilizers	45	Jute, poly- ethylene liner	Tipper tie and sewn	4.00*

*Includes 20 cents additional charge per ton for tipper tie.

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk material is received by rail, truck, or barge; transferred directly to bagging machines by conveyor belts and hoppers. Small quantities of bulk may be moved from storage to bagging machines by payloader and conveyor belts. Bagged material is palletized and usually moved to storage by forklift for later loading. Occasionally, bagged material may be moved directly from bagging machine to dock to ship.

Method of Determining Weight: Automatic scales on bagging machines. Check weigh one out of every 20 bags.

Bag Damage: Estimated at 0.25 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: 50 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	1,500	11,000
In nearby areas (tons)	0	1,500
Length of time stored (days)	Less than 72 hours	21
Days free time	Not available	Not available
Charges (dollars per ton)	No charge	Not available

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$1.00	\$5.00
Wharfage and handling	.50	1.00
Bagging	XXX	4.00
Bags	XXX	\$6.80 - 8.00
Total	\$1.50	\$16.80 - 18.00

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours

Overtime Policy: At expense of customer

Wage Rates: Not available

FUTURE PLANS

Anticipate addition of another bagging plant of same capacity of present facility. May also add additional bagging machine to present facility.

PROBLEMS

Labor is biggest problem. Hygroscopic nature of urea is also a problem.

MISCELLANEOUS

Policies to Prevent Demurrage: Continuous coordination between concerned parties.

Source of Material: Urea comes from Donaldsonville, Louisiana

Months Most Material Shipped: May - January

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: A substantial portion of their activity is through contract loading for Gulf Oil.

Name: Public Bulk Terminal of New Orleans

Location: New Orleans, Louisiana

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 36 feet

- in Channel: 36 feet

Size of Ship Handled - Average: 20,000 tons

- Maximum: 35,000 tons

Number of Ships Loaded Simultaneously: 2

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 if using bulk terminal facilities and loading from barges

- maximum: 2 if loading from rail cars

Quantity of Fertilizer Exported Annually - 1968: 47,000 tons

Maximum Capacity: 200,000 - 300,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Barge to ship*	Traveling gantry, clamshell	400 - 600
Barge to ship	Floating crane (not at bulk loader) clamshell, portable hopper, trimmer	100 - 150
Rail to ship	Hopper pit, conveyor belt, traveling gantry, spout, trimmer	600

*Most material is loaded from barge to ship rather than rail to ship because transportation costs to New Orleans are less by barge than by rail.

Comments: Barge to ship using bulk terminal facilities: Barges are unloaded by clamshell which takes 8 to 10 tons per lift. The clamshell loads directly from barge to ship. The barge is moored either alongside the vessel or in a barge channel on the opposite side of the dock. Although the gantry and clamshell have a capacity of 1,000 tons per hour, the actual rate from barge is only 400 to 600 tons per hour. If barge cranes are used, the same procedure is followed. Bulldozing is used to clean barge and trim vessel. Rail to ship: Fertilizer falls by gravity from bottom dump hopper cars to pit to conveyor belt to traveling gantry to spout to mechanical trimmer to hold.

Method of Determining Weight: Draft survey when loading from barges. Accept rail bills of lading when loading from rail cars.

Time Required to Load 10,000 Tons: Rail to ship - 16 - 20 hours
Barge to ship - bulk carrier, 40 hours
Barge to ship - tween deck, 60 hours

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>
Wharfage	\$0.18
Handling	Ammonium sulfate - \$0.90 Phosphate - \$0.22
Total (all charges)	\$0.90 - 1.65 for bulk carriers \$1.25 - 1.90 for tween deck vessels \$2.30 from barge to vessel, including trimming, using floating crane \$1.55 from rail to vessel

LABOR

Length of Work Week: 5 days

Length of Work Day: 20 hours, 2 shifts; first shift works 10 hours, second shift, 11 hours but lose one hour per day for meal times

Overtime Policy: All work before 8 a.m., between 12 noon and 1 p.m., and after 5 p.m. from Monday through Friday is overtime at time and a half. Holidays, Saturday, and Sunday are at overtime rate.

Wage Rates: Straight time - \$6.92 per hour including fringe benefits
Overtime - \$9.64 per hour including fringe benefits

On loading bulk carriers use 8 men--2 gangs of 4 men each. On loading tween deck general cargo vessels, use 10 to 11 men per gang.

FUTURE PLANS

None for fertilizer. Have plans to expand amount of open storage available.

PROBLEMS

Types of ships that carry bulk fertilizer are mostly tween deck vessels which are harder and slower to load. Loading would be more efficient with bulk carriers. Switching of barges is sometimes slow, thus slowing down loading. If fertilizer could be moved from barge to conveyor belt to gantry to spout to hold, loading would be speeded up. Ammonium sulfate is highly corrosive and very objectionable. If a large quantity were moved through the port, the port would consider putting an embargo against its movement.

MISCELLANEOUS

Policies to Prevent Demurrage: Interested parties keep well informed on ETA of vessel. All material coming by barge is at port when vessel arrives normally.

Source of Material: Ammonium sulfate, Chicago and steel mills along the Ohio and Mississippi Rivers; urea, Mississippi River plants; diammonium phosphate, Mississippi River plants at Taft, Louisiana; bulk urea has been outloaded from New Orleans.

Months Most Material Shipped: All year

Ideal Shipping Period: Doesn't matter

Comments on Dock Ownership, Leasing, Etc.: The bulk loading facility is owned and operated by the Port of New Orleans.

Name: Occidental Chemical Corporation

Location: Taft, Louisiana

Type of Facility: Private

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 50 feet

- in Channel: 50 feet

Size of Ship Handled - Average: 10,000 - 15,000 tons

- Maximum: 20,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 1 maximum: 3

Quantity of Fertilizer Exported Annually - 1968: 196,000 tons

Maximum Capacity: 300,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Storage to ship	Conveyor belt, trimmer	170

Comments: The production plant is located at dock. Material is transferred from production plant to large bulk storage facility by conveyor belt. From storage material is moved with permanent elevators and conveyor belts to ship's hold where a portable trimmer is used for trimming.

Method of Determining Weight: "Hardy" batch scale that prints weight is located on the conveyor belt at the dock. National Cargo Bureau checks deadweight of ship before and after loading.

Time Required to Load 10,000 Tons: 2.5 days (24-hour day)

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to ship	Conveyor belt*	70

Comments: *The bagging machine is located adjacent to the bulk storage. After bagging, bags are dumped from sewing machine onto a conveyor belt (same belt is used for both bagged and bulk) that transfers bags to ship-side where they are transferred onto a portable belt that dumps bags onto a reverse banana unloader that lowers bags into hold of ship where it is palletized or stacked. If preferable, bags can be palletized on the dock as bags come off the permanent conveyor belt and lowered into hold of ship with dock crane or ship's gear.

Method of Determining Weight: Electric eye counter on conveyor belt located at the dock end of belt. National Cargo Bureau also checks deadweight of ship before and after loading.

Time Required to Load 10,000 Tons: 10 days (16-hour day); bagging is the effective upper limit.

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Diammonium phosphate	24	Not available	Sewn	Not available

Number of Bagging Machines: 3

Route of Fertilizer Movement: Material moves from production plant to bulk storage by conveyor belt. Transferred by permanent elevators to a small holding bin above the bagging equipment.

Method of Determining Weight: Automatic scales on bagging machines which are checked periodically by check weighing bags.

Bag Damage: None

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	38,000	0
In nearby areas (tons)	0	0

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Bags	\$6.00

LABOR

Length of Work Week: 5 days

Length of Work Day: Three 8-hour shifts for bulk, two 8-hour shifts for bagged.

Overtime Policy: Overtime in addition to normal shift differential is paid only on weekends. If used, it is at request of ship's company and paid by them.

Wage Rates: Not available

FUTURE PLANS

Plans are to install a tipper tie machine(s) that can handle 70 tons per hour.

PROBLEMS

A minor problem exists in coordinating outshipments of fertilizers with imports of raw solid materials since raw materials are normally shipped in by barge and move through the same dock facilities.

MISCELLANEOUS

Policies to Prevent Demurrage: Attempt to coordinate normal charter party regulations with unloading of incoming raw material.

Source of Material: Plant located near dock

Months Most Material Shipped: In off-domestic months

Comments on Dock Ownership, Leasing, Etc.: Dock owned by Occidental for their own private use.

Name: Ramsay, Scarlett and Company, Inc. (Burnside Bulk Marine Terminal)

Location: Burnside, Louisiana

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 40 feet

- in Channel: 40 feet

Size of Ship Handled - Average: 10,000 long tons

- Maximum: 60,000 long tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 2 maximum: 2

Quantity of Fertilizer Exported Annually - 1968: 44,300 long tons

Maximum Capacity: 1,000,000 long tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Barge to ship	Gantry crane, clamshell, conveyor belt, stationary shiploader	600

Comments: Two gantry cranes with clamshell buckets unload from barges to hoppers on cranes to conveyor belt to shiploader to vessel.

Method of Determining Weight: Electronic belt scale

Time Required to Load 10,000 Tons: 16 - 17 hours

STORAGE

	<u>Bulk</u>
At dock (tons)	0
In nearby areas (tons)	0
Length of time stored (days)	Not applicable
Days free time	Not applicable
Charges (dollars per ton)	Not applicable

CHARGES

Not available.

LABOR

Length of Work Week: 7 days

Length of Work Day: Three 8-hour shifts

Wage Rates: Not available

FUTURE PLANS

None.

PROBLEMS

No storage for fertilizer. Urea and ammonium sulfate are no longer handled due to their corrosive nature.

MISCELLANEOUS

Policies to Prevent Demurrage: First come, first served

Ideal Shipping Period: Fertilizer can be loaded year-round.

Comments on Dock Ownership, Leasing, Etc.: Terminal is owned by the Greater Baton Rouge Port Commission, leased by Olin Corporation, and operated by Ramsay, Scarlett and Company, Inc.

Name: Triad Chemical

Location: Donaldsonville, Louisiana

Type of Facility: Private

Fertilizer Handled: Bulk (Facility is under construction, to be completed by April 1970.)

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

- in Channel: 100 feet

Size of Ship Handled: None handled as yet

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: None

Maximum Capacity: 400,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Plant to storage to ship	Payloader, hopper, conveyor belt, shiploader	150

Comments: Urea will be only material loaded. Urea will be moved from plant to 40,000-ton storage silos by conveyor belts and elevators. Material will be reclaimed with 5-yard front-end loader to above ground hopper to conveyor belt to stationary bulk loader to spout to slinger. Electric ship puller will be used to position vessel.

Method of Determining Weight: Draft survey

Time Required to Load 10,000 Tons: 65 - 70 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	20	Burlap, poly- ethylene liner	Sewn and tipper tie	Not available

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk urea is moved from storage by payloader to hopper to conveyor belt to bagging machines.

Method of Determining Weight: Automatic scales on bagging machines, check weigh with platform scales.

Bag Damage: Not available

Portion of Bagged Material Loaded That is Bagged at This Facility: Present plans call for all bagged material to be used domestically. Long-range plans include facilities for loading bags for export.

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	40,000	1,000
In nearby areas (tons)	0	0
Length of time stored (days)	Not applicable	Not applicable
Days free time	Not applicable	Not applicable
Charges (dollars per ton)	Not applicable	Not applicable

CHARGES

Not available.

LABOR

Length of Work Week: 7 days - planned

Length of Work Day: Three 8-hour shifts - planned

Wage Rates: \$2.90 - \$3.75 straight time

FUTURE PLANS

Long-range plans call for bagged loading facility. Will use bulk conveyor system to move bags to ship, then employ a device for lowering bags into hold of ship. They are looking at a number of alternative lowering devices, including a spiral down spout.

PROBLEMS

Weather.

MISCELLANEOUS

Source of Material: All material loaded will be from their own plant.

Months Most Material Shipped: No material shipped as yet.

Ideal Shipping Period: April - December

Name: Greater Baton Rouge Port Commission

Location: Baton Rouge, Louisiana

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 40 feet

Size of Ship Handled - Average: 3,000 tons

- Maximum: 5,000 tons

Number of Ships Loaded Simultaneously: 2 bagged

Number of Hatches Loaded Simultaneously:

Bagged - usual: 3 maximum: All, if labor available

Quantity of Fertilizer Exported Annually - 1968: 38,000 tons (new facility for fertilizer in 1968)

Maximum Capacity: 60,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail or truck to storage to ship	Forklift, pallet, ship's gear, dock crane	30

Comments: Bagged material arriving by rail is palletized and placed in transit storage. Material arriving by truck is normally already palletized. From storage it is taken to ship by forklift where it is transferred to ship's hold using ship's gear or dock crane and hand stowed. All material is placed in storage prior to arrival of vessel. Usually accept 32 rail cars per day of bagged material.

Note: Port has two docks for handling fertilizers.

Method of Determining Weight: Accept truck or rail bills of lading

Time Required to Load 10,000 Tons: 4 - 5 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	23	Burlap, poly- ethylene liner	Tipper tie and sewn	\$5.25
Ammonium sulfate	28	Burlap	Sewn	4.10

Number of Bagging Machines: 2

Route of Fertilizer Movement: Rail to bagging machine. The facility is currently installing a new bagging facility with a capacity for handling 500 tons per hour.

Method of Determining Weight: Automatic scales on bagging machine and check weigh every 25th bag on independent platform scale. State inspector also check weighs bags.

Bag Damage: On material bagged at plant, negligible while loading ship; on material shipped to port by rail or truck, 1 to 2 percent. Damaged bags are returned to Borden plant.

Portion of Bagged Material Loaded That is Bagged at This Facility: 50 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	5,000
In nearby areas (tons)	Not available
Length of time stored (days)	15
Days free time	15
Charges (dollars per ton)	\$0.07 per day after free time

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$ 5.09
Wharfage	.35
Handling (unloading rail car or truck)	1.51
Bagging	5.25
Total	\$12.20 (average)

LABOR

Length of Work Week: 5 days, 1 shift per day

Length of Work Day: 8 hours

Overtime Policy: Port encourages use of overtime. Whether overtime is used depends on vessel.

Wage Rates: \$5.09 per hour for longshoremen

FUTURE PLANS

Would like to build another dock if money is available. Have already floated bond to get money to put in a bulk handling facility.

PROBLEMS

No storage for bulk materials and lack of storage for more than 5,000 tons of bagged materials. Port would rather move five 1,000 tons of material than one shipment of 10,000 tons.

MISCELLANEOUS

Policies to Prevent Demurrage: Obtain name of vessel and estimated time of arrival (ETA) prior to accepting cargo to be shipped.

Source of Material: Tennessee and Louisiana

Comments on Dock Ownership, Leasing, Etc.: Bagging facility is operated by private firm. Port supplies building.

Name: Port of Lake Charles

Location: Lake Charles, Louisiana

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 40 feet

Size of Ship Handled - Average: 10,000 - 15,000 tons

- Maximum: 23,000 tons

Number of Ships Loaded Simultaneously: 1 bulk and 8 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: All hatches

Quantity of Fertilizer Exported Annually - 1968: 15,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, bulk loader	750

Comments: Bulk fertilizer would be transported to port by bottom dump rail cars. The material would move from rail car to hopper pit to conveyor belt to bulk loader to ship. The port has storage facilities for rock phosphate which consist of twelve 1,800-ton capacity silos, but these would not be used for fertilizer storage.

Note: The port has bagging facilities but has closed the operation down due to increased costs. The port is not interested in handling fertilizers due to large amount of other materials and goods going through the port, particularly grain and food products.

Method of Determining Weight: Automatic scales on conveyor belt

Time Required to Load 10,000 Tons: 1 day

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Forklift, pallet, ship's gear	40

Comments: Previously, bulk material was bagged at the port, palletized, put into storage, and then loaded onto ship using forklift and ship's gear.

Method of Determining Weight: Automatic scales on bagging machine plus count bags loaded

Time Required to Load 10,000 Tons: 5 days

BAGGING FACILITIES

Formerly bagged urea, but no longer in operation due to high operating costs.

Number of Bagging Machines: 2

Method of Determining Weight: Automatic scales on bagging machine plus check weigh every 20th to 25th bag

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent when bagging facility was in operation.

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	None for chemical fertilizer	50,000
In nearby areas (tons)	0	100,000 plus
Length of time stored (days)	Not applicable	15
Days free time	Not applicable	15
Charges (dollars per ton)	Not applicable	\$0.07 per day after free time for first 15 days, then \$0.14 per day

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Wharfage	\$0.35	\$0.35
Total	Not available	Not available

LABOR

Length of Work Week: 7 days

Length of Work Day: 8 hours

Overtime Policy: All labor after 4 p.m. is overtime.

Wage Rates: Not available

FUTURE PLANS

Expanding storage facilities.

PROBLEMS

Have bagged urea at this facility but had difficulties with it due to hygroscopic nature. Henceforth, the port will only handle urea or other fertilizers if they need the business. Will not store fertilizers in same warehouses as other food products which are the main products handled.

Name: Hydrocarbon Products Company, Inc.

Location: Port Arthur, Texas

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

- in Channel: 65 feet

Size of Ship Handled - Average: 6,000 tons

- Maximum: 20,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: 20,000 tons of urea

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Barge to ship	Dock crane, clamshell, hopper, conveyor belt, trimmer	100
Storage to ship	Payloader, hopper, conveyor belt, trimmer	100

Method of Determining Weight: Belt scales and draft surveys

Time Required to Load 10,000 Tons: Thirteen 8-hour days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear	50
Bagging machine to ship	Forklift, pallet, ship's gear	50

Method of Determining Weight: Count bags

Time Required to Load 10,000 Tons: 5 days (8-hour day)

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	50	Burlap, poly- ethylene liner	Bar loop and sewn	Not available

Number of Bagging Machines: 1

Route of Fertilizer Movement: Materials can move directly from rail or truck to bagging or from bulk storage to bagging. From bagging, bags normally move into storage but can go directly to ship.

Method of Determining Weight: Batch weigh at bagging and check weigh every tenth bag.

Bag Damage: Less than 1 percent and it is rebagged and shipped

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	700	5,000
In nearby areas (tons)	0	0

CHARGES

Not available.

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours - 1 shift

Overtime Policy: Dock pays overtime for bagging; ship pays overtime for loading.

Wage Rates: Not available

FUTURE PLANS

Additional storage for bulk material is under consideration to reduce the demurrage charges where material is held in rail cars.

PROBLEMS

Labor is a problem. With recent dock strikes and sympathy strikes, it has been difficult to keep labor on job when loading boats. Demurrage has been running high since cars are used for storing materials until ships are ready to load.

MISCELLANEOUS

Policies to Prevent Demurrage: Attempt to coordinate timing of barge and rail receipts with arrival of ships.

Source of Material: Kerens, Texas; Pryor, Oklahoma; El Dorado, Arkansas; Lake Charles, Louisiana

Months Most Material Shipped: No seasonal pattern

Name: Port of Beaumont

Location: Beaumont, Texas

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 34 feet

- in Channel: 36 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 20,000 tons (Have only handled one 5,000-ton shipment of fertilizer out of this port in 1969.)

Number of Ships Loaded Simultaneously: 3

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 maximum: 6

Quantity of Fertilizer Exported Annually - 1969: 5,000 long tons

Maximum Capacity: 300,000 long tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to storage to ship	Forklift, pallet, wagon, ship's gear	30 - 35 long

Comments: Fertilizer is bagged at the port. Bagged fertilizer is palletized and placed in transit storage. When vessel arrives, pallets are placed on wagons (two per wagon) and a train of 8 to 10 wagons is used to transfer material to dock. Forklifts and ship's gear are used to place fertilizer in hold of vessel where it is hand stowed. If transit storage space is not available, fertilizer moves directly from bagging machine to vessel.

Time Required to Load 10,000 Tons: 64 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	25 - 33	Burlap, poly- ethylene liner	Bar loop and sewn	\$5.90
Other fertilizers	25 - 33	Jute	Sewn	4.95
Other fertilizers	25 - 33	Paper	Sewn	5.20

Number of Bagging Machines: 2

Route of Fertilizer Movement: Fertilizer moves from bottom dump rail car to hopper pit to conveyor belt to hopper to bagging machines.

Method of Determining Weight: Sample weigh every 25th bag plus automatic scales on bagger plus count pallets used and bags loaded

Bag Damage: Less than one-half of 1 percent. Potassium sulfate was found to be the worst material to bag because used paper bags which tore. Damaged material is rebagged.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	10,800
In nearby areas (tons)	0
Length of time stored (days)	14
Days free time	30
Charges (dollars per ton)	\$0.05 per day for first 7 days after free time, \$0.07 per day for next 7 days, then \$0.10 per day thereafter, if 3,000 tons or more

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$ 5.00
Wharfage	.40
Bagging	5.90
Total	\$11.50

LABOR

Length of Work Week: 5 days - one shift per day

Length of Work Day: 8 hours - 8 a.m. until 5 p.m.

Overtime Policy: Used as needed

Wage Rates: \$7.15 per hour straight time including fringe benefits
5 days per week from 8 a.m. until 5 p.m. with one hour off for lunch.
All other time is at time and a half (about \$9.15 per hour for overtime).

FUTURE PLANS

If business warranted, would consider putting in bulk handling facilities.

PROBLEMS

None. Lack of business is the only problem. Had expected to bag much more fertilizer than has materialized.

MISCELLANEOUS

Policies to Prevent Demurrage: Accept six cars per day when bagging. Usually know 30 days in advance arrival date of vessel. This allows time to get material to port, bag it, and have it in storage before arrival of vessel. Rail cars have five days' free time on fertilizer for export.

Source of Material: Urea - Lake Charles, Louisiana; Kerens, Texas; and Pryor, Oklahoma

Comments on Dock Ownership, Leasing, Etc.: New bagging facility, which is a private facility, in warehouse space leased from the port.

Name: Phillips Chemical Company

Location: Pasadena (Houston), Texas

Type of Facility: Private; do contract loading for Rohm-Haas

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 36 feet

Size of Ship Handled - Average: 12,000 tons

- Maximum: 40,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 2

Quantity of Fertilizer Exported Annually - 1968: 150,000 tons

Maximum Capacity: 360,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Plant to storage to ship	Hopper pit, conveyor belt, bulk loader, trimmer	200
Rohm-Haas fertilizer:		
Truck to storage to ship	Hopper pit, conveyor belt, bulk loader, trimmer	200

Comments: Phillips fertilizer goes from plant to storage. From storage, fertilizer is gravity fed into hopper pit to conveyor belt system underground to portable conveyor belt system at dockside to movable tower to spout and trimmer into ship's hold. Rohm-Haas Company fertilizer is trucked from Rohm-Haas plant to Phillips facility. Have two truck "tippers"; fertilizer is fed into hopper pit to conveyor belt to storage and from storage to ship. Total amount of fertilizer to be shipped is in storage prior to arrival of vessel.

Method of Determining Weight: Weigh trucks light and heavy for Rohm-Haas material. Weigh fertilizer in bin above bulk loader.

Time Required to Load 10,000 Tons: 8 days - one shift per day

STORAGE

	<u>Bulk</u>
At dock (tons)	0
In nearby areas (tons)	50,000
Length of time stored (days)	30
Charges (dollars per ton)	\$0.40 for first 15 days \$0.30 for last 15 days

CHARGES

Total charges per ton for bulk fertilizer are \$2.50 for outside customers.

LABOR

Length of Work Week: 5 - 5-1/2 days

Length of Work Day: 8 hours

Overtime Policy: Work overtime if requested.

FUTURE PLANS

None.

PROBLEMS

None.

MISCELLANEOUS

Policies to Prevent Demurrage: Material to be shipped is in storage prior to arrival of vessel.

Source of Material: Phillips and Rohm-Haas, Houston, Texas

Months Most Material Shipped: All year; no specific month

Ideal Shipping Period: Summer, the no-rain season

Comments on Dock Ownership, Leasing, Etc.: Phillips owns and operates the facility.

Name: Olin Corporation (Agricultural Division)

Location: Pasadena (Houston), Texas

Type of Facility: Private

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 32 feet

Size of Ship Handled - Average: Varies

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: Not available

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Storage to ship	Bridge crane, payloader, hopper bin, conveyor belt, loading boom, trimmer	100 - 200

Comments: Bulk fertilizer is put directly into bulk storage from production line by means of bridge cranes. These are then used to transfer it to a second transit storage building with bins. It is then taken by front-end payloader to hopper bin to bridge conveyor belt to boom to downspout to trimmer in ship's hold.

Method of Determining Weight: Automatic belt scales on conveyor belt

Time Required to Load 10,000 Tons: 100 hours

STORAGE

	<u>Bulk</u>
At dock (tons)	50,000
In nearby areas (tons)	0

CHARGES

Total charges per ton for bulk are not available.

LABOR

Length of Work Week: 3 - 7 days

Length of Work Day: 3 shifts per day - 8 hours each

Wage Rates: Not available

FUTURE PLANS

None.

PROBLEMS

Usually at mercy of shipping line in terms of when vessel arrives.

MISCELLANEOUS

Source of Material: Olin plant, Pasadena, Texas

Ideal Shipping Period: No particular period, year-round

Comments on Dock Ownership, Leasing, Etc.: Company facility operated by and for Olin's use.

Method of Determining Weight: Trucks are light and heavy weighed at fertilizer plant.

Time Required to Load 10,000 Tons: 6 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to ship	Forklift, pallet, ship's gear	30 long
Storage to ship	Forklift, pallet, ship's gear	30 long

Comments: Bags are palletized at bagging machine, moved to storage by forklift, or directly to dock if ship is in berth. Ship's gear is normally used for loading.

Method of Determining Weight: Automatic scales on bagging machines with platform scale check weighing

Time Required to Load 10,000 Tons: 6 - 10 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	50	Burlap, poly- ethylene liner	Tipper tie and sewn	*
Ammonium sulfate	50	Paper (plastic reinforced)	Not available	*
Mixed fertilizers	50	Polypropylene, polyethylene liner	Tipper tie and sewn	*

*Bagging charge varies from \$6.00 to \$6.60 per long ton depending on type of bag, closure, commodity, and volume being bagged.

Number of Bagging Machines: 3

Route of Fertilizer Movement: Bulk material arrives by rail and truck, dumped into hoppers into conveyor system to storage or directly to bagging machines. Bagged material is palletized and moved either to storage or directly to shipside.

Method of Determining Weight: Automatic scales on bagging machines with periodic platform scale check weigh

Bag Damage: Bag damage described as "nil." Damaged bags are rebagged.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	20,000	10,000
In nearby areas (tons)	Not available	Not available
Length of time stored (days)	Not available	Not available
Days free time	15*	15*
Charges (dollars per ton)	Not available	Not available

*For quantities exceeding 500 tons.

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not applicable	\$ 5.25 - 5.50
Wharfage	Not available	.40
Handling (included in bagging cost)	Not available	-
Bagging	XXX	6.00 - 6.60
Bags	XXX	7.00
Total	\$1.50*	\$18.65 - 19.50

*Itemization of charges not available.

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours, regular day

Overtime Policy: In order to get gangs, usually have to call them in one hour ahead of regular starting time, i.e., involves one hour of overtime for each 8-hour day.

Wage Rates: Not available

FUTURE PLANS

May increase bag handling capacity slightly.

PROBLEMS

Union contracts.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Not available

Months Most Material Shipped: Not available

Ideal Shipping Period: Not available

Comments on Dock Ownership, Leasing, Etc.: Bulk of material moved through this facility is from American Plant Food.

Name: Cargill Cargo Carriers, Inc., and Rogers Terminal and Shipping Corporation

Location: Channelview (Houston), Texas

Type of Facility: Private; under contract to Olin Corporation

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

Size of Ship Handled - Average: 6,000 tons

- Maximum: 10,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bagged - usual: 4 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: None (New facility in 1969.)

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear	30 - 32

Comments: Bulk fertilizer is barged from Olin Corporation's Houston plant to dock facility where it is unloaded by crane and clamshell to conveyor to storage. From storage it goes by conveyor to bagging machine. Bags are palletized and stored until the total amount to be shipped is accumulated. Forklifts take palletized fertilizer to shipside where it is lifted into the ship's hold by ship's gear and hand stowed.

Method of Determining Weight: Automatic scales on bagging machine plus count number of pallets (bags) loaded

Time Required to Load 10,000 Tons: 10 days assuming one 8-hour shift per day

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Mixed fertilizers	30	Burlap, poly-ethylene liner	Sewn	Not available

Number of Bagging Machines: 2

Route of Fertilizer Movement: Barge bulk fertilizer to facility. Use stationary crane and clamshell to unload barge. Material goes from clamshell to hopper to conveyor belt to storage. Taken from storage by front-end payloador to hopper to conveyor belt to bagging machine. Rate of transfer from barge to storage is 250 tons per hour.

Method of Determining Weight: Automatic scales weigh bulk fertilizer on conveyor belt as it is unloaded from barge. Automatic scales on bagging machine determine amount of fertilizer per bag. In addition, sample check weigh bags when bagging.

Bag Damage: Less than one-tenth of 1 percent. Damaged bags are replaced--rebagged or place an outer bag over damaged one.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

	<u>STORAGE</u>	
	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	33,500	3,000
In nearby areas (tons)	0	0
Length of time stored (days)	Not applicable	2 weeks
Charges (dollars per ton)	Not applicable	No specific storage charges; all charges incorporated in contract with Olin

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Wharfage	\$0.60
Handling (transfer to dock)	1.15
Pallet rental	.10
Total*	\$6.21 per long ton

*Includes charges not specified in above items.

LABOR

Length of Work Week: 7 days - 2 shifts

Length of Work Day: First shift, 10 hours; second shift, 4 - 5 hours

Overtime Policy: Straight time is 8 - 12 a.m. and 1 - 5 p.m.; all other time is overtime including Saturday, Sunday, and holidays. Labor Day and Christmas are holidays (no work days) in Houston area.

Wage Rates: Average \$9.21 per hour straight time including fringe benefits
Average \$12.63 per hour overtime including fringe benefits

FUTURE PLANS

No specific plans; possibility of expanding facility to also handle bulk fertilizers.

PROBLEMS

Dock is only 300 feet long; hence, ship must be shifted as it is being loaded.

MISCELLANEOUS

Policies to Prevent Demurrage: Olin Corporation arranges for ships, shipping of fertilizers, etc. Dock facility does not enter into problem of demurrage.

Source of Material: Olin Corporation, Houston, Texas

Months Most Material Shipped: All year long; no specific period

Name: Port of Houston (Bulk Materials Handling Plant)

Location: Greens Bayou (Houston), Texas

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 36 feet

- in Channel: 40 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 35,000 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 542,934 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, bulk loader, trimmer	Ammonium sulfate - 500 Diammonium phosphate - 600 Potash - 700 - 1,200
Truck to ship	Hopper pit, conveyor belt, bulk loader, trimmer	Maximum of 1,400

Comments: Bottom drop hopper rail cars or boxcars are assembled at holding area of port until 60 to 80 cars are accumulated prior to arrival of ship. Once loading starts, cars move continuously over hopper pit and additional ones are scheduled for delivery. Fertilizer falls by gravity to hopper pit to conveyor belt to traveling bulk loading tower to spout to trimmer to hold of ship. Hold must be 10 feet by 10 feet minimum to accommodate trimmer. On boxcars, material is augered out of car. Facility has car shakers which are used if material sets up. The boom and telescoping spout are moved to fill each hold.

Method of Determining Weight: Accept rail bills of lading; weigh trucks light and heavy.

Time Required to Load 10,000 Tons: 12 - 13 hours

STORAGE

	<u>Bulk</u>
At dock (tons)	0
In nearby areas (tons)	0
Length of time stored in rail cars (days)	About 7

CHARGES

<u>Item</u>	<u>Bulk</u> <u>(Per Ton)</u>
Stevedoring	\$0.35 - .40
Wharfage	.25
Handling	.45
Total	\$1.05 - 1.10

LABOR

Length of Work Week: 7 days - 2 shifts per day

Length of Work Day: 10 hours per shift when loading ship--8 hours straight time, all other overtime. Saturday, Sunday, and holidays overtime.

Wage Rates: Straight time - \$6.00 per hour including fringe benefits
Overtime - \$8.34 per hour including fringe benefits

FUTURE PLANS

None.

PROBLEMS

Occasionally have demurrage on rail cars when unloading large shipment. Bulk urea tends to liquefy due to high humidity conditions at port. Ammonium sulfate has caused corrosion problems with electrical equipment. Have better insulation on wiring and use paint resistant to corrosion. Once loaded out bulk urea and had problems with conveyor belt slipping due to hygroscopic nature.

MISCELLANEOUS

Policies to Prevent Demurrage: Accumulate total amount of material to be shipped in rail cars prior to arrival of vessel. Start accumulating rail cars about 7 days prior to ETA of ship. Sometimes have problems in accumulating and consolidating all rail cars due to lack of a large holding yard. Can only accumulate 80 cars in holding yard.

Source of Material: Houston area for bulk ammonium sulfate and diammonium phosphate; New Mexico for potash.

Months Most Material Shipped: All year long

Ideal Shipping Period: Does not matter

Comments on Dock Ownership, Leasing, Etc.: The port operates the bulk facility including labor. Usually have three stevedores in addition to port labor when loading ship.

Name: Southern Stevedoring Company, Inc.

Location: Houston, Texas

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 38 feet

Size of Ship Handled - Average: 15,000 tons bagged, 24,000 tons bulk

- Maximum: Not available

Number of Ships Loaded Simultaneously: 1 bulk and 1 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged: Depends on number of hatches on vessel

Quantity of Fertilizer Exported Annually - 1968: Not available

Maximum Capacity: 60,000 tons bagged
Bulk - not available

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt	800
Truck to ship	Hopper pit, conveyor belt	200
Barge to ship	Dock crane, clamshell, hopper, conveyor belt	300

Comments: Bulk material arriving by rail and truck is loaded onto vessel by means of conveyor belts and hoppers. Barged material is transferred to vessel by dock crane, clamshell, and conveyor belts.

Method of Determining Weight: Rail bills of lading, truck weights, and barge weights

Time Required to Load 10,000 Tons: 14 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Day)</u>
Storage to ship	Forklift, pallet, ship's gear	1,000
Truck to storage to ship (prebagged)	Forklift, pallet, ship's gear	1,000

Comments: All bagged material is moved through storage sheds to vessel by forklift, pallet, and ship's gear.

Method of Determining Weight: Automatic scales on bagging machines. Truck weights on prebagged material.

Time Required to Load 10,000 Tons: Approximately 10 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	20	Burlap, poly-ethylene liner	Sewn and tipper tie	Not available
Triple superphosphate	20	Not available	Sewn	Not available
Diammonium phosphate	20	Not available	Sewn	Not available
Ammonium sulfate	25	Not available	Sewn	Not available
Mixed fertilizers	20	Not available	Tipper tie and sewn	Not available
Potash	25	Not available	Sewn	Not available

Number of Bagging Machines: 2

Route of Fertilizer Movement: Since no bulk storage exists, all material moves directly to bagging machines by means of conveyor belt, crane, and clamshell. Bagged material is palletized and moved into storage by forklift.

Method of Determining Weight: Automatic scales on bagging machines, spot check on platform scales.

Bag Damage: Varies from 0.25 to 0.50 percent. Paper bags are worse--runs 0.50 percent.

Portion of Bagged Material Loaded That is Bagged at This Facility: 75 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	5,000
In nearby areas (tons)	0	0
Length of time stored (days)	Not available	Not available
Days free time	Not available	Not available
Charges (dollars per ton)	Not available	Not available

CHARGES

No information on charges.

LABOR

Length of Work Week: 5 days

Length of Work Day: Not available

Overtime Policy: Used as needed, paid for by customer.

Wage Rates: Not available

FUTURE PLANS

None planned due to lack of space for expansion.

PROBLEMS

Labor is big problem. Urea and mixed fertilizer create handling problems.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Not available

Months Most Material Shipped: Not available

Ideal Shipping Period: Can load year-round

Name: Bulk Packaging Corporation

Location: Galveston, Texas

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 32 - 34 feet MLT

Size of Ship Handled - Average: 12,000 tons

- Maximum: 25,000 tons

Number of Ships Loaded Simultaneously: 1 bulk and 1 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged: Depends on number of hatches on vessel

Quantity of Fertilizer Exported Annually - 1968: 250,000 - 300,000 tons

Maximum Capacity: 600,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship.	Hopper pit, conveyor belt, ship loader	200
Storage to ship	Payloader, hopper, conveyor belt, ship loader	260
Barge to ship	Dock crane, clamshell	100

Comments: Bulk material arriving by rail hopper cars is discharged into hopper pit onto conveyor belt system to ship loader to ship. Material may be routed over same system to storage and later reclaimed with payloaders. Material arriving in barges is discharged by dock crane and clamshell directly to vessel.

Method of Determining Weight: Beam-type conveyor scale on loading tower. Draft survey also used on material loaded from barge and from storage.

Time Required to Load 10,000 Tons: 4 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Forklift, pallet, ship's gear*	30 metric

*Occasionally, may supplement ship's gear with dock crane.

Comments: All bagged material moves from bagging machine to storage to await arrival of vessel. Bags are palletized at bagging machine, moved by forklift to storage. Loaded pallets are reclaimed by forklift and delivered to dock for loading by ship's gear. Occasionally, ship's gear is in such a state of disrepair that a dock crane must be used.

Method of Determining Weight: Material weighed by automatic scales on bagging machines. Bags are check weighed on platform scale.

Time Required to Load 10,000 Tons: 6 - 7 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge* (Per Ton)</u>
Urea	30	Jute, poly-ethylene liner	Sewn and bar loop	\$6.25
Ammonium sulfate	30	Jute, poly-ethylene liner	Both sewn at same time	4.75
Mixed fertilizer	30	Jute, poly-ethylene liner	Sewn	4.75
Mixed fertilizer	30	Paper - 5 ply, plastic reinforced	Sewn	5.00
Potash	30	Paper - 5 ply, plastic reinforced	Sewn	5.00

*Rates effective through September 30, 1969.

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk material is moved either from storage by payloader or directly from rail cars to bagging machines by conveyor belt. Bags are palletized at bagging machines and moved to storage by forklift.

Method of Determining Weight: Automatic scales on bagging machines. One out of every 30 bags is checked weighed on platform scale.

Bag Damage: Varies from 0.25 to 1.00 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	35,000 - 40,000	9,000
In nearby areas (tons)	0	0
Length of time stored (days)	30	30
Days free time	Not available	30*
Charges (dollars per ton)	Not available	\$0.40 per month

*For quantities exceeding 3,000 tons; 15 days for smaller quantities.

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not applicable	\$5.30
Wharfage	\$0.25	.40
Handling	\$1.50 - 3.00*	Not applicable
Bagging	XXX	\$ 4.75 - 6.00
Bags	XXX	Not available
Total	\$1.75 - 3.25	\$10.45 - 11.70

*Hopper cars to storage to ship, \$2.20 per ton; boxcars to storage to ship, \$2.75 per ton; storage to ship, \$1.50 per ton; barge to storage to ship, \$3.00 per ton; barge to ship, \$2.15 per ton.

LABOR

Length of Work Week: 5 days

Length of Work Day and Overtime Policy: During loading, work day runs from 7 a.m. to 11 p.m.; 7 - 8 a.m. and 5 - 11 p.m. is overtime. Customer pays overtime on bagged loading, while Bulk Packaging pays for overtime on bulk loading.

Wage Rates: Not available

FUTURE PLANS

None indicated for this facility. Have new facility at Beaumont, Texas.

PROBLEMS

Labor is biggest problem.

MISCELLANEOUS

Policies to Prevent Demurrage: Not available

Source of Material: Not available

Months Most Material Shipped: Not available

Ideal Shipping Period: Fertilizer can be loaded year-round.

Name: Brazos River Harbor Navigation District

Location: Freeport, Texas

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 32 feet

- in Channel: 36 feet

Size of Ship Handled - Average: 11,000 tons

- Maximum: 13,700 tons

Number of Ships Loaded Simultaneously: 2 if 10,000 tons or less

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 5 maximum: Up to 7

Quantity of Fertilizer Exported Annually - 1969: 40,000 tons

Maximum Capacity: 100,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Truck to ship	Truck crane with clamshell, portable hopper, conveyor belt, trimmer	155

Comments: Bulk fertilizer is brought to dock by truck where it is dumped on the apron of the dock. A truck crane with clamshell transfers fertilizer from dock to portable hopper to conveyor belt to portable hopper above ship's hold to spout to mechanical trimmer. If it rains, fertilizer on dock is covered with a plastic cover.

Method of Determining Weight: Weigh trucks light and heavy.

Time Required to Load 10,000 Tons: 70 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Truck to storage to vessel	Forklift, pallet, wagon, ship's gear	25

Comments: Pallets are supplied by port to fertilizer plant (Dow Chemical). Fertilizer is palletized at plant and trucked to port and put in transit storage until vessel arrives. Pallets are placed on a train of 8 to 10 wagons, transported to dock where a forklift is used to place pallet on dock. Ship's gear is used to place fertilizer in hold where it is hand stowed.

Method of Determining Weight: Fertilizer weighed at plant; accept bills of lading from plant.

Time Required to Load 10,000 Tons 80 hours

BAGGING FACILITIES

Number of Bagging Machines: The port has one bagging machine, which has never been used. Its capacity is 15 tons per hour.

Bag Damage: Nil - 40 bags in 10,000 tons

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bagged</u>
At dock (tons)	5,000
In nearby areas (tons)	6,000
Length of time stored (days)	15
Days free time	15
Charges (dollars per ton)	\$0.20 per net ton for every 7 days or fraction thereof after free time

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Wharfage	\$0.30	\$0.35
Pallet rent	XXX	.125
Total*	\$1.85 if 5,000 tons or more loaded	\$5.50 - 6.00 excluding cost of bagging and bags

*Includes charges not specified in above items.

LABOR

Length of Work Week: 7 days - 2 shifts per day

Length of Work Day: First shift, 7 a.m. until 6 p.m.; second shift, 7 p.m. until 11 p.m.

Overtime Policy: Straight time, 8 a.m. until noon and 1 p.m. until 5 p.m. 5 days per week; Saturday, Sunday, and holidays plus all other time at overtime rate.

Wage Rates: \$6.92 per hour straight time including fringe benefits
\$9.64 per hour overtime including fringe benefits

FUTURE PLANS

Completing a new warehouse that will be available for storage for bagged fertilizers.

PROBLEMS

No storage for bulk fertilizers and no bulk loading equipment. Ammonium sulfate found corrosive on equipment.

MISCELLANEOUS

Policies to Prevent Demurrage: No problems; fertilizer plants are only 3 miles from port.

Source of Material: Freeport (Dow Chemical and Red Barn Fertilizer Company)

Months Most Material Shipped: All year

Ideal Shipping Period: Doesn't matter

Comments on Dock Ownership, Leasing, Etc.: The port owns all equipment including pallets.

Name: Port of Corpus Christi, Corpus Christi Public Elevator

Location: Corpus Christi, Texas

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 38 feet

- in Channel: 40 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 12,900 tons

Number of Ships Loaded Simultaneously: 1

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 maximum: 7

Quantity of Fertilizer Exported Annually - 1968: None. New facility in 1969; expect to handle 90,000 tons of urea in 1969.

Maximum Capacity: 120,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to storage to ship	Forklift, pallet, ship's gear	30

Comments: Fertilizer (urea) is bagged and palletized at port facility and placed in storage until the amount to be shipped is accumulated. It is then transferred by forklift from storage to shipside where ship's gear is used to lift it into the hold of the vessel where it is hand stowed. The facility has loaded out full loads of bagged urea rather than partial loads. Material is bagged in one warehouse and then moved by tractor-pulled trailer train to a second warehouse at dockside.

Method of Determining Weight: Automatic scales on bagging machine and check weigh on platform scales at random. State also check weighs. Stevedoring firm accepts rail bills of lading. Count bags.

Time Required to Load 10,000 Tons: 10 days assuming one shift per day

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge* (Per Ton)</u>
Urea	30	Jute, poly-ethylene liner	Bar loop and sew outer bag	\$4.25

*Excluding bag cost of 34 cents each.

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk fertilizer (urea) comes to port by bottom drop rail hopper cars. Fertilizer is fed by gravity to hopper pit to conveyor belt to hopper over bagging machine to bagger. Rail cars are used for bulk storage. Eight rail cars are scheduled per day.

Method of Determining Weight: Automatic scales on bagging machine plus spot check weight on scales every 10 to 15 bags. State also checks weight of bags.

Bag Damage: Loading - negligible--84 out of 184,000 bags; material is rebagged.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	10,000
In nearby areas (tons)	4,500
Length of time stored (days)	Maximum of 30
Days free time	30
Charges (dollars per ton)	\$0.07 per five-day period after free time

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$ 4.75
Wharfage	.35
Bagging	4.25
Bags	6.80
Total	\$16.15

LABOR

Length of Work Week: 5 days - one shift per day

Length of Work Day: 8 hours

Overtime Policy: Pay one hour overtime from 7 a.m. to 8 a.m. to ensure obtaining gangs.

Wage Rates: Longshoremen - \$7.33 per hour straight time including fringe benefits
\$11.60 per hour overtime including fringe benefits

FUTURE PLANS

None.

PROBLEMS

Type of ship chartered to transport fertilizer is usually an older ship which frequently has faulty gear. Port has often had trouble obtaining a copy of the charter party to know exactly what is specified and what is expected of the port. They have also experienced problems of unloading urea out of bottom drop rail cars. Vibrators have been rented to shake rail cars when this happens.

MISCELLANEOUS

Policies to Prevent Demurrage: Normally, 70 percent or more of the fertilizer is bagged and in storage prior to arrival of vessel. Schedule rail cars (by producer) to make up balance.

Source of Material: Urea - Kerens, Texas, 5 days from port by rail; Pryor, Oklahoma, 5 days from port by rail; Houston, Texas, 1 day by rail; Geismar, Louisiana

Months Most Material Shipped: All year

Ideal Shipping Period: Does not matter

Comments on Dock Ownership, Leasing, Etc.: The port authority operates the facility including storage warehousing and rents space to stevedoring company.

Name: Port of Brownsville (Brownsville Navigation District)

Location: Brownsville, Texas

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 34-1/2 feet

- in Channel: 36 feet

Size of Ship Handled - Maximum: 32,000 tons

Number of Ships Loaded Simultaneously: 1 bulk and 7 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 5 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: None. Have handled inbound bagged fertilizers but have not handled export fertilizer.

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to storage to ship	Payloader, portable conveyor belt, elevator leg, shiploader	100 - 120

Note: The port has never exported bulk or bagged fertilizers but has facilities for handling both for export. Over 50 percent of volume of materials handled at port is for materials moving between U. S. and Mexico.

Comments: Rail boxcars would be used to bring fertilizer to port where it would be unloaded using front-end loaders and portable conveyor belt to storage. From bulk storage, payloaders place material in hopper of elevator leg to conveyor belt to spout to ship's hold. This would entail double handling of the material. Bulk fertilizer could also come to port by barge. In either case, all material would be assembled at port prior to arrival of vessel.

Method of Determining Weight: Automatic scale on conveyor belt

Time Required to Load 10,000 Tons: 100 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Forklift, pallet, ship's gear	30 - 32

Comments: Bagged fertilizer would be transported to port by rail boxcars. The loose bags would be palletized in rail car and taken to transit storage by forklift. The total amount to be exported would be assembled at port prior to arrival of vessel. Fertilizer would be taken from storage to shipside by forklift, placed in hold of vessel by ship's gear, and hand stowed. The dock is long enough to work all hatches simultaneously.

Method of Determining Weight: Accept rail bills of lading and count pallets and bags loaded.

Time Required to Load 10,000 Tons: 65 - 70 hours assuming 5 hatches loaded simultaneously

BAGGING FACILITIES

Number of Bagging Machines: None. Portable baggers could be rented if necessary.

Bag Damage: One-fourth of 1 percent on loading bagged material
One-half of 1 percent on loading bulk material

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	10,000	50,000
In nearby areas (tons)	0	40,000
Days free time	30	30
Charges (dollars per ton)	\$0.01 per ton after free time	\$0.05 per ton after free time

CHARGES

<u>Item</u>	<u>Bulk</u> <u>(Per Long Ton)</u>	<u>Bagged</u> <u>(Per Long Ton)</u>
Wharfage	\$0.35	\$0.40
Total*	\$1.85	\$5.50

*Includes charges not specified in above items.

LABOR

Length of Work Week: 5 days - one shift per day

Length of Work Day: 8 hours

Overtime Policy: Can work from 7 a.m. to 11 p.m.

Wage Rates: Stevedores - \$7.50 per hour straight time including fringe benefits
 \$4.35 per hour without fringe benefits
 \$9.67 per hour overtime

FUTURE PLANS

Considering putting in a hopper pit and conveyor belt system which would allow port to handle bottom dump hopper rail cars. Would consider putting in bagging facility if business warranted one.

PROBLEMS

Lack of facilities to handle bulk materials such as hopper pit and conveyor belt system. Also, although the conveyor belt system to spout can handle 300 tons of material per hour, the elevator leg which feeds into the system has a capacity of only 125 tons per hour.

MISCELLANEOUS

Policies to Prevent Demurrage: Harbor master's office of port authority coordinates movement of rail, truck, and ships. All fertilizer at port prior to arrival of vessel.

Source of Material: Houston area

Comments on Dock Ownership, Leasing, Etc.: Port authority operates facility. Stevedoring firms lease warehouse space.

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Name: Crescent Wharf & Warehouse Company, 10th Avenue Terminal
(Port of San Diego)

Location: San Diego, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

Size of Ship Handled - Average: 10,000 - 15,000 tons

- Maximum: 25,000 tons

Number of Ships Loaded Simultaneously: 1 bulk or 1 bagged usually, but have facilities for handling up to 5 vessels for bagged fertilizers

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged - usual: 5 Maximum: 5

Quantity of Fertilizer Exported Annually - 1968: 400,000 tons

Maximum Capacity: Several million tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, traveling ship loader, trimmer	1,000

Comments: Fertilizer falls by gravity from bottom dump rail cars into a covered hopper pit, onto a conveyor belt to ship loader and mechanical trimmer into ship's hold. Trucks are sometimes used instead of rail cars for outloading small amounts of fertilizer materials. There is no enclosed storage facility available for bulk fertilizer at the port. Rail cars are accumulated in a holding yard until the amount of fertilizer to be exported is assembled.

Method of Determining Weight: Rail cars are weighed light and heavy.

Time Required to Load 10,000 Tons: 16 - 24 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Pallet, forklift, ship's gear	25
Rail to ship	Pallet, forklift, ship's gear	25
Bagging machine to storage to ship	Pallet, forklift, ship's gear	25
Bagging machine to ship	Conveyor belt, pallet, forklift, ship's gear	50

Comments: Prebagged fertilizer is palletized in boxcars by stevedores and taken to storage or ship by forklift trucks. To achieve a rate of loading of 25 tons per hour per hatch, more than one rail car must be unloaded at the same time. The same holds true for unloading out of trucks. Fertilizer bagged at the port is palletized and placed in storage before vessel's arrival. After the vessel arrives, the fertilizer is taken to shipside where ship's gear is used to place it in the hold where it is hand stowed.

Method of Determining Weight: Accept rail bills of lading

Time Required to Load 10,000 Tons: 80 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	28	Burlap with poly- ethylene liner	Tipper tie liner & sew burlap	Not available
Ammonium sulfate	32	Burlap with poly- ethylene liner	Sewn	Not available
Diammonium phosphate	32	Burlap with poly- ethylene liner	Sewn	Not available
Potash	32	Burlap with poly- ethylene liner	Sewn	Not available
Soda ash	32	Paper	Sewn	Not available

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bottom dump rail car to covered hopper pit to conveyor belt to hopper over bagging machine. Rate of transfer is 65 tons per hour. The same process applies to material coming in by truck.

Method of Determining Weight: Automatic scale on bagging machine. Random sample of bags is check weighed. Weight is also checked by state surveyor.

Bag Damage: Damage to bags in loading ship - less than one-half of 1 percent. Damage to bags brought in by rail or truck - less than one-half of 1 percent. Paper bags have a greater degree of damage than burlap.

Portion of Bagged Material Loaded That is Bagged at This Facility:
80 - 90 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	10,000
In nearby areas (tons)	0	0
Length of time stored (days)	Not applicable	10 - 30
Days free time	0	10, but Government can request up to 27
Charges (dollars per ton)	Not applicable	\$0.01 per day after free time

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Included in total	Included in total
Wharfage	\$0.10 (included in total)	Included in total
Handling	Included in total	Included in total
Bagging	XXX	Included in total
Total	Less than \$1.00 per ton depending on number of tons	Urea - \$10.25 All other bagged fertilizers - \$9.75

LABOR

Length of Work Week: 7 days--5 days straight time, 2 days overtime, with Saturday, Sunday, and holidays overtime

Length of Work Day: 8 hours--6 hours straight time, 2 hours overtime for first shift; all other time at overtime rate

Overtime Policy: See above. Most shippers do not want to pay overtime.

FUTURE PLANS

The facility may put in storage for bulk fertilizer.

PROBLEMS

No storage space available at present for bulk fertilizer. Urea and other hygroscopic fertilizer materials give problems in loading because they are not always free flowing. The firm is working with shakers and air probes to overcome these problems. There are no problems as far as bagged materials are concerned nor as far as the dock and its equipment and facilities are concerned.

MISCELLANEOUS

Policies to Prevent Demurrage: The firm tries to regulate the arrival of rail cars when bagging fertilizer so that approximately 500 tons of material arrives per day for bagging. They are given 10 days' advance notice of the estimated time of arrival of the vessel, then 48 hours' notice before the ship arrives at port. They start bagging 10 - 20 days before the ship arrives and adjust rate of bagging and rail deliveries as more specific information is obtained.

Source of Material: Potash - New Mexico, Utah, and California
Mixed fertilizers - Idaho and California
Triple superphosphate - Idaho and California
Urea - California

Months Most Material Shipped: January - February, June - July

Ideal Shipping Period: Summer because there is no rain

Comments on Dock Ownership, Leasing, Etc.: The dock, warehouses, loading, and unloading facilities are owned by the Port of San Diego and are leased on a 10-year lease to the highest bidder. The bagging machine is owned by the Crescent Wharf & Warehouse Company as are the pallets and payloaders and forklift trucks. The facility is new. Both fertilizer company officials and fertilizer traders have high praise for it.

Name: Crescent Wharf & Warehouse Company and Metropolitan Stevedore Company (Port of Long Beach)

Location: Wilmington (Long Beach), California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 40 - 45 feet

Size of Ship Handled - Average: 10,000 - 20,000 tons

- Maximum: 50,000 - 60,000 tons

Number of Ships Loaded Simultaneously: 1 bulk or 1 bagged usually, but the port can handle up to 3 vessels for bulk and 5 vessels for bagged materials simultaneously

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged - usual: 5 Maximum: 5

Quantity of Fertilizer Exported Annually - 1968: 997,373 tons; 561,199 tons consisted of potash

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, ship loader, trimmer	600 - 700
Truck to ship	Hopper pit, conveyor belt, ship loader, trimmer	300

Comments: The facility has no covered storage available for bulk fertilizers. Bottom drop rail hopper cars are assembled in a holding yard until the amount to be shipped is accumulated. The cars are then taken to the bulk loading facility where the fertilizer falls by gravity into a covered hopper pit, to a covered conveyor belt to the bulk loading tower and spout into the ship's hold. A trimmer on the end of the spout is used when necessary. The same process is used for loading out of trucks.

Method of Determining Weight: Accept rail bills of lading. Weighing facilities are not available for bulk fertilizers.

Time Required to Load 10,000 Tons: 16 - 24 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Pallet, forklift, ship's gear	15
Truck to storage to ship	Pallet, forklift, ship's gear	15
Rail to ship	Pallet, forklift, ship's gear	15

Comments: Prebagged fertilizer normally arrives at port by rail or truck. The loose bags are palletized in the boxcar or the truck and taken by forklift to transit storage at dockside until the ship arrives. Usually, the total amount of fertilizer to be shipped is accumulated in transit storage before ship's arrival. It is then taken out of transit storage by forklift to shipside where ship's gear is used to place the fertilizer in the hold of the ship where it is hand stowed. Most (90 percent) of the ships accepting fertilizer at this port are general cargo vessels that are only partially loaded with fertilizer.

Method of Determining Weight: Accept rail or truck bills of lading. There are no facilities at the dock for weighing bagged fertilizers.

Time Required to Load 10,000 Tons: 10 days

BAGGING FACILITIES

Number of Bagging Machines: None

Bag Damage: Less than 0.5 percent of the prebagged fertilizer arriving at the facility. Less than 0.5 percent of the bags are damaged in the process of loading the ship. Damaged bags are covered with a new bag.

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	As required
In nearby areas (tons)	0	As required
Length of time stored (days)	Not applicable	10
Days free time	Not applicable	10
Charges (dollars per ton)	Not applicable	\$0.07 per day after free time including Sat., Sun., and holidays. On fertilizer stored away from dock, charge is \$0.50 per month.

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Wharfage	\$0.10	Included in total
Handling	1.11	Included in total
Bagging	XXX	Included in total
Total	Negotiated, usually less than \$1.21	Urea - \$10.25 All other bagged fertilizers - \$9.75

LABOR

Length of Work Week: 7 days

Length of Work Day: 8 hours, 2 shifts per day--first shift, 6 hours straight time, 2 hours overtime; second shift, 8 hours overtime.

Overtime Policy: 30 hours straight time per week. All other time is overtime including Saturday, Sunday, and holidays. Overtime is usually worked at the port.

Wage Rates: \$7.00 - \$8.00 per hour straight time including fringe benefits with time and a half for overtime

FUTURE PLANS

Expect to double the capacity of bulk loading by adding a second bulk loader.

PROBLEMS

There is no storage for bulk fertilizers. Bulk fertilizers that are particularly dusty or that are hygroscopic cause problems in loading. No problems were enumerated in loading bagged fertilizers. Thus far, there has been no interest in building storage facilities for bulk fertilizers. Most bagged fertilizers move through the port within the free time.

MISCELLANEOUS

Policies to Prevent Demurrage: Ship's charter advises the port the estimated time of arrival (ETA) of the ship 10 days in advance. Close coordination between shipper, railroad, and stevedoring company then prevents demurrage or storage charges to ensure the material will be at the port by the time the ship arrives. Bagged fertilizer materials are shipped to the port within the 10 days free time period prior to arrival of the vessel.

Source of Material: Potash - New Mexico and Utah
Urea - California
Diammonium phosphate - California and Idaho
Mixed fertilizers - California and Nevada

Months Most Material Shipped: All months

Ideal Shipping Period: Summer months when there is no rain

Comments on Dock Ownership, Leasing, Etc.: The warehouses are owned by the port and leased to stevedoring firms on a 10-year lease to the highest bidder. Stevedoring company charges for loading are negotiated for each shipment.

Name: Port of Los Angeles (including U. S. Borax Company Bulk Facility)

Location: Los Angeles, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

Size of Ship Handled - Average: 10,000 - 20,000 tons

- Maximum: 50,000 - 60,000 tons

Number of Ships Loaded Simultaneously: 1 bulk or 1 bagged usually, but have facilities for handling 3 bulk carriers and up to 30 general cargo ships simultaneously.

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged - usual: 5 Maximum: 5

Quantity of Fertilizer Exported Annually - 1968: 109,966 tons

Maximum Capacity: Several million tons of both bulk and bagged materials

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship (Port Authority)	Hopper pit, conveyor belt, bulk loader, trimmer	700
Rail to silo to ship (U. S. Borax)	Hopper pit, conveyor belt, bulk loader	700
Truck to ship (Port Authority)	Hopper pit, conveyor belt, bulk loader, trimmer	100

Comments: The port so far has not loaded out bulk fertilizers but has handled bulk potash. There are bulk loading facilities at two terminals each capable of handling 700 tons per hour. For the Port of Los Angeles, bulk fertilizer would feed from bottom dump hopper cars by gravity to a hopper pit to a covered conveyor belt to the bulk loader and trimmer into ship's hold. At the U. S. Borax bulk loader, fertilizer would be fed from bottom drop hopper rail cars to conveyor belt to silo to conveyor belt to bulk loader and spout into ship's hold.

Method of Determining Weight: Port of Los Angeles - accept rail bills of lading. U. S. Borax facility - automatic scales built into conveyor belt system.

Time Required to Load 10,000 Tons: 16 - 20 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to ship	Pallet, forklift, ship's gear	20 - 24
Truck to ship	Pallet, forklift, ship's gear	30
Bagging machine to storage to ship	Pallet, forklift, ship's gear	30 - 36
Bagging machine to ship	Pallet, forklift, ship's gear	30 - 36

Comments: Prebagged fertilizer is palletized and either put into transit storage or loaded directly onto the ship. Normally, sufficient fertilizer is accumulated in storage before arrival of the vessel to make up the total load or nearly the total load. The fertilizer is delivered to transit storage by whaleback carriers (wagons). Forklift trucks and ship's gear are used to load the bagged fertilizer into the hold of the ship where it is hand stowed.

Method of Determining Weight: Accept rail bills of lading

Time Required to Load 10,000 Tons: 90 - 100 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	19	10-oz. burlap with poly- ethylene liner	Tipper tie inner bag & sew outer bag	Not available
Diammonium phosphate	19	Paper	Sewn	Not available
Mixed fertilizers	19	Paper	Sewn	Not available
Potash	19	Burlap	Sewn	Not available
Nitrate of soda	19	Paper	Sewn	Not available

Number of Bagging Machines: 2

Route of Fertilizer Movement: Fertilizer is transferred from rail cars, truck, or storage to bagging machine. Rate of transfer for rail or truck to bagging machine is 37.5 tons per hour; storage to bagging machine, 28 to 30 tons per hour.

Method of Determining Weight: Automatic scale on bagging machine and sample weigh bags at random on platform scale

Bag Damage: On bags arriving at port, less than 0.5 percent; on bags loaded onto ship, less than 0.5 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: 5 percent

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	30,000
In nearby areas (tons)	28,000 - 30,000	100,000
Length of time stored (days)	Not applicable	10
Days free time	10 in nearby areas	10
Charges (dollars per ton)	\$0.50 per month	\$0.07 per day after free time; \$0.02 per day in noncovered areas; \$0.50 per mo. on second floor of certain warehouses for storage facilities near the dock; storage charge is \$0.018 per bag per month on bags weighing less than 80 lbs. and \$0.024 per bag per month on bags weighing 80 lbs. or more

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	Not available	Included in total
Wharfage	\$0.10	Included in total
Handling	1.11	Included in total
Bagging	XXX	Included in total
Total	Not available	Urea - \$10.25 All other bagged fertilizers - \$9.75

LABOR

Length of Work Week: 7 days--5 days straight time, 2 days overtime

Length of Work Day: 8 hours--6 hours straight time, 2 hours overtime, or 30 hours straight time per week with all else overtime

Overtime Policy: Normal to use overtime when loading a ship

Wage Rates: \$7.00 per hour including fringe benefits

FUTURE PLANS

Eventually plan to expand handling and storage facilities for bulk materials handling, up to the point of doubling the capacity. Currently, however, the present bulk facilities are only utilized at 50 percent of present capacity. Hope to eventually put in 30,000 tons of storage for bulk materials plus a conveyor belt system for loading into ship's hold.

PROBLEMS

Lack of an efficient bulk storage facility close to dock. Dusty fertilizers create smog control problems in loading bulk fertilizers and create the need to use curtains around hatches while loading.

MISCELLANEOUS

Policies to Prevent Demurrage: Charter party advises port facility 10 days in advance the estimated time of arrival (ETA) of the vessel. Close coordination between shipper, stevedoring firm, and railroad prevents demurrage.

Source of Material: Potash - New Mexico, Utah, and California
Urea - California
Mixed fertilizers - California and Nevada
Diammonium phosphate - California and Idaho

Ideal Shipping Period: Summer, no rain

Comments on Dock Ownership, Leasing, Etc.: The port provides warehouses, bulk loaders, etc., and leases these to private stevedoring companies on the basis of the highest bidder. The stevedoring firm furnishes the bagger, pallets, forklift trucks, etc. All costs and charges are negotiated for each shipment between competing stevedoring firms.

Name: Oxnard Harbor District, Port of Hueneme

Location: Port Hueneme, California

Type of Facility: Public

Fertilizer Handled: Bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 31 feet at mean low-low water

Size of Ship Handled - Average: 8,500 tons

- Maximum: 10,145 tons

Number of Ships Loaded Simultaneously: 2

Number of Hatches Loaded Simultaneously:

Bagged - usual: 4 - 5 Maximum: 6

Quantity of Fertilizer Exported Annually - 1968: 33,061 tons

Maximum Capacity: 84,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Truck to storage to ship	Pallet, forklift, ship's gear	22

Comments: Pallets are taken to the Shell Company fertilizer plant at Ventura. Fertilizer is put onto pallets in the plant (34 bags of urea per pallet) and delivered by truck to the port where they are put into storage. The total amount of fertilizer to be shipped is assembled and stored at the port before the arrival of the vessel. Forklift trucks and ship's gear are used to place the fertilizer into the hold where it is hand stowed.

Method of Determining Weight: Accept truck bills of lading

Time Required to Load 10,000 Tons: Up to 10 days

BAGGING FACILITIES

Method of Determining Weight: Scales are available at the dock (50-ton capacity). However, weight is determined at the Shell plant at Ventura and truckers' bills of lading are accepted for weight.

Bag Damage: Nil

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bagged</u>
At dock (tons)	15,000
In nearby areas (tons)	400
Length of time stored (days)	30
Days free time	30
Charges (dollars per ton)	0

CHARGES

<u>Item</u>	<u>Bagged</u> <u>(Per Ton)</u>
Stevedoring	Not available
Wharfage	\$0.70
Handling	\$1.10 - \$1.78 depending on tonnage
Bagging	Not available
Bags	Not available
Palletizing	\$3.00
Total	\$7.00*

*Includes charges not listed separately in above items.

LABOR

Length of Work Week: 7 days--2 shifts

Length of Work Day: 8 hours

Overtime Policy: 6 hours straight time, 2 hours overtime, or 30 hours per week straight time with all the rest overtime

FUTURE PLANS

The harbor will be expanded from two to three deep draft berths beginning January 1970. Bulk facilities and bagging facilities will be put in as soon as practical depending on volume of business.

PROBLEMS

None.

MISCELLANEOUS

Policies to Prevent Demurrage: All fertilizer is assembled and stored at no cost before arrival of the ship.

Source of Material: Urea - Ventura, California

Months Most Material Shipped: October and November

Ideal Shipping Period: May to October in the no-rain season

Comments on Dock Ownership, Leasing, Etc.: The port is owned and operated by the port authority.

Name: Port of Oakland and Marine Terminals Corporation

Location: Oakland, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet to 34 feet maximum at high tide

Size of Ship Handled - Average: 10,000 tons

Number of Ships Loaded Simultaneously: 1 bulk, 3 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged: Load all hatches

Quantity of Fertilizer Exported Annually - 1968: 30,500 tons

Maximum Capacity: 150,000 tons bagged material

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail or truck to ship	Hopper pit, conveyor belt	Ammonium sulfate, 125 - 150 Potash, 100
Storage to ship	Steel tanks, conveyor belt	Ammonium sulfate, 200 - 210 Potash, 250 - 300

Comments: The port has never exported bulk fertilizers. However, they have the equipment to handle bulk fertilizer exports. Fertilizer would come to the port in bottom drop hopper rail cars or by truck. It would fall by gravity to a hopper pit and onto a conveyor belt which would elevate it to steel storage tanks; from there it would move by conveyor belt to the ship's hold.

Method of Determining Weight: Accept bills of lading

Time Required to Load 10,000 Tons: 3-1/2 days

BAGGED FERTILIZER LOADING

<u>Source of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Bagging machine to storage to ship	Pallet, forklift, ship's gear	25 long
Bagging machine to ship	Pallet, forklift, ship's gear	15 long

Comments: Thus far all bagged fertilizer loaded at the port has been bagged at the port. The bagged fertilizer is palletized and put in transit storage until the amount to be exported is accumulated. It is then transferred from storage to shipside by forklift. Ship's gear is used to lift the fertilizer from dock to ship's hold where it is hand stowed. On rare occasions fertilizer moves from bagging machine directly to ship.

Time Required to Load 10,000 Tons: 7 days with 2 shifts per day

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton) approx.</u>
Urea	12.5	Paper or burlap with polyethylene liner	Sewn	\$4.00
Ammonium sulfate	12.5	Paper or burlap with polyethylene liner	Sewn	\$4.00
Diammonium phosphate	23 - 25	Burlap with polyethylene liner	Sewn	\$4.00
Potash	23 - 25	Burlap with polyethylene liner	Sewn	\$4.00

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bulk fertilizer is brought to the port by bottom drop rail hopper cars. The facility has storage for 20 tons of material from rail to bagging machine. About 50 tons per hour moves from rail to bagger. At a maximum, 500 tons per day can be bagged. About 25 working days are required to assemble and bag fertilizer for a shipment of 10,000 tons.

Method of Determining Weight: Bags are automatically weighed by bagging machine plus sample weigh every 25th bag. The State also sample weighs bags. Bags are counted as they are put on board ship.

Bag Damage: Less than one-half of 1 percent in loading ship. The material is rebagged.

Portion of Bagged Material Loaded That is Bagged at This Facility: 100 percent

	<u>STORAGE</u>	
	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	5,000 maximum	Up to 150,000
In nearby areas (tons)	0	Up to 750,000
Length of time stored (days)	14	27
Days free time	14	27
Charges (dollars per ton)	\$0.045 per day after free time	\$0.515 - 0.77 per month after free time plus \$1.01 for handling

<u>Item</u>	<u>CHARGES</u>	
	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring and handling	\$1.02	\$6.00
Wharfage	.45	1.00
Bagging	XXX	4.00
Total	\$1.47	\$11.00

LABOR

Length of Work Week: 7 days, 2 shifts per day

Length of Work Day: 8 hours per shift with 30 hours straight time per week

Wage Rates: \$7.00 per hour including fringe benefits

FUTURE PLANS

None.

PROBLEMS

None, except the port finds potash corrosive in wet weather. The main problem is that they have facilities to move much more fertilizer than was moved in 1968.

MISCELLANEOUS

Policies to Prevent Demurrage: Vessel must give 12 days' notice before its arrival at port.

Source of Material: Potash - Utah
Phosphate fertilizers - Idaho
Ammonium sulfate - California

Months Most Material Shipped: In the fall and winter

Ideal Shipping Period: May to November when there is no rain

Comments on Dock Ownership, Leasing, Etc.: The port leases warehouse facilities to private stevedoring firms who do the bagging, etc. The bagger, forklift trucks, etc., are owned by the stevedoring firm.

Name: Port of San Francisco
Location: San Francisco, California
Type of Facility: Public
Fertilizer Handled: Bagged
Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet
Size of Ship Handled - Average: 10,000 tons
 - Maximum: 28,000 tons
Number of Hatches Loaded Simultaneously: Bagged - usual: All hatches
Quantity of Fertilizer Exported Annually - 1968: None; 15,000 tons in 1967

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Forklift, pallet, ship's gear	25

Comments: The Port of San Francisco is a general cargo port which has 45 berths. Fertilizer is considered just another commodity. They would like to handle more bagged fertilizer than they have in the past. Prebagged fertilizer would be transported to the port by rail or truck, preferably already palletized. If it were not palletized, it could be palletized at the port. The palletized bagged fertilizer would be put into transit storage until the total amount to be shipped was accumulated. It would then be taken by forklift truck to shipside where it would be loaded onto the ship using the ship's gear and hand stowed.

Method of Determining Weight: Accept rail bills of lading

Time Required to Load 10,000 Tons: 7 days

BAGGING FACILITIESNumber of Bagging Machines: NoneBag Damage: Very little on prebagged material already palletized before it arrives at the port.Portion of Bagged Material Loaded That is Bagged at This Facility: NoneSTORAGE

	<u>Bagged</u>
At dock (tons)	Up to 10,000 in transit storage only
Length of time stored (days)	1 month
Days free time	10
Charges (dollars per ton)	\$0.045 per day or \$0.515 per month after free time for urea and calcium nitrate; \$0.05 per day or \$0.64 per month for other bagged fertilizers

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Wharfage	\$1.00
Total	\$11.00*

*Includes charges not listed separately in above items.

LABORLength of Work Week: 7 days, 2 shifts per dayLength of Work Day: 8 hours per shift or a total of 30 hours straight time per week. All other time is overtime including Saturday, Sunday, and holidays.Wage Rates: \$7.00 per hour including fringe benefits

FUTURE PLANS

Would consider putting in facilities for bagging if volume of business warranted such an investment. Would also consider putting in bulk storage facilities under the same conditions.

PROBLEMS

The port has no facilities specifically allocated for handling fertilizers and consider it just another commodity. They would welcome greater volume of bagged materials.

MISCELLANEOUS

Source of Material: Ammonium sulfate - California

Comments on Dock Ownership, Leasing, Etc.: The port leases warehousing facilities to private firms.

Name: Parr-Richmond Terminal Company

Location: Richmond, California

Type of Facility: Public

Fertilizer Handled: Bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 32 feet at mean low-low water

Amount of Fertilizer Loaded Per Ship - Average: 1,000 - 1,500 tons

- Maximum: 4,000 tons

Number of Ships Loaded Simultaneously: Bulk - 1

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Quantity of Fertilizer Exported Annually - 1968: 10,000 - 20,000 tons

Maximum Capacity: 50,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, bulk loader	300
Truck to ship	Hopper pit, conveyor belt, bulk loader	300

Note: This facility is equipped to only partially load bulk vessels because of the slowness of transfer of materials from rail to ship.

Comments: The facility only started loading bulk materials in 1968. Bottom drop rail hopper cars or trucks feed fertilizer by gravity into a hopper pit. From there it goes by a 36-inch conveyor belt to a tower and spout into the ship's hold or to covered storage and then to the tower, spout, and ship's hold. The spout is fixed; hence, the ship must be moved as each hatch is filled.

Method of Determining Weight: Weigh rail cars and trucks heavy and light

Time Required to Load 10,000 Tons: 2-1/2 days

STORAGE*

	<u>Bulk</u>
At dock (tons)	5,000
In nearby areas (tons)	Not available
Length of time stored (days)	Normally not stored
Days free time	All fertilizer exported so far has moved under free time.
Charges (dollars per ton)	\$0.64 plus \$1.28 in-out handling charge. Charge for urea, \$0.515 per month storage plus \$1.01 in-out handling charge.

*Normally, material is not stored but goes directly from rail cars to ship's hold.

CHARGES

<u>Item</u>	<u>Bulk</u> <u>(Per Ton)</u>
Stevedoring	\$0.82
Wharfage	.50
Services	.28
Total	\$1.60

LABOR

Length of Work Week: 5 days

Length of Work Day: 8 hours, 2 shifts per day. A third shift is used when required.

FUTURE PLANS

None.

PROBLEMS

Physical limitations of the bulk loader; i.e., can load only 300 tons per hour. As a result, only have had partial loads of bulk fertilizer. Main problem has been insufficient volume of business since most fertilizer manufacturing in the area is for domestic use.

MISCELLANEOUS

Source of Material: Ammonium sulfate - Idaho
Ammonium phosphate and triple superphosphate - California

Comments on Dock Ownership, Leasing, Etc.: The port facility is privately owned and operated for public use.

Name: Benicia Port Terminal Company

Location: Benicia, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 38 feet

Size of Ship Handled - Maximum: 46,000 long tons

Number of Ships Loaded Simultaneously: 1 bulk, 3 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: All hatches

Quantity of Fertilizer Exported Annually - 1968: None - new facility

Maximum Capacity: 260,000 long tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, bulk loader	500
Truck to ship	Hopper pit, conveyor belt, bulk loader	250

Comments: This is a new facility which has not yet handled fertilizer. The facility is equipped with a bulk loader. Bottom drop rail hopper cars or trucks would transport fertilizer to the port. Fertilizer would fall by gravity into a pit and onto a conveyor belt to the bulk loader to ship's hold. Two large storage silos exist at the bulk facility, but these would not be used for fertilizer storage.

Method of Determining Weight: Accept rail or truck bills of lading

Time Required to Load 10,000 Tons: 40 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Truck to storage to ship	Forklift, pallet, ship's gear	20

Comments: Usually, fertilizer would be transported by truck to the port and would be already palletized at Pittsburg at the Shell fertilizer plant. The shipper would send extra bags to take care of damaged bags when loading the vessel. The palletized fertilizer would be placed in transit storage until the total shipment was accumulated. It would then be transferred by forklift to shipside and loaded onto the ship using ship's gear where it would be hand stowed.

Method of Determining Weight: Accept truck bills of lading

Time Required to Load 10,000 Tons: No experience

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	20,000
In nearby areas (tons)	10,000	20,000
Days free time	10	10
Charges (dollars per ton)	\$0.25 per month	\$0.30 per month

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$0.50	\$8.00
Wharfage	1.00	4.00
Total	\$1.50	\$12.00

LABOR

Length of Work Week: 7 days, 2 shifts per day

Length of Work Day: 8 hours per shift--first shift, 6 hours straight time, 2 hours overtime; second shift, 8 hours overtime; Saturday, Sunday, and holidays overtime

Wage Rates: \$9.00 per hour including fringe benefits

FUTURE PLANS

None.

PROBLEMS

No storage facility for bulk fertilizers at dockside.

MISCELLANEOUS

Policies to Prevent Demurrage: The port attempts to have entire cargo at dock before vessel arrives.

Source of Material: Ammonium sulfate - Pittsburg, California
Potash - California and Utah

Ideal Shipping Period: April through October

Comments on Dock Ownership, Leasing, Etc.: Port operates the facility
itself. Hires stevedores for loading ship.

Name: Diablo Service Corporation (owned by Phillips Petroleum Company)

Location: Pittsburg, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged, but primarily bulk

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

Size of Ship Handled - Average: 10,000 - 15,000 tons

- Maximum: 30,000 tons

Number of Ships Loaded Simultaneously: 1 bagged or 1 bulk

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged - usual: All hatches

Quantity of Fertilizer Exported Annually - 1968: 9,246 long tons

- 1967: 37,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Truck to ship	Hopper pit, conveyor belt, bulk loader, trimmer	200 - 250

Comments: Bulk fertilizer is transported by truck from the Shell plant at Pittsburg to the port. The trucks are dumped into a hopper pit to a conveyor belt to a loading boom to spout and trimmer in ship's hold. The conveyor belt is capable of handling 700 tons per hour. However, since trucks must be used to bring the material to the port, the effective loading capacity is reduced to 200 - 250 tons per hour.

Method of Determining Weight: Accept truck bills of lading. Trucks are weighed at Shell Oil Company fertilizer plant.

Time Required to Load 10,000 Tons: 3 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Truck to storage to ship	Forklift, pallet, ship's gear	20

Comments: The facility could handle bagged fertilizer but has only loaded bulk materials. If they did load out bagged materials, the fertilizer would be bagged at the plant, palletized, and delivered to the port by truck where it would be put into storage until a full load was assembled. Forklift, pallets, and ship's gear would be used to load the fertilizer onto the ship where it would be hand stowed. Port furnishes pallets to Shell Oil Company.

Method of Determining Weight: Count number of bags loaded

Bag Damage: Almost none since material is palletized at plant

Time Required to Load 10,000 Tons: 5 days if all hatches are loaded simultaneously

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	0	5,000
Length of time stored (days)	Not applicable	10, excluding week-ends and holidays
Days free time	Not applicable	10
Charges (dollars per ton)	Not applicable	\$1.19 per month

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring and wharfage	\$1.95	
Trucking	.70	
Total	\$2.65	Not known since have not handled bagged fertilizer

LABOR

Length of Work Week: 7 days, 2 shifts per day

Length of Work Day: 8 hours

Overtime Policy: Use stevedores on overtime basis when loading ship. Saturday, Sunday, and holidays and second shift all overtime.

Wage Rates: \$9.00 per hour including fringe benefits

FUTURE PLANS

None.

PROBLEMS

Lack of storage facilities for bulk or bagged fertilizers.

MISCELLANEOUS

Policies to Prevent Demurrage: Since fertilizer plant is also located at Pittsburg, have little trouble with demurrage. Shell Oil arranges for ships, etc., and notifies port.

Source of Material: Pittsburg, California

Months Most Material Shipped: In the fall

Comments on Dock Ownership, Leasing, Etc.: The port is owned by Phillips Petroleum Company (parent company).

Name: Port of Stockton

Location: Stockton, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet, 6 inches at mean low-low tide

Size of Ship Handled - Average: 10,000 - 12,000 long tons

- Maximum: 18,000 long tons

Number of Ships Loaded Simultaneously: 1 bulk, 1 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged - usual: All hatches

Quantity of Fertilizer Exported Annually - 1968: 31,000 tons,
- 1967: 110,000 tons

Maximum Capacity: 360,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to storage to ship	Payloader, reclaiming pit, conveyor belt, bulk loader	150 long

Comments: Fertilizer is transported to port by rail or truck (from Best Valley N.). From rail it is placed in temporary covered flat storage until the total load to be exported is accumulated. Payloaders are used to move it from flat storage to reclaiming pits in the floor where it falls by gravity to conveyor belt to bulk tower to spout to skip's hold. The bulk loader has a fixed spout and, therefore, the vessel must be moved as each hatch is filled.

Method of Determining Weight: Trucks are light and heavy weighed. Accept bills of lading on rail cars.

Time Required to Load 10,000 Tons: 66 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail or truck to storage to ship	Pallet, forklift, ship's gear	30
Rail to ship	Pallet, forklift, ship's gear	20 - 22

Comments: Fertilizer arriving at port by rail is palletized and put into storage until the total amount to be shipped is accumulated. It is then taken to shipside by forklift, lifted into the ship's hold by ship's gear, and hand stowed. Fertilizer coming to the port by truck is already palletized. Alternatively, it can be taken from rail car as loose bags and placed in ship's slings and hand stowed in hold.

Method of Determining Weight: Count bags, weigh trucks light and heavy, accept rail bills of lading

Time Required to Load 10,000 Tons: 5 - 6 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>
Diammonium phosphate (inbound)	40 - 50	Paper	Not available

Number of Bagging Machines: 2

Route of Fertilizer Movement: Bagging facilities are used for inbound fertilizer. They have not been used to bag fertilizer for export. However, they could just as easily be used for bagging fertilizer for export.

Method of Determining Weight: Automatic scales on bagging machine, and check weigh bags at random

Bag Damage: Less than one-half of 1 percent of bags coming to port for export are damaged. Material is rebagged or the damaged bags are sent back to the fertilizer plant.

Portion of Bagged Material Loaded That is Bagged at This Facility: None; all bagged material is inbound for use in California.

	<u>STORAGE</u>	
	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	15,000	15,000 - 20,000
In nearby areas (tons)	0	0
Length of time stored (days)	Less than 12	10 - 14
Days free time	12	10
Charges (dollars per ton)	\$0.01 per day after free time	\$0.64 per month after free time plus \$1.28 handling charge

<u>Item</u>	<u>CHARGES</u>	
	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Wharfage	Included in total	\$1.00
Handling	Included in total	1.28
Palletizing	--	3.00
Total	\$2.50	\$11.00 - \$12.00 when loose; \$8.00 - \$9.00 when already palletized*

*Includes charges not listed separately in above items.

LABOR

Length of Work Week: 7 days, 3 shifts per day

Length of Work Day: First shift - 8 hours straight time
Second shift - 8 hours overtime
Third shift - 5 hours overtime

FUTURE PLANS

None, unless exports of fertilizer increase. If fertilizer export business expands, would increase bulk loading capacity from 150 to 400 tons per hour.

PROBLEMS

None. In fact, would like to handle more fertilizer. Bulk ammonium nitrate was once loaded out of the port without problems.

MISCELLANEOUS

Policies to Prevent Demurrage: Fertilizer plants are within a close radius of the port; hence, there are few demurrage problems. Materials to be shipped are always at the port before arrival of vessel.

Source of Material: California and Utah

Months Most Material Shipped: July to January

Ideal Shipping Period: March to October

Name: Port of Sacramento

Location: Sacramento, California

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 30 feet at mean low-low tide

Size of Ship Handled - Average: 15,000 tons

- Maximum: Up to 37,000 tons

Number of Ships Loaded Simultaneously: 1 bulk, 2 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 Maximum: 1

Bagged - usual: 5 Maximum: 5

Quantity of Fertilizer Exported Annually - 1968: None, but the port has facilities for handling both bulk and bagged fertilizer for export. They exported 9,500 tons in 1965.

Maximum Capacity: 180,000 tons bulk
180,000 tons bagged

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Estimated Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, ship loader	300 - 350 long
Storage to ship	Payloader, conveyor belt, ship loader	300 - 400 long

Comments: The port has concentrated mainly on exporting rice. They did export 9,500 tons of bulk fertilizer in 1965. Fertilizer would come to the port by bottom dump rail cars where it would be gravity fed to a pit and conveyor belt to covered transit storage. From storage, payloaders would be used to take fertilizer to a conveyor belt to ship loader and into the ship's hold. Alternatively, fertilizer could move directly from rail to conveyor belt to ship loader to ship's hold. The conveyor system and ship loader are fixed.

Method of Determining Weight: Weigh rail cars light and heavy

Time Required to Load 10,000 Tons: 2-1/2 to 3 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail or truck to storage to ship	Pallet, forklift, ship's gear	20 long

Comments: Bagged fertilizer would come to the port by rail or truck. It would be palletized and placed in transit storage until the amount to be exported was accumulated. It would then be taken from storage to ship by forklift where ship's gear would be used to lift it into the hold where it would be hand stowed.

Method of Determining Weight: Accept bills of lading

Time Required to Load 10,000 Tons: 5 to 6 days assuming 5 hatches were loaded simultaneously

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	15,000	25,000
Length of time stored (days)	Not available	Not available
Days free time	30	10
Charges (dollars per ton)	\$0.30 per month	Urea - \$0.515 per month; other bagged fertilizers - \$0.64 per month

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$1.75	\$6.50
Wharfage	.45	1.00
Handling	.50	Urea - \$1.01 Other fertilizers \$1.28
Palletizing	--	2.70
Total	\$2.70	\$11.21 for urea, \$11.48 for other fertilizers

LABOR

Length of Work Week: 7 days, 2 shifts per day

Length of Work Day: 8 hours per shift--6 hours straight time, 2 hours overtime for the first shift, 8 hours overtime for the second shift. There is a third shift of 5 hours if needed.

Wage Rates: Average of \$5.00 per hour

FUTURE PLANS

If business warranted, the port would install bulk storage and handling facilities plus a bagging facility. Although the port has not handled fertilizer to any extent, they would welcome it either bagged or bulk as a regular commodity.

MISCELLANEOUS

Comments on Dock Ownership, Leasing, Etc.: The port operates the facilities rather than leasing them to private firms.

Name: Portland Public Docks
Location: Portland, Oregon
Type of Facility: Public
Fertilizer Handled: Bulk and bagged
Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet at mean low tide

Size of Ship Handled - Average: 7,000 - 9,000-ton barge with bulk urea inbound from Alaska

- Maximum: 50,000 tons

Number of Ships Loaded Simultaneously: 1 bulk or 1 bagged. Have facilities to handle up to 21 general cargo vessels.

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 4 maximum: Depends on number of hatches

Quantity of Fertilizer Exported Annually - 1968: 74 tons bagged material

Maximum Capacity: 792,000 bulk
500,000 bagged

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, bulk loader	150 long

Note: Most fertilizer handled at the port is inbound for use in the Pacific Northwest rather than for export. Bulk urea is shipped from Alaska to Portland using 7,000 to 9,000-ton barges.

Comments: Bulk fertilizer is brought to port by bottom dump hopper rail cars. The fertilizer falls by gravity from rail cars to hopper pit to conveyor belt to bulk loader to ship's hold. Storage facilities are available for handling bulk fertilizer, but these would not normally be used because it would mean double handling of the material.

Method of Determining Weight: Weigh rail cars light and heavy at dockside

Time Required to Load 10,000 Tons: 67 hours

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to storage to ship	Pallet, forklift, pallet loader, ship's gear	50 - 75

Comments: Bagged fertilizer comes to the port by rail, truck, or barge before arrival of the ship. It is then palletized and moved to storage by forklift. After the vessel arrives, the fertilizer is moved from storage by forklift to shipside where the pallet is placed on a "pallet loader"-- a device which will accommodate 2 - 4 pallets per lift. The pallet loader is then lifted into the ship's hold by ship's gear or by a port crane.

Method of Determining Weight: Accept bills of lading plus count bags loaded

Time Required to Load 10,000 Tons: 50 hours for a 4-hatch vessel assuming 50 tons are loaded per hatch per gang per hour or 400 tons per hatch per gang per day

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Triple superphosphate	10	Paper	Sewn	\$5.84
Diammonium phosphate	10	Paper	Sewn	\$5.84

Note: Bagging facilities are used to bag inbound fertilizer.

Number of Bagging Machines: 1

Route of Fertilizer Movement: Bulk fertilizer is brought to port by rail or barge, put into storage, and then bagged for use areas in the Pacific Northwest.

Method of Determining Weight: Automatic scales on bagger plus sample bag weight by checker plus state checks weight of sample bags

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	10,000 long	5,000 long
In nearby areas (tons)	0	Up to 1,000,000
Days free time	30	10
Charges (dollars per ton)	\$0.10 per long ton per month after free time	\$0.50 per long ton per month after free time

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$0.71	\$1.92
Wharfage	\$0.45 per long ton	.80
Total	\$2.00*	\$6.15*

*Includes charges not listed separately in above items.

LABOR

Length of Work Week: 7 days, 2 shifts per day of 8 hours per shift

Length of Work Day: 8 hours per shift--6 hours straight time and 2 hours overtime. Straight time totals 30 hours per week. All other time is overtime.

FUTURE PLANS

Plan to deepen channel to 40 feet at mean low water. No plans for expanding facilities for handling fertilizers. If volume of fertilizer warranted expansion, the port would tie into bulk storage with a conveyor belt system rather than using rail cars for bulk storage.

PROBLEMS

None.

MISCELLANEOUS

Policies to Prevent Demurrage: The port has rail marshalling yard capacity for 450 rail cars. They are allowed 5 days' free time on rail cars excluding Saturday, Sunday, and holidays. They plan the arrival of rail cars so that the total amount to be shipped will be at the port upon the arrival of the vessel. The port receives 2-weeks advance notice of the estimated time of arrival of the vessel, then one-week notice, then daily notice.

Source of Material: Urea - St. Helens, Oregon, and Portland, Oregon
Phosphates - Idaho

Months Most Material Shipped: Imports - winter and early spring

Comments on Dock Ownership, Leasing, Etc.: The port operates the facilities rather than leasing them out to private firms.

Name: Port of Astoria
Location: Astoria, Oregon
Type of Facility: Public
Fertilizer Handled: Bulk and bagged
Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet
Number of Ships Loaded Simultaneously: 2 bulk, 4 bagged
Number of Hatches Loaded Simultaneously:
 Bulk - usual: 1 maximum: 1
 Bagged - usual: All hatches
Quantity of Fertilizer Exported Annually - 1968: 9,000 tons
Maximum Capacity: 100,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to ship	Hopper pit, conveyor belt, bulk loader	350

Comments: The port would use grain elevator facility for loading bulk fertilizer. Fertilizer would be gravity fed from bottom drop hopper rail cars to receiving pit to conveyor belt to spout to ship's hold. It would bypass grain elevator storage.

Method of Determining Weight: Automatic scales weigh material in grain elevator unloading complex.

Time Required to Load 10,000 Tons: 5 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail or truck to storage to ship	Pallet, forklift, ship's gear	20

Comments: Bagged fertilizer is transported to port from St. Helens, Oregon, by rail or truck and palletized and put into transit storage. The total amount to be shipped is accumulated before arrival of vessel. It is then taken from storage by forklift to shipside where it is loaded using ship's gear and is hand stowed in hold.

Method of Determining Weight: Accept certified bills of lading

Time Required to Load 10,000 Tons: 5 days

BAGGING FACILITIES

Number of Bagging Machines: None

Bag Damage: On material transported to port by rail or truck - 0.5 percent
On material loaded at port - 0.5 percent

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bagged</u>
At dock (tons)	20,000
Length of time stored (days)	30 - 60
Days free time	As needed
Charges (dollars per ton)	0

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Wharfage	\$2.25	\$4.40
Total	Not given	Not given

LABOR

Length of Work Week: 7 days, 2 shifts per day.

Length of Work Day: 8 hours--6 hours straight time, 2 hours overtime

FUTURE PLANS

The port is considering installing a bagging facility.

MISCELLANEOUS

Policies to Prevent Demurrage: All bagged fertilizer is in transit storage at port before arrival of vessel.

Source of Material: Shell Chemical Plant, St. Helens, Oregon

Ideal Shipping Period: Does not matter

Comments on Dock Ownership, Leasing, Etc.: The port facilities are operated by the port authority rather than being leased to private firms.

Name: Port of Vancouver

Location: Vancouver, Washington

Type of Facility: Public

Fertilizer Handled: Bagged*

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 40 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 30,000 tons

Number of Ships Loaded Simultaneously: 4 bagged

Number of Hatches Loaded Simultaneously:

Bagged - usual: 2 Maximum: 4

Quantity of Fertilizer Exported Annually - 1968: None, imported 25,000 tons of bulk urea

Maximum Capacity: 120,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Truck to storage to ship	Pallet, forklift, ship's gear	25 - 30

*The port does not have facilities for exporting bulk fertilizers; however, bulk urea is imported from Norway. A dock crane with a clamshell or ship's gear with clamshell are used to transfer bulk fertilizer from the hold of the ship to a portable hopper to a conveyor belt to covered storage.

Comments: Urea is bagged and palletized at the fertilizer plant (Shell Oil) and shipped by truck to the port. The port supplies the pallets and trucks. It is put into transit storage at the port until the quantity to be exported in one shipment is accumulated. Forklifts and ship's gear are used to move it from storage to ship's hold where it is hand stowed.

Method of Determining Weight: Accept bills of lading

Time Required to Load 10,000 Tons: 80 hours

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea (imported from Norway)	6.25	Paper with poly-ethylene liner	Sewn	\$3.00

Number of Bagging Machines: 1

Route of Fertilizer Movement: Bulk urea is currently imported and bagged. The facility could be used to bag urea for export. They have not bagged any urea for export at this facility.

Method of Determining Weight: Automatic weigher on bagger

Portion of Bagged Material Loaded That is Bagged at This Facility: None

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	10,000 long	10,000
In nearby areas (tons)	0	0
Days free time	Not applicable	10 plus 20 if over 300 tons
Charges (dollars per ton)	Not applicable	\$0.12 per month

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$7.47 (average)
Wharfage	\$0.80
Handling	\$2.60 on material already palletized; \$3.60 on material not palletized
Total	\$10.87 - \$11.87

LABOR

Length of Work Week: 7 days

Length of Work Day: 2 shifts of 8 hours each--first shift is 6 hours straight time and 2 hours overtime; second shift is 8 hours overtime. Saturday, Sunday, and holidays are overtime.

Wage Rates: \$7.05 per hour straight time including fringe benefits;
\$7.90 per hour overtime

FUTURE PLANS

None.

PROBLEMS

Do not have bulk facilities for exporting bulk fertilizers.

MISCELLANEOUS

Policies to Prevent Demurrage: Total fertilizer to be loaded is in storage before arrival of ship. Shipper notifies port authority 30 days before arrival of vessel so material is available by the time the vessel arrives.

Source of Material: Urea - St. Helens, Oregon. The port has imported bulk urea from Norway. They have had no difficulties in handling, bagging, or receiving the bulk material by ship. The hygroscopic nature of the material appeared to cause no problems.

Comments on Dock Ownership, Leasing, Etc.: The port operates the facility. It leases warehouse space to a private firm for bulk urea imports and for bagging. The private firm owns the bagging equipment.

Name: Port of Longview

Location: Longview, Washington

Type of Facility: Public

Fertilizer Handled: Bagged*

Bagging Equipment Available: No

GENERAL INFORMATION

Depth of Channel - at Dock: 35 feet

Size of Ship Handled - Average: 7,000 - 10,000 tons

- Maximum: 60,000 tons

Number of Ships Loaded Simultaneously: 3

Number of Hatches Loaded Simultaneously:

Bagged - usual: 5 - 6

Maximum: Depends on number of hatches

Quantity of Fertilizer Exported Annually - 1968: 8,818 tons

Maximum Capacity: 200,000 - 300,000 tons

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Rail to ship	Pallet, forklift, ship's gear	20
Truck to ship	Pallet, forklift, ship's gear	20
Storage to ship	Pallet, forklift, ship's gear and/or dock crane	20

*The port has not handled any bulk fertilizer exports. However, they have a conveyor belt and bulk loader for grain handling that could be converted to handle bulk fertilizers arriving by rail or truck.

Comments: Bagged fertilizer is palletized. Forklift and ship's gear are used to place it into the hold where it is hand stowed.

Method of Determining Weight: Weigh rail cars or trucks light and heavy or accept bills of lading

Time Required to Load 10,000 Tons: 7 days

BAGGING FACILITIES

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea (using portable bagger)	10	Jute with poly-ethylene liner	Heat seal	Not available

Number of Bagging Machines: None. Portable baggers can be obtained from a contractor.

Bag Damage: One-tenth of 1 percent on bagged material coming to port. Bagged urea causes more problems than other types of fertilizers. Damaged bags are returned to the manufacturer.

Portion of Bagged Material Loaded That is Bagged at This Facility: 5 percent

STORAGE

	<u>Bagged</u>
At dock (tons)	10,000
In nearby areas (tons)	0
Length of time stored (days)	1 month
Days free time	Not specified
Charges (dollars per ton)	\$0.125 per week

CHARGES

<u>Item</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$7.75
Total terminal charge	5.66
Total	\$13.41

LABOR

Length of Work Week: 7 days, 2 shifts per day

Length of Work Day: 8 hours per shift

Overtime Policy: 16 hours per day straight time plus overtime; excludes Saturday and Sunday

Wage Rates: Average charge for labor for loading, unloading, and putting into and out of storage - \$7.24 per hour including straight time, overtime, and fringe benefits

FUTURE PLANS

No plans for expansion of facilities to handle fertilizers unless exporter or manufacturer will guarantee a satisfactory annual quantity.

PROBLEMS

None.

MISCELLANEOUS

Policies to Prevent Demurrage: Close control of berth availability and assignment of berths

Source of Material: Urea - Columbia City, Oregon
Transport charge to port - \$0.675 per hundredweight

Months Most Material Shipped: Fall months

Ideal Shipping Period: Summer and fall months when rainfall is least

Comments on Dock Ownership, Leasing, Etc.: The port authority owns and operates the facilities and equipment rather than leasing to various private firms.

Name: Port of Seattle

Location: Seattle, Washington

Type of Facility: Public

Fertilizer Handled: Bulk and bagged

Bagging Equipment Available: Yes

GENERAL INFORMATION

Depth of Channel - at Dock: 45 feet

Size of Ship Handled - Average: 10,000 tons

- Maximum: 50,000 tons

Number of Ships Loaded Simultaneously: 1 bulk, 5 bagged

Number of Hatches Loaded Simultaneously:

Bulk - usual: 1 maximum: 1

Bagged - usual: 5 maximum: 5

Quantity of Fertilizer Exported Annually - 1968: Exported 686 tons of
bulk urea, imported 10,000 tons of bulk urea

Maximum Capacity: Bulk - 48,000 tons
Bagged - up to 200,000 tons

BULK FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour)</u>
Rail to storage to ship	Hopper pit, conveyor belt, payloader, bulk loader	150 maximum

Note: The majority of fertilizer moving through this port is imported materials for use in the Pacific Northwest rather than exported. Most exports are for bagged materials and are parcel shipments on liner carriers.

Comments: Most fertilizers moving through this port are imported rather than exported. Facilities exist for exporting bulk materials. For bulk export fertilizers, material comes to port in bottom 'ump rail cars where it is gravity fed into a hopper pit to conveyor belt to floor storage. From floor storage it is transported to the ship's hold by way of portable conveyor belt to weigh hopper to conveyor belt to gantry to spout to ship's hold.

Method of Determining Weight: Weighed in weigh hopper while being loaded on ship

Time Required to Load 10,000 Tons: 4.5 days

BAGGED FERTILIZER LOADING

<u>Route of Movement</u>	<u>Transfer Equipment</u>	<u>Rate of Transfer (Tons Per Hour Per Hatch)</u>
Storage to ship	Pallet, forklift, ship's gear	15

Comments: Bagged fertilizer is transported to the port by rail or truck where it is palletized and placed in transit storage until the quantity to be shipped is accumulated. It is then taken from storage by forklift truck to shipside where it is placed in the hold by ship's gear and hand stowed. The same routine is followed for fertilizer bagged at the port.

Method of Determining Weight: Accept bills of lading

Time Required to Load 10,000 Tons: 134 hours

BAGGING FACILITIES*

<u>Type of Fertilizer</u>	<u>Bagging Rate (Tons Per Hour Per Machine)</u>	<u>Bag Type</u>	<u>Method of Closure</u>	<u>Bagging Charge (Per Ton)</u>
Urea	Not available	Paper with poly-ethylene liner	Sewn	Not available
Calcium phosphate	Not available	Paper	Sewn	Not available

*For imported fertilizer for use in Pacific Northwest

Number of Bagging Machines: 1

Route of Fertilizer Movement: Imported bulk fertilizer is brought to the port by ship or rail car where it is put into storage by a conveyor belt system, then bagged.

Method of Determining Weight: Automatic scales on bagging machine

Bag Damage: Less than 1 percent on bagged material for export

Portion of Bagged Material Loaded That is Bagged at This Facility: None for export; about 20 percent of the inbound urea is bagged at the port. Export materials could be bagged at the port.

STORAGE

	<u>Bulk</u>	<u>Bagged</u>
At dock (tons)	5,000	Up to 150,000
In nearby areas (tons)	0	5,000
Length of time stored (days)	Not applicable	60 - 90 on inbound material
Days free time	30 for 200 tons or more	30 for 200 tons or more
Charges (dollars per ton)	\$0.45 per month	\$0.45 per month

CHARGES

<u>Item</u>	<u>Bulk (Per Ton)</u>	<u>Bagged (Per Ton)</u>
Stevedoring	\$1.00	\$5.00
Wharfage	.50	.80
Bagging	XXX	Not available
Total*	\$4.00	\$8.66

*Includes unspecified charges, i.e., trimming, clerking, pallet rent, etc.

LABOR

Length of Work Week: 7 days, 2 shifts per day

Length of Work Day: 8 hours per shift--6 hours straight time, 2 hours overtime for first shift, 8 hours overtime second shift, or 30 hours straight time per week excluding Saturday, Sunday, and holidays

Wage Rates: \$5.00 per hour average including fringe benefits

FUTURE PLANS

None; fertilizer plants in the Pacific Northwest area are domestic oriented. Almost all fertilizer moving through the port is inbound for use in the area. Have had some bulk shipments of urea to Hawaii.

PROBLEMS

Lack of storage space for handling inbound bulk fertilizers

MISCELLANEOUS

Policies to Prevent Demurrage: On rail shipments, fertilizer is transported to the port before the arrival of the vessel. Estimated time of arrival (ETA) of ship is known one month in advance, and this information is used to schedule rail car deliveries.

Source of Material: Urea - Oregon

Ideal Shipping Period: Summer, when rainfall is less

Comments on Dock Ownership, Leasing, Etc.: Port operates the bulk facility. Bagging facilities, bagging, and warehousing of bagged materials are carried out by private firms.