

2.3 Environmental Protection During the Operational Period

2.3.1 Solid Waste Management

(1) Description

**Table 2.3.1 Mitigation Measure No. 6:
Solid Waste Management**

DESCRIPTION OF MEASURE				
Collection and disposal of solid waste produced during port operations.				
OBJECTIVE: Maintain a clean site, prevent odor and contamination of soil and water				
RATIONALE: In the functioning port, solid waste from vessels will be dealt with by Shipping Agents, who normally employ a contractor to carry material to landfill. The remaining waste is the responsibility of the Port Authority, and CEPA will require all companies operating within the port to develop and apply Waste Management Plans to deal with their waste. CEPA will prepare an overall Plan for the port, to provide the framework within which the plans of each company must fit. They will also provide trash containers, a central disposal point, and a garbage truck, and will arrange for La Unión Municipality to collect the waste from outside the port. The Port Waste Management Plan will be included in the Port Operations Manual (POM), which contains procedures describing how all the activities in the port are to be conducted.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Request La Unión City to collect port waste				CEPA
2. Require firms to prepare Waste Management Plan				CEPA
3. Prepare Port Operations Manual				CEPA
4. Prepare Port Waste Management Plan				CEPA
5. Provide trash containers and collection truck				CEPA
6. Waste managed according to plans				CEPA
MONITORING				
1. Correct deposition, collection, disposal of waste				PEU

(2) Approach

1) Port Management

As the government body responsible for ports, airports and railways in El Salvador, CEPA will have overall authority over the port on behalf of the government, and will thus take major decisions regarding matters of policy. They will appoint a Port Manager who will be responsible for the day-to-day business and operation of the port, and he will head a management team including managers of other departments (such as Administration, Operations and Maintenance), each of whom will be responsible for their aspect of the operation.

Port operations will be privatized at least to an extent, with companies being invited to tender for various concessions, including cargo handling and the provision of services for certain port facilities (for example waste management). CEPA will retain responsibility for development of the port site, for planning and supervision of developments and operations, and for the provision of major port maintenance services such as routine dredging of the approach channel.

2) Port Operations Manual

CEPA will prepare an Operations Manual, containing procedures that have to be followed within the port. This will cover all activities, and will be provided to

all concessionaires, to all vessels visiting the port, and to all container and haulage companies. The Port Management Team will monitor the application of the procedures, and will take action in cases of repeated violation.

3) Solid Waste Management

Solid waste will be generated by most of the activities in the port when it is operational, including the administration buildings, the facilities provided for workers (canteens and washrooms), the activities of the various companies operating on site, and the ships that visit the port. Measures to minimize and deal with waste produced during the handling of bulk solids are described separately below (Section 2.3.6). Waste produced by vessels is dealt with by Shipping Agents, who normally appoint a contractor to collect and dispose of the material to a local landfill.

As the Port Authority, CEPA will only be responsible for waste produced by its own activities, and those of the companies operating in the port under the various concessions. This material is generally limited to domestic-type waste, including litter, waste paper and packaging, food, etc. CEPA will require each company to develop and implement a Waste Management Plan to deal appropriately with its solid waste, and CEPA will develop an overall Waste Management Plan for the port which will be the framework integrating the individual plans of the companies.

CEPA will provide the central infrastructure necessary for implementation of the plans, that is metal trash containers, a deposition point and a garbage truck to carry waste to the port perimeter. Here waste will be transferred into the vehicles of La Unión Municipality, who will carry the material to the municipal landfill.

4) Change to the Mitigation Measure

The Environmental Permit included a requirement for the port to provide an incinerator to burn solid waste, but this was omitted with MARN approval, as this would be a very expensive method of dealing with a relatively small quantity of waste, which can be dealt with effectively via the existing Municipal waste management service.

(3) Action Required – Construction Phase

CEPA will:

- Liase with La Unión City to obtain their agreement to extend their existing waste management service to include the port.

(4) Action Required – Operational Phase

CEPA will:

- Appoint Consultants to prepare a Port Operations Manual (POM) containing procedures describing how all activities in the port are to be conducted;
- Provide copies of the POM to all companies granted concessions for port activities, to all vessels visiting the port, and to all container and haulage companies;
- Make the Port Manager responsible for monitoring the implementation of the POM amongst CEPA employees, concessionaires and their employees, and port

visitors including those from vessels and haulage trucks;

- Ensure that the Port Manager reports to CEPA on a monthly basis the results of the monitoring, and takes action in cases of serious or repeated transgressions;
- Include in the POM a procedure requiring all companies operating in the port to prepare and implement their own Waste Management Plan;
- Prepare and implement an overall Waste Management Plan for the port that integrates the plans of the individual companies. This will be an annex to the POM;
- Provide each company with standardized trash containers;
- Collect and empty the trash containers regularly as specified in the Port Waste Management Plan, transport waste to the port perimeter and transfer the material to La Unión Municipality garbage trucks.

2.3.2 Liquid Waste Management

(1) Description of Measure

**Table 2.3.2 Mitigation Measure No. 7:
Liquid Waste Management**

DESCRIPTION OF MEASURE				
Include in the port design, measures to collect, treat and dispose of any spills of hazardous liquids.				
OBJECTIVE: Prevent pollution of soil and water by spilled liquids.				
RATIONALE: The completed port will not handle liquid cargoes in bulk, so the only area in which hazardous liquids will be handled is in the vehicle maintenance workshop. The drainage system has been designed to collect all drainage from this area and pass to an oil-water separator, designed to treat the waste to El Salvador discharge standards. If bulk liquids are handled in future, CEPA will provide necessary pollution control measures in discussion with MARN.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Port Design: includes oil-water separator				Completed
2. Port Design: workshop drainage to separator				Completed
3. Prepare port oilspill contingency plan				CEPA
4. Provide booms, skimmers, absorbents				CEPA
MONITORING				
1. Oil/grease in separator effluent (weekly)				PEU

(2) Approach

1) Liquid Bulk Cargoes

It is very unlikely that any liquid cargoes will be handled in bulk at La Unión port, because:

El Salvador's main imports of crude oil and finished gasoline are unloaded at buoys offshore of Acajutla port, operated by RASA, and this operation is likely to continue independent of the ports;

The smaller quantities of gasoline, diesel and fuel oil imported through Acajutla port by Texaco and other companies are unlikely to move to another port as they have invested in the infrastructure to support their operations at Acajutla;

Importers of grain, fertilizer, cement and other solid bulks, and container traffic, would be discouraged by frequent visits from oil tankers, as the complexity of tanker maneuvering operations normally delays other vessels which have to lie up offshore instead of coming straight in to port;

Other bulk liquids handled by El Salvador's ports (mainly animal and vegetable fats, soybean oil, alcohol, liquid butane gas, caustic soda, and alkanes), are imported in such small quantities that it would not be financially viable for La Unión port to invest in facilities to handle these materials.

2) **Liquid Waste Management**

The only area in which hazardous liquids will be handled is the vehicle maintenance workshop, where oil will be drained and refilled in vehicle engines. The port designs include an oil-water separator, and the drainage system will pass all drainage from the workshop area (including runoff) to the separator, which has been designed to treat effluents to El Salvador discharge standards (Table 2.3.3).

The remainder of the Port (including the multi-purpose terminal and container yards) will not carry the risk of major spills of hazardous liquids, so they will contain no special pollution control or drainage measures. Land drains from these areas will discharge surface runoff into the waters of the port.

Because there could be accidental spillage of oil from vessels visiting the port, CEPA will develop an oil spill contingency plan prescribing how spillages will be dealt with. The necessary equipment will be provided (including floating booms to contain spillages, and skimmers and absorbents to remove and treat the oil) and the Port Management Team will be required to practice implementing the plan every year so that action is routine when a spill occurs.

3) **Change in the Mitigation Measure**

The Mitigation Measure included several elements recommended by the EIA, that were included when it was assumed that the port would handle liquid cargoes in bulk. These were:

- Provision of a slop tank or mud tank where ships could wash oily residues from their tanks;
- Bunds around oil loading and unloading areas to contain spilled liquids;
- Vapor collecting tanks to maintain safety in truck loading areas;
- Concrete boxes under the jetty at pipe connecting points to collect spills;
- A 150 m³ storage tank in a bunded area for lubricating oil.

With MARN approval these were omitted from the design.

(3) **Action Taken - Design Stage**

The port drainage system has been designed so that surface water from the vehicle maintenance workshop will drain into pipes and be conveyed to an oil-water separator

The oil-water separator has been designed to treat the likely maximum amounts of wet season runoff plus potential liquid spillages, to El Salvador discharge standards (Table 2.3.3);

The details of the drainage system and oil-water separator are shown on drawings and in Specifications that form part of the Contract Documents for port construction.

(4) Action Required – Operational Phase

CEPA will:

- Appoint specialist to develop an Oil Spill Contingency Plan for the port and provide training to the Port Management Team and other staff who will be involved, in the implementation of the plan;
- Provide all equipment required for the Oil Spill Contingency Plan, ensure that the Port Management Team maintain all equipment fully functional at all times, and that they carry out a full-scale practice of the plan every year;
- Inform MARN of any plans to handle any bulk liquids in the future, and request MARN approval of measures proposed to control pollution from the handling of these materials.

Table 2.3.3 El Salvador Standards for the Discharge of Agricultural, Domestic and Industrial Effluent

PARAMETER	MAXIMUM PERMISSIBLE VALUE
Oil and grease (domestic & industrial water)	20 Mg/ltr
Aluminium	5 Mg/ltr
Arsenic	0.1 Mg/ltr
Total Barium	5 Mg/ltr
Beryllium	0.5 Mg/ltr
Boron	1.5 Mg/ltr
Cadmium	0.1 Mg/ltr
Total Cyanide	0.2 Mg/ltr
Zinc	5 Mg/ltr
Cobalt	0.2 Mg/ltr
Copper	1Mg/ltr
Faecal Coliforms	2000 NMP
Total Coliforms	10,000 NMP
True color	200 Pt – Co
Composed Phenolics	0.5 Mg/ltr
Hexavalent Chromium	0.1 Mg/ltr
Total Chromium	1 Mg/ltr
BOD ₅ at 20°C (domestic water)	30 Mg/ltr
BOD ₅ at 20°C (industrial water)	200 Mg/ltr
Detergents	10 Mg/ltr
COD (industrial water)	600 Mg/ltr
COD (domestic water)	60 Mg/ltr
Fluoride	5 Mg/ltr
Total phosphorous	10 Mg/ltr
Total herbicide	0.1 Mg/ltr
Hydrocarbons	5 Mg/ltr
Total iron	10 Mg/ltr
Lithium	2 Mg/ltr
Total Manganese	2 Mg/ltr
Floating material	Absent
Mercury	0.1 Mg/ltr
Nickel	0.2 Mg/ltr
Nitrogen	50 Mg/ltr
Organo-chlorides	0.05 Mg/ltr
Organo-phosphates and carbamates	0.1 Mg/ltr
PH	5.5 – 9.0 Units
Silver	0.2 Mg/ltr
Lead	0.05 Mg/ltr
Selenium	0.05 Mg/ltr
Sedimentable solids	1 Mg/ltr
Suspended Solids (domestic water)	60 Mg/ltr
Suspended solids (industrial water)	100 Mg/ltr
Sulfates	1000 Mg/ltr
Radioactive substances	Nil
Temperature	+ 5°C
Turbidity	100 NTU
Vanadium	1 Mg/ltr

[Source: Proposed values by National Council of Science and Technology CONACYT (Consejo Nacional de Ciencia y Tecnología)]

2.3.3 Occupational Health and Safety

(1) Description of Measure

**Table 2.3.4 Mitigation Measure No. 11:
Occupational Health and Safety**

DESCRIPTION OF MEASURE				
Operate Occupational Health and Safety (OHS) Plans and provide safety equipment for workers during port construction and operation.				
OBJECTIVE: Protect health and safety of workers and maintain occupational hygiene.				
RATIONALE: To protect the health and safety of workers, the Port Contractor will be required to produce and operate an OHS plan covering construction site activities, and to provide safety equipment including clothing, footwear, head and eye protection, gloves, harnesses, etc. CEPA will produce an OHS plan for the operating port, and provide safety equipment for those activities that are their responsibility.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Contract Docs: Operate OHS Plan (construction)				Completed
2. Contract Docs: Provide safety equipment				Completed
3. Construction activities conducted as in Plan				Contractor
4. OHS Plan and equipment for operating port				CEPA
5. Operational activities conducted as in Plan				CEPA
MONITORING				
1. Construction activities conducted as in Plan				Consultant
2. Operational activities conducted as in Plan				Port Manager

(2) Approach

1) Occupational Health and Safety

Most of the activities performed at a construction site carry a degree of risk to the safety of workers, with those of most risk being activities involving demolition, or where vehicles are involved (such as at the borrow site), or when workers are working above ground on scaffolding. Similarly in an operating port many of the activities involve complex machinery (such as the unloading of bulk cargoes) or vehicles (container handling), or hazardous materials (in cargoes).

It is normal practice for construction sites and industrial premises to operate OHS Plans, and provide safety equipment to protect workers. This will be achieved in the present project as follows:

- Contract Documents require the Port Contractor to prepare and operate an OHS Plan at the construction site and provide safety equipment for workers;
- CEPA will prepare an OHS Plan for the operating port, will provide equipment and facilities for operations that are their responsibility, and will audit performance and keep a record of accidents.

(3) Action Taken - Design Stage

Contract Documents require the Contractor to:

- Prepare and submit as part of his bid, an Occupational Health and Safety Plan to be applied throughout the construction period. This will describe procedures to be followed and equipment to be provided.

(4) Action Required - Construction Phase

CEPA will:

- Ensure that the Consultant appointed to supervise construction monitors the implementation by the Port Contractor of the approved OHS plan;

(5) Action Required – Operational Phase

CEPA will:

- Appoint specialist to prepare a Port Occupational Health and Safety Plan, describing procedures to be followed and equipment and facilities to be provided to maintain the health and safety of all port workers;
- Provide all safety equipment indicated by the OHS Plan as being necessary for those operations which remain in the control of CEPA, and all equipment and facilities which are to be provided by the Port Authority;
- Make the Port Manager responsible for monitoring the implementation of the OHS plan amongst CEPA employees, concessionaires and their employees, and port visitors including those from vessels and haulage trucks;
- Ensure that the Port Manager reports to CEPA on a monthly basis the results of the monitoring, and takes action in cases of serious or repeated transgressions.

2.3.4 Port Environmental Unit

(1) Description of Measure

**Table 2.3.5 Mitigation Measure No. 13:
Port Environmental Unit**

DESCRIPTION OF MEASURE				
Form a group of experts to be responsible for environmental matters within the port.				
OBJECTIVE: Minimize the environmental impacts of port operations				
RATIONALE: Most of the activities of the port could damage the environment if mitigation measures are not implemented properly, if operational procedures are not followed, and if accidents occur. A small Unit of experts will be established, to determine whether procedures are being implemented, and to carry out monitoring to assess whether agreed conditions are being met and to determine how the port is affecting the environment. This will comprise a qualified Manager, a Mechanical Engineer and a Water Quality Scientist.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Establish Port Environment Unit (PEU)				CEPA
2. PEU carry out ambient and effluent monitoring				PEU
MONITORING BY ENVIRONMENTAL UNIT				
1. Daily observations for pollution evidence				PEU
2. Oil Separator effluent: Oil/grease				PEU
3. WWTP: BOD, COD, TSS, Coliform				PEU
4. Ambient air, soil, water quality				PEU
5. Report results to CEPA				PEU

(2) Approach

Most modern ports now have some kind of Environmental Unit, with facilities on site where they can carry out basic tests of water quality and other environmental parameters. These tests, and other observations are very important in monitoring the effects of the port on the environment, and providing early indications of potential problems. Such a Unit will be established at La Unión Port, to carry out the following

activities:

- *Ad hoc* observations and annual audits of the compliance of port operators, staff and visitors, with procedures set down in the Port Operations Manual relating to environmental matters;
- Monthly monitoring of ambient water, air and soil quality within the port, and the concentrations of key parameters in wastewater discharges and atmospheric emissions from port operations and processes;
- Review of the monitoring results, comparing ambient values with national standards and baseline conditions established before the port was constructed, and comparing the quality of discharges and emissions with national standards and permit conditions specific to particular operations;
- Assessment of the impact of the port on the environment on the basis of the above comparisons, and early identification of any exceeding of standards, or other potential environmental problems;
- Regular reporting of the results of such analyses to CEPA, with recommendations regarding appropriate remedial action.

(3) Action Required – Operational Phase

CEPA will:

- Establish a La Unión Port Environmental Unit (PEU), comprising a qualified personnel;
- Provide an office space to enable the PEU to conduct its various activities over the long term;
- Specify that the PEU is to carry out the following ambient monitoring every month at three permanent stations:
 - Air : Particulate matter;
 - Seawater : BOD₅, COD, Turbidity, TSS, Dissolved Oxygen, Oil and Grease, total and fecal coliforms;
- Specify that the PEU is to carry out the following monitoring of effluent discharges every month, taking one sample per effluent:
 - WWTP : PH, BOD₅, COD, TSS, total and fecal coliforms;
 - Oil Separator : visual inspection of oil and grease;
- Require the PEU to make daily observations for visual evidence of pollution in and around the port, and *ad hoc* observations of working practices to ensure that none carry a risk of damaging the environment;
- Require the Environmental Unit to report every month (and immediately if an emergency situation arises) to CEPA and the Port Manager on the results of its observations and monitoring.

2.3.5 Environmental Measures in Port Operations Manual

(1) Description of measure

**Table 2.3.6 Mitigation Measure No 14:
Environmental Measures in Port Operations
Manual**

DESCRIPTION OF MEASURE				
Prepare and include environmental measures in the Operations Manual for the port.				
OBJECTIVE: Raise awareness of environmental risks/impacts, reduce pollution incidents and the impact of the port on the environment.				
RATIONALE: The Port Environmental Unit will establish an Environmental Management System with procedures specifying how the port and it's various operations will manage and minimize their effects on the environment.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Set up Port Environmental Management System				PEU
MONITORING				
1. <i>Ad hoc</i> observation of working practices				PEU
2. Annual audit: compliance with EMS procedures				PEU

(2) Approach

The procedures of the Port Operations Manual should prevent accidents during port operations and thus avoid environmental damage. However given that most activities in the port could affect the environment, it is important that the port also takes positive action to manage and minimize its impacts, in addition to these preventative measures. This is the function of an Environmental Management System (EMS), which covers such actions as recycling of paper and other waste, reducing the use of fuels and energy, etc, but also examines the direct impact of the port on the environment through the materials it uses, the products it makes, and the way materials are handled. The PEU will design and implement an EMS for the port, which will become an integral part of the POM, and will apply to all port activities.

(3) Action Required – Operational Phase

CEPA will:

- Employ a qualified and experienced specialist to work with the PEU to develop and implement a Port Environmental Management System and manual, prescribing how the port and its operators are to manage their environmental performance;
- Require the PEU to carry out annual audits of the performance of all companies operating in the port, to ensure compliance with the EMS procedures.

2.3.6 Control of Emissions from Bulk Solids Handling

(1) Description of Measure

**Table 2.3.7 Mitigation Measure No. 15:
Management of Bulk Solids**

DESCRIPTION OF MEASURE				
Use techniques and equipment to reduce dust produced during handling of bulk solids.				
OBJECTIVE: Minimize atmospheric emissions produced by bulk solids handling.				
RATIONALE: The handling of dry bulk solids can be a major source of air pollution in ports. Emissions can be reduced by the use of appropriate handling equipment, including covered low-velocity conveyors, collecting trays, minimizing heights between conveyors at transfer points, covering stockpiles, storage in silos, using bag filters at air extraction points, etc. A single company will be awarded the port operations concession of the Multi Purpose Terminal, and they will be responsible for providing cargo handling equipment. CEPA will provide bidders with copies of the POM and EMS to establish environmental standards and procedures, and will include environmental protection as one of the criteria in evaluating bids.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Provide POM, EMS to all port operations bidders				CEPA
2. Use env. protection as evaluation criterion				CEPA
3. Handling equipment provided, dust controlled				CEPA
MONITORING				
1. Monitoring of dust emissions once per week				PEU

(2) Approach

1) Dust Reduction

Methods traditionally used to handle bulk solids in ports, such as grab unloaders transferring loose material from the hold of the vessel into hoppers, and then into open trucks or conveyors, have for many years been significant sources of atmospheric pollution in and around ports (Photo 2.3.1). Inappropriate transfer, between open conveyors with large height differences, and the storage of material in uncovered stockpiles compound the dust problem, and frequently in ports trees, vegetation and buildings become covered with dust, and there are deposits of material on the ground and in the water (Photo 2.3.2). This is not only unsightly and a cause of pollution, but it can be a human health risk and also represents a loss of revenue.

Modern ports employ a variety of measures to reduce the emission of materials from bulk handling operations, and these include:

- Vacuum unloading through pipes into closed trucks or hoppers;
- Transport via covered conveyors with low velocity belts; setting conveyors so that there are small height differences at transfer points to minimize the distance the material has to fall; using collection trays below the conveyor; enclosing transfer stations to prevent material being blown around;
- Covering stockpiles or storing solids in silos equipped with rotating valves and other dust retention systems;
- Use of bag filters and other dust suppression mechanisms at all points where storage areas are open to the atmosphere.

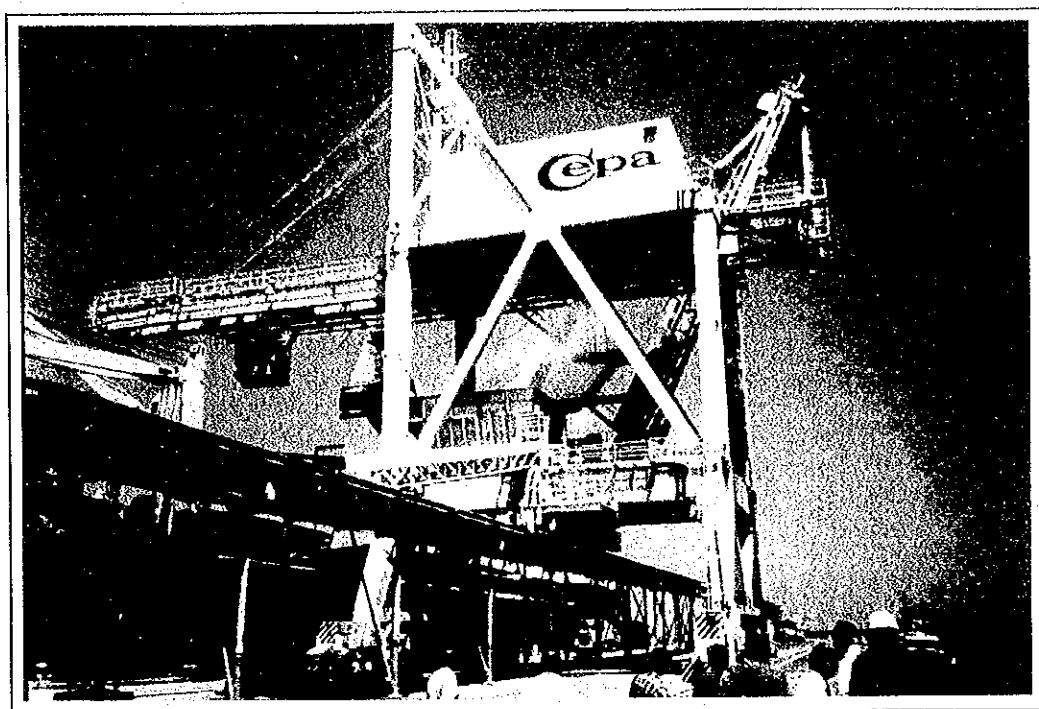


Photo 2.3.1 Grab Unloading of Grain at Acajutla Port

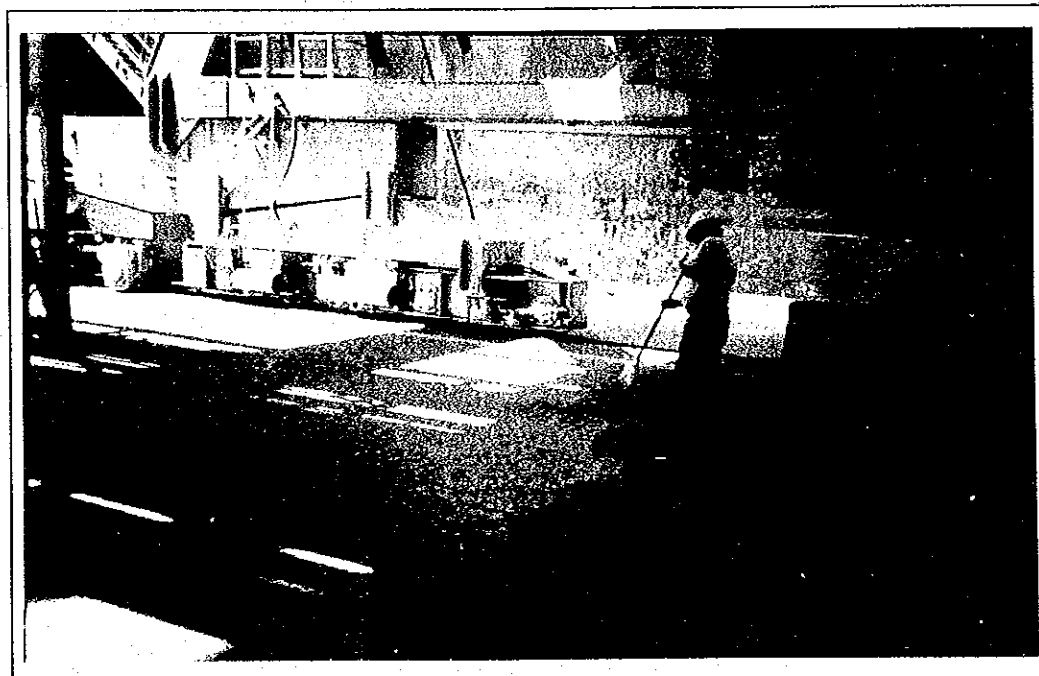


Photo 2.3.2 Grain Spilled on the Wharf at Acajutla Port

2) Bulk Solid Cargoes

It is likely that the main solids handled in bulk in La Unión Port will be imports of fertilizer, grain (wheat and maize), maize flour and soybean flour (for animal feed), and exports of raw sugar. Although cement will initially be imported in bags, if this activity expands it may change to bulk handling in the future.

Certain of these materials are hazardous to human health (fertilizer and cement) if ingested by breathing, and all would be deposited in and around the port as particulate matter if they were allowed to blow around during handling or storage. They would all be polluting if they were allowed to spill into the sea around the port. Fertilizer and sugar in particular are high BOD materials, which could significantly reduce oxygen levels in the water through eutrophication, particularly in the vicinity of the port where there is reduced current action. Although small spillages of grain and flour in the water would probably be consumed by fish, larger spillages would be broken down by bacteria, again consuming oxygen and possibly causing the death of fish and other organisms.

3) Cargo Handling

It is likely that one or two companies will be granted the concession for port operations, and that they will then be responsible for loading, unloading and storage of all cargoes, including solid bulks, break bulk (material in bags and drums) and containerized cargo. The operator provides the necessary handling equipment, machinery, labor and storage facilities, and companies engaged in importing and exporting materials (the private port users) pay a tariff for these services. Cargo handling and storage infrastructure is not included in the port design as the requirements are the responsibility of the company granted the concession, and will only be determined during the bidding process, conducted towards the middle of the construction period.

However, as CEPA will control the process and adjudicate the bids, they will be able to influence the selection to ensure that the preferred bidder includes an appropriated degree of environmental protection in their operation. CEPA will provide tendering companies with a copy of the draft Port Operations Manual and Draft Environmental Management System Manual to establish the standards with which the selected Port Operator will have to comply. They will then use the degree of environmental protection proposed by the bidders as one of the selection criteria.

(3) Action Required – Construction Phase

CEPA will:

- Provide drafts of the Port Operations Manual and Environmental Management System Manual to all companies tendering for the port concessions;
- Include environmental protection as one of the criteria used in evaluating bids for all port concessions;
- In proposals for the handling of bulk solids, ensure that the approach proposed by the preferred bidder provides as much dust prevention as possible. This will include the following, where possible:
 - Pneumatic unloading rather than grab or open bucket conveyors;
 - Covered conveyors rather than open systems;

- Low velocity belts preferred over high velocity;
- Enclosed transfer stations (transfers between conveyors) preferred over open stations;
- Adjustable conveyors preferred, to provide small drop distances between belts at transfer stations;
- Closed storage in silos with dust retention systems rather than storage in open stockpiles;
- Use of bag filters, hoods and other dust extraction methods at all ventilation points.

2.3.7 Operation of Liquid Treatment Plants

(1) Description of Measure

**Table 2.3.8 Environmental Permit Condition No. 9:
Operation of Liquid Treatment Plants**

DESCRIPTION OF MEASURE				
Employ a qualified technician to operate the port water treatment plants and monitor effluent discharges.				
OBJECTIVE: Maintain WWTP and oil-water separator in full working order, and ensure that discharges meet El Salvador standards.				
RATIONALE: Measures to control water pollution in the port comprise an oil-water separator and a sewage treatment plant. These have been designed to treat pollutants so that water released to the environment meets El Salvador discharge standards. The Contractor will prepare an Operation and Maintenance Manual for the plants specifying procedures to be followed, and CEPA will hire a qualified technician to operate the plants and measure basic parameters of the effluent.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. WWTP designed to treat to discharge standard				Completed
2. Separator designed to treat to discharge standard				Completed
3. Contract Docs: Contractor supply O&M manual				Contractor
4. Plants built as specified				Contractor
5. Hire technical operator for treatment plants				CEPA
6. Provide basic monitoring equipment				CEPA
7. Technician maintains plants, monitors effluent				PEU
MONITORING				
1. Plants built as specified				Consultant
2. Monthly: flow, pH, temperature, visual quality				Technician
3. Monthly: oil/grease, BOD, COD, TSS, bacteria				PEU

(2) Approach

1) Oil Treatment

The oil-water separator will receive drainage from the vehicle maintenance workshops, and has been designed to treat the liquids to El Salvador discharge standards (Table 2.3.3), before effluent is released to the sea at the container berth. Contract Documents require the Contractor to provide an Operation and Maintenance (O&M) Manual describing the procedures that need to be followed to maintain the plant in working order. CEPA will employ a qualified technician to operate the separator, following the procedures set down in the O&M manual, and to record basic parameters of the effluent.

2) Wastewater Treatment

A sewage treatment plant will be provided to treat waste from on site toilets and washrooms, and this has also been designed to treat the material to El Salvador discharge standards (Table 2.3.8). Again the Contractor will provide an O&M Manual and the technician will operate the plant and monitor basic effluent parameters.

Table 2.3.9 El Salvador Standards for the Discharge of Domestic Wastewater

PARAMETER	LIMIT
Bacteria	Analyzed sample shall not have a density higher than 5000
Coliform total	UFC per 100 ml
Coliform fecal	Analyzed sample shall not have a density higher than 1000
	UFC per 100 ml
Biochemical Oxygen Demand (BOD ₅)	Not below 5 mg per liter It shall not be allowed that oxygen falls below 5 mg/ltr
Dissolved Oxygen	5 mg/ltr or higher
PH	It shall be maintained between 6.5 to 7.5, and not to modify natural level more than 0.5 ph units.
Turbidity	It shall not increase more than 5 turbidity units above the environmental limit of the receptor water body
Temperature	It shall be maintained between 20 and 30 °C, and not to modify the temperature of the receptor water body more than 5 °C
Toxicity	Not above 0.05 mg/ltr of organo-chlorine pesticides

[Source: Decree No. 40 Special Regulation of Technical Norms for Environmental Quality]

3) Effluent Analysis

The Port Environmental Unit will take samples of both effluents every month for analysis of the more complex determinands. These are oil and grease in the separator discharges, and BOD, COD, Total Suspended Solids and total and faecal coliforms in the WWTP effluent. These will be carried out by an external laboratory, and the Environmental Unit will report to CEPA on the results.

(3) Action Taken - Design Stage

- The oil-water separator and WWTP have been designed to treat adequately the expected volumes of material, producing effluents that comply with El Salvador Discharge Standards (Tables 2.3.3 and 2.3.8);
- The Contract Documents require the Port Contractor to prepare Operation and Maintenance Manuals for the oil-water separator and WWTP, which describe clearly all procedures to be followed.

(4) Action Required – Operational Phase

CEPA will:

- Employ a qualified and experienced technician to operate the oil-water separator and WWTP as prescribed in the O&M Manuals, with the responsibility of ensuring that the plants operate to the design specifications at all times;
- Give the technician the additional responsibility of keeping daily records of the temperature, pH, flow rate and visual quality of effluent discharged from both plants, and reporting to the Port Environmental Unit;

- Give the Port Environmental Unit the responsibility of taking samples every week of the effluent from both plants and sending to an approved external laboratory for analysis of total oil and grease (separator effluent) and BOD₅, COD, TSS and total and faecal coliforms (WWTP effluent);
- Require the Port Environmental Unit to report to CEPA every month on the results of the effluent analyses, highlighting any failures to meet El Salvador discharge standards;
- Take action to address any cases of serious or repeated departure from El Salvador discharge standards. This will involve an assessment of the reason for the departure and a determination of required remedial action.

2.3.8 Maintenance of Treatment Plants

(1) Description of Measure

**Table 2.3.10 Environmental Permit Condition No. 10:
Maintenance of Treatment Plants**

DESCRIPTION OF MEASURE				
Maintain port pollution treatment facilities and remove and dispose of waste material.				
OBJECTIVE: Prevent discharge of polluting effluents.				
RATIONALE: The various oil-water separator and wastewater treatment plant require regular maintenance and removal of waste to maintain optimum performance. CEPA will appoint a contractor to remove and dispose of sludge in an approved manner.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. Determine appropriate means of sludge disposal				CEPA
2. Appoint Contractor to remove, dispose sludge				CEPA
3. Sludge removed and disposed of				CEPA
MONITORING				
1. Removal and disposal of sludge as specified				PEU

(2) Approach

1) Change in Permit Condition

This Environmental Permit Condition included a requirement to maintain the incinerator and oil slop tank, which are no longer relevant as for reasons explained in Sections 2.3.1 and 2.3.2 above, these facilities have been omitted from the design.

2) Treatment plants

As explained in Section 2.3.7 above the Contractor will provide an O&M Manual for the oil-water separator and WWTP, and this will specify the frequency with which waste sludge needs to be discarded and the method of removal. CEPA will consult with La Unión Municipality and the National Administration of Water Supply and Sewerage (ANDA) to identify the appropriate disposal method(s) and location, and will then appoint a waste contractor to carry out the operation.

2.3.9 Prevent Rodents Entering the Port from Ships

(1) Description of Measure

**Table 2.3.11 Environmental Permit Condition No. 14:
Prevent Rodents Entering the Port from Ships**

DESCRIPTION OF MEASURE				
Prevent rats and other rodents entering the port from visiting ships.				
OBJECTIVE: Prevent proliferation of pests in the port damaging cargoes, and the introduction of alien species.				
RATIONALE: Poorly controlled loading and pest control procedures at other ports could mean that the holds of ships that visit La Unión Port could be inhabited by rats and other rodents, feeding on the loose and bagged cargoes. These could be species alien to the Americas if ships visit from far afield, so to prevent the proliferation of pests in the port and the introduction of alien species that could upset the balance of natural ecosystems, these animals need to be prevented from entering the port. This is routinely done in ports by the use of metal barriers on the mooring ropes.				
MAIN ELEMENTS				
	D	C	O	Responsibility
1. POM: require ships to use anti rodent barriers				CEPA
2. Control pests throughout port				CEPA
MONITORING				
1. Monitor use of discs, pests in port				PEU

(2) Approach

Many of the ships that visit La Unión Port will be carrying cargoes that attract rats and other rodents. This applies particularly to materials handled in bulk, such as the grains, and maize and soybean flours, but also break-bulk cargoes carried in bags. Rodents will need to be prevented from entering the port where they could cause serious damage to cargoes being stored. Pests could also bring wider ecological problems if they were species alien to the Americas, because they could upset the balance of natural ecosystems if they escaped from the port and proliferated in the surrounding habitats.

This is a problem that has been solved in ports by a very simple yet effective way. Rats normally leave the hold of ships is by running down the mooring ropes, and they can be prevented from doing this by installing metal barriers along the ropes, which are large enough to prevent the rats from climbing over. Most vessels now carry their own devices to prevent rats entering their holds, and a procedure will be added to the Port Operations Manual requiring ships to use these devices on all mooring ropes at all times when in the port.

The port will apply its own pest control procedures to keep down the populations of rodents attracted by the cargoes, and this will involve:

- General good housekeeping measures as prescribed by the Operational Procedures, including preventing spillage of solids and storing bulks in hygienic conditions in closed containers;
- Specific pest control measures when required.

(3) Action Required – Operational Phase

CEPA will:

- Include in the Port Operations Manual a procedure making it mandatory for ships to employ anti-rat discs on all mooring ropes at all times whilst moored in the port;
- Employ a local contractor to control pests in the port.