

DTH 000099148

1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-6

Plasticizer Modernization - Phase III

\$85,000

Project Description

This project is part of a multi-phase program to upgrade the plasticizer operation. The first phase of this project was AFE'd in 1982 for \$240,000 and consists of the following six items:

- (1) A steam jacketed phthalic anhydride charge manifold with steam jacketed charge meters.
- (2) A phthalic anhydride fluff scrubbing system.
- (3) A Schenk filter precoat pump.
- (4) A skim tank transfer pump.
- (5) Improved level indicators on the caustic wash hold tank, the wastewater treatment tank, and the API skim tank.
- (6) A wastewater bleed system.

The second phase of the project for \$20,000 is included in the 1983 Construction Forecast. This phase consists of a control room to provide operating personnel protection from the elements during the cold winter months. The control room will be suitable to house new electronic instrumentation provided in Phases III, IV, and V.

Two items are included in Phase III of the project:

- (1) Electronic instrumentation for one plasticizer reactor.
- (2) Enclosure of electrical switchgear.

Problem Description

Presently, the plasticizer reactors are controlled by pneumatic instruments mounted on local panels. These instruments are old, outdated, and not up to Conoco standards for instrumentation and control. This project will replace the pneumatic instruments on one reactor with electronic controls. The electronic instruments will also provide more efficient control of the reaction processes, with less maintenance downtime due to instrument malfunctions. The new electronic instrumentation will be installed on a control panel located in the new pressurized control room provided with Phase II of the project.

The existing electrical switchgear is located against the north wall of the second floor of the plasticizer building. This switchgear is only 20 feet away from the plasticizer reactors in an area classified as an explosive area. The switchgear area will be enclosed and provided with a positive ventilation system. The plasticizer elevator controls that are located adjacent to the switchgear will be relocated.

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Phase IV of the modernization program is included in the 1985 Construction Forecast Projection. This phase will provide electronic instrumentation for two more of the reactors at a cost of \$65,000. Phase V is included in the 1986 Construction Forecast Projection. It will provide electronic instrumentation for the fourth and final reactor at a cost of \$35,000.

Alternatives

No alternatives were considered for this project.

Project Economic Summary

No economics are calculated for this project, however overall plasticizer operation economics have been evaluated by the plant and the business area. The Plasticizer Manufacturing Study (R. A. Frohreich, March 2, 1983) and the Aberdeen Plasticizer Economics (S. K. Saborsky, May 5, 1983) evaluated the profitability of plasticizer production versus outside purchase. The final conclusion was that continued operation including capital expenditures for this total modernization project is justified.

The process design and cost estimate are of budget quality and were prepared by the plant.

This project will be AFE'd in the third quarter of 1984 with project completion expected in the fourth quarter of 1985.

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1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-7

Reduction Of VCM Exposure

\$115,000

Project Description

The following items are required to reduce operator exposure to vinyl chloride:

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|-------------------------------|-----------|
| 1. Vinyl Area Sewer Revisions | \$ 60,000 |
| 2. Utility Water System | \$ 55,000 |

The permissible exposure limit to vinyl chloride is defined in the OSHA standard as follows:

- a. No employee may be exposed to vinyl chloride at concentrations greater than 1 ppm averaged over any 8-hour period.
- b. No employee may be exposed to vinyl chloride at concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes.
- c. No employee may be exposed to vinyl chloride by direct contact with liquid vinyl chloride.

Problem Description

1. Vinyl Area Sewer Revisions

After PVC slurry is steam stripped to below 400 ppm vinyl chloride in the reactors in accordance with the VCM Standard, the slurry is dumped and rinsed to the blend tanks. Then the reactor is rinsed to the process sewer to remove residual resin particles. This reactor rinse water is contaminated with vinyl chloride. Some of this vinyl chloride is vaporized from the water while in the sewer, and the vinyl chloride vapor escapes from the sewer system by backing up through open surface drains or other sewer vent openings. When reactors are rinsed to the sewer, vinyl chloride concentrations above the permissible exposure limits are found in the vicinity of open surface drains in the vinyl reactor modules.

This project will reroute the reactor sewer rinse water out of the reactor modules. The rinse water from each reactor module will flow through a 12 inch sealed sewer to an open process sewer manway immediately upstream from the Pond 1 settling basins. The manway where the rinse water will tie-in to the process sewer is distant from plant operations and personnel.

2. Utility Water System

Presently there is no utility water system in the reactor areas. A utility water system is needed for housekeeping purposes, vessel cleaning,

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Problem Description (Continued)

2. Utility Water System (Continued)

clearing of plugged lines and equipment, and other miscellaneous uses. Presently process water and the high pressure service water used for the double mechanical seal flush and catalyst injection are available in the reactor areas. The pressure of the process water system is not adequate for all housekeeping needs or for clearing plugged lines. The high pressure seal water is at times used for these purposes. The additional, sudden water requirement for these non-process users reduces the seal water system pressure. This is poor practice as consistent high pressure service water is required to prevent seal failures. Multiple seal failures have occurred due to low seal water pressure caused by use of this system for utility water. Often, a VCM leak will result because of the seal failure. When this occurs, the area must be restricted while plant personnel with respiratory protection enter the area and isolate the equipment. On one occasion earlier this year, seven seals on vacuum pumps and compressors failed when the high pressure system was used for utility water. The entire recovery area was restricted for several hours while plant personnel with respiratory protection isolated the rotating equipment. The entire module was shut down because of leaks and seal repairs.

This project will provide a utility water system in each of the vinyl reactor areas. A pump and utility water header will be installed in each module. Several new utility stations will be installed in the old module. Existing surplus pumps will be used for the project. The installation of the utility water system will provide water at the required pressure to meet the utility needs while maintaining the integrity of the high pressure service water system.

Alternatives

No alternatives were considered for this project.

Project Economic Summary

No economics are calculated for the first item. However, installation of the utility water system will reduce double mechanical seal failures resulting from the presently occurring pressure dips in the high pressure service water system. It is estimated that seal failures will be reduced by 25% with the installation of the utility water system. These savings provide an Internal Rate of Return of 18% on the \$55,000 capital investment.

The process design and cost estimate are of budget quality and were prepared by the Plant.

The project will be AFE'd in the first quarter of 1984 with project completion expected in the second quarter of 1985.

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1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-8

Truck Loading Facilities For Silos

\$120,000

Project Description

This project will provide facilities so that bulk hopper trucks can be safely loaded from railcar product silos. A gangway, access platform, and steps to the access platform will be provided for one dry blend silo, three compound silos, and eight resin silos.

Problem Description

Presently to load a truck, the yard operator positions one of the four compartments of the hopper under a silo. He then climbs up the ladder on the side of the truck and walks across the top of the truck to the compartment to be loaded. He opens the loading hatch on the compartment and maneuvers the silo discharge chute into the open hatch. After the compartment is filled, the operator closes the hatch and climbs down off the truck. The truck is then moved so another compartment is under the silo and the loading procedure is repeated. Currently there is no protection to keep an operator from falling off the top of a truck, which is approximately thirteen feet above grade. The chance of injury is increased during wet or icy conditions. Handrails are attached to the bottom of the silo structure to provide protection in loading railcars, but these are not low enough to provide any protection for loading trucks. The existing handrails cannot be lowered because of railcar clearance requirements.

Installation of the proposed gangways, access platforms and steps will greatly reduce the possibility of an operator falling off a bulk truck during the loading operation. With the new system after the truck is positioned under the silo, the operator will climb the stairs to the access platform and then go to the gangway. The operator will pivot the gangway down to the top of the truck and then go out onto the truck. He will then fill the compartment as it is presently done. When the compartment is filled and the hatch closed he will walk to the access platform and pivot the gangway up so the truck can be moved. When the truck is repositioned he will load the next compartment. With this project installed the operator will no longer need to climb up and walk across the top of the truck. The access platform also provides a place for the operator to stand while the truck is being moved.

An average of about three trucks per day is loaded from the resin silos. All resin types are at times loaded into trucks. Gangways will be installed on eight of the seventeen resin silos. With proper scheduling it will be possible to minimize the need to load trucks from the silos that do not have gangways.

Truck Loading Facilities For Silos (A-8)

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Problem Description (Continued)

Approximately five trucks each month are loaded from the compound silos. The multiple product slate of the compound operation requires a gangway for each of the three compound silos as the silos cannot be used for different colors.

A gangway will be installed on one of the dry blend silos. One will be adequate to meet the shipping requirements of about six trucks per month.

Alternatives

Installation of fixed railings was evaluated but this is not possible because railcars are loaded from the same silos. Installation of gangways on all resin silos was also considered but through proper scheduling the need to load trucks from silos without the gangways will be minimized.

Project Economic Summary

No economics are calculated for this safety project.

The process design and cost estimate are of budget quality and were prepared by the plant.

2 The project will be AFE'd in the first quarter of 1984 with project completion expected in the fourth quarter of 1984.

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DTH 000099154

1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-9

Security Fence

\$50,000

Project Description

This project will provide funds to install a security fence to enclose the railroad trackage immediately south of the plant site. This trackage commonly called the Monroe Lead is used to store incoming VCM railcars, other incoming raw materials, loaded product hopper cars, and empty hopper cars to be loaded in the plant. This lead consists of dual trackage extending 2,400 feet south of the plant. The security fence will be installed on each side of the dual lead and will extend from the south plant boundary the entire length of the lead. A locked gate will be installed at the south end of the security fence to prevent entry into the area. The fence is being installed to prevent tampering of any of the railcars stored on the lead.

Problem Description

Presently there is no plant surveillance of the storage tracks due to its remote location from the plant. There are no natural barriers or fences to prevent access to the rail cars. Also the track is adjacent to a neighborhood baseball park which draws a large number of people to the area, especially at night. Presently there is no way to assure cars will not be tampered with while being stored there.

Since vinyl chloride is a hazardous and toxic substance, it is necessary to protect the cars from vandalism while stored on the Monroe Lead. If a valve on one of the incoming vinyl chloride cars was opened, overexposure of people in the area would likely result plus a vapor cloud in the explosive range would also develop. The VCM cars have quite good security in transit to the Monroe Lead. After they leave the manufacturer's plant, they are rolling to the plant with brief stops in the switching yards. In the switching yards there is no special security for the VCM cars but the fact that railroad personnel are continually in the area reduces the likelihood of tampering with the cars. However, once the cars arrive in Aberdeen they are then stored on the unprotected Monroe Lead from one to seven days before they are brought into the plant to be unloaded. The installation of the security fence will greatly deter any vandalism to the VCM cars while they are stored on the Monroe Lead.

In the past there have been several incidents of tampering with railcars on the lead track. Foreign objects such as rocks and cans have been found in hopper cars, and switching of placards on full and empty VCM railcars has occurred. Although no VCM has yet been released from cars stored on the lead, the fact that other cars have been tampered with point out the need for increased security of the storage track. The security fence will also protect the hopper cars stored there from vandalism.

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Security Fence (A-9)
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Alternatives

No alternatives were considered for this project.

Project Economic Summary

No economics are prepared for this security project.

The cost estimate for the project was prepared by the plant.

The project will be AFE'd in the second quarter of 1984 with completion expected in the first quarter of 1985.

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BTH 000099156

1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-10

VCM Standard Compliance Improvements

\$160,000

Project Description

The following items are needed to improve our capability of complying with the requirements of the EPA Vinyl Chloride Standard. These items will lessen the chance of a vinyl chloride release to the atmosphere.

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|--|----------|
| 1. Energy Absorbing Rupture Discs For 745 Reactor | \$35,000 |
| 2. Additional Block Valve On Reactor Atmospheric Vent Line | \$92,000 |
| 3. Additional Reactor Pressure Indication | \$33,000 |

Problem Description

1. Energy Absorbing Rupture Discs For PVC Reactors

Premature failure of reactor rupture discs has caused several VCM releases in the past. When the disc bursts prematurely, the shock from the rupture can cause the relief valve to momentarily lift even though the pressure is below the relief valve set point. Bench scale tests have been conducted which confirm this does occur when the disc ruptures at 70% of the relief valve pressure or greater. The relief valve may lift at pressures less than the 70% but no testing has been done in this range. A new type rupture disc, called an Energy Absorbing Disc (EAD), has been developed which when installed between the conventional S-90 disc and the relief valve absorbs the shock from a premature rupture disc failure. Bench scale tests have shown that if the S-90 disc fails at below 85% of its rated burst pressure the EAD will not burst. Thus installation of an EAD between the S-90 disc and the relief valve will minimize the likelihood of a relief valve discharge due to a premature S-90 disc failure.

This project will provide funds to install EAD's on 745 reactor. A plant test will be conducted to assure the EAD performance on a reactor is similar to the bench scale tests before funds are requested for this project. The 1985 Construction Forecast Projection includes a \$175,000 item to install EAD's on the remaining nine reactors.

2. Additional Block Valve On Reactor Atmospheric Vent Line

The vinyl chloride standard prohibits the discharge of VCM to the atmosphere from any manual vent valve on a PVC reactor. Presently, the atmospheric vent line on each reactor contains only one valve. If the valve should malfunction and open with the reactor under pressure, excessive venting of vinyl chloride would occur. Also, any leakage from the valve during normal operation would be discharged to the

Problem Description (Continued)

2. Additional Block Valve On Reactor Atmospheric Vent Line (Continued)

atmosphere. In addition, if the coupling between the valve and the actuator fails which has occurred several times on other reactor valves, the valve could be open when thought to be closed creating a hazardous condition. All other lines from the reactor to the atmosphere have a double block valve arrangement.

This item provides for the installation of an additional block valve in each reactor atmospheric vent line. The new valves will be individually operated from the control panel and will be interlocked into the existing sequencing systems. These valves will reduce leakage from the reactor during normal operation and reduce the possibility of a massive release in case of a malfunction of one of the existing valves.

3. Additional Reactor Pressure Indication

Indication of the reactor pressure plays a key role in maintaining reactor stability during the polymerization process. This along with the reactor temperature indication alerts the operator to potential reactor runaway situations. Currently, each reactor is equipped with a single pressure transmitter to provide both pressure indication and alarm capabilities. Failure of the transmitter or a drift in calibration could result in the operator not knowing the correct pressure in the reactor. The importance of this operating parameter dictates the need for redundant indication of reactor pressure.

A second pressure transmitter will be installed on each reactor in the new module. The transmitters will send a signal to new digital pressure indicators located in the control room. Installation of this additional pressure indication will reduce the possibility of a vinyl chloride release due to failure of the existing instrumentation.

The 1985 Construction Forecast Projection includes a project for \$35,000 to install an additional pressure transmitter and digital pressure indicator on each reactor in the old module.

Alternatives

No alternatives were considered for this project.

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Project Economics Summary

No economics are prepared for this environmental project.

The cost estimates and process designs are of budget quality and were prepared by the plant.

The project will be AFE'd in the second quarter of 1984 with completion expected in the third quarter of 1985.

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DTH 000099159

1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-11

Plant Sewer Revisions

\$180,000

Project Description

This project will provide a new process sewer from the API Separator and the new reactor module to Pond 3. With these revisions wastewater from the plasticizer, compound, and boilerhouse areas will flow directly to Pond 3. Rainfall and deluge water from the new reactor module will be diverted to Pond 3 with this system.

Problem Description

Presently with the existing process sewer system, wastewater from the entire plant flows through Pond 1. Due to additional paving and new process areas which have been added to the plant, the existing process sewer system is not adequate to handle process flows and run off during heavy rainstorms or extended usage of the deluge system.

In August of 1982, during an unusually heavy rainfall, the plant process sewer system was observed to overflow at the API Separator and at Pond 1. This overflow resulted in a bypass of untreated wastewater directly to the plant storm water sewer system. For some time prior to this, water had been observed backing up into the API separator during heavy rainfall or whenever the deluge system was running. Efforts to find any blockage in the system or find any excessive flows were not successful. After the wastewater bypass, an intensive effort to find any pluggage was undertaken. All major process sewers were routed-out and several restrictions were found. The rainwater entering the process water system was studied to see if any could be diverted to the storm water system. Approximately 20% of the rainfall area that drained to the process sewer was diverted to the storm sewer system. Even after these measures, the process water system still backed up into the API Separator during heavy rains or when using the deluge system. PED was then requested to make a thorough study of the plant process sewer system. Numerous tests were conducted using the plant deluge system to simulate heavy rainfall. The tests showed that the process sewer system was undersized at these peak flows. These tests were verified by taking elevations of the sewers and calculating theoretical flows.

In June of 1983, the process sewer system was observed to overflow again at the API Separator resulting in another wastewater bypass.

Because the API Separator contains wastewater, oils, and plasticizers, overflow to the storm sewer is a serious problem. Wastewater bypasses are prohibited by the plant's NPDES wastewater permit, oil discharges are prohibited by Section 311 of the Clean Water Act and plasticizer discharges are prohibited by the Comprehensive Environmental Response Compensation and Liability Act (Superfund).

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Problem Description (Continued)

This project will greatly reduce the likelihood of overflowing the API Separator by providing additional process sewer capacity. Water from the compound, plasticizer, and the boilerhouse areas will flow directly to Pond 3. A short line will connect this new line with the new module. This line will allow water to flow directly from the new module to Pond 3 during peak flows such as heavy rainfall or when the deluge system is operating. Provisions will also be made to divert water with high solids concentrations from the dry blend area to Pond 1 in order to avoid a solids buildup in Pond 3.

Project Alternatives

The alternative of eliminating total rainwater flow to the process sewer was examined but this was not possible.

Project Economic Summary

No economics are prepared for this environmental project.

The project is based upon a Class "A" Process Design prepared by PED and a definitive cost estimate prepared by the plant.

The project will be AFE'd in the first quarter of 1984 with completion expected in the fourth quarter of 1984.

1984 CONSTRUCTION FORECAST

Aberdeen Chemical Plant

A-12

City Water Backflow Prevention

\$130,000

Project Description

This project will provide improved backflow prevention between the city water supply and the process water system. A break tank will be installed in the city water connection at the east side of the plant, and double block and bleed valves will be installed in the city water connection at the north side of the plant. The north city water connection will not be removed entirely since the connection may need to be opened in the event of a warehouse fire at the front of the plant.

All city water that flows into the process water system will pass through the break tank, which will be located next to the boilerhouse. A centrifugal pump or its spare will pump city water out of the tank and into the process water main. City water addition to the process water main will be pressure regulated in order to minimize city water consumption.

Problem Description

City water ties into the process water system at the north and east sides of the plant. These connections are protected from backflow by a single swing check valve in each line. The process water system is hard piped into process equipment in vinyl chloride service in numerous places. There has been backflow into the plant process water system which has been detected inside the plant. There has not been backflow into the city water system. Improved protection is required to prevent backflow of contaminated process water into the city water system. This project will provide the required backflow protection with the installation of a breaktank and a pump system.

Alternatives

A backflow preventer was considered for this service, but could not be used because of the large pressure drop required. Also, the breaktank is positive protection whereas the backflow preventer could fail.

Project Economic Summary

No economics are prepared for this environmental project. Increased utility costs are estimated to be \$9,300 in the first project year.

The cost estimate and process design are of budget quality and were prepared by the Plant.

The project will be AFE'd in the first quarter of 1984 with completion expected in the first quarter of 1985.

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