

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-20

Fixed Point Monitor Data Computer and Warning Lights

\$114,000

Project Description

This project will provide an automatic data acquisition system to gather and record VCM fixed point monitoring data. The system will consist of a processor, keyboard printer terminal, and appropriate fixed point monitor interface equipment. Warning lights will also be installed and be actuated by the computer to warn employees when VCM is detected in an area of the plant.

The system will:

1. Gather, analyze, and reduce the data from the 40 Honeywell fixed monitoring locations.
2. Activate a flashing warning light if vinyl chloride concentration in the area is greater than 1 ppm. Lights will be installed at 14 locations in the vinyl area.
3. Alarm and printout when a monitoring point indicates a leak as defined in the EPA Leak Detection and Elimination Plan (leak defined as a location having three consecutive readings greater than 5 ppm VCM).

Problem Description

Four fixed point monitoring systems were installed in 1974 as part of the program to meet the OSHA requirements for reducing employee exposure to VCM. Each system monitors ten points by sampling at each location every ten minutes and analyzing for VCM content. The resulting 5760 data points per day are recorded on continuous strip charts. The time and cost to manually gather and reduce the strip chart records limits the quantity of information that can be obtained from the fixed point monitoring system. As a result the full benefit of the monitoring system is not being realized. Installation of the proposed computer system will provide such information as averages over a time period and the number of high readings at a location. With this type of information efforts to reduce exposure through mechanical or operation changes can be evaluated.

Personnel monitoring in 1978 showed 93 employees were exposed to VCM concentrations (time weighed average) above 1.0 ppm. Of the 93 overexposures 43 employees were reported wearing respiratory protection. Dosimetry for the first seven months of 1979 shows 38 employees were exposed to VCM concentrations above 1 ppm. Of the 38 overexposures to date in 1979 only 14 of the employees were reported wearing respiratory protection.

The flashing light system will warn personnel in an area when there is a VCM concentration above 1.0 ppm in that area so that they may either leave the area or put on protective equipment. This system will reduce the total number of overexposures in which protective equipment is not used.

VAB.0001099969

8/10/79

Problem Description - (cont.d)

The EPA Leak Detection and Elimination Plan requires a system to detect leaks and specifies certain action when a leak is detected. For this plan the plant's definition of a leak is for a location to have a VCM concentration greater than 5 ppm for three consecutive readings. Presently this situation is detected by the panel operator observing from the strip charts a point has had three consecutive high readings. Installation of the computer with the alarm and printout will provide immediate notification of a leak and appropriate corrective action will be taken.

Alternatives

No other alternative were considered.

Project Economic Summary

No project economics were computed for the project.

The budget quality estimate was developed by the plant based on recommendations from the Central Computer Department.

The cost for the computer system was estimated to be \$69,000. The cost of the flashing light system was estimated to be \$45,000.

The project will be AFE'd in the second quarter of 1980 with project completion expected in the fourth quarter of 1980.

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-21

Inert Vent Flammability Control System

\$85,000

Project Description

An oxygen and hydrocarbon analyzer will be purchased to provide an analysis of the inert vent stream which is burned in the incinerator. Monitoring of this stream will enable the Plant to prevent the oxygen concentration in this stream from building to an explosive level.

A liquid seal flame arrestor will also be installed on the inert vent line to the incinerator in series with the existing mechanical flame arrestor.

Problem Description

The inert vent from the VCM receivers is burned in the EPA incinerator. Since portions of the EPA compliance system operate under vacuum, leaks in the system can cause the inert vent stream to contain air. In the event of a major air leak, the oxygen concentration of the inert vent stream could reach the explosive limit. The oxygen hydrocarbon analyzer will enable the Plant to detect the hazardous situation and take appropriate steps to reduce the oxygen concentration and to stop the air leak.

PED has indicated that the existing mechanical flame arrestor may not work in this service. The addition of a liquid seal flame arrestor will improve the safety of the system.

Alternatives

No other alternative was considered.

Project Economic Summary

The capital requirement is of preliminary quality. CED prepared a preliminary estimate based upon a PED preliminary design done for the Oklahoma City Chemical Plant.

Schedule

This project will be AFE'd in the first quarter of 1980 and completed by the third quarter of 1980.

8/10/79

VAB.0001099971

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-22

Phthalic Anhydride Handling Improvement

\$63,000

Project Description

Funds are requested for improvements to the phthalic anhydride storage and transfer systems. The project will install new heating coils on one of the phthalic anhydride storage tanks. Also, a new steam jacketed unloading line will be installed from the unloading station to the storage tank.

Problem Description

Phthalic anhydride is one of the principle raw materials used in producing plasticizer. The unloading and storage tanks have been a major source of operating, safety, and maintenance problems.

Phthalic anhydride is stored in bulk storage tanks equipped with external steam coils. These coils are used to keep the phthalic anhydride molten by maintaining the temperature at 300°F. The heating coils were installed in 1962 and are worn out. Steam leaks are increasingly more numerous and severe, creating a personnel hazard and energy loss. Also, because of tracing problems, the unloading line freezes and plugs, requiring maintenance clean-out. This is a major safety problem because of the high temperature and toxic nature of the phthalic anhydride. The new steam-jacketed line will require less maintenance by providing better heat transfer to keep the phthalic anhydride from freezing.

Alternatives

No other alternatives were considered.

Project Economic Summary

No project economics were computed for the project.

The cost estimate is based upon a budget quality design and estimate by the plant.

This item will be AFE'd in the first quarter and completed in the third quarter of 1980.

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1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-23

Safety Equipment and Projects

\$25,000

Project Description

Funds are requested for the following safety projects and equipment.

1. Walkway from 600 series silos to 281 silo	\$10,000
2. Reactor seal change platform for new unit	5,000
3. Smoke Detection System	8,000
4. Portable Fire Monitor	<u>2,000</u>
	\$25,000

Problem Description

1. With the walkway installed, access to the top of 281 and 282 silos will be by the stairs to the 600 series silos. The existing ladder up the side of the silo has oversized rungs which are difficult to grasp in the winter. This walkway will provide a second egress from the tops of the silos.
2. The platform is necessary to provide a safe means of working on the reactor seals in the new unit. One accident which could have been a disabling injury has occurred due to the inadequate means of access to the seal area. The platform will be portable so it can be removed from the area when the work is completed.
3. A smoke detection system will be installed in the main offices, administration offices, and the east warehouse. The system will provide early warning of a fire in these areas which are normally unoccupied at night and on weekends. The system will consist of the detectors, electrical equipment, and an alarm in the laboratory which is staffed around the clock. Early detection of a fire will allow plant personnel to contain it in a minimal area. A major fire in the office area could destroy valuable plant and engineering records. The plant desires to install the smoke detection system in the warehouse area rather than expensive sprinkler protection proposed by the insurance carrier.
4. The portable monitor would be used at the initiator freezers if a problem should develop and also be available for use throughout the plant.

8/10/79

VAB.0001099973

Alternatives

No alternatives were considered.

Project Economic Summary

No economics were prepared for this project. This project will be AFE'd in the first quarter of 1980 with completion expected in the third quarter of 1980.

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-24

Breathing Air Modifications

\$21,000

Project Description

This project will provide for the purchase and installation of a Nash breathing air air-water separator system and air receiver. The separator system will be installed downstream of the existing Nash breathing air compressors. A hook-up station which will allow the temporary use of bottled air in the event of failure of the compressor system will also be provided.

Problem Description

The pressure rating of the existing air-water separators has been reduced as a result of a recent MED plant inspection. These vessels need to be replaced with one with a proper pressure design rating. The existing air-water separators were not specifically designed for this purpose and are not effective in removing water from the breathing air. The installation of the package breathing air air-water separator will provide drier breathing air to the user stations.

Alternatives

An alternative of purchasing bottled air and using it as the breathing air supply rather than supplying air from the existing compressors was considered. This alternative was rejected because both the initial investment and yearly operating costs would be greater than that of the proposed project.

Project Economic Summary

The capital requirement is based on budget cost estimate and budget quality process design prepared by the plant.

The project will be AFE'd in the second quarter of 1980 with completion expected in the last quarter of 1980.

MISCELLANEOUS

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1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-25

Miscellaneous Projects Under \$10,000

\$300,000

Project Description

Capital funds are requested to cover expenditures for projects costing less than \$10,000 each. Plant revision work to provide operation improvements will be done under this item. Such items as safety and laboratory equipment, environmental emission testing devices, and other minor equipment will also be purchased under this item.

Budget History

	<u>1978</u>	<u>1979</u>
Approved Budget, \$M	275	250
Actual Expenditure, \$M	262	189 (1)

(1) Committed as of July 1, 1979.

Project Economic Summary

No economics were determined for this item. The project will be AFE'd in the first quarter of 1980.

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-26

Laboratory Equipment

\$77,000

Project Description

This project will provide for the purchase of the following Laboratory items.

1. Digital Electronic Thermometer	\$ 1,000
2. Electronic Balance	3,000
3. Automated Viscosity System	35,000
4. Twin Screw Lab Compounder	35,000
5. Blown Film Adapter	<u>3,000</u>
	\$77,000

Problem Description

1. Digital Electronic Thermometer - Doric 410 A-J - \$1,000

This electronic thermometer will replace the mercury thermometer currently used. With this digital thermometer, the accuracy of the resin dry time test will be improved. Due to the location of the mercury thermometer, it is easily broken and can be a potential safety hazard.

2. Electronic Balance - Mettler Model PL 200 - \$3,000

This is a top loading digital readout balance with a 220 gram capacity and readability to 0.001g. This balance is being requested for use in the oven moisture and oven volatile tests. We currently use a manual analytical balance which requires approximately six (6) minutes to complete a zeroing weighing procedure. The PL 200 balance has a touch-bar zeroing feature which eliminates the time consuming process of "Dialing-In" weights and zero. Since each sample requires three weighings, we estimate a savings of 5 minutes per sample. Approximately 500 samples are tested per month (1979 averages). This represents about 42 hours/month time savings. This time savings will be reflected in the time reduction for reporting of this data on process samples and shipments.

3. Automated Viscosity System - Scholt Viscometer - \$35,000

At present, the measurement of resin viscosity is a labor intensive test and is very error prone. Most of the problems that occur with the resin viscosity test are directly related to technique errors. The above proposed unit will eliminate all operator involvement except for the sample preparation. The unit is also capable of running 10 samples at one loading whereas the current manpower for this test produces 6-8 samples per day.

5. Blown Film Adapter - C. W. Brabender - \$3,000

The Wayne extruder has proven to be a very useful tool for measuring compound quality. Its usefulness can be increased by the addition of a blown film tower. The blown film test is a current requirement of Western Electric compounds. Furthermore, it appears to be a very good test for poor dispersion, resin gels, and contamination. It is also applicable to the evaluation of all flexible compound. The unit will also take-off a strip from the 4" strip die which will provide a uniform extrudate, free from the defects of our present manual take-off technique. This will permit faster extrusion rates, and will make the extruder more useful for evaluating processability.

Budget History

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
Approved Budget, \$M	21.5	31.2	6.0	14.0	50.0	31.0
Actual Expenditures	14.0	32.1	5.0	18.2	48.6	30.8 ⁽¹⁾

(1) Committed as of August 1, 1979.

Alternatives

No alternatives were considered.

Project Economic Summary

No economics were computed for this item.

This project will be AFE'd in the first quarter of 1980 with completion expected in the fourth quarter of 1980.

8/10/79

VAB.0001099979

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-27

Critical Spare Equipment

\$56,000

Project Description

This project will provide funds to obtain replacement or spare equipment as follows:

- | | |
|--------------------------------|----------|
| 1. Large Reactor Condenser | \$40,000 |
| 2. Orbitran Controller | 12,000 |
| 3. Large Reactor Relief Valves | 4,000 |

Problem Description

1. If failure of several tubes in a condenser occurs and re-tubing becomes necessary, a reactor would be down for several weeks without this spare.
2. Various control parts will be needed to assure continuous operation. Turn-around time on repairs is also extensive.
3. EPA rules cause these valves to receive a lot of review. They would provide flexibility for testing.

Alternatives

The Oklahoma City Plant has a spare reactor condenser. This condenser cannot be used at this plant because the nozzle sizes and orientation are different than the condensers used at this plant.

Project Economic Summary

No conventional economics were calculated on this project. Each of these items are needed to preclude economic loss. The magnitude of these losses are:

1. Loss of a reactor for three weeks would result in loss of resin production of 2.6 MM pounds or \$175,000 at a resin margin of 6.7¢/lb.
2. Loss of the Orbitran controller could shut Compound Line III down for a week. Lost compound production of 0.11 MM pounds results in a revenue loss of \$9,000 at a compound gross margin of 8¢/lb.

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1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-28

Weather Protection for Drum Storage Area

\$14,000

Project Description

Funds are requested to install a weather protection shelter over the raw material drum storage area located in the northeast section of the plant.

Problem Description

The drum storage area is presently unprotected from rain or other elements. This results in rust damage to the drum and loss of identification by tags due to fading or being washed off. This presents problems in handling, contamination of drum contents, and inventory control.

This project will install a protective rain shelter over the storage area.

Alternatives

No alternatives were considered.

Project Economic Summary

No economics were computed for this project.

The capital requirement is based on a budget estimate by the plant.

This project will be AFE'd in the first quarter of 1980 with completion expected in the third quarter.

1980 CAPITAL BUDGET

Aberdeen PVC Plant

A-1M

VCM Emission Reduction

\$10,000,000 Capital

Project Description

The existing reactor recovery and steam stripping operation will be revised to incorporate external batch stripping. Two identical systems will be installed within the plant. One system will be located within each of the two reactor modules. The following description relates to the proposed system's operation within one module.

In the proposed operation, the reactor contents will be transferred into one of two external batch strippers at the conclusion of the polymerization reaction cycle. The reactors themselves will be rinsed with water to remove remaining material on the wall of the reactor. The rinse water will also flow to the external batch stripper.

The material in the external batch stripper will be steam stripped to reduce the residual VCM content to less than 100 ppm. This will be accomplished at slightly lower temperature and at longer stripping times than now employed for our existing in-situ reactor stripping process.

Minor modifications to the seal water systems of the reactor and EPA recovery system will be installed. These modifications will enable these systems to efficiently recover vapors from the external batch strippers. Desuperheated steam will be used as a purge medium to remove reactor VCM vapor prior to initiating the next reaction cycle.

Problem Description

The EPA has proposed new and more demanding regulations to reduce vinyl chloride emissions. These regulations have not yet been finalized. They undoubtedly will undergo substantial modification before being promulgated. Our judgement is that the new regulations, if promulgated at all, will not be finalized until late in 1980. In this event, funds would not be required until 1981. There is, however, the possibility the EPA could publish the new regulations earlier than we now anticipate and that funds would be needed in 1980.

The anticipated new regulations would have a major effect on our PVC operations. Most significant of the possible changes to the current regulation (promulgated October 21, 1976) would be mandating slurry stripping to an allowable total reactor emission level (slurry and vapor) of less than 100 ppm compared to the current allowable of 420 ppm.

8/10/79

Problem Description (cont.d)

Our PVC plants now strip PVC slurry within the reactor. Using our current procedures and equipment, we now meet the 420 ppm emission level required by the current EPA regulation. Extensive testing has, however, shown that a 100 ppm total emission level is not consistently attainable with existing equipment. If the EPA revised the 420 ppm limit to 100 ppm, we will require use of new equipment and methodology.

Alternatives

The final form of the regulation amendments is not known and, therefore, all alternatives have not been evaluated. We hope the EPA will not adopt the proposed amendments. If, however, these amendments are promulgated, alternative containment configurations will be evaluated to determine the optimum containment route.

Prior to proposing this memorandum item, we have briefly assessed the following alternatives:

1. Rather than incurring the expense of the new external stripping vessels, the existing blend tank air sparging system might be adapted for the final stripping step. This system would be less expensive than the proposed system and would involve a separate, new incinerator to consume the blend tank vapors.

This alternative has a major safety problem of a possible flashback from the incinerator to the vent collection system and back to the blend tanks. A technology to break flame front propagation is required. We are continuing to investigate existence and development of a flare front arrestor which would allow us to adopt this less capital intensive alternate.

2. A continuous steam stripping system could be installed. This would involve the addition of stripping columns to the project as defined in the Project Description.

The addition of equipment to facilitate continuous steam stripping could be required if extremely low emission levels are promulgated. Our information indicates continuous stripping can attain a 10 ppm emission level.

Project Economic Summary

The order of magnitude estimate for this project was prepared by CED from a preliminary PED design.

8/10/79

VAB.0001099983