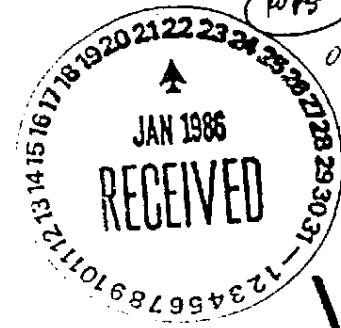


CC: PEM MAA PLF 1-33
GEH JKH SRA 27
RTB



ORIG: RAC

VISTA

TO: Plant Managers
FROM: D. L. Davis
DATE: January 21, 1986
SUBJECT: 1985 COST REDUCTION PRACTICES

Interoffice
Communication

Attached are descriptions of the cost reduction practices and programs that were used at the various plants in 1985. This list was compiled from the responses submitted by each plant and has been organized by the categories which the cost reductions would impact. Of course, there is some overlap as some items impact more than one cost category.

This document will serve as a starting point for exchange of cost reduction ideas. Further discussions with personnel from the other plants is encouraged to obtain further information, pass along possible improvements or suggestions, etc. Also, please let me know of any way I can be of assistance.

D. L. Davis
D. L. Davis

bh

Att.

cc: RDG RTF

To dist:

*Please identify
with your people ideas
that may have merit
for VCM plant.*

*Please submit list by
JUNE 14 showing items
as high potential, medium
potential and long term or
less potential items.*

*Use page number and title
to prepare your list.*

RAC

CWH 000007988

1985 COST REDUCTION PRACTICES

GENERAL

1. Vista's Formation

Baltimore thought that nearly everyone at the plant recognized the fact that Vista was a company with a heavy debt load as well as being a company that did not have "deep pockets" like DuPont/Conoco had. These facts caused many of our people to associate Vista's success (and their jobs) with the financial success of the organization. This mind-set caused people to be cost conscious as well as making them better accept cost reduction measures when these affected them.

2. Tightening the Belt Attitude

Baltimore commented that each department head and his key supervisors had this attitude and their day to day decisions reflected it.

3. Atmosphere of Acceptable Risk Taking

Because Baltimore did not have to run the plant at full capacity, there was room to take some prudent risks to reduce costs. Specific examples on spare pump repair and turnaround planning are included in the Maintenance Costs section.

4. Recognition of Costs Being Too High

Baltimore also commented that everyone recognized that in almost every area there were better, more cost effective ways to get the job done, and that there were areas where we could eliminate practices that were wasteful. Until this mental recognition is made, it is very difficult to go out and find better ways to do the job.

5. Better Understanding of Plant Costs

The field personnel at LCLAB (and possibly other smaller plants) appeared to have a better understanding of plant costs. Improving the understanding of plant costs at the larger plants could have a significant cost savings impact.

6. Price, Quality, and Vendor Selection

CWH 000007989

LCLAB remarked that a simple statement that most plants may be already accomplishing is to become tough with suppliers on the price and quality of raw materials, processing supplies, and warehouse materials. Vendors are willing to cooperate if we've done our homework on price. For example, Nalco was reminded that LCCC buys several hundred thousand dollars of product from them. They not only rescinded a price increase, but gave us a 3% discount. The LCLAB Plant wanted a Fisher valve because we already have replacement parts in stock, and we advised them that they were 20% higher in price than another vendor. Fisher came back with a new competitive price.

Compare quality as well as price and advise vendors of quality problems. (NOTE: Other similar examples are given in some of the specific items that follow.)

* 7. Accrual of Costs vs. Requesting Invoices

In previous years, invoices were always requested by LCCP from vendors for year-end closing. This year closing costs were accrued and invoices not solicited.

INVENTORY

1. Coordination of Product Inventory with Business Area

Aberdeen's resin inventory was usually maintained well below the target through more frequent coordination with the Business Area.

2. Maintaining an "Active" Product Inventory

Compound and dry blend involve many finished products. More frequent review of these finished product inventories by Aberdeen led to quicker movement of obsolete products into the marketplace and thus an "active" inventory.

* 3. Cooling Tower and Boiler Water Treatment Chemicals Inventory Reduction

LCCP negotiated with a vendor to reduce costs. The vendor offered to maintain in-plant inventories at 90-day level and maintain the cheapest shipping cost and a 3% price cut on all purchases. A second water treatment vendor offered to maintain 60 to 90-day inventory and provide 90-day payment terms to cover working capital.

* 4. Reduction of Nickel Hydrogenation Catalyst Inventory

LCCP negotiated an arrangement for the vendor (Calsicat) to produce required catalyst for the calendar year and hold it in Erie, Pennsylvania, at their cost until they needed it (or at the end of the year). This allowed LCCP to maintain extremely low in-plant inventory but maintain secure availability.

5. Scheduling of Raw Material Deliveries

Aberdeen's 0744 account is normally \$1.0-\$1.5MM due primarily to the many microingredients used in compound and dry blend. A substantial reduction in this inventory has occurred through more accurate sales forecasting and inventory reports, which allow better scheduling of raw material deliveries.

CWH 000007990

6. Controlling Warehouse Losses Using a Security Card System

The LCLAB Plant has a security card system in use to monitor entry into the warehouse after hours. A printout of what cards and the times of entry is reviewed daily and this is compared with the warehouse purchases. Annual losses from the warehouse amount to less than \$1M/yr.

7. Review of All Plant Inventory for Non-Productive Assets

LCCP reviewed all inventories: process, warehouse, supplies, tools, files, etc., and determined whether that inventory is required and to what extent it is required. Non-productive assets were then either sold, written off, or disposed of.

TRANSPORTATION

1. Increased Truck Backhauls - Aberdeen has a weekly meeting with Vista transport terminal personnel to coordinate use of our trucks for backhauls.

VARIABLE COSTS - GENERAL

1. Exercising Contractual Take-or-Pay Relief During Reduced Demand Periods

Both LCVCM and LCCP received reductions in oxygen and/or electrical costs via contractual agreements with the suppliers.

LCVCM's oxygen contract with Big 3 specifies a 15-day take-or-pay relief period if advance written notice of the outage is provided. LCVCM notified Big 3 and saved \$52.5M during their 1985 turnaround. Also, by providing Gulf States Utilities 30 days advance written notice of electrical megawatt reductions, \$10M was saved. Likewise, LCCP saved \$15M by notifying GSU of reduced electrical requirements during turnaround periods (or any other reduced demand periods).

LCVCM commented that these examples illustrate the importance of the plants participating in contract preparation and that they have on file an executed copy. Also, line operation approval of invoices is desirable.

VARIABLE COSTS - RAW MATERIALS & BY-PRODUCTS

CWH 000007991

1. Use of Less Expensive Raw Materials

Aberdeen used alternative raw materials, especially in compound and dry blend where they have around 175 raw materials. Examples: substitution of BASF's Vinuran for our normal impact modifier, replacement of our resin antioxidant with the cheaper, more effective Isonox, use of cheaper initiators during periods of low production, etc.

LCCP maximized the use of cheaper anhydrous HCl from Olin in production of methyl chloride. By utilizing full unit capacity when the less reliable supply of Olin HCl was available, the use of higher cost HCl from LCVCM was reduced.

LCVCM completed piping and instrumentation modifications in June, 1985 to permit import of Olin HCl as an Oxychlorination Unit feedstock. The net effect of the project is to back out a portion of the more expensive chlorine used in the Direct Chlorination Area. Estimated annual savings are \$200M-\$600M.

VARIABLE COSTS - UTILITIES/ENERGY

1. PVC Dryer Improvements

Rotary dryer upgrade work at Aberdeen, together with increased emphasis on dryer throughput rates, resulted in large energy savings.

The following dryer improvements at Oklahoma City were the largest of the energy savings activities that contributed to the favorable efficiency variances for electricity (\$42.8M) and natural gas (\$29.7M) and the record CMA energy reduction of 38.7%:

- a. The baffles inside M-503 dryer line's centrifuge housing were revised to reduce the spraying of centrate water into the PVC wetcake, resulting in a reduction of PVC wetcake moisture content and increased dryer rates.
- b. An unadjustable pool depth plate in M-502 dryer line's centrifuge was replaced with an adjustable plate from a spare centrifuge, resulting in a reduction of PVC wetcake moisture content and increased dryer rates.
- c. The first "snow" fences in M-501 and M-503 dryers were removed to reduce contamination. Dryer rates were improved since plugging problems and reduced air rates were eliminated.
- d. The M-504 dryer line's centrifuge was changed to amperage control versus torque control to reduce wetcake feed rate fluctuations and to increase the dryer's throughput.
- e. The trunnion rollers for the M-500 dryer were adjusted to allow a better seal to reduce air leakage into the dryer line and improve drying efficiency.
- f. A baffle that restricted the coarse side overflow from the M-502 dryer line Sweco was removed, thus eliminating buildup, partial blinding of the screen and reduced throughput.

2. Shutdown of Unnecessary Energy Consumers

OKC operated on only one (out of three) slurry blend tanks for most of the year--except when producing film grade resin which requires an additional tank for product segregation.

CWH 000007992

3. Cracking Furnace Efficiency Improvements

Cracking furnace improvements at LCVCM were a key factor contributing to the fiscal 1985 production and energy conservation records. The improvements included:

- a. Replaced bad order refractory in both heaters with new fiber type refractory.
- b. Replacement of all burner tips.
- c. Revised decoke procedure.
- d. Increased use of cracking promoter to maximize production rates.

- e. Al Thomas was brought in during the 1985 turnaround to assist in evaluating and inspecting the cracking furnaces. A number of improvement areas were identified.

Ethylene cracking furnace combustion efficiency at LCCP was improved by sealing the tubes to the furnace floor with ceramic cloth and maximizing primary vs. secondary air to the burners.

4. BTU and Reflux Temperature Control of the Distillation Columns

Both the Baltimore and LCLAB Plants have implemented a program of installing BTU control schemes for the distillation columns. The net result has been an improvement in energy consumption, product quality and deviations, and allows the operator more time to perform other tasks. Basically, this scheme works by controlling the heat input to the base of a distillation column based on BTU control rather than temperature and by controlling the top of the tower based on temperature rather than reflux flow rate.

5. Utilizing More Aggressive Operating Practices

LCCP challenged a number of conservative operating practices by instituting programs to change process variables more aggressively to minimize fuel requirements without adversely affecting product quality, other costs, etc. Examples included:

- a. Lower distillation tower pressure to lower reboiler temperature requirement.
- b. Lower Normal Paraffin Unit hydrotreater temperature.
- c. Reduce Alcohol hydrogenating temperatures.

6. Diesel Air Compressor vs. Turbine Driven Air Compressor

LCCP found that renting a diesel-driven air compressor proved cheaper than operating steam turbine driver and venting the resultant low pressure steam (during low demand period for low pressure steam).

7. Air Compressor Control Scheme Revisions

Based on engineering studies of the LCVCM air compressor, it was determined a closed control scheme with modified load and unload set points could save energy. The changes were made in October 1985 with no surge problems encountered. The change will save an estimated 1,350,000 KWH or about \$73M annually.

8. Electronic Speed Controls on Turbines

CWH 000007993

LCCP found that electronic speed controls improve dependability and efficiency of turbine drivers.

9. Maximize Heat Transfer of Critical Equipment by Monitoring Fouling Factors and Scheduling Cleaning on Regular Basis

Large heat duty interchangers in LCCP's Normal Paraffin, ALFOL Alcohol, and the Ethylene Units are monitored regularly tracking

exchanger fouling. Cleaning is scheduled when energy savings justify costs.

10. Steam Purity Control

Producing steam at LCCP's boilers at high purity levels maintains the excellent efficiencies of turbine drivers located in LCCP, VCM, and LAB Plants. An improved boiler feedwater treatment program, better control of system surges to prevent sodium carryover, and better monitoring of operation by the chemical vendor (Nalco) have been largely responsible for the improved purity.

11. Steam Trap and Steam Leak Monitoring, Repair and Control

An extensive program to inspect all LCCP steam traps twice per year was initiated including computer tracking of performance, replacements, etc. The Steam Leak Control Program involves operator unit inspections monthly, listing and categorizing the location, size, pressure, etc., of all steam leaks. The outputs of both the steam trap and steam leak inspections are forwarded to Maintenance for scheduling and repair.

LCLAB also evaluated their existing steam trap and insulation monitoring programs for potential improvements and greater energy savings.

12. Steam Tracing Supplies

LCLAB's current steam tracing program defines when the steam tracing is turned on and off manually based on the ambient temperature and the freezing point of each process material. A proposed program will consolidate supply points for ability to turn tracing on and off with weather changes. Automatic on/off controls for tracing are also to be evaluated.

13. Electrical Tracing

LCLAB evaluated replacing steam tracing with electrical tracing in services where condensate cannot be recovered.

14. Removable Insulation

CWH 000007994

LCLAB continued to evaluate uses for removable insulation to reduce energy losses and to reduce insulation repair costs. As a result, two 1986 Capital Budget projects were developed which will cost a total of \$45M, and will save approximately 45.9 MMM BTU/Yr., which is equivalent to savings of \$130M/yr.

15. EDC Purification Reflux Pump Replacement

Operational changes at LCVCM and lower by-product production associated with the new oxygen-based process have reduced tower reflux rates on the purification columns to the point the pumps were operating well under their rated capacity. To energy-optimize the system, two smaller reflux pumps were purchased and installed and two

pumps were relocated to replace larger pumps on the 1985 turnaround. Annual savings are estimated to be \$28M.

16. Vacuum System Comparison

LCLAB is evaluating whether a mechanical vacuum system can economically replace existing steam vacuum jets.

VARIABLE COSTS - PROCESSING SUPPLIES AND FIXED COSTS - PROCESSING SUPPLIES/OPERATING SUPPLIES

1. Improved Management through Accountability and Monitoring

OKC placed significant emphasis in this area by tabulating a summary of each feature (and sub-feature) code and assigning department head responsibilities and accountabilities. Department heads/supervisors started looking in detail about things that were once before "miscellaneous and undefined". They began questioning purchase quantities, why they were using as much as they were, from whom they were purchasing, etc. Consequently, almost every feature code reflected substantial reductions versus 1985 budget (a total favorable variance of \$234M) and 1984 actual.

LCLAB developed a Lotus 1,2,3 spreadsheet to perform a budget, actual, variance comparison for each department. The spreadsheet was detailed to the feature code and reported by month, quarter, and cumulative. The 8611 run was used as input and the report then issued to department heads by the 10th of each month. This has been effective in detecting coding errors and following invoice flow. As a historical base is built, we will be able to prepare our operating supplies budget better.

2. Waste Muriatic Acid Sales to Texas United

In November 1985 LCVCM began to sell low grade acid off the incinerators to Texas United, saving approximately \$100M - \$140M/yr. The major thrust of the savings is attributable to reduced limestone and caustic neutralization costs.

3. Use of LCVCM Plant Muriatic Acid for Exchanger Cleaning

LCVCM muriatic acid was used in chemical cleaning activities at the LAB Plant and LCVCM during the 1985 turnarounds, saving approximately \$6M.

4. Use of ALFONIC Ethoxylate for General Plant Clean-up

CWH 000007995

The use of purchased detergents, used for general plant cleanup, was stopped at Baltimore. We now use ALFONIC 610-60 diluted with water. Savings are estimated at \$20,000/yr.

5. Utilize More Aggressive Operating Practices

LCCP's adoption of more aggressive operating practices also extended into efforts to minimize process supply chemical usage. One example was reducing the circulating sulfuric acid concentration in the Methyl Chloride Unit acid towers.

6. Reduced Losses of Heat Transfer Fluid

Losses of the recirculating hot oil used at Baltimore (Therminol 66) were cut drastically by the installation of new pumps with mechanical seals, reduction in vent losses, cost awareness on the part of our operators, and recovery of some contaminated oil at a custom processor. Savings are estimated at \$100M/yr. compared to previous consumption rates.

7. Modification of the VCM Caustic Decanter, S-206

LCCVCM engineering evaluations of this vessel determined inefficient phase separation was occurring which resulted in increased flake caustic consumption in the downstream dryers. A cross-sectional baffle and redundant level instrumentation were installed to improve the decanter's operation. The primary driving force for the study was to reduce monomer alkalinity and thereby improve product quality. The flake caustic savings were an added benefit, which resulted in savings of \$40M-\$80M/yr.

8. Caustic Savings for Effluent Wastewater pH

Baltimore's use of caustic soda, used to adjust the final water effluent pH, was reduced by changing the operation of the wastewater system in a manner that used spent caustic from the process unit to offset the use of purchased caustic. Savings are estimated at approximately \$86M/yr.

A capital revision was installed by OKC to permit the plant to delist the south wastewater effluent basin as a RCRA facility (hazardous due to high pH). The project was designed in such a way that substantial bulk caustic savings would also be realized by not pumping out their underground storage tank of caustic to remove settled solids. Instead, the caustic was transferred to a new holding tank for reuse prior to pumping out the solids.

9. Catalyst, Molecular Sieve, and Carbon Regeneration

The LCLAB Plant is investigating regeneration of Pacol catalyst. Investigations can be made to determine if there are cost savings in regenerating other catalysts or possibly regenerating carbon filters.

LCCP found that regeneration and screening of dryer sieves costs approximately half of the cost of new sieves. LCCP is also evaluating regeneration of the Normal Paraffin Unit "Molex" sieves for the next sieve replacement.

CWH 000007996

10. Extend Catalyst Life

LCLAB is re-evaluating the use of carbon beds to reduce apparent PNA concentration at the end of a catalyst run. Improved quality may extend catalyst run time, as increased PNA concentration is the limiting factor in catalyst life.

11. Nitrogen Cost Reduction

Nitrogen cost savings at LCVCM have resulted in annual savings of \$170M. The following steps have been taken in this area:

- a. Competitive bidding for ship and equipment purging results in nitrogen costs of approximately 50¢/100 SCF vs. \$1.30/100 SCF list price.
- b. Pipeline leak checks of lines and associated equipment and instrumentation.
- c. Optimizing pipeline nitrogen usage. The contract with Liquid Air provides a double-tiered price structure with the unit price increasing by a factor of 8 at 40,000 SCFH. Purging activities (especially during turnaround) are structured to stay under the higher tier pricing level.
- d. Nitrogen invoices are checked monthly by operating personnel for accuracy.
- e. A back-up liquid nitrogen tank was eliminated as redundant since existing gas bottles and compressor could provide the same service.

12. Cooling Water Treatment Improvements

In December 1985 LCVCM switched cooling water treatment vendors, the treatment system (phosphate to zinc) and reassigned sampling from the lab to operations. Results to date have been favorable with reduced corrosion, reduced fouling and better overall system control. The improved cooling water treatment was a contributing factor of the extended run length recently achieved.

LCCP's optimization of cooling water treatment chemicals has significantly improved thermal efficiencies in the Ethylene Unit and now will potentially allow reaching a three-year turnaround status.

13. Polymer Optimization at Secondary Wastewater Treatment

Prompted by a vendor recently shutting down an area distribution terminal, LCVCM was faced with higher inventory and transportation costs. To avert these costs, the plant screened polymers of competitive vendors and found lower dosages of lower-priced polymers could be used without adversely affecting the effluent water quality. Estimated annual savings of \$15M were achieved.

14. Alternate Antifoulant Supplier

CWH 000007997

Baltimore saved approximately \$50M/yr. in the consumption of fractionation section antifoulant (used to keep heat exchangers and reboilers clean) by bringing in a new supplier who had a good product at a lower cost.

15. Reduction of Laboratory Gas Cylinders

LCCP installed an air compressor or used plant instrument air in place of purchasing cylinders of air for use in chromatographic FID detectors. Also, a hydrogen generator was installed to supply hydrogen for chromatographic FID detectors in place of purchased cylinders.

16. Use, Reuse, and Abuse of Personnel Protection Equipment

Employees at OKC were constantly reminded of unnecessary waste of gloves, disposable coveralls, etc. Also, a memo was issued relative to apparent abuse of the plant's safety shoe policy.

The chemical gloves used by Baltimore operators are now recycled versus using and discarding. Savings are estimated at \$10M/yr.

Respirators used by Baltimore employees were at one time sent out for cleaning and inspection. We now have our employees doing this most of the time for an estimated \$25M/yr. savings.

17. Savings on Low Value Warehouse Items

Low value items are no longer stocked in "free bins" at Baltimore. Issues of these items are made from the warehouse, cutting down on wasteful practices.

Costs for low value items were reduced at OKC by scrutinizing purchase/inventory procedures and implementing a program in which used bolts, fittings, nuts, etc. were cleaned up and restocked.

FIXED COSTS - GENERAL

1. LCVCM Operation of Ethylene Storage Terminal

In December 1984 the VCM Plant assumed operating responsibility for the Ethylene Storage Terminal in Sulphur, LA. The Terminal was formerly operated by Union Texas Petroleum. The Terminal is now under a 10-year lease to Vista. Annual savings are estimated to be \$500M-\$600M.

FIXED COSTS - PAYROLL & BENEFITS

1. Personnel Reorganization

Aberdeen completed a reorganization, resulting in a reduction in force. This required a very extensive and honest review of each position in the organization, together with discussions on eliminating tasks and/or combining duties.

2. Not Filling Vacant Positions Immediately

CWH 000007998

Baltimore's Payroll & Benefits cost for 1985 was some \$549M under budget, and it also was essentially the same as FY 1984. The primary emphasis in this area was reducing overtime and not filling jobs immediately after they became vacant, nor were jobs open at the beginning of the year filled immediately. The "budgeted" staffing for

FY 1985 was 175 people; actual staffing averaged out to be 170.75 people.

At OKC, a maintenance supervisor retired and filling of the position was deferred indefinitely. A Laboratory Technician resigned (August 1984) and the position was not filled until March, 1985. The Laboratory Technician position was filled from maintenance and the resulting vacancy in maintenance was not filled. Also, filling of the Utility Helper positions were deferred.

3. Overtime Reduction and Turnaround Staffing

At Baltimore, overtime was reduced from the budgeted level of 14% to an actual result of 10%. Manpower usage during turnarounds was optimized by normally shutting down the Hydrotrope Unit during alkylate turnarounds and assigning these operators to maintenance. The boiler house was left unmanned during most turnarounds (the boilers are usually shut down), and the boiler house Stationary Engineers were assigned to Maintenance. The equipment still running (air compressors) was temporarily assigned to another operator during these periods.

4. Computer Laboratory Management System

LCCP is evaluating the installation of a Computer Laboratory Management System to provide additional information with less manpower.

FIXED COSTS - MAINTENANCE, MATERIAL & CONTRACT

General Practices

1. More Definitive MM&C Budget

Each year more effort is made at Baltimore to define and identify extraordinary expense items more thoroughly and, furthermore, to attempt to stay within budgeted amounts. A favorable variance of \$364M was achieved in 1985. The Maintenance Contract portion of the budget is now on a computer program which tracks the cost of each extraordinary item identified in the budget. As unbudgeted or unidentified items surface during the budgeted year, they are listed and the costs tracked also. By using the computer program to track the budgeted as well as the unbudgeted items, adjustments are made to keep total expenditures in line with the budgeted "bottom line". It is unrealistic to expect to have listed all items over \$2,500, but we are getting better.

2. Low Level Cost Accounting

CWH 000007999

Baltimore remarked that the cost accounting for jobs should be moved to the lowest level possible--even to the craftsman. We have been doing this on an informal/somewhat formal basis and it seems to be working well.

3. Preventive Maintenance

Considerable emphasis was placed on PM programs at OKC, shutting down equipment as soon as problems were suspected to minimize damage/repair costs, and making the first repair the last repair.

4. Monitoring Cost Commitments

Aberdeen implemented collection and reporting of maintenance material and contract cost commitments on a daily basis. This provides immediate feedback to all maintenance supervisors on the cost impact of their actions and their cost performance to date. It allows adjustments to be made in a timely fashion in order to achieve good cost performance.

A formal register ticket (used for purchasing services) approval process was implemented at OKC, providing for tighter controls of this expenditure mechanism. The new approval process is similar to the existing procedure for purchase requisitions.

5. Atmosphere of Acceptable Risk Taking

Because Baltimore did not have to run the plant at full capacity, there was room to take some prudent risks. For example, it had been standard practice to fix most process pumps on an emergency basis, even when the spare pump was in good working order. These emergency repairs added to overall costs since they would disrupt planned maintenance activity and they usually would be done using some overtime. Our current practice is to repair these pumps on a scheduled basis. LCCP also realized savings by repairing spare equipment on days rather than at night on overtime.

Turnaround planning at Baltimore was done keeping in mind the fact that we did not have to do every conceivable job at each shutdown. If we judged incorrectly on a particular job, we could shut down between turnarounds and do it or wait two months until the next turnaround and then do it.

6. Extending Time Between Unit Turnarounds

Where applicable, turnaround timing at LCCP has been extended, saving maintenance expenditures.

CONTRACTOR PRACTICES

1. Contractor Evaluation

Although we have no formal evaluation methods for the contractors which we use at Baltimore, they are constantly being evaluated on an informal basis. We look at such things as hourly rates, quality of supervisory personnel, equipment integrity and availability, overall knowledge of the job, safety record and quality of workmanship. In the past two years, we have eliminated six contractors for one or more of the above reasons. Several others have been warned to get within our guidelines or we would not have work for them.

CWH 000008000

Another technique which we feel has generated cost savings has been to divide up T&M (Time & Material) work which cannot be bid. An example is the 1985 winterization program where we used four different contractor companies rather than the historical two. This created a competitive atmosphere in which we could see productivity improvements. In general, you have to know your contractors and their capabilities and compare them to what you know can be accomplished. Don't be afraid to throw one out of the yard just because he has been around for a long time and knows the plant and work rules.

2. Contractor Rates

A hard line negotiation for holding down contractor rates and adders was made in December at OKC, resulting in lower than budget contract costs.

3. Minimizing Contractors

Minimum contractors were employed throughout the year at OKC with particular emphasis placed on terminating supplemental contractors as soon as the work for which they were hired was finished.

4. Contractor Supervision

LCCP established the practice with contractors of using only working foremen on jobs of 5 men or less.

5. Contractor Job Knowledge

Baltimore commented that in general, we should not rely on contractors to tell us how to do a job. Some 90-95% of the time we should be telling them and giving them specific job procedures. A single example follows: A certain chemical cleaning contractor was using a neutralization procedure for R-4/R-6, Multistage Reactor, which was costing us over \$9,000 each time. One cannot help but believe that most of this was done deliberately to put money in their pocket. Using our own procedure, we have since neutralized these same reactors several times for less than \$1,000 each, using a contractor, and for the cost of the caustic using our own chemical cleaning rig. NOTE: The contractor which was charging \$9,000 no longer works in the Baltimore Chemical Plant. There will always be a few jobs that are of such speciality that we cannot know a whole lot about them. However, I expect the Contract Engineer and Engineers, as well as others, to follow these types of jobs such that at some point in time they will know how to direct someone to do them and above all, know the quality of the finished job.

CWH 000008001

SPECIFIC PRACTICES

1. Independent Shops vs. Original Manufacturers

Aberdeen has used independent shops instead of the original equipment manufacturers to obtain some parts and/or repairs. Notable cost savings involved the use of Prager in New Orleans instead of Lightnin (reactor agitators) and Farrel (Line III compounder).

2. In-Plant Railcar Relief Valve Maintenance

VCM railcars are required to have their relief valves changed every 5 years. The work is now performed at the VCM Plant vs. an outside shop, yielding an annual savings of \$20M-\$30M.

3. Railcar Maintenance by Plant Personnel

Walt Miller's group showed Aberdeen personnel how to repair hopper car linings. Now we do more of our own railcar maintenance to include walkway welding repairs which can damage the hopper lining.

4. Contract Baghouse Maintenance

Savings were achieved by LCCP when maintenance on the Alumina Unit baghouse was contracted out to "EEMCO." This contractor is highly specialized and utilizes a fluorescent powder to aid in a very effective leak test.

5. Improved Winterization Program

Baltimore reduced costs on their 1985 winterization by use of the following: Vista lead man, screwed aluminum insulation covers, computerized cost tracking and work order processing, use of preinsulated tubing for steam supply, and multiple contractor crews.

6. Scheduling of Acid Pit Work

Baltimore rescheduled acid pit cleaning/repair for warm rather than cold weather months.

7. Automotive Maintenance Savings

During 1985 the VCM Plant phased out the use of contract road vehicle maintenance and now utilizes the S&T Terminal to perform routine

CWH 000008002

maintenance on road vehicles. Savings were approximately \$5M. Aberdeen also used their transport terminal's repair shop for some automotive repairs.

Baltimore's assigned vehicles were maintained to a great extent by plant craftsmen rather than outside repair shops. We used people who were known to be good auto mechanics, even though we do not have this as a specific craft. Typically, outside shops charge \$25-\$30/hr. labor versus our mechanic rate of approximately \$15/hr. (including benefits).

8. Railroad Maintenance

Aberdeen spent extraordinary money on railroad maintenance, but have substantially reduced expenditures for derailment clean-up and repair.

9. Inspection for Corrosion Under Insulation

Systematic inspection of insulated surfaces by LCCP has avoided potential process downtime by correcting problems prior to failure.

10. Sewer Clean-out Program

Baltimore reduced premature sewer failures and unnecessary excavation by routine "roto-rooting" and flushing out of the plant sewers rather than waiting for them to plug up.

11. Direct Purchase of Plant and Insulation Materials

A system has been set up where LCCP purchases, stores, and distributes the majority of paint needed by contractor jobs. This allows for bulk pricing and avoids contractor markup, saving \$20M-\$40M annually.

Insulation materials are also purchased directly by LCCP on large contract jobs and saves the usual 10-15% contractor handling fee.

12. Switching to Less Expensive Contractors & Vendors

Baltimore realized savings from the following changes:

- a. Switched from BFI to Jet Blast for lower rates on equipment and labor to chemical clean.
- b. Switched from Chesapeake Crane to Tidewater for lower rental rates (on 8612 account).
- c. Switched from Artic Refrigeration to J. G. Martin Co. for HVAC repair and instituted a PM program.
- d. Switched from MP Industries to G. C. Zarnas Co. for plant painting requirements.
- e. Switched from Rhinehart Railroad to Central Maintenance for railroad repair, and also instituted a PM/upgrade program.

CWH 000008003

EQUIPMENT-RELATED ITEMS

1. Materials of Construction in Corrosive Environments

Baltimore commented that all material replacements for equipment repair should be evaluated by someone based on "how much did it cost" and "how long did it last." Too often we fall into the "in-kind replacement" rut. A good example follows: the first stage vacuum

venturi for W-14, Paraffin Recycle Tower was corroding out on a regular two to three-month basis. Two spares were stocked in the warehouse at a repaired cost of \$7,500 each. After investigating the problem, we found that we could replace the wetted parts of these stainless steel venturis with Hastelloy C-276 and eliminate this problem. We did the work in our own shop at a cost of \$2,800--less than half the cost of a repaired stainless steel venturi. We repaired a second venturi in Hastelloy and stocked it in the warehouse at \$2,800 versus \$7,500 while the third spare was retired to the boneyard. The economics of material and equipment upgrading must always be looked at and arbitrary practices generally avoided.

LCVCM replaced eight high maintenance lined steel pumps with fiberglass pumps in the Incinerator Area, resulting in annual maintenance savings of \$11M.

Also, the VCM Plant had had poor success using loose Teflon-lined vessels. The loose liners are prone to leaks and difficult to repair. All of the plant's three loose-lined vessels were replaced with bonded-lined vessels in 1985.

LCCP is currently evaluating a test methyl chloride reactor lined with Fluoroshield polymer as a potential replacement for glass-lined reactors. Longer life is the goal.

Baltimore adopted the use of Hastelloy anchor bolts and acid-proof concrete and/or coating in acid service areas.

2. Redesigned Reboiler Bundles

LCVCM has experienced high cleaning costs on the Light Ends and Heavy Ends column monel reboilers. A new design with a rectangular pitch vs. a tight square pitch is being evaluated along with the use of carbon steel metallurgy. The changes should result in lower initial cost and reduced cleaning costs.

3. EDC Tar Stills Pump Replacement

CWH 000008004

A high maintenance diaphragm pump in heavy ends service was replaced with a surplus centrifugal pump with a double mechanical seal and flush system in October 1985 at a cost of \$6M. The replacement pump has performed very well to date eliminating a chronic maintenance and potential safety problem. Annual savings are estimated to be \$15M. An alternate capital project was being considered to install a Pressure Pot Transfer System at a cost of \$80M. Based on the pump's performance to date, the higher cost capital project will not be needed.

4. Motors in Areas of Excessive Moisture

During the rewind process, a savings equivalent to \$1.25 per horsepower was achieved by LCCP by providing an anti-moisture intrusion treatment for windings coupled with an encapsulating process.

5. Coupling Replacement on Rotating Equipment of 50 HP or Less

Gear couplings were replaced with Rex "Omega" flexible element couplings saving approximately \$50M per year at LCCP.

6. Identification of Improved Oil Seal for Ethylene Recycle Compressor

Based on discussions with LCCP, they were able to reduce oil leakage substantially by utilization of the new "G" Seal in their Elliott 29M Compressor. LCVCM has budgeted the purchase of a "G" Seal for the Ethylene Recycle Compressor, BL-307. Oil leakage into the ethylene may be a contributing cause to pressure drop in the lead Oxychlorination reactor which is the primary limitation on plant run length between turnarounds.

FIXED COSTS - MISCELLANEOUS

1. Elimination of Rail Leases

Aberdeen realized savings by elimination of some railtrack leases.

2. Review and Revision of Leases

Reviewing the leasing agreements instead of accepting the previous lease at LCLAB (and obviously following authority limitations) has resulted in a purchase of a temporary building with a less than 6-month payout and extended leases on a copy machine from 12 months to 24 months at a cost savings.

3. Reduction of Outside Lab Analyses

Aberdeen eliminated some weekly wastewater analyses to decrease outside lab costs.

4. Improve Wastewater Solids Handling

LCCP improved the movement of solids in the wastewater lagoons with the use of subsurface aerators and also used a hydraulic pump at the sludge filter press unit to improve solids handling.

* 5. Stormwater Segregation

LCLAB reduced the volume of stormwater that must be treated by improved segregation of contaminants from stormwater.

6. Waste Disposal

CWH 000008005

LCLAB is evaluating if there is a market of plant waste materials currently being disposed of as hazardous wastes such as their spent alumina. One potential place to look for a market is "waste exchanges" set up by several states. The purpose of the waste

exchange is to put individuals with wastes in contact with potential users.

7. Rental Cost Reductions

Baltimore's crane rental costs were reduced by shifting from occasional rentals of large expensive cranes to renting a smaller crane continuously. This freed up the plant's crane which was normally adequate to do the job a larger crane was rented for. The small, rental crane can handle most of the routine plant jobs.

Approximately \$26M in maintenance rental of a front end loader was eliminated at OKC. Historically, a front end loader was used to transport cull sacks from the V-40 area to trash dumpsters. Permanent steel containers on rollers were constructed to collect the culls (rather than sacks) and a barrel handling device was purchased for the forklifts, eliminating definite back injury potential as well as need for rental of the front end loader.

LCCP made a concerted effort to use Vista machinery for short contractor jobs such as unloading or moving material. This eliminates the usual 4-hour rental periods on contractor machinery such as cranes.

8. Switching and Weighing Cost Reduction

OKC's switching and weighing costs for railcars were reduced substantially by optimizing railcar movements with the railroad and taking maximum advantage of allowances given.

9. Hand Tool Purchases

Better controls were put on the purchases of hand tools at Baltimore, saving approximately \$14M/yr.

10. EDS Cost Reduction from PC Use

Although the "blue book" fixed cost clearances did not reflect any savings in this category in 1985 (Plants were charged computer clearances equivalent to budget), actual computer clearances from EDS were reduced at OKC approximately 65-70% by downloading most of the plant's computer programs in EDS to the plant's PC.

Also, approximately \$6.0-6.5M was saved at OKC in long distance telephone charges by use of the plant's PC instead of EDS.

LCVCM estimated their increased use of PC's in place of EDS saved \$7M.

- * LCCP continued to review EDS programs and applications and evaluate alternatives such as PC use. By placing their new turnaround cost control program on a PC, they saved approximately \$4.5M compared to EDS charges.

CWM 000008006

11. Paper and Time Savings on Copies

- X LCLAB reviewed distribution lists on all reports, etc. and saved paper and time by sending only to those persons who need the information. Even an action as simple as duplexing copies as much as possible saves on paper purchases.

CWH 000008007

Cost Reduction Practices

POTENTIAL
PAGE

100%
BETTER UNDERSTANDING OF PLANT COSTS

HI 6 BIDS TOWED WITH SUPPLIES - AS IN

BASIC CLEAN-OUT CONTRACT

3 VARIABLE COST TAKE OR PAY CONTRACTS

HI 1 OLIV HCl USAGE

HI 4 3 OPTIMIZE CRACKING REACTOR USAGE

Adding temp control to HCl

Column REBOILER. May be APPROPRIATE WITH L.E., H.E., & VCM COLUMNS

BTL Control USED WITH MOTOR

LESS USED WITH STREAM

HI 8 Electronic speed controls - for BL-SOIT

May be BL-SOIT

MONITORING OF FOSLINS

MEG 6 11 STREAM LKX/STREAM TAP MONITORING -

NEEDS TO BE DONE BY MAINT/OPERATORS

(MAY ALREADY BE)

STREAM TRADING OFF/ON PROGRAM

ELECTRICAL TRADING

REMOVING BLT IN SOLAR

POLYMER USAGE AT CARRIER

MATERIALS OF CONSTRUCTION

REDUCING ESOLINE BUBBLES

STEAMWATER SEGREGATION

PC USAGE

Job No.

Title