1988 CAPITAL BUDGET

Lake Charles VCM Plant

H-101 Control Revisions $100,000 Capital

Project Description

This economic project provides recirculation of the cooling water used in H-101, the Direct Chlorination Reactor Cooler, to increase the shellside cooling water velocity and provide temperature control on R-101, the Direct Chlorination Reactor. The project includes installation of a cooling water recirculation line, a recirculation pump, and a temperature control valve.

Problem Description

In August, 1986, H-101 developed ~~a~~ tube leaks, resulting in ~~an environmental incident~~ and making replacement necessary. The exchanger historically has failed approximately every 30 months. Failure is ~~caused by~~ erosion on the process (tube) side and shell side corrosion caused by pitting. The process side corrosion is allowed to occur intentionally, as the tubes are sacrificed to provide iron for ferric chloride, which catalyzes the chlorination reaction. Sacrificial ferrules were installed in the tops of the exchanger tubes during the May 1987 turnaround. ~~These will~~ protect the tubes from process side corrosion while still providing ferric chloride.

Cooling water is currently supplied to the shellside of H-101 without temperature control by the main cooling water supply header. The cooling water lines supply approximately 6700 gpm to the shell side flow velocity of 2.7 ft/sec. A minimum velocity of 3 ft/sec. is recommended to minimize shellside pitting, which leads to premature tube failure. A shellside cooling water velocity of 4 ft/sec. can be obtained ~~and is preferable~~ ~~requiring~~ a cooling water flowrate of 9000 gpm. This project will supply 9000 gpm cooling water to H-101 by ~~recirculating~~ ~~a portion of~~ the cooling water ~~return back to the supply,~~ thus reducing shellside pitting and extending the life of the exchanger to four or more years.

The project will also provide temperature control for R-101, the Direct Chlorinator Reactor. In the past, the cooling water flow to H-101 has sometimes been "pinched back" during

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the winter months to maintain the reactor temperature at 55°C. However, the resulting cooling water velocities in H-101 are very low, making it susceptible to pitting. In recent years, the cooling water valve has been left wide open, resulting in reactor temperatures of 45-50°C. At these lower temperatures increased concentrations of 1,1,2-trichloroethane, an unwanted by-product, are formed in the reactor. This project will control operation at the desired temperature of 55°C while maintaining an adequate flowrate of cooling water to H-101 to minimize corrosion due to pitting.

Project Alternatives

The following alternatives were considered:

1) Modify the tube pitch and the number of baffles in H-101 to give a more even velocity profile, thereby eliminating "dead zones" which are highly susceptible to pitting, ~~and~~ raise overall cooling water velocity. This alternative was rejected because it would require installation of a new exchanger and it would not provide the benefits of temperature control.

2) Install a closed cooling water system which would allow ~~other water~~ treatment systems such as chromate treatment to be used and allow leaks to be contained ~~in the closed system~~. This ~~option was rejected due to the~~ high associated cost.

STILL NEED ECONOMICS

3) Run a 4th cooling water pump

Talk about money/Dec. 1 RR.

8-21-87

VISTA **Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS

Estimate Summary

W. O. No. _____
Sheet No. _____ Of _____

Project Title R-101 Temperature Control
Location 15M Estimator [illegible] Class of Estimate Budget Capacity _____
Department _____ Nelson Refinery Index _____ Original Date _____
Checked By _____ Approved By _____ % Quoted _____ Rev. No. _____ Date 3-3-87

DESCRIPTION	LABOR MH	LABOR $	MATERIAL $	SUBCONTRACT $	TOTAL	%
EQUIPMENT						
Pressure Vessels						
Towers & Internals						
Exchangers						
Pumps & Compressors		8000	12000			
Furnaces						
TOTAL EQUIPMENT		8000	12000		20000	
OTHER MATERIALS						
Piping		15000	30000		45000	
Instruments		2000	5500		7500	
Electrical		2500	2500		5000	
Structural						
Concrete & Site		1500	500		2000	
Insulation						
Painting				2500	2500	
Fireproofing						
Buildings						
TOTAL OTHER MAT.		21000	38500	2500	62000	
TOTAL DIRECT COST		29000	50500	2500	82000	
FIELD COST						
HOME OFFICE COST						
BOND, ARI, SALES TAX					3000	
ESCALATION 3%					1500	
CONTINGENCY 10%					10500	
TOTAL					97000	

SEPT. 1984

CWH 000008858

Control Valve			$4,000
Tempature Controller			$4,500
Pump			$8,500
Motor			$3,500
Globe Valve	18"Ø		$11,000
Gate Valve	10"Ø	2en	4,000
Gate Valve	8"Ø	2en	2,600
Check Valve	8"Ø	2en	4,000
Globe Valve	6"Ø		1,200
Other Valves			1,000
			$23,800
Pipe			2,000
Flanges			$1500
wor			1200
Fitting			2,000
			6500
Electrical			$2500
Electrical Labor			$2600
Instrument			1000
Instrument Labor			2,000
Painting			500
Labor			2,000