

# **RADIAN**

**CORPORATION**

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19 April 1990

Mr. Michael T. Wiseley  
Process Engineering Department  
Vista Chemical Company  
900 Threadneedle  
P.O. Box 19029  
Houston, Texas 77079

RE: Proposal for Metals Removal Technology Evaluation (VCM Facility)

Dear Mike:

Pursuant to our discussions in Houston on 17 April 1990, Radian Corporation can provide to Vista Chemical Company the following:

- An engineering evaluation of alternative technologies for metals removal from organic chemicals wastewaters. This evaluation will include an analysis of state-of-the-art technologies; probable capital and operation/maintenance costs with respect to the VCM wastewater problem; and effluent quality achieved under normal operating conditions.
- An engineering evaluation of alternative conceptual wastewater treatment systems for dissolved and total metals removal. This activity will involve a review and critique of the proposed Vista VCM metals removal process flow diagram (dated 16 April 1990), and approaches suggested by Radian as possible alternatives which would also meet target effluent quality. Radian will also examine the feasibility of a combined stormwater and process wastewater treatment system for metals removal. The evaluation will include estimates of capital and operation/maintenance costs for the selected alternatives so that the most appropriate options can be evaluated by treatability testing.
- Bench-scale treatability testing will be conducted on a composite sample provided by Vista Chemical. At this time, two tests are envisioned, one with equipment wash wastewater and one with a combined stormwater and equipment wash wastewater. Vista will also need to provide Radian with an appropriate volume of stormwater runoff for admixture with the process wastewaters. It is our intention to conduct coagulation/precipitation tests using a standard jar test apparatus. The samples will be evaluated for coagulant dose, Ph effects, and sludge thickening/settleability. Metals analysis will be performed by ICP and graphite furnace AAS. The results of the study will be presented in a brief technical memorandum to Vista within six (6) weeks of sample receipt.

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Program costs are estimated as follows:

| Activity                                 | Labor<br>Hours | Analytical | ODC   | Total Cost |
|------------------------------------------|----------------|------------|-------|------------|
| Task 1: Technology Assessment            | 37             | --         | \$100 | \$2,890    |
| Task 2: Treatment System<br>Alternatives | 50             | --         | \$200 | \$3,740    |
| Task 3: Treatability Study               | 70             | \$1,980    | \$500 | \$6,750    |
| Totals                                   | 157            | \$1,980    | \$800 | \$13,380   |

Analytical costs include analysis for nickel, copper, zinc, and lead in the wastewater samples. Sample duplicates, matrix spikes, and matrix spike duplicates are included in the cost of analysis.

Should you require additional information or clarification of the proposed test program, please contact me.

Sincerely,

*Frank*

Frank J. Castaldi, Ph.D., P.E.  
Principal Engineer  
Process Engineering Department

FJC:kla

cc: M. L. Owen (4)  
R. Ahmed (Houston)