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**SILO PROJECT INDEPENDENT REVIEW TEAM DOCUMENTATION - LETTER  
FROM ROBERT C. ROAL CONCERNING NOVEMBER 14 & 15, 1996  
MEETING**

11/30/96

ROAL  
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LETTER

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RE: NOVEMBER 30, 1996 LETTER FROM ROBERT C. ROAL

FEMP Silos Project  
Path Forward Decision  
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11/27/96

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November 30, 1996

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Post-It Fax Note	7671	Date	12/5/96	Page	3
To	Mark Dehring	From	Dennis Dymov	Co.	
Co Recd		Phone #	7055	Fax #	
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SUB CONTRACT #97SS000256

Mr. Dehring;

The meeting at Fluor Daniel Fernald facilities on Nov. 14 and 15, 1996, was to organize the Independent Review Team; explain their role, present the history, status and problems of Silos Project: A tour of the pilot plant facility was made on the afternoon of the first day. Lee Merkhofer of Applied Decision Analysis, Inc. explained the decision approach that would be followed, and Bob Heck explained how teams input would be used.

On Friday, Nov. 15th, the group worked on the process, first developing the objectives. These were then grouped and related to each other. Don Paine presented the company's view of the alternatives that could be the path forward for the project. The alternatives were discussed and, I believe, the team agreed with the alternatives.

There was a discussion of plans for the next meeting on Dec. 12th and 13th, the formal meeting adjourned, and several smaller informal discussions went on for a while.

My observations:

The pilot plant operation was hindered by a very poorly designed slurry handling system and off gas system. The melter worked reasonably well, and the operations learned quickly, and, later operations improved. Total melter on stream time was several days during the period of June through Sept.

Slurry System - The slurry system used 1 1/2 inch piping with standard elbows and screwed fillings. The diaphragm pumps had short life. The slurry piping, valving and pumping should be totally removed and properly designed with long radius (about 2') bends. There should not be any dead legs or sharp bends. Screwed fittings should not be used. The plant operating experience has not been long

enough to see extensive erosion yet, but the system, as designed, will not last long (maybe a month or two) until the piping is breached at fittings (elbows and tees, in particular).

Somebody with experience in design and operation of slurry systems should evaluate components - particularly valves and pumps for the new design. A cold test loop using bentonite would be useful to test components. Valves in a slurry system should be minimized: Dead legs flushed and drained immediately; and valves should not be used for flow control; only shut off or diversion.

The diaphragm pumps are cheap, but have limited life. Hard surfaced centrifugal pumps are available that, when properly selected, would be a better choice. These should have variable speed motors for flow control and double, purged, high quality double mechanical seals. These pumps need to be near the bottom of the slurry tanks they pump from, but, consideration must be given to access and shielding for replacement.

Off Gas System - The first problem is it's underdesigned. A process off gas system is rarely of adequate capacity. I would guess the piping needs to be at least one, probably two sizes larger in diameter. The sizing should be for at least double current capacity and probably triple. The pressure drop in condensers, scrubbers, etc. then need to be checked. Likely these equipment will have to be replaced also.

The scrubbers and condensers should have deentrainers immediately down stream or incorporated into the design of these vessels. These kinds of equipment are very good at having high droplet (and solids) loads into the gas stream, which, when the stream is heated ahead of the HEPA filter, results in very high heating duty (heat of vaporization, in addition to sensible heat) plugging, and erosion that leads to premature failures

Overall - The pilot plant does not appear to have had much thought to personnel radiation exposure in the design. Change out of pumps, valves, and the melter look, to me, to insure very high personnel exposures. For that reason, any thought to process actual material from Silos 1 & 2 needs to be evaluated very carefully.

The future use of the pilot system may well be best kept non-radioactive to perform test runs to support a production facility.

Before the next meeting, Fluor Daniel should develop a capital and operating cost estimate for comparison with the stabilization (no vitrification) alternative and the other two alternatives. I believe

this option would have to be much less expensive and faster than the other alternatives, because of the paper system risks.

Sincerely,



Robert Roal

RCR/rkr