

Critical Analysis Team Report

CAT Report #33

13 December 2002

The Critical Analysis Team (CAT) conducted an overview of silos projects during the second week of December 2002. Following are CAT comments on the silos projects and several documents the CAT reviewed.

Project Management Infrastructure

The following four items require the focus of silos project upper management:

- The current schedules indicate many silos startup and operations activities occurring in parallel. In order to support these activities the operational staff should be supplemented with qualified personnel to ensure adequate design reviews, procedure development, training development, acceptance testing, operational testing, and readiness preparations. The recent startup of the RCS should demonstrate the importance of applying such qualified personnel early.
- The CAT has been concerned with project controls for several years. Sound project management requires detailed knowledge of project baselines content and status. It is important that project managers regularly obtain, review and evaluate task level data. To better understand the project controls process and status in the silos project, the CAT's schedule should include attendance at one of the monthly status briefings/meetings.
- **Recommendation 33-1:** A comprehensive document control process, including adequate staffing, should be developed and implemented. The Accelerated Waste Retrieval (AWR) project experienced difficulties during startup of the Radon Control System. As the silos projects progress, flaws in the document control process have the potential to create significant barriers to successful project implementation. Given the anticipated increase in contractor submittals and field activities in the next two years, development and implementation of an efficient, effective document control process is critical.
- **Recommendation 33-2:** The Silos Project Director should assure implementation of consistent configuration control and ensure instruments, controls, hardware and software are consistent, integrated and implemented across the silos projects. Inconsistencies impact operations, maintenance, and training and ultimately leading to cost increases and schedule delays.

- Projects at many DOE sites have exhibited an inability to ensure 'lessons learned' are documented and acted upon.

Recommendation 33-3: The Silos Project Director should ensure RCS 'lessons learned' are discussed, understood, documented and acted upon by AWR, Silo 3 and Silos 1 and 2 projects to prevent repetition.

General Comments

- The hot test of the Radon Control System (RCS) represents a success for the Fernald site. Continual operation of this facility will be necessary in the near future (April, 2003). To ensure RCS startup does not interfere with other silos activities, and to obtain important data concerning the facility's capabilities, the project should, (1) complete punch-list activities and assess data from the hot test; (2) complete procedures and training; (3) complete a continuous test to ensure the RCS will meet all its operational needs prior to cap removal. The RCS should then be operated continuously for an extended period prior to silo penetration.
- Based on the documents reviewed by the CAT, the design review process remains inadequate. The current design review process—essentially a 'roundtable' combined with Jacobs squad check—does not appear to be resulting in thorough design reviews. This schedule driven review process reduces the opportunity for qualified individuals to sufficiently review, document and communicate comments. Further, documentation of comments and comment resolutions become more difficult. Lastly, qualified operations and maintenance personnel have been unable to participate in many of these reviews due to, (1) insufficient numbers of qualified staff; and (2) staff being assigned to other priority activities (such as RCS startup).

The document review process should be revised to provide sufficient time for an independent, structured design review that involves all appropriate Fluor organizations. All review comments should be documented, resolved and tracked to closure.

- Despite the late stage of the silos project, the design of significant equipment items is being reconsidered. For example, the Silo 3 project is only 11 months from completion of construction, and the vacuum arm wand design is still being questioned. The Final Report of the Office of Science and Technology Technical Assistance Team (TAT) concluded the pneumatic retrieval system will successfully retrieve loose Silo 3 material. There is no compelling reason to change the vacuum arm wand definitive design. Design improvements to the vacuum arm wand suggested by the TAT should be considered. However, alternative technologies to the vacuum arm wand for Silo 3 at this stage of the project are not likely to result in a cost, schedule or obvious technical advantage

and therefore should not be pursued.

The CAT understands that, through discussions with stakeholders and regulators, the Proposed Plan for Silo 3 design will include an attempt at binder and/or water addition during Silo 3 material packaging. The design for such water and/or binder addition is relatively immature, untested and not ready for implementation.

All proposed changes to silos projects should be managed through the formal project change review and approval process including technical, schedule and cost analyses to demonstrate added value.

- Existing documentation does not provide a clear picture (and is conflicting in some cases) of Silo 3 waste characteristics (e.g. particle size, particle size after disturbance, hygroscopic properties, etc.). The latest data the CAT has reviewed (WSRC-RP-2001-00167, Silo 3 Waste Treatment Phase I Physical Testing Final Report, Jan 9, 2001) indicates the waste may absorb and react with moisture more than has been previously reported. This characteristic could have significant impacts on the operation of the Silo 3 facility. The primary concern is the potential for rapid and frequent caking and plugging of the dust collectors, HEPA filters and ULPA filters. To remedy potential operational impacts, project technical staff should compile and evaluate existing data and implement a plan to fill data gaps to support final design and operation.

Comments on the Silos 1 and 2 Integrated Test Plan, Rev. A

- The Silos 1 and 2 Integrated Test Plan for mock-up and testing of the container transfer system, gantry manipulator, and fill-head is important and timely. The test plan appears to be a reasonable approach to determining the capabilities of this system. The CAT recognizes the plan is a draft and does not yet include all of the data required (e.g. awaiting design or other information) to complete the test plan.
- The CAT also briefly reviewed the test plans for Surrogate 1.5-Inch Diameter Test Loop, Real Waste Test at DIAL and Surrogate 2-Inch Diameter Test Loop. These draft test plans are a good start toward resolving project uncertainties.

Comments on the Process Control Plan and Operating Sequence for the AWR BOP Optimization Project

The CAT conducted only a cursory review of this package and offers the following observations.

The process control philosophy outlined in this document is focused on extensive automation. The CAT is concerned that this philosophy is impractical, has not benefited

from Operations staff input and appears contrary to Fluor Fernald's site operational philosophy. Therefore, the process control approach should be revised with direction from Operations. Following are several comments on which the CAT's concerns are based.

- The document does not differentiate between instruments vital to operation (primary) and those instruments that the facility can operate without ('nice to have' instruments such as slurry line pressures, pump speed, slurry density, etc.). 'Primary' instruments should be interlocked for automated action initiated by the computer control system. The other instruments should not be interlocked in this fashion.
- Operations will likely prefer operator initiated operation of valves for routing. Computer based valve control for each operating scenario introduces significant complexity to the control system and is probably unwarranted.
- There are many omissions (e.g., bottom of page 3-5, "The slurry pump lifts out of the waste material when the batch transfer has been completed and the slurry lines have been flushed.") However, the document should also indicate that the pump must be shut off.
- Page 3-6, Section 3.2.6: Flexibility and automated valving line-ups create the risk of misroutings. In addition, operating flexibility should not be a primary objective. Safe, reliable and disciplined operation may restrict or eliminate flexibility.

Due to the large number of cross-routings as well as the automated valve lineups the CAT has previously recommended the need for an analysis of the consequences of a misrouting and whether those consequences are acceptable. If the consequences are unacceptable, measures such as blanks or spool pieces in place of valves should be taken to minimize the risk of a misrouting.

- The tables in the appendices are very complicated and difficult to understand or check.

Comments on AWR BOP Optimization Mechanical Package 107, Rev. 0

The CAT recognizes this package has been released for construction. The CAT conducted only a cursory review of this package and offers the following high-level observations.

- Any specification requirement that cannot be accurately defined or verified should be deleted (e.g., "Deliver in a sound and clean condition"; "Will take all precautions to protect material from damage"; "Care should be taken in off-loading equipment"; "Submit equipment cut sheets as appropriate.")

- The package refers to multiple documents that are not available. Examples include references to Sections 6 and 7 of the contract (is the reference to Sections 6 and 7 accurate?) and QA requirements outlined in the contract. An adequate review requires access to these documents.
- Fluor appears to be requiring too much documentation for approval. The package should be reviewed to ensure Fluor indeed does need to approve all of this information. A closer evaluation would likely show much of the documentation is either not needed or needed for information only. If indeed approval is necessary, silos project management should ensure the availability of sufficient qualified personnel to review and approve these submittals in the scheduled time frame to prevent significant cost and schedule growth. In addition, sufficient document control capabilities must be provided to receive, identify, reproduce, distribute, file and control these submittals.
- Some of the requirements do not appear applicable. For example, "If piping will be left empty or untreated for more than 2 days, the system shall be purged and filled with 10 PSIG nitrogen" (Section 15050, Page 9). The CAT is not aware of any such requirement for chemical facility process piping.

Also included is the following Fluor Fernald site label requirement, "The minimum character height for a well illuminated environment is 0.004 times the nominal reading distance (i.e., 0.112 inch height at 28 inch distance)," (Section 15052, Page 5). Such a requirement could have been handled by referencing the need to use labels that meet ANSI standards.

The spot check of this document by the CAT indicates this material has not received an adequate review and should not have been approved and released for construction.