Critical Analysis Team Report #37

October 6, 2003

This report documents the Critical Analysis Team's observations after participating in silos project updates at the Fernald site. The CAT appreciates the support and time of silos project personnel during the visit.

Near the end of the CAT's visit, the Silos startup manager provided draft documents outlining the development of the basis for control systems software. The CAT performed a preliminary review of this information. It appears to provide the necessary bridge between the Piping & Instrument Diagrams (P&IDs) and instrument tabulation lists in defining the operating philosophy and control logic needed to prepare the control system software. The CAT will continue to review control systems development over the next several months.

CAT Observations

1. CAT interviews with both Quality Assurance/Quality Control and Safety organization personnel indicated comprehensive, well-planned and administered programs.

2. Multiple individuals and organizations (e.g construction, projects, and startup/operations) are developing detailed schedules in support of construction completion, readiness, startup and operations. Ideally, one overall, credible schedule integrating all project components should be developed. Or, at a minimum, all organizations should be communicating and coordinating as schedules are developed.

3. Continuity in project management and key personnel is important to project success. The CAT is concerned that personnel turnover in the silos project continues to be significant.

4. Fluor's new Startup and Operations organization has divided responsibility for project turnover/startup and operation between two managers. This dilutes accountability and responsibility and unnecessarily increases the number and difficulty of turnover transitions between project phases. The construction turnover/startup and operations should be consolidated under one manager.

5. The silos project cost and schedule negative variances continue to increase at a significant rate. The cumulative to date cost and schedule variances for silos show an increase from negative $15.8 million in July to negative $19.8 million in August, a 26% increase. The CAT is concerned that this significant negative variance at this stage of the projects (41% complete) will be extremely difficult, if not impossible, to recover.

   Fluor should address the following concerns to ensure cost and schedule overruns do not result in 'cutting corners,' adversely impacting silos project facilities:

   - Corrective actions should not rely inappropriately on additional work (e.g. double shifts, longer shifts, etc.). Additional work increases productivity only to a point (usually about 50 hours per week). Beyond this, additional work tends to have

the opposite of its intended effect due to lower morale, increased safety incidents, increased work absences, and lower job productivity.

- Laboring to achieve unrealistic schedules leads to a workforce that is 'overwhelmed,' resulting in lower productivity, poorer work products and burnout. The CAT believes the Project Engineers have been overloaded for approximately one year and others are rapidly approaching the same condition.
- Readiness activities need to be aggressively implemented to ensure they do not impact schedule. To prepare for this, the readiness organization should review lessons learned from RCS startup and have Quality Assurance conduct an audit of the silos project documentation control system and documentation (including required contractor submittals) to ensure they are prepared to support readiness activities.
- Construction needs to ensure that work package preparation is able to keep ahead of actual field work. The ongoing ramp-up in electricians emphasizes the need of providing sufficient advanced work direction to ensure productivity.
- Fluor should review staffing levels of teaming partners, contractors and subcontractors to ensure that the silos project is maximizing its productivity. In addition, to maintain such productivity, Fluor should require regular progress reporting and performance tracking.

6. The CAT questions the necessity of utilizing a remotely operated vehicle (ROV) for silos 1 and 2 heel removal. Given the capabilities of the sluicing system, as well as the silos' sloped bottom and sump, the CAT is relatively confident that sluicing will remove a sufficient amount of waste to make ROV intervention unnecessary. In any case, cheaper, faster, more reliable alternatives can likely be identified and implemented (e.g. long reach tools, hands-on approaches, etc.). Therefore, expending significant resources on ROV implementation should be discouraged.

7. The construction organization should develop a man-loaded construction plan using a bottoms-up task approach. Only after this plan is developed can startup and operations develop realistic schedules and staffing plans for turnover, testing and operation. Given the potential for multiple, overlapping silos activities (e.g. Silo 3 and AWR), such a plan is necessary to solidify schedules and staffing requirements.

8. The CAT met with the new silos project Construction Manager. Several proposed changes are encouraging to the CAT and we look forward to seeing progress towards their implementation:

    - Working a maximum of five, ten-hour days per week.
    - Developing construction teams (each team including individuals from construction, quality, safety, etc.) that are assigned to specific work tasks.
    - Including construction team performance measures in construction work packages.

9. The CAT is disappointed that, despite repeated reminders, the Silos Project has two separate control systems (AWR and Silos 1 and 2 have a Siemens system while Silo 3 has an Allen Bradley system). Separate control systems inject difficulties into the project through added work, and complications, and duplications in checkout, testing, programming, vendor support, and training.

10. The Engineering Execution Plan states that the CAT, "...can perform the structured reviews" required under DOE Order 413.3. While the CAT has commented on multiple project documents and processes, no formal Order 413.3 reviews have taken place.

11. The CAT commends the AWR Project Manager for a comprehensive understanding of his project's status, identifying project problems and devising realistic solutions to those problems.

12. During a walkthrough of the construction site, the workforce appeared to be under-utilized. The CAT recognizes that a brief walkthrough of a construction site may not provide an accurate picture of the site's productivity. Still, the CAT encourages Fluor to ensure a productivity measurement and tracking system is developed and utilized.

13. The redlining process as currently outlined in the Engineering Execution Plan (EEP) is troublesome. This process does not ensure that all changes and non-conformances are appropriately documented, reviewed, approved and incorporated into baseline project documentation. Implementing changes without an approved Design Change Notice (DCN) or Non Conformance Report (NCR) places the project at risk for significant difficulties during turnover, readiness, startup and operation.

14. The AWR project's decision to sluice 24 hours per day should assist in equipment running more efficiently, reducing worker exposure and safety issues and, ultimately, completing the sluicing operation ahead of schedule.

15. The CAT is concerned about the storage of vendor provided equipment. Fluor should ensure that equipment and materials that are delivered to the construction site need to be receipt inspected and properly packaged, stored and controlled to ensure that they are not damaged or missing when needed for installation.

16. The CAT is dismayed at the inability of the Silos 1 and 2 and Silo 3 projects and their subcontractors to schedule and meet deadlines for testing and demonstration of the filling systems and associated process equipment. The Silos projects should not underestimate the importance of these tests. The CAT interprets the delays to the Silos 1 and 2 Integrated Process Test as indicative of serious problems. The CAT requests detailed feedback from FF on problems it is encountering with the ITP, plans to remedy those problems, and processing contingency plans should the existing design fail.

17. The CAT is concerned that Silos 1 and 2 has initiated procurement of the three production fill stations prior to completing demonstration testing of the test fill unit as planned. This approach could lead to delays and additional cost should the demonstration unit fail or require significant design changes.

Upcoming CAT Activities

- Participate in the Fernald Citizens Advisory Board meeting (October 21).
- Review documentation of Silos 1 and 2 pumps, valves and instrumentation slurry testing.
- Review Silo 3 test plan for packaging/handling/conditioning system and observe Silo 3 packaging station demonstration. (plan was scheduled for June onsite review; the demonstration is now scheduled for October 17th).

- Observe Silos 1 and 2 integrated fill room test (originally planned for June, delayed until August and now delayed until October).
- Review the list of Quality Assurance audits that have been performed in the previous two years (provided by first week of October).
- Review the Quality Assurance audit of the Engineering Execution Plan (provided by first week of October).
- Review the reports of Silo 3 wand testing on Silo 4.
- Review selected silos project process control philosophies and instrument tabulations (plans available now, review over next several months).
- Prepare CAT plan for Reliability, Availability and Maintainability, Safety and Operability review of completed silos facilities and systems.