

Office of Enterprise Assessments (EA)
Operational Awareness Record - Rev. 0

Report Number: EA-WIPP-2014-06-23

Site: Waste Isolation Pilot Plant (WIPP)

Subject: Limited Review of Engineering Configuration Management Processes

Dates of Activity: June 23-27, 2014

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Activity Description/Purpose:

Perform a limited-scope review of configuration management processes within the Nuclear Waste Partnership LLC (NWP) engineering organization. Assess the thoroughness and effectiveness of an NWP internal review of engineering design control by a four-person external team.

Result:

WIPP management is committed to complying with U.S. Department of Energy (DOE) Order 420.1B, *Facility Safety*, which states that “Configuration management must integrate the elements of system requirements and performance criteria, system assessments, change control, work control, and documentation control.” In March 2014, NWP brought in a four-person external team from one of its partner companies, URS Corporation (URS), to perform an independent review. That team of senior engineers was tasked with assessing the WIPP design control process. Phase I of the review involved procedures and processes, while Phase II expanded the review to include technical documents and engineering change orders (ECOs). The team issued a final report titled *NWP Independent Review* to the DOE Carlsbad Field Office (CBFO) on July 1, 2014.

Findings from the report are summarized below:

- No clear definition is provided as to which documents constitute the technical design baseline beyond the system descriptions.
- The calculation procedure lacks rigor, does not adequately implement the Quality Assurance Program Description, and does not track unverified assumptions to closure.
- Design review and verification are not performed as intended by the procedure.
- System health reports are not consistent, do not reflect analysis by the cognizant system engineer, and do not meet the intent of DOE Order 420.1B.

The EA review was performed concurrent with Phase II of the URS review. Specifically, EA reviewed the effectiveness of the NWP independent review effort and examined additional areas related to the technical baseline and document control.

In general, the EA team found that the findings summarized in the body of the NWP final report understate the extent of conditions described in the detailed results (Appendices 4 and 8 of the report). Examples include:

- Design inputs were not adequately documented.
- Technical baseline requirements were not defined.
- Unverified assumptions were not documented, controlled, or closed out.
- Engineering program and procedures may require revision to handle expected large changes.
- Weaknesses were apparent in the commercial grade dedication process.

Overall, NWP adequately implements the portion of the design change process involving the development of ECOs. EA reviewed portions of the interim ventilation project and observed a design review meeting. The ventilation project is a large project for WIPP, with some design and procurement functions to be performed by other offices. All affected groups/organizations participated in the review meeting and a questioning attitude was evident. However, the dispersed nature of the technical baseline (discussed further below) led to a concern on the part of the EA reviewer about how WIPP management will define and control the dissemination of design input information to outside parties. NWP engineering noted that an “approval and variation request” process was in place to control the information dissemination process. EA will perform a follow-up review in this area.

Although development of ECOs was adequate, NWP closure of ECOs is less than timely. There is a large number (approximately 70) of implemented ECO packages awaiting closure. Since ECO change documents for implemented packages are attached to the affected drawings in the control room and are accessible to users, this lack of timeliness was not identified as a design control issue.

EA examined document control processes and interviewed key personnel in engineering and the document control staff. The results are summarized below.

- WIPP uses Documentum for its electronic record management system. Hard copy records, such as closed ECOs, are sent to a separate office in Carlsbad for scanning into Documentum. The electronic copy becomes the record source for that document. Access to Documentum is available to users on site but actual use is very limited. In addition, not all records are scanned into Documentum. Current drawings of record are kept only in hard copy in a locked file room on site. Operations has 24-hour access to the file room. However, this limited availability of essential records to other personnel, especially during off-normal work hours, reflects a document control process that is outdated and a significant challenge to configuration management.
- Vendor drawings, manuals, and correspondence are also kept in hard copy in cabinets. No controlled vendor manuals exist, although reconstitution of controlled manuals is a planned corrective action. Vendor manuals should be easily accessible to all site organizations as part of an informed maintenance program.
- ECOs are not scanned into Documentum until after closure, which is a significant issue given the backlog of unclosed ECOs. Each implemented but unclosed ECO represents a physical change to the plant that is not reflected on the issued design drawings.

Both the EA review and the NWP independent review found issues with documentation of the project technical baseline. Design input documents are poorly defined or nonexistent. Calculations performed to support a technical change are not numbered and are not issued as stand-alone documents, but rather are included as part of the ECO package. Consequently, the technical basis and justification for the current design has been dispersed through approximately 12,000 design change packages.

NWP issued an Engineering Performance Improvement Plan in May 2014. In general, the plan lacks clear guidance as to the role of engineering in defining, documenting, and defending the technical design basis for the project. The plan focuses on organizational and cultural changes without addressing the process-related shortfalls noted in both the EA and NWP reviews. The plan committed to capturing improvement opportunities from the internal review in a separate Performance Assurance Management Plan to be issued by September 30, 2014; however, at the time of this report, no Performance Assurance Management Plan had been issued and the Engineering Performance Improvement Plan has not been revised. Feedback from NWP engineering during preparation of this EA operational awareness record noted that findings from the internal review report had been entered into the WIPP Issues Management Process for tracking and closure. EA will perform a follow-up review of this area.

EA identified several opportunities for improvement during this review:

1. NWP and CBFO need to follow-up on the extent of conditions described in Appendices 4 and 8 of the NWP final report to ensure all deficiencies are identified and addressed.
2. Planned efforts to upgrade the system design descriptions should be expanded to include reconstitution of the full design basis for safety-related systems.
3. The engineering calculation procedure should be revised to ensure that all calculations are issued as stand-alone documents and that all unverified assumptions are technically justified prior to implementation of a change.
4. Design documentation (i.e., drawings, calculations) should be available through the electronic records system and easily accessible to every user on site. The electronic record should be established as the record source for these documents.

These opportunities for improvement are provided for consideration by CBFO and NWP engineering. No response is required.

EA Participants	References
1. Charles Allen	– NWP Independent Review SMP-14-002
	– NWP WP 09 Rev. 36 Conduct of Engineering

Were there any items for EA follow-up? Yes No

EA Follow-Up Items

1. Perform additional review of the interim ventilation project as it progresses, with emphasis on work by third parties and on control of design input information.
2. Review the proposed Performance Assurance Management Plan and/or other mechanisms used by NWP engineering to address corrective action commitments related to the internal review performed by URS.
3. Review the process for controlling design input information transfer to outside offices.