

# Project Hanford Lessons Learned

**Title:** THORP Incident Underscores Importance of Operator Vigilance and Strong Conduct of Operations

**Date:** December 6, 2005

**Identifier:** 2005-RL-HNF-0041

## **Lessons Learned Summary:**

Failure to respond appropriately to off-normal conditions led to a serious process leak at British Nuclear Group's Thermal Oxide Reprocessing Plant in Sellafield, England. A review conducted by Fluor Hanford (FH) following the incident indicates that similar conduct of operations behaviors may exist at FH. These behaviors, coupled with a cross-cutting programmatic weakness involving response and timely follow-up to off-normal events, warrant further management attention.

## **Discussion of Activities:**

The Office of Environment, Safety and Health issued [Safety Bulletin 2005-11](#) to provide information about a serious process leak at British Nuclear Group's Thermal Oxide Reprocessing Plant (THORP) in Sellafield, England. The Safety Bulletin summarizes issues identified by event investigators and groups them into two major categories: (1) Conduct of Operations Issues, and (2) Cultural Issues.

- Conduct of operations issues involved: "Operators failed to respond appropriately to off-normal conditions including: nuclear material balance discrepancies, sump samples containing uranium and erratic sump level indicators."
- Cultural issues included: "Operators, safeguards personnel, team leaders and managers believed that material losses of this magnitude could not have occurred and that it had to be an error in paperwork. Their belief was that because THORP was a 'new plant,' built to the highest standards with all welded piping and vessels, a leak would be extremely unlikely. Even if a major leak were to occur, they reasoned, the operators would be alerted by the sump alarm. Unfortunately, the sump alarms did not result in appropriate operator response."

The safety bulletin concludes with the following:

"The incident at the THORP underscores the importance of operator vigilance and strong conduct of operations. The failure to promptly recognize anomalous plant indications, coupled with operators who did not consider the loss of containment to be credible, resulted in a nuclear mishap and a significant cleanup effort."

## **Analysis:**

FH conducted a review of Deficiency Tracking System (DTS) information to determine if conduct of operations issues or behaviors similar to THORP had occurred at facilities operated by FH. The review found several recent examples that demonstrate similar behavioral attributes

with respect to poor conduct of operations in the lack of attention to detail and cultural complacency. Even though FH incidents differ, similar to THORP's culture, complacency regarding assumptions made or the lack of a questioning attitude is apparent in many issues that have taken place here at Hanford. A summary of these issues is provided below.

#### Conduct of Operations Issues

- An FH Independent Assessment [FH-QA-IA-05-013](#), completed in March 2005, identified a crosscutting programmatic issue relative to inadequacies with identification and reporting of off normal events. Some facilities did not perform assessments of their occurrence reporting process to determine if the actions taken were effective.

Two major FH projects have received formal direction ([PFP](#), [KBC](#)) from DOE-RL to improve Conduct of Operations. Both projects were directed to submit corrective action plans detailing actions taken or planned to address problems in the following areas:

- Investigation of off-normal events
- Operations procedures
- Communications
- Recent DOE Operational Awareness reports have identified problems at multiple facilities in the following areas:
  - Conduct of critiques
  - Notification of DOE of off-normal events

These issues indicate there are similar problems with investigation of abnormal events at some FH facilities as those that existed at Sellfield.

#### Cultural Issues

- In October of 2004 a facility management assessment ([SNF-MN-04-MA-0338](#)) identified that high radiation alarms had been bypassed for several years and that no action had been taken to correct the problem. A work request had been submitted but, due to lack of engineering, the ECN and facility modification package had not been completed. It was discovered that the work package was waiting on an ECN from an engineer who was no longer employed by at the Project.
- A recent Technical Safety Requirement (TSR) violation occurred at an FH project in which the action was not invoked for an out of specification for a period of over two months (Occurrence Report EM-RL-PHMC-0017). One of the contributors to this improper event response was the belief by personnel involved that the condition was not "real". The TSR is based on laboratory data which has been documented and forms the technical basis for this and many similar TSR's at the facility.

Although the consequences from this event were very different from those at THORP, the delay in taking proper actions was created by similar biases among facility personnel with respect to credibility of observed indications and the postulated event scenario the indicators represented. The proper response should have been to invoke the procedurally directed action in parallel with investigation of causes of the anomaly.

## Conclusion

FH DTS data provides evidence that there are instances in which FH personnel have not responded properly to off-normal events. Fortunately, these situations have not resulted in events with consequences of the same magnitude as those at THORP. However, the review indicates that there is benefit in reviewing the THORP event with FH personnel.

## **Recommended Actions:**

1. Managers should use this lesson learned in a round table discussion or safety meeting to highlight:
  - The good practices in place at the facility, how they differ from the examples cited above, and the need to prevent complacency from allowing these practices to change, OR
  - The relevance of the examples cited above to the facility and the actions needed to correct this situation.
2. Managers should review the investigation and abnormal event protocol with employees to ensure that response and timely follow-up to off-normal events is clearly understood.

**Estimated Savings/Cost Avoidance:** Although no specific dollar figure can be determined for the cost of events here at Hanford, the THORP event is expected to cost several million in clean-up dollars alone.

**Priority Descriptor:** BLUE/Information

**Work / Function:** Conduct of Operations

**Hanford Functional Categories:** Associated Causal Factors - N/A

**Hazard:** All

**ISM Core Function:** Perform Work within Controls

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**References:** ES&H Safety Bulletin-2005-11, August 2005