PHMC Lessons Learned Fluor Hanford Inc.

Information Bulletin

Date: January 14, 2006 **Identifier:** 2006-RL-HNF-0001

Title: Inadequate Work Management Structure Leads to Recurring Electrical Events

Lessons Learned Summary: Failure to address the adequacy of the work management program structure following contractor transition led to two separate electrical events. Contrary to basic electrical safety principles, workers failed to check every circuit part to verify that isolation methods were effective prior to commencing work activities. Workers are reminded to **test every circuit part, every time** and to not make assumptions when it comes to isolation of hazardous energy.

Discussion of Activities: When the Groundwater Protection Project (GPP) was transferred from Bechtel Hanford, Inc. (BHI) to Fluor Hanford, Inc. (FHI) the existing BHI work management structure was left in place. Under BHI work management was a function of the engineering group which followed general construction practices. The transition included an increase work scope and additional work areas that increased communication issues during daily work activities. Changes were made to address some specific work management issues but the organization itself was not restructured to adequately manage the new work scope and the much larger organization.

The utilization of the existing work control program structure subsequently led to two separate events at the GPP within a six month period. One event resulted in a worker receiving an electrical shock. A recurring event report (EM-RL--PHMC-GPP-2005-0007) was issued by GPP on June 25, 2005.

The first event (EM-RL--PHMC-GPP-2005-0001) occurred on January 25, 2005. In preparation for repair work on Well N-106A motor/pump electrical system, a preliminary check was performed for hazardous energy 480 VAC. The worker discovered that a second source of power, control circuit 120 VAC, was not isolated by the breaker identified in the pre-work walk down. 120 VAC was identified on two screw contacts on a Molex plug. The electrician made the wrong assumption that if there was no power in two of the contacts the rest would have no energy. By not testing each screw during the initial field walk down a secondary source of voltage went undetected. Lock and tag of the equipment was performed out of sequence with the procedural requirement. Corrective actions for this event did not effectively address the issue of an inadequate work management process, which led to the second event described below.

The second event (EM-RL--PHMC-GPP-2005-0006) occurred on June 20, 2005. An

Instrument Specialist received a mild electrical shock while performing work on a programmable logic controller (PLC). Confusion about the work scope led to several hours re-reviewing the work package and discussions between the technicians, the person in charge (PIC) and Engineering. The PLC cabinet has other power sources, from sensors connected to pumps or monitors. These devices operate on a sensor demand signal. The Instrument Technicians believed that the appropriate isolation was to disconnect the PLC from the battery. They disconnected the PLC from the battery and watched the PLC lights go off. At this time the Instrument Technicians believed there was zero energy. They did not do a power check, which is acceptable per Hanford's Lock and Tag procedure plug and power provision. However, because there multiple power sources were involved the PLC should have been locked out using a controlling organization and authorized worker lock.

Analysis: Lacking adequate organizational structure, work management was a lower priority and a secondary endeavor involving several different work groups. Although the basic requirements of a work management process were met, and work packages consisted of most of the required elements, these elements were not well integrated.

Roles and responsibilities at the project level were not defined, resulting in assumptions being made regarding who was responsible and for what actions.

Communications between working groups was ineffective, resulting in a lack of discipline in the implementation of the work management process. Lack of rigor in the work release process resulted work packages that were ready to be worked.

Recommendations:
When organizational changes occur evaluate the current organizational structure to ensure that it adequately addresses and implements elements of the Integrated Safety Management System, technical correctness, and regulatory compliance.

Roles and responsibilities should be defined at the project level.

When working on PLC's and associated part sand components or Adjustable Frequency Drives and Uninterruptible Power Supplies that have a potential or known secondary power, all lockout/tagout isolation boundaries, including control, power, should be 100 percent field verified.

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References: Occurrence Report: EM-RL-PHMC-GPP-0001, EM-RL-PHMC-GPP-0006, EM-RL-PHMC-GPP-0007