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Department of Energy

# memorandum

DATE: May 31, 2007 Audit Report Number: OAS-L-07-13

REPLY TO ATTN OF: IG-32 (A07RL048)

SUBJECT: Audit of Safety Allegations Related to the Waste Treatment Plant at the Hanford Site

TO: Manager, Office of River Protection

## INTRODUCTION AND OBJECTIVE

The Department of Energy's (Department) Hanford Site is responsible for treating and preparing 53 million gallons of radioactive and chemically hazardous waste for disposal. Bechtel National, Inc. (Bechtel) is designing, building and commissioning the Waste Treatment Plant (Plant), a category II nuclear facility, which is comprised of a complex of treatment facilities to vitrify and immobilize radioactive waste into a sturdy and stable form of glass to isolate the radioactive waste from the environment.

In March 2006, the Office of Inspector General received allegations that certain pieces of equipment for the integrated control network were procured for the Plant even though they were not approved or did not have proper documentation or fail-safe features. The six specific allegations were that:

- Network equipment to distribute communication signals and power that was tested and procured for the Plant had not been approved by Bechtel;
- Prototype valve equipment that was purchased for the Plant lacked proper documentation and had a non-functional failsafe feature;
- The subcontractor selected to provide the primary control system was a substandard supplier;
- The primary control system did not function properly due to a significant number of computer lock-ups during testing;
- A different subcontractor could result in substantial cost savings for acquisition of the control system; and,
- The control system was not acceptable for use in a nuclear facility.

The objective of our audit was to determine if the allegations were accurate.

## CONCLUSIONS AND OBSERVATIONS

We could not substantiate five of the six allegations. In fact, we found that:

- Bechtel had approved the network equipment that was tested and procured for the Plant;
- Valve equipment procured for the Plant had proper documentation and functional fail-safe features;

- The primary control system subcontractor was highly rated within the industry for process instrumentation and controls;
- Causes for computer lock-ups during testing were identified and corrected; and,
- There was no evidence that a different subcontractor could result in substantial cost savings.

However, we did find that the control system supplier was not required to meet the more stringent quality assurance standards required for nuclear facilities, or their equivalent. We reported on this issue in a separate report – *Quality Assurance Standards for the Integrated Control Network at the Hanford Site's Waste Treatment Plant* (DOE/IG-0764, May 2007).

Network Equipment

The network equipment procured for the Plant was approved by Bechtel. The specific equipment referred to in the allegation involved spur blocks that distribute signal and power from a system process controller to numerous field devices. The spur block also serves as a surge protection device so if one device develops a short, it would prevent it from affecting other devices. Bechtel entered into a contract that required the subcontractor to provide a model spur block for testing within 30 days of signing the contract. At the time the contract was signed, Bechtel requested two modifications to the spur block: special labeling and an LED indicator light which could be visible without opening the spur block case. Both modifications were cosmetic and did not affect the function of the spur block. Because the subcontractor could not make the modifications within 30 days it supplied Bechtel with an unapproved model for interim testing. This test model gave rise to the allegation. However, since the unapproved model lacked only cosmetic changes and had the same functionality as the model approved by Bechtel, we concluded that using the unapproved spur block for testing was reasonable. Ultimately, procured spur blocks included the cosmetic changes and were approved by Bechtel for use in the Plant.

Valve Equipment

The valve equipment tested for the Plant was not prototype, rather, it had been on the commercial market since 1999 and tested and certified by a number of organizations. Although Bechtel had not required documentation to be submitted for the valve, the supplier provided software files that contained sufficient information and documentation for the testing performed by Bechtel. Additionally, Bechtel required that the valve being tested be registered with a recognized industry organization. Finally, the valve assembly had two fail safe features, one feature for loss of signal/power and another for loss of operating air. Both features were part of the device provided to Bechtel for testing and had been satisfactorily tested before delivery. At the time of our review, Bechtel was still testing the valve equipment.

## Control System

Among the allegations we could not substantiate were that the selected subcontractor for the control system was a substandard supplier, the control system was unacceptable for use since it consistently locked up, and the selection of a different subcontractor could result in substantial cost savings. In fact, we found that Bechtel had contracted with a highly rated supplier. In 2005, the supplier was rated in the top 10 by industry publications for process instrumentation and controls both nationally and internationally.

Also, we could not substantiate the allegation that the control system was unacceptable for use in the Plant because it did not function properly due to a significant number of lock-ups during testing in Bechtel's Controls and Instrumentation laboratory. We confirmed with control system experts that computer lock-ups would not be uncommon during the phase of system development and that lock-ups resulted from computer overheating believed to be caused by a lack of air flow. Bechtel's Controls and Instrumentation personnel took a number of actions, including replacing a defective laptop computer, which corrected the lock-up problems.

Finally, we were unable to validate whether the selection of a different control system subcontractor would result in substantial cost savings. Our review of the procurement file did not provide any information that supported the allegation.

## SCOPE AND METHODOLOGY

The audit was conducted from April 2006 to May 2007, at the Hanford Site in Richland, Washington. The scope of the audit covered allegations related to the Plant. To accomplish this audit, we reviewed the allegations made regarding work at the Plant and reviewed and analyzed information related to the allegations. Further, we reviewed related laws, regulations, policies and procedures, and interviewed Department and Bechtel personnel with responsibilities in areas related to the allegations.

We conducted the audit in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. We assessed internal controls established under the Government Performance and Results Act of 1993 related to the Office of River Protection's Waste Treatment Plant at the Hanford Site. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not conduct reliability assessments on computer processed data because only a limited amount of computer processed data was used during the audit.

Management waived the exit conference.

We appreciate the cooperation of your staff during our review. Because no formal recommendations are being made in this report, a formal response is not required.

for Fredrick G. Pieper, Director
Energy, Science and Environmental
Audits Division
Office of Inspector General

cc: Deputy Secretary
Chief of Staff
Team Leader, Audit Liaison Team, CF-1.2
Audit Liaison, Office of River Protection