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NUCLEAR REGULATORY COMMISSION
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MEMORANDUM FOR: H. J. Miller, Acting Chief
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Division of Quality Assurance, Vendor,
and Technical Training Center Programs
Office of Inspection and Enforcement

FROM: Craig G. Walenga
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SUBJECT: REPORT OF OBSERVATIONS MADE DURING A DOE-SPONSORED
AUDIT OF FLUOR TECHNOLOGY, INC.

From August 25-29, 1986, I observed an audit conducted by the Department of Energy/Salt Repository Project Office (DOE/SRPO) on the quality assurance activities of Fluor Technology, Inc. Fluor is working on a repository conceptual design, a guide for shaft design, and studies on waste emplacement and rod consolidation.

In accordance with the NRC agreement with DOE/HQ and DOE/SRPO, NMSS chose to observe the audit and asked specifically for IE participation. This three-day audit was conducted by two Battelle Project Management Division (BPMD) employees, two DOE/SRPO employees, one DOE/HQ employee and one Office of Nuclear Waste Isolation (ONWI) employee.

Two objectives for this observation were identified by NMSS in their audit observation protocol. The first was to observe and comment on the effectiveness of the audit team. The second was to evaluate the adequacy and implementation effectiveness of the Fluor QA program.

As to the first objective, the audit team conducted an adequate audit of Fluor's QA program, although several weaknesses minimized the overall effectiveness of the audit. Appendix A provides observations and associated conclusions concerning the quality of the audit.

As to the second objective, the Fluor QA program appears to be adequate. However, this audit lacked sufficient depth of review in many areas to draw a definitive conclusion as to the effectiveness of Fluor's implementation of the QA program.

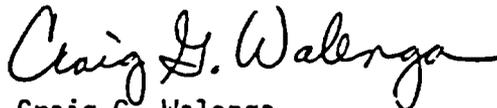
This audit observation was the first in the HLW area where direct and immediate NRC/IE interaction with the audit team was authorized when potential concerns were noted. Discussions about the concerns and about the practical application

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and implementation of audit techniques provided important, immediate feedback to the audit team. I consider this method of direct NRC feedback on current audit problems and concerns to be one of the most beneficial ways that the NRC can interact with DOE to provide a positive impact on the HLW program.



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Concurred by:

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NRC On-site Representative for DOE/SRPO
Division of Waste Management
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Enclosure: Appendix A

APPENDIX A

1. Purpose

The basic purpose of the observation was to assess the effectiveness of DOE/SRPO's audits to determine the quality of Fluor's QA program and its implementation.

2. Criteria

In general, the criteria that were used to assess the audit's effectiveness were synthesized from the NRC recommendations in item 5 of the Minutes of the DOE/NRC Meeting on Quality Assurance, issued December 31, 1985, by the Quality Assurance Manager for the Office of Geologic Repositories. A broad listing of criteria used to assess the audit's effectiveness can be summarized as follows:

- A. Selection of specific areas for the audit's focus from which most audit activities would evolve.
- B. Effective, detailed audit preparation prior to field deployment of the audit team.
- C. Involvement of appropriate DOE/SRPO technical or QA audit team personnel during the entire audit process. Especially, effective use of the technical members.
- D. Conduct of team meetings to discuss findings and observations.
- E. Establishment of self-critiques and other feedback mechanisms for improvement.

3. Areas Observed

This report is based on the observations of the pre-audit team meeting, the pre-audit conference, the audit team's daily meetings, the post-audit conference, and the various team reviews of Fluor's computer software activities, independent review process, indoctrination and training program, NCR system and audit program. By agreement with the audit team, any concerns by the observers were promptly identified to the team members and discussed either immediately or at the daily team meetings.

4. Observations

A. Audit Area Selections

Based on the review of the audit checklists and the current status of Fluor's activities, the areas chosen for review were appropriate.

B. Comprehensive Pre-Audit Preparation

- (1) The checklist was weak in that the questions in many audited areas were generic and superficial. The questions emphasized a more programmatic review. Implementation effectiveness was to

be determined by each auditor in his own way. One example of this was found in the generic programmatic checklist questions for computer software.

- (2) The audit lacked an early, well-defined focus for each area. While the general audit areas were selected early in the audit process, the focus on specific Fluor activities that could be prepared for in advance by the auditors to allow for a more thorough and in-depth review was missing. Examples of this weakness are as follows:
- a. The Fluor activities and studies to be reviewed during the audit were first identified at the pre-audit team meeting on-site the afternoon before the audit. At that late date, DOE's Fluor project manager provided information to help the audit team select areas to be audited. This minimized the effectiveness of the team's preparation.
 - b. The technical observers seem to have been chosen more for their general knowledge of HLW activities and availability than for any specific technical expertise. For example, the lack of a technical expert in the use of the computer code chosen for in-depth review would have minimized the effectiveness of the review had the computer code documentation been available. The two technical observers were the DOE project manager and the ONWI Fluor site representative.
 - c. The determination as to what computer codes to review was made only after 1 1/2 hours of interviews conducted by one three-man audit team. A specific computer code was identified by the team for review; however, the documentation for that code was not available at Fluor during the audit period.
 - d. The checklist questions reflected the lack of team awareness of Fluor's activities. The auditors were not directed to sample specific items in audit areas but were directed in a generic way to "review five comment reports," "select a representative sample," and "review a sample (if any)." Many areas had few items to review and, in the case of the NCR system, there were no items to review. The NRC has found that this random sampling technique is not very effective in establishing an accurate status of a program's implementation effectiveness. Selective sampling with coordinated in-depth review has proven to be more effective.

C. Effective Team Preparation and Utilization in the Audit Process

The audit team was not effectively prepared or used although the qualifications and experience of the team members were excellent. The following examples are provided:

- (1) One technical observer was indoctrinated on auditing principles by the lead auditor through a brief discussion conducted during the pre-audit team meeting.
- (2) Two three-man teams spent most of the first day in three-on-one interviews attempting to identify the status of a specific Fluor program area and the availability of objective data to review. The ineffective use of the audit team members forced the lead auditor to form three audit teams for the remainder of the audit.
- (3) Specific audit teams were formalized at the pre-audit team meeting. Team preparation consisted only of each team member's reviewing an information notebook late that evening.

D. Conduct of Team Meetings

No major concerns were identified about the conduct of team meetings. However, the lack of specific, coordinated review areas left little chance for synergistic interaction of the various teams during the team meetings.

E. Self-Critiques

Although a DOE/HQ representative was present at the audit and was to provide a report on his observations, he was also an audit team member. Having a critique by this person is commendable; however, a person that is not constrained by audit responsibilities and who is appropriately trained or experienced in performance-oriented audit techniques would be more beneficial to the SRPO audit program. Audit critiques should be conducted on all DOE audits until the desired audit techniques are considered to be properly implemented by and are ingrained into the DOE QA staff.

5. Summary

The audit was acceptable in its attempt to determine the existence of a QA program at Fluor that complies with contractual and regulatory requirements. The audit's ability to determine the effective implementation of the QA program by Fluor was weak due to a lack of in-depth effectiveness reviews in most areas audited. This lack of in-depth effectiveness reviews is attributed to the newness of the audit techniques required. It appears that DOE/SRPO has not yet developed an adequate understanding of the principles required and preparation necessary to successfully assess the implementation effectiveness of a quality assurance program and lacks experience in implementing the concepts. This audit was a good practical step in DOE/SRPO's development of an effective audit function.

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