

Office of Civilian Radioactive Waste Management



**Quality Assurance
Management Assessment
Final Report
FY 1998**

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Office of Civilian Radioactive Waste Management

*Office of the Director
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FY 1998
QUALITY ASSURANCE MANAGEMENT ASSESSMENT
of the
CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM

Prepared by
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for the
Office of Civilian Radioactive Waste Management

FINAL REPORT

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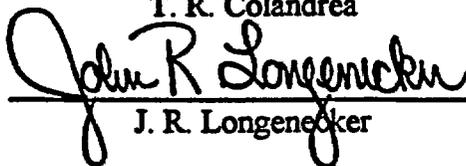
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Executive Summary

The FY 98 integrated Quality Assurance Management Assessment (QAMA) was initiated on January 6, 1998, by the Director, Office of Civilian Radioactive Waste Management (OCRWM) with approval of the QAMA Plan.

During the remainder of the fiscal year, OCRWM and its seven major participants were assessed according to QA Program requirements. At the conclusion of each assessment, the assessment team briefed senior management of the assessed organization on the results of the assessment. The briefing was followed by a written "interim" report identifying areas needing improvement.

Collectively, the interim reports, along with this report, represent the results of the FY 98 integrated QA Management Assessment. This report covers the OCRWM (HQ and YMSCO) portion of the QA Management Assessment and provides specific recommendations for OCRWM (DOE) management attention.

This executive summary summarizes the results of all assessments and identifies those key issues and findings that should be brought to the attention OCRWM's senior management.

Summary:

- Although several areas needing improvement were identified, OCRWM's overall Quality Assurance Program is adequate and effective. The OCRWM Quality Assurance Program is identifying problems and initiating actions to correct those problems.

Key Issues and Findings:

- To assure program success, there is a need to improve human performance throughout the OCRWM program. Senior managers, mid-level managers, team leaders, and supervisors, (DOE and contractor) should endorse and carry out leadership behaviors that are consistent with those found in organizations where a strong nuclear regulatory culture exists.
- There is a need for the M&O to promote self-identification of problems, improve root cause analysis, and develop more effective corrective actions.
- OCRWM's line organization, particularly at the lower levels, should become more involved in problem identification and resolution.

- M&O award fee criteria need to measure and reward performance for developing quality products as well as developing and implementing cost-effective management systems. DOE appraisals and bonuses should be based on criteria that reward success in achieving quality performance.
- Project planning needs to be improved to assure that critical path tasks through repository opening are clearly defined, that the necessary resources are allocated to these tasks, and that responsibility for completing each task is made. Such a detailed plan covering the time through repository opening does not exist, although the M&O has committed to do so. Short-term crises should not be allowed to prevent this resource-loaded schedule from being completed.
- Leaders with experience in first-of-a-kind NRC licensed projects or other first-of-a-kind engineering or complex technology projects will be required as the Yucca Mountain Project moves from the task of scientific investigation to the final engineering of a repository and preparation of an NRC license application. Reliance solely on existing scientific staff to plan and manage this transition is unlikely to lead to success.
- As the program moves into the engineering and license application phase, the roles and responsibilities of DOE and the respective participants must be clear, and a strong commitment to working as a single team with shared goals should be developed. Today ownership of some of the key functions, such as the procedures program, records management program, scientific investigation program, procurement program, document control program, are not clear to DOE or contractor staff. As part of implementing the new YMSCO organization, a clear statement of the DOE functional ownership roles down to the team leader level as a minimum should be articulated.
- The integration of organizational elements and technical products must be improved. Despite repeated attempts to address this issue, there is not a sense of ownership of the integration task by the M&O, and the lack of integration is obvious to independent reviews such as the TSPA-VA peer review panel. DOE and the M&O should work together to assure that integration is performed by the team as work products are planned and prepared.
- Over the next year, a strong emphasis should be placed on resolving a number of key issues that have lingered for years, and likely represent the greatest threats to a successful license application. These issues include documenting key decisions, data qualification, and traceability of data, validation of models and records submittal and retrieval.

- As part of implementing an effective nuclear regulatory culture, the program should stress a performance-based approach to verification, including increasing reliance on performance-based audits and surveillances that add value to work products generated.

The recommendations for the HQ and YMSCO assessment are listed in Appendix D.

The recommendations from the interim reports (major participants) are listed in Appendix E.

1.0 Introduction

The Director, OCRWM, is responsible for conducting an annual independent management assessment of OCRWM's Quality Assurance Program to determine its adequacy and effectiveness. This requirement stems from a commitment in OCRWM's QARD. This commitment implements the requirements of Title 10, Code of Federal Regulations, Parts 60, 71 and 72, for licensee management to regularly review the status and adequacy of the Quality Assurance Program.

The QAMA was conducted in accordance with the requirements of the Quality Assurance Management Assessment Plan dated January 6, 1998, and QAP 2.7, *Management Assessment*. QAP 2.7, *Management Assessment*, prescribed the training requirements and quality assurance process to be followed during the assessment to ensure compliance with OCRWM's QARD. The two principal objectives of the QAMA are to: (1) evaluate the status, adequacy and implementation effectiveness of the OCRWM QA Program and (2) identify areas where improvement is needed.

The QAMA Plan defined the management requirements and technical approach for conducting an integrated assessment of OCRWM and the affected organizations it funds. The integrated approach calls for the QAMA to be conducted by a single organization. This approach has three important features: (1) it permits close examination of organizational interfaces, (2) it provides a consistent overview and a broad perspective of how well the QA Program is functioning throughout OCRWM and (3) it reduces assessment costs.

The OCRWM and its major program participants, as identified in Appendix A, were evaluated during the assessment. These organizations perform work within the scope of OCRWM's QARD. The assessment date and responsible assessment team leader are also identified.

At the conclusion of each assessment, the assessment team briefed senior management of the assessed organization on the results of the assessment. The briefing was followed by a written "interim" report identifying areas needing improvement.

The purpose of the briefings and interim reports were to provide management with immediate feedback on the effectiveness of the quality assurance program so that improvement actions could be promptly initiated where needed.

QAP 2.7, *Management Assessment*, requires this report to contain instructions to OCRWM management for responding to the recommendations contained herein. The specific instructions for OCRWM management are to:

1. "Review the management assessment report and all recommendations affecting their area of responsibility,
2. "Provide responses to the Director, OCRWM and any action plans pertaining to the recommendations; and
3. "Issue correspondence to the Director, OCRWM when actions committed to in the approved responses have been completed."

2.0 Scope and Applicability

The integrated assessment was applicable to OCRWM and the affected organizations (major participants) that it funds as identified in Appendix A.

The assessment evaluated: (1) the adequacy and effectiveness of the OCRWM's Quality Assurance Program, (2) the adequacy of resources and personnel provided to achieve and assure quality, and (3) potential quality problems that could affect mission success. The assessment also evaluated specific items as requested by OCRWM and affected organization senior management. The results of the assessment are identified in Section 4.0.

The assessment also determined the status of the recommendations presented in the FY 1997 Quality Assurance Management Assessment. The status of these recommendations is presented in Section 5.0.

Members of the QAMA team are identified in Appendix B.

Personnel interviewed during the assessment are identified in Appendix C.

3.0 Technical Approach

3.1 Overview

Informal checklists identifying specific attributes to be assessed were prepared by the team. These checklists provided guidance to the team for identifying and evaluating major quality assurance program issues.

Interviews of program personnel were conducted. The team selected individuals for an interview from both management and staff positions. The interviews solicited information, opinions and conclusions from each individual regarding their experience in executing the Quality Assurance Program. Information obtained during the interviews was evaluated and used to formulate conclusions.

The assessment evaluated the status of commitments resulting from the FY 97 assessment recommendations to the extent possible.

Conclusions reached by the QAMA Team regarding the adequacy and effectiveness of the Quality Assurance Program were based on an analysis of the data obtained from applicable document reviews, interviews and observations of work-in-progress.

The assessment was conducted according to the process specified in QAP 2.7, *Management Assessment*, revision 4.

3.2 Functions and Topics Evaluated

Organization; quality assurance program; QA transition; the role of QA representatives; Engineering Assurance; QA-related interactions between OQA and the NRC and State of Nevada; QA training; QA-related communications; lessons-learned; nuclear regulatory culture; requirements flow-down; technical data management; performance assessment activities; Viability Assessment/License Application activities; design and scientific control; systems engineering; interface control and integration; baseline change control; graded QA; control of data; data qualification; documenting key decisions; commitment management program; procurement; corrective action; trend analysis; timeliness of deficiency report closure; records management; audits and surveillances; lessons learned; and OCRWM Concerns Program.

4.0 Results and Recommendations

As the integrated assessment progressed throughout the year, certain issues emerged that were evaluated by the QAMA team to determine their potential impact on quality and the achievement of OCRWM's mission objectives. At the conclusion of each assessment, the QAMA team briefed management of the assessed organization regarding the nature of any issues identified during the assessment and prepared a written interim report.

Appendix E identifies the QAMA recommendations from each interim report for the major participants assessed.

This section presents the results of the FY 98 QAMA as they relate to OCRWM Headquarters and the Yucca Mountain Site Characterization Office. The following issues should be addressed by OCRWM management.

4.1 Nuclear Regulatory Culture

The QAMA team was encouraged by the emphasis currently being placed on assuring the implementation of an effective nuclear regulatory culture on the Yucca Mountain Project. However, we noted from our interviews that a number of people in OCRWM and the M&O view the effort as just another task force that will prepare a white paper and then fall by the wayside in a few months. Despite the short period of time available to make the transition, a detailed implementation plan and a sense of urgency necessary for implementing an effective nuclear regulatory culture appeared to be missing. This attitude, unless corrected, will threaten the success of the NRC licensing process.

The change in culture must be made by a change in behavior at all levels. Program leaders must influence people and organizational processes to change the culture. Leaders in an effective nuclear regulatory culture exhibit certain behavior characteristics. These leaders:

- Cultivate open communication at all levels that creates a questioning attitude and seeks feedback.
- Promote teamwork designed to eliminate error-likely situations and strengthen defenses.
- Identify and eliminate organizational weaknesses that create conditions for error.
- Specify and reinforce desired workplace behaviors and personal accountability.
- Promote attention to detail.

- Endorse and promote error prevention measures and disseminate lessons-learned.
- Prevent the emergence of complacency.

Some of these leaders are in place on the OCRWM Program, and they appear to be having positive impacts. A clear action plan and more of these leaders will be needed in the future.

Given the constant barrage of near term distractions, a key challenge for OCRWM management is to allocate resources and time to implement the culture change in an effective and timely manner. To promote the implementation of an effective nuclear regulatory culture, and to assure that the focus is placed on the key issues, change agents (leaders) will be needed in both the M&O and OCRWM organizations.

Recommendation No. 1:

OCRWM management should proactively deploy and maintain a nuclear regulatory culture that defines the specific beliefs, behaviors, and assumptions required of the team to support OCRWM's objective for a successful license application. Key actions include: (1) direct the existing task force to develop an action plan that defines the critical actions needed to implement an effective nuclear regulatory culture; (2) assign specific responsibilities to carry out the action plans; (3) provide the necessary resources to implement the plan; (4) review implementation progress on a regular basis during weekly staff meetings, program reviews, etc., to assure that progress is being made; and (5) reward individuals and organizations who lead the way in implementing the culture change.

4.2 OCRWM Roles and Responsibilities

A critical element of an effective nuclear regulatory culture is the clear definition of roles and responsibilities. Our interviews identified that there is still uncertainty within both OCRWM and M&O as to what the OCRWM management role is today, what it is going to be in the coming months following the recent reorganization, and what it should be to assure program success. Not surprisingly, there is a feeling on the M&O's part that OCRWM's management style varies from office to office with some people who are very hands-on and others who are not. To improve the effectiveness of the M&O, OCRWM must decide what role (overseer, manager, integrator) it will play in future phases of the project.

Recommendation No. 2:

When communicating its new organization, OCRWM should clearly define its role and relationship with the M&O with respect to whether it is an overseer, manager, or integrator, taking into account OCRWM's responsibility as the potential licensee.

4.3 Measuring and Rewarding Performance

The OCRWM program is at a point where top performance is needed from all participants to assure that critical milestones are met. A successful nuclear regulatory culture requires, in part, an effective performance management system, clearly defined responsibilities, and metrics for measuring performance. However, some of the top-performing managers on the program indicated in our interviews that they had observed few benefits in the past for performing quality work, and few sanctions for those who did not adhere to procedures or develop effective, quality products.

Critical elements in assuring that performance objectives are met are the award fee mechanism in contracts, annual employee appraisals, and bonuses. In reviewing the award fee criteria for the M&O contract, we noted that past award fee criteria were not typically tied to the quality of the work, but instead focused mainly on delivering products like the VA by an agreed-to date. The approach of using a product schedule as the key performance measure and award fee criterion appears to have allowed some of the M&O's basic management systems (configuration management, systems engineering/integration, records management, procedures system, software configuration management, and procurement) to remain as costly problem areas for years.

We understand from discussions with YMSCO management that the next set of award fee criteria will focus more on product quality and performance. We applaud this effort, and believe that clear metrics need to be developed and implemented to assure that the M&O is measured on their ability to deliver quality products on time, and their ability to develop and implement effective management systems so that quality products can be consistently provided.

Recommendation No. 3:

OCRWM management should ensure that future award fee criteria measure and reward M&O performance in developing quality products as well as in developing and implementing cost-effective management systems that consistently meet program needs. In addition, all members of the team, including DOE

managers and staff, should have clear performance metrics and performance incentives tied to mission success. These metrics should be included in DOE and M&O employee appraisals to create a strong incentive for teamwork and mission success. DOE should assure that evaluation of performance is objective and measurable.

4.4 Project Planning

Effective planning is critical to assuring that resources are applied to the tasks most important to product quality and project success. From our interviews, we found that the Yucca Mountain Project still lacks a resource-loaded plan spanning the period from the Viability Assessment (VA) through repository opening. Although a critical path schedule exists in the VA, the essential elements of assignments and resource-loading are missing. M&O and OCRWM personnel indicated that despite the implementation of several new planning systems by the M&O over the past several years, a comprehensive, integrated plan has yet to be developed. Various reasons for this were cited, including the focus on near-term crises rather than long-range planning. The M&O indicated that they recognize this as a problem and are working to develop a resource-loaded plan.

Recommendation No. 4:

YMSCO management should give priority for the development of a resource-loaded plan with clear milestones and assignments through repository opening. Clear direction to the M&O regarding the level of detail needed in this plan should also be provided.

4.5 Key Issue Resolution

During the course of our assessments, many of the same issues as in past years emerged as obstacles to achieving a successful license application. The issues that were identified include lack of an effective nuclear regulatory culture, documenting key decisions, data qualification, traceability of data (from models to the data base to the records system), validation of models, and records submittal and retrieval (records management). All of these issues have been identified as weaknesses in the past and the M&O has stated that initiatives are underway to address them and improve their related management systems.

The Office of Quality Assurance is working closely with the M&O to ensure that these problems are corrected, but the consistent involvement of DOE line management was not evident. As the potential licensee, prompt resolution of these issues is clearly in the best interest of DOE. The collective efforts of DOE

and M&O line management to resolve these issues as a team, will not only lead to prompt and effective corrective action, but will demonstrate leadership and teamwork setting the context for attaining an effective nuclear regulatory culture as well.

Recommendation No. 5:

DOE line managers, team leaders, and key personnel should give priority attention to ensuring that key issues are promptly and effectively resolved by the M&O. Each responsible DOE individual should establish clear and measurable goals (e.g., percentage retrievability of records) for the expected improvements over the next year in those areas that have been identified as needing improvement.

Regarding the records management key issue, the QAMA team is particularly concerned that recurring problems in this area could prevent the OCRWM program from achieving success during the licensing process. For example, as identified in the M&O interim QAMA report, records required to support the licensing process are still not consistently submitted to the Records Processing Center (RPC) in a timely manner. Furthermore, records retrieval emerged again as a problem area this year with YMSCO records management staff indicating that retrieval rates could be less than 50 percent, even after extensive efforts by the M&O recently to reprocess the records to redo the key words and scan records into the system to achieve full-text search capability. Because of these recurring problems, the QAMA team is providing a separate recommendation to YMSCO to ensure that the issues in records management are promptly and properly resolved.

Recommendation No. 6:

The YMSCO individual responsible for the Records Management Program needs to ensure that timely and effective actions are taken to improve the records management system to the extent that the system adequately supports the licensing process. As part of this effort, consideration should be given to conducting an industry peer review of the OCRWM records management system to: (a) identify any control features contained in successful records management systems that are lacking in the OCRWM approach and (b) establish specific performance metrics for measuring the effectiveness of the OCRWM records management system.

4.6 Integration of Yucca Mountain Project Activities

The scientific and engineering complexities of the Yucca Mountain Project coupled with the number and location of participating organizations dictate the need for effective integration of organizational elements and technical products. Previous assessments have noted the lack of effective integration by the M&O. Integration has not improved, and may have worsened in some cases, following last year's M&O reorganization. An example was noted in the June 1998 Peer Review Panel's report of the TSPA Viability Assessment where the Panel stated that:

*"Unfortunately, for some issues, the same types of interactions do not appear to be taking place between the scientific staff that is providing input into the analyses and the staff that is developing the TSPA-VA. The Panel is concerned that aspects of the repository program appear to be fragmented. For some issues, even in those cases where important scientific data are available, they sometimes do not find their way into the TSPA system."*¹

The M&O is currently implementing an action plan to improve integration as a result of recommendation No. 2 from the FY 97 QA Management Assessment. RW-40 is monitoring the implementation of these systems integration actions. However, given the importance to program success, there is an additional need for DOE line management at YMSCO to ensure that integration occurs as products are planned and produced, not after the fact.

Recommendation No. 7:

Each DOE line manager, team leader, and key individual should ensure that timely and effective integration takes place in the products for which they have responsibility. Senior DOE management should ensure that each individual fully understands that the M&O has the first line responsibility for integration and that DOE is responsible for ensuring that integration is taking place and is effective.

4.7 Transition From Science to Engineering

Despite the articulated goal of moving from the scientific investigation phase to the engineering phase of the Yucca Mountain Project, the QAMA team observed that implementation plans for this transition are lacking. In addition, concerns were

¹ Third Interim Report, Total System Performance Assessment Peer Review Panel, June 25, 1998

expressed that the transition will be complicated by the fact that some of YMSCO management do not place the same emphasis on engineering as they do on science. As an example, YMSCO engineering staff have been excluded from some key planning meetings and as members of the VA Integration Group.

Furthermore, there appears to be a feeling among some DOE managers that the existing scientific staff and management at the YMSCO can be smoothly transition into the engineering management role, rather than recruiting experienced engineering staff. A smooth, carefully planned transition to the engineering phase of the project, led by DOE managers experienced in managing first-of-a-kind engineering projects, will be critical to the success of future phases of the project.

Recommendation No. 8:

In preparation for moving the Project from the science phase to the engineering phase, YMSCO management should: (a) elevate the role of engineering to make it commensurate with its importance to mission success, and (b) establish and fill key engineering positions throughout the Project with qualified personnel who have engineering experience on first-of-a-kind NRC-licensed projects or with first-of-a-kind engineering on complex technology projects.

4.8 Lessons-Learned

Given the tight budgets and demanding schedules, the OCRWM program cannot afford to repeat mistakes. In both the M&O and National Spent Nuclear Fuel Program assessments, we noted that lessons-learned were not being effectively disseminated. In addition, we noted less than full acceptance of the value of reviewing and applying the WIPP lessons-learned to the Yucca Mountain Project.

In implementing an effective nuclear regulatory culture, prompt identification of problems, effective determination and implementation of corrective action, and dissemination of lessons-learned should be a responsibility of every manager. The means of disseminating lessons-learned should be as cost effective and streamlined as possible to minimize administrative burdens and time constraints on key managers.

Recommendation No. 9:

OCRWM management should take actions necessary to ensure that major OCRWM program participants are implementing cost-effective lessons-learned programs, and that the lessons-learned from other programs such as WIPP are analyzed and effectively applied as appropriate.

4.9 Compliance versus Performance-based Verification

A performance-based approach to verification is a critical element of an effective nuclear regulatory culture. Performance-based audits and surveillances generally provide a more direct measure of product quality and results achieved in the work performed. Compliance audits, on the other hand, measure programmatic implementation and may not add immediate value to a given product. Each verification method has significant value in the overall scheme of quality assurance oversight.

The assessment team evaluated verification activities with respect to the mix between compliance and performance-based audits and surveillances. The QAMA team believes the OCRWM's quality assurance program has matured to a point where greater emphasis can be placed on performance and results-oriented verifications.

Recommendation No. 10:

OQA should: (a) place particular emphasis on conducting performance-based audits and surveillances in the future; (b) eliminate the routine practice of conducting annual compliance-based audits of each organization, (c) address any remaining compliance-based elements during the performance-based audits (to the extent that these elements need to be evaluated within an organization), and (d) revise the QARD to accomplish this approach if necessary.

4.10 NRC Licensing Process Training

The M&O has developed an in-depth training program regarding the NRC licensing process that is scheduled to be presented in the future. The assessment team believes that OCRWM personnel would benefit from this training as it is a key element in effecting the change to an effective nuclear regulatory culture.

Recommendation No. 11:

Senior OCRWM management should provide the direction and follow-through to ensure that appropriate OCRWM managers and staff attend the NRC Licensing Process training course.

4.11 QA Training Issues

During last year's assessment, it appeared that good progress was being made to address issues in the area of QA-related training and verification of education and

experience. For example, a task force comprising representatives from the various parties (i.e., M&O training staff, OCRWM training staff, both from Headquarters and YMSCO, and OQA personnel) was meeting regularly and achieving substantial agreement as to how best to move forward on these issues. However, during the past year, the momentum surrounding a number of these issues appears to have been lost. There does not appear to be agreement among the parties as to how to address the issue of verification of education and experience in a timely and effective manner. Other concerns expressed during the QAMA interviews in the training area appear to be languishing due to a lack of a timely consensus between the parties regarding an acceptable path forward.

Recommendation No. 12:

The OCRWM individual responsible for the training program needs to restore a sense of urgency between the parties in reaching agreement on QA-related training/qualification issues and ensure that they are addressed in a timely and effective manner.

4.12. Communication During Audits/Surveillances

For the third consecutive year, the QAMA team found the audit and surveillance program to be highly effective. Audits and surveillances are effectively planned, and thoroughly and professionally conducted by well-trained individuals. There are times however, when communications between the QATSS auditors and the audited parties could be improved. Inadequate communications between the auditors and audited parties has, on occasion, caused considerable "churning" to reach agreement regarding the validity, severity, and corrective action for deficiencies. When a deficiency is not well defined, corrective action can be both slow and ineffective. While this problem is the exception rather than the rule, it is an area that deserves management attention.

Recommendation No. 13:

The Director, OQA should review the audit process, seek customer feedback as to the value and effectiveness of audits, and determine how the audit process could be improved. The Director, OQA should also continually promote teamwork, and good communications to eliminate any disagreement regarding the validity of deficiencies.

4.13 QATSS Operational Effectiveness

Quality Assurance Technical Support Services (QATSS) is the technical support contractor to the Office of Quality Assurance. The Director of OQA and the QATSS Program Manager requested the QAMA team to evaluate the operational activities performed by QATSS to identify opportunities for improvement. The following observations and recommendations resulted from this evaluation.

4.13.1 Communications Within QATSS

Personnel interviewed during this assessment expressed some concern regarding instances where agreements reached with QATSS personnel were later reversed. In some cases for example, agreements between auditors and audited parties regarding proposed responses to audit deficiencies were later rejected when they were passed through the QATSS and OQA management chain for approval. The QAMA team also noted instances where some groups within QATSS were not fully aware of the issues being addressed by, and priorities of, other QATSS groups. These problems indicate a lack of effective vertical and horizontal communication.

Recommendation No. 14:

QATSS should undertake an initiative, with OQA participation, to achieve strengthened leadership, increased communications, clearer definition of roles and responsibilities, stronger team spirit, and greater unity of purpose.

4.13.2 Customer Contact

The QAMA interviews indicated that some QATSS management and staff have low visibility with the YMSCO and M&O line organizations who they serve. For example, at YMSCO, there is a need for the QATSS Program Manager to increase customer contact with YMSCO and M&O managers and staff.

Considering the M&O's commitment to use QATSS staff as its QA resource, it is very important for QATSS to proactively assess their customers' current and future needs. Customer needs are certain to change as the YMP license application is prepared and the project focus shifts from scientific investigation to engineering. During this time of transition, it is important for QATSS management to evaluate the capability of their team

to meet customers' needs with respect to organizational structure, staffing levels, and skill mix.

Recommendation No. 15:

The QATSS Program Manager should: (a) identify the QATSS customers, (b) meet with these customers to determine the effectiveness of the support provided, (c) determine long-term needs such as staffing requirements, skill mix, and organizational structure, and (d) develop strategies in conjunction with OQA to meet these needs.

5.0 Status of FY 97 QAMA Recommendations

The FY 1997 QAMA identified fourteen (14) recommendations in the final report to OCRWM. This section lists the recommendations that were contained in the final report and provides the status of each recommendation as of September 1998.

Recommendation No. 1: The responsible OCRWM and M&O line manager should closely monitor the EA organization to ensure that the EA role is clearly defined and implemented in a manner that: (1) does not duplicate any of OQA's responsibilities and (2) focuses on performance and results similar to the effective approach employed by the M&O's Office of Product Integrity.

Status: CLOSED. The intent of this recommendation was to inform YMSCO management of the need to closely monitor the M&O's EA organization to ensure effectiveness. The response from YMSCO management satisfied this intent. Further, the role of Engineering Assurance has evolved during fiscal year 1998 and it may undergo additional changes in FY 1999. See recommendation number ten (10) from the FY 98 M&O Interim QAMA Report.

Recommendation No. 2: Management leadership, vision and authority are needed within OCRWM and the M&O in order to address the design interface control and integration issue on a program-wide basis. Critical interfaces throughout the program (transportation, waste handling, EM, storage, etc.) must be defined and managed. Senior people who understand interface control and integration are needed to improve the effectiveness of this function.

Status: CLOSED. The M&O's action plan to implement this recommendation is scheduled to be completed by January 15, 1999. Reference; M&O letter to Samuel Rousso, from Colin A. Heath, dated June 30, 1998. In response to this letter, the Director, Office of Acceptance, Transportation, and Integration (RW-40), informed the M&O's Assistant General Manager, Waste Management & Integration, that, as a result of the RW reorganization, implementation of systems integration actions are now the responsibility of RW-40. Reference; memorandum to Colin A. Heath, from Dwight Shelor, dated July 24, 1998. The memo further advised the M&O to keep RW-40 informed as to the completion status of all related action items to ensure completion.

OCRWM line management (RW-40) is overseeing the implementation of the M&O's action plan and the systems integration function is evaluated by the QAMA team each year. Therefore, recommendation number 2 from the FY 97 QAMA final report is considered closed.

Recommendation No. 3: The M&O should use, to the extent possible, the information developed as a result of earlier requirement research efforts. Coordinate this effort with OWAST and Program Management to avoid the need for another research effort by these organizations to capture requirements applicable to them. Confirm that appropriate QA controls are in place to ensure the process is adequately controlled.

Status: CLOSED. The intent of this recommendation was to avoid the potential of duplicating work that had already been done in the area of requirements research, and to coordinate planned research work between projects so that OWAST would not have to launch a similar effort in the future.

The M&O's response indicated that management had evaluated this situation and that the requirements research activity is taking full advantage of all previous requirements research activities. Reference: M&O letter, to Samuel Rousso, from Colin A. Heath, subject: Quality Assurance Management Assessment Plan, dated June 30, 1998.

The QAMA team believes that no further follow up is required.

Recommendation No. 4: OCRWM and M&O management need to identify what is needed to control baseline changes, articulate the policy, streamline the process and define a single system for the entire OCRWM Program.

Status: CLOSED. The M&O's action plan to implement this recommendation was scheduled to be completed on July 31, 1998, after the QAMA team's on-site assessment of the M&O. The M&O is to prepare an analysis of the Level II change control process of OWAST and YMSCO and report the results to OCRWM by August 30, 1998. Reference; M&O letter to Samuel Rousso, from Colin A. Heath, dated June 30, 1998.

In response to this letter, the Director, Office of Acceptance, Transportation, and Integration (RW-40), informed the M&O's Assistant General Manager, Waste Management & Integration, that, as a result of the RW reorganization, implementation of systems integration actions are now the responsibility of RW-40. Reference; memorandum to Colin A. Heath, from Dwight Shelor, dated July 24, 1998. The memo further advised the M&O to keep RW-40 informed as to the completion status of all related action items to ensure completion.

OCRWM line management (RW-40) is overseeing the implementation of the M&O's action plan and the change control process is evaluated by the QAMA team each year. Therefore, recommendation number 4 from the FY 97 QAMA final report is considered closed.

Recommendation No. 5: Ensure that the policy and upper-tier procedure for documenting key decisions is reviewed by people with NRC licensing experience so that the process will effectively identify meaningful thresholds and avoid over-commitments. Ensure that the procedure is integrated with related processes/procedures. Involve OWAST so that the processes and procedures can be transferred and adapted.

Status: CLOSED. The intent of this recommendation was to ensure that any policies or procedures developed for documenting key decisions received input from people with NRC licensing experience so that the process will effectively identify meaningful thresholds and avoid over commitments. The QAMA team also recommended coordination with the WAST project so that the processes and procedures could be adapted by OWAST as appropriate.

The response from the YMSCO Project Manager was sufficient to close this recommendation without additional follow up by the QAMA team. Reference; memorandum from R. Dyer to L. Barrett, dated February 17, 1998, Subject: Response to FY 97 QAMA Recommendations.

Recommendation No. 6: OCRWM should have an integrated Commitment Management Program in place to effectively manage all regulatory commitments from inception to closure. The guidelines prescribed by the Nuclear Energy Institute, Guidelines for Managing NRC Commitments, should serve as a meaningful resource for ensuring that essential elements of the program are adequately and consistently addressed.

Status: CLOSED. The response to this recommendation provided a comprehensive plan for developing and implementing a fully integrated commitment management program for OCRWM by August 1, 1998. Reference, memorandum from S. Rousso to L. Barrett, dated March 23, 1998, subject: Action Plan in Response to the FY 97 Quality Assurance Management Assessment Report. Follow up by the QAMA team in July 1998 determined that significant progress has been made.

This recommendation is considered closed, but the QAMA team will evaluate implementation effectiveness during the FY 99 Quality Assurance Management Assessment.

Recommendation No. 7: Adequate resources and authority need to be given to the TSPA task force along with continued M&O senior management support to complete the cultural change that is needed in the organizations performing PA activities.

Status: CLOSED. The TSPA task force conducted several highly effective vertical slice reviews over the past year. The results of these reviews led to several M&O corrective action initiatives. The need for the Project to continue to move toward an effective

nuclear regulatory culture is identified in recommendation number 1 of this report. No further action is required in regard to this recommendation.

Recommendation No. 8: The "record submittal" control feature of the Records Management Program should be evaluated to determine if it will adequately support OCRWM's needs during the licensing process.

Status: SUPERCEDED. This recommendation has been superceded by recommendation number 9 from the FY 98 M&O Interim Report. The QAMA team will conduct appropriate follow-up on the M&O's actions in this area.

Recommendation No. 9: OCRWM management should evaluate the organizational structure and corresponding responsibilities to ensure that (1) ownership of functions and processes is clearly defined and communicated and (2) responsibilities do not overlap.

Status: CLOSED. The YMSCO reorganized in August 1998. The effectiveness of the new organization will be evaluated by the QAMA team during the FY 99 Quality Assurance Management Assessment.

Recommendation No. 10: M&O management should evaluate the current organizational structure and remove any barriers to horizontal communication. An alternative approach to company FTE allocation should be considered by the M&O to ensure that OCRWM gets the best person for the job regardless of company affiliation.

Status: CLOSED. Several changes were made to the M&O's organizational structure in 1998 and the M&O has stated a commitment to selecting staff based on their ability to achieve project goals. The effectiveness of the new organization will be evaluated by the QAMA team during the FY 99 Quality Assurance Management Assessment.

Recommendation No. 11: OCRWM management in consultation with M&O management should evaluate the need for a Chief Engineer, taking into account the need for the licensee to establish design authority and consistency within each project.

Status: SUPERCEDED. This recommendation has been superceded by recommendation number 8 from this report. The QAMA team will conduct appropriate follow-up on the FY 98 QAMA recommendations.

Recommendation No. 12: For the procurement of commercially available items and services, OCRWM and the M&O should identify and endorse those nationally recognized QA standards that have a proven track record for adequate controls. Impose the appropriate national QA standard in the purchase order consistent with the item or service

being procured. Evaluate the supplier, during subsequent audits, against the imposed QA standard rather than the QARD.

Status: CLOSED. The Office of Quality Assurance completed an evaluation of commercial QA standards. Reference: memorandum, from D. G. Horton to L. H. Barrett, subject: Completion of Actions of the Quality Assurance Management Assessment Recommendation Number 12. The results of the evaluation are to be factored into forthcoming procurements as appropriate. No further action by the QAMA team is required.

Recommendation No. 13: The construction specifications for common building materials should be revised to remove the excessive QA requirements in favor of commercial requirements. The requirement for A/E witness and/or QC inspection during receipt and installation should also be deleted, permitting these resources to be used more effectively on items and activities important to waste isolation. The M&O also needs to use the lessons learned from this situation as self-assessment examples for improving performance and reducing costs throughout the M&O, USGS and the laboratories.

Status: CLOSED. The response from the YMSCO indicated that the specifications would be revised as funding is provided to the M&O. Reference: memorandum from J. R. Dyer to L. H. Barrett, subject: Responses to the FY 97 Quality Assurance Management Assessment Recommendations, dated February 17, 1998. The QAMA team will evaluate the effectiveness of QA grading in forthcoming Quality Assurance Management Assessments.

Recommendation No. 14: M&O management should provide the Director, OCRWM, with a response to the recommendations identified in the FY 1996 QA Management Assessment of the M&O.

Status: CLOSED. The M&O provided OCRWM senior management with a response to the FY 96 QAMA recommendations. Reference: letter to R. A. Milner from R. L. Strickler, subject: FY 1997 QA Management Assessment, Recommendation No.14.

APPENDIX A**Organizations Assessed in FY 1998**

Location	Date	Assessor
Berkeley	February 9-10, 1998	WEB ¹
Livermore	February 11-12, 1998	WEB ¹
USGS	March 3-5, 1998	WEB ¹
Los Alamos	March 16-18, 1998	TRC ¹
Sandia	March 19-20, 1998	TRC ¹
Kiewit	April 6-10, 1998	WEB ¹ , JRL, TRC
M&O Vienna	May 5-6, 1998	WEB, JRL, TRC ¹
OCRWM - HQ	May 7-8, 1998	WEB, JRL, TRC ¹
M&O Las Vegas	June 1-5, 1998	WEB, JRL, TRC ¹
YMSCO	July 6-10, 1998	WEB, JRL, TRC ¹

¹ Team Leader

APPENDIX B**Assessment Team**

Wayne E. Booth, Thomas R. Colandrea and John R. Longenecker made up the assessment team. Team Members may be contacted as necessary to facilitate resolution of recommendations.

Wayne E. Booth	Program Manager	702-804-1330
Thomas R. Colandrea	Senior QA Specialist	619-487-7510
John R. Longenecker	Senior Management Specialist	619-792-6031

Each team member received the requisite indoctrination and training for conducting QA Management Assessments as required by the OCRWM Quality Assurance Program and QAP 2.7, *Management Assessment*.

Documentation of indoctrination and training, and personnel qualifications and experience are contained in the Quality Records Package for each individual.

APPENDIX C

Personnel Contacted

Kiewit/PB

V. Barish
 J. Copeland
 H. Cox
 J. Eastlund
 K. Limond
 R. Mele
 S. Nanex
 D. Osborne
 C. Rixford
 L. Schwartzwalte
 R. Spence
 T. Tomek
 S. Zimmerman

LANL

G. Bussod
 M. Clevenger
 C. Herrington
 T. Hirons
 C. Martinez
 F. Perry
 A. Sanchez-Pope
 L. Souza
 J. Young
 G. Zyvoloski

M&O

R. Andrews
 K. Ashlock
 J. Bailey
 S. Bennett
 R. Berlien
 S. Bodnar
 G. Bradshaw
 D. Calloway
 G. Carruth
 J. K. Clark
 J. R. Clark
 P. Dahl

M&O cont.

V. Dulock
 R. Able
 S. Fogdall
 C. Garrett
 S. Gibson
 S. Goodin
 C. Hastings
 P. Hastings
 L. Hayes
 J. Heaney
 C. Heath
 R. Howard
 W. Kennedy
 C. Kerrigan
 R. Marler
 L. Meyer
 H. Montalvo
 E. Moreno
 R. Morgan
 B. Packer
 M. Penovich
 M. Plinski
 J. Pranzatelli
 G. Robinson
 R. Sandifer
 M. Shepherd
 J. Shupe
 R. Snell
 D. Stahl
 W. Stroupe
 J. Stringer
 A. Tayfun
 T. Touchstone
 P. Turner
 G. Vawter
 M. Voegelé
 R. Wagner
 D. Wilkins
 M. Wisenberg

M&O cont.

T. White
 J. Younker

NRC

W. Belke

OCRWM

J. Adams
 P. Auer
 L. Barrett
 J. Blaylock
 W. Boyle
 S. Brocoum
 A. Brownstein
 R. Clark
 J. Compton
 H. Cox
 R. Craun
 M. Diaz
 R. Dyer
 C. Ford
 J. George
 A. Gil
 W. Glasser
 S. Gomborg
 J. Graff
 H. Greene
 C. Hampton
 S. Hanauer
 P. Harrington
 K. Hodges
 D. Horton
 S. Horton
 W. Hudson
 C. Humphries-Alder
 V. Iorii
 S. Jones
 C. Kouts
 W. Lake

OCRWM cont.

M. Malone
 J. Mattimoe
 J. Martin
 R. Mele
 B. Murthy
 C. Newbury
 R. Peck
 J. Pelletier
 R. Powe
 J. Replogle
 S. Rouse
 S. Rousso
 R. Scott
 M. Senderling
 L. Shephard
 N. Slater
 P. Smith
 L. Souza
 R. Spence
 D. Stucker
 T. Sullivan
 J. Therien
 D. Tunney
 M. VanDerPuy
 A. Van Luik
 J. Verden
 N. Voltura
 L. Wagner
 C. Warren
 D. Warriner
 C. Weber
 A. Whiteside
 A. Williams
 D. Williams

SNL

M. Chavez
 N. Francis
 J. Gauthier
 J. Graff
 S. Howarth
 A. Orrell
 R. Price
 J. Schelling
 P. Warner

USGS

P. Auer
 T. Chaney
 R. Craig
 L. Ducret
 E. Kwicklis
 M. Mustard
 P. Tucci
 A. Whiteside

LLNL

B. Bryn
 W. Clarke
 M. Fernandez
 E. Hardin
 R. Monks
 C. Palmer
 J. Pellitier
 D. Wilder
 J. Ziemba

LBNL

J. Apps
 B. Bodvarsson
 V. Fissekidon
 C. Hastings
 D. Mangold
 A. Simmonds
 J. Ziemba

State of Nevada
 S. Zimmerman

APPENDIX D**Final Report Recommendations**

This appendix consolidates the recommendations from this report in one location for easy reference by readers.

Recommendation No. 1: OCRWM management should proactively deploy and maintain a nuclear regulatory culture that defines the specific beliefs, behaviors, and assumptions required of the team to support OCRWM's objective for a successful license application. Key actions include: (1) direct the existing task force to develop an action plan that defines the critical actions needed to implement an effective nuclear regulatory culture; (2) assign specific responsibilities to carry out the action plans; (3) provide the necessary resources to implement the plan; (4) review implementation progress on a regular basis during weekly staff meetings, program reviews, etc., to assure that progress is being made; and (5) reward individuals and organizations who lead the way in implementing the culture change.

Recommendation No. 2: When communicating its new organization, OCRWM should clearly define its role and relationship with the M&O with respect to whether it is an overseer, manager, or integrator, taking into account OCRWM's responsibility as the potential licensee.

Recommendation No. 3: OCRWM management should ensure that future award fee criteria measure and reward M&O performance in developing quality products as well as in developing and implementing cost-effective management systems that consistently meet program needs. In addition, all members of the team, including DOE managers and staff, should have clear performance metrics and performance incentives tied to mission success. These metrics should be included in DOE and M&O employee appraisals to create a strong incentive for teamwork and mission success. DOE should assure that evaluation of performance is objective and measurable.

Recommendation No. 4: YMSCO management should give priority for the development of a resource-loaded plan with clear milestones and assignments through repository opening. Clear direction to the M&O regarding the level of detail needed in this plan should also be provided.

Recommendation No. 5: DOE line managers, team leaders, and key personnel should give priority attention to ensuring that key issues are promptly and effectively resolved by the M&O. Each responsible DOE individual should establish clear and measurable goals (e.g., percentage retrievability of records) for the expected improvements over the next year in those areas that have been identified as needing improvement.

Recommendation No. 6: The YMSCO individual responsible for the Records Management Program needs to ensure that timely and effective actions are taken to improve the records management system to the extent that the system adequately supports the licensing process. As part of this effort, consideration should be given to conducting an industry peer review of the OCRWM records management system to: (a) identify any control features contained in successful records management systems that are lacking in the OCRWM approach and (b) establish specific performance metrics for measuring the effectiveness of the OCRWM records management system.

Recommendation No. 7: Each DOE line manager, team leader, and key individual should ensure that timely and effective integration takes place in the products for which they have responsibility. Senior DOE management should ensure that each individual fully understands that the M&O has the first line responsibility for integration and that DOE is responsible for ensuring that integration is taking place and is effective.

Recommendation No. 8: In preparation for moving the Project from the science phase to the engineering phase, YMSCO management should: (a) elevate the role of engineering to make it commensurate with its importance to mission success, and (b) establish and fill key engineering positions throughout the Project with qualified personnel who have engineering experience on first-of-a-kind NRC-licensed projects or with first-of-a-kind engineering on complex technology projects.

Recommendation No. 9: OCRWM management should take actions necessary to ensure that major OCRWM program participants are implementing cost-effective lessons-learned programs, and that the lessons-learned from other programs such as WIPP are analyzed and effectively applied as appropriate.

Recommendation No. 10: OQA should: (a) place particular emphasis on conducting performance-based audits and surveillances in the future; (b) eliminate the routine practice of conducting annual compliance-based audits of each organization, (c) address any remaining compliance-based elements during the performance-based audits (to the extent that these elements need to be evaluated within an organization), and (d) revise the QARD to accomplish this approach if necessary.

Recommendation No. 11: Senior OCRWM management should provide the direction and follow-through to ensure that appropriate OCRWM managers and staff attend the NRC Licensing Process training course.

Recommendation No. 12: The OCRWM individual responsible for the training program needs to restore a sense of urgency between the parties in reaching agreement on QA-related training/qualification issues and ensure that they are addressed in a timely and effective manner.

Recommendation No. 13: The Director, OQA should review the audit process, seek customer feedback as to the value and effectiveness of audits, and determine how the audit process could be improved. The Director, OQA should also continually promote teamwork, and good communications to eliminate any disagreement regarding the validity of deficiencies.

Recommendation No. 14: QATSS should undertake an initiative, with OQA participation, to achieve strengthened leadership, increased communications, clearer definition of roles and responsibilities, stronger team spirit, and greater unity of purpose.

Recommendation No. 15: The QATSS Program Manager should: (a) identify the QATSS customers, (b) meet with these customers to determine the effectiveness of the support provided, (c) determine long-term needs such as staffing requirements, skill mix, and organizational structure, and (d) develop strategies in conjunction with OQA to meet these needs.

APPENDIX E**Interim Report Recommendations**

This appendix consolidates recommendations from the seven FY 98 interim reports for the reader's convenience.

Berkeley: None.

Livermore: None

USGS: None

Los Alamos: None

Sandia: None

Kiewit: (1)

Kiewit Recommendation No. 1: Kiewit/PB management needs to take appropriate actions to ensure that work packages and related QA records are promptly and effectively transferred to the M&O.

M&O: (11)

M&O Recommendation No. 1: M&O management should be aware that at the working level there is not widespread acceptance of, or confidence in, recent initiatives. Management should ensure that the DOE initiatives underway to institute a nuclear regulatory culture are pursued with an overriding sense of urgency that prevents them from losing focus and effectiveness with time.

M&O Recommendation No. 2: The M&O should determine why the root causes of significant programmatic issues are not being identified and/or corrected, and determine why management has failed to recognize this as a problem. In addition, the M&O should evaluate recommendations from previous assessments, audits, and reviews to identify commonalities and indicators of emerging broader problems. Issues resulting from this evaluation should be promptly and effectively resolved in a manner that adequately supports the priorities for developing an adequate license application.

M&O Recommendation No. 3: The M&O should develop and institutionalize an effective Lessons Learned program that provides for the planned and timely exchange of lessons-learned information from other similar DOE programs and commercial projects.

In particular, the WIPP lessons-learned in the areas of data control and technical data base management should be strongly endorsed and applied by M&O management. The Lessons Learned Program should be streamlined to avoid unnecessary administrative detail and cost.

M&O Recommendation No. 4: The transmittal of data and technical information (inputs and outputs) between laboratory participants should be controlled. Assumptions used in scientific reports, studies, and models that require subsequent verification should be systematically identified. The control features established for these processes should be standardized among participants to the extent possible.

M&O Recommendation No. 5: The M&O should: (a) identify the remaining data sets not currently in the TDB which are essential to supporting the Site Recommendation and License Application; (b) prioritize the data entry process consistent with the importance of the data to be entered into the TDB; (c) determine the extent to which these essential data sets need to be qualified; and (d) provide M&O senior management with clear visibility regarding the rate of progress for submitting, qualifying, and entering these essential data sets into the TDB. Prompt corrective action should be taken if the data submittal, data entry, or data qualification process bogs down with respect to getting essential data sets into the TDB in a timely manner.

M&O Recommendation No. 6: The corrective action plan for CAR-LVMO-006 should take into account the need to share software among users and reconcile identified errors with all users.

M&O Recommendation No. 7: Senior management should evaluate the scientific planning process to determine if it is adequate to support the program through license application. This evaluation should be coordinated with the Director, Office of Quality Assurance, to factor in plans by OQA to improve the scientific planning process.

M&O Recommendation No. 8: The procedure system should be evaluated from a systems engineering perspective to determine if its shortcomings are a contributing factor to the lack of effectiveness in other programmatic functional areas. The Quality Review Board should also be evaluated to determine if it is effective in terms of adding value to procedure reviews and timeliness of reviews.

M&O Recommendation No. 9: M&O senior management should: (a) evaluate the records submittal process to determine the cause(s) of the problems experienced to date in this area; (b) implement prompt corrective action to achieve a lasting solution to these records problems; and (c) ensure that the corrective actions taken are effective in that all records required to support licensing are consistently submitted to the RPC in a timely and complete manner.

M&O Recommendation No. 10: The M&O should use the Office of Quality Assurance as its direct QA staff as originally intended. Any problems encountered in the process of doing this (e.g., skill mix within OQA does not meet the M&O's needs; responsiveness of the OQA personnel is not adequate) should be immediately brought to the attention of OQA management for prompt resolution. Consideration should also be given to incorporating EA personnel into the line organization, both physically and organizationally.

M&O Recommendation No. 11: M&O senior management should provide the direction (e.g., send a clear message when training is mandatory) and follow up to ensure that all appropriate M&O personnel attend the upcoming NRC Licensing Process training course.

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