

**Department of Energy**  
Washington, DC 20585

July 19, 2002

Mr. Martin J. Virgilio, Director  
Office of Nuclear Materials Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Two White Flint North  
Rockville, MD 20852

Dear Mr. Virgilio:

During the September and December 2001 Quality Assurance (QA) meetings, the development of the Performance Improvement Transition Plan was presented and discussed with you and your staff. This Plan was focused on the root cause analysis for Corrective Action Reports (CAR) BSC-01-C-001 and BSC-01-C-002. As discussed in my April 5, 2002 letter to you, we have prepared the attached Management Improvement Initiatives that address the CAR BSC-01-C-001 and BSC-01-C-002, evaluates the assessment results from 15 source documents and charts a path forward for overall OCRWM improvements. This Plan focuses on five key areas:

- Program Roles, Responsibilities, Authority, and Accountability
- Quality Assurance Programs and Processes
- Program Procedures
- Corrective Action Program
- Safety-Conscious Work Environment.

It also includes a crosswalk to the source document (Appendix A) and the corrective actions for CAR BSC-01-C-001 and BSC-01-C-002 (Appendix B).

As noted in the Plan, I will be focusing my attention on the critical first step of clearly defining roles, responsibilities, authority, and accountability across the Office of Civilian Radioactive Waste Management to define ownership of and accountability for Program functions. I will hold my management team accountable to ensure these improvements are implemented, schedules are met, and that progress is sustained.

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This is an aggressive initiative that will require change within the organization and strong management support. I am fully committed to these Management Improvement Initiatives and will keep you informed of our progress.

Sincerely,

A handwritten signature in black ink, appearing to read "Marg", with a long horizontal line extending to the right.

Dr. Margaret S.Y. Chu, Director  
Office of Civilian Radioactive  
Waste Management

Enclosure:  
Report entitled "Management Improvement Initiatives,"  
PLN-CRW-AD-000009, July 2002

cc w/encl:

D. D. Chamberlain, NRC, Arlington, TX  
R. M. Latta, NRC, Las Vegas, NV  
B. J. Garrick, ACNW, Rockville, MD  
Richard Major, ACNW, Rockville, MD  
W. D. Barnard, NWTRB, Arlington, VA  
Budhi Sagar, CNWRA, San Antonio, TX  
W. C. Patrick, CNWRA, San Antonio, TX  
Steve Kraft, NEI, Washington, DC  
J. H. Kessler, EPRI, Palo Alto, CA  
J. R. Egan, Egan & Associates, McLean, VA  
R. R. Loux, State of Nevada, Carson City, NV  
Margie Paslov-Thomas, State of Nevada, Carson City, NV  
Alan Kalt, Churchill County, Fallon, NV  
Irene Navis, Clark County, Las Vegas, NV  
George McCorkell, Esmeralda County, Goldfield, NV  
Leonard Fiorenzi, Eureka County, Eureka, NV  
Andrew Remus, Inyo County, Independence, CA  
Michael King, Inyo County, Edmonds, WA  
Mickey Yarbrow, Lander County, Battle Mountain, NV  
Lola Stark, Lincoln County, Caliente, NV  
L. W. Bradshaw, Nye County, Pahrump, NV  
David Chavez, Nye County, Tonopah, NV  
Josie Larson, White Pine County, Ely, NV  
Arlo Funk, Mineral County, Hawthorne, NV  
R. I. Holden, National Congress of American Indians, Washington, DC  
Allen Ambler, Nevada Indian Environmental Coalition, Fallon, NV  
N. H. Williams, BSC, Las Vegas, NV  
K. G. Hess, BSC, Las Vegas, NV  
Don Pearman, BSC, Las Vegas, NV  
CMS Coordinator, BSC, Las Vegas, NV

cc w/o encl:

C. W. Reamer, NRC, Rockville, MD  
J. R. Schlueter, NRC, Rockville, MD  
J. T. Greeves, NRC, Rockville, MD  
R. A. Milner, DOE/HQ (RW-2), FORS  
S. E. Gomberg, DOE/HQ (RW-52), FORS  
N. H. Slater-Thompson, DOE/HQ (RW-52), FORS  
R. B. Murthy, DOE/OQA (RW-3), Las Vegas, NV  
J. R. Dyer, DOE/YMSCO, Las Vegas, NV  
D. G. Horton, DOE/YMSCO, Las Vegas, NV

cc w/o encl: (continued)

M. E. Van Der Puy, DOE/YMSCO, Las Vegas, NV

G. W. Hellstrom, DOE/YMSCO, Las Vegas, NV

S. P. Mellington, DOE/YMSCO, Las Vegas, NV

J. D. Ziegler, DOE/YMSCO, Las Vegas, NV

C. A. Kouts, DOE/YMSCO (RW-2), FORS

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QA: N/A

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## ***MANAGEMENT IMPROVEMENT INITIATIVES***

***PLN-CRW-AD-000009***

***Revision 0***

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***July 2002***

***U.S. Department of Energy  
Office of Civilian Radioactive Waste Management  
Washington, D.C.***

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QA: N/A

*Office of Civilian Radioactive Waste Management*

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# ***MANAGEMENT IMPROVEMENT INITIATIVES***

***PLN-CRW-AD-000009***

***Revision 0***


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***July 2002***

*U.S. Department of Energy  
Office of Civilian Radioactive Waste Management  
Washington, D.C.*


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Prepared by:

for   
M. Van Der Puy  
Director, Office of Project Support  
Yucca Mountain Site Characterization Office

7/18/02  
Date

Approval:

  
M. Chu  
Director  
Office of Civilian Radioactive Waste Management

7/19/02  
Date

## CHANGE HISTORY

<u>Revision Number</u>	<u>Interim Change No.</u>	<u>Effective Date</u>	<u>Description of Change</u>
0	0	07/25/2002	Initial issue



## FOREWORD

In assuming the responsibilities as Director of the U.S. Department of Energy Office of Civilian Radioactive Waste Management in April 2002, I began my commitment to conduct a thorough review of the Program, including the readiness of the Yucca Mountain Site Characterization Project to proceed with an application for a U.S. Nuclear Regulatory Commission license. In this review, I focused on progress to date and the key future actions required for the Office of Civilian Radioactive Waste Management to succeed.

From my review, I observed changes that have been made in the Yucca Mountain Site Characterization Project during the past two years. The U.S. Department of Energy and Bechtel SAIC Company, LLC have made a number of positive changes to date, including improvements in the integration of Bechtel SAIC Company, LLC; U.S. Department of Energy; U.S. Geological Survey; and National Laboratory efforts. In addition, there is a strong commitment among the Yucca Mountain Site Characterization Project team to performing work correctly, in a safety- and quality-conscious manner. My review also indicated that additional improvements are needed to ensure that the U.S. Department of Energy is able to deliver a high-quality license application to the U.S. Nuclear Regulatory Commission.

To position the U.S. Department of Energy to be a successful U.S. Nuclear Regulatory Commission licensee and to enable us to meet the mandated requirements for a safely operating high-level nuclear waste repository, I have identified the following areas in which improvements are needed:

- Program roles, responsibilities, authority, and accountability
- Quality Assurance Programs and processes
- Program procedures
- Corrective Action Program
- Safety-conscious work environment.

In this document, I have identified the actions that the Office of Civilian Radioactive Waste Management will implement to achieve improvement in each of the areas listed above and have included effectiveness indicators that will be used to measure progress. I believe that by improving these five areas, the underlying root causes for the larger management issues and most of the more detailed deficiencies the Program has been experiencing will be corrected, and sustained performance improvements will be achieved.

A key element in formulating these actions is my personal recognition that managers' behaviors and accountability need to change. I will be focusing my personal attention on clearly defining roles, responsibilities, authority, and accountability across the Office of Civilian Radioactive Waste Management to define ownership of and accountability for Program functions. In accomplishing this critical first step, I will put in motion the improvements for the Quality Assurance Program and its related processes, improvements to streamline and enhance the usability of our procedures, much-needed improvements in the Corrective Action Program, and improvements in our safety-conscious work environment. I will be assessing our progress on a continuing basis and I will hold my management team accountable to ensure these improvements are sustained and that the Office of Civilian Radioactive Waste Management is self-identifying

and fixing its problems. I will ensure that timely and effective corrective actions are implemented so that problems are promptly and effectively resolved.

In the following sections of this document, I have described the actions that will be taken in each of the five key areas. Experts with experience in the successful conduct of government and commercial nuclear power programs have reviewed these actions, and their comments have been incorporated. Improvement actions are now underway in each area, with responsibilities for implementation delineated and accountability for results well understood by my management team.

In summary, I am making the required resources to implement these actions available to my management team; I will personally review our progress on a regular basis; and I will report our progress to the U.S. Nuclear Regulatory Commission as part of our ongoing communications. I believe that the actions identified in this document will position the Office of Civilian Radioactive Waste Management Program to successfully obtain a license to operate a safe and efficient nuclear waste repository system.



Dr. Margaret S.Y. Chu  
Director  
Office of Civilian Radioactive Waste Management

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## ACRONYMS

BSC	Bechtel SAIC Company, LLC
CAR	corrective action report
DOE	U.S. Department of Energy
DR	deficiency report
HIRD	harassment, intimidation, retaliation, or discrimination
HQ	Headquarters
MII	Management Improvement Initiatives
NRC	U.S. Nuclear Regulatory Commission
OCRWM	Office of Civilian Radioactive Waste Management
OQA	Office of Quality Assurance
QA	quality assurance
QARD	Quality Assurance Requirements and Description
R2A2	roles, responsibilities, authority, and accountability
SCWE	safety-conscious work environment
USGS	U.S. Geological Survey
YMP	Yucca Mountain Site Characterization Project

## 1. INTRODUCTION

Over the past several years, the Yucca Mountain Site Characterization Project (YMP) has had a number of accomplishments, including the accumulation and analysis of more than 20 years of site characterization data, completion of one major tunnel and one drift to explore the potential repository site, study of the geology, and extensive testing of potential materials and components at U.S. Department of Energy (DOE) National Laboratories. These efforts were led by the DOE Office of Civilian Radioactive Waste Management (OCRWM) and were supported by the U.S. Geological Survey (USGS); several National Laboratories; Bechtel SAIC Company, LLC (BSC); and other contractor organizations.

Noteworthy accomplishments from YMP include the development and execution of methods for collecting and analyzing site characterization data, the development of new mining and drilling techniques that preserve the characteristics necessary for effective data collection, and the development of a wide range of complex computer-based algorithms and models. In developing the database on which a site selection recommendation could be made, contributing scientists and engineers used customary technical practices of interactive development, expert knowledge-based decision-making, and peer review validation of analysis activities. The pioneering nature of early Program research efforts created a collegial, academic culture among institutions whose staff accomplished work in accordance with unique protocols and processes.

In 1998, senior Program managers agreed that products developed during earlier years, while technically sufficient, might not have the traceability necessary to support a license application. As a result, management began developing initiatives to help implement a transition from a research-driven work environment toward the nuclear regulatory work environment. Reaffirming the need for such a transition was the identification of several significant conditions adverse to quality by the Office of Quality Assurance (OQA).

In 2001, OQA identified conditions adverse to quality regarding modeling of long-term repository performance and software development. These conditions were documented in corrective action reports (CARs) BSC-01-C-001 and -002. The significance of these new observations was compounded by their similarity to those identified in 1998. Consequently, during the period May through August 2001, YMP conducted root cause analyses that identified weaknesses in management systems, quality processes, and organizational roles and responsibilities. These analyses addressed quality issues associated with model validation and software qualification activities, and discrepancies identified in the Total System Performance Assessment for Site Recommendation and related technical products. Follow-up reviews verified the quality and technical soundness of the site recommendation products.

As a result of the root cause analyses, senior management recognized the need for a sustained, OCRWM Program-level management initiative to:

- Establish clear roles, responsibilities, authority, and accountability (R2A2) within and among the DOE, BSC, USGS, and other contractor organizations
- Clarify elements of the quality assurance (QA) program and improve the effectiveness of its implementation

- Help drive the organization to a culture consistent with that found in a U.S. Nuclear Regulatory Commission (NRC)-regulated environment.

By a letter dated January 31, 2002, DOE submitted the document *OCRWM Management Improvement Initiatives* to the NRC. That document did not meet previous commitments or expectations. The letter of April 5, 2002, from the Director of OCRWM to the NRC Director of Nuclear Material Safety and Safeguards acknowledged this and committed OCRWM to submitting a revised document that reflects the following:

- Actions to address deficiencies and recommendations from OCRWM Program assessments
- Remedial and corrective actions to address key CARs
- Other relevant actions to improve OCRWM management practices.

In March 2002, a project team was convened to improve the original document. In June 2002, the revised document was subjected to a thorough review by an independent group of experts with experience in successfully conducting government and commercial nuclear power programs. The following sections represent the work product of the OCRWM managers, federal employees, and contractor employees who were involved in the analysis and development of action plans to address weaknesses in the identified key areas, as well as the comments received from the independent review by outside experts.

## **2. PURPOSE**

This document was developed to address weaknesses in implementation of OCRWM QA requirements and establish a foundation of continuous improvement. The ultimate goal of the Management Improvement Initiatives (MII) is to ensure YMP work products consistently meet quality objectives and are fully defensible.

## **3. SCOPE**

This MII includes a set of actions to address QA deficiencies being managed in accordance with AP-16.1Q, *Management of Conditions Adverse to Quality*. The MII incorporates a broader set of management actions necessary to address weaknesses identified in other venues, including the results of critical self-analyses and independent program assessments. As such, the MII is considered a comprehensive corrective action plan necessary to address weaknesses in the implementation of the OCRWM QA requirements and attain a level of performance expected of an NRC license applicant.

## **4. RESPONSIBILITIES**

The action plans in Section 5 define management and organizational responsibilities.

## **5. DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS**

The five key areas discussed in this section were identified after analyzing information from a range of sources. A senior management team reviewed information from the following sources:

- The deficiencies and recommendations identified in various assessments of OCRWM functions and the actions identified to address these assessment findings. This included the eight sources of information discussed at the September 6, 2001, Quarterly QA Meeting between DOE and the NRC.
- Remedial actions and actions to preclude recurrence of the conditions noted in the two CARs that identified problems with modeling and software.
- Planned actions that are within, or will be within, NRC regulatory purview and subject to the OCRWM QA program requirements.
- Other identified improvements.

The observed Program weaknesses were analyzed to determine the programmatic areas where improvement was needed, and five key areas for improvement emerged. Once these five key areas were established, action plans were developed. These actions address the Program's weaknesses and envelope the lower-level individual deficiencies and recommended actions identified in the information sources. In this way, the underlying root causes for the larger management issues, and most of the more detailed deficiencies the Program has been experiencing, will be corrected, and sustained performance improvements will be achieved.

Of significant near-term importance is the need to define, clearly and formally, the roles and responsibilities both within and between DOE and the contractor organizations. Without this, it is not possible to build accountability into the management of OCRWM. In addition, there is a need to focus on making step change improvements in the following key OCRWM processes: QA, procedures, corrective action management, and SCWE. Details of the planned improvement actions are provided in Sections 5.1 through 5.5. Appendix A provides a crosswalk of the source documents to the five key improvement areas and other appropriate sections of this management improvement initiative document. Appendix B identifies the actions to address CARs BSC-01-C-001 and -002.



## 5.1 PROGRAM ROLES, RESPONSIBILITIES, AUTHORITY, AND ACCOUNTABILITY

**Objective:** Clearly define R2A2 across the OCRWM Program to define ownership of and accountability for Program functions, and to successfully support the licensing process.

**Current Condition:** The OCRWM organization, processes, procedures, and skills are structured to support the scientific studies required to determine site suitability, rather than preparing OCRWM to support the activities necessary to license a repository. This structure has led to confusion over R2A2 as the Program transitions toward obtaining a license for repository construction.

**Desired Condition:** The OCRWM organization is aligned to support licensing activities in a manner that clarifies R2A2. Managers understand and accept their responsibilities and are accountable for results.

**Approach:** DOE will realign the OCRWM organization and management approach, including realignment of the DOE and BSC relationship, clarification of management's R2A2, and definition of expectations of management and management processes. The following are key elements of the organization realignment:

- Realign the OCRWM organization to:
  - Streamline DOE's management structure and oversight functions
  - Reinforce the DOE role of setting goals and expectations, providing policy guidance, and measuring performance of Program execution
  - Ensure integration across the various Program elements, including effective interfaces within the DOE, with involved states and federal organizations, and with other organizations
  - Assign a single point of responsibility for each critical Program function, including QA, Program procedures, Corrective Action Program management, and SCWE.
- Clarify and strengthen the OCRWM relationship with BSC to ensure that DOE establishes Program goals and performance expectations for the contractor and then holds the contractor accountable for performing the necessary work. DOE and BSC will realign their respective organizations to focus on this new way of doing business to support the licensing process. Rigor and discipline will be employed to ensure that direction provided to contractors is provided only by a contracting officer or contracting officer's representative.
- Clarify management R2A2 within the OCRWM organization to ensure that managers understand their respective roles and responsibilities and that commensurate authority accompanies assigned responsibilities. Managers will be held accountable for fulfilling their responsibilities.

- Prepare an OCRWM *Program Manual* that documents the OCRWM management processes, documents management R2A2, and addresses the responsibilities and interfaces for each of the requirements in the BSC contract.

An independent assessment process will provide feedback to senior OCRWM management regarding progress, issues, and recommendations for keeping the organization aligned and focused on the licensing effort during this important transition. In addition, the DOE annual performance appraisals for managers and supervisors will reflect performance criteria relative to their assigned roles and responsibilities to allow senior management to hold them accountable.

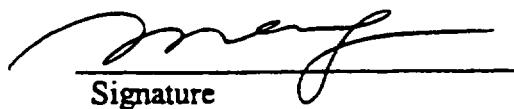
Table 1. Roles, Responsibilities, Authority, and Accountability Action Plan

Action Statement	Responsible Manager	Target Date
DOE will issue a policy statement identifying the expectations of OCRWM management.	Chu (DOE Headquarters [HQ])	8/02
DOE will clarify R2A2 within the OCRWM organization to ensure commensurate authority accompanies assigned responsibilities.	Chu (DOE HQ) Dyer (DOE YMP)	9/02
DOE staff will be oriented through various communications methods to the realigned organization and the associated R2A2. This realignment will allow DOE to manage overall Program performance and hold BSC accountable for performance (i.e., quality, schedule, and cost).	Runkle (DOE HQ) Dyer (DOE YMP)	10/02
BSC staff will be oriented to the realigned organization and the associated R2A2.	Pearman (BSC)	10/02
DOE will issue a <i>Program Manual</i> that provides the implementing requirements that will guide the organization realignment to support the licensing process.	Runkle (DOE HQ) Dyer (DOE YMP) Pearman (BSC)	10/02
DOE annual performance appraisals will be revised to reflect manager performance criteria relative to the appropriate R2A2.	Runkle (DOE HQ)	12/02

**Effectiveness Indicators:**

1. Program quality and schedule performance show consistently improving trends.
2. Deficiency reports (DRs) and CARs related to R2A2 show a consistently decreasing trend to within established control limits.

**Responsible Manager:** M. Chu (DOE HQ)

 , 7/19/02  
Signature Date

## 5.2 QUALITY ASSURANCE PROGRAMS AND PROCESSES

**Objective:** The OCRWM QA program implements applicable regulatory requirements and the associated QA processes to support effective line organization implementation of quality practices that ensure the quality of technical products to support the license application.

**Current Condition:** Activities are currently being carried out in a quality manner; however, our performance requires improvement to fully support our mission of safe, high-quality design, construction, and operation of a high-level waste repository that meets the NRC requirements for a license. In some cases, quality is being achieved through the inspection process, or “inspected into” products by OQA, rather than being routinely implemented by the line organizations. The OCRWM *Quality Assurance Requirements and Description (QARD)*, DOE/RW-0333P, contains a combination of requirements, commitments, and guidance that is confusing and difficult to implement.

**Desired Condition:** Roles and responsibilities for implementation of the QA program are clearly defined such that OQA and the line organizations understand their respective roles. The OCRWM QARD contains the necessary and sufficient quality requirements that are clearly identified and are traceable to source documents. Line management and individuals performing quality-related work understand the quality requirements applicable to their work and are held accountable for adherence to the requirements. Program procedures are user-friendly and provide sufficient guidance with a minimum of administrative burden to allow compliance with requirements and achievement of quality as a routine part of daily business.

**Approach:** The actions to improve quality focus on line management’s responsibility and accountability for implementing quality at the working level. Clearly defining QA R2A2s will be accomplished as part of implementing the actions identified in Section 5.1. In addition, the QA program is being aligned with a logical flowdown of necessary and sufficient requirements through review and revision of the OCRWM QARD. This will ensure that applicable requirements are identified and documented, and that requirements in the QARD are generally traceable back to regulatory drivers. The QARD will be supplemented with policies where appropriate to communicate OCRWM management expectations. The QA program and processes will meet regulatory requirements for QA and will fully support the licensing process. Procedure improvements (addressed in Section 5.3) will institutionalize quality processes and ensure technical products are correct and support license application activities.

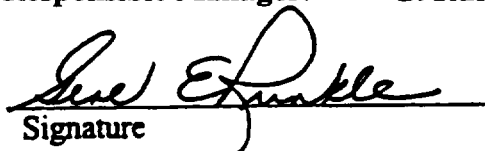
Table 2. Quality Assurance Programs and Processes Action Plan

Action Statement	Responsible Manager	Target Date
DOE will issue a policy statement identifying the expectations of OCRWM management, including line management's ownership of the QA program as the principal means of achieving quality. (This action will be completed in conjunction with R2A2 actions; see Section 5.1.)	Chu (DOE HQ)	8/02
DOE will clarify R2A2 within the OCRWM organization, including the R2A2 for DOE and BSC QA. (This action will be completed in conjunction with R2A2 actions; see Section 5.1.)	Chu (DOE HQ)	9/02
DOE and BSC respective staffs will be oriented to the realigned DOE and BSC QA R2A2s through various communication methods. (This action will be completed in conjunction with R2A2 actions; see Section 5.1.)	Runkle (DOE HQ) Pearman (BSC)	10/02
The QARD will be reviewed and revised as necessary to ensure that applicable requirements are identified, documented, and traceable to regulatory drivers. (Internal and external review cycle will follow.)	Runkle (DOE HQ)	11/02
DOE annual performance appraisals will be revised to include performance criteria that address line management's responsibility to implement the OCRWM QA program.	Runkle (DOE HQ)	12/02

**Effectiveness Indicators:**

1. Number of high-priority self-identified DRs and CARs compared to the total number of high-priority identified DRs and CARs (self-identified/total identified goal is greater than 80 percent).
2. Average closure time for high-priority corrective action DRs and CARs and the number of delinquent corrective actions for high-priority QA-related DRs and CARs show a decreasing trend to within established control limits.

**Responsible Manager:** G. Runkle (DOE HQ)

 / 7/18/02  
Signature Date

### 5.3 PROGRAM PROCEDURES

**Objective:** Institute more effective and efficient work control procedures consistent with standard nuclear industry practices. Procedures are user-friendly and provide sufficient guidance with a minimum of administrative burden to allow compliance with safety and quality requirements as a routine part of daily business.

**Current Condition:** Procedures are typically overly prescriptive and inefficient. In many cases, unnecessary and repetitive administrative requirements (e.g., rigid procedure format and redundant requirements in multiple procedures) overcome substantive content and impede work execution. In addition, the National Laboratories and USGS personnel do not feel their proposed procedure comments and revisions are adequately addressed.

In March 2002, DOE and BSC completed a joint evaluation of procedure ownership. As a result, many procedures have been transferred from DOE to BSC.

**Desired Condition:** An effective and efficient set of separate DOE and BSC procedures are implemented that address the applicable requirements, are commensurate with the complexity and safety and quality significance of the task, and fully support licensing activities. DOE and BSC have separate and discrete procedure sets to control their respective activities.

**Approach:** The realignment and streamlining of work processes and procedures begins with the clear identification of the work scope and responsibilities of each organization, principally DOE and BSC. (The laboratories and USGS will work in accordance with BSC procedures.) This will be accomplished as part of R2A2 actions identified earlier in this document. Both DOE and BSC will review their respective procedure sets and, where appropriate, procedures will be revised in accordance with the revision of the QARD described in Section 5.2 to reflect organizational realignment described in Section 5.1 and to make them more effective and efficient. Applicable procedures proven effective in the commercial nuclear industry will be adopted and tailored for use, as appropriate. New or revised procedures will be issued in compliance with requirements. Personnel that will use the new or revised procedures will be trained prior to implementing the new procedures. Procedure improvements will implement applicable regulatory requirements, and will fully support the licensing process.

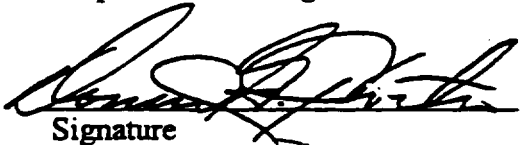
Table 3. Program Procedures Action Plan

Action Statement	Responsible Manager	Target Date
DOE will clarify R2A2 within the OCRWM organization, including clear identification of the work scope and responsibilities for procedure development and implementation of each organization. (This action will be completed in conjunction with R2A2 actions; see Section 5.1.)	Chu (DOE HQ)	9/02
DOE and BSC will review their respective procedure sets and define procedure hierarchies based on their work requirements.	Horton (DOE YMP) Williams (BSC)	10/02
New or revised procedures will be issued in compliance with OCRWM requirements using a phased approach.	Horton (DOE YMP) Williams (BSC)	Starting 11/02 Starting 11/02
Personnel that will use the new or revised procedures will be trained prior to implementing the procedures.	Van Der Puy (DOE YMP) Williams (BSC)	Starting 11/02 Starting 11/02

**Effectiveness Indicators:**

1. Decreasing number of DRs and CARs with a cause code of ineffective procedures.
2. Average cycle time for procedure revisions shows a decreasing trend to within established control limits.
3. Average age of procedure Interim Change Notices shows a decreasing trend to within established control limits.

**Responsible Manager: D. Horton (DOE YMP)**

 Signature

7/18/02  
Date

## 5.4 CORRECTIVE ACTION PROGRAM

**Objective:** Implement a single Corrective Action Program to ensure deficiencies and needed improvements are identified, prioritized, and documented, and that timely and effective corrective actions are taken to preclude recurrence of adverse conditions.

**Current Condition:** Multiple corrective action management systems exist for identifying, tracking, and resolving deficiencies. The current systems require knowledge of various reporting systems and forms to report different categories of conditions. The current forms and processes required for identifying and fixing deficiencies are burdensome and do not yield useful reports that can be used by management to identify trends and corrective actions, prioritized schedules for completion, and responsible individuals. Routine self-assessments are not being used consistently to achieve continuous improvement. Root cause analyses are not embraced consistently as an effective tool to prevent recurrence of deficiencies or to identify and resolve broader management issues. Corrective actions are not completed in a timely manner.

**Desired Condition:** A single Program-wide Corrective Action Program exists that:

- Assists with the management of corrective actions and provides managers ready access to information about corrective actions, their closure status, and the assigned responsible individuals.
- Allows deficiencies and adverse conditions to be readily evaluated and prioritized and categorized according to safety and quality significance; and that allows individual assignment of responsibility and accountability for action.
- Is user-friendly and an integral part of the way line management conducts business, and allows actions to correct and minimize recurrence of the conditions to be identified and completed in a timely fashion.
- Allows trends to be evaluated and reported to management so they can anticipate and mitigate adverse conditions, communicate lessons learned, and facilitate improvement through the use of focused self-assessments.

**Approach:** Although implementation of corrective action is a line function, the Director of OQA will be assigned responsibility for and be held accountable for administration of the Corrective Action Program. This individual will be held accountable for ensuring the Corrective Action Program is substantially improved to function at a level consistent with nuclear industry practices. A DOE/BSC task team will define OCRWM's needs, will evaluate the current corrective action management systems, and will establish requirements and specifications for the single Corrective Action Program. BSC will be assigned the responsibility for implementation and day-to-day management of the single Corrective Action Program. In addition, OCRWM senior management will clearly communicate line management's responsibility and accountability to conduct self-assessments and identify needed improvements and conditions adverse to quality and enter them into the Corrective Action Program (see Section 5.1). It is a line management function to identify, define, prioritize, and implement timely and effective corrective actions, and OCRWM senior management will hold line management accountable for

successful execution of these functions. DOE and contractor employees will be made aware of the new, simplified, more effective Corrective Action Program and how to use it. OQA will be held accountable for administering and monitoring the effectiveness of the Corrective Action Program, including monitoring performance metrics such as the average time to close corrective actions, in addition to emergence and recurrence rates. OQA will provide a monthly report to OCRWM senior management so action can be taken if near-term improvements are not realized.



Table 4. Corrective Action Program Plan

Action Statement	Responsible Manager	Target Date
The Director of OQA will be assigned responsibility and held accountable for a single improved OCRWM Corrective Action Program.	Chu (DOE HQ)	8/02
DOE will form a task team to establish the Program requirements and specifications for the Corrective Action Program.	Horton (DOE YMP)	9/02
BSC will implement a single OCRWM Corrective Action Program consistent with nuclear industry practices, including tracking, trending, reporting, and closure verification processes.	Pearman (BSC)	2/03
BSC will define and implement a self-assessment program, a lessons learned program, and a method to identify and correct adverse conditions.	Pearman (BSC)	3/03

**Effectiveness Indicators:**

1. Number of repetitive conditions (decreasing trend).
2. Average closure duration for high-priority DRs and CARs (decreasing trend to within established control limits).
3. Less than 10 percent of the high priority DR and CAR closures are delinquent.

Responsible Manager: M. Chu (DOE HQ)/R. Dyer (DOE YMP)

  
 Signature \_\_\_\_\_ Date 7/19/02  
  
 \_\_\_\_\_ Date 7/18/02



## 5.5 SAFETY-CONSCIOUS WORK ENVIRONMENT

**Objective:** Foster and sustain an environment in which employees feel free to raise concerns without fear of reprisal, and with confidence that issues will be addressed promptly and appropriately.

**Current Condition:** Some personnel do not know what a SCWE is, and others behave in ways contrary to a SCWE. Some employees do not fully understand the OCRWM Concerns Program and expectations for implementation. Employee concerns are not consistently addressed in a timely manner. Management involvement in the evaluation of employee concerns and trends is less than adequate. However, currently senior management (OCRWM Director, YMP Project Manager, and BSC Deputy General Manager) is tracking progress on open employee concerns on a weekly basis.

Some managers and staff do not act consistently according to a common set of values and are not held accountable. This has led to overemphasis on meeting schedules, less-than-desired attention to quality, and some behaviors inconsistent with a SCWE. Conflicts between individuals and organizations are not resolved, leading to distractions in the workplace and delays in completing work products. An issue escalation process is not defined.

**Desired Condition:** An environment exists in which employees feel free to raise concerns without fear of harassment, intimidation, retaliation, or discrimination (HIRD), and with confidence that their issues will be addressed promptly. OCRWM organizations embrace a SCWE, and management enforces expected behaviors. Personal and organizational accountability focuses on sustaining a SCWE. Open communication exists, with conflicts identified and resolved in a timely manner at the lowest level possible, or escalated promptly, if necessary.

OCRWM Concerns Program processes provide for prompt, efficient, and effective means of prioritizing, addressing, and closing employee concerns. An environment exists in which employees willingly identify problems, prompt feedback occurs, and timely and effective resolution of concerns is routine. Affected management is involved in developing the proposed resolution to employee concerns.

The BSC Concerns Program is fully functional and focused on ensuring that employee concerns are addressed in a prompt and meaningful manner. Managers and supervisors are aware of their SCWE responsibilities and are held accountable for maintaining a SCWE.

**Approach:** OCRWM has issued a SCWE Policy that communicates senior management expectations. Program personnel will be trained on the SCWE Policy. The training will emphasize the relationship between a SCWE and nuclear safety. A SCWE will be sustained through continuous reinforcement and communications efforts. An issue escalation process will be developed, and decisions will be communicated. SCWE-type concerns will be monitored, tracked, and reported to senior management. Management will identify and enforce consequences of non-compliance through performance appraisals and/or disciplinary actions. OCRWM will improve the performance and effectiveness of the OCRWM Concerns Program, and BSC will implement a BSC Concerns Program. Employees and managers will be trained and will develop an understanding of the SCWE policy requirements and how they relate to

OCRWM work activities. Responsibilities and accountabilities of supervisors/managers to establish and maintain a work environment where employees can express their ideas and concerns without fear of HIRD will be strongly emphasized.

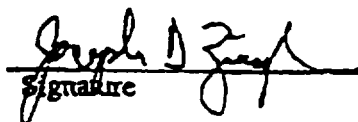
Table 5. Safety-Conscious Work Environment Action Plan

Action Statement	Responsible Manager	Target Date
On April 30, 2002, the OCRWM Program Director and the YMP Project Manager issued a revised and expanded SCWE policy. This policy has been communicated to employees through meetings and project communiqués. The YMP Project Manager and the BSC Deputy General Manager are designated as SCWE change champions.	Chu (DOE HQ)	Completed 5/02
DOE will implement SCWE and employee concerns program performance metrics into BSC contract assessment.	Runkle (DOE HQ)	Completed 7/02
DOE will modify the BSC contract and other DOE contracts to require the implementation of the Program SCWE policy requirements.	Runkle (DOE HQ)	8/02 – BSC 10/02 – Others
DOE will eliminate the backlog of open OCRWM employee concerns and shorten the life-cycle for addressing concerns.	Runkle (DOE HQ)	8/02
DOE will establish a DOE policy and procedures regarding expectations to escalate issues in an expedient manner.	Dyer (DOE YMP)	8/02
BSC will establish a BSC policy and procedures regarding expectations to escalate issues in an expedient manner.	Pearman (BSC)	8/02
DOE and BSC will develop and/or revise SCWE-related Program-wide employee and supervisor/manager training modules based upon nuclear industry practices.	Van Der Puy (DOE YMP) Turner (BSC)	8/02
BSC will establish internal BSC mechanisms for reporting, investigating, and resolving employee concerns.	Pearman (BSC)	9/02
DOE and BSC will conduct employee and supervisor/manager SCWE training.	Van Der Puy (DOE YMP) Turner (BSC)	12/02
An external SCWE expert group will evaluate YMP-wide SCWE.	Chu (DOE HQ)	7/03

**Effectiveness Indicators:**

1. Number of substantiated HIRD employee concerns (generally decreasing).
2. Cycle time for addressing employee concerns. Goal: Less than 30 days for routine concerns and less than 90 days for HIRD concerns that involve complex issues or complex concerns.
3. External evaluation SCWE assessment results show positive changes.

**Responsible Manager:** J. Ziegler (DOE YMP)

 \_\_\_\_\_  
Signature

7-18-02  
Date

## **6. MANAGEMENT APPROACH – COMMITMENT TO EFFECTIVENESS EVALUATION**

Defining the organizational R2A2 is a critical first step in addressing the weaknesses in the key areas noted in Section 5 in a manner that is both effective and long-lasting. OCRWM senior management will communicate the management approach to both federal and contractor employees to ensure that the need for change is communicated, accepted, and enforced throughout the organization. To guide these activities, a Management Alignment Plan and a Communication Plan will be used. More detailed activity schedules will be maintained by the Responsible Manager to implement the action plans described in this document. In addition, the indicators detailed in this section will allow the measurement of progress to determine the effectiveness of these improvement initiatives.

Key elements of the approach to implementing these action plans include:

- Establishing a vision, supporting policies, and procedures that yield continuous improvement in OCRWM operations and quality products.
- Establishing an operating environment that is characterized by rigor, discipline, safety-consciousness, formality, and accountability. Roles and responsibilities will be clear and explicit.
- Creating a team of “change agents” that is competent and dedicated to continuous improvement, and that values self-identification and timely closure of issues.
- Ensuring that OCRWM is successful by measuring performance and providing the necessary resources to implement improvements.

The DOE and BSC management team is committed to a process of continuous improvement. This team and the Director of OCRWM will be reviewing progress on a regular basis. In addition, the teams will continue to seek best practices and lessons learned from other industry groups such as utilities, the Nuclear Energy Institute, and the Institute of Nuclear Power Operations.

OCRWM will continue to report progress regularly to the NRC to demonstrate both the effectiveness with which these plans are being carried out and the tangible accomplishments that result.

### **6.1 EFFECTIVENESS REVIEW AND CLOSURE PROCESS**

A process will be instituted to ensure that the action plans are carried out and are effective in improving performance. Key steps in this process include the following:

1. The Responsible Manager will review and approve completion of the action.
2. OCRWM OQA will review and agree that the action is completed.

3. Upon OQA agreement that the action plans have been completed, experts from outside DOE will review the overall effectiveness of the action plans.

After the third step has been completed, DOE will advise the NRC of the final closure results.

## **6.2 EFFECTIVENESS INDICATORS**

Goals must be established to manage and hold OCRWM accountable for positive change. The goals listed below establish the desired end state. It is understood that the desired normal end state may not be achievable over a short time frame because OCRWM is changing the fundamental way business is conducted. Therefore, if necessary, interim goals will be established to measure progress toward achieving the end state goals.

### **R2A2**

1. Program quality and schedule performance show consistently improving trends.
2. DRs and CARs related to R2A2 show a consistently decreasing trend to within established control limits.

### **QA Programs and Processes**

1. Number of high-priority self-identified DRs and CARs compared to the total number of high-priority identified DRs and CARs (self-identified/total identified goal is greater than 80 percent).
2. Average closure time for high-priority corrective action DRs and CARs and the number of delinquent corrective actions for high-priority QA-related DRs and CARs show a decreasing trend to within established control limits.

### **Program Procedures**

1. Decreasing number of DRs and CARs with a cause code of ineffective procedures.
2. Average cycle time for procedure revisions shows a decreasing trend to within established control limits.
3. Average age of procedure Interim Change Notices shows a decreasing trend to within established control limits.

### **Corrective Action Program**

1. Number of repetitive conditions (decreasing trend).
2. Average closure duration for high-priority DRs and CARs (decreasing trend to within established control limits).
3. Less than 10 percent of the high priority DR and CAR closures are delinquent.

## **SCWE**

1. Number of substantiated HIRD employee concerns (generally decreasing).
2. Cycle time for addressing employee concerns. Goal: Less than 30 days for routine concerns and less than 90 days for HIRD concerns that involve complex issues or complex concerns.
3. External evaluation SCWE assessment results show positive changes.

**APPENDIX A**  
**CROSSWALK OF SOURCE DOCUMENTS**

## APPENDIX A

### CROSSWALK OF SOURCE DOCUMENTS

#### **Index:**

Table A-1. Crosswalk of Source Documents

Table A-2. List of Documents

#### **Table A-1 Legend:**

Column 1 identifies source document (listed in Table A-2) and a statement reference number. Where listed more than once, the statement has been broken down to individual elements, and mapped to different MII locations.

Column 2 presents the recommendation, expectation, or commitment statement; where applicable, page and/or section number is also listed.

Column 3 indicates where statement is enveloped in the MII or otherwise dispositioned.

Table A-1. Crosswalk of Source Documents

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). (AOS, page 1, 2nd para.)	FOREWORD AND SECTION 1, INTRODUCTION.
NRC1-01	DOE stated that it will develop a comprehensive corrective action plan that will address the causes of problems identified during its investigation and a Performance Improvement Transition Plan to improve the level of performance of QA program implementation. (NRC 1, page 2, 4th para., 2nd sentence)	FOREWORD AND SECTION 1, INTRODUCTION.
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: TSPA root cause results and recommendations including root and common causes. (AOS, page 1, 2nd para., bullet 2)	FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. Results of the Technical Document root cause analysis report are listed as "TD" items in this crosswalk.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Review of results of vertical and horizontal document in process reviews conducted on the S&ER, PSSE, and SSPA for the purpose of ensuring that any additional adverse trends are included in the Plan. (AOS, page 1, 2nd para., bullet 3)	FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. This was addressed in Section 3.3.5 of the Technical Document root cause analysis report, the results of which are listed as "TD" items in this crosswalk. The PSSE was not specifically listed as being reviewed in the root cause analysis report, but was considered and verified with the author.
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: The results of the TSPA audit will be integrated into the Plan. (AOS, page 1, 2nd para., bullet 4)	FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. Results of TSPA Audit indicated no new actions beyond those for CAR-BSC-01-C-001. See Murthy, 2002 MOL.20020509.0259.
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Results of self-assessments performed over the last six months. (AOS, page 1, 2nd para., bullet 6)	FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. Results of this review indicated no significant issues beyond those already addressed in the MII.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Lessons learned from previous corrective actions including what is different with this plan versus previous initiatives. How is DOE going to prevent recurrence? (AOS, page 1, 2nd para., bullet 7)	FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. A lessons learned analysis was conducted and documented, the results of which are addressed in the MII and listed as "LL" in the crosswalk.
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Quality Assurance Management Assessment (QAMA) Review Results. (AOS, page 1, 2nd para., bullet 8)	FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. The results of the FY2001 Quality Assurance Management Assessments of OCRWM and BSC are addressed in this MII and listed as "QAMA" and "QAMA BSC" in the crosswalk.
LL-01	The need for change must be accepted, communicated, and enforced throughout the organization. Senior management should personally communicate the seriousness of the need for change. Face-to-face meetings with all project personnel, perhaps at the department level, should be considered. Consequences to the organization of the failure to change must be communicated. (LL Recommendation 1, bullet 1)	SECTION 6, MANAGEMENT APPROACH.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
LL-01	The need for change must be accepted, communicated, and enforced throughout the organization. Personal and organizational benefits of change must also be defined. (LL Recommendation 1, bullet 3)	SECTION 6, MANAGEMENT APPROACH.
LL-01	The need for change must be accepted, communicated, and enforced throughout the organization. The capability of the existing project leadership to lead the needed change to a nuclear licensing environment should be assessed, with weaknesses addressed. Development of mentoring relationships with industry experts who have experienced culture change should be considered. (LL Recommendation 1, bullet 4)	SECTION 6, MANAGEMENT APPROACH.
LL-01	The need for change must be accepted, communicated, and enforced throughout the organization. Change champions should be identified and supported. Where obvious champions do not exist, efforts to develop the desired attributes or hire new personnel should be considered. (LL Recommendation 1, bullet 5)	SECTION 6, MANAGEMENT APPROACH.
LL-02	Senior Management must demonstrate sustained, personal commitment to OMII. Senior management must assure the implementation of the OMII will result in sustained organizational and process change, not just the completion of planned actions. (LL Recommendation 2, bullet 1)	SECTION 6, MANAGEMENT APPROACH.
LL-02	Senior Management must demonstrate sustained, personal commitment to OMII. Progress must be consistently communicated throughout the organization until completion. (LL Recommendation 2, bullet 3)	SECTION 6, MANAGEMENT APPROACH.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
LL-02	Senior Management must demonstrate sustained, personal commitment to OMII. Barriers to success must be actively sought out and eliminated. (LL Recommendation 2, bullet 4)	SECTION 6, MANAGEMENT APPROACH.
LL-02	Senior Management must demonstrate sustained, personal commitment to OMII. Successes must be publicly acknowledged. (LL Recommendation 2, bullet 5)	SECTION 6, MANAGEMENT APPROACH.
OMII-1	Conduct a series of management meetings to communicate information from the lessons learned evaluation and future expectations. These meetings should have two different focuses depending on the level of involvement in the original OMII. The general management team should be briefed on the lessons learned evaluation findings and actions that are being taken by management to prevent recurrence. Detailed examples of the management actions need to be reviewed to tie the action to the lesson learned finding being addressed. These meetings should clearly communicate the fact that the corrective actions being taken are different from previous corrective actions to improve performance in that senior management will be held accountable for specific actions. For those persons directly involved in the January 31, OMII development, additional information should be made available to clearly communicate roles and actions associated with why OMII contained inaccuracies and associated corrective actions taken. In addition, training should be provided to address listening and conflict resolution skills. (OMII LL Recommendation 1)	SECTION 6, MANAGEMENT APPROACH.

Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
OMII-2	Issue a letter(s) to specific individuals, sections, and departments to clearly define performance expectations, responsibilities and authorities. Specific individuals are to be identified to clearly communicate to the organization the lead and point of contact for the item or issue. The purpose of these letters is to clarify roles and responsibilities in the organization and reestablish accountability. A series of checks and balances should be implemented in the Project to ensure effective re-establishment of accountability (e.g., letters to outside organizations, CARs, etc., should be selected at random for detailed accuracy verification and verification of conflict escalation). A series of confirmatory assessments, audits and/or surveillances should be utilized to verify line organization performance. (OMII LL Recommendation 2)	SECTION 6, MANAGEMENT APPROACH.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
OMII-3	<p>The DOE Project Manager and BSC President and General Manager should either redirect an existing Deputy Manager or establish a new Deputy Manager position. The Deputy Manager(s) are to: as a minimum work as a team to provide a conflict resolution forum, identify conflicts for issue escalation, perform independent assessment of CAR/DR, identify management initiatives necessary to prevent inaccurate submittals, and monitor progress in re-engaging personnel in the organization. Senior Managers and Deputy Manager(s) should receive training in listening, conflict resolution, and managing organizational change. The Deputy Manager(s) will champion the changes identified and provide frequent feedback to the Senior Managers on progress and issues encountered in implementing the necessary actions. The Deputy Manager(s) will be held accountable for successful overall OMII implementation and effectiveness. (OMII LL Recommendation 3)</p>	SECTION 6, MANAGEMENT APPROACH.
LL-02	<p>Senior Management must demonstrate sustained, personal commitment to OMII. Senior management must be actively engaged in monitoring OMII progress and effectiveness, and make adjustments when necessary to assure success. (LL Recommendation 2, bullet 2)</p>	FOREWORD AND SECTION 6, MANAGEMENT APPROACH. RW-1 commitment affirmed in MII introduction.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
NRC1-02	<p>DOE will submit the Performance Improvement Transition Plan to NRC by December 15, 2001, which will specifically address the following items:</p> <ul style="list-style-type: none"> <li>- Software and modeling results and corrective action report (CAR) root cause analysis results and recommendations including root, generic, and common causes,</li> <li>- TSPA root cause results and recommendations including root and common causes,</li> <li>- Review of results of vertical and horizontal document in process reviews conducted on the S&amp;ER, PSSE, and SSPA for the purpose of ensuring that any additional adverse trends are included in the Plan.</li> <li>- The results of the TSPA audit will be integrated into the Performance Improvement Transition Plan.</li> <li>- Coordination of the DOE Integrated Safety Management System (ISMS) with QA Program Initiatives including closure of ISMS issues resulting from self-assessment(s).</li> <li>- Results of self-assessments performed over the last six months.</li> <li>- Lessons learned from previous corrective actions including what is different with this plan versus previous initiatives.</li> <li>- QA Management Assessment (QAMA) Review Results. (NRC1, page 2, 4th para., 3rd sentence)</li> </ul>	<p>FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS.                      These issues are addressed in responses to AOS-1 needs, and are not tracked separately.</p>

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
NRC1-03	DOE and BSC Senior Project Managers will be assigned to manage and monitor corrective action implementation. (NRC 1, page 3, 1st para., 1st sentence)	SECTION 6, MANAGEMENT APPROACH.
NRC1-04	Performance measures will be defined to evaluate both the progress of implementation and the effectiveness of the actions taken to ensure continuous improvement. (NRC 1, page 3, 1st para., 2nd sentence)	SECTION 6, MANAGEMENT APPROACH.
NRC1-05	BSC QA personnel will conduct performance based and compliance based audits and surveillances of in-process work to confirm that the corrective actions taken are implemented and effective. (NRC 1, page 3, 2nd para., 1st sentence).	SECTION 6, MANAGEMENT APPROACH.
NRC1-06	The DOE Office of QA will conduct audits, progressive reviews, and verification of corrective and preventive action implementation as it is completed. DOE committed to provide the scope and time frame of DOE and BSC oversight activities as part of the plan to be delivered on December 15, 2001. DOE will provide audit and review schedules for these DOE and BSC activities to the NRC as they are developed and updated. (NRC 1, page 3, 2nd para., 2nd-4th sentences)	SECTION 6, MANAGEMENT APPROACH.
NRC1-07	Establish NRC/DOE dialogue on the Performance metrics prior to inclusion in the Transition Plan scheduled for submittal to the NRC in December 2001. (NRC 1, Attachment 1, item 11)	SECTION 6, MANAGEMENT APPROACH. Informal communications conducted during development of the MII.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
NRC2-01	<p>...OQA and BSC QA activities to monitor the implementation of the Transition Plan. ...indicated that elements of the Transition Plan, under the jurisdiction of the QARD, would be subject to OQA and BSC QA oversight (e.g., the corrective actions addressed by the transition plan for the model validation and software CARs). ...QA would be providing oversight to ensure that the performance measures/metrics, addressed by the Transition Plan, accurately reflected the progress being made in a given area. ...line management has the responsibility to ensure that the Transition Plan is properly implemented. (NRC 2, page 3, 5th para.)</p>	<p>SECTION 6, MANAGEMENT APPROACH.</p>
NRC3-01	<p>DOE stated that it will develop a comprehensive corrective action plan that will address the causes of problems and a plan to improve the level of performance of its quality assurance program implementation. This plan will consider and address items such as: 1) results of DOE's reviews of the documents supporting the site recommendation; 2) root-cause analysis for the various quality assurance problems; 3) lessons learned from past corrective action plans; 4) accountability; 5) performance measures; 6) upgrading and enhancing procedures; and 7) audits, surveillances, self assessments, and management oversight to confirm that the corrective actions are being implemented and are effective. (NRC 3, Enclosure 2, page 2, 5th para.)</p>	<p>FOREWORD, SECTION 1, INTRODUCTION, AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. See also NRC1-02.</p>

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-02	The YMSCO Project Manager should provide a single focus on improving human performance and enhancing professionalism rather than on discrete initiatives such as nuclear culture, integrated safety management, safety conscious work environment, etc. YMSCO management should rely on proven INPO tools and guidance, including the use of self-assessments by the line organizations, on improving human performance and enhancing professionalism. (QAMA, Section 4.2, Recommendation 2)	SECTION 1, INTRODUCTION AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS.
QAMA-BSC-01	Determine why the process for root cause determination and corrective actions of repetitive and significant issues has been ineffective. (QAMA-BSC, Section 3.1 Recommendation 1, 2nd phrase)	SECTION 1, INTRODUCTION AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS. A lessons learned analysis was conducted and documented, the results of which are listed as "LL" in the crosswalk.
QAMA-BSC-01	Take the appropriate action to preclude this situation from recurring. (QAMA-BSC, Section 3.1 Recommendation 1, 3rd phrase)	SECTION 1, INTRODUCTION AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-BSC-02	There should be a single focus on improving human performance and enhancing professionalism, with effective implementation of the QA Program as a prerequisite, rather than on discrete initiatives such as the nuclear culture initiative or integrated safety management. Management needs to promptly address the problems that were recently identified by the root cause analysis team (report dated July 19, 2001), and issues identified by surveys and self-assessments. Plans should include metrics to measure effectiveness of corrective action, manager counseling, individual accountability, training, and possibly seeding the organization with new staff (effective leaders with proven track records) to influence change. (QAMA-BSC, Section 3.2 Recommendation 2)	SECTION 1, INTRODUCTION AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS.
TD-17	DOE and the M&O must accept that manager behavior and expectations need to change. (TD Section 4.5.2.2, 2nd sentence)	SECTION 6, MANAGEMENT APPROACH.
TD-17	DOE and the M&O should celebrate the many past achievements of the Project. (TD Section 4.5.2.2, 1st sentence)	SECTION 6, MANAGEMENT APPROACH.
TD-17	Develop a performance improvement plan that incorporates the recommendations from the Modeling and Software Root Cause Analysis and this Root Cause Analysis, including performance indicators, communicate the plan and performance indicators to the DOE, NRC and employees. (TD Section 4.5.2.2, 3rd sentence)	SECTION 1, INTRODUCTION AND SECTION 5, DISCUSSION OF ACTION PLANS IN FIVE KEY AREAS.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
AOS-02	Key decisions and some actions that are proceeding in parallel with, and will be addressed in, the Plan development will be presented at the September 7, 2001 management meeting. They include: Procedure ownership and designation of interpretive authorities being aligned within BSC organization. (AOS, page 1, 5th para., bullet 3)	SECTION 5.1, PROGRAM R2A2.
AOS-02	Key decisions and some actions that are proceeding in parallel with, and will be addressed in, the Plan development will be presented at the September 7, 2001 management meeting. They include: Values/Expectations/Consequences are being defined. (AOS, page 1, 5th para., bullet 4)	SECTION 5.1, PROGRAM R2A2.
AOS-02	Key decisions and some actions that are proceeding in parallel with, and will be addressed in, the Plan development will be presented at the September 7, 2001 management meeting. They include: Roles, Responsibilities, Accountability, and Authority are being defined within DOE and BSC as well as between DOE and BSC. (AOS, page 1, 5th para., bullet 5 )	SECTION 5.1, PROGRAM R2A2.
LL-01	The need for change must be accepted, communicated, and enforced throughout the organization. Performance evaluation plans for all project personnel must be revised to ensure the expected performance attributes are institutionalized at a personal level. (LL Recommendation 1, bullet 2)	SECTION 5.1, PROGRAM R2A2.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
MP-TSPA-03	Organization Responsibility/Accountability - it is anticipated that the root cause determinations could find that improved responsibility and accountability are needed for project related work. Consequently, the BSC management team is prepared to enhance the responsibility and accountability on the project. (MP-TSPA, page 4, bullet 2)	SECTION 5.1, PROGRAM R2A2.
OMII-4	BSC should establish a senior review board reporting directly to the BSC President and General Manager. The Board is to provide YMP Senior Managers with an independent review of significant project issues and plans. Board members should not be employees of BSC or DOE. They should have the following experience: NRC licensing, turning troubled organizations around, successful DOE project management etc. The Deputy Manager(s) are to status the board of project progress, significant issues and organizational performance. The Board will provide the BSC President and General Manager with a written report for each Board meeting. The report will contain at a minimum a description of what was reviewed, personnel contacted, and any applicable recommendations. (OMII LL Recommendation 4)	SECTION 5.1, PROGRAM R2A2.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-03	<p>YMSCO should establish a firm date for developing a management plan, approach, and organizational structure that aligns the authorities and roles and responsibilities of the YMSCO and BSC organizations. YMSCO and BSC managers should be involved in reaching and promptly implementing these decisions, and be held accountable for effective implementation. In evaluating how best to structure the YMSCO organization, and the roles, responsibilities, and authorities, YMSCO should evaluate the structure of other successful government and private sector projects. As OCRWM's role and organization are defined, YMSCO should identify any required changes in staffing or skill mix, and set a date for implementing these changes. (QAMA, Section 4.3, Recommendation 3)</p>	SECTION 5.1, PROGRAM R2A2.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-BSC-05	BSC should identify a complete set of functions that are needed to group the programmatic requirements applicable for all project phases. The scope of each function should be defined, management expectations for each function should be established, requirements should be allocated to each function, the BSC individual responsible for the integrity of the function should be established, requirements should be allocated to each function, the BSC individual responsible for the integrity of the function should be identified, and metrics to measure the performance of each function should be established. The programmatic document hierarchy should be constructed around the identified functions to ensure proper allocation of programmatic requirements. BSC needs to achieve compliance with procedure AP-REG-006, <i>Identification and maintenance of the YMP Requirements Baseline</i> . (QAMA-BSC, Section 3.4, Recommendation 5)	SECTION 5.1, PROGRAM R2A2.
SCWE-08	Clarifying the respective roles and responsibilities of senior site management and the OCRWM Concerns Program, including a more precise understanding of the interface, and then communication of these roles to the OCRWM workforce. In this regard, the OCRWM Concerns Program should be reviewed to assure: (SCWE Section III.B.3.a, bullet 6, 1st sentence)	SECTION 5.1, PROGRAM R2A2.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Coordination of the DOE Integrated Safety Management System (ISMS) with Quality Assurance Program Initiatives including closure of ISMS issues resulting from self assessment(s). (AOS, page 1, 2nd para., bullet 5)	SECTION 5.2, QA PROGRAMS AND PROCESSES. The sole ISM deficiency was related to procedural compliance and is addressed in Section 5.2.
AOS-02	Key decisions and some actions that are proceeding in parallel with, and will be addressed in, the Plan development will be presented at the September 7, 2001 management meeting. They include: BSC QA program redefinition initiated. (AOS, page 1, 5th para., bullet 2)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
AOS-03	DOE and BSC Senior Project Managers will be assigned to manage and monitor corrective action implementation (organizational structure will be discussed during the September 6-7, 2001, QA and management meetings). This will be part of the Plan provided to the NRC on December 15, 2001. (AOS, page 2, 1st para.)	SECTION 5.2, QA PROGRAMS AND PROCESSES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
AOS-04	Corrective action implementation includes follow-up assessments and monitoring of performance improvements through pre-defined performance measures to evaluate both the progress of implementation and the effectiveness of the actions taken to ensure continuous improvement. Performance measures will be included as part of the Plan delivered on December 15, 2001. (AOS, page 2, 2nd para.)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
AOS-05	BSC Quality Assurance personnel will conduct performance based and compliance based audits and surveillances of in-process work to confirm that the actions taken are effective as part of the quality assurance program realignment. The DOE Office of Quality Assurance will conduct audits, progressive reviews, and field verification of corrective and preventive action implementation as it is completed. DOE will provide a commitment as to the scope and time frame of DOE and BSC oversight activities as part of the plan to be delivered on December 15, 2001. Audit and review schedules for these DOE and BSC activities will be provided to the NRC as they are developed and updated. (AOS, page 2, 3rd para.)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
LL-04	Quality assurance must be developed as an inherent means of doing work. Roles and responsibilities for implementing the Quality Assurance program need to be re-evaluated and communicated; line management ownership of quality needs to be developed. (LL Recommendation 4, bullet 1)	SECTION 5.2, QA PROGRAMS AND PROCESSES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
LL-04	Quality assurance must be developed as an inherent means of doing work. The Quality Assurance program and processes need to be simplified and the Quality Assurance role well understood so line management can effectively implement Quality Assurance requirements. (LL Recommendation 4, bullet 2)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
QAMA-BSC-03	BSC should develop an Assessment Program document that defines all elements of the Program. The Program document should (1) describe the Program's scope, philosophy, and objectives, (2) establish requirements and management expectations, and (3) assign organizational responsibilities. One discrete requirement of the Assessment Program should be a criterion to evaluate the effectiveness of previous corrective actions. Upon completion of the Assessment Program document, existing assessment procedures should be identified and then reviewed to ensure that all elements and requirements of the Assessment Program properly flow down into procedures. The final objective of this effort should be to help line management at BSC and the laboratories/USGS effectively apply this process on a consistent basis. (QAMA-BSC, Section 3.3, Recommendation 3)	SECTION 5.2, QA PROGRAMS AND PROCESSES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-BSC-04	BSC QA management should propose to OQA management that a document such as a Performance Report be reinstated to report "a performance condition in an activity or associated documentation where remedial actions or minor improvements are necessary to meet minimum requirements." This report should require minimal line management effort to document and resolve the problem. The use of the current deficiency Report (DR) to address insignificant problems is, in many cases, overkill because the rigor and formality of a DR is not required for these minor deficiencies. (QAMA-BSC, Section 3.3, Recommendation 4)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
SCWE-06	A management initiative to improve communication across the three QA organizations, particularly in the identification and resolution of QA issues. In this regard, management should better explain to the larger OCRWM workforce the role of QA in the overall mission of the Project. (SCWE Section III.B.3.a, bullet 4)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
SCWE-20	Determine the extent to which planning and scheduling in product preparation contribute to insufficient time from QA review, and improve planning and scheduling to assure adequate QA review time. (SCWE Section IV.B.3.b)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
TD-01	Senior management must value a robust checking and review process to ensure errors in documents are identified and reconciled before a document is issued. This can be accomplished by management adopting this as a project value. (TD Section 4.1.2.1)	SECTION 5.2, QA PROGRAMS AND PROCESSES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
TD-02	Senior management must establish the proper configuration management process, which must include a final C&R process of a frozen document. (TD Section 4.1.2.2, 1st sentence)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
TD-03	Benchmark and assess configuration management processes used to develop technical documents. Where gaps are determined, prepare and issue appropriate configuration management procedures. (TD Section 4.1.2.3)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
TD-04	Senior management must set high values and expectations for technical document quality. This can be accomplished by management adopting this as a project value. A good example of such a value is AP 3.11Q Section 3.18 (Signature of author, checker, and responsible manager). (TD Section 4.2.2.1)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
TD-16	DOE and the M&O must embrace, support and communicate the expectation that Project products will be error free, and they must create performance measures that will track progress towards meeting the goal of error free documents. (TD Section 4.5.2.1)	SECTION 5.2, QA PROGRAMS AND PROCESSES.
LL-03	The priority of quality versus schedule must be communicated. Detailed, resource loaded, logic driven project schedules are necessary to provide direction and focus, and help identification of real, versus perceived, schedule impacts so that priorities can be based on fact. (LL Recommendation 3, bullet 1)	SECTION 5.3, PROGRAM PROCEDURES.
LL-03	The priority of quality versus schedule must be communicated. Appropriate quality assurance requirements for technical products must be carefully determined, clearly defined, well communicated and achieved. (LL Recommendation 3, bullet 2)	SECTION 5.3, PROGRAM PROCEDURES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
MP-TSPA-01	<p>Procedure Revision Enhancements - science and design processes (both of which are ongoing at Yucca Mountain) have different characteristics. These processes can be controlled in a more appropriate manner if the processes reflect the nature of each type of activity. Consequently, there is a need to implement separate processes for these activities. In addition, this will allow the implementation of a more standard design and engineering approach for the design and engineering activities. (MP-TSPA, page 3, 5th para., bullet 1)</p>	SECTION 5.3, PROGRAM PROCEDURES.
MP-TSPA-02	<p>Baseline Management - better control of project scope and schedule using industry accepted scheduling methods that are: Fully integrated, Resource-loaded, and Logic-tied schedules, thus assuring that scoped activities can be accomplished as scheduled and to assure that appropriate schedule adjustments are made when scope is changed. This also enhances the project ability to properly include commitments in the scoped and scheduled work and to satisfy commitments. (MP-TSPA, page 4, bullet 1)</p>	SECTION 5.3, PROGRAM PROCEDURES.
QAMA-04	<p>YMSCO management should establish a firm milestone by which the Project will have its technical, cost and schedule baseline in place. Responsibilities for this effort and management expectations regarding the level of detail contained in the baseline should be clearly communicated to OCRWM and BSC managers. (QAMA Section 4.4, Recommendation 4)</p>	SECTION 5.3, PROGRAM PROCEDURES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-05	YMSCO management should set a firm date for reviewing and revising Project procedures to assure that they are adequate and effective for the NRC licensing phase of the Project. Any initiative to revise the procedures should be built around the processes and outputs from the Project, rather than just on the existing set of Project procedures. (QAMA Section 4.5)	SECTION 5.3, PROGRAM PROCEDURES.
QAMA-BSC-07	BSC should reach agreement with OCRWM on a firm date by which the program technical/cost/schedule baseline, and roles and responsibilities for maintaining it and changing it will be in place. (QAMA-BSC, Section 3.6, Recommendation 7)	SECTION 5.3, PROGRAM PROCEDURES.
QAMA-BSC-08	BSC should request input and suggestions from each laboratory and the USGS on ways in which QA-related training needs for the laboratories/USGS can be met more efficiently and effectively. Areas to address should include: the process for determining the form, content, and extent of training needed by each laboratory and the USGS; the requirement that "certified trainers" must conduct training; a subject-by-subject determination as to whether training should be presented by the training department or the laboratories/USGS; the process for providing visibility regarding personnel training status to each laboratory and the USGS; and the manner in which BSC management, including laboratory and USGS management, obtain timely and visible information regarding the effectiveness of training. BSC should obtain concurrence of the laboratories/USGS for any improvements resulting from the analysis of this information. (QAMA-BSC, Section 3.9, Recommendation 8)	SECTION 5.3, PROGRAM PROCEDURES.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
LL-04	Quality assurance must be developed as an inherent means of doing work. Quality principles, such as self-assessment, deficiency reporting, and prompt corrective action ,must be established as a cultural value. (LL Recommendation 4, bullet 3)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
LL-05	Timely identification and resolution of corrective actions must be valued. User-friendly processes for timely identification and reporting of deficiencies, completion of root cause analyses, and development of corrective actions are needed. (LL Recommendation 5, bullet 1)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
LL-05	Timely identification and resolution of corrective actions must be valued. Additional emphasis should be placed on determining extent of issues, conditions or problems when investigating deficiencies. (LL Recommendation 5, bullet 2)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
LL-05	Timely identification and resolution of corrective actions must be valued. Appropriate use of independent external evaluations (diverse nuclear utility tiger teams) to assist in investigation of issues/problems and the development of corrective action plans should be considered. (LL Recommendation 5, bullet 3)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
LL-05	Timely identification and resolution of corrective actions must be valued. Greater emphasis should be placed on self-assessments. (LL Recommendation 5, bullet 4)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
LL-05	Timely identification and resolution of corrective actions must be valued. Mechanisms to clearly identify, and monitor the progress and effectiveness of implementing corrective actions are needed. (LL Recommendation 5, bullet 5)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
LL-05	Timely identification and resolution of corrective actions must be valued. Managers should be held accountable for timely closure of corrective actions, consistent with established corrective action system requirements. (LL Recommendation 5, bullet 6)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-01	OCRWM senior management must play a key role in implementing an effective corrective action program on a high priority basis. OCRWM line managers must be held accountable for assuring that corrective actions in their area of responsibility are identified and implemented. (QAMA, Section 4.1, Recommendation 1, 1st & 2nd sentences)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-01	Implementation of effective corrective actions should be a key element in each OCRWM manager's performance appraisal, and should be directly tied to the BSC fee determination. (QAMA, Section 4.1, Recommendation 1, 3rd sentence)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-01	OCRWM should establish metrics to ensure that problems are resolved in a timely way, and that they do not recur. (QAMA, Section 4.1, Recommendation 1, 4th sentence)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-01	The lead for monitoring the corrective action program in YMSCO should be assigned by the Project Manager to an organization other than OQA, perhaps the Office of Project Execution. (QAMA, Section 4.1, Recommendation 1, 5th sentence)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-06	YMSCO management should establish a firm date by which an effective commitment management system will be in place, should specify in writing the performance expectations for the system, and then evaluate periodically whether the system is meeting these expectations. (QAMA, Section 4.6, Recommendation 6)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-BSC-01	M&O management should reinforce corrective action program ownership with the line organization. (QAMA-BSC, Section 3.1, Recommendation 1, 1st phrase)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-BSC-06	BSC should continue a strong focus on using the Lessons Learned Program with increased emphasis placed on identifying and including management best practices in the program. (QAMA-BSC, Section 3.5 Recommendation 6, 1st sentence)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
QAMA-BSC-09	CIRS should be simplified to make it a useful management tool. As a first step, a summary page, identifying the specific control features needed by management to effectively and efficiently manage issues, should be developed and incorporated into CIRS. (QAMA-BSC, Section 3.10, Recommendation 9)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
SCWE-11	Revision of self-assessment practices or procedures to require management to communicate to the impacted workforce both the results of the assessments and management's plans to address the findings. (SCWE Section III.B.3.a, bullet 7)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
SCWE-12	A schedule to transition fully to a single issue identification system under CIRS, and communicate at appropriate milestones to the workforce. At the time of full implementation, conduct a coordinated training program for all employees. (SCWE Section III.B.3.a, bullet 8)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
SCWE-23	Make the corrective action processes more responsive to deficient conditions by requiring corrective actions be more prompt and meet open duration times comparable to industry practices (i.e., reset targets from 100 to 45 days). (SCWE Section IV.B.6.b, bullet 1)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
SCWE-24	Continue the transition to the CIRS as the single system for workers to report and document concerns to the CAP. As part of this transition, train all personnel (both QA and non-QA) to assure that anyone who may have a concern knows how to use the CIRS system and its relationship to other means of raising issues, such as the Concerns Program and DPO process. (SCWE Section IV.B.6.b, bullet 2)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
SCWE-25	Give the self-assessment program sufficient priority to work off the backlog of planned assessments; assure workers are provided adequate training in conducting self-assessments; assure quality and non-quality findings arising out of self-assessments are documented, evaluated, and resolved in a timely manner; and assure affected organizations are provided both the results of self-assessments and the corrective actions management will take in response. (SCWE Section IV.B.7.b)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
TD-10	Senior management must establish a value and expectation for a positive issue management process. This will require that issues management process be separated from commitment tracking. (TD Section 4.4.2.1)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
TD-11	Senior management must implement a positive and definitive process for self-identification, tracking, and resolution of issues. This process should allow for easy documentation and closure of minor issues. (TD Section 4.4.2.2)	SECTION 5.4, CORRECTIVE ACTION PROGRAM.
LL-03	The priority of quality versus schedule must be communicated. Employees should be assured access to senior project management so that concerns regarding product quality vs. schedule can be freely raised. (LL Recommendation 3, bullet 3)	SECTION 5.5, SCWE.
LL-06	Barriers to progress must be promptly identified and resolved. Formal issue escalation and resolution processes must be developed to encourage prompt identification and the resolution of barriers to progress. (LL Recommendation 6, bullet 1)	SECTION 5.5, SCWE.
LL-06	Barriers to progress must be promptly identified and resolved. Senior managers need to maintain an open door policy and encourage candid input from employees (management by walking around). (LL Recommendation 6, bullet 2)	SECTION 5.5, SCWE.
LL-06	Barriers to progress must be promptly identified and resolved. Formal training on interpersonal conflict management is needed. (LL Recommendation 6, bullet 3)	SECTION 5.5, SCWE.
OCP-01	To address Trend 1 (a) and (b): additional facility and personnel resources are needed for the OCP to address both the 2001 backlog (46 concerns) and the backlog of incoming concerns for 2002 (10). Additional resources are especially important if the OCP continues to receive an average of 11.5 concerns per month. (OCP Recommendation 1)	SECTION 5.5, SCWE.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
OCP-02	To address Trend 2, all Project staff must receive training to foster understanding and implementation of a SCWE, as stated in the NRC Policy Statement, May-1996. This training should be comprehensive and presented on a recurring basis. In addition to training, project communication should stress all of the available methods for issue identification, including the process for escalation of issues and differing professional views. (OCP Recommendation 2)	SECTION 5.5, SCWE.
OCP-03	To address Trend 3, management must foster a work environment free from harassment, intimidation, retaliation and discrimination. This must be stressed through the attitudes of management when addressing/resolving issues and the attitudes of conveyed to an employee when issues are first identified. (OCP Recommendation 3)	SECTION 5.5, SCWE.
SCWE-01	Senior management should take timely, visible action to respond to issues identified in the survey. In this regard, senior management should consider designating a single senior manager to be the responsible manager to coordinate all SCWE initiatives on the Project. (SCWE Section III.B.3, 1st para.)	SECTION 5.5, SCWE.
SCWE-02	Senior management should take the initiative and set the tone for a SCWE by issuing a clear statement on Project expectations for raising and responding to concerns. We recognize that DOE issued a Policy Statement on August 7, 2001, but this Statement should be integrated within a multi-dimension plan to convey and reinforce management expectations. (SCWE Section III.B.3.a, 1st & 2nd sentences)	SECTION 5.5, SCWE.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
SCWE-03	Systematic senior management communication, by both word, and deed, to workers that management values their opinions (SCWE Section III.B.3.a, bullet 1)	SECTION 5.5, SCWE.
SCWE-04	Clear expectations by more senior management as what workers are expected to do when, for whatever reason, they have concerns that they choose not to raise with immediate supervision, including: (1) what workers should expect if they raise issues directly with senior management; and (2) how senior management views the role of the OCRWM Concerns Program as a forum to raise and resolve issues. (SCWE Section III.B.3.a, bullet 2)	SECTION 5.5, SCWE.
SCWE-05	A management initiative to respond to concerns in a more timely manner and a statement to workers of what is expected of them when, in their view, too much time has elapsed without having heard of how their concern has been addressed, or they disagree with its disposition. (SCWE Section III.B.3.a, bullet 3)	SECTION 5.5, SCWE.
SCWE-07	Senior management more visible modeling SCWE principles in large meetings and in its routine communications to the workforce. For example, in many NRC-licensed facilities, staff meetings or larger meetings begin with a "safety moment", where senior management conveys a SCWE principle or example from a personal perspective. (SCWE Section III.B.3.a, bullet 5)	SECTION 5.5, SCWE.
SCWE-09	Appropriate, but not excessive, use of confidentiality – consistent with NRC's policy on confidentiality for persons raising issues directly with that agency. (SCWE Section III.B.3.a, bullet 6, 1st subbullet)	SECTION 5.5, SCWE.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
SCWE-10	Appropriate coordination with senior site management with respect to caseload management, including: (1) early coordination with regard to issues involving wrongdoing, personnel issues, or potential safety significance; (2) elimination of the OCRWM Concerns Program practice of providing the concerned individual a copy of its report and recommending corrective action, or sanctions in the case of personnel issues; and (3) definition of the OCRWM Concerns Program's task as finding facts for management consideration and action. (SCWE Section III.B.3.a, bullet 6, 2nd subbullet)	SECTION 5.5, SCWE.
SCWE-13	Assuring communications, particularly those from senior management, regarding the need to meet schedules are balanced with greater emphasis on quality and safety. In this regard, the SCWE at the Project should be enhanced by a more uniform and complete understanding of nuclear safety, and the relationship of current activity to nuclear safety. (SCWE Section III.B.3.a, bullet 9)	SECTION 5.5, SCWE.
SCWE-14	Periodic reinforcement of management's SCWE expectations by publication in site newsletters (for example, congratulating and rewarding an employee or contractor for raising an issue and describing how it was successfully resolved). (SCWE Section III.B.3.a, bullet 10)	SECTION 5.5, SCWE.
SCWE-15	Revised expectations of management performance, and holding DOE and contractor managers and supervisors accountable for SCWE as part of the Performance Evaluation Process (for example, some NRC licensees have "SCWE implementation" as an element on all evaluations for supervisors and above). (SCWE Section III.B.3.a, bullet 11)	SECTION 5.5, SCWE.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
SCWE-16	Clear definition of the additional resources (legal, Human Resources, etc) available to supervisors and others in management to obtain advice and assistance when dealing with challenging employee situations (typically those that involve both protected activity and performance issues). In this regard, consider establishing a designated "rapid response" team of key senior managers and support staff to address emerging personnel issues. (SCWE Section III.B.3.a, bullet 12)	SECTION 5.5, SCWE.
SCWE-17	Train all supervisors and managers on identification and response to employee concerns and particularly possible HIRD. The training should include reinforcing the importance of providing timely feedback to employees and obtaining feedback from employees on the sufficiency of the response. (SCWE Section III.B.3.b)	SECTION 5.5, SCWE.
SCWE-19	DOE management should continue to assist the OCRWM Concerns Manager in reviewing, prioritizing, and addressing the current backlog. (SCWE Section IV.B.2.b)	SECTION 5.5, SCWE.
SCWE-21	Supplement the current GET training with a module specifically focused on SCWE principles as expressed in the recent DOE Policy Statement, and provide this to all incoming personnel, and annually to current personnel. In this regard, updating Licensing and Training – Manager and Supervisor to include DOE's Policy Statement and making it a requirement for all OCRWM personnel could provide acceptable entry-level training. (SCWE Section IV.B.4.b, bullet 1)	SECTION 5.5, SCWE.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
SCWE-22	Provide supervisory training in the identification and response to potential retaliation. Such training should provide tools and techniques to enable supervisors and other managers to perform their duties more effectively (e.g., addressing disciplinary and performance issues, including addressing safety concerns), while avoiding discriminatory conduct and the chilling effect that such conduct may create. (SCWE Section IV.B.4.b, bullet 2)	SECTION 5.5, SCWE.
SCWE-26	a) Identify and collect SCWE PIs and b) Use SCWE PIs to assist management in evaluating the SCWE. (SCWE Section IV.B.8.b)	SECTION 5.5, SCWE.
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Software & modeling results and CAR root cause analysis results and recommendations including root, generic, and common causes. (AOS, page 1, 2nd para., bullet 1)	APPENDIX B. Action Summaries for CARs BSC-01-C-001 and 002, and other recommended actions pertaining to modeling and software are addressed in Appendix B.
CAR 001	The specific actions from CAR BSC-01-C-001 are listed in Appendix B with pointers to the CAR page containing or addressing it. Items in parentheses are amplifications or clarifications of the actual CAR wording.	APPENDIX B, Table B-1.
CAR 002	The specific actions from CAR BSC-01-C-002 are listed in Appendix B with pointers to the CAR page containing or addressing it. Items in parentheses are amplifications or clarifications of the actual CAR wording.	APPENDIX B, Table B-2.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
M/S	Actions to address the recommendations of the Root Cause Analysis Report for CAR BSC-01-C-001 and CAR BSC-01-C-002 are addressed in Appendix B.	APPENDIX B, Table B-3.
SCWE-27	Evaluate the sequence of events associated with the issuance of CAR-01-002 and withdrawal of the initial recommendation to issue a stop work order, and determine any "lessons learned" from the prospective of chilling effect. (Is management sending a mixed message in focusing on the source of the message rather than the message itself?) (SCWE Section IV.B.9.b)	APPENDIX B, Table B-3.
TD-05	Conduct facilitated management off-site sessions with participation, as applicable, from DOE, BSC, the National Laboratories and USGS. In these sessions, document, sign, and communicate a high-level set of common: Project values, Consistent rewards and consequences, and Processes to hold each other accountable. (TD Section 4.2.2.2)	APPENDIX B, Table B-3, M/S-34.
TD-06	Establish a set of performance indicators to track the recommended common and generic corrective actions listed in the RCAR. Set goals, monitor, trend, conduct assessments and take management actions when progress fails to achieve expectations. Communicate goals and progress to all personnel. Report results quarterly to Bechtel corporate management. Bechtel corporate management should challenge the Project's performance and conduct field evaluations to validate the performance. (TD Section 4.2.2.3)	APPENDIX B, Table B-3, M/S-35.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
TD-07	Assess the management and supervisory capabilities of the current BSC organizations (Suggest: DOE consider a parallel management and supervisor capabilities assessment) with emphasis on: management skills (plan, organize, schedule, contract implementation, people development), performance, capability to change and lead change, and nuclear culture and culture change experience. (TD Section 4.3.2.1, 2nd sentence)	APPENDIX B, Table B-3, M/S-19.
TD-08	Where deficiencies are identified in the above assessment, develop and implement a plan to train, mentor, and/or replace project management staff. (Suggestion: Many troubled complex high-risk technical facilities and DOE facilities have used organizational development consultants to facilitate this process). (TD Section 4.3.2.2)	APPENDIX B, Table B-3, M/S-20.
TD-09	Train BSC and DOE organization staff on the requirements of the current contract, set the expectation that the contract will be followed, and hold the management accountable. (TD Section 4.3.2.3)	APPENDIX B, Table B-3, M/S-21.
TD-12	Develop a BSC quality assurance plan that implements the existing contract allowing management assessments and independent assessments, and change the contract to allow BSC to perform surveillances. (TD Section 4.4.2.3)	APPENDIX B, Table B-3, M/S-22.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
TD-13	Benchmark issue management programs at DOE facilities and/or commercial nuclear facilities to identify best practices and revise as appropriate the issue management program (IM). As a minimum: Set a lower threshold for initiation of root cause evaluations, management directed self-assessments and employee self-identification of issues. Establish a senior manager to conduct daily screening and assignment of responsibility for employee self identified issues. Create performance measures for root cause evaluations, self-assessments and employee issues identification, set goals and trend. Conduct an effectiveness review of the revised issues management program and performance measures six months after implementation. (TD Section 4.4.2.4)	APPENDIX B, Table B-3, M/S-23.
TD-14	Communicate and train the Project staff on the issue management program requirements and management expectations for implementation. (TD Section 4.4.2.5)	APPENDIX B, Table B-3, M/S-24.
TD-15	Continue development of an effective issues management trending program for the identification of potential issues. (TD Section 4.4.2.6)	APPENDIX B, Table B-3, M/S-25.
AOS-02	Key decisions and some actions that are proceeding in parallel with, and will be addressed in, the Plan development will be presented at the September 7, 2001 management meeting. Budgets and schedules being realigned to ensure fiscal accountability for quality related work resides with the responsible managers. (AOS, page 1, 5th para., bullet 6)	MII Leadership Team indicated this will not be addressed in MII.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
QAMA-BSC-06	BSC management and users of the Lessons Learned Program should be interviewed to determine how to make the program more useful for them. (QAMA-BSC, Section 3.5 Recommendation 6, 2nd sentence)	The current process for the development of procedures has the required controls for assuring user community input. All affected organizations are required to review any new or revised procedure. Any employee may also initiate a Document Action Request to provide proposed procedural improvements.

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Table A-1. Crosswalk of Source Documents (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED IN MANAGEMENT IMPROVEMENT INITIATIVES
SCWE-18	Assure all identified deficiencies that meet the criteria for inclusion in the CAP are so included. In this regard, management should review the scope and nature of the practice at the National Laboratories of documenting issues in scientific notebooks rather than in the CAP to assure issues recorded are appropriately and timely considered for inclusion in the CAP. (SCWE Section III.B.3.c)	In November 2001, DOE Navarro Quality Services authored a scientific notebook white paper, Report on the Increase in Problems with Scientific Notebooks for the Director, Office of Quality Assurance. The following were identified as the scope of the report: 1) potential causes and types of problems recently identified with Scientific Notebooks; 2) potential negative impact on the usability of the Scientific Notebooks. The Navarro white paper recommendations and also the results of a recent surveillance, conducted by DOE OQA, are addressed in the current proposed revision to the BSC Scientific Notebook Procedure. The formal BSC review is complete and comment resolution is underway with anticipated completion and effective date for the revised procedure by Sept 1, 2002. this revision addresses the problems identified with the Scientific Notebook process in the past.

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Table A-2. List of Documents

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AOS	Brownstein, A. 2001. "Expected DOE Actions In Response to QA Issues. (8/30/01) DOE August 2001 Off-site." Facsimile from A. Brownstein (DOE/OCRWM) to D. Horton (DOE/YMSCO), September 6, 2001. ACC: MOL.20020408.0233
CAR 001	OCRWM 2001. Corrective Action Report BSC-01-C-001. Validation (Confidence Building) of Analyses and Models is Not Being Documented in Accordance with AP-3.10Q. Records from May 3, 2001 to July 9, 2002.
CAR 002	OCRWM 2001. Corrective Action Report BSC-01-C-002. Inadequate implementation of Supplement I Software Quality Assurance Requirements. Records from June 12, 2001 to July 9, 2002.
LL	OCRWM 2002. Yucca Mountain Project Evaluates Past Initiatives To Help Ensure Future Success. OCRWM-LL-2002-026, April 30, 2002.
M/S	Metta, S. and Hosmer, J. 2001. <i>Root Cause Analysis Report for CAR BSC-01-C-001, CAR BSC-01-C-002, Rev 01, August 8, 2001.</i> Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20011023.0447.
MP-TSPA	Williams, N.H., 2001. "Transmittal of Management Plan for TSPA-SR and Other Continuing Quality Issues, Revision 2 – Proposed Response to Nuclear Regulatory Commission May 17, 2001, Letter regarding Quality Assurance and Performance Assessment Issues." Letter from N.H. Williams (BSC) to S.J. Brocoum (DOE/YMSCO), July 06, 2001. ACC: MOL.20010910.0323.
NRC1	Reamer, C. 2001. "Minutes of the September 6, 2001 Quality Assurance and Key Technical Issues Status Management Meeting." Letter from C. Reamer (NRC) to R. Murthy (DOE/OCRWM), September 24, 2001. ACC: MOL.20011214.0172
NRC2	Reamer, C. 2001. "Meeting Summaries for the December 5, 2001 QA and Key Technical Issue Status Management Meetings." Letter from C. Reamer (NRC) to R. Murthy (DOE/OCRWM), December 20, 2001. ACC: MOL.20020327.0682.
NRC3	Meserve, R.A., 2001. "Preliminary Comments of the U.S. Nuclear Regulatory Commission (NRC) Regarding a Possible Geologic Repository at Yucca Mountain, Nevada." Letter from R.A. Meserve (NRC) to R.G. Card (DOE), November 13, 2001. ACC: MOL.20020204.0275.
OCP	Voltura, N. 2002. "OCRWM Concern Program Trend Report for 2001 and 2002." Memorandum from N. Voltura (DOE/OCRWM) to J. Ziegler (DOE/YMSCO), April 5, 2002. ACC: MOL.20020509.0244

Table A-2. List of Documents (Continued)

OMII	OCRWM, 2002. Yucca Mountain Project (YMP) Evaluates the Development and Submittal Process of OCRWM Management Improvements Initiative (OMII) to the Nuclear Regulatory Commission (NRC). OCRWM-LL-2002-066, July 2, 2002
QAMA	DOE 2001. <i>Office of Civilian Radioactive Waste Management Quality Assurance Management Assessment Report Fiscal Year 2001</i> , Final Report, September 15, 2001. ACC: MOL.20020110.0010.
QAMA-BSC	Barrett, L.H. 2001. "FY 2001 Quality Assurance Management Assessment (QAMA) Interim Report of the Management and Operating (M&O) Contractor." Letter from L. H. Barrett (DOE/OCRWM) to K. Hess (BSC), October 24, 2001. ACC: MOL.20020110.0007.
SCWE	Morgan et al. 2001. <i>Safety Conscious Work Environment Final Report</i> , U.S. Department of Energy, Contract Number DE-AC08-01RW12154, Morgan, Lewis & Bockius LLP, Washington, DC, August 28, 2001 (redacted version). ACC: MOL.20020529.0050
TD	King, J. and Hosmer, J. 2001. <i>Root Cause Analysis Report For Yucca Mountain Project Technical Document Deficiencies August 17, 2001</i> . Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20011023.0449.

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**APPENDIX B**

**ACTION SUMMARIES FOR CARs BSC-01-C-001 AND 002, AND OTHER  
RECOMMENDED ACTIONS PERTAINING TO MODELING AND SOFTWARE**



**APPENDIX B**

**ACTION SUMMARIES FOR CARs BSC-01-C-001 AND 002, AND OTHER  
RECOMMENDED ACTIONS PERTAINING TO MODELING AND SOFTWARE**

**Index:**

Table B-1. Action Summary for BSC-01-C-001

Table B-2. Action Summary for BSC-01-C-002

Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software

**CAR 001: Improve Quality-Related Model Validation Processes**

**Objective:** The CAR is indicative of a failure of management to either provide effective controls and/or to manage the implementation of approved processes and procedures in the performance of quality-affecting work to the QARD. The CAR specifically addressed the lack of consistent implementation of the procedure requirements for model validation during the preparation of Analysis and Model Reports (AMRs) for Site Recommendation. The objective of this Action Summary is to improve the management and implementation of model development such that the models used to support the License Application are validated for their use in demonstrating the post-closure performance of the Yucca Mountain repository in accordance with 10 CFR 63.

**Current Condition (as of the CAR issue date)**

Based on the number of past Deficiency Reports and Corrective Action Requests, there is a lack of consistent implementation of model validation procedure requirements.

- The modeling procedure (AP-3.10Q) is not consistently followed, nor is that requirement enforced through consequences for noncompliance.
- There is no BSC functional owner of the modeling process, resulting in conflicting interpretations of procedure requirements.
- The training on the modeling procedure was not effective.
- Self-identification of model validation problems and effective resolution did not occur.

**Desired Condition**

- Modeling implementing procedures are adhered to and individuals are held accountable for procedural compliance.
- Model developers are trained properly.
- Model development problems are self-identified and evaluated to identify process improvements/clarifications as appropriate.
- A single individual has ownership and accountability for the modeling process (procedure).

Table B-1. Action Summary for BSC-01-C-001 (Continued)

**Approach**

The planned improvement approach includes:

- Assigning the responsibility for functional management (ownership) of the modeling process to the Chief Science Office as the focal point for model validation criteria and the formal procedure interpretive authority for acceptable model validation.
- Replacing the governing procedure for model development with revised and augmented procedures that separate analyses from models, further define requirements and criteria for model validation, and include involvement of the CSO in the planning and execution of model validation.
- Developing and implementing effective training on the new model validation requirements.
- Increased self-identification of model validation problems.
- Enforcing established administrative policies that address personnel accountability to encourage adherence to procedures.
- Monitoring the effectiveness of the process changes through self-assessments.

Table B-1. Action Summary for BSC-01-C-001 (Continued)

**CAR BSC-01-C-001 Actions**

Action Statement	Comment	Target Date	Contact
<b>Immediate Actions</b>			
1. Bechtel senior management team to provide recommendations to the BSC General Manager and Manager of Projects on process improvements for corrective actions. [1 June 2001 Initial Response Block 14a, Page 1 of 3]		Complete	K. Hess
2. Develop amended actions for Block 15 (Extent of Condition) and Block 17 (Action to Preclude Recurrence) of DRs LVMO-00-D-119, LVMO-01-D-007 & BSC-01-D-050 and submit to OQA. [1 June 2001 Initial Response, Block 14a, Page 1 of 3]	Actions for these DRs included the Model Validation Status Review (MVSR), unique identification for each model and the identification of deficient models. No further action for CAR in these areas as all actions are documented in the DRs and determined to be complete by OQA verification. NOTE: The MVSR included the list of deficient models. (defined in MVSR as Bin 2 & 3 models)	Complete – amended responses for DRs accepted by OQA.	W. Watson
3. BSC senior management team to organize a root cause team, including off-project personnel. [1 June 2001 Initial Response, Block 14a, Page 1 of 3]	Documented in the resumes included in the <i>Root Cause Analysis for CAR BSC-01-C-001 and CAR BSC-01-C-002</i> , submitted in the 9 August 2001 Amended Initial Response	Complete	N. Williams
<b>Remedial Actions</b>			
4. Model validation issues in MVSR Bin 2 and 3 were documented as technical product errors (TER) in accordance with procedure AP-15.3Q. [22 March 2002 Amended Complete Response, Block 14, Page 2 of 6]	The TERs track each individual model through the final resolution of model validation issues during development of the LA. Final resolution under AP-15.3Q will be the disposition of the individual Bin 2 and 3 models.  *Effectiveness will be evaluated during the normal QA audit/surveillance process by OQA.	Complete – TERs issued. See TER log per procedure AP-15.3Q.	W. Watson

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Table B-1. Action Summary for BSC-01-C-001 (Continued)

Action Statement	Comment	Target Date	Contact
<b>Actions to Preclude Recurrence</b>			
<p>5. Complete the corrective actions described in the Complete Response to DRs LVMO-00-D-119, LVMO-01-D-007 and BSC-01-D-050. [15 February 2002 Complete Response, Block 17, page 4 of 7]</p>	<p>These corrective actions include actions such as replacement of the modeling procedure AP-3.10Q, <i>Analyses and Models</i>, by AP-SIII.9Q, <i>Scientific Analyses</i>, &amp; AP-SIII.10Q, <i>Models</i>, and development of training on AP-SIII.10Q. The 15 February 2002 Complete Response, included the description of corrective actions from the DRs for completeness.</p> <p>Inherent in the issuance of the new procedures as committed to in the DRS was the establishment of the CSO as the functional manager.</p> <p>The training included attendance by CSO and Science and Analysis Project Management.</p> <p>*Effectiveness will be evaluated during the normal QA audit/surveillance process by OQA.</p>	<p>Complete – all actions are documented in the DRs and determined to be complete by OQA verification. See OQA closure package records for the subject DRs.</p>	<p>W. Watson</p>
<p>6. Science and Analysis Project planning direction to staff included a template of required planning activities to ensure that schedules by BSC encompasses model development (including validation) and model report document preparation, checking, review and approval. [15 February 2002 Complete Response, Block 17, Page 5 of 7]</p>	<p>The template was used to develop Plan B and ensure that modeling activities were appropriately scheduled for the LA. The current schedule for license application model development (which includes model validation) is shown on the project baseline P3 schedule.</p>	<p>Completed – included in Plan B BCP submitted in March 2002.</p>	<p>R. Andrews</p>
<p>7. BSC self-identification of model validation problems will occur in real-time. [15 February 2002 Complete Response, Block 17, Page 5 of 7]</p>	<p>This action is an inherent aspect of the CSO review of in-process model development required by the new modeling procedure.</p>	<p>4/16/04</p>	<p>M. Voegele</p>

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Table B-1. Action Summary for BSC-01-C-001 (Continued)

Action Statement	Comment	Target Date	Contact
8. Self-assessments will be conducted during the development and documentation of the License Application (LA) models. [22 March 2002 Amended Complete Response, Block 17, Page 5 of 6]	Self-assessments will be conducted by the CSO during the development and validation of the LA model as an on-going effort.	4/16/04	M. Voegele
9. Procedure AP-SIII.10Q will be added to the CSO training matrix. [22 March 2002 Amended Complete Response, Block 17, Page 6 of 6]	The training completed as part of the corrective actions for DRs 119, 070, and 050 was focused on the differences between the new and old modeling procedure. New training is being developed as 'stand-alone' training on AP-SIII.10Q.	9/15/2002	M. Voegele
10. The performance indicators developed by CSO from the review of TWPs and draft model validation documentation will provide a means for CSO and Line Management to assess the effectiveness of the self-identification and issue management processes. [26 April 2002 Amended Complete Response, Block 8, Page 6 of 7]		4/16/04	M. Voegele
<b>Other Actions Contained in CAR Response</b>			
11. An additional evaluation of the cumulative impact of Bin 3 models will be performed and documented in a revision to the MVSR. [22 March 2002 Amended Complete Response, Block 15, Page 2 of 6]		4/16/04	J. Younker

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Table B-1. Action Summary for BSC-01-C-001 (Continued)

Action Statement	Comment	Target Date	Contact
12. Review new AMRs or revisions to existing AMRs issued between 11 June 2001 (date of records review that identified AMRs for the MSVR) and 21 December 2001 (effective date of AP-SIII.10Q). Review any new models found for compliance with the then current version of the modeling procedure and issue TERs on any deficient models. Document the results of this additional extent of condition and submit to OQA. [22 March 2002 Amended Complete Response, Block 15, Page 2 of 6]	Reviews found no additional models beyond that identified in DIR 02-07 (see 22 March 2002 Amended Complete Response Block 15 for details of DIR).  See 26 April 2002 Amended Complete Response, Block 4 (Extent of Condition) for results of the review.	Complete – documented in 26 April 2002 Amended Complete Response, Block 4.	N. Williams

Responsible Manager

  
 Nancy Williams (702) 295-5143

Date 7/18/02

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**CAR 002: Improve Quality-Related Software Management Processes**

**Objective:** The CAR is indicative of a failure of management to either provide effective controls and/or to manage the implementation of approved processes and procedures in the performance of quality-affecting work to the QARD. The CAR specifically addressed the lack of an effective Independent Verification and Validation (IV&V) process, failure to withdraw and/or use codes from SCM, lack of supplemental procedures, and the lack of effective training and implementation with regard to software development. The existing software procedure will be augmented with supplemental procedures to address the lack of an effective IV&V process, and the lack of supplemental procedures. Management has communicated the expectation for procedural compliance to address the failure to withdraw and/or use codes from SCM. Training will be provided on the new supplemental procedures to address the lack of effective training and implementation with regard to software development. When the above actions are completed, the effectiveness of the process changes will be assessed by a self-assessment on software developed under the new procedures.

**Current Condition (As of the CAR issue date)**

Based on the number of past Deficiency Reports and Corrective Action Requests, there is a lack of effective management of the software processes.

- Procedures are not consistently followed nor is that requirement enforced through consequences for noncompliance.
- Software professionals are not utilized effectively during software development, software documentation, and software qualification to ensure that the final qualification documentation is adequate.
- No supplemental procedures are in place to provide additional and necessary software development controls.
- The procedure was owned by DOE during the period covered by the CAR findings instead of the M&O (implementing organization).

**Desired Condition**

- Adherence to the software management implementing procedures and holding individuals accountable for procedural compliance.
- Qualified software developers are jointly involved in the development and IV&V processes.



Table B-2. Action Summary for BSC-01-C-002 (Continued)

- Supplemental procedures are issued to provide additional software management controls.
- A single individual has ownership and accountability for the procedures that govern the management of software.

**Approach**

The planned improvement approach includes:

- Revising the governing procedure for software management and create supplemental procedures to further control software management and the IVV processes.
- Enforcing established administrative policies that address personnel accountability to encourage adherence to procedures.
- Assigning an individual within BSC to be the "owner" of AP-SI.1Q and any additional software-related supplemental procedures.
- Monitoring the effectiveness of the process changes through self-assessments.

Table B-2. Action Summary for BSC-01-C-002 (Continued)

**CAR BSC-01-C-002 Actions**

Action Statement	Comment	Target Date	Contact
<b>Immediate Actions</b>			
1. Prior to the issuing of CAR YMSCO-01-C002, BSC senior management initiated action and presented information to corporate sponsors. [6/26/01 Initial Response, Block 14a, Page 1 of 2]		Complete	K. Hess
2. Bechtel Corporate Executives supported the actions and mobilized to Las Vegas a senior management team composed of personnel with extensive commercial nuclear experience. The team's objectives were to review BSC actions underway and provide additional corporate resources if necessary. [6/26/01 Initial Response, Block 14a, Page 1 of 2]		Complete	K. Hess
3. An independent root cause team including off-project personnel experienced in root cause determination was organized prior to the initiation of the CAR in response to apparent software compliance issues such as LMVO-00-D-099. [6/26/01 Initial Response, Block 14a, Page 1 of 2]		Complete	K. Hess

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Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
4. Also, during the week of 4 June 2001, the General Manager of BSC issued a limited management stand-down on software development. [6/26/01 Initial Response, Block 14a, Page 1 of 2]		Complete	K.Hess
5. No new software development or modification may take place during the stand-down unless specific exemptions are granted on a case-by-case basis. [6/26/01 Initial Response, Block 14a, Page 1 of 2]	Software Stand-down is still in effect.	10/1/02	K. Hess
6. The stand-down will be lifted when the following conditions are satisfied: 1) Completion of 3-tiered training on Software Management procedure AP-SI.1Q, Rev 3, ICN 1; 2) Completion of the root cause determination to ensure that all contributing factors are known; 3) Satisfactory resolution of factors identified in the root cause determination that would be needed to ensure that software development is carried out in compliance with AP-SI.1Q. [6/26/01 Initial Response, Block 14a, Page 1 of 2]		10/1/02	K. Hess

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Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
<b>Remedial Actions</b>			
7. The software items that were identified in CAR-002 (for Lack of Supplemental Procedures) and the completed remedial actions are listed in CAR-002, Table 2. User request forms were prepared and submitted for the two deficient items. [6/11/02 Complete Response, Block 6, Page 7 of 25]	This required the submittal of two Software User Requests.	Complete	M. Jaeger
<b>Actions to Preclude Recurrence</b>			
8. The actions to preclude recurrence for BSC-01-C-002 will be assessed for their effectiveness by a self-assessment on software developed under the new procedures. [6/11/02 Complete Response, Block 8, Page 9 of 25]	Inherent to the self-assessment process is establishment of a set of performance indicators that measure the effectiveness of the revised software development process.	12/1/03	M. Jaeger
9. Procedure improvements will preclude installation problems. [6/11/02 Complete Response, Block 8, Page 9 of 25]		10/1/02	P. Thompson
10. AP-SI.1Q will be revised and new supplemental procedures will be issued in support of it. The revised processes will provide for clear identification of procedural roles, responsibilities, and authorities relative to software management requirements. [6/11/02 Complete Response, Block 8, Pages 9 and 10 of 25]		10/1/02	P. Thompson

Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
11. The software procedures will better define IV&V requirements. [6/11/02 Complete Response, Block 8, Page 9 of 25]		10/1/02	P. Thompson
12. The AP-SI.1Q procedure change will address the interfaces between organizations. [6/11/02 Complete Response, Block 8, Page 10 of 25]		10/1/02	P. Thompson
13. Supplemental procedures will be developed to address software development and software IV&V. [6/11/02 Complete Response, Block 8, Page 10 of 25]		10/1/02	P. Thompson
14. The SCM Tool will provide the additional configuration management controls necessary to preclude recurrence of installation problems. [6/11/02 Complete Response, Block 8, Page 9 of 25]		10/1/02	S. Splawn
15. AP-SI.1Q will be revised to require that applicable software development/qualification documentation be signed by software professional(s) identified by the BSC CIO. [6/11/02 Complete Response, Block 8, Page 10 of 25]		10/1/02	P. Thompson

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Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
<p>16. The responsibility and ownership for AP-SI.1Q was transferred from DOE to BSC. BSC has identified the Chief Information Officer (CIO) as the functional manager who owns the procedure. [6/11/02 Complete Response, Block 8, Page 10 of 25]</p>		Complete	K. Hess
<p>17. BSC and DOE recognize the lack of procedural compliance was an important casual factor. DOE took the following actions to ensure that the expectation of compliance is well communicated: a Yucca Mountain Site Characterization Project (YMP) Announcement was posted by Russ Dyer, DOE Project Manager (4/16/02), establishing firm commitment to procedural compliance and action/escalation steps to be taken if procedural compliance became a problem. [6/11/02 Complete Response, Block 8, Page 10 of 25]</p>		Completed	R. Dyer

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Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
<p>18. BSC and DOE recognize the lack of procedural compliance was an important casual factor. BSC took the following actions to ensure that the expectation of compliance is well communicated: A BSC Today announcement was posted 12/4/01 establishing a firm commitment to procedural compliance and action/escalation steps to be taken if procedural compliance became a problem. BSC issued POL-HR-031, <i>Progressive Discipline Guidelines for Non-Bargaining Employees</i>. [6/11/02 Complete Response, Block 8, Page 10 of 25]</p>		Completed	K. Hess
<p>19. BSC Project management is working with DOE, the National Labs and USGS to ensure that personnel performance issues are addressed appropriately and quickly in accordance with each organization's policies and procedures. BSC will establish policies and/or guidance to consistently identify and implement appropriate action for compliance problems. [6/11/02 Complete Response, Block 8, Page 10 of 25]</p>		8/1/02	M. Voegele

Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
20. A revision to AP-SI.1Q and development of new associated supplemental procedures is in progress. The revised processes will provide for clear identification of procedural roles, responsibilities, and authorities relative to software management requirements. Training of the procedure (new AP-SI.1Q and supplemental procedures) users and responsible managers will specifically emphasize these R2A2 provisions. [6/11/02 Complete Response, Block 8, Page 10 of 25]	This action is considered complete (target date) when the course is prepared and ready to give to OCRWM personnel.	9/1/02	P. Turner



Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
<p>21. The Chief Information Officer (CIO), as procedure owner, will support the BSC Training Department in their development of the training courses that will be used to train project personnel on the new software procedures and ensure that the training content is effective. The training program will ensure that the individuals involved in the development of software are fully aware of the roles, responsibilities, authority and accountability (R2A2). A portion of the training given on the new and revised procedures will emphasize the preparation of the software qualification package and that the individual preparers will be held accountable for the final quality of the submitted package. This training will be provided with the support of Subject Matter Experts (SMEs). The questions from the attendees and appropriate answers will be documented and shared with other procedure users in accordance with the BSC Training Department's standard processes. [6/11/02 Complete Response, Block 8, Page 10 of 25]</p>	<p>This action is considered complete (target date) when the course is prepared and ready to give to OCRWM personnel.</p>	<p>9/1/02</p>	<p>P. Turner</p>

Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
<p>22. Training will be scheduled at YMP locations prior to the effective date of the new procedures so that as many personnel as possible are trained during this period. Courses will be scheduled, as required, to train personnel. Software users (of software in the Baseline), developers, reviewers, verifiers, senior and middle-level managers will be required to attend the training prior to performing work covered under the procedure. At the conclusion of the training, in accordance with standard BSC Training Department processes, a test will be given to the attendees to evaluate the effectiveness of the training. [6/11/02 Complete Response, Block 8, Page 11 of 25]</p>	<p>This action is considered complete (target date) when the course is prepared and ready to give to OCRWM personnel.</p>	<p>9/1/02</p>	<p>P. Turner</p>
<p>23. Effectiveness of the training will be evaluated through self-assessments. [6/11/02 Complete Response, Block 8, Page 11 of 25]</p>	<p>YMP staff who develop Q software must attend the course prior to the effective date of the procedure or prior to developing software. The self-assessments will begin after the effective date of the procedure.</p>	<p>12/1/02</p>	<p>N. Williams</p>
<p>24. Improved SDN trending will provide a method to identify programmatic issues to include in the project issue management programs. [6/11/02 Complete Response, Block 8, Page 9 of 25]</p>		<p>10/1/02</p>	<p>D. Tommela</p>

Table B-2. Action Summary for BSC-01-C-002 (Continued)

Action Statement	Comment	Target Date	Contact
<b>Other Actions Contained in Car Response</b>			
25. BSC Quality Assurance department will perform a surveillance on a sample of the software on the baseline to independently verify the software performs correctly. Any functionality problems will be evaluated via the SDN process. Responses to CAR-002 will be amended if necessary. [6/11/02 Complete Response, Block 4, Page 3 of 25]		9/30/02	D. Krishna

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Responsible Manager  / Date 7/18/02  
 Nancy Williams (702) 295-5143

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
AOS-01	Develop a comprehensive DOE/Contractor plan (Performance Improvement Transition Plan) (the "Plan") to drive a transition to a level of performance necessary to prepare for the potential pursuit of a license to construct the repository. (Submit to NRC December 15, 2001). The Plan will specifically address: Software & modeling results and CAR root cause analysis results and recommendations including root, generic, and common causes. (AOS, page 1, 2nd para., bullet 1)	Action Summaries for CARs BSC-01-C-001 and 002, and other recommended actions pertaining to modeling and software are addressed in this table.
M/S-01	(Remedial) Ensure timely completion of the Model Validation Review: (M/S Section 4.7.1)	Appendix B, Table B-1 (CAR-001), Action 2
M/S-02	(RC-1, RC-2, RC-3) Establish a functional manager who owns the modeling process in BSC. The owner will, establish binding technical and quality requirements for AP-3.10Q implementation, define model validation acceptance criteria for both engineering and scientific models, establish a single timely communication and feedback process (for completed AMRs and questions during AMR development), implement an effective disagreement escalation and resolution process, and establish minimum training and experience requirements for model developers. The owner must be (Note: this may require several qualified persons): technically qualified in modeling, able to understand interpret NRC model validation expectations, able to build an effective working relationship with NRC staff, knowledgeable of QA program requirements, and competent in project management skills. (M/S Section 4.7.2)	Appendix B, Table B-1 (CAR-001), Action 5 The criteria for the "owner" in the second part of the recommended actions are not discussed in the CAR response. BSC assigns the functional managers, such as the CSO, the responsibility to select and assign personnel to perform tasks with knowledge, skills and experience commensurate with the task assigned. Therefore no additional commitment in the CAR response is required to assure the correct person(s) are assigned by the CSO to this task.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-03	(RC-5) Review and revise AP-3.10Q to incorporate results of the Model Validation Review cited above. Provide specific go/no-go model validation criteria as well as a decision process for use when bounding criteria are impossible to provide in advance. (M/S Section 4.7.3)	Appendix B, Table B-1 (CAR-001), Action 5 Although the model validation CAR response did not specifically discuss this issue, AP-SIII.10Q has been developed and issued with specific criteria on model-validation and on the use of models within their bounds. The CSO review effort on draft model validation documentation provides a "go/no go" determination.
M/S-04	(RC-5) Establish and charter a model development and application users group whose members include the affected organizations. Its purpose should be to ensure model developers and users are involved in process development and consistent application of requirements. (M/S Section 4.7.4)	Appendix B, Table B-1 (CAR-001), Action 5 Although not specifically discussed, the discussion of roles, responsibilities, authority and accountability in Block 8 noted that the revised procedural process of AP-SIII.10Q was determined to be more appropriate than the mentoring approach to model validation that was the focus of this recommended action.
M/S-05	(RC-1) Establish a website to capture modeling/interpretation guidance for access by affected individuals and groups. The web site should contain: compliance information and guidance, frequently asked questions and answers, and lessons learned and good practices pertaining to the modeling process. (M/S Section 4.7.5)	Appendix B, Table B-1 (CAR-001), Action 5 This recommendation will not be implemented as stated. This is a "mentoring" approach rather than a proceduralized "plan, review, implement plan and confirm approach." The new procedure AP-SIII.10Q implements the latter approach.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-06	(RC-6) Define, design and deliver additional training necessary to implement AP-3.10Q. Include modelers, reviewers, checkers, managers, QA personnel, and contractors involved with modeling. Use the Systematic Approach To Training (SAT) process (or equivalent), including proficiency evaluation. (M/S Section 4.7.6)	Appendix B, Table B-1 (CAR-001), Action 5 The approach contained in Systematic Approach to Training was used as a guide in the development of the training program on the new procedure.
M/S-07	(RC-1, RC-3, RC-5) Functional owner should conduct mentoring and assistance visits with model developers at several stages of model development. Communicate the need for changes and assist in their accomplishment. Involve a mix of Subject Matter Experts (SME) committed to success. Report questions and their resolution on the website. (M/S Section 4.7.7)	Appendix B, Table B-1 (CAR-001), Action 5 This is a "mentoring" approach rather than a proceduralized "plan, review, implement plan and confirm approach." The new procedure AP-SIII.10Q implements the latter approach.
M/S-08	(RC-3) Establish and enforce an integrated, resource-loaded baseline schedule for remaining AMR preparation and delivery, that explicitly provides adequate schedule durations and resources. (M/S Section 4.7.8)	Appendix B, Table B-1 (CAR-001), Action 6 Completed – The Performance Assessment Project integrated resource-loaded baseline schedule was included in the Plan B BCP submittal.
M/S-09	(RC-4) At regular intervals, perform focused self-assessments of the model development, validation, and approval process (M/S Section 4.7.9)	Appendix B, Table B-1 (CAR-001), Action 8
M/S-10	Establish a set of performance indicators, and perform assessments that will measure the effectiveness of corrective actions and the effectiveness of the modeling process. (M/S Section 4.7.10)	Appendix B, Table B-1 (CAR-001), Action 9

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-11	(RC-1, RC-2, RC-3) Establish a functional manager as owner of the software process in BSC. The owner will: establish binding requirements for software procedure(s) implementation, benchmark the Project software procedure against other DOE M&O software procedures, establish a timely communication and feedback process incorporating both positive and negative feedback to software developers, implement an effective disagreement escalation and resolution process, and establish minimum training and/or experience requirements for software developers. The owner (or designees) must be: technically qualified in software development, knowledgeable of QA program requirements, and competent in project management skills. (M/S Section 5.4.1)	<p>Appendix B, Table B-2 (CAR-002), Action 16                      The CAR response identifies the functional manager in Block 8, Lack of Supplemental Procedures. The procedure will be developed under the AP-5.1Q process that includes an effective disagreement escalation and resolution process.</p> <p>Although the other issues that are associated with benchmarking, procedure development, and minimum training/experience requirements for software developers are not discussed, the recommendations are addressed as part of existing project procedures.</p> <p>The criteria for the "owner" in the second part of the recommended actions are not discussed in the CAR response. BSC assigns functional managers, such as the CIO, the responsibility to select and assign personnel to perform tasks with knowledge, skills and experience commensurate with the task assigned. Therefore no additional commitment in the CAR response is required to assure the correct person(s) are assigned by the BSC CIO to this task.</p>

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-12	(RC-2, RC-3) Subdivide AP-S1.1Q, then implement the QARD Supplement 1, Software requirements in a series of implementing procedures that: use a graded approach in the software process to establish the major applications, routines, and macros that must be qualified, use a graded approach in the software process that considers differences between business software engineering design and scientific research code development, conduct user validation before implementation, perform a readiness review before implementation, are consistent with the Carnegie Mellon University Software Engineering Institute Capability Maturity Model, clearly identify points-of-contact for questions concerning the procedure, and address maintenance/operational/implementation and retirement. Areas the software process owner should consider when subdividing AP-S1.1Q include: requirements management, configuration management, software quality assurance, project planning and tracking, subcontract management, testing and validation, documentation, coding, and software development. (M/S Section 5.4.2)	Appendix B, Table B-2 (CAR-002), Action 13 The CAR response includes a commitment in Block 8, Lack of Supplemental Procedures, to issue supplemental procedures along with a revision to AP-S1.1Q. The additional detailed requirements such as a graded approach will be considered as part of the development of the revised procedure(s), although the specific details may differ from the recommendation as the procedures are finalized.
M/S-13	(RC-3) Produce a web site to capture software process guidance for access by all affected individuals and groups. The web site should contain: compliance information and guidance, frequently asked questions and answers, software development/installation/compliance checklist (e.g., NWI-CM-001Q), and, lessons learned and good practices pertaining to the software process. (M/S Section 5.4.3)	Exception - While a web site currently exists, the continuation of the web site is not a condition for success of the revised procedure. Although the CAR does not discuss the use of a web site, the BSC CIO has held periodic, project-wide meetings to communicate issues addressed by the recommendation.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-14	(RC-3) Establish a software users' group with a defined charter, whose members include the National Laboratories, USGS, and BSC. The software users' group should create software-coding guidelines as appropriate for each computer language used. The users group should understand and make recommendations to control the number of platforms and operating systems. (M/S Section 5.4.4)	Appendix B, Table B-2 (CAR-002), Action 15 The CAR response commits to the involvement of software professionals in the software development, document preparation, and qualification process. This has been determined to be more appropriate than a software user group.
M/S-15	(RC-1, RC-2, RC-3) Following Corrective Action No. 2, establish a short term team of subject matter experts from the user group and trainers to visit software development locations to communicate the reasons for procedure change and assist in change management. Team members must be: a mix of subject matter experts from the affected organizations, available after the initial implementation to follow-up and mentor the software developers, committed to success, and fully supported by senior management. (M/S Section 5.4.5)	Appendix B, Table B-2 (CAR-002), Action 15 During the initial effort to develop supplemental procedures, a short-term team held meetings at software development locations. Since those meetings, a revision to the draft procedures was initiated. Additional communications with the developer community will continue as AP-5.1Q is implemented for the review of the proposed procedures.  In addition, the CAR identifies actions to prevent recurrence that includes the use of CIO assigned subject matter experts to support the developer community.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-16	(RC-2, RC-3) Ensure that effective documentation and compliance staff support is available to the software developers to assist with documentation requirements and installation dry runs. Conduct a lessons learned forum among compliance support groups from the National Laboratories, USGS, and BSC to establish and implement best practices. (M/S Section 5.4.6)	Appendix B, Table B-2 (CAR-002), Action 8 An action to support the developer community with subject matter experts is included in the CAR response as a long term commitment. Self-assessments are planned to evaluate the effectiveness of the corrective actions. Documenting lessons learned or initiating corrective actions for findings is inherent in the self-assessment process.
M/S-17	(RC-1) Establish an enterprise architecture that controls the number of platforms and operating systems the Project needs to support. This needs to be supported and acceptable to the scientific, and engineering interest on the Project. (M/S Section 5.4.7)	Exception - The number of platforms and operating systems in use on the Yucca Mountain Site Characterization Project is not germane to the deficiencies identified in the software CAR; as an example, compliance with procedures is not a function of the number of operating systems, programming languages, types of computers, etc. The issues associated with the number of platforms and operating systems are business decisions to be made by Project Management and not part of the CAR.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-18	Establish a set of performance indicators, and perform assessments that will measure the effectiveness of corrective actions and the effectiveness of the modeling (sic) process. (M/S Section 5.4.8)	Appendix B, Table B-2 (CAR-002), Action 8 The CAR includes a commitment to perform a self-assessment to measure the effectiveness of the corrective actions for the software process. As part of that process, performance indicators will be established as a basis to measure the effectiveness of the corrective actions. The broader issue of project performance indicators to measure progress are included in the MII, Section 6, Management Approach.
M/S-19	Assess the management and supervisory capabilities of the current BSC organizations (Suggest: DOE consider a parallel management and supervisor capabilities assessment) with emphasis on: management skills (plans, organize, schedule, contract implementation, people development), performance, capability to change and lead change, and nuclear culture and culture change experience. (M/S Section 6.1.2.1)	Section 6, Management Approach, of the MII discusses a Management Alignment Plan which will ensure the YMP management team is equipped and aligned as necessary to implement the needed cultural changes.
M/S-20	Where deficiencies are identified in the above assessment, develop and implement a plan to train, mentor, and/or replace Project management staff. (Suggestion: Many troubled complex high-risk technical facilities and DOE facilities have used organizational development consultants to facilitate this process.) (M/S Section 6.1.2.2)	Section 6, Management Approach, of the MII discusses a Management Alignment Plan which will ensure the YMP management team is equipped and aligned as necessary to implement the needed cultural changes.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-21	Train BSC and DOE organizational staff on the requirements of the current contract, set the expectation that the contract will be followed, and hold the management accountable. (M/S Section 6.1.2.3)	Section 5.1 of the MII discusses actions being taken to clarify Program Roles, Responsibilities, Authority, and Accountability, including execution of the BSC contract.
M/S-22	Develop a BSC quality assurance plan that implements the existing contract allowing management assessments and independent assessments, and change the contract to allow BSC to perform surveillances. (M/S Section 6.1.6.1)	Section 5.1 of the MII discusses actions being taken to clarify Program Roles, Responsibilities, Authority, and Accountability.
M/S-23	Benchmark issues management programs at DOE facilities and/or commercial nuclear facilities to identify best practices and revise, as appropriate, the issue management program (IM). As a minimum: set a lower threshold for initiation of root cause evaluations, management directed self-assessments and employee self identification of issues, establish a senior manager to conduct daily screening and assignment of responsibility for employee self identification of issues, create performance measures for root cause evaluations, self assessments and employee issues identification, set goals and trend, and conduct an effectiveness review of the revised IM program and performance measures six months after implementation. (M/S Section 6.1.6.2)	Section 5.4 of the MII discusses actions being taken to improve the Corrective Action Program, including issues management.
M/S-24	Communicate and train the Project staff on the issue management program requirements and management expectations for implementation. (M/S Section 6.1.6.3)	Section 5.4 of the MII discusses actions being taken to improve the Corrective Action Program, including issues management.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-25	Continue development of an effective issues management trending program for the identification of potential issues. (M/S Section 6.1.6.4)	Section 5.4 of the MII discusses actions taken to improve the Corrective Action Program, including issues management.
M/S-26	Transfer to BSC ownership of all APs for which BSC, the National Laboratories, and USGS perform the work, including AP-5.1Q, <i>Plan and Procedure Preparation, Review, and Approval</i> . (M/S Section 6.1.8.1)	Section 5.3 of the MII discusses actions taken to improve Program Procedures.
M/S-27	Appoint a BSC functional manager to own each AP including AP-5.1Q. (M/S Section 6.1.8.2)	Section 5.3 of the MII discusses actions taken to improve Program Procedures.
M/S-28	Benchmark procedure programs at DOE facilities and/or commercial nuclear facilities to identify best procedure development and control practices. (M/S Section 6.1.8.3)	Section 5.3 of the MII discusses actions taken to improve Program Procedures.
M/S-29	DOE and BSC define and agree to a procedure change process with the following attributes: involves the procedure owner and appropriate team members during procedure development and change. The owner has the final authority for comment incorporation unless escalation to management occurs, is efficient (allowing for employee participation) and provides a short turnaround for non-intent changes (i.e., one day) and a 30-calendar day turnaround for intent changes as it goals, and revise AP-5.1Q to meet these attributes. (M/S Section 6.1.8.4)	Section 5.3 of the MII discusses actions taken to improve Program Procedures.
M/S-30	Communicate and train BSC, DOE, USGS, and the National Labs personnel on the procedure program requirements and management expectations for implementation. (M/S Section 6.1.8.5)	Section 5.3 of the MII discusses actions taken to improve Program Procedures.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-31	Benchmark commercial nuclear facilities (INPO accredited training programs) and DOE nuclear Category-1 facilities with emphasis on the following attributes: training effectiveness measurements (testing), job task analysis as a tool for training identification, development and processes, and establish expectations for management and subject matter experts to be involved in training. (M/S Section 6.1.10.1)	Section 6, Management Approach. Training is not specifically discussed in MII; however, improvements in training effectiveness are an inherent part of implementing the MII.
M/S-32	Revise training processes, and management expectations, within BSC as required, to reflect the best practices. (M/S Section 6.1.10.2)	Section 6, Management Approach. Training is not specifically discussed in MII; however, improvements in training effectiveness are an inherent part of implementing the MII.
M/S-33	Within a facilitated session, DOE and BSC senior managers should present their organizations' current R2A2s, including interfaces. The R2A2s of and between organizations should be agreed upon and communicated. (M/S Section 6.3.1)	Section 5.1 of the MII discusses actions taken to clarify Program Roles, Responsibilities, Authority, and Accountability.
M/S-34	Conduct facilitated management off-site sessions with participation, as applicable, from DOE, BSC, the National Laboratories, and USGS. In these off-site sessions, document, sign, and communicate a high-level set of common: Project values, Consistent rewards and consequences, and Processes to hold each other accountable. (M/S Section 6.3.2)	Section 6 of the MII discusses the Management Approach for implementing the MII, to include Management Alignment and Communication.

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Table B-3. Crosswalk of Other Recommended Actions Pertaining to Modeling and Software (Continued)

SOURCE DOCUMENT AND NEED IDENTIFIER	NEED AND SOURCE DOCUMENT LOCATION	WHERE NEED IS ADDRESSED/ CLARIFICATION
M/S-35	Establish a set of performance indicators to track progress toward implementing the recommended common and generic corrective actions. Set goals, monitor, trend, conduct assessments and take management actions when progress fails to achieve expectations. Communicate goals and progress to all personnel. Report results quarterly to Bechtel corporate management. Bechtel corporate management should challenge the Project's performance and conduct field evaluations to validate the performance. (M/S Section 6.3.3)	Section 6, Management Approach, of the MII discusses how the MII will be communicated, and effectiveness measured and reported.
SCWE-27	Evaluate the sequence of events associated with the issuance of CAR-01-002 and withdrawal of the initial recommendation to issue a stop work order, and determine any "lessons learned" from the prospective of chilling effect. (Is management sending a mixed message in focusing on the source of the message rather than the message itself?). (SCWE Section IV.B.9.b)	Section 5 of the MII discusses actions in Quality Assurance Programs and Processes, and the Safety-Conscious Work Environment, to include, in general, prevention of "chilling effect." Due to the age of CAR BSC-01-C-002, a separate lessons learned review will not be conducted. However a CIRs entry (2885) has been created to follow-up on the potential chilling affect.

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