



Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
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April 18, 2002

The Honorable John T. Conway, Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW. Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

Enclosed is the *Corrective Action Plan for Integrated Safety Management System Improvements* for the Oak Ridge Operations Office and the Bechtel Jacobs Company LLC. The plan addresses issues from the Defense Nuclear Facilities Safety Board (Board) letter of October 15, 2001, as well as from recent assessments and reviews conducted at Oak Ridge.

The plan represents a comprehensive set of actions necessary to assure the protection of the public, workers, and environment through implementation of technically adequate and 10 CFR 830 Subpart B-compliant safety basis documents, tailored to current missions and hazards, with an effective, enabling Integrated Safety Management Systems and supporting safety management programs.

The Department wishes to brief the Board the week of May 13, 2002, or at your earliest convenience, on the contents of this plan.

Sincerely,

A handwritten signature in cursive script that reads "m. Holland".

Michael D. Holland
Acting Manager

Enclosure
cc (w/enclosure):
R. Card, US
J. Roberson, EM-1
M. Johnson, SC-2
M. Whitaker, S-3.1

**U.S. Department of Energy
Oak Ridge Operations Office
and
Bechtel Jacobs Company LLC**



**Corrective Action Plan
for Integrated Safety Management
System Improvements**

April 2002

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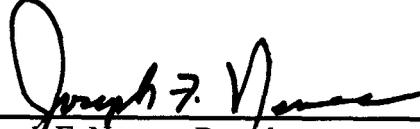
Date Issued—April 2002

Approved by:



Michael D. Holland, Acting Manager
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Joseph F. Nemecek, President
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ACRONYMS

AB	Authorization Basis
AEMD	Assessments and Emergency Management Division
AHA	Activity Hazards Analysis
AM	Assistant Manager
AMAU	Assistant Manager for Assets Utilization
AMEM	Assistant Manager for Environmental Management
AMESH	Assistant Manager for Environment, Safety and Health
AML	Assistant Manager for Laboratories
ARF	Alternate Release Fraction
ASA	Auditable Safety Analysis
BIO	Basis of Interim Operation
BJC	Bechtel Jacobs Company LLC
CAAS	Criticality Accident Alarm System
CAP	Corrective Action Plan
CATS	Corrective Action Tracking System
CCR	Competence Commensurate with Roles and Responsibilities
COR	Contracting Officers Representative
D&D	Decontamination and Decommissioning
DMSA	DOE Material Storage Area
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EM	Environmental Management
EMHA	Emergency Management Hazard Analysis
ES&H	Environment, Safety and Health
ETTP	East Tennessee Technology Park
FATCAT	Facility Authorization Tool-Container Analysis Tool
FHA	Fire Hazards Analysis
FM	Facility Manager
FP	Fire Protection
FP&EM	Fire Protection and Emergency Management
FPEA	Fire Protection Engineering Assessment
FR	Facility Representative
FRAM	Functions, Roles, and Accountability Matrix
FSAR	Facility Safety Analysis Report
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Materials Inventory System
HQ	Headquarters
I/CATS	Issues/Corrective Action Tracking System
IH	Industrial Hygiene
IMS	Issues Management System
INPO	Institute of Nuclear Power Operations
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
M&I	Management and Integration
MOP	Manager of Projects
MSRE	Molten Salt Reactor Experiment
NCS	Nuclear Criticality Safety

NFPA	National Fire Protection Association
NSD	Nuclear Safety Division
NTS	Noncompliance Tracking System
OFI	Opportunities for Improvement
ORION	Oak Ridge Issues and Open Actions System
ORO	Oak Ridge Operations
OSR	Operational Safety Requirements
P/QA	Performance/Quality Assurance
PIP	Performance Improvement Project
R/CAAS	Radiation/Criticality Accident Alarm System
RF	Release Fraction
S&M	Surveillance and Maintenance
SAR	Safety Analysis Report
SB	Safety Basis
SBRB	Safety Basis Review Board
SER	Safety Evaluation Report
SF&EM	Security, Fire and Emergency Management
SME	Subject Matter Expert
SMP	Safety Management Program
SSC	Systems, Structures and Components
TQ	Threshold Quantities
TQP	Training and Qualifications Program
TSR	Technical Safety Requirements
UOSV	Uranium Oxide Storage Vault
USEC	United States Enrichment Corporation
USQD	Unreviewed Safety Question Determination
WSS	Work Smart Standards

EXECUTIVE SUMMARY

This Corrective Action Plan (CAP) has been prepared to summarize key actions taken by the U.S. Department of Energy (DOE) Oak Ridge Operations (ORO) Office and Bechtel Jacobs Company LLC (BJC), and to present plans developed to address Integrated Safety Management (ISM) issues cited by the Defense Nuclear Facilities Safety Board (DNFSB) letter of October 15, 2001 from DNFSB Chairman John Conway to Under Secretary of Energy Robert Card. In that letter, the DNFSB identified areas of concern associated with the development of and adherence to Authorization Basis (AB), the absence of nuclear safety orders from the Management and Integration (M&I) Contract Work Smart Standards (WSS) list, the lack of clear definition and competence to execute roles and responsibilities within both DOE-ORO and BJC, and indications that the Integrated Safety Management System (ISMS) of DOE-ORO and BJC are not functioning, especially in the area of feedback and improvement. Subsequently, the DOE-ORO Manager issued a letter on November 1, 2001 revoking the verification of the DOE-ORO and BJC ISMS that had been completed in November 2000.

DETERMINATION OF NATURE AND EXTENT OF CONDITION

DOE-ORO and BJC had implemented a number of actions to upgrade the existing environmental management (EM) safety basis (SB) documents for compliance with 10 CFR 830 Subpart B. Following the DNFSB October 15, 2001 letter, additional actions were initiated, including several assessments by DOE-Headquarters (HQ), DOE-ORO, and BJC management to more accurately determine the nature and extent of the identified areas of concern. The assessment results were utilized to further define the issues and facilitate causal factor identification, including root causes. The assessments identified findings and issues requiring a number of compensatory measures and corrective actions to ensure that no imminent threats to workers, the public, or the environment existed. Key actions and assessments include:

- **EM SB 10 CFR 830 Compliance Review** – This was completed by BJC on April 9, 2001. This report concluded that none of the existing EM SBs were in full compliance with the new rule. BJC submitted initial and revised upgrade implementation plans in August 2001, and December 2001, respectively.
- **BJC Noncompliance Tracking System (NTS) Report** – Issued by BJC on October 5, 2001, this report considered a series of occurrence reports related to SB implementation and included a *broad and systematic* root cause analysis to identify corrective actions associated with BJC nuclear safety program implementation. This NTS report subsequently has been revised to reflect the findings from a DOE-HQ independent assessment, a BJC management assessment, and a joint DOE-ORO and BJC technical adequacy assessment.
- **DOE-ORO and BJC Evaluation of Orders of Interest to the DNFSB** – DOE-ORO and BJC performed detailed analyses of the list of 109 orders attached to the October 15, 2001 letter. The analyses determined that 25 of the directives warranted further consideration for incorporation into the BJC contract. DOE-ORO is currently processing these changes through their directives management program and subsequent modifications to the BJC contract. DOE-ORO directed the addition of four orders to the BJC contract on February 28, 2002.
- **BJC SB Flowdown Assessment and DOE-ORO Independent Verification** – BJC completed comprehensive assessments of SB documents and the flowdown of requirements from these documents to facility operations. The assessments involved all BJC Category 2 and 3 nuclear facilities, with 28 assessment reports issued. DOE-ORO subsequently performed an independent review of the BJC assessment, including field verifications, to determine that the operations reviewed were adequately bounded by their existing SB, and that compensatory measures were in place where appropriate.

- **DOE-ORO/BJC SB Technical Adequacy Assessment** – DOE-ORO and BJC completed a joint review of a select group of 15 nuclear facilities to determine the adequacy of the SBs hazards and accident analyses. In general, the assessment concluded that the SBs for all of the facilities have assessed the dominant hazards of earthquake and fire initiators and have developed controls protecting most key analytical assumptions. The SB-identified controls have been appropriately flowed down to procedures or Operational Safety Requirements (OSRs)/Technical Safety Requirements (TSRs). Necessary compensatory measures were put in place where appropriate.
- **DOE-HQ Office of Science Independent SB Assessment of BJC and DOE-ORO** – During December 2001 and January 2002, a DOE-HQ team performed an independent assessment and reviewed SB documents for all ORO EM Category 2 and 3 nuclear facilities. The independent assessment report was issued on January 31, 2002 and identified 20 findings and 46 associated recommendations for improvements to DOE-ORO and BJC nuclear safety systems and processes for managing nuclear facilities under the ORO EM program. The assessment team reported that there had been a systemic break down in nuclear safety management systems and processes within DOE-ORO and BJC. The report stated that the principal contributing factor for this breakdown was a lack of management priority and accountability for nuclear safety within DOE-ORO and BJC. The assessment team found that BJC and subcontractor operations personnel were generally aware of hazards and controls and that a number of program improvements were underway. The report concluded that upgrading the SB program in the near term and re-evaluation of the previously submitted 10 CFR 830 Subpart B compliance plan should help resolve the TSRs, OSRs, and SB hazard and accident analysis concerns.

The results of the BJC management assessments and compensatory measures implemented were summarized in a letter issued by BJC to DOE-ORO (Reference: P.F. Clay, BJC to L. Fritz, DOE-ORO, “Actions to Determine Safety of Ongoing Bechtel Jacobs Company LLC Environmental Management Operations”, dated March 4, 2002). DOE-ORO subsequently issued a report of their independent verification of the BJC assessments on March 15, 2002 (Reference: G. L. Dever, DOE-ORO to J. F. Decker, SC-1, “Determination for Continued Operations of Environmental Management Facilities Operations”, dated March 15, 2002). In an April 4, 2002 letter, L. Fritz to P.F. Clay, “Determination for Continued Operations of Environmental Management Facilities Operation,” DOE-ORO directed that two additional compensatory measures be implemented and that four corrective actions be addressed. Collectively, the assessments and compensatory measures have established the basis to assure safe operations.

ISSUE DEFINITION

Major issues were identified and subjected to further analysis to determine causal factors and root causes:

- Inadequate SB authorization and management system for Assistant Manager for Environmental Management (AMEM) nuclear facilities managed by BJC. (DOE)
- Development, maintenance, and implementation of SB documents have not been managed to consistently assure adequate implementation. (BJC)
- DOE Orders of Interest important to nuclear safety were not included as requirements in the M&I contract WSS. (DOE and BJC)
- Inadequate technical expertise in ORO to manage the SB for nuclear facilities. (DOE)
- Sufficient technical expertise is not in place to accomplish responsibilities required by the SB for nuclear facilities. (BJC)
- A rigorous program has not been maintained to ensure that competencies are commensurate with roles and responsibilities. (BJC)
- Declaration of ISMS may have been premature. (DOE)

- Feedback and improvement process has not been fully effective to ensure an expected degree of ISM maturity. (BJC)
- ISM implementation by BJC failed to adequately assure ongoing effectiveness and continuous improvement. (BJC)

ROOT CAUSE ANALYSIS

The DOE-ORO and BJC independent and self-assessments confirmed the DNFSB observations and identified a number of weaknesses in ISMS implementation. In some cases, the issues were common to both the DOE-ORO and BJC organizations. DOE-ORO and BJC performed a systematic analysis of issues identified in the independent HQ assessment, in the NTS report, and in the additional DOE-ORO/BJC assessments and reviews. The findings, observations, conclusions, and recommendations from these assessments were evaluated by the DOE-ORO/BJC ISMS Improvement Project Team leaders and technical support staff. The evaluation team included personnel trained in TapRoot, Barrier, Fault Tree, Kepner-Tregoe, and other root cause methods designed to obtain and analyze data necessary to understand relevant causal factors and institute sustained improvements.

The root causes are:

- The DOE-ORO and BJC processes and organizational alignment for management of AB documents have not been fully integrated, nor well documented.
- The WSS process failed to identify an adequate set of nuclear safety standards.
- The BJC training and qualification for personnel involved in nuclear facility operations did not meet the expectations of DOE Order 5480.20A, which was not included in the BJC contract.
- The ORO belief that the nuclear safety risks for the BJC work were not significant.
- Lack of management accountability and consequences for not having approved SB documents.
- The maintenance of ISMS was not effective.
- Lack of management priority and accountability for closing the ISM system deficiencies.

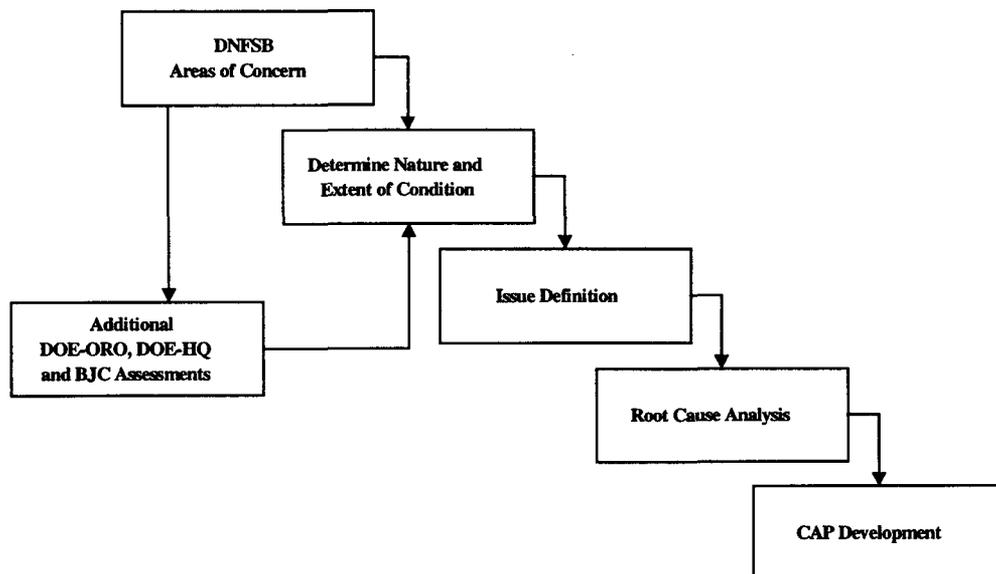
DOE-ORO/BJC IMPROVEMENTS PROJECT CAP APPROACH AND DEVELOPMENT

Based on the causal factors, DOE-ORO and BJC initiated a comprehensive ISMS Improvements Project and developed this integrated CAP. The overall objectives include ensuring that all causal factors are addressed and corrective actions are integrated, that actions are effective and institutionalized in both the DOE-ORO and BJC organizations to prevent recurrence of the issues, and that appropriate priorities are established for the follow-up actions. Considering the breadth of the issues the DOE-ORO/BJC project team elected to utilize the four areas of concern highlighted in the DNFSB October 15, 2001 letter as a basis for capturing all of the issues, observations, and findings from the assessments. Four task teams were established to initiate corrective action development for issues under each of the following areas:

- SB Improvements
- DOE Orders of Interest to the DNFSB
- Technical Competence/Training/Qualifications/Staffing
- ISMS Improvements

The project team developed this CAP to reflect the synthesis of issues resulting from multiple assessments, to incorporate the plan to upgrade all of the SBs for EM facilities, and to establish SB process improvements which will be institutionalized via DOE-ORO and BJC policies, procedures, and documented corporate expectations. The outline for this CAP was based on guidance provided in a letter from the Assistant Secretary for EM to Field Office Managers, *Policy for Content and Implementation of Corrective Action Plans (CAP)*, dated October 4, 2001 which sets policy on expected content of CAPs. Figure ES-1 depicts the overall CAP development approach.

Figure ES-1 Corrective Action Development Overview



CORRECTIVE ACTIONS

As the assessments and reviews were completed, compensatory measures were implemented where needed to assure the safety of ongoing operations. Initial actions and compensatory measures included:

- Implementation of facility-specific compensatory measures or operational limitations where needed to assure continued safe operations for all DOE-ORO EM nuclear facilities.
- Completion by BJC of comprehensive flowdown assessments for all nuclear facilities to identify any concerns related to technical adequacy, flowdown of requirements, implementation, and compliance.
- Completion by DOE-ORO of an independent verification of essential facilities SB flowdown assessments performed by BJC.
- Completion of a joint DOE-ORO BJC technical adequacy review of SB hazards and accident analyses for 15 representative facilities.
- Revocation of DOE-ORO and BJC ISMS verification and initiation of planning for a comprehensive re-verification of ISMS programs, including management systems beyond SB.
- Allocation of additional experienced resources to supplement DOE-ORO and BJC staff in the performance of essential nuclear safety functions.
- Modifications of the M&I contract for areas where gaps in the WSS were identified.

A summary of the issues, root causes, causal factors and corrective actions is provided in Section 5.0. Detailed information sheets regarding assigned responsibilities, schedules, and closure documentation are found in the Appendices. The corrective actions are presented in several formats for clarity and utility throughout this document.

PERFORMANCE MONITORING AND IMPROVEMENTS

DOE-ORO and BJC actions to assure CAP implementation include those to monitor implementation of corrective actions and those to assess effectiveness of implemented actions. CAP implementation progress will be monitored through monthly reporting of action status and due dates. DOE-ORO and BJC will review trend analysis data each month and will prepare a monthly status report on CAP implementation. Principal actions to assess the effectiveness of implemented corrective actions include:

- Corrective action process improvements, utilizing Institute of Nuclear Power Operations (INPO) guidelines.
- Trend analysis process improvements, utilizing Six Sigma tools.
- The independent assessment process will continue to be used to evaluate the adequacy and effectiveness of DOE-ORO and BJC programs and their implementation. These independent assessments routinely evaluate the effectiveness of implemented corrective actions in areas being assessed.
- An independent external evaluation of BJC ISMS readiness will be performed by BJC prior to BJC certification to DOE-ORO of BJC readiness for DOE re-verification of the BJC ISMS.
- The DOE verification review of the ORO and BJC ISMS will provide the final measure of the adequacy and effectiveness of CAP implementation in correcting and preventing reoccurrence of the SB, ISMS, WSS, and technical competence issues addressed in this CAP.

DOE-ORO and BJC also anticipate that the DOE Office of Independent Oversight will periodically review the progress of corrective action closure and effectiveness.

OVERALL CAP OBJECTIVE

This CAP presents more than 100 corrective actions to address specific issues, findings, and observations cited by the DNFSB, the DOE-HQ Independent SB Assessment, DOE-ORO assessments and BJC self assessments. However, DOE-ORO and BJC have focused the actions collectively to attain an overall objective. DOE-ORO and BJC view the completion of this CAP as an opportunity to realize significant improvements to their respective nuclear safety and ISM programs. The overall objective is to assure the protection of the public, workers, and environment through implementation of technically adequate and 10 CFR 830 Subpart B-compliant SB documents, tailored to current missions and hazards, with an effective, enabling ISMS and supporting Safety Management Programs (SMPs).