

Attachment 1

**Letter from Paul Clay to Lori Fritz
Dated March 4, 2002,
"Actions to Determine Safety of Ongoing
Environmental Management Operations"**

U. S. Department of Energy
Oak Ridge Operations Office
Post Office Box 2001
Oak Ridge, Tennessee 37831

Attention: Lori Fritz, Contracting Officer's Representative

Subject: Actions to Determine Safety of Ongoing Bechtel Jacobs Company LLC Environmental Management Operations

This letter summarizes the actions implemented by Bechtel Jacobs Company LLC (BJC) to assess, confirm, and establish the basis for continued safe operations of the Category 2 and 3 nuclear facilities managed by BJC for the Department of Energy Oak Ridge Operations (DOE ORO) EM program. The Defense Nuclear Facilities Safety Board (DNFSB), in its October 15, 2001, letter to DOE, recommended several actions. BJC has focused efforts on what we consider the highest priority recommendation: "[DOE] should [make] a determination of the safety of ongoing operations" BJC has completed a series of actions to assure that EM operations and activities in nuclear facilities can continue to be performed safely.

Summarized below are the actions taken by BJC to assess and confirm the basis for continued safe operations of our Category 2 and 3 nuclear facilities managed consistent with the Safety Basis list approved by DOE. For each assessment, we have summarized (1) the scope of the assessment; (2) the overall assessment conclusion; (3) the implementation of any necessary compensatory measures; and, (4) near-term actions. A discussion of other related and long-term actions is also provided. Collectively, we believe that these assessments, compensatory measures, and actions ensure the safety of continued work activities.

Safety Basis Flow Down (SBFD) Assessments for Category 2 and 3 Facilities – In early February 2002, BJC completed comprehensive assessments of our Safety Basis documents and the flow down requirements from these documents to facility operations. The SBFD Assessments involved all BJC category 2 and 3 nuclear facilities, with 28 separate assessment reports issued. The following areas were reviewed: facility hazard classification; flow down of safety requirements to procedures; field implementation of safety basis related requirements; knowledge, training, and qualifications of facility management responsible for maintaining operations in accordance with safety basis controls; and flow down of requirements to subcontractors. A copy of the SBFD Assessment summary report is provided as Attachment 1. It furnishes more detail on the methods and results of the assessment. Copies of the 28 detailed facility reports are on file in the BJC Document Management Center.

- **Conclusion** – The SBFD assessments concluded that BJC safety basis documents are outdated and require upgrades to comply with 10 CFR 830 Subpart B and annual update requirements. The assessment identified 88 findings and 192 observations. Four of the findings were determined to be reportable conditions and occurrence reports were filed. No imminent threats to workers, the public, or the environment were identified.
- **Compensatory Measures** - The BJC Safety Basis Review Board evaluated all findings and observations and identified only one compensatory measure required. The compensatory measure initially identified for the Waste Examination and Assay Facility was to upgrade procedure controls with respect to verification of minimum container dimensions for the facility. The recommended compensatory measure was related to flow down from Nuclear Criticality Safety Evaluation (NCSE)-OR-7824-1485 (not a safety basis document). A review of the NCSE by the responsible nuclear criticality safety engineer determined that the cited requirement for minimum container dimensions is not a limit and control of NCSE-OR-7824-1485.

- **Near-term Actions** - Findings and observations from the SBFDA assessments have been entered into the BJC Issues and Corrective Action Tracking System (I/CATS) and will be tracked to completion. Approval of corrective actions for all findings and observations is nearing completion, with schedules for completion consistent with the significance of the condition. Corrective actions include procedural updates, training, resolution of administrative discrepancies and ambiguous statements in Safety Basis Documents, improvements to configuration management implementation, etc. A number of these items will be addressed in the Safety Basis annual update or upgrading of the safety basis to achieve 10 CFR 830 compliance. The majority of the remaining corrective actions will be completed this fiscal year.

Safety Basis Technical Adequacy Assessment – BJC and DOE completed a joint review of a select group of 15 nuclear facilities (based on operating status, critical mission, and hazard/risk potential) to determine the adequacy of the Safety Bases' hazards and accident analyses. This included assessing the safety basis for completeness of the postulated accident list, reviewing technical adequacy of analysis, and assuring that key analysis assumptions were translated into controls. A copy of the report and direction for implementing compensatory measures and further actions are provided in Attachment 2.

- **Conclusion** – In general, the Safety Bases 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 Safety Basis identified controls have appropriately flowed down to procedures or Operational Safety Requirements/Technical Safety Requirements. Several immediate compensatory measures were recommended and are being implemented as summarized below. The review also identified seven actions requiring further analysis. In addition, a number of improvements were recommended for incorporation in the upgrade of the documents for 10 CFR 830 compliance.
- **Compensatory Measures** - Direction has been provided to the responsible BJC MOPs relative to implementation of the following compensatory measures:
 - **Radioactive Solid Waste Storage Facilities, Buildings 7823B, C, and D** – Suspend radionuclide inventory increases pending: definition of inventory limits based on the consolidation of B, C, and D as one facility (remove segmentation assumption); and, analysis of large fire initiated releases (broader than current safety basis assumptions).
 - **High-Level Radiation Analytical Facility, Building 3019B** – Place the east wall under configuration management as a passive design feature.
 - **UF6 Cylinder Storage Yard, 1066-B** – BJC recommends that DOE review and approve in advance, the types of materials to be moved by train near the 1066-B cylinder yard at ETTP, pending the results of an evaluation through the Unreviewed Safety Question Determination (USQD) process. Note that the tracks have been leased by DOE to the Community Re-use Organization of East Tennessee (CROET). Another DOE prime contractor (BNFL) utilizes the tracks to ship wastes offsite. Thus, BJC has no authority to review the materials moved by train by a lessee or another DOE prime contractor. BJC will initiate an USQD against control of materials transported by train on these tracks.
- **Near-term Actions** - Findings and recommendations from the joint DOE/BJC Safety Basis Technical Adequacy Assessment have been reviewed and additional analyses initiated. The assessment report findings and recommendations are being entered into I/CATS for tracking and control. A schedule for completion of the recommended additional analyses is being compiled.

DOE Headquarters Independent Safety Basis Assessment of BJC and DOE Oak Ridge Operations Office – During December 2001 and January 2002, a DOE Headquarters team performed an independent assessment and reviewed safety basis documents for all ORO EM Category 2 and 3 nuclear facilities. Nuclear safety procedures and other related documents, such as the Work Smart Standards, were also reviewed, and interviews were conducted with numerous BJC and ORO managers and personnel and with the DNFSB site representative. The team confirmed that significant improvement is needed in management of the safety basis for DOE ORO EM nuclear facilities and presented findings requiring action by DOE and BJC.

- **Conclusion** – The team determined that there is no imminent risk to the public or workers from readily releasable nuclear materials. The team recommended that upgrading the safety basis program in the

- near term and re-evaluation of the previously submitted 10 CFR 830 Subpart B compliance plan should help resolve the TSR, OSR, and safety basis hazard and accident analysis concerns.
- **Compensatory Measures** - Two areas that were identified as requiring further assessments have been or are being addressed. The Safety Basis Technical Adequacy Assessment summarized above has evaluated the technical adequacy concerns raised by the DOE Headquarters team. Compensatory measures pertaining to these technical adequacy concerns are cited in the previous paragraph. The Safety Basis Technical Adequacy Assessment also evaluated the fire protection and emergency programs. The assessment did not identify any necessary compensatory measures, but did confirm the need for program improvements. An assessment of Fire Protection and Emergency Management Safety Management Programs for each BJC nuclear facility is underway and planned for completion in March. The report also recommended immediate action to improve inventory controls relative to facility categorization. Improvements in this area are being developed.
 - **Near-term Actions** - Per discussions with DOE ORO, a coordinated Corrective Action Plan will be prepared. A preliminary assessment of the findings and recommendations in this report indicate a high correlation to corrective or improvement actions already initiated by BJC.

Other Actions

Other actions related to the DOE Review or the October 15, 2001 DNFSB letter include:

- Radiological and Category 3 nuclear facilities are being reviewed to assure that categorization is fully compliant with DOE Standard 1027 and DOE ORO expectations.
- Evaluation of 109 DOE Orders of Interest to the DNFSB has been completed. Four Orders were approved for incorporation into the BJC contract in January; 98 Orders either did not apply to the BJC contract, had been superceded, had no bearing on BJC contract, were in the contract, or were being implemented. DOE is considering the remaining seven Orders for incorporation into the contract.
- Safety Basis process improvements are under way including: revision of the USQD procedure; procedural improvements; delegation of approval authority for less-than-category-3 safety documents; updates to Nuclear Facility Safety subcontract technical specifications; preparation of a company level Nuclear Safety Assurance Policy; and, preparation of Documented Safety Analysis (DSA) guides. These DSA guides will be used in development of 10 CFR 830-complaint upgrades to the current BJC safety basis documents.
- A new Training and Qualification Program for personnel assigned to nuclear and radiological facilities is being developed and implemented.
- Annual updates are underway for Category 2 Nuclear Facility Authorization Agreements and for Category 2 and Category 3 Safety Basis documents.

Long-term Actions - As discussed with DOE, BJC is updating the plan and schedule for submittal of 10 CFR 830-complaint upgrades to the current BJC safety basis documents. We have established a joint BJC/DOE Safety Basis Working Group (SBWG), and are meeting weekly to address topics associated with our safety basis program and planned upgrades. Both DOE EM and Nuclear Safety Division are actively participating in the working group. Recent SBWG reviews have addressed the specific DSAs to be developed and the safe harbor method to be applied. The majority of these matters have been resolved, and final agreement on the remaining topics is expected within the next few weeks.

An updated plan and schedule for submittal of 10 CFR 830-complaint upgrades is under development and will be completed by mid April 2002, following meetings with DOE and Mr. Paul Gubanc, who is on special detail to EM-1.

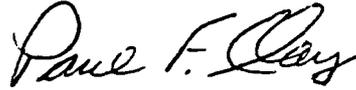
Overall Safety Assessment

Based on the reviews, compensatory measures, and actions outlined above, it is my assessment that the facilities being managed by BJC are being and can continue to be operated in a safe and compliant manner, pending upgrades to the Safety Basis documents.

Lori Fritz
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March 4, 2002

We look forward to working with DOE to further refine our plans for prioritizing 10 CFR 830-compliant upgrades to the current documents. If you have any questions, please contact me at 241-1188, or John Lyons at 574-3166.

Sincerely,



Paul F. Clay
Vice President and General Manager

PFC:JRL:ljs
GM-02-0013

Attachments:

1. Safety Basis Flow Down Assessments for Category 2 and 3 Nuclear Facilities, February 18, 2002
2. Safety Basis Technical Adequacy Assessment, March 1, 2002

Distribution w/attachments:

Leah Dever, DOE
Gordon Dover
Gil Drexel
Greg Eidam
Charlie Frye
R. D. George
Tom Hash
Steve Houser
Steve Liedle
John Lyons
Jimmy Massey
Margaret Morrow, DOE

Joe Nemec
Andy Phelps
Robert Poe, DOE
Steve Richardson
Sharon Robinson, DOE
Don Seaborg, DOE
M'balia Tagoe
Ed Trujillo
Mike West
Bruce Wilson
File - EMEF-DMC - RC

Letter to Lori Fritz from Paul Clay (GM-02-0013, dated 3/4/02)
Subject: Actions to Determine Safety of Ongoing Bechtel Jacobs Company LLC, Environmental
Management Operations

Attachment 1

Bechtel Jacobs Company LLC

Safety Basis Flow down Assessment
For Category 2 and 3 Nuclear Facilities

February 18, 2002



DOE Contract No. DE-AC05-98OR22700

Job No. 23900

February 18, 2002

U. S. Department of Energy
Oak Ridge Operations Office
Post Office Box 2001
Oak Ridge, Tennessee 37831

Attention: Ms. Lori Fritz
Acting Assistant Manager for Environmental Management

Subject: Safety Basis Flowdown Assessments for Category 2 and 3 Nuclear Facilities

Dear Ms. Fritz:

Attached for your information is the summary report of the twenty-eight safety basis flowdown assessments of Bechtel Jacobs Company LLC Category 2 and 3 Nuclear Facilities. These assessments were performed as a part of the BJC corrective action plan associated with Noncompliance Tracking System report NTS-ORO-BJC-BJCPM-2001-0004. The findings and observations from these assessments have been entered into the BJC Issues/Corrective Action Tracking System (I/CATS) and will be tracked to closure.

Based on conditions identified during these assessments and the associated DOE Independent Assessment led by Dae Chung, two additional assessments are underway to address safety basis technical adequacy (joint review with DOE) and safety management program implementation for fire protection and emergency management.

Any questions regarding these assessments may be directed to John Lyons (574-3166) or Bruce Wilson (241-5113).

Sincerely,

A handwritten signature in cursive script that reads "Paul F. Clay".

Paul F. Clay
Vice President and General Manager

PFC:JRL:bh
GM-02-0006

Attachment: As stated

cy: M. J. Hitchler
R. E. Lynch
J. R. Lyons
J. C. Massey
M. K. Morrow, DOE
J. A. Mullis, DOE

J. F. Nemeec
R. W. Poe, DOE
B. A. Wilson
File - PFC
File - EMEF-DMC-RC

The following documents are enclosed.

Enclosure 1 - Summary Report of Bechtel Jacobs Company Safety Basis Flowdown Assessment

Enclosure 2 – List of the Individual Facility Safety Basis Flowdown Assessment Reports

Enclosure 3 – Summary Listing of Safety Basis Flowdown Assessment Findings and Observations by Facility

Enclosure 4 – Safety Basis Flowdown Assessment Plan

Enclosure 5 – Flowchart of Safety Basis Assessment Process

Enclosure 6 - Criteria for Selection of Assessors and List of Assessors

Enclosure 7 - The Safety Basis Review Board Charter

Enclosure 1
Summary Report of Bechtel Jacobs Company
Safety Basis Flowdown Assessment

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Enclosure 1
Summary Report of Bechtel Jacobs Company
Safety Basis Flowdown Assessment

Assessment Overview

Safety Basis Flowdown Assessments were conducted for all BJC category 2 and 3 nuclear facilities in accordance with the Safety Basis Flowdown Assessment Plan, ECS/NS-02-01, Rev 1, November 26, 2001 (Enclosure 4). The assessments reviewed the following areas:

1. Facility categorization
2. Flow down of safety basis requirements to implementing documents
3. Field implementation of SB related requirements
4. Knowledge, training, and qualification of facility management responsible for maintaining operations in accordance with safety basis controls
5. Flow down of requirements to subcontractors.

The Safety Basis Flowdown Assessments were conducted by assessors independent of the facility, with extensive nuclear industry experience, and with experience performing comparable assessments and inspections (Enclosure 6). Where possible DOE Facility Representative and Program Managers were involved in the assessments or in review of the assessment results. The draft assessment reports were reviewed by the responsible BJC Manager of Project and associated line management staff for factual accuracy, and by the BJC Safety Basis Review Board (Enclosure 7) for content and technical adequacy.

The Safety Basis Review Board made determinations, with the assessment teams, of Findings and Observations, consistent with the BJC procedure BJC-PQ-1210, Issues Management Program. In accordance with that procedure, the following definitions were used:

Finding: A direct violation of a requirement.

Observation: A condition that could be improved or strengthened. An observation is not a requirement violation; it is a method by which opportunities for managerial or programmatic improvements may be identified.

The responsible BJC Manager of Projects is responsible for determination of reportability of findings and for development and implementation of corrective actions.

Assessment Results

Twenty eight (28) separate Safety Basis Flowdown Assessment Reports were issued (Enclosure 2).

The results of the 28 assessment reports are summarized below:

| | |
|----------------------|-----|
| • Findings | 88 |
| • Observations | 192 |
| • Proficiencies | 6 |
| • Occurrence Reports | 3 |

Enclosure 3 provides a Summary Listing of Safety Basis Flowdown Assessment Findings and Observations by Facility. All assessment findings and observations have been entered into the BJC Issues/Corrective Action Tracking System (I/CATS) and will be tracked to closure. Corrective Actions for identified findings and observations are being defined by the responsible line managers, and will be approved by the Safety Basis Review Board Chairman.

Reportable Conditions

Three of the findings identified during the assessments were determined by the responsible Manager of Projects to be reportable conditions. The occurrence reports resulting from these assessments are as follows:

- ORO--BJC-X10ENVRES-2001-0033, "*Potentially Inadequate Safety Analysis (PISA) Storage Casks Located Outside the Building 3517 Confines*"
- ORO—BJC-K25GENLAN-2002-0001, "*Management Concern Regarding Vagueness of a Statement Made in the Technical Safety Requirements for the UF6 Cylinder Storage Yards*"
- ORO—BJC-X10WSTEMRA-2002-0001, "*Violation of Technical Safety Requirement Concerning Particulate Inventory Control.*"

General Conclusions

The following general conclusions have been identified from a review of the individual assessments:

1. BJC safety basis documents are outdated and require updates to comply with 10 CFR 830 Subpart B and annual update requirements.
2. With the following exceptions, the assessment teams concluded that there were no significant questions or concerns with respect to operations safety. The exceptions included:
 - Building 3517, Fission Product Development Laboratory, potential for safety basis inadequacy [ORO--BJC-X10ENVRES-2001-0033, "*Potentially Inadequate Safety Analysis (PISA) Storage Casks Located Outside the Building 3517 Confines*"] – The final occurrence report has been submitted and is awaiting DOE approval. The corrective action plan has been approved by the SBRB. There are no other operational concerns with the casks storage.
 - Building 3019B, High Radiation Level Analytical Laboratory, concern regarding planned Fire Department Response (resolved)

- K-27 LEU Process Building, concern that inspections required in the operational controls section of the Basis for Interim Operations were not being performed. A revision to the facility inspection procedure/checklist will be made to clearly document that the inspection requirements are being met.
 - Waste Disposition facilities occurrence report, ORO—BJC-X10WSTEMRA-2002-0001, “Violation of Technical Safety Requirement Concerning Particulate Inventory Control.” does not indicate and immediate operational safety concern. As an interim measure each waste container is being individually evaluated for compliance with the TSR requirement prior to being accepted at WD facilities. This measure will continue until the TSR requirement is flowed down to waste generators as part of the waste certification program.
3. The assessments identified no imminent safety concerns, therefore only a limited number of compensatory measures were determined to be required.
 4. Facility categorizations were correct and data was available to support the categorization. The assessment teams determined that some facilities have had a significant reduction in hazardous material inventory and may be candidates for downgrading.
 5. Rigorous flowdown of safety basis requirements to implementing documents needs improvement. Note: Individual flowdown issues are identified in the facility assessment reports.
 6. Field implementation of safety basis related requirements needs improvement in many of the facilities.
 7. Knowledge of facility managers in general is adequate. However, clear definitions of expectations and improvements in training and qualifications of facility personnel are required at many of the facilities.
 8. BJC subcontractors are using the correct safety basis documents; however, subcontract flowdown mechanisms need improvement.
 9. Safety basis crosswalks developed during the assessments need to be formalized and maintained as a management tool to assure current and accurate requirement flowdown to the governing implementing documents.
 10. A requirement to generate an implementation plan for each safety basis prior to implementation is not currently required. Consideration should be given to requiring and implementation plan for each safety basis document prior to the document becoming effective.

Proficiencies

The following proficiencies were identified in the individual assessment reports:

- Subcontractor support for NCS and Fire Protection at the Portsmouth site were capable and supportive of the BJC activities
- The Portsmouth site has initiated a comprehensive training program for managers and supervisors regarding the importance of and roles and responsibilities for the safety basis for operation of facilities.
- The Portsmouth site has effectively implemented and used the USQD/USQD screening process as evidenced by the large number that have been performed.

- The Paducah project has established a safety basis flowdown matrix that captures the safety basis requirements and how the requirement is flowed into implementing procedures for both self performed work and work performed by the subcontractor. The matrix identified where the flow down was deficient and the required actions to fix the deficiency.
- The Paducah project is identifying items in procedures as items required to meet safety basis requirements. This helps ensure that changes to procedures that impact SB requirements can be easily identified. It also identifies to procedure users the steps of procedures that have increased importance.
- The Duratek Federal Services document management center, the requirements flowdown and requirements tracking system, and the training program documentation systems being used at the ORNL Liquids and Gaseous Low Level Waste Operations Facilities are models of efficiency, accuracy, and professionalism.

Enclosure 2
List of the Individual Facility
Safety Basis Flowdown Assessment Reports

K. M. W. Feb 15, 2002
Team Leader

List of the Individual Facility Safety Basis Flowdown Assessment Reports

1. ORNL Tower Shielding Facility
2. ORNL Building 3038
3. ORNL Interim Waste Management Facility 7886
4. ORNL Building 3019-B
5. ORNL Building 3517
6. ORNL Oak Ridge Research Reactor
7. ORNL Pits, Trenches, and Augered Holes
8. ORNL Bulk Shielding Facility
9. ORNL Federal Facility Agreement Tanks
10. ETTP UF6 Cylinder Yards
11. ORNL Liquids and Gaseous Waste Operations
12. Portsmouth Site
13. ORNL Molten Salt Reactor Experiment
14. ETTP K-25 Building
15. ETTP K-27 Building
16. ORNL Gunnite and Associated Tanks and ORNL Tank W-1A Removal
17. Paducah Site
18. Y-12 Waste Disposition (WD) Depleted Uranium Oxide Storage Vaults
19. ETTP WD K-25 Vaults
20. ETTP WD K-33 Storage Pad
21. ORNL WD Radioactive Solid Waste Storage Facilities
22. Y-12 WD Old Salvage Yard
23. ORNL WD Retrievable Waste Storage Well Facilities
24. ORNL WD Waste Examination and Assay Facility
25. ORNL WD Transuranic Waste Storage Facilities
26. ORNL WD Radioactive Solid Waste Storage Pads
27. ORNL WD Remote Handled Transuranic Waste Storage Facilities
28. ORNL WD Solid Waste Compactor

Enclosure 3
Summary Listing of Safety Basis Flowdown Assessment
Findings and Observations by Facility

B. M. Feb 15, 2002

SB Flowdown Summary

Finding and Observation Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|--|--|--|-----------------------|---|
| Tower Shielding Facility Greg Eidam, ORNL | 1. Seventy-two experimental shields were removed from the Tower Shielding Facility in mid-1998. This effort was initiated by the previous prime contractor and completed by BJC. Although removal of the shields decreases the quantity of on-site hazardous materials and makes the facility safer, it is not clear that changes to the facility were documented and safety analyzed in accordance with USQD requirements <u>before</u> the change was made. A USQD (or USQD Screening) may not have been prepared. | 1. The Authorization Agreement (AA) does not list all of the documents that are the safety basis for the TSF and lists technical specifications that are no longer being followed. | None recommended. | No significant questions concerns with respect to operations safety. |
| Building 3038 Isotope Develop Laboratory Greg Eidam, ORNL | 1. No unreviewed safety questions determination (USQD) was prepared for As-found Conditions that were Potentially Outside of the Safety Basis (SB). | <ol style="list-style-type: none"> 1. Ambiguously Defined Primary Containment System Boundary 2. Unclear Surveillance Frequency Requirements for Primary Containment System Surveillance 3. Configuration Management Program Requirements for the 3038 Primary Containment System are Ambiguous 4. Qualification Program for Facility Operations Staff Does Not Specifically Address Safety Basis Requirements | None Recommended | No significant questions concerns with respect to operations safety. |
| Building 3517 Fission Product Develop Laboratory Greg Eidam, ORNL | <ol style="list-style-type: none"> 1. Potentially inadequate safety analysis for radioactive thermoelectric generators (RTG) and radioactive material stored in casks outside of Building 3517 that are not addressed in safety basis documents. 2. Some hazardous material is not stored as described in the administrative controls section of the OSR | <ol style="list-style-type: none"> 1. Unclear surveillance frequency requirements for the primary containment system 2. Configuration management program requirements for the 3517 primary containment system are ambiguous. 3. Ambiguously defined primary containment system boundary | | <p>Concern with potential safety basis inadequacy</p> <p>Occurrence Report ORO--BJC-X10ENVRI 2001-0033, "Potential Inadequate Safety Anal (PISA) Storage Casks Located Outside the Building 3517 Confines</p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|--|--|---|-----------------------|---|
| 7886 Interim Waste Management Facility Charlie Frye/ Waste Operations | None | <p>1. There is no approved BJC procedure to perform surveillance and maintenance of the IWMF. The BJC Facility Manager currently uses a Weskem procedure.</p> <p>2. The current IWMF Safety Basis documents are listed on the BJC SB website and are controlled and available in the BJC Document Management Center (DMC) at ETPP, Building K-1002. References 1 and 2 are listed on the BJC SB website without a notation that the SAR and TSR were commented and not approved by DOE (see Ref. 3). <u>Correction will be handled by the Nuclear Safety Organization as a programmatic matter.</u></p> | None Recommended | No significant questions or concerns with respect to operations safety. |
| Building 3019B High Radiation Level Analytical Lab Greg Eidam/ORNL | 1. The UT-B fire department pre-fire plan for 3019B is not fully compliant with the compensatory measures of the JCO and associated SER. | <p>1. Not all the requirements of the compensatory measures identified in the JCO and the DOE SER are fully flowed down to implementing procedures, signs, or other implementing means.</p> <p>2. Some Descriptions in Attachment A to the JCO do not have implementing controls to ensure they remain as described.</p> | None Recommended | One operational concern existed regarding the planned response of the ORNL Fire Department to Building 3019 fire being contrary to the current safety basis for 3019-B. |
| Oak Ridge Research Reactor (ORR) Greg Eidam/ORNL | 1. The ORR pool walls required by DOE-SER-OR-3042-0003 to be safety significant design features for safety, are not being maintained under configuration management. | <p>1. Specific inspections for the storage pool wall structure integrity, a safety significant design feature for safety, are not being performed.</p> <p>2. USQD-OR-3042-0018 did not have calculations or documents to support an assumption.</p> <p>3. The Technical specifications in the subcontract did not contain the ASA, SER, or USQDs required to describe the SBs for the facility.</p> <p>4. The December 21, 2001 list of SB documents did not include USQD-OR-3086-0030.</p> <p>5. The rigor of operations in implementation of facility controls needs improvement.</p> <p>6. A safety feature used to prevent or mitigate hazards not screened out in the ASA may no longer be an important safety feature.</p> <p>7. The project is using the monitron alarm rather</p> | None Recommended | No significant questions or concerns with respect to operations safety. |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|--|--|---|-----------------------|---|
| | | <p>than the pool level as the primary basis for facility evacuation without having performed a USQD.</p> <p>8. BJC has not established a consistent approach to the training and qualification of personnel functioning in a facility manager role for nuclear facilities.</p> | | |
| ORNL Pits Trenches and Augered Holes Greg Eidam/ORNL | None | None | None Recommended | No significant question concerns with respect to operations safety. |
| ORNL Federal Facility Agreement Tanks Greg Eidam/ORNL | None | None | None Recommended | No significant question concerns with respect to operations safety. |
| ORNL Bulk Shielding Facility Greg Eidam/ORNL | None | The Bulk Shielding Facility Authorization Agreement (AA) is out-of-date. | None Recommended | No significant question concerns with respect to operations safety. |
| ETPP UF6 Cylinder Yards M'balia Tagoc/ETTP | <p>FM-1) The latest FHA was issued July 1999 and includes a requirement for procedures to identify allowable parking areas for the cylinder yards. This requirement has not been flowed into implementing procedures.</p> <p>FM-2) Some safety basis documents were not available or readily retrievable from the DMC at the time of the assessment activity</p> <p>FF-1) K/D-6572, <i>Technical Safety Requirements for the K-25 Site UF6 Cylinder Storage Yards</i>, requires that the IFSM organization perform periodic validations of the adequacy of the safety documentation. The IFSM reviews emergent safety documentation through USQD or safety basis document approval, however, the intent of periodic validations is not defined nor is there evidence that the technical adequacy of safety documentation is periodically evaluated.</p> <p>FF-2) Some requirements in K/D-SAR-29, <i>K-25 Site UF6 Cylinder Storage Yards Final Safety Analysis Report</i>, are not flowed into implementing procedures.</p> | <p>OF-1) K/D-6572, <i>Technical Safety Requirements for the K-25 Site UF6 Cylinder Storage Yards</i>, requires that "Lines of authority, responsibility, and communication established... Relationships documented ... job descriptions for key personnel..." BJC-GM-1400, <i>Integrated Safety Management System Description</i> defines lines of authority and responsibilities; however, a job description for the UF6 cylinder program manager does not exist. The function of the facility manager is described in generic terms in ET-1002. In addition, the UF₆ Cylinder program Manager is not identified as a key person in BJC's prime contract with DOE.</p> <p>OF-2) K/D-SAR-29, <i>K-25 Site UF6 Cylinder Storage Yards Final Safety Analysis Report</i>, does not acknowledge the operation of the fire protection system transition from LMES to CROET/OMI.</p> <p>OF-3) K/OPS-35, <i>Basis for Interim Operation of the UF6 Cylinder Storage Yards</i>, and K/D-SAR-29, <i>K-25 Site UF6 Cylinder Storage Yards Final Safety Analysis Report</i>, state that ultrasonic tests are performed but implementing procedures do not</p> | None Recommended | <p>No significant question concerns with respect to operations safety.</p> <p>Occurrence Report ORO—BJC- K25GENLAN-2002-0 <i>"Management Concern Regarding Vagueness Statement Made in the Technical Safety Requirements for the Cylinder Storage Yards"</i></p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|---|---|---|-----------------------|---------------------------|
| | <p>FF-3) A configuration control program has not been established in compliance with K/D-SAR-29, K-25 Site UF6 Cylinder Storage Yards Final Safety Analysis Report, and BJC-procedure DE-A-0500, Configuration Management Program.</p> <p>FF-4) Some requirements in K/OPS-35, Basis for Interim Operation of the UF6 Cylinder Storage Yards, are not flowed into implementing procedures.</p> <p>FF-5) Both K/OPS-35, Basis for Interim Operation of the UF6 Cylinder Storage Yards, and K/D-SAR-29, K-25 Site UF6 Cylinder Storage Yards Final Safety Analysis Report, are active safety authorization basis documents but have contradictory information. There is no direction provided on which document takes precedence in the case of conflict.</p> | <p>specify criteria for selecting cylinders to test.</p> | | |
| <p>ORNI, LLLW Operations Charlie Frye/Waste Ops</p> | <p>TSRs WM-LGWO-7856-TSR-R3, WM-LGWO-2649-TSR-R3, AND WM-LGWO-7877-TSR-R1 do not include an appendix for facility design features for safety as required by DOE Order 5480.22</p> | <ol style="list-style-type: none"> 1. No flowdown of the requirement to not transfer when the vault plug is removed. There is an accident mitigation feature to not perform transfers when the vault plug is removed. The supervisor does monitor and document the operation with the plugs removed, but there is no formal flow down to ensure that the requirement is met. 2. No validation of program adequacy of a service contractor. In the LLLW BIO, Hoisting and Rigging procedure is an accident preventor for a dropped load initiating a release of LLLW. UTB or WESKEM are the contractors used for the hoisting and rigging activity. There is no flowdown of the requirement to ensure there is an adequate Hoisting and Rigging program at UT-B. WESKEM's program adequacy is validated by BJC through | | |

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| | | <p>Waste Disposition; and Duratek FS is responsible for program adequacy of sub-tier subcontractor.</p> <ol style="list-style-type: none"> 3. BJC STR and Staff Training on SB documents lacks formality. There are training requirements for all levels of BJC personnel who are involved with SB documents. BJC has extensive Required Readings on SB procedures and USQD processes. The only formal course is in USQD's. There is no required reading documentation of SB's. All BJC Training required reading were current as of 11/13/01 except for one Safety Advocate. There is no company-wide guidance about who receives this type training. 4. Authorization Agreement not consistent with safety basis documents. Assessment conducted 10/25/01 by BJC project staff noted SAB omissions from the AA. The issue is entered in ICATS for AA discrepancies with corrective actions. 5. Unnecessary delay in processing findings and corrective actions. Five radiological facilities were identified with safety basis documents not in full compliance with BJC procedures in December 2000 during a Safety Authorization Basis Documents Survey. No corrective actions were created or accomplished until the October 25, 2001 project SAB review was performed. | | |
| <p>Portsmouth Gil Drexel/Portsmouth</p> | <ol style="list-style-type: none"> 1. Inadequate demarcation of Fissile Material Storage Arrays in X-7745R as required by Nuclear Criticality Safety Approval (NCSA)-7745R003.D00, 2. No Procedural Requirements Flowdown for administrative controls to minimize the impact of a large fire through the control of combustible | <ol style="list-style-type: none"> 1. Discrepancies in SB Documents. 2. Management Initiative to Establish an Expanded Facility Manager Program Still in Progress. 3. Development of a Configuration Management Program Still in Progress. 4. Weaknesses in Training/Knowledge of FMs. 5. Discrepancies Between the Availability of | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> <p>The review did not identify any issues that would prohibit resumption of</p> |

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| | materials in Cylinder Yards X-745 C&E. | USEC and Wastren Operating Procedures in X-326 L-Cage. 6. SB documents are not current, which has lead to a high number of USQDs and SERs. 7. The Emergency Management Program does not incorporate DOE Order 151.1. | | activities that were suspended by BJC on December 3, 2001. |
| Depleted Uranium Oxide Storage Vaults/Shed Mike Wes/Waste Disposition | 1. The SAR contains a requirement for portable dry-type fire extinguishers to be located at specific places in the faciity. Additionally a Gamewell fire alarm box located on the main power pole near the northeast corner of Vault 9285-1 is required. The existing Gamewell alarm pullbox is out of service and the life safety upgrades (LSU) pullbox was not initially found. Subsequent investigation found determined that the LSU pullbox was located near the stop sign at the West Portal Road. The facility Emergency Manual did not note the location of the new pullbox or the fire extinguishers. 2. The SAR contains requirement for employees to receive facility specific training. No documented facility specific training was identified during the assessment. 3. SER-YT-OUSV-0002Requires an upgraded SAR toe the DOE-STD-3009-94 format and content. The current SAR submittal is only a bas for interim operation until it is upgraded to the required standard format and content. An upgraded SBD has not been submitted. | 1. Not all activities identified by the SB documents and management requirements documents are flowed into procedures. The items include a requirement to check that no free fluids are in drums prior to off site shipment, containers with flammable materials to be sampled or bulked per approved work procedures, and no procedural requirement to confirm forklifts maintenance and inspections are current prior to use. 2. There is no documentation (such as required reading) that SB documents have been read by operations personnel. 3. A mechanism does not exist to manage SB document with the Subcontractor. | None Recommended | The review indicated that there were no significant questions or concerns with operational safety. |
| K-25 Non Waste Disposition M'balia Tagoc/ETTP Projects | None | 1. Training on SAB documentation (e.g., K-25 BIO) is not required for the nuclear safety manager (ATI position of Facility Safety Specialist). While it was apparent that the nuclear safety manager was knowledgeable of SAB requirements, it is recommended that required reading on SAB documentation be added to the nuclear safety manager's training requirements.. 2. Section 2.1 of K/ER-335 requires that weak | None Recommended | The review indicated that there were no significant questions or concerns with operational safety. |

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| | <p>Implementation of the USQD program needs improvement and needs to be clarified in the Canberra contract.</p> <p>3. The SBDs identify requirements regarding equipment that is in operational mode, and the procedures describe equipment operation; however Canberra is not authorized to operate some of this equipment.</p> <p>4. The SBDs identify TSR requirements regarding the particulate size for TRU waste materials. It was determined that the necessary programs and/or procedures are not in place to adequately regulate particle size limits (less than 10 micrometers) for waste received from the waste generator. Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "Violation of Technical Safety Requirement Concerning Particulate Inventory Control."</p> | <p>standby mode and this is not reflected in the current procedures.</p> <p>4. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 2 on page 6 deals with identification of the applicable SB documents and flowdown to the subcontractor. Not all SB documents have been identified and contractually flowed down to Canberra.</p> <p>5. The SBDs identify requirements regarding the educational requirements for WEAFF facility workers. Procedures do not address the specific educational requirements mandated by the SBDs.</p> <p>6. The SBDs identify a requirement regarding the Evacuation Drills. BJC procedures regarding Evacuation Drills appears to have been cancelled without replacement.</p> <p>7. The SBDs identify requirements regarding the Configuration Management Program. The management assessment concluded that the Configuration Management Program needs improvement.</p> <p>8. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents.</p> <p>9. The SBDs identify a requirement regarding the training of non-Canberra personnel. Training procedures do not clearly cover the training and qualifications of non-Canberra personnel who perform hands-on work at the WEAFF.</p> | | |
| <p>Radioactive Solid Waste Storage Facilities 7572, 7574, 7842, 7878, 7879</p> | <p>1. The four waste Types defined by the SAR and used for a direct control of particle size for dispersion analyses are not addressed in currently-</p> | <p>1. The Configuration Management (CM) program has not been implemented effectively through subcontractors.</p> | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with</p> |

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| | | <p>building areas be marked with flagging, painted hash marks on the floor, and panels to restrict access. Inspection revealed that some areas are marked with flagging but do not have painted hash marks on the floor. Other areas have painted hash marks on the floor but no flagging. No areas were viewed that had panels to restrict access. SAB wording would indicate that all three items are to be done. Facility practices and procedures appear to be reasonable but do not line up with the requirement.</p> <p>3. Section 5.2.3.3 of K/ER-335 requires compliance with NFPA 5056. This reference is a typographical error. NFPA 505 is the correct citation. However, for consistency with implementing procedures, a SAB reference to OSHA 29CFR1910.178 may be more appropriate. Note, NFPA 505 is a mandatory standard incorporated by reference in OSHA regulations.</p> | | |
| <p>K-27 LEU Process Building M'balia Tagoe/ETTP Projects</p> | <ol style="list-style-type: none"> 1. The current BIO does not address the potential criticality concerns resulting from the presence of the nine containers of technetium-uranium. 2. Special requirements identified in the USQD, K-USQD-0054, "<i>Technetium Containers Identified During Facility Safety Walkdowns in K-27 Process Building</i>", May 1995, were not addressed in subsequent revisions to the K-27 facility's SB document. 3. The operational control required by section 6 of the BIO is not being fully performed. | <ol style="list-style-type: none"> 1. Personnel interviewed did not have a complete set of SB documents. 2. Facility personnel did not maintain a crosswalk of the SB requirements to implementing procedures. 3. Facility personnel were not able to discuss accidents, initiating events, and/or the controls to prevent or mitigate (minimize the severity) the accidents described in the SB documents. 4. No training requirements were found for required reading of the SBs for management and facility personnel. Additionally, no specific training or qualification requirements exist for developing, maintaining, and implementation of SB documents for nuclear facilities. 5. USQD-ET-0333 R0, "<i>Technetium Containers Identified During Facility Walkdown</i>" was not on the December 21st list of SB Documentation list provided to DOE. | <p>None Recommended</p> | <p>One significant concern that the inspections required by the operation controls section of the E are not being performed</p> |

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| | | <ol style="list-style-type: none"> 6. During the walkdown of the K-27 Building it was obvious that several pieces of electrical equipment had been de-energized and taken out of service, however signs were not in clear view. 7. Outdated sign for Criticality safety requirements was found. 8. The requirement in K-USQD-0054 to have permanent identification tags placed on each cylinder which clearly indicates the material inside the container and identify these as Fissile Materials-Technetium-Uranium complex or Mixture could not be verified. 9. Two USQDs were not included during the BIO update (K-USQD-0119 R1, and K-USQD-0054) sent to DOE for approval. In 2001. | | |
| <p>MSRE Greg Eidam/ORNL Projects</p> | <p>A computer program used to track inventory limits versus system pressure is not a program under QA controls. This issue was resolved during the assessment. In particular, MSRE personnel indicated that they would use manual calculations and independently check the calculations</p> | <ol style="list-style-type: none"> 1. Document discrepancies between the facility and the Document Management Center (DMC) as to what are current SB documents. 2. TSR surveillance requirements ambiguous and not flowed into operating procedures for pressure relief valves. 3. The configuration management program does not include a list of configuration items. 4. One minor anomaly noted during facility walkdown with regard to the calibration of a temperature recorder. 5. There is no flowdown of the requirement to maintain CIF3 concentrations less than limits identified in the BIO. 6. Ambiguities With Several Requirements in SER-7503-NSD-01 and Program Implementation. 7. No criteria established for monitoring differential pressures across Valve V-561 in procedures. 8. Incorrect wording in the BIO regarding main charcoal bed system valves. 9. No central location describing the education, | <p>None recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

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| | | <p>experience and other qualifications for a job along with the training qualifications of personnel performing that specific job.</p> <p>10. There is no program in place to ensure that the fire protection engineering facility assessment is performed on a periodic basis.</p> | | |
| Tank W-1A and Suth Tank Farm GAAT Greg Eidam. ORNL Projects | None | None | None Recommended | The review indicated that there were no significant questions or concerns with operational safety. |
| Paducah Site Gordon Dover/Paducah | <ol style="list-style-type: none"> 1. The administrative control listed in the SAR for on-site worker training for required actions and emergency response and evacuation to minimize impact of a large fire are not included in any training for all on-site workers. 2. CHATs Cylinder handlers, slings, and cranes used to handle UF6 cylinders are designated safety significant but do not have a program that describes what maintenance elements are in place to ensure that they meet their intended requirements. | <ol style="list-style-type: none"> 1. Authorization Agreements for The C-746Q and DMSAs, both category 2 facilities have been submitted to but not approved by DOE. 2. Lack of DOE approval for SB document submittals and updates has made maintaining a clear, precise SB very difficult. This has resulted in numerous USQs, USQDs, and SERs that comprise the SBs for the Paducah Project facilities. 3. Cylinders transferred to DOE/BJC from USEC are stored in a USEC cylinder yard rather and are being maintained by BJC in accordance with BJC procedures. However, USEC review of BJC procedures to assure consistency with USEC/NRC Safety Basis requirements has not been performed. 4. Computer software used to select cylinders to inspect and to record results of inspections of UF6 cylinders is not controlled in a configuration management program. 5. An administrative control required by the SAR for control of flammable and combustible materials in cylinder yards has not been fully implemented in inspection procedures. 6. Some SB requirements are not flowed down into implementing procedures. The specific items are identified on the Paducah Safety Basis (SB) Crosswalk Flowdown Matrix. | None Recommended | The review indicated that there were no significant questions or concerns with operational safety. |

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| <p>Old Salvage Yard, Y-12 Site Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. An assessment of the flowdown requirements indicated no standing order or required reading concerning the limited access requirement to the facility or change in facility status has been performed as required by the JCO. 2. Instruments are not available to satisfy the JCO requirement of 0.5 sec for the Personal Radiation Detection Instrument response time. As a result, access to the facility is limited and equipment important to safety such as fire alarms and telephones are no longer being checked to determine if they are functioning. No routine facility checks are being performed in relation to equipment identified as important to safety. | <ol style="list-style-type: none"> 1. Requirements or activities in the Safety Basis have not been incorporated into procedures. 2. An approved SAR with annual updates does not exist for the OSY. USQDs are not available to address identified deficiencies. As a result, the USQDs and SAR are inconsistent with each other and the procedures. 3. There was no documentation (such as required reading records) that the SBDs had been read by operations personnel. 4. A mechanism does not exist to effectively manage SB documents with the subcontractor. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |
| <p>K-33 Storage Pad, ETPP Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. No local emergency manual (LEM) was available at the K-33 Pad. A copy was located at security portal 8. Information in the LEM is not current. 2. Training needs to be put in place to ensure operators, supervisors, and managers understand SBDs and their contents including major nuclear materials of concern. In addition, a required reading program of SB documents by appropriate managers needs to be in place. 3. Requirements of NCSE-ET-K-33-1488 are not contained in the implementing procedures. | <ol style="list-style-type: none"> 1. Descriptions in the BNFL SB documents do not reflect current BJC management systems for NCSEs (NCSAs) or other work controls process (EWP). 2. The WEKEM inspection leak testing and corrective actions procedure has been revised such that it no longer contains "Attachment 3" called out in USQD 2001-04 3. The WESKEM/BJC personnel are not aware of an Authorization Agreement for K-33. 4. There is no programmatic review process in place to periodically evaluate USQDs at ETPP. 5. Uncontrolled copies of the SB documents are maintained in the K-14213 documents center. An MOU between BJC and BNFL documents BNFLs responsibility for maintaining the SB documents. The current MOU needs to be amended to release controlled copies of the BIO to BJC and their subcontractor. 6. A mechanism does not exist to effectively | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

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| <p>K-25 Vaults, ETPP Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The requirements to ensure changes in tenant managed areas and operations in the K-25 Building are appropriately evaluated to ensure compliance with the facility SB documents and other contract requirements as documented in the MOU are not captured in the WESKEM USQD procedures. In addition, the requirement to forward copies of USQDs and NCSEs to the FMSIT subcontractor is not implemented. 2. Facility emergency manuals for Vaults 1X, 2X, and 16A are not current. 3. The requirement for DOT-approved containers in K-USQD-0312 does not flow down into implementing procedures. 4. A process does not exist that describes, reviews, updates, and maintains current the listing of active and applicable SB documents for the K-25 Vaults. 5. Training is not in place to ensure operators, supervisors, and managers understand the SBDs and their contents including major nuclear materials of concern. In addition, a required reading program of SB documents by appropriate managers is not in place. 6. Requirements of an NCSE technical document do not flow down into the implementing procedures and/or is not fully implemented in the field. | <p>manage SB documents with the subcontractor.</p> <ol style="list-style-type: none"> 1. Descriptions in SB documents do not reflect the current BJC management systems for NCSEs versus NCSAs. 2. Operations/activity descriptions in the SB documents need to be updated to reflect activities no longer performed. 3. Procedures do not adequately or completely address an SB requirement. 4. Procedures need to convey the requirement rather than reference the SB document. 5. The <15% inventory limit for liquid hazardous wastes needs to be stated as a volume or mass limit to support effective control. 6. WESKEM procedures do not limit placement of combustible materials in the vaults as required by the BIO. 7. The WAC does not define limitations for transuranic activity <2% if the uranium activity. 8. WESKEM procedures do not address suspension of fissile material operations during loss of operation conditions for the R/CAAS per the TSR. 9. Flowdown of an NCSE technical supporting document is not adequate. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |
| <p>Waste Examination and Assay Facility Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The SBDs identify requirements for equipment; however, some of the subject equipment has been removed from the facility. 2. The USQD Program is tasked to ensure that changes regarding organizational structures and responsibilities are adequately reviewed and to ensure that appropriate actions are implemented. It was determined that changes regarding organizational structures and responsibilities were implemented without USQD coverage. | <ol style="list-style-type: none"> 1. The SBDs identify requirements that are not adequately addressed in the operating procedures, or the procedure(s) are out of date. 2. The SBDs identify requirements that either identify an obsolete organizational citation and/or cite a reference document that is no longer active. 3. The SBDs identify requirements that are predicated on the equipment being in operational status. Some of the equipment is in | <p>Upgrade Procedure controls with respect to verification of minimum container dimensions for the 7824 Facility.</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

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| Mike West/Waste Disposition | <p>used procedures as required.</p> <ol style="list-style-type: none"> 2. Unreviewed Safety Question Determinations (USQDs) were not performed to address changes in organizational structures and responsibilities stated in the SBD. There is no clear transition of duties and responsibilities established in the SBD from the one-contractor structure of 1998 to organizations that currently hold these responsibilities. There is no assurance that all responsibilities identified in the SBD have been transferred to current organizational entities. 3. Procedures have allowed for storage of waste containing up to 1% liquid which is in excess of the 0.5% maximum specified in the SBD. 4. Storage facilities have not tracked and managed inventories in terms of the number of 55-gal drums and the number of 4x4x6 boxes "or a comparable volume of other sized containers" as required by the SBD. 5. The database used for inventory control, DOTCALC, is not a validated/verified system. Formal procedures for use of the system do not exist. A corrective action, ICATS #3977, already exists to address this issue. 6. There is no documented evidence that currently used waste acceptance criteria were reviewed and approved by the Nuclear Criticality Safety (NCS) organization as required. NCSA 69 cites an obsolete document as the WAC relied upon; there is no evidence that currently used documents were reviewed and approved for use with NCSA 69. | <ol style="list-style-type: none"> 2. Programmed maintenance is not comprehensively planned and implemented. 3. A formal procedure for designation, tracking and control of documents that shall comprise the Safety Basis for facilities has not been established and implemented. 4. Obsolete organizational identification and responsibility citations are spread throughout the SBD. It is thus difficult to ensure that all necessary duties are currently assigned. 5. The requirement to "provide NCS requirements for a new or a change to an existing Fissile Material Operation through the NCS evaluation process" creates excessive delay in the pickup, and storage of waste which would otherwise be handled in accordance with the SBD criteria for less than 250 g UFEM. 6. The BJC procedure for conduct of emergency drills was cancelled without replacement. 7. Waste handling operations are not proceduralized. 8. Training procedures do not clearly cover the training and qualification of non-WESKEM personnel who perform hands-on work. 9. There is no uniform WESKEM policy regarding format for identification of the responsible person in procedures. See SR 174. 10. Alternative procedures for calculation of Pu isotopic content in waste authorized by NCSA-69 is not reflected in procedures. 11. There is no specific provision to inspect for excessive moisture condensation during waste storage facility inspections. 12. The interface between the EMEF Document Center and the WESKEM Document Center needs to be formally defined. 13. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with | | operational safety. |

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| | | <p>reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents.</p> | | |
| <p>Radioactive Solid Waste Storage Facilities 7823B, 7823C, 7823D, and 7823E Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The four waste types defined by the SAR and used for a direct control of particle size for dispersion analyses are not addressed in currently-used procedures as required. However, it appears that they are tracked sufficiently to maintain accurate facility radioisotope inventory control. 2. Unreviewed Safety Question Determinations (USQDs) were not performed to address changes in organizational structures and responsibilities stated in the SBD. There is no clear transition of duties and responsibilities established in the SBD from the one-contractor structure of 1998 to organizations that currently hold these responsibilities. There is no assurance that all responsibilities identified in the SBD have been transferred to current organizational entities. 3. Procedures have allowed for storage of waste containing up to 1% liquid which is in excess of the 0.5% maximum specified in the SBD. 4. Procedures fail to specify the limit that no individual container exceed 100 g 235UEFM and a requirement to confirm that the 250 g UFEM limit for the facility before a shipment is added to the facility is not stated. 5. The database used for inventory control, DOTCALC, is not a validated/verified system. Formal procedures for use of the system do not exist. A corrective action, ICATS #3977, already exists to address this issue. 6. Storage facilities have not tracked and managed inventories in terms of the number of 55-gal drums and the number of 4x4x6 boxes "or a comparable volume of other sized containers" as required by the SBD. | <ol style="list-style-type: none"> 1. The Configuration Management (CM) program has not been implemented effectively through subcontractors. 2. Programmed maintenance is not comprehensively planned and implemented. 3. A formal procedure for designation, tracking and control of documents that shall comprise the Safety Authorization Basis for facilities has been established and implemented. 4. Obsolete organizational identification and responsibility citations are spread throughout the SBD. It is thus impossible to ensure that all necessary duties are currently assigned. 5. The requirement to "provide NCS requirements for a new or a change to an existing Fissile Material Operation through the NCS evaluation process" creates excessive delay in the pickup, and storage of waste which would otherwise be handled in accordance with the SBD criteria for less than 250 g UFEM. 6. The BJC procedure for conduct of emergency drills was cancelled and not replaced. 7. Waste handling operations are not proceduralized. 8. Training procedures do not clearly cover the training and qualification of non-WESKEM personnel who perform hands-on work. 9. There is no uniform WESKEM policy regarding format for identification of the responsible person in procedures. 10. There is no procedural provision for operation of the facilities in a standby mode. 11. There is no procedural requirement to locate portable fire extinguishers at each facility. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

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| | | <ol style="list-style-type: none"> 12. There is no specific provision to inspect for excessive moisture condensation during waste storage facility inspections. 13. A USQD for the RSWSF facilities was written for the consolidation of filter cake waste. The procedure written for this operation calls for the repackaging to be done in Building 7823, which is not a RSWSF facility. 14. Procedure WD-WM-SWO-501.36 cites several obsolete documents, is out of date and in need of upgrading. 15. Open-and-consolidate operations are not addressed by procedure. 16. The interface between the EMEF Document Management Center and the WESKEM DMC needs to be formally defined. 17. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents. | | |
| <p>Radioactive Solid Waste Storage Facilities 7831Q, 7831C, 7842B, 7842C, 7878A, and 7934 Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The four waste Types defined by the SAR and used for a direct control of particle size for dispersion analyses are not addressed in currently-used procedures as required. However, it appears that they are tracked sufficiently to maintain accurate facility radioisotope inventory control. 2. Unreviewed Safety Question Determinations (USQDs) were not performed to address changes in organizational structures and responsibilities stated in the SBD. There is no clear transition of duties and responsibilities established in the SBD from the one-contractor structure of 1998 to organizations that currently hold these responsibilities. There is no assurance that all responsibilities identified in the SBD have been | <ol style="list-style-type: none"> 1. The Configuration Management (CM) program has not been implemented effectively through subcontractors. 2. Programmed maintenance is not comprehensively planned and implemented. 3. A formal procedure for designation, tracking and control of documents that shall comprise the Safety Basis for facilities has not been established and implemented. 4. Obsolete organizational identification and responsibility citations are spread throughout the SBD. It is thus difficult to ensure that all necessary duties are currently assigned. 5. The requirement to "provide NCS requirements for a new or a change to an existing Fissile | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

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| | <p>transferred to current organizational entities.</p> <p>3. Procedures have allowed for storage of waste containing up to 1% liquid which is in excess of the 0.5% maximum specified in the SBD.</p> <p>4. Storage facilities have not tracked and managed inventories in terms of the number of 55-gal drums and the number of 4x4x6 boxes "or a comparable volume of other sized containers" as required by the SBD.</p> <p>5. The database used for inventory control, DOTCALC, is not a validated/verified system. Formal procedures for use of the system do not exist. A corrective action, ICATS #3977, already exists to address this issue.</p> | <p>Material Operation through the NCS evaluation process" creates excessive delay in the pickup, and storage of waste which would otherwise be handled in accordance with the SBD criteria for less than 250 g UFEM.</p> <p>6. The BJC procedure for conduct of emergency drills was cancelled and not replaced.</p> <p>7. Waste handling operations are not proceduralized.</p> <p>8. Training procedures do not clearly cover the training and qualification of non-WESKEM personnel who perform hands-on work.</p> <p>9. There is no uniform WESKEM policy regarding format for identification of the responsible person in procedures.</p> <p>10. There is no procedural provision for operation of the facilities in a standby mode.</p> <p>11. There is no procedural requirement to locate portable fire extinguishers at each facility.</p> <p>12. There is no specific provision to inspect for excessive moisture condensation during waste storage facility inspections.</p> <p>13. A USQD for the RSWSF facilities was written for the consolidation of filter cake waste. The procedure written for this operation calls for the repackaging to be done in Building 7823, which is not a RSWSF facility.</p> <p>14. Procedure WD-WM-SWO-501.36 cites several obsolete documents, is out of date and in need of upgrading.</p> <p>15. Open and consolidate operations are not addressed by procedure</p> <p>16. The interface between the EMEF Document Management Center and the WESKEM DMC needs to be formally defined.</p> <p>17. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents</p> | | |

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| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|--|--|--|-----------------------|--|
| | | for the facilities. Required reading and associated records were not in place for the facility SB documents. | | |
| Retrievable Waste Storage Wells Facility 7822A, 7823A, 7827, 7829 Mike West/ Waste Disposition | <ol style="list-style-type: none"> 1. The four waste Types defined by the SAR and the limitation on particulates less than 10 microns in diameter established in the TSR, used for a direct control of particle size for dispersion analyses, are not addressed in currently-used procedures as required. Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "<i>Violation of Technical Safety Requirement Concerning Particulate Inventory Control.</i>" 2. Unreviewed Safety Question Determinations (USQDs) were not performed to address changes in organizational structures and responsibilities stated in the SBD. It was determined that changes to organizational structures and responsibilities were implemented without USQD coverage. 3. The calculation system and database used for inventory control, DOTCALC, is not a validated/verified system. Formal procedures for use of the system do not exist. A corrective action, ICATS #3977, already exists to address this issue. 4. Facilities 7822A and 7823A are empty, inactive wells transferred to the Surveillance and Maintenance (S&M) Program. However, a USQD was not processed to document that these units are in STANDBY or that the responsibilities for S&M have transferred. | <ol style="list-style-type: none"> 1. The Configuration Management (CM) program has not been implemented effectively through subcontractors. 2. Programmed maintenance is not comprehensively planned and implemented. 3. A formal procedure for designation, tracking and control of documents that shall comprise the Safety Basis for facilities has not been established and implemented. 4. Obsolete organizational identification and responsibility citations are spread throughout the SBD. It is thus difficult to ensure that all necessary duties are currently assigned. 5. The BJC procedure for conduct of emergency drills was cancelled and not replaced. 6. Training procedures do not clearly cover the training and qualification of non-WESKEM personnel who perform hands-on work. 7. There is no uniform WESKEM policy regarding format for identification of the responsible person in procedures. 8. Operating procedure WD-OP-X501.15 erroneously references a "Ref. 6", which is not listed, for NCS limits. 9. The Inspection instructions of operating procedure WD-OP-X501.15 do not call for examination of the grading around the wells to ensure water runoff. 10. Operating procedure WD-OP-X501.15 does not contain a specific limitation that storage and retrieval operations may involve only one well at a time. 11. The interface between the EMEF Document Management Center and the WESKEM DMC needs to be formally defined. | None Recommended | The review indicated that there were no significant questions or concerns with operational safety. |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|---|--|--|-------------------------|---|
| | | <p>12. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents.</p> | | |
| <p>Radioactive Solid Waste Storage/Staging Pads 7822J & 7842A Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The SBDs state requirements regarding the limits for liquid hazardous waste stored at the facility. It was determined that the operating procedures do not adequately define/clarify these limits consistent with the Safety Basis Document(s). 2. The SBDs state that eighteen topical areas are addressed by the Conduct of Operations Program; however, it was determined that only eleven of the required topical areas are addressed by WESKEMs Conduct of Operations Program. 3. The SBDs state requirements regarding the USQD Program. The USQD Program is tasked to ensure that changes regarding facility operations are adequately reviewed and to ensure that appropriate actions are implemented. It was determined that changes to the facility operations were implemented without USQD coverage. 4. The SBDs state a requirement regarding inventory control. The database used for inventory control, DOT-CALC, is not a validated/verified system. Formal procedures for use of this system do not exist. A corrective action, ICATS number 3977, already exists to address this issue. 5. The SBDs provide a TSR requirements regarding the particulate size for LLW waste materials. It was determined that the necessary programs and/or procedures are not in place to adequately regulate particle size limits (less than 10 micrometers) for the waste generator. <p>Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "Violation of Technical</p> | <ol style="list-style-type: none"> 1. The SBDs have requirements that are not adequately addressed in the operating procedures. 2. The SBDs have requirements that either identify an obsolete organizational citation and/or cite a reference document that is no longer active. 3. The SBDs have requirements regarding the Configuration Management Program. The management assessment concluded that the Configuration Management Program needs improvement. 4. The SBDs have requirements regarding document control through a records management center. The interface between EMEF Document Management Center and the WESKEM Document Center needs to be formally defined. 5. The SBDs have requirements regarding evacuation drills. It appears that BJC procedures regarding evacuation drills have been cancelled without replacement. 6. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|---|--|---|-------------------------|---|
| | <i>Safety Requirement Concerning Particulate Inventory Control."</i> | | | |
| <p>Transuranic Waste Storage Facilities 7826 & 7834 Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The SBDs state requirements regarding the limits for liquid hazardous waste stored at the facility. It was determined that the operating procedures do not adequately define/clarify these limits consistent with the Safety Basis Document(s). 2. The SBDs state that eighteen topical areas are addressed by the Conduct of Operations Program; however, it was determined that only eleven of the required topical areas are addressed by WESKEMs Conduct of Operations Program. 3. The SBDs state a requirement regarding inventory control. The database used for inventory control, DOT-CALC, is not a validated/verified system. Formal procedures for use of this system do not exist. A corrective action, ICATS number 3977, already exists to address this issue. 4. The SBDs provide requirements regarding storage volume limits. It was determined that the SBD citations for storage volume limits are self-inconsistent and are also inconsistent with the waste acceptance criteria defined in operating procedures. 5. The SBDs provide a TSR requirements regarding the particulate size for LLW waste materials. It was determined that the necessary programs and/or procedures are not in place to adequately regulate particle size limits (less than 10 micrometers) for the waste generator. Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "Violation of Technical Safety Requirement Concerning Particulate Inventory Control." 6. The SBDs state requirements regarding the USQD Program. The USQD Program is tasked to ensure that changes regarding facility operations are adequately reviewed and to ensure that | <ol style="list-style-type: none"> 1. The SBDs have requirements that are not adequately addressed in the operating procedures. 2. The SBDs have requirements that either identify an obsolete organizational citation and/or cite a reference document that is no longer active. 3. The SBDs have requirements regarding the Configuration Management Program. The management assessment concluded that the Configuration Management Program needs improvement. 4. The SBDs have requirements regarding document control through a records management center. The interface between EMEF Document Management Center and the WESKEM Document Center needs to be formally defined. 5. The SBDs have requirements regarding storage of RCRA waste at the facility. SBD language regarding RCRA storage implies that storage of RCRA waste is permissible; however, it is not permissible per the RCRA permit. 6. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|---|--|---|-------------------------|---|
| | <p>appropriate actions are implemented. It was determined that changes to the facility operations were implemented without USQD coverage.</p> | | | |
| <p>Remote Handled TRU Waste Storage Bunker 7833 Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The SBDs state requirements regarding the limits for liquid hazardous waste stored at the facility. It was determined that the operating procedures do not adequately define/clarify these limits consistent with the Safety Basis Document(s). 2. The SBDs state that eighteen topical areas are addressed by the Conduct of Operations Program; however, it was determined that only eleven of the required topical areas are addressed by WESKEMs Conduct of Operations Program. 3. The SBDs state a requirement regarding the USQD Program. The USQD Program is tasked to ensure that changes regarding organizational structures and responsibilities are adequately reviewed and to ensure that appropriate actions are implemented. It was determined that changes to organizational structures and responsibilities were implemented without USQD coverage. 4. The SBDs provide requirements regarding storage volume limits. It was determined that the SBD citations regarding storage volume limits are self-inconsistent and are also inconsistent with the waste acceptance criteria defined in operating procedures. 5. The SBDs provide a TSR requirement regarding the particulate size for TRU waste materials. It was determined that the necessary programs and/or procedures are not in place to adequately regulate particle size limits (less than 10 micrometers) for waste received from the waste generator. <p>Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "Violation of Technical Safety Requirement Concerning Particulate Inventory Control."</p> | <ol style="list-style-type: none"> 1. The SBDs have requirements that are not adequately addressed in the operating procedures. 2. The SBDs have requirements that either identify an obsolete organizational citation and/or cite a reference document that is no longer active. 3. NCSE requirements address the amounts of liquid waste that may be stored at the facility. These NCSE requirements are less restrictive than the SBDs. 4. An NCSE requirement addresses the storage of waste in an above ground facility; however, the 7883 facility is described as 85% below grade. This is a contradiction within the NCSE. 5. An SBD has a requirement regarding changes that must be implemented for the next SAR update. The SAR has not been updated annually as required, and the items identified in the SBD have not been incorporated. 6. The SBDs identify the need for a Configuration Management Program. The management assessment concluded that the Configuration Management Program needs improvement. 7. The SBDs have requirements regarding evacuation drills. It appears that BJC procedures regarding evacuation drills have been cancelled without replacement. 8. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|---|---|---|-------------------------|---|
| | <p>6. The SBDs state a requirement regarding inventory control. The database used for inventory control, DOT-CALC, is not a validated/verified system. Formal procedures for use of this system do not exist. A corrective action, ICATS number 3977, already exists to address this issue.</p> | <p>9. The SBDs have requirements regarding document control through a records management center. The interface between EMEF Document Management Center and the WESKEM Document Center needs to be formally defined.</p> | | |
| <p>Remote Handled TRU Waste Storage Facility 7855 Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The SBDs state requirements regarding the limits for liquid hazardous waste stored at the facility. It was determined that the operating procedures do not adequately define/clarify these limits consistent with the Safety Basis Document(s). 2. The SBDs state that eighteen topical areas are addressed by the Conduct of Operations Program; however, it was determined that only eleven of the required topical areas are addressed by WESKEMs Conduct of Operations Program. 3. The SBDs state a requirement regarding the USQD Program. The USQD Program is tasked to ensure that changes regarding organizational structures and responsibilities are adequately reviewed and to ensure that appropriate actions are implemented. It was determined that changes to organizational structures and responsibilities were implemented without USQD coverage. 4. The SBDs state a requirement regarding inventory control. The database used for inventory control, DOT-CALC, is not a validated/verified system. Formal procedures for use of this system do not exist. A corrective action, ICATS number 3977, already exists to address this issue. 5. The SBDs provide a TSR requirement regarding the particulate size for TRU waste materials. It was determined that the necessary programs and/or procedures are not in place to adequately regulate particle size limits (less than 10 micrometers) for waste received from the waste | <ol style="list-style-type: none"> 1. The SBDs have requirements that are not adequately addressed in the operating procedures. 2. The SBDs have requirements that either identify an obsolete organizational citation and/or cite a reference document that is no longer active. 3. The SBDs identify the need for a Configuration Management Program. The management assessment concluded that the Configuration Management Program needs improvement. 4. The SBDs have requirements that state that programmatic controls shall be in place to ensure that procedures are kept current as conditions change. The management assessment revealed that some operating procedures are out-of-date. 5. The SBDs have requirements regarding document control through a records management center. The interface between EMEF Document Management Center and the WESKEM Document Center needs to be formally defined. 6. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents. | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|--|---|--|-------------------------|---|
| | <p>generator. Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "Violation of Technical Safety Requirement Concerning Particulate Inventory Control."</p> | | | |
| <p>Solid Waste Compactor Facility 7831 Mike West/Waste Disposition</p> | <ol style="list-style-type: none"> 1. The SBDs state requirements regarding the limits for liquid hazardous waste stored at the facility. It was determined that the operating procedures do not adequately define/clarify these limits consistent with the Safety Basis Document(s). 2. The SBDs state that eighteen topical areas are addressed by the Conduct of Operations Program to ensure safe operation of the facility; however, it was determined that only eleven of the required topical areas are addressed by WESKEMs Conduct of Operations Program. 3. The SBDs provide requirements regarding storage volume limits. It was determined that the SBD citations for storage volume limits are self-inconsistent and are also inconsistent with the waste acceptance criteria defined in operating procedures. 4. The SBDs provide a TSR requirement regarding the particulate size for TRU waste materials. It was determined that the necessary programs and/or procedures are not in place to adequately regulate particle size limits (less than 10 micrometers) for the waste generator. Addressed in occurrence report ORO—BJC-X10WSTEMRA-2002-0001, "Violation of Technical Safety Requirement Concerning Particulate Inventory Control." 5. The SBDs state a requirement regarding inventory control. The database used for inventory control, DOT-CALC, is not a validated/verified system. Formal procedures for use of this system do not exist. A corrective action, ICATS number 3977, already exists to address this issue. | <ol style="list-style-type: none"> 1. The SBDS have requirements that are not adequately addressed in the operating procedures. 2. The SBDs have requirements that either identify an obsolete organizational citation and/or cite a reference document that is no longer active. 3. A review of the SBDs against the operating procedures revealed that [1] some of the operating procedures do not adequately reflect the current facility status or [2] that the procedures should be updated. 4. The SBDs identify a need for a Configuration Management Program. The management assessment concluded that the Configuration Management Program needs improvement. 5. An SBD has requirements regarding the next update to the TSR. The TSR has not been updated annually as required, and therefore the specific changes identified in the SBD have not been incorporated. 6. The SBDs have requirements regarding evacuation drills. It appears that BJC procedures regarding evacuation drills have been cancelled without replacement. 7. The SBDs have requirements regarding control of documents through a records management center. The interface between EMEF Document Management Center and the WESKEM Document Center needs to be formally defined. 8. The SBDs have requirements regarding facility operations. Discontinued operations are not | <p>None Recommended</p> | <p>The review indicated that there were no significant questions or concerns with operational safety.</p> |

SB Flowdown Summary

| Facility/MOP | Findings | Observations | Compensatory Measures | Overall Safety Assessment |
|--------------|----------|---|-----------------------|---------------------------|
| | | <p>reflected in the SAR or via the USQD process.</p> <p>9. Part of this assessment included questions from the BJC Management Assessment Checklist and Report. Item 10 on page 7 deals with reading and understanding the SB documents for the facilities. Required reading and associated records were not in place for the facility SB documents.</p> | | |

Enclosure 4
Safety Basis Flowdown Assessment Plan

K. Min Feb 15, 2002

**Bechtel Jacobs Company
Safety Basis Process
Performance Monitoring Report**

TYPE: Management Assessment

TITLE: Implementation of the BJC Safety Basis Process, Revision 1
November 26, 2001

NUMBER: ECS/NS-02-01 (02 = FY 2002)

ORGANIZATION: BJC Projects and the Nuclear Safety / Nuclear Criticality
Safety Organization

LOCATION: All Sites

DATES: October 31, 2001, through February 11, 2002

PROJECT NUMBER: Engineering & Construction Services

PERFORMED BY:

PURPOSE: To assess the implementation of the Bechtel Jacobs Company (BJC) Safety Basis (SB) process. This assessment will be a field review of the SB requirements, facility categorization, flow down of SB requirements to procedures, knowledge of facility management responsible for maintaining operations in accordance with SB controls, and document management of SB related documents.

RESULTS SUMMARY:

Bechtel Jacobs Company
Safety Basis Process
Performance Monitoring Report

TYPE: Management Assessment

TITLE: Implementation of the BJC Safety Basis Process, Revision 1

NUMBER: ECS/NS-02-01 (02 = FY 2002)

ORGANIZATION: BJC Projects and the Nuclear Safety / Nuclear Criticality Safety Organization

LOCATION: All Sites

DATES: October 31, 2001, through February 11, 2002

PROJECT NUMBER: Engineering & Construction Services

PERFORMED BY: See attached list of assessors *H. Men* Term leader Feb 15, 20

PURPOSE: To assess the implementation of the Bechtel Jacobs Company (BJC) Safety Basis (SB) process. This assessment will be a field review of the SB requirements, facility categorization, flow down of SB requirements to procedures, knowledge of facility management responsible for maintaining operations in accordance with SB controls, and management of SB related documents.

ASSESSMENT SUMMARY:

This Management Assessment report is a summary of the results of separate assessments performed for each BJC category 2 and 3 nuclear facility to assess the flowdown and effective implementation of safety basis requirements. The Safety Basis Flowdown Assessments were performed as a corrective action associated with BJC Occurrence Report ORO--BJC-Y12WASTE-2001-0010 and associated NTS Report NTS-ORO-BJC-BJCPM-2001-0004. Separate facility level assessment reports have been placed into the BJC Document Management Center and a file copy is maintained by the Nuclear Safety Organization.

1.0 Scope

- The scope of this assessment includes all BJC nuclear category 2 and 3 and radiological facilities. It will be organized by site and project and include BJC self-performed work as well as subcontractors. An implementation plan has been developed and submitted to DOE for approval to bring the SB documents into compliance with 10CFR830 Subpart B by April 2003. This assessment will include a review of hazard categorization and documentation, flow down of SB requirements to procedures, field implementation of requirements, and knowledge of facility management responsible for maintaining operations in accordance with SB controls.

The scope includes:

- Facility hazard classification of Nuclear Category 2, 3 facilities
- Flow down of safety basis requirements – Nuclear Category 2 and 3 facilities
- Field implementation of SB related requirements – Nuclear Category 2 and 3 facilities
- Knowledge, training, and qualifications of appropriate managers, supervisors, and operators – Nuclear Category 2 and 3 facilities
- Flow down of requirements to subcontractors – Nuclear Category 2 and 3 facilities

Specific lines of inquiry are contained in attachment 1.

Some facilities have completed or begun reviews of the areas to include in this assessment. Where recent reviews have been completed, a spot check of the adequacy of the facility review will be sufficient. The use of spot checks rather than completion of a completed attachment 1 requires team leader concurrence.

2.0 Relevant Procedures

- PQ-A-1420; *Management Assessment*
- BJC-NS-1010; *Nuclear Safety/Nuclear Criticality Safety Program Assessment Plan*
- BJC-NS-1002, *Safety Documentation for Nuclear Category 2 & 3 Facilities*
- BJC-NS-1009, *Safety Documentation for Facilities With Hazards Less Than Nuclear Category 3*
- DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*

3.0 Assessment Teams

There will be several two-person teams depending on personnel availability. BJC personnel will not assess areas for which they have responsibility. The teams will be formed from the following personnel:

Ken Mero, BJC Team Lead
Alvin Gwathney, BJC
Dave Reed, BJC
Joe Little, BJC
Joe McNeeley, BJC
Chris Caldwell, SAIC
Tim Floyd, SAIC
Tom Dahl, TetraTech
Carl Pilj, DOE ORO
Lonnie Brock, DOE ORO
Dennis Myers, PWT
Charlie Griffiths, PWT
Doan Falconer, Parallax
Brian Debs, Parallax
Paul Kellog, Parallax

4.0 Schedule

The schedule will be developed based on availability of team members and will attempt to minimize the effects on facility operations.

The priority of facilities for assessment

1. Nuclear Category 2
2. Nuclear Category 3
3. Radiological Facilities

5.0 Results

Attachment 1 will be completed for each facility assessed. The significant results of the assessment will be highlighted using attachment 2. Attachments 1 and 2 will be provided to the MOPs when they are completed.

ATTACHMENT 1

Management Assessment Checklists and Reports

MANAGEMENT ASSESSMENT CHECKLIST AND REPORT

Project Title: _____ Facility: _____

Assessed Area: **Facility Hazard Classification of Nuclear Category 2, 3
and Radiological Facilities**

Assessment Team Members: _____

Project personnel interviewed: _____

References:

| Checklist: | | Results: | | |
|--|---|----------|----|---------------------------|
| Item No. | Criteria | OK | No | Remarks/ Conditions Found |
| 1. | Does Preliminary Hazard Screening (PHS) exist? See BJC-NS-1002 or BJC-NS-1009. | | | |
| 2. | Does Hazard Identification and Facility Classification (HIFC) form exist? | | | |
| 3. | Is the HIFC approved by DOE? | | | |
| If the facility had an initial classification of Cat 2 and was downgraded to Cat 3, or Cat 3 to Radiological, or Rad to non-radiological, check the following (otherwise, mark "NA"): | | | | |
| 4. | Does supporting analysis exist for the downgrading? | | | |
| 5. | Has the analysis supporting the categorization downgrade been approved by DOE? | | | |
| For each Cat 2 & 3 & Radiological facility: | | | | |
| 6. | Does characterization information (e.g. rad surveys, chemical analyses, inventories, etc) exist for current conditions? | | | |
| 7. | Does the characterization information support the facility's categorization? | | | |
| For each Cat 2 & 3 nuclear facility provide a list of current DOE-approved authorization basis documents including: | | | | |
| 8. | Nuclear Safety (DSA, SAR, BIO, ASA, TSR, OSR, SER, etc.) | | | |
| 9. | Non-nuclear Safety (HASPs, hazard surveys, hazard assessments, emergency action levels, etc. | | | |
| 10. | DOE approvals of changes from positive Unreviewed Safety Questions (USQs). | | | |
| 11. | Is the SB list consistent with the Authorization Agreement for the facility? (if an AA exists) | | | |
| 12. | For each item above that cannot be met, is there a corrective action plan, schedule, & available funding? | | | |
| For Radiological facilities: | | | | |
| 13. | Provide a list of any documents affecting categorization: USQDs, NCSEs, NCSDs, other. | | | |

Submitted: _____ Date: _____ Approved By: _____ Date: _____
Team Member
Assessment Team Leader

MANAGEMENT ASSESSMENT CHECKLIST AND REPORT

Project Title: _____ Facility: _____

Assessed Area: **Flow Down of Authorization Basis Requirements to Procedures**

Assessment Team Members: _____

Project personnel interviewed: _____

References:

| Checklist: | | Results: | | |
|------------|---|----------|----|---------------------------|
| Item No. | Criteria | OK | No | Remarks/ Conditions Found |
| 1. | Have surveillance procedures been developed and approved that incorporate clearly defined acceptance criteria from TSR/OSR requirements? | | | |
| 2. | Do surveillance procedures required by TSRs/OSRs ensure compliance within the necessary periodicity? | | | |
| 3. | Have administrative controls been established to ensure compliance with applicable TSR/OSR limiting conditions of operation (LCO) action statements? | | | |
| 4. | Have the initial testing, in-service surveillance and maintenance requirements to ensure integrity of design features for safety (DFS) been identified & performed satisfactorily and within required periodicity? | | | |
| 5. | Are hazardous material inventories maintained within the allowable limits established in the SB documents? | | | |
| 6. | Have USQD screenings or USQDs been completed for all changes to the facility, SB documents, operations, activities, or procedures? | | | |
| 7. | Do all commitments, assumptions & other req'ments (statements that begin with will, shall, must, all, etc.) in the SB documents flow down to procedures that ensure that the req'ments are met by facility activities? Note: Many of these items will not begin with will shall, must, etc. and may be buried in the analysis sections. | | | |
| 8. | Do commitments, assumptions, & other requirements from technical/design documents referenced in the SB flow into the SB documents or implementing documents? | | | |
| 9. | Are facility SB documents and Authorization Agreements developed, maintained current, and utilized. | | | |

| | | | | |
|-----|---|--|--|--|
| | NOTE: Annual updates to SARS and other SB documents have not always been submitted to DOE. In such cases USQDs prepared since the last update should be reviewed to ensure that any commitments, assumptions & other req'ments are included in flow down reviews? | | | |
| 10. | Are structures, systems & components (SSCs) important to safety described in SB documents included in a configuration management process? | | | |
| 11. | Prepare a crosswalk of SB req'ments to implementing procedures to verify that the SB req'ments are fully implemented. | | | |
| 12. | Are all SB documents accurate, effective, controlled, and available in the DMC? | | | |

Submitted: _____ Date: _____ Approved By: _____ Date: _____
Team Member Assessment Team Leader

MANAGEMENT ASSESSMENT CHECKLIST AND REPORT

Project Title: _____ Facility: _____

Assessed Area: **Field Implementation of SB-related Requirements**

Assessment Team Members: _____

Project personnel interviewed: _____

References:

| Checklist: | | Results: | | |
|------------|---|----------|----|---------------------------|
| Item No. | Criteria | OK | No | Remarks/ Conditions Found |
| 1. | Does the facility and its operations match the SB documents? Note: This will require a walkdown of the facility . | | | |
| 2. | Are approved and controlled procedures and other work instructions used in performing operations? | | | |
| 3. | Are approved and controlled procedures and other work instructions used in performing required surveillances? | | | |
| 4. | Does the facility/operations manager control & approve commencement of operations and other new activities? | | | |
| 5. | Are the safety management programs specified in the SB documents properly implemented in the field? | | | |

Submitted: _____ Date: _____ Approved By: _____ Date: _____
Team Member Assessment Team Leader

MANAGEMENT ASSESSMENT CHECKLIST AND REPORT

Project Title: _____ Facility: _____

Assessed Area: **Knowledge, Training, and Qualifications of Appropriate Managers, Supervisors, and Operators**

Assessment Team Members: _____

Project personnel interviewed: _____

References: _____

| Checklist: | | Results: | | |
|---|--|----------|----|---------------------------|
| Item No. | Criteria | OK | No | Remarks/ Conditions Found |
| The following are a minimum set of questions that project managers, facility managers, and/or facility operators should be able to answer concerning the facility AB documents and flow down requirements: | | | | |
| 1. | What are the facility SB documents for operation of the facility? N/A for Operators. They should know that they are to work from procedures. | | | |
| 2. | Where can a copy of the SB documents be obtained or reviewed? N/A for operators. They should know to work from current approved procedures. | | | |
| 3. | What are the worst accidents and initiating events that could occur at the facility as discussed in the SB documents? | | | |
| 4. | Describe the controls to prevent or mitigate (minimize the severity) the accidents described in the SB documents, including both engineered & administrative controls. | | | |
| 5. | Will surveillances, tests, routine checks, &/or maintenance activities required on facility SSCs ensure that features that prevent or mitigate accidents function as required? | | | |
| 6. | What types & quantities of nuclear materials are present in the facility? How much is allowed in the facility? | | | |
| 7. | What controls are in place to ensure that the types and amounts of allowable nuclear materials are not exceeded? | | | |
| Training and Qualification: | | | | |
| 8. | Are training & qualification req'ments defined for staff & line management involved in managing the nuclear facilities & in developing, maintaining, and implementation of SB documents? | | | |
| 9. | Are training and qualifications and training records complete and current? | | | |
| 10. | Have line management and staff read and understood the SB documents for their facilities and do the training records reflect completion of training? | | | |

Approved By: _____ Date: _____
 Assessment Team Leader

MANAGEMENT ASSESSMENT CHECKLIST AND REPORT

Project Title: _____ Facility: _____

Assessed Area: **Flow Down of Requirements to Subcontractors**

Assessment Team Members: _____

Project personnel interviewed: _____

References:

| Checklist: | | Results: | | |
|------------|---|----------|----|---------------------------|
| Item No. | Criteria | OK | No | Remarks/ Conditions Found |
| 1. | For facilities where work is performed by subcontractors, are the subcontractor's roles and responsibilities for developing, maintaining, & implementing SB requirements well defined? Are these roles and responsibilities imposed by the subcontract? | | | |
| 2. | Does the subcontract describe or does a process exist which describes which SB documents are applicable for the facilities operated by the subcontractor? | | | |

Submitted: _____ Date: _____ Approved By: _____ Date: _____
 Team Member Assessment Team Leader

ATTACHMENT 2

SAFETY BASIS REVIEW

Facility _____ Nuclear Category _____

_____ was reviewed as part of an assessment of all nuclear category 2 and 3 facilities. The assessment was identified as a corrective action for the NTS report, NTS-ORO-BJC-BJCPCPM-2001-0004. Technical adequacy of the SB documents did not include a detailed review of calculations, but did include a review to ensure assumptions made in the SB documents remain valid.

The following areas were reviewed:

- Facility hazard classification of nuclear category 2, 3 and radiological facilities;
- Flow down of SB requirements to procedures;
- Field implementation of SB-related requirements;
- Knowledge, training, and qualification of facility management responsible for maintaining operations in accordance with SB controls;
- Flow down of requirements to subcontractors.

The detailed results of the review are included in the attached checklists.

The assessment team will make a statement the either the review indicated that the facility categorization was correct and documentation existed to support the categorization or the facility categorization was not correct or sufficient documentation did not exist to support the categorization.

The assessment team will make a statement that the review indicated that there were no significant questions or concerns with operational safety or list the questions or concerns with operational safety.

The following are the opportunities for improvement identified during the review:

1. USQDs, if required
2. Compensatory measures recommended, if applicable
3. Items to consider in development of rule compliant DSA.

Additional Comments:

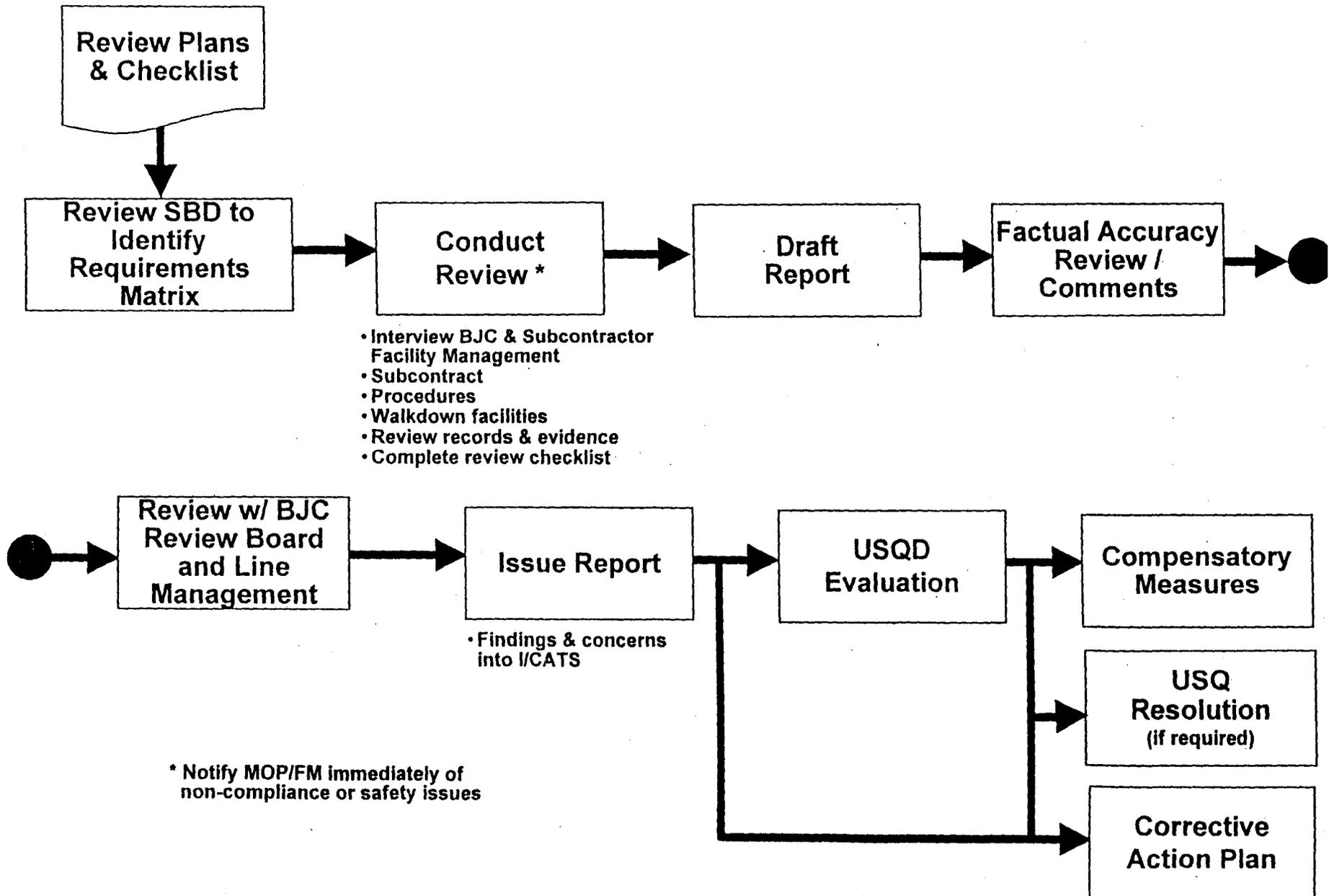
Reviewer/date: _____ Reviewer/date: _____

Team Leader/date: _____

Enclosure 5
Flowchart of Safety Basis Assessment Process

L. Mu Feb 15, 2002

Safety Basis Flowdown Implementation Review



Enclosure 6
Criteria for Selection of Assessors and List of Assessors

K. M. W. Feb 15, 2002
Page 1 of 1

Criteria for Review and Acceptance of Assessor Qualifications

1. Independence from the facility, operations, and/or activity being assessed.
2. Extensive experience in the nuclear industry, i.e., DOE, commercial nuclear power, naval nuclear power.
3. Extensive experience performing inspections at commercial nuclear reactor facilities or performing assessments at DOE nuclear facilities.

Assessors participating in the reviews:

All Facilities Except Waste Disposition

Mero – BJC Nuclear Safety Manager – Over 30 years nuclear experience in both DOE and naval nuclear power operations. Qualified as a lead auditor.

Little – BJC Nuclear Safety Lead – Over 35 years experience preparing safety documents for ERMW projects and commercial nuclear power plants.

Gwathney – BJC Nuclear/Facility Safety Technical Lead for Waste Disposition and Waste Operations. Over 20 years nuclear experience including over five years in the nuclear/facility safety position.

McNeeley – BJC Nuclear/Facility Technical Lead for ETTP Depleted Uranium Cylinder Yards. Over 14 years experience working with DOE isotope enrichment technologies.

Caldwell – Consultant - Over 20 years experience in commercial, naval nuclear power, and DOE nuclear facilities. Over nine years experience as a NRC Senior Resident Inspector at a commercial reactor site.

Dahl – Consultant - Over 30 years experience as a project manager and nuclear system operations manager in DOE and naval nuclear power operations.

Debs - Consultant – Over 30 years experience in the DOE nuclear complex, commercial nuclear industry, and naval nuclear power program including an inspector for the Nuclear Regulatory Commission.

Falconer – Consultant – Over 20 years nuclear facility experience including Resident Inspector and Operator License Examiner for the Nuclear Regulatory Commission.

Floyd – Consultant – Over 20 years nuclear industry experience including lead licensing engineer for two commercial plants.

Griffith – Consultant – Over 25 years nuclear industry experience including management advisor to DOE Facility Managers for restart of DOE nuclear facilities.

Kellogg – Consultant – Over 30 years nuclear industry experience including NRC experience directing routine and non-routine inspection activities at commercial plants.

Myers – Consultant – Over 25 years nuclear industry experience including over five years as NRC Senior Resident Inspector and inspector at a commercial plant.

Enclosure 7

Safety Basis Review Board Charter

B. Mum : Feb 15, 2002



| | | |
|--|---|-------------|
| OWNER: General Management | BJC-GM-211 | REV. NO. 2 |
| SUBJECT AREA: Safety | EFFECTIVE DATE: 12/19/01 | Page 1 of 2 |
| DOC TYPE: Charter | PREPARER/POC: Bruce Wilson | |
| TITLE: SAFETY BASIS REVIEW BOARD | APPROVED BY/DATE: John Lyons 12/19/01 [Approval Signature on File] | |

MISSION AND SCOPE

In the Corrective Action Plan for Noncompliance Tracking System (NTS) report, NTS-ORO—BJC-BJCPM-2001-0004, *Inadequacy in Safety Authorization Basis Management*, action five (5), Bechtel Jacobs Company LLC (BJC), committed to the following corrective action: "Conduct review of AB [Authorization Basis] documents for all category 2 and 3 nuclear facilities to assess flowdown of requirements into subcontracts and implementing documents, technical adequacy of AB documents, knowledge and understanding of BJC and subcontractor staff, and implement compensatory measures if needed."

The BJC Nuclear Facility Safety Manager is responsible for implementation of this corrective action. The Safety Basis (SB) Review Board is established to oversee implementation of this corrective action and associated findings. As an initial task the Board is responsible for reviewing the results of the SB Flow Down Assessment for each facility in response to the NTS corrective action. The Board will also review the results of assessments of facilities for radiological categorization.

This Board will have ongoing responsibility for: reviewing AB documents; reviewing AB document updates or revisions; reviewing resolution of Department of Energy (DOE) comments on AB documents; reviewing adequacy of corrective actions associated with DOE Oak Ridge Operations (ORO) or DOE Headquarters (HQ) AB document assessments; and reviewing plans for resumption of suspended or shutdown activities in category 2 and 3 nuclear facilities.

ROLES

The Board will review the SB Flow Down Assessment reports and receive a debriefing of the assessment results along with the responsible Manager of Projects (MOP) for the facility. If questions arise over interpretation of SB document requirements, the Board will provide guidance to the assessment teams and/or the MOPs as to proper interpretation and actions to take, and will have the final authority for these interpretations.

The Board will either concur or not concur with the assessment teams' recommendations as to whether the assessment indicated there were no significant questions or concerns with operational safety and whether the assessment indicated that the facility categorization was correct, documentation existed to support the identification and implementation of safety basis related controls and the materials supporting the management of the change process.

| | |
|-------------------------------------|-------------|
| OWNER: General Management | BJC-GM-211 |
| TITLE: SAFETY BASIS REVIEW BOARD | REV. NO. 2 |
| | Page 2 of 2 |

The Board will determine the appropriateness of the compensatory measures recommended by the SB Flow Down Assessment teams. The Board will also concur with any corrective action plans or corrective actions required as a result of the assessments.

The Board will review AB documents and AB document updates or revisions and receive a briefing of the documents along with the responsible MOP for the facility. The Board will also review resolution of DOE comments on AB documents and any corrective actions arising from DOE ORO or DOE HQ AB assessments. If questions arise over interpretation of SB document requirements, the Board will provide guidance to the MOPs as to proper interpretation and actions to take, and will have the final authority for these interpretations. The Board will recommend approval to the General Manager who will submit the appropriate documents to DOE when required.

The Board will review resumption or restart plans for the facility and receive a briefing on the plans along with the responsible MOP. If questions arise over interpretation of SB document requirements, the Board will provide guidance to the MOPs as to proper interpretation and actions to take, and will have the final authority for these interpretations. The Board will recommend approval to the General Manager who will submit the appropriate documents to DOE when required.

RESPONSIBILITIES

The SB Review Board will be comprised of the following:

- John Lyons, Deputy General Manager for Safety Systems Integration, Chairman
- Jimmy Massey, Manager of Projects for Safety Systems Integration, alternate Chairman
- Mike Hitchler, Nuclear Safety Technical Advisor
- Bruce Wilson, Nuclear Facility Safety Manager

A quorum will consist of 3 of 4 of the board members.

| REVISION LOG | | |
|-----------------|---|----------------|
| Revision Number | Description Of Changes | Pages Affected |
| 0 | Initial Release | All |
| 1 | Non-intent change. Changed responsibilities for Chairman and added Alternate Chairman. | 2 |
| 2 | Intent change. Title change. Added responsibilities: to review assessments of facilities for radiological characterization; to review AB documents and revisions; to review resolution of DOE comments on AB documents; to review adequacy of corrective actions from DOE AB document assessments; and to review plans for resumption of suspended or shutdown activities in Cat 2 or Cat 3 facilities. Added alternate chairman. | All |

Waste Disposition Facility Reviews

Benson – Consultant – Over 15 years nuclear experience including Senior Reactor Operator Certification.

Carty – Consultant – Over 15 years DOE complex experience including project management and lead engineering roles – Licensed PE.

Dahl – Consultant – Over 30 years experience as a project manager and nuclear systems operations manager in DOE and naval nuclear power operations.

Ellis – Consultant – Over 20 years nuclear experience including project management experience at DOE nuclear facilities.

Kucsmas – Consultant – Over 20 years DOE experience including performing technical reviews.

Thiesen – Consultant – Over 10 years DOE experience including calculations and risk assessments to meet safety analysis requirements.

Wayland – Consultant – Over 40 years nuclear experience including 35 years in the DOE complex. Licensed PE.

Willingham – Consultant – Over 25 years DOE experience including maintenance of SB documents and preparation of USQDs.

Letter to Lori Fritz from Paul Clay (GM-02-0013, dated 3/4/02)
Subject: Actions to Determine Safety of Ongoing Bechtel Jacobs Company LLC, Environmental
Management Operations

Attachment 2

Bechtel Jacobs Company LLC

Safety Basis Technical Adequacy Assessment

March 1, 2002



DOE Contract No. DE-AC05-98OR22700

Job No. 23900

March 1, 2002

U. S. Department of Energy
Oak Ridge Operations Office
P. O. Box 2001
Oak Ridge, Tennessee 37831

Attention: Lori Fritz, Contracting Officer's Representative for Bechtel Jacobs Company LLC

Subject: Safety Basis Technical Adequacy Assessment

Dear Ms. Fritz:

In response to issues identified during the Safety Basis Flowdown Assessments and concerns expressed by the Department of Energy (DOE) Headquarters Independent Assessment team (Dae Chung), Bechtel Jacobs Company (BJC), and DOE-Oak Ridge Operations determined that a Safety Basis Technical Adequacy Assessment was needed. The assessment was scoped to address the technical adequacy of the hazards analysis, accident analysis, and control selection process. A joint DOE/BJC assessment team was established under the leadership of Carl Everatt (DOE) and Mike Hitchler (BJC), with involvement of Jay Mullis, Jimmy Dyke, Jorge Ferrer, Roger Casteel (representing DOE) and John Hoffmeister, Doug Heal, and Greg Swenson (representing BJC). The review concentrated on a representative number of facilities. The criteria for selection of facilities are contained in the report.

The assessment has been completed, and the report issued as a BJC management assessment report. As such, the programmatic and facility specific recommendations will be entered into the Issues/Corrective Action Tracking System and tracked to completion. BJC has defined compensatory measures and actions as described in the enclosed interoffice memorandum (with assessment report). Included in the compensatory measures is the recommendation that DOE ORO evaluate the need to suspend or limit train movements at ETTP pending completion of a USQD by BJC.

Should you have any questions, please contact Bruce Wilson at 241-5113 or Mike Hitchler at 574-5884.

Sincerely,

A handwritten signature in cursive script that reads "Paul F. Clay".

Paul F. Clay
Vice President and General Manager

PFC:JRL:dm
EIS-02-040

Enclosure: As stated

Ms. Lori Fritz
Page 2
March 1, 2002

cc: R. Brown - DOE ORO
P. Burdick
R. D'Antoni
G. Dover
G. Drexel
G. Eidam
J. Ferrer - DOE-ORO
C. Frye
M. Hitchler
J. Lyons
J. Massey
M. Morrow - DOE ORO
J. Mullis - DOE-ORO
D. Perez - DOE-ORO
R. Poe - DOE-ORO
S. Robinson - DOE Portsmouth Site Office
D. Seaborg - DOE Paducah Site Office
M. Tagoe
M. West
B. Wilson
File - PFC
File - EMEFDMC - RC



Interoffice Memorandum

To Gil Drexel
Gordon Dover
Greg Eidam
Charlie Frye
M'balia Tagoe

File No. IOM-GM-02-12

Subject Safety Basis Technical Adequacy
Assessment Required Actions

Date March 1, 2002

From Paul F. Clay *P.F. Clay*

Of Vice President and General Manager

Copies To Cindy Daugherty
John Lyons
Steve Houser
Jimmy Massey
Andy Phelps
Bruce Wilson
File: EMEF DMC -RC

At K1225 **Ext** 241-1188

DOE and BJC recently completed a Joint Safety Basis Technical Adequacy Assessment. A copy of the report is attached. In the assessment report, the team recommended several compensatory measures and a number of actions requiring further analysis. Consistent with discussions with your staff, the following compensatory measures and actions are to be implemented as stated:

FACILITY COMPENSATORY MEASURES

- CM1. **Radioactive Solid Waste Storage Facilities, Buildings 7823B, C, and D** - Suspend radionuclide inventory increases pending (1) definition of inventory limits based on the consolidation of B, C, and D as one facility (remove segmentation assumption) and (2) analysis of large fire initiated releases (broader than current safety basis assumptions). (Frye)

- CM2. **High-Level Radiation Analytical Facility, Building 3019B** - Place the east wall under configuration management as a passive design feature. (Eidam)

These compensatory measures are to be implemented immediately, and are to remain in effect until authorized by myself or resolved via DOE approved safety basis documents. Please provide written confirmation of implementation by **COB Wednesday, March 6th**.

Additionally, we are recommending that DOE evaluate the need for the following compensatory measure:

- CM3. **UF₆ Cylinder Storage Yard, 1066-B** - Evaluate the need to suspend or limit train movements at ETP pending completion of USQD required under A6 below. (DOE)

FACILITY FURTHER ACTIONS

- A1. **Radioactive Solid Waste Storage Facilities, Buildings 7823E; 7831A and C; 7842B and C; 7878A; 7879; 7934; 7572 and 7574** - Reassess hazard categorization to verify current assumption relative to facility segmentation. Analyze releases associated with maximum credible fire (e.g., vehicle crashes and forest fires). (Frye)
- A2. **High-Level Radiation Analytical Facility, Building 3019B** - Assess the practicality of evacuation times following explosions. (Eidam)
- A3. **Low Level Liquid Waste System** - Train USQD reviewers on transfer line accidents, key assumptions, and special hazards associated with construction or maintenance of transfer systems. (Frye)
- A4. **Recycle and Assembly Building, X-7725** - Expedite EMHA of hazardous chemicals. (Drexel)
- A5. **Tower Shielding Facility, Building 7700A and B** - Evaluate accidents having a frequency $>10^{-2}$ per year using anticipated event consequence evaluation criteria to determine the need for controls. Verify that the pre-fire plan recognizes the presence of reactive materials. (Eidam)
- A6. **UF₆ Cylinder Storage Yard, 1066-B** - Perform a USQD to evaluate the effect of train accidents and resultant fires. (Tagoe)
- A7. **Low-Enriched Uranium (LEU) Process Building K-27** - Reassess hazardous material releases against each ERPG-2 threshold. (Tagoe)

These actions are to be addressed as a high priority in order to reduce the uncertainty associated with the technical adequacy of the associated safety basis documents. Please provide input by **Friday, March 15th** of your planned schedule for completion of each action.

Additional improvements are identified in the attached report. These are to be addressed as part of the 830 upgrade plan.

Should you have any further questions, please contact Mike Hitchler at 574-5884.

Enclosure: As stated

BECHTEL JACOBS MANAGEMENT ASSESSMENT REPORT
Based on the
JOINT DOE/BJC SAFETY BASIS TECHNICAL ADEQUACY REVIEW

DOE and BJC have developed a detailed program that is responsive to the issues raised in the DNFSB letter dated October 15, 2001. A key element of this program is activities assessing safety basis requirements and the flowdown of these requirements into facility operations. A DOE-Headquarters independent assessment, as well as, several BJC and DOE assessments has been completed. The BJC and DOE assessments identified required improvements. One action is to review the technical adequacy of the Safety Basis' hazards and accident analysis, which result in requirements (TSR/OSRs and Safety Management Program attributes). This report documents the results of a joint DOE and BJC team effort that reviewed a representative sample of nuclear facility Safety Basis.

PATICIPANTS

The review team was composed of eight individuals with backgrounds in safety basis documentation development, review and implementation. The team was composed of:

| <u>DOE</u> | <u>BJC</u> |
|-------------------|-------------------|
| Jay Mullis | Mike Hitchler |
| Carl Everatt | Doug Heal |
| Jimmy Dyke | John Hoffmeister |
| Roger Casteel | Greg Swenson |

The team was selected based on their familiarity with the development and review of BIO, SAR and JCO related hazard and accident analysis. The team was supported by engineering staff from each reviewed facility and by safety basis analytical staff for specialty areas.

REVIEW APPROACH

Task 1

Select a representative sample of facility Safety Bases for review. Sample selection criteria included:

- Operating- the facility is operating or has anticipated near term planned activities,
- Mission - Essential-key to meeting DOE goals or supporting other mission essential facilities.
- High Hazard/Risk Potential
- BJC Flowdown Review

The BJC Managers Of Projects (MOPs) provided data for all nuclear and radiological facilities. The data specified the operating status and missions for each facility. These are documented in *Bechtel Jacobs Management Assessment Nuclear Radiological Facility's Operating and Mission Status as Used by the Joint DOE/BJC Safety Basis Technical Adequacy Review* (GM-02-0010). The team reviewed this data and selected fifteen nuclear and sixteen radiological facilities as candidates for technical review and DOE flowdown. These are listed in Table 1. Where a Project had several facilities (e.g. WDP, PORTS and PAD) with similar missions, SB approach and procedural flowdown, a single representative facility was selected. The DOE flowdown

review and walkdown are outside the scope of this document. All fifteen nuclear facilities' safety basis analysis and controls were reviewed.

Task 2

Collect the technical evaluations, judgements and analysis, which are used as the basis for inclusion or exclusion of facility controls. Each facility's Safety Basis and other supporting documentation was reviewed. Key information was extracted from these documents and used to complete a basic data review form. Key information was defined as dominant accidents, key assumptions, and explicit and implied controls and assessors actions. Key information and data sheets are documented in *Bechtel Jacobs Management Assessment Key Information Data Sheets as Used by the Joint DOE/BJC Safety Basis Technical Adequacy Review* (GM-02-009).

Task 3

Assess the safety basis for completeness of the postulated accident list and technical adequacy of analysis. The team defined a minimum list of expected accidents applicable to these facilities, these included natural phenomena (seismic, wind and flood), fire/lightning, criticality, explosion (flammable gas and shock sensitive material) and material mishandling events. If events were missing from the SB the rationale was reviewed and an assessment was made for significance. If the event was significant, the team performed a limited consequence assessment. This consequence assessment was based on MACCS analysis for F at 1 m/sec and D at 4.5 m/sec stability classes and included elevated and ground level releases. Also a set of Dose Conversion Factors (DCFs) for all anticipated radionuclides resident at these facilities was specified. These are documented in *Bechtel Jacobs Management Assessment Radionuclide Transport and Dose Conversion Factor Data as Used by the Joint DOE/BJC Safety Basis Technical Adequacy Review* (GM-02-0011). After defining the minimum accident set, the team reviewed this set's analysis for appropriate technical rigor and consistency with DOE guidance (e.g. DOE STD 3009, 3011, 1027 and HDBK 3010). As issues arose, the impact of more appropriate assumptions was assessed.

Task 4

Based on the teams revised dominant accident set, the current controls were assessed. The assessment checked that all key assumptions, which flowed from the analysis, were properly protected and that revised analysis would not result in new or alternate control requirements. Attachment 1 documents the Technical Adequacy Review results for each of the nuclear facilities listed in Table 1.

RESULTS AND CONCLUSIONS

In general, risk is dominated by earthquake and fire initiators, which result in material dispersal or criticality. All facilities have assessed these hazards and have developed controls protecting most key analytical assumptions. The SB identified controls have appropriately flowed down to procedures or OSR/TSRs. Procedures are consistent with key technical assumptions; however, in several areas these assumptions were not identifiable as requirements. Improvements are listed in Attachment 1, these should be considered as part of the 830 upgrade program. There are several actions recommended.

Programmatic Recommendations

The review was complicated by the distributed and diffuse nature of the SBs and safety evaluations. This was caused by the lack of SB content and analytical guidance to

subcontractors, lack of annual updates, and very long DOE approval cycles for submittals. This condition made traceability of analysis assumptions to controls very difficult. BJC implementing guidelines for technical content and technical rigor should be developed prior to release of tasks associated with 830 upgrades. Recognizing that tasks have been released and that the SB upgrade program has near term milestones, an alternative is to utilize a SB Technical Review of all tasks by the NS SME prior to release of tasks.

Categorization of Cat. 3 facilities must be reassessed. DOE STD 1027 requirements defining rules for segmentation and inventory exclusion must be observed. Inventory exclusion concerns were identified in the SB Flowdown Review, however new segmentation concerns were identified. The radiological categorization review must include a review of prior segmentation.

A DOE O 420.1 Fire Protection Safety Management Program must be developed and implemented. A key assumption is that large fires are very infrequent and are of short duration. This implies that the FP SMP is assuring low combustible loading, up to date fire detection and suppression system maintenance/surveillance and pre-fire plans consistent with SB assumptions.

Facility Specific Recommendations

7823-B,C,D and E: Fires were assumed to progress slowly, involve 10% of the inventory in the each hour for a total of a two-hour fire. The most likely large fire would result from a vehicle crash with subsequent fuel and hydraulic line rupture or forest fires. These fires could engulf much more of the inventory containers (probably 100%) and would be fully developed over a 10-20 minute interval. The team was told that current inventories are very low (~1-3% of allowed inventories). This assures that current dose limits are met. An assessment of these events consolidating B, C and D as one facility should be performed prior to acceptance of increased inventories to assure that dose limits are met.

3019B: The east wall integrity following an explosion is essential in minimizing doses to 3019A personnel and should be designated a Design Feature.

3019B: For facility workers very short evacuation times are credited to maintain inhalation dose below 100 rem. An assessment of the practicality of these times and improved training or consideration of protective strategies should be performed.

LLLWS: The BIO lists tank failures and overfills as the dominant accidents. The team judged accidents, which result in transfer line breaks to be nearly as dominant. The frequency of these events is judged to be Unlikely (<10⁻³ per yr.) and have consequences of ~1 and 50 rem for public and worker (100m) receptors. These doses are dominated by inhalation rather than the ingestion pathways stated in the BIO. Although procedures provide general coverage, there has not been the same technical rigor applied to these accidents and resultant controls as applied to the tank failure and overfills scenarios. Transfer line accidents should be reanalyzed as part of the 830 upgrade program, specifically addressing maximum credible transfer inventories and break sizes, manual or operator spill termination times and the need for controls. USQD reviewers should be trained on the importance of transfer operations and the key assumptions which could challenge EGs.

X-7725: Potential radiological doses are minimal, however the facility is known to have significant inventories of hazardous materials. Team estimates of inventories and calculated

consequences show that there is the potential to approach ERPG 2 values for facility (100m) and co-located workers. Estimates of hazardous inventories and an EMHA type consequence assessment should be expedited.

7700-A,B: The BIO evaluation criteria for anticipated events is nonconservative with respect to DOE STD 3011. Evaluated all events having a frequency of 10^{-1} - 10^{-2} per year using anticipated consequence evaluation criteria.

7700-A,B: Verify that the ORNL Fire Department's pre-fire plan recognizes that reactive materials are present.

1066-B: Trains pass within 25 ft of the 1066-B yard. The SB assumes that large inventories of flammable material (< 75 gal), in particular liquids, are not present. Train accidents and transported hazards have not been reviewed in the SB. Perform a USQD to evaluate the effect of these conditions on SB fire initiators.

K-27: The hazardous material assessment used an average of all ERPG-2 thresholds as the acceptability criterion. This is non-conservative by as much as two orders of magnitude. Reassess current results against the ERPG-2 thresholds for all significant quantities of stored hazardous material.

The basis for the review was the current SB and as much additional material as could be assembled given time constraints. This information included SB technical supporting documentation, interviews with analysts and DSA upgrade documentation. Where unavailable, conservative judgments were made. As such, the recommendations could be updated, if additional information is available.

TABLE 1

SAFETY BASIS REVIEWS

NUCLEAR FACILITIES

| Primary | Project | POC |
|-------------------|----------------|----------------------|
| 7823 B, D, E | WDP (West) | Karen Balo |
| 3019 B | ORNL (Eidam) | Sylvia Wright-Reeder |
| LLLW | WD (Frye) | Merle Lauterbach |
| Active Vaults K25 | WDP (West) | Scott Loveless |
| 744 G | PORTS (Drexel) | Ralph D'Antoni |
| 7725 | PORTS (Drexel) | Ralph D'Antoni |
| 7745 R | PORTS (Drexel) | Ralph D'Antoni |
| 326 DMSA | PORTS (Drexel) | Ralph D'Antoni |
| C 745 | PAD (Dover) | Dick Veazey |
| C 746 Q | PAD (Dover) | Dickie Kuehn |
| Phase 2 DMSAs | PAD (Dover) | Ricky Keeling |
| | | |

SECONDARY PRIORITY

| Primary | Project | POC |
|-----------------------|----------------|----------------------|
| 7700 A, B TSF | ORNL (Eidam) | Sylvia Wright-Reeder |
| 1066 B, E, F, J, K, L | ETTP (Tagoe) | Halen Philpot |
| K25 | ETTP (Tagoe) | Greg Huddleston |
| K27 | ETTP (Tagoe) | Jay Frantz |
| | | |
| | | |

RADIOLOGICAL FACILITIES

| Primary | Project | POC |
|---------|-------------|--------------------------------|
| 9401-5 | UCOF (Frye) | Dave Whitehead George McRae |
| 9623 | CPCF (Frye) | Dave Whitehead George McRae |
| 9624 | ESF (Frye) | Dave Whitehead George McRae |
| 9616-7 | WETF (Frye) | Dave Whitehead George McRae |
| 1419 | CNF (Frye) | Pete Peterson Tommy Bowers |
| 1407 ? | CNF (Frye) | Pete Peterson Tommy Bowers |
| 1425 | TSCA (Frye) | Pete Peterson Tommy Bowers |
| 1435 | TSCA (Frye) | Pete Peterson Tommy Bowers |
| 752 A | PAD (Dover) | Dickie Kuehn |

SECONDARY PRIORITY

| Primary | Project | POC |
|---------------|--------------|-----------------|
| C-410 or 420 | PAD (Dover) | Dave Massey |
| 753 A | PAD (Dover) | Dickie Kuehn |
| 7456 G3, 4, 5 | PAD (Dover) | Dick Veazey |
| 746 x | PAD (Dover) | Dickie Kuehn |
| 733 | PAD (Dover) | Dickie Kuehn |
| 1065 | WDP (West) | Scott Loveless |
| 5109 | ORNL (Eidam) | Charlie Johnson |
| | | |
| | | |

ATTACHMENT 1

**TECHNICAL ADEQUACY REVIEW RESULTS:
HAZARDS, CONSEQUENCES, AND CONTROLS ASSESSMENT**

**Technical Adequacy of the Analysis and Controls for the Radioactive Solid Waste Storage
Facilities; Building 7823B, C, D, E; 7831A; 7831C ; 7842;
7842B, C; 7878A; 7879; 7934; 7572; and 7574**

Completeness and Technical Rigor

The analysis and controls described in the Safety Basis were reviewed for completeness and technical accuracy. Documents reviewed include the *Safety Analysis Report for the Radioactive Solid Waste Storage Facilities* (ORNL/WM-RSWOG/RSWSF/SAR/R0-1), *Recommended Effective Release Fractions for use in Calculating Revised Category 2 Threshold Quantities for ORNL WMRAD Facilities* (DAC AX2827-SSE-001), and *Calculation of DOE-STD-1027-92 Revised Cat 2 TQs* (DAC-AX2825-SSE-001). The Radioactive Solid Waste Storage Facilities (RSWSFR) are currently categorized as Hazard Category 3. Consideration of criticality events and the assumption of < 1% by weight particulates less than 10 micrometers within the waste may change the Hazard Categorization to 2, but this alone would not impact the adequacy of the controls.

The existing analysis considers a number of "bounding" accidents (handling accident, earthquake, high winds, fire, internal reactions, and confinement failure) for both radiological and chemical hazards. Analysis within the SAR states the risk from these accidents is below the DOE evaluation guidelines (Risk Bins 1, 2, and 4) for the public and co-located worker. The approach of analyzing bounding events was considered appropriate for the time period for which the documents were written. Future revisions will need to analyze the full spectrum of accidents, including smaller consequence, higher frequency events, worker safety issues, and chemical safety issues.

The methodology used in the safety basis considers most of the bounding accidents for the public (1000m) and co-located worker (644m). This analysis lacks much of the rigor associated with the current DOE Safety Basis requirements as mentioned previously. Movement of the co-located worker from 644 meters to 100 meters will result in a corresponding increase in the estimated consequences within the DSA upgrade. In addition, a review of the bounding fire found several of the assumptions to be non-conservative (only one facility impacted, 10% of the inventory involved, two hour release duration, etc.). Countering the non-conservative assumption were several overly conservative assumptions, primarily the facility inventory is several orders of magnitude less than the Hazard Category 2 limits in DOE-STD-1027. A bounding analysis considering actual inventory within the facility showed consequences below the evaluation guidelines. It should be noted that the facility inventory should be reevaluated before the inventory in the facilities is increased.

Identification of Controls

The existing SAR did not identify any SSC's since there were no Risk Category 5,6,7,8 or 9 accidents identified in the analysis. It did document a number of administrative controls that were credited in the hazard analysis.

Recommendation

The following are a list of required actions:

1. Evaluate a large pool fire associated with type 2, 3, and 4 waste
2. The SAR also covers facilities 7831A, 7831C, 7842, 7842B, C, 7878A, 7934, 752 and 7574. These facilities should be assessed for proper segmentation and vulnerability to pool fires.

The following items were addressed as part of the safety basis flowdown process. These will be resolved as part of the overall upgrade to the BJC Safety Basis.

3. Determine new Waste Acceptance Criteria (WAC) after removing the assumption of the <1% particulate limit.
4. Determine the appropriate Hazard Categorization of the facilities consistent with the guidelines in DOE-STD-1027. Determine an appropriate facility inventory limit based on the conclusion of these results.

Technical Adequacy of Controls for 3019B

Completeness and Technical Rigor

Accident analysis and controls described in JCO-OR-3019B-0001 were evaluated for completeness and technical adequacy. The 3019B building is currently in S&M mode and 3019A has active operations occurring. The primary hazards involve releases of radioactive material contained in ductwork (420 g Pu equivalent inhalation dose) and criticalities associated with water ingress of fissile material containing pipes and ducts (5-12 kg of U 235). Consequences are appropriately calculated for receptor locations: public(240 m), co-located(100 m and 3019A) and in-facility. The dominant accident initiators, scenarios developed, release mechanisms and analysis appear to be complete and adequate for defining controls. The technical rigor is appropriate. Specifically, RFs and ARFs are consistent with conservative DOE STD 3010 values, criticality calculations are referenced and performed using appropriate methods and initiating event frequencies are judged to be reasonable. The primary uncertainties have been specified and in general addressed. The highest uncertainty is associated with full characterization of the material within the ducts, especially that associated with quantities and location of fissile material.

Identification of Controls

Identified controls are primarily administrative. These focus on limiting building access and evacuation, work control involving areas with perchloric acid, fire protection, criticality, emergency management and maintenance. The control set is generally consistent with the hazards and accident analysis. Areas of concern involve a credited SSC and evacuation training for facility/subcontractor workers. The integrity of the 3019B east wall is assumed in the accident analysis and is key to assuring that 3019A personnel doses and injuries are minimized for explosion events. This wall is neither under configuration management nor periodic inspection. The accident analysis predicts that facility worker doses exceed 25 and 100 rem within 19 and 72 seconds respectively. This is very short relative to most evacuations. Either provide training for personnel performing activities in this building that identifies the need for rapid evacuation for anomalous conditions or, since the hazard is an inhalation dose, consider a respirator requirement for work in this area.

Potential compensatory actions recommended:

1. Designate the 3019B east wall as a credited Design Feature.
2. Provide specific training for all personnel performing work in the building on evacuation times associated with perchloric explosions or a respirator.

Technical Adequacy of Controls For Liquid Low Level Waste System

Completeness and Technical Rigor

The Liquid Low Level Waste System (LLLWS) was segmented for hazard categorization/classification purposes (HS/LLLW/F/1/R3) into buildings, tanks, transfer lines, and valve boxes with hazard categorization/classifications ranging from Nuclear Category 2/Low to Industrial/Industrial. Safety Basis (SB) documents for the LLLWS, including ORNL/WM-LGWO/LLLW/BIO/R1, HS/LLLW/F/1/R3, SSA/7966-WMRAD/SSE/R0, WM-LGWO-7856-SSA, WM-LGWO-7856-TSR, Rev. 3, WM-LGWO-2099-SSA, Rev. 1, WM-LGWO-7877-SAR, Rev. 1, WM-LGWO-7877-TSR, Rev. 1, WM-LGWO-USQD-1998-4, and WM-LGWO-LLLW-OSR, Rev.12, were evaluated to determine if the accident analyses and controls were complete and technically adequate. An additional 90 USQDs are part of the SB for LLLWS; however, not all could be reviewed in the time available for this BJC Management Assessment. The Basis for Interim Operations (BIO) which serves as the foundation document for LLLWS identified dropped heavy load and overfills of tanks/evaporator as the dominant accidents. The analysis for these accidents appears to be complete and the controls for them properly derived. Although the BIO was revised by WM-LGWO-USQD-1998-4 to address an on-site construction accident during transfer (pipe break), the analysis makes assumptions that enable the consequences to stay within the evaluation guidelines (EGs), e.g., the subject USQD assumes 5% [by volume] suspended sludge. If sampling prior to transfers does not protect this assumption, the consequences could exceed the EGs. DAC-AX276108-SSE-001 indicates that the consequences resulting from the release of 33% suspended sludge would exceed the EGs (505 rem to the co-located worker at 100m and 8 rem to the public). Without this assumption, the pipe break accident would be designated as a dominant accident. The safety basis documents for LLLWS need to be reviewed to ensure that other similar assumptions have been identified. The assumption of no more than 5% suspended sludge and any other assumption that is credited to keep the consequences below the EGs need to be established in the LLLWS Operational Safety Requirement (OSR) or associated facility-specific TSRs.

The BIO and System Safety Analysis (SSA) credit the Waste Acceptance Criteria for ensuring that the radiological inventories used in the analyses are protected. Facility personnel indicated that the WAC ensures the analyzed inventories are protected for a defined period, and that reanalysis would be required in 2005.

Identification of Controls

With the exception of the pipe break accident, the controls derived from the BIO and SSA accident analyses appear to be complete and appropriate. The derived controls from the BIO and SSAs were established in the LLLWS OSR and facility-specific TSRs. Verification of control flowdown to procedures was performed in December 2001 during the Bechtel Jacobs Safety Basis Flowdown Review. As stated above, assumptions credited to keep the consequences below the EGs should be established in the LLLWS OSR or associated facility-specific TSRs for the entire system. Additionally, the TSR controls derived from the Building 7856 SSA associated with the pipe break accident should be considered for incorporation into the LLLWS OSR to be applied to the entire LLLWS. Where engineered safety features exist, such as an interlock activated by the transfer line annulus pressure monitor alarms to close the transfer line valves, they should be the preferred method of control established in the OSR/TSR over administrative controls.

Recommendations

The BJC Management Assessment Team was not able to review all safety basis documents available for LLLWS do to time constraints. Some documents may exist that already address these recommendations, in which case, no further action would be needed. Additionally, it is not expected that the implementation of these recommendations divert significant resources from the upgrade effort to prepare a 10 CFR 830 compliant SAR and TSR for the LLLWS. This based on the frequencies of those events are $<10^{-3}$ per year and also that procedures appear to be consistent with analytical assumptions. In the interim, until the 830 approvals are implemented, the USQD evaluation should be informed of these listed issues and their potential impact. Where appropriate, implementation of these recommendations should be accomplished by addenda to the LLLWS OSR and/or BIO.

1. Establish controls for the 5% (by volume) suspended sludge assumption in the LLLWS Operational Safety Requirements (OSR).
2. Evaluate LLLWS safety basis documents to identify other assumptions that, if not protected, would result in exceedance of the Evaluation Guidelines and establish the controls in the LLLWS OSR to protect the identified assumptions.
3. Evaluate Building 7856 TSR controls for application for the entire LLLWS and establish those selected controls in the LLLWS OSR. Examples of controls to consider are the operability requirements for engineered safety features such as:
 - Pipeline annulus pressure interlock system to shutoff transfer in case of pressure loss
 - Pipeline annulus pressure monitoring and manual transfer shutoff capability shall be implemented

Other controls to consider, where engineered safety features do not exist to automatically stop the transfer upon detecting a break in the transfer line, are administrative controls to require the operator to continuously monitor the annulus pressure during transfers and to immediately stop the transfer if the pressure drops below the establish level. Analysis is expected to allow from 15 to 40 minutes for this response.

Examples of other controls that should be considered for possible application in other LLLWS facilities are:

- Valve sump box interlock terminates transfer out of Building 7856 in case of a leak inside the valve box
 - Valve sump box monitoring and manual transfer shutoff to terminate transfer out of associated tanks
 - Tank relief line availability shall be assured
 - Relief line isolation valves must be verified to be open
 - Verification of isolation of process water supply from tanks before transfer
 - Verification of isolation of sump transfer line valve in closed status
4. Coordinate the OSR and TSRs such as adding references to the TSRs in the OSR. Without the proper coordination, confusion may be created when the OSR scope includes a facility with a TSR. Is the TSR all inclusive or does the OSR still apply to that facility?

Improvement Recommendation

1. Establish a control or place an applicability statement in the BIO to require reanalysis by 2005.

Technical Adequacy of Controls for K-25 Building

Completeness and Technical Rigor

The K25 Building BIO (K/ER-335 R1), SER ET-K25-002 and USQD-ET-K/25/27-039 Rev. 0 were reviewed. The building is segmented for Hazard Categorization purposes. One segment is considered Category 2 due to potential for criticality. The other segments are either considered Radiological (e.g. Below Category 3) or non-nuclear. The building is considered at least 700 meters from nearest offsite location (TVA Substation north of Blair Road).

The primary hazards in the Category 2 segment of the building are fissile/radioactive material contained in the process building cascade equipment including 57 deposits with greater than safe mass, fissile material stored in basement vaults (fuel pins, UF6 heel cylinders, etc) and Tc-99 contained within the process equipment. Total estimated primary radioactive material considered is 17,613 Kg Uranium and 32 Kg Tc-99.

Hazards were analyzed using DOE-STD-3011 guidance. Dominant accident scenarios consisted of:

1. Criticality initiated by a building fire (10^{-4} to 10^{-6}), earthquake (10^{-2} to 10^{-4}), Tornado/Microburst ($<10^{-6}$) or Human Error (10^{-4} to 10^{-6}). Results in a fatal dose to the facility worker and 90 rem to collocated workers (30m).
2. Airborne radioactive material release due to earthquake (6×10^{-3}) or single waste drum collapse (0.1). Results in 9.7 mrem at the site boundary.
3. HF release due to reaction of UF6 cylinder heels. Results in negligible effects at site boundary (e.g. significantly less than ERPG-2 values).

Review of the scenario development and the results of the analysis determined the approach to be reasonable with the exception of the Tornado/Mircoburst initiated criticality. The probability of this event was determined by the reviewers to be in the Extremely Unlikely range as opposed to Beyond Extremely Unlikely (e.g. $<10^{-6}$). However, the consequences of this event are bounded by the earthquake initiated criticality.

Identification of Controls

Controls were developed that consisted of commitments to the ETTP Radiation/Criticality Accident Alarm System (a Safety Significant system), fixed Fire Protection System, Safety Management Programs (e.g. Criticality Safety, Fire Protection, USQD Program, etc), process equipment resealing/inspection (prevents water intrusion and moderation of fissile material) and specific controls to insure Hazard Categorization assumptions. All controls were determined to be adequate for the hazards analyzed. However, due to the importance of the controls that protect the Hazard Categorization assumptions, these controls should clearly be identified as Operational Controls as opposed to being buried in the Hazard Categorization section of the BIO.

Recommendation

Based on the information above, the team concludes that the analysis and controls outlined, if rigorously implemented, provide the appropriate level of protection. Recommended improvement. Clarify that the controls listed in section 5.2.3.3 of the BIO are Operational Controls, which are necessary to maintain the Hazard Categorization assumptions.

Technical Adequacy of Controls for X-744G, X-7725, and X-7745R

Completeness and Technical Rigor

The adequacy of the safety analysis and derived controls to permit continued operations were evaluated for 3 Portsmouth facilities identified as essential for continued operations. The facilities are X-774G, X-7725, and X-7745R and are all active waste handling type facilities. X-744G and X-7725 are large storage buildings and X-7745R is a storage yard. The facilities are addressed in a site level SAR (POEF-LMES-89) as ancillary facilities and the analysis presented is minimal and qualitative in nature. The set of accident initiators is judged to be adequate however the accident progression and consequences evaluations are not presented except in the cases of criticality and large fire. The qualitative results for the criticality event are presented as below Evaluation Guides (EGs) for offsite and potentially significant onsite exposures. Although minimal quantitative data is presented in the SAR, the team has determined this to be an accurate assessment based on typical criticality events and the approximately 700 meters to the site boundary. For large fires, the SAR concludes that possible scenarios can be postulated with the potential to exceed offsite consequence EGs. However, it then dismisses the need for further analysis based on a short qualitative statement based on typical fire release transport behavior. Fire is stated to result in potentially significant onsite exposure. Although no quantitative data is presented in the SAR, the team judgement, based on inventories provided by the facility, is that radiological doses will be minimal (onsite and offsite) and the primary concern is chemical exposures. X-7725 has large quantities of hazardous materials which have not been characterized. Estimates of PCBs and other toxic material could result in exceeding ERPG 2 values.

Identification of Controls

The controls identified in the SAR are minimal. For criticality controls, an administrative program to prevent a criticality is required along with a Criticality Accident Alarm System (CAAS). The CAAS is identified as a safety significant system. For fire controls, the Fire Protection Program is identified with "essential safety actions" specified: (1) detection, (2) downwind evacuation (based on personnel training to recognize and respond to a fire), and (3) onsite fire department.

Recommendations

Based on the information above, the team concludes that the controls outlined, if rigorously implemented, provide the appropriate level of protection required for the criticality event. Based on the potential toxicological consequences from a fire, the fire protection program should be evaluated for additional credited attributes to prevent a fire such as vehicle barriers, fuel limitations, and automated detection and suppression systems for X-7725. The EMHA upgrade effort should be expedited.

Technical Adequacy of Controls for Portsmouth 326 DOE Material Storage Areas

Completeness and Technical Rigor

The Portsmouth DOE material storage areas (DMSA's) were identified essential for continued operations. These DMSA's were a result of consolidating potentially fissile contaminated DOE equipment that was in facility(s) leased to a company under NRC regulation. The lessee determined the material would not be needed to operate the facilities, and requested DOE cleanup and control the material. Following consolidation, the contractor prepared a USQD to evaluate the new operation of staging the potential fissile material in the X-326-L and X-333 facilities. The predominate hazard associated with the storage operation is a criticality event. A criticality event will result in irreversible health affects to the localized employee with minimal offsite effects to the public. The facility where the material is stored has been evaluated through an unreviewed safety question determination POEF/SWS-003-97 and the operations were shown to be bounded by site wide SAR for storage of fissile material. The accident sequences evaluated for the material storage operations are large fire and criticality. Therefore, the analysis contained in the SAR bounds the DMSA storage activities since inadvertent criticality is the accident of concern for the DMSA activities. The controls credited within the SAR to control inadvertent criticality are the nuclear criticality safety program and the criticality accident alarm system. The DMSAs are identified in the Authorization Agreement (I-00-128-0004) for Portsmouth, which identifies the site with SAR and TSR as the applicable Authorization Basis documents to these operations. The TSR has identified the CAAS and Nuclear Criticality program as requirements for operations with fissile material within these facilities.

Identification of Controls

Operational controls for the DMSA are identified within the sitewide TSRs and the SAR program descriptions for the Portsmouth Site. Application of the site wide nuclear criticality safety program is an adequate control to prevent the inadvertent criticality event, and usage of the CAAS is appropriate to protect site workers from the low likelihood of an inadvertent criticality event. The controls are appropriate to control the hazard from the DMSA activities and provide an adequate level of defense-in depth to protect the worker. Based on the information above, the team concludes that the controls outlined, if rigorously implemented, provide the appropriate level of protection required for the events postulated within the SAR.

Recommendation

Potential compensatory measures recommended: None.

Technical Adequacy of Controls for C-745

Completeness and Technical Rigor

The adequacy of the safety analysis and the derived controls to permit continued operations were evaluated for the C-745 facility at the Paducah Site. The C-745 facility is a cylinder storage yard and is addressed in a site level SAR (KY/EM-174) as an ancillary facility. The level of analysis presented is minimal and qualitative in nature. The set of accident initiators was judged to be adequate however the accident progression and consequences evaluations are not presented except in the case of large fire. For large fires, the SAR concludes there is a potential to exceed offsite consequence EGs with potentially significant onsite exposures.

Identification of Controls

The controls identified in the SAR are minimal. The Fire Protection Program is identified with specified attributes including: (1) limiting of flammable/combustibles (2) downwind evacuation (based on personnel training to recognize and respond to a fire), (3) communication with response personnel, (4) onsite fire department, and (5) cylinder inspections. Based on the information above, the team concludes that the controls outlined, if rigorously implemented, provide the appropriate level of protection required.

Recommendations

Based on the severity of potential onsite and offsite consequences, the fire protection program should be evaluated for more explicit identification of credited attributes to prevent a fire such as specific volumes on fuel limitations consistent with analysis assumptions and demonstrated ability to rapidly control access to effected areas (including offsite).

Technical Adequacy of Controls for C-746Q

Completeness and Technical Rigor

The adequacy of the safety analysis and the derived controls to permit continued operations were evaluated for the C-746Q facility at the Paducah Site. The C-746Q facility is a large storage building and is addressed in a site level SAR (KY/EM-174) as an ancillary facility. The level of analysis presented is minimal and qualitative in nature. The set of accident initiators was judged to be adequate however the accident progression and consequences evaluations are not presented except in the cases of criticality and large fire. The results for the criticality event presented (1.1 REM) are below Evaluation Guides (EGs) for offsite and the onsite consequences are qualitatively presented as "potentially significant". The team concluded this to be an accurate assessment based on typical criticality events and the approximately 800 meters to the site boundary. For large fires, the SAR concludes possible scenarios can be postulated with the potential to exceed offsite consequence EGs, however it then dismisses the need for further analysis based on a short qualitative statement based on typical fire release transport behavior. Fire is stated to have a potentially significant onsite exposure. Although no quantitative data is presented in the SAR, the teams judgement based on inventories provided by the site is that radiological doses will be minimal (onsite and offsite) and the primary concern is chemical exposures. Based on inventories provided by the site and comparative/scaling calculations, ERPG-2 limits appear to be exceeded at the 100m co-located receptor location.

Identification of Controls

The controls identified in the SAR are minimal. For criticality controls, an administrative program to prevent a criticality is required along with a Criticality Accident Alarm System (CAAS). The CAAS is identified as a safety significant system. For fire controls, the Fire Protection Program is identified with "essential safety actions" specified: (1) detection, (2) downwind evacuation (based on personnel training to recognize and respond to a fire), and (3) contact of response organizations. Based on the information above, the team concludes that the controls outlined, if rigorously implemented, provide the appropriate level of protection required for the criticality event.

Recommendations

Based on the potential toxicological consequences from a fire, the fire protection program should be evaluated for additional credited attributes to prevent a fire such as vehicle barriers, fuel limitations, and periodic inspections.

Technical Adequacy of Controls for Paducah DOE Material Storage Areas (Phase 2 Only)

Completeness and Technical Rigor

The Paducah DOE material storage areas (DMSA's) were identified essential for continued operations. These DMSA's were a result of consolidating potentially fissile contaminated DOE equipment, etc. that were dispersed throughout several facilities that were leased to a company under NRC regulation. Once the facilities were leased the lessee determined the material would not be needed to operate the facilities and requested DOE cleanup and control the material. Following consolidation the equipment DOE prepared a safety evaluation report (SER for USQD EM&EF 98-078 and revised by SER for USQD-RM-DMSADRA-5R2) to define and approve operational controls for the safe storage of the material within the DMSA's until they could be fully characterized and the situation remediated. A hazard and accident analysis was not prepared to provide a basis for the controls; however, the predominate hazard associated with the storage operation is a criticality event. A criticality event will result in irreversible health affects to the localized employee with minimal offsite effects to the public. To compensate for the lack of a hazard analysis as a basis for control selection, subject matter experts (SME) in the area of criticality reviewed the storage operations and proposed a conservative set of controls to protect the facility and site worker. Following issuance of the original SER in September 1999, amended March 2000, a second SER was prepared to consolidate the DMSA's controls with the controls identified for a similar storage situation discovered on the non-leased portion of the Paducah Site (i.e., Building C-410). The second SER was approved in June 2001, however the SER has outstanding comments that have not been resolved. The technical rigor in both SER's for the DMSA's is lacking since no hazard analysis was prepared to provide a technical basis for control selection, but SME input was utilized in the preparation of the SER's. The conservative controls established in the September 1999 version of the SER's is not in question; however, as stated above the June 2001 SER has been approved with outstanding comments from the DEO-ORO SME's for criticality safety and authorization basis documentation preparation.

Identification of Controls

Operational controls for the DMSA's are identified within the SER. The controls were derived from subject matter expert input and not documented hazard techniques. The controls were appropriate for the hazards evaluated and provide an adequate level of defense-in depth to protect the worker.

Recommendations

Based on the information above, the team concludes that the controls outlined, if rigorously implemented, provide the appropriate level of protection required for the events postulated within the SAR. No actions are required.

Improvements recommended:

1. The technical deficiencies in the June 2001 SER should be resolved or the SER cancelled. Canceling the June 2001 SER would revert operations back to the September 1999 SER for the DMSA's which establishes a set of controls with no outstanding SME concerns.
2. Control to assure that the Paducah USEC Fire Department is aware of hazardous materials present and is trained to address events involving these materials within.

Technical Adequacy of Controls for Tower Shielding Facility (7700 A&B)

Completeness and Technical Rigor

The Safety Basis (SB) document reviewed for the Tower Shielding Facility (TSF) is the *Basis for Interim Operation for the Tower Shielding Facility*, ORNL/RRD/INT109 addresses a range of accidents, which appears to be bounding for the facility. The probability range for anticipated accidents is adjusted to be greater than 0.1 per year, instead of the 0.01 per year prescribed by DOE standards. This was justified as based on the expected 10-year life of the facility. This means that the "unlikely" probability range is between 10^{-1} per year and 10^{-4} per year instead of between 10^{-2} per year and 10^{-4} per year. This adjustment is not appropriate and the effect on the results of the risk evaluation matrix and choice of bounding accidents should be evaluated. The BIO uses qualitative evaluations for virtually all of the events and it does not provide a summary of values extracted from referenced documentation. Three dominant accident types were identified. These types were physical damage to the fuel, fire involving flammable or toxic chemicals, and inadvertent criticality. As a point of technical accuracy, reactive materials, such as sodium and lithium hydride are incorrectly identified as flammable materials in the hazard evaluation. This reflects an apparent misunderstanding of the classification process, so the original hazard screening should be reviewed. The potential for hazardous materials to be stored in locations other than those evaluated needs to be considered.

Identification of Controls

A number of hazards were identified, but not all of the controls were addressed in the TSR section. Controls discussed in the text of the document appear to have a bearing on preventing or mitigating accidents, but are not always consistently addressed. For example, the fire department is credited for mitigating the effects of a fire involving sodium and lithium hydride, but there is no indication that coordination with the fire department is required nor any specification of a required response time.

The TSF appears to be operated in a safe manner, but the process for identification of key assumptions credited in the analysis and the development of SB controls from those assumptions is not sufficient for a Category 2 facility. An effort is required to systematically evaluate the controls and develop an assurance that they are enacted with appropriate requirements, including an update to the TSR section to reflect the status of all controls assumed or credited in the analysis.

Recommendations

The BIO as written is adequate for continuing surveillance and maintenance activities of the TSF until an 830 Rule compliant document can be developed.

Based on the fact that the following controls are cited to reduce the likelihood of a scenario. If the consequences of these scenarios exceed EGs then additional controls should be considered as SB requirements for inclusion in the TSR or the BIO as follows:

- Control to require forklift inspections
- Control to require segregation of hazardous material containers from vehicle traffic paths

- Control to require storage of hazardous materials in acceptable containers

The effect on EG compliance should be evaluated using frequency binning consistent with the DOE STD 3011.

Verify that the ORNL Fire Department is aware of hazardous materials (reactive and flammable) present and is trained to address events involving these materials within.

Technical Adequacy of Controls for K-25 Site UF₆ Cylinder Yards 1066-B, E, F, J, K, and L

Completeness and Technical Rigor

The adequacy of hazard analysis and the derived controls to permit continued operations were evaluated for 6 UF₆ cylinder storage yards at ETTP identified as essential for continued operations. The facilities are storage yards 1066-B, E, F, J, K, and L, and all are mainly storage activities with limited handling operations. The storage of UF₆ cylinders in the 1066 Yards was evaluated in a safety analysis report K/D-SAR-29 and a Basis for Interim Operation K/OPS-035. Although minimal quantitative data is presented in the SAR, the team concluded this to be an accurate assessment based on typical hazard and operations conducted within the storage yards. The dominant accident scenarios for the operations were correctly evaluated, and the accident sequence with the greatest consequences to the public was from a fire. The fire accident sequence had multiple initiating events ranging from vehicle accidents to aircraft crash into a yard. The equivalent of one full (28,000 lbs. of HF/UF) is assumed to release material (3300 lbs. in 10 minutes and 4700 lbs. over 110 minutes) during the postulated SAR fire events. The bounding consequences from the postulated fire events are toxicological material and not the radiological inhalation effects. The radiological effects from the dispersion of the material are low and well below any evaluation guidelines for the onsite worker and the public. The modeling and results appear to be appropriate given that fire size and durations are minimized. Also, review of the hazard categorization indicates the hazard categorization for each of the storage yards was correctly performed.

Identification of Controls

Operational controls were identified within the SAR and the controls were derived from the hazard and accident analysis. The controls were appropriate for the hazards evaluated and provide an adequate level of defense-in depth to protect the worker and the public. Specifically for the bounding accident case of fire the controls, the Fire Protection Program is identified with "essential safety actions" specified: (1) minimization of flammable and combustible material, (2) downwind evacuation (based on personnel training to recognize and respond to a fire), (3) Access restrictions or passive barriers to protect against large fires from trucks, (4) No refueling operations are allowed within the cylinder yard for vehicles utilized in the operations, (5) onsite fire department and communications with them when operations within the yard are occurring.

Recommendations

In general, the team concludes that the controls outlined, if rigorously implemented, provide the appropriate level of protection required for the events postulated within the SAR.

The only exception was the observation that commercial trains may travel across the ETTP site and come within 25 ft of the 1066-B yard. The materials transported by the train are not controlled and the abnormal environment the material may pose on the UF₆ cylinders may not be analyzed in the current AB document. Control of the material allowed access to ETTP via rail and its proximity to the storage yard is warranted.

Technical Adequacy of Controls for K-27

Completeness and Technical Rigor

The analysis and controls described in the *Basis for Interim Operation of the Low-Enriched Uranium (LEU) Process Building K-27 (K/ER-334)* and the *Fire Hazards Analysis for Building K-27 (BJC/OR-442)* were evaluated for completeness and technical adequacy. Building K-27 is correctly categorized as a Hazard Category 3 facility. The categorization is based upon comparison of the total facility inventory to the Hazard Category 2 and 3 limits in DOE-STD-1027.

The existing analysis considers "bounding" accidents (earthquake, forklift/handling error, facility fire, wind, drum corrosion, contaminated surfaces, mechanical failure/operator error, and tank corrosion) for both radiological and chemical hazards. This approach was acceptable when the Safety Basis was approved in January of 1998. Analysis within the BIO states the risk is below the DOE evaluation guidelines (Risk Bin III and IV) for the public and co-located worker at 600 meters.

As mentioned in the above paragraph, the methodology used in the safety basis only considers bounding accidents for the public (950m) and co-located worker (600m). Although this approach is acceptable, the analysis lacks much of the rigor associated with the current DOE Safety Basis requirements. Lack of documentation for secondary accidents will make modifications or discoveries difficult to analyze. This is not a significant problem at this time since the facilities is only conducting routine surveillance and maintenance activities, but a more detailed analysis will need to be completed before additional operations can be authorized. In addition, movement of the co-located worker from 600 meters to 100 meters will result in a corresponding increase in the estimated consequences. Analysis will be required to determine if the increased consequences will change the current risk associated with the accidents. In addition, and of greatest concern, is the computational method used to derive the offsite consequences associated with a release of chemicals. The use of an average ERPG may have inappropriately reduced the consequences.

Identification of Controls

There were no Risk Category I or II accidents identified in the analysis. As such, there are no Safety Basis controls associated with this facility. An operational "Best Management Practice" was identified (Process Equipment Inspection) to prevent the spread of contamination. Additional controls may be required if the new chemical release computations show the consequences exceed the evaluation guideline

Recommendations

Potential Compensatory Actions: The review of the safety basis identified one required action.

1. The computations supporting the chemical analysis in Appendix B of the BIO utilize an average ERPG-2 value for analysis. Using this approach, the consequences from a chemical release are approximately two orders of magnitude below the evaluation guidelines. Utilizing an average ERPG-2 value is considered technically inadequate and a new computation of

chemical consequences should be completed for the individual chemical constituents as soon as possible to determine if new controls are required. In the mean time, operations should be limited to surveillance and maintenance activities.

Recommended Improvements: Several areas for improvement were identified in this review. These recommendations do not affect the operational safety of the facility, but should be completed during the next update of the DSA.

1. Complete a more systematic review of hazards and potential secondary accidents in the upcoming 10CFR 830 update.
2. The Facility Worker and Co-located Worker should be analyzed consistent with the requirements in 10CFR830.
3. Use initiating frequencies in the analysis instead of expected frequencies. For example, the frequency of the forklift accident should be $<10^{-2}$. This change in frequency does not change the risk bin associated with the accident, but does provide a more realistic "unmitigated" frequency.
4. Include periodic fire inspections as a Best Management Practice.