This supporting document provides the bases for the safety classification for the K Basin Transfer Bay Bridge Crane and the bases for the structures, systems, and component safety classification.

Design reconstitution on the transfer bay bridge crane based upon a graded approach that provides the basis for the safety classification of existing structures, systems, and components (SSC). The requirements of SNF Engineering Desk Instruction ENG-DI-003, Commercial Grade Item Upgrade Dedication Process, does not apply to existing SSCs or engineered equipment items.
Authorization Basis Safety Classification of Transfer Bay Bridge Crane at the 105 K Basins

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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P.O. Box 1000
Richland, Washington

Approved for public release; further dissemination unlimited
Authorization Basis Safety
Classification of Transfer Bay Bridge Crane at the 105 K Basins

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Authorization Basis Safety Classification
Of the Transfer Bay Bridge Crane at 105K Basins

Prepared by:
G.A. Chaffee, FFS
B.S. Lew, X-West
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1.0 Introduction

This supporting document provides the bases for the safety classification for the K Basin transfer bay bridge crane and the bases for the Structures, Systems, and Components (SSC) safety classification. A table is presented that delineates the safety significant components.

This safety classification is based on a review of the Authorization Basis (AB). This Authorization Basis review was performed regarding AB and design baseline issues. The primary issues are:

1. What is the AB for the safety classification of the transfer bay bridge crane?

2. What does the SSC safety classification “Safety Significant” or “Safety Significant for Design Only” mean for design requirements and quality requirements for procurement, installation and maintenance (including replacement of parts) activities for the crane during its expected life time?

The AB information on the crane was identified based on review of Department of Energy-Richland Office (RL) and Spent Nuclear Fuel (SNF) Project correspondence, K Basin Safety Analysis Report (SAR) and RL Safety Evaluation Reports (SERs) of SNF Project SAR submittals. The relevant correspondence, actions and activities taken and substantive directions or conclusions of these documents are provided in Appendix A.

2.0 Background

The 105 K transfer bay cranes were built in the early 1950's in accordance with the Electric Overhead Crane Institute, the predecessor to the Crane Manufacturers Association of America, Inc. (CMAA). In 1982, UNC Nuclear Industries replaced both trolleys in accordance with CMAA. In 1998, the KW Basin trolley was replaced with a new 32-ton trolley to meet the requirements of the Spent Nuclear Fuel (SNF) mission. An upgrade for the KE Basin trolley has been identified but not yet implemented.

The Department of Energy (DOE) had concluded that violations to the Design, Procurement, Work Process, and Quality Improvement provisions of 10 CFR 830.120 occurred in the Spent Nuclear Project (SNFP), K-Basins, and other Project Hanford Management Contract (PHMC) facilities. External Letter, EA-1000-04, "Preliminary Notice of Violation and Proposed Imposition of Civil Penalty $330,000 and Compliance Order," (Michaels 1999). Consequently, the Facilities Evaluation Board (FEB) performed an evaluation audit. Their evaluation stated "The KE and KW transfer bay bridge cranes are identified as safety significant on the SEL and K Basins authorization basis upgrades to the cranes were procured as safety significant (SS) and they have been maintained as general service equipment", Internal Letter FEB-99-043, "Extent of Condition Phase 2 Review of Final Report" (Flynn 1999). They further stated that "The requirements in 10 CFR 830.120 ["Quality Assurance Requirement"] specify safety significance will be accounted for in the design, procurement, performance, and testing. Although the crane was procured and supplied as safety significant, the turnover to the plant and adjustments to the
existing maintenance programs to address the safety significant components were not accounted for.

3.0 ISSUE 1: What is the AB for the safety classification of the transfer bay bridge crane?

In response to RL, External letter, 97-SFD-252, "Contract No. DE-AC06-96RL13200 - Safety Classification and Designation As Important-To-Safety (ITS) of Spent Nuclear Fuel (SNF) Project Cranes and Handling Equipment," (Sierackl 1997), the SNF Project provided its position regarding the safety classification of the crane in External letter, FDH-9761261 R4, "Safety Classification of Cranes and Handling Equipment," (Williams 1997). Table 2 of Attachment 1 of this letter designates the safety classification of the crane as ‘Safety Significant’. However, Attachment 1 at Section I.A.2 uses the terminology ‘safety significant for design only’ as designated in HNF-SD-SNF-SEL-001, "K Basins Safety Equipment List," (HNF 2000).

External letter, 98-SFD-026, "Contract No. DE-AC06-96RL13200 - "Safety Classification and Designation as Important to Safety of Spent Nuclear Fuel Project (SNFP) Cranes and Handling Equipment," (Hansen 1998), provides RL review comments to Williams (1997). RL conditionally accepted with questions the classification in Table 2, Attachment 1 of Williams (1997). This Table states ‘Safety Significant’, not ‘safety significant for design only’ as stated in Section I.A.2. As discussed in this RL letter, the safety significant function is encompassed by RL’s statements from Hansen (1998):

- "... no breach of safety class confinement barriers, e.g., the K Basins pool or Multi-Canister Overpack, will occur.”
- "Crucial to the designation that the K Basin crane is safety-significant is showing that a dropped load will not breach the pool concrete such that the safety class function of the basin is maintained for a design basis accident”
- "RL concurrence on the classification of the K Basin crane as safety significant is based on the Fluor Daniel Hanford (FDH) statement that the basin will not be punctured by a drop of a load. The Basin Safety Analysis Report shall document the conclusions of this analysis”

RL’s definition of the crane’s safety significant function is there is not a loss of safety class confinement barrier of the basin pool nor the Multiple Canister Overpack (MCO) as a result of a drop of a load from the crane. However, in a later communication (External Letter, 99-SFD-081, "Contract No. DE-AC06-96RL13200-Approval of Sludge Shipment Using Chem Nuclear 1-13G Cask at the K-East (KE) Basin South Load Out Pit (SLOP) [Hall 1999]”), RL accepted the management of the risk for a dropped load from the crane without imposing additional requirements on the crane.

The drops of loads from the crane that can impact safety class confinement barriers of the basin or the MCO can be categorized into four scenarios:

1. drops of equipment and other related loads, including those induced from the design basis seismic event, impacting the confinement barrier of the pool
(2) drops of the cask-MCO, including those induced from the design basis seismic event, impacting the confinement barrier of the pool

(3) drop of the crane due to structural failures induced by a seismic event impacting the confinement barrier of the pool

(4) drops of the cask-MCO, including those induced from the design basis seismic event, impacting the confinement barrier of the MCO.

These scenarios are addressed differently for the crane at K Basins:

(a) Prevention or mitigation of drops of equipment and other related loads impacting the confinement barrier of the pool - addressed by administrative controls in Table 3-10 of the SAR

(b) Prevention or mitigation of drops of the cask-MCO on the confinement barrier of the pool - addressed by the ‘Alternative Approach’ and the management of its risk by RL, where RL has accepted the use of the original general service (GS) design of the Immersion Pail Support Structure (IPSS) and relies on the low frequency of drops of a cask-MCO and mitigation of the consequences of the cask-MCO drop, if it occurs

(c) Prevention or mitigation of the drop of the crane from structural failures induced by a seismic event impacting the confinement barrier of the pool - addressed by calculations that were reviewed and accepted by RL to demonstrate that the crane will maintain its structural integrity during and after the design basis seismic event (External letter, 98-SFD-089, "Contract No. DE-AC06-96RL13200 - Removal of Restrictions Regarding Crane Trolley Movements," [Wagoner 1998])

(d) Prevention or mitigation of drops of the cask-MCO, including those induced from the design basis seismic event, impacting the confinement barrier of the MCO - addressed by calculations found to be acceptable for criticality and confinement requirements by the MCO Topical (HNF-SD-SNF-SARR-005, Rev 1, "Multi Canister Overpack Topical Report, HNF [1999]).

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SAR 3L explicitly identifies the seismic event as an initiator of a cask-MCO drop. The SNF Project and RL letters associated with the ‘Alternative Approach’ address the issues related to a cask-MCO drop as a risk package encompassing all drop initiators, including seismic initiated drops. Seismic initiated drops were not explicitly identified as needing separate or expanded consideration. As an indication of acceptability, the frequency of operational drops (number/year) of a cask-MCO is said to be on the same order of magnitude as the frequency of the seismic design basis event, leading to the understanding that the RL and the SNF Project accepted the management of risk of the occurrence of seismic induced drop events as well as operational induced drop events of the cask-MCO. This includes consideration of taking emergency response to a cask-MCO drop under the scenarios of with and without supply of offsite power.
In summary, this AB review determined that RL's definition of the 'Safety Significant' function of the crane is that there is not a loss of safety class confinement barrier of the basin pool, nor the MCO, as a result of a drop of a load from the crane. This is satisfied by administrative controls, management of risk and acceptance of analysis. As such, given that issues regarding drops of equipment/other loads and the cask-MCO are resolved by administrative controls and the management of risk, the current AB requires only demonstration of adequate design that the crane maintain structural integrity during and after a design basis earthquake and that the MCO will maintain its confinement function and its criticality geometry control functions after a drop from the crane. This demonstration is consistent with 'safety significant for design only'.

4.0 ISSUE 2: What does the SSC safety classification “Safety Significant” or “Safety Significant for Design Only” mean for requirements design and quality requirements for procurement, installation and maintenance (including replacement of parts) activities for the crane during its expected life time?

In its response to Sieracki (1997), Williams (1998) provides the SNF Project position regarding the safety classification of the crane. The basis for compliance of the crane to applicable Department of Energy (DOE) and Hanford Site requirements is in Section I.A.2. The thrust of this argument is that the crane meets the specified design codes and standards of applicable DOE and Hanford Site requirements. These are ‘CMAA, ANSI B30.XX’, for General Service (GS) and Safety Significant (SS) cranes and ‘ASME-NOG-1’ for Safety Class (SC) cranes². K Basin cranes were ‘built to’ CMAA-70, "Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes", ANSI B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist", and ANSI B30.10, "Hooks" with a seismic evaluation for the bridge, structure and trolley overturn to ASME NOG-1, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)" and AISC, "Manual of Steel Construction, Allowable Stress Design".

Operational activities, such as hoisting inspection, testing, and maintenance (including replacement of parts), related to the crane are to be in accordance with the Hanford Site Hoisting and Rigging Manual (Manual) [DOE-RL 92-36]. The Hanford Site Hoisting and Rigging Manual requires that crane maintenance files be established. However, a preliminary review of the Manual indicates that the Manual provides requirements for such activities but does not distinguish such requirements by safety classification, that is, the Manual does not define sets of requirements for Safety Class (SC), Safety Significant (SS) and General Service (GS). As such, the operational requirements for the crane are the same for GS, SS or SC classifications.

The recommended quality classification of the Transfer Bay Bridge Crane is based on HNF-PRO-259, "Graded Quality Assurance" and AP-EN-6-028, "Graded Approach". The ‘Graded Approach’ Checklist in these procedures were completed and are in Appendix B. The results of implementing this Administrative Procedure found the following risk levels and recommended the quality levels be implemented as follows: 'The structural elements of this SSC are assigned a moderate risk and associated quality level (QL) 2. The controls for the SSC are assigned low risk and associated QL 3 for component identification. The power supply cables and control wiring are assigned low risk and are identified as QL 0.'

² Hanford PRO-097, Table B-I is in error and a correction through Corrective Action Management (FDH-PI-WA-EG-19991601) has been submitted. The requirements identified in this document identify the correct requirements.
In summary, this AB review reaffirmed that the transfer bay bridge crane meets the applicable design codes and standards and seismic evaluations were performed in accordance with applicable design codes. Further implementation of the "Graded Approach" procedure determined appropriate Quality requirements for ongoing operational maintenance.

5.0 Conclusion

The AB safety classification of the transfer bay bridge crane was determined to be Safety Significant with satisfaction of this classification by administrative controls, management of risk and acceptance of analysis. As such, given those issues regarding drops of equipment/other loads and the cask-MCO are resolved by administrative controls and the management of risk, the 'Safety Significant' function of the crane is to maintain structural integrity during and after a design basis earthquake.
6.0 References

Project Hanford Management System
Topical Area, "Quality Assurance"
  HNF-PRO-259, Graded Quality Assurance
Topical Area, "Engineering Program"
  HNF-PRO-097, Engineering Design and Evaluation

Spent Nuclear Fuel Project Administrative Procedures
Topical Area, "Engineering Program"
  AP-EN-6-028, Spent Nuclear Fuel Project Graded Approach


ANSI/ASME B30.2, 1990, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist), American Society of Mechanical Engineers.


ASME-NOG-1, Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder), American Society of Mechanical Engineers, New York, 1995

CMAA#70, 1994, Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes, Crane Manufacturers Association of America, Inc., Charlotte, North Carolina


HNF, 1999, Multi-Canister Overpack Topical Report, HNF-SD-SNF-SARR-005, Fluor Hanford, Richland, Washington

HNF, 1999, K Basins Safety Equipment List, HNF-SD-SNF-SEL-001, Fluor Hanford, Richland, Washington


### AUTHORIZATION BASIS AND DESIGN RELATED CHRONOLOGY

<table>
<thead>
<tr>
<th>DATE</th>
<th>DOCUMENT / EVENT</th>
<th>ACTION / ACTIVITY</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/97</td>
<td>RL letter 97-SFD-202</td>
<td>Requested that the SNF Project demonstrate how its cranes comply with DOE Orders, in particular to DOE 6430.1A</td>
<td>See page 10 of 22 for response for the transfer bay bride crane. Response notes that the trolley is not designed &amp; not seismically qualified and does not provide a safety classification for the crane.</td>
</tr>
<tr>
<td>10/97</td>
<td>Project letter FDH-97600091</td>
<td>Provides SNF Project response to RL letter 97-SFD-202</td>
<td>SAR Rev 3B provided a description of the transfer bay bride crane and classified the KW transfer bay bride crane as non-safety GS</td>
</tr>
<tr>
<td>11/97</td>
<td>RL letter 97-SFD-252</td>
<td>Provides RL’s review comments of Project letter FDH-97600091 and requires a response for a commitment within one week of the date of this letter to provide additional technical information</td>
<td>Notes that ‘RL is concerned’ that the Project has not properly classified the cranes according to either 6430.1, General Design Criteria - Defines safety function as ‘prevention of load drops’, with emphasis on adequate handling equipment rather than features to mitigate the consequences of a load drop -RL’s position is that ‘cranes used to lift fuel, or to lift equipment over spent fuel are designated SC as defined in the Order[6430.1A]’ -transfer bay bride crane issues are in Section 1 of Attachment 1</td>
</tr>
<tr>
<td>1/98</td>
<td>Project letter FDH-9761261 R4</td>
<td>Provides SNF Project response to RL letter 97-SFD-252</td>
<td>-Provides classification according to 6430.1A &amp; NRC 10 CFR72 -Using a graded approach, this letter classifies the crane is classified ‘SS’ or ‘SS for design only’ based on: (1) Cranes are designed &amp; built to CMAA-70 standards and features beyond CMAA requirements (2) 6430.1A, paragraph 1460 specifies CMAA-70 standards (3) Upgraded crane design to the transfer bay bride rating is consistent with existing design of K Basins structures (4) K Basins SEL Rev I classifies the crane as ‘SS for design only’ (5) HNF-PRO-097 which implements 5480.23 &amp; 6430.1A for the Hanford Site, specifies the relevant design codes to be ‘CMAA, ANSI B30.XX’ for GS &amp; SS cranes and ‘ASME-NOG-I’ for SC cranes (6) K Basins cranes were ‘built to’ CMAA-70, ANSI B30.2 &amp; ANSI B30.10 with seismic evaluation for the bridge, structure &amp; trolley overturn to ASME NOG-1 &amp; AISC. (7) Concludes that crane meets applicable 6430.1A &amp; relevant Hanford Site policies. The upgrade to the crane to the transfer bay bride rating is a like-for-like replacement of an existing crane, to the same criteria as previously existed, and to all the requirements of the approved functional requirements document.</td>
</tr>
</tbody>
</table>

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1 HNF-PRO-097, Table B-1 is in error and a correction through Corrective Action Management ((FDH-PI-WA-EG-19991601) has been submitted. The requirements identified in this document identify the correct requirements.
## Appendix A

**AUTHORIZATION BASIS AND DESIGN RELATED CHRONOLOGY**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
</table>
| 3/98 | RL letter 98-SFD-026 (9852032A) | Provides RL's review comments of Project letter FDH-9761261 R4. -Conditionally accepts with questions the classification in Table 2, Attachment 1 of FDH-9761261 R4. This Table says 'SS', not 'SS for design only'. -Agreement by DOE is based on FDH's assertions and conclusions on drops analyses, that these analyses are valid and that no breach of safety class confinement barriers, e.g., the K Basins pool or Multi-Canister Overpack, will occur.
-RL letter states that: "Crucial to the designation that the K Basin crane is safety-significant is showing that a dropped load will not breach the pool concrete such that the safety class function of the basin is maintained for a design basis accident" and "RL concurrence on the classification of the K Basin crane as safety significant is based on the FDH statement that the basin will not be punctured by a drop of a load. The Basin Safety Analysis Report shall document the conclusions of this analysis.” |
| 3/98 | RL Letter, 98-SFD-063 | Provides RL's approval with comments of SAR 3B in Project letter FDH-9759080 R2, 10/97. -RL notes that the SAR 3B reflects the upgrade of the crane capacity to 32 tons, but prohibits lifting of loads near the cooling pool to limits in Table 3-10, 'Non Perforation Criteria', which effectively precludes damage to the Basin walls and floor. The only damage under these restrictions would be dropping items on the fuel during seismic events or other upset conditions. -RL also imposed a Special condition of Approval restricting all loads from being lifted above the pool using the crane or placing the trolley itself above the cooling pool until the crane classification questions in RL letter 98-SFD-026 are addressed by FDH and approved by RL.
-RL also imposed a Special condition of Approval restricting all loads from being lifted above the pool using the crane or placing the trolley itself above the cooling pool until the crane classification questions in RL letter 98-SFD-026 are addressed by FDH and approved by RL.
-RL also imposed a Special condition of Approval restricting all loads from being lifted above the pool using the crane or placing the trolley itself above the cooling pool until the crane classification questions in RL letter 98-SFD-026 are addressed by FDH and approved by RL. |
| 4/98 | Project letter FDH-9853261 | Provides seismic analyses of the new crane trolley and results of independent reviews of these analyses per RL Letter, 98-SFD-063. -Project analyses in ECN 645558 -RL accepts analyses and independent reviews were performed per requirements in 6430.1A -RL removed restrictions of moving the trolley over the cooling pool |
| 5/98 | RL Letter, 98-SFD-089 | Provides RL's approval of seismic analyses in Project letter FDH-9853261. -RL accepts SNF Project seismic analysis of the crane which demonstrates that the unloaded crane trolley will not fall down during a seismic event. RL removes restrictions on crane trolley movement over the cooling pool. -The intent of this letter (98-SFD-089) was clarified by 99-SFD-081 that crane trolley could move fuel and material above the cooling pool; however, these movements must remain in compliance with limits in Table 3-10. |
| 6/98 | Project letter FDH-9853930 R4 | Submits K Basins SAR 3E/3F. Provides SNF Project position, analyses and classification of the crane as 'SS for design only' in Table 2-9 |
### AUTHORIZATION BASIS AND DESIGN RELATED CHRONOLOGY

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Notes</th>
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<tr>
<td>9/98</td>
<td>RL Letter 98-SFD-176 provides RL's approval of SAR 3E/3F in Project letter FDH-9853930 R4</td>
<td>- RL approved SAR amendment 3E/3F which resolved the concern with the crane safety classification by classifying the crane as 'SS for design only' in Table 2-9</td>
</tr>
<tr>
<td>1/99</td>
<td>Project letter FDH-9857261 R1 requests approval for use of Chem-Nuc cask &amp; clarification of use of the crane</td>
<td>- -</td>
</tr>
<tr>
<td>2/99</td>
<td>RL Letter 99-SFD-081 responds to Project letter FDH-9857261 R1</td>
<td>- RL re-iterates its approvals of SAR amendment 3E/3F in its letter 98-SFD-176 on 9/18/98 that resolved the concern with the crane safety classification. - This letter (99-SFD-081) clarified RL Letter 98-SFD-089 that crane trolley could move fuel and material above the cooling pool; however, these movements must remain in compliance with limits in Table 3-10.</td>
</tr>
<tr>
<td>1999</td>
<td>Rev 3, K Basins Safety Equipment List Designates Crane as SS for 'Design Only'</td>
<td>- -</td>
</tr>
<tr>
<td>7/99</td>
<td>FEB Audit Report</td>
<td>- FEB finding that 'The KE and KW transfer bay bridge cranes are identified as safety significant (SS) and they have been maintained as general service equipment.' Further, the FEB stated that 'The requirements in 10CFR 830.120 specify safety significant will be accounted for in the design, procurement, performance and testing. Although the crane supplied as safety significant, the turnover to the plant and adjustments to the existing maintenance programs to address the safety significant components were not accounted for.' - FEB is an internal site management organization, not a regulatory authority</td>
</tr>
<tr>
<td>7/99</td>
<td>SNF Project Letter FDH-9955223 SNF Project proposes 'Alternative Approach' to use original design of the IPSS</td>
<td>- Proposes 'Alternative Approach' regarding drops of the cask-MCO - Does not specifically raise crane issues regarding its safety classification</td>
</tr>
<tr>
<td>8/99</td>
<td>RL Letter 99-SFD-160 (9955355) RL accepts SNF Project proposal for the 'Alternative Approach' to use the original IPSS design</td>
<td>- Accepts proposed 'Alternative Approach' regarding drops of the cask-MCO - Does not specifically address crane issues regarding its safety classification</td>
</tr>
</tbody>
</table>
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Graded Approach Checklist

SSC Identification:  **Transfer Bay Bridge Crane**

Functions:  Basic function is primary hoisting device in the transfer bay of the 105K facilities.  Used to position IXMs and used for handling MCOs.  The safety significant function is to maintain structural integrity during operations and not collapse into the Safety Class Basin Structure.

**Grading Factor 1.** Nuclear safety classification of the item or activity.

SSC Classification:  _SS___X_____

This SSC is identified as Safety Significant.  Its safety function is to maintain structural integrity to avoid collapse during an earthquake.

**Grading Factor 2.** Level of risk and impact associated with a failure or deficiency.

**Grading Factor 7.** Control of potential project delays and costs if failures or deficiencies occur.

**RISK LEVEL**  Moderate

**JUSTIFICATION:**

This SSC does not serve to confine radioactive material; however, its structural failure may result in damage to the basin structure that provides primary confinement for radioactive materials.  A failure of this SSC would also result in significant delays in moving MCOs out of the basin thereby delaying the primary project mission.

**Grading Factor 3.** Age, status, and condition of a facility, process, or an item.

**RISK LEVEL**  Low

**JUSTIFICATION:**

The KW transfer bay bridge crane was upgraded as part of the path forward project work and upgrades to the KE transfer bay bridge crane have been identified but not yet implemented.  The current schedule for removal of fuel from the K-Basins shows approximately five years of life for the primary function of removal of spent nuclear fuel from the basin.  The upgrades results in an essentially new crane in good condition with a required relatively short life, thereby resulting in a low risk.
Appendix B

Grading Factor 4. History of problems at a facility, with a process, or an item.

RISK LEVEL    Low

JUSTIFICATION:

The transfer bay bridge cranes have a good performance history with very rare failures. Therefore, this is a low risk item.

Grading Factor 5. Adequacy of existing controlling documentation, e.g. existing SARs, engineering drawings, construction specifications, vendor data, acceptance tests, etc.

RISK LEVEL    Low

JUSTIFICATION:

The documentation associated with the transfer bay bridge crane is well maintained. There is an annual inspection and monthly wire rope inspections performed in accordance with the Hanford Site Hoisting and Rigging Manual (DOE-RL-92-36).

Grading Factor 6. Complexity of products or activities involved.

RISK LEVEL    Low

JUSTIFICATION:

Although, the crane controls represent somewhat new technology for the 100K area, this technology is standard throughout the industry. The crane is not unique in its design. Like any piece of equipment with the lifting capacity of this crane, there is special training required for operation of this item. The maintenance for this item does not require special training.

OVER-ALL RISK LEVEL:

The structural elements of this SSC are assigned a moderate risk and associated quality level (QL) 2. The controls for the SSC are assigned low risk and associated QL 3 for component identification. The power supply cables and control wiring are assigned low risk and are identified as QL 0.
OVER-ALL JUSTIFICATION:

The safety significant function of the transfer bay bridge crane is reinforced with the periodic inspections in accordance with the Hanford Site Hoisting and Rigging Manual. Because of the design and authorization bases, the transfer bay bridge crane is classified as safety significant and QL 2. The primary cause of crane failures in indoor facilities resulting in structural collapse is undetected degradation of the crane components through age and use. For this reason, the Surveillance Procedures associated with this SSC is identified as Safety Significant requiring strict documentation and control of the inspections and any resulting corrective actions.

The control system for the crane is under strict configuration control, including revision control for the software operating parameters. The configuration controls for the hardware controls are standard commercial practice for a piece of equipment of this nature and therefore are assigned to QL3, to ensure trace-ability of component identification.

The power supply to this crane is a commercial standard power supply. The control wiring is standard industrial control wiring. Basic wiring is considered skill of the craft for electricians; therefore, the power and control wiring is identified to be QL0.
Appendix C

Structures, Systems and Components Classification

Safety significant subsystems and components of the KW transfer bay bridge crane are identified in Table 1 below. The KE transfer bay bridge crane has not been upgraded, however, analysis (WHC-SD-SNF-SA-002, Seismic Evaluation of the K Basin Bridge Cranes (HOI-320 & HOI-418 [WHC 1996]) supports the safety function that the crane will not collapse during or after an earthquake.

<table>
<thead>
<tr>
<th>SSC and System Number</th>
<th>Safety Classification</th>
<th>Safety Function</th>
<th>Critical Attributes</th>
<th>Component Name</th>
<th>Configuration Identifiers</th>
<th>Reference Documentation</th>
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<tbody>
<tr>
<td>HOI-418 / 14</td>
<td>Safety Significant</td>
<td>Maintain structural integrity</td>
<td>Passive</td>
<td>Bridge Structure</td>
<td>BRDG-HOI-418</td>
<td>VI-4670; No drawings available.</td>
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<tr>
<td>HOI-418 / 14</td>
<td>Safety Significant</td>
<td>Maintain structural integrity</td>
<td>Passive</td>
<td>Bridge Wheel Assembly</td>
<td>BRDG-WHEEL-DR-HOI-418-E (Drive); BRDG-WHEEL-IDL-HOI-418-E (Idler)</td>
<td>VI 4670, page 49; Moffett Engineering Company</td>
</tr>
<tr>
<td>HOI-418 / 14</td>
<td>Safety Significant</td>
<td>Maintain structural integrity</td>
<td>Passive</td>
<td>Bridge Wheel Assembly</td>
<td>BRDG-WHEEL-DR-HOI-418-W (Drive); BRDG-WHEEL-IDL-HOI-418-W (Idler)</td>
<td>VI 4670, page 49; Moffett Engineering Company</td>
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<tr>
<td>HOI-418 / 14</td>
<td>Safety Significant</td>
<td>Maintain structural integrity</td>
<td>Passive</td>
<td>Trolley Wheel Assembly</td>
<td>TRLY-WHEEL-DR-HOI-418-N (Driver) North; TRLY-WHEEL-IDL-HOI-418-N (Idler) North</td>
<td>VI 18520, Ederer Drawings B-35226, B-35227</td>
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<td>TRLY-WHEEL-DR-HOI-418-S (Driver) South; TRLY-WHEEL-IDL-HOI-418-S (Idler) South</td>
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<td>Main Hoist Reducer</td>
<td>MN-RED-HOI-418</td>
<td>VI 18520, Flender Drawing 5 687 975</td>
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<td>Wire Rope &amp; Rope Reaving (includes Crosby Open Swaged Sockets)</td>
<td>WIR-ROPE-HOI-418-N; WIR-ROPE-HOI-418-S</td>
<td>VI 18520; Ederer Drawing B-35236</td>
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## Appendix C

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<td>Upper Block Assembly includes Crosby Shackles, Rope End Pin, Rope Shackle End Pin, and Side Plates</td>
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<td>Lower Block Assembly includes Hook Pin, Sheave Pin, Rope End Pin, and Shackle End Pin</td>
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<td>Spreader Beam</td>
<td>SPRDR-BM-HOI-418</td>
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<td>Rope Clamp</td>
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<td>Misreeving detection</td>
<td>Passive – Confirms cable is within grooves of main hoist drum</td>
<td>Spooling Sensor Bar</td>
<td>SPL-SENR-BAR-HOI-418</td>
<td>VI 18520; Ederer Drawing B-35428</td>
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# DISTRIBUTION SHEET

**To**  
Distribution

**From**  
Spent Nuclear Fuel Nuclear Safety

**Date**  
4-6-00

**Project Title/Work Order**
SNF-5848, Authorization Basis Safety Classification of the K Basins Transfer Bay Bridge Crane

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EDT No. 601515  
ECN No.