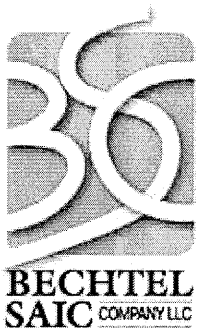

QA: QA

000-30R-MGR0-00500-000-004

March 2008

Q-List

Prepared for:
U.S. Department of Energy
Office of Civilian Radioactive Waste Management
1551 Hillshire Drive
Las Vegas, Nevada 89134-6321

Prepared by:
Bechtel SAIC Company, LLC
1180 Town Center Drive
Las Vegas, Nevada 89144

Under Contract Number
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DISCLAIMER

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BSC

TECHNICAL REPORT SIGNATURE PAGE/ CHANGE HISTORY

Complete only applicable items.

1. QA: QA

2. Total Pages: 37/6 RJG 3/12/08

3. Technical Report Title Q-List			
4. DI (including Rev. No.) 000-30R-MGR0-00500-000-004			
	Printed Name	Signature	Date
5. Originator	R.J. Garrett		3/12/08
6. Checker	S.F. Deng		3/12/08
7. QER	S.H. Horton	S. H. Horton	03/12/08
8. PCSA Manager	M.R. Wisenburg		03/12/2008
9. Manager, Licensing & Nuclear Safety	R.M. Kacich		3-12-08
10. Remarks			

Change History

11. Revision No.	12. Description of Change
00	Initial issue as TDR-MGR-RL-000005. This initial issue supersedes YMP/90-55Q Rev. 07 to conform to AP-2.22Q Rev. 01. This initial issue classifies the preliminary license application design SSCs; combines the separate appendices for classification of MGR SSCs, Exploratory Studies Facility Engineered Items, and Natural Barriers that were a part of the superseded document into one list of SSCs and barriers important to safety or important to waste isolation. The former Exploratory Studies Facility Engineered Items were included in the MGR SSCs.
000	Initial issue as 000-30R-MGR0-00500-000-000. This initial issue supersedes TDR-MGR-RL-000005. The document identifier was changed to conform to the document numbering methodology for engineering documents. The former Exploratory Studies Facility Engineered Items were deleted from the document. This revision classifies the license application design SSCs and affects the entire document.
001	Complete revision supersedes 000-30R-MGR0-00500-000-000 and is issued to update classifications because of ongoing design evolution.
002	General revision of systems and components to update classifications because of ongoing design evolution for license application. Supersedes 000-30R-MGR0-00500-000-001.
003	Limited revision of descriptions and names of systems and components to update classifications as a result of DOE comment resolutions for License Application references. Technical changes are indicated by change bars in margins; minor editorial changes made are not indicated by change bars. Supersedes 000-30R-MGR0-00500-000-002.
004	General revision of systems and components to update classifications due to ongoing design evolution to support the license application. Supersedes 000-30R-MGR0-00500-000-003.

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TABLES

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ACRONYMS AND ABBREVIATIONS

BSC	Bechtel SAIC Company, LLC
ITS	important to safety
ITWI	important to waste isolation
SSCs	structures, systems, and components

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1. PURPOSE

The purpose of this report is to document the safety classification of the Yucca Mountain repository structures, systems, and components (SSCs) that are important to safety (ITS) and to document the identification of natural and engineered barriers and other SSCs important to waste isolation (ITWI). This report supports the design and licensing activities for the Yucca Mountain Project. There are no limitations on the use of this document.

2. QUALITY ASSURANCE

As determined from Section 2.1.C.1.1 of the *Quality Management Directive* (Ref. 8.1.1), the activity under which this report was developed is subject to the repository quality assurance program requirements because the SSCs and barriers identified in this report as ITS or ITWI are subject to the quality assurance requirements of 10 CFR 63.142 (Ref. 8.3.1). Therefore, the approved version of this document is designated as QA: QA. This report was prepared in accordance with PA-PRO-0313, *Technical Reports* (Ref. 8.1.2), and LS-PRO-0203, *Preparation and Maintenance of the Q-List* (Ref. 8.1.4).

3. USE OF SOFTWARE

The operating environment used in writing this report included the use of Microsoft Word 2003 software installed on a Dell OPTIPLEX 745 personal computer. The operating system used on this computer is Microsoft Windows XP Professional Version 5.1.2600. The use of Microsoft Word software is classified as Level 2 software usage per Attachment 12 of *Software Management* (Ref. 8.1.3). No software (approved for quality assurance work or commercially available) was used for any calculation in this report.

4. ASSUMPTIONS

There are no assumptions in this report.

5. CLASSIFICATION METHODOLOGY

The methodology and process for classifying SSCs and natural and engineered barriers are provided in LS-PRO-0203, *Preparation and Maintenance of the Q-List* (Ref. 8.1.4).

6. ITEMS IMPORTANT TO SAFETY AND IMPORTANT TO WASTE ISOLATION

6.1 STRUCTURES, SYSTEMS, AND COMPONENTS

Information summarized in Appendix A for preclosure SSCs is reproduced from *Preclosure Nuclear Safety Design Bases* (Ref. 8.2.1, Table A-1).

6.2 NATURAL AND ENGINEERED BARRIER SYSTEMS

The information summarized in Appendix A that lists the postclosure natural and engineered barrier systems and associated SSCs is presented in *Postclosure Nuclear Safety Design Bases* (Ref. 8.2.2, Table 7-1). Natural and engineered barriers are grouped into the following three principal barriers:

- Upper Natural Barrier, consisting of surface topography, soil, and volcanic rock above the repository
- Engineered Barrier System, consisting of cladding, drip shield, emplacement drift invert ballast, waste form and waste package internals, and waste package
- Lower Natural Barrier, consisting of volcanic rock and alluvial material below and downgradient from the repository.

6.3 EXPLORATORY STUDIES FACILITY ENGINEERED ITEMS

This report does not include SSCs of the Exploratory Studies Facility identified in *Classification of Exploratory Studies Facility Engineered Items* (Ref. 8.2.3, Section 6.6). SSCs of the Exploratory Studies Facility are existing conditions that the repository design must evaluate at the time of construction authorization. Therefore, it is inappropriate to treat the SSCs of the Exploratory Studies Facility as part of the repository.

7. CLASSIFICATION CRITERIA

The following criteria used in the classification of repository SSCs and natural and engineered barriers are summarized from *Preparation and Maintenance of the Q-List* (Ref. 8.1.4), *Preclosure Nuclear Safety Design Bases* (Ref. 8.2.1), and *Postclosure Nuclear Safety Design Bases* (Ref. 8.2.2).

Identification of ITS SSCs

Structures are defined as elements that provide support or enclosure such as buildings, freestanding tanks, basins, dikes, and stacks. Systems are collections of components assembled to perform a function, such as heating, ventilation, and air-conditioning. Components are items of equipment such as pumps, valves, relays, piping, cable trays, conduit, or elements of a larger array, such as digital controllers. The repository architecture is divided into systems and subsystems, as presented in *Repository System Codes* (Ref. 8.2.4).

The classification of SSCs as ITS (or non-ITS) is an iterative process based on, and consistent with, the level of development of the repository design, which provides inputs to the classification of SSCs.

Important to safety is defined in 10 CFR 63.2 (Ref. 8.3.1) as follows:

> *Important to safety*, with reference to structures, systems, and components, means those engineered features of the geologic repository operations area whose function is:
>
> (1) To provide reasonable assurance that high-level waste can be received, handled, packaged, stored, emplaced, and retrieved without exceeding the requirements of § 63.111(b)(1) for Category 1 event sequences; or
>
> (2) To prevent or mitigate Category 2 event sequences that could result in radiological exposures exceeding the values specified at § 63.111(b)(2) to any individual located on or beyond any point on the boundary of the site.

Implementation of this regulatory definition of ITS has produced the following specific criteria in the preclosure safety analysis to classify SSCs:

> An SSC is classified as ITS if it appears in an event sequence and at least one of the following criteria apply:
>
> - The SSC is relied upon to reduce the frequency of an event sequence from Category 1 to Category 2.
> - The SSC is relied upon to reduce the frequency of an event sequence from Category 2 to beyond Category 2.
> - The SSC is relied upon to reduce the aggregated dose of Category 1 event sequences by reducing the event sequence mean frequency.
> - The SSC is relied upon to perform a dose mitigation or criticality control function.

The classification process involves the selection of the SSCs in the identified event sequences (including event sequences that involve nuclear criticality) that are relied upon to perform the identified safety functions such that the preclosure performance objectives of 10 CFR Part 63 are not exceeded. The ITS classification extends only to the attributes of the SSC involved in providing the ITS function. If one or more components of a system are determined to be ITS, the system is identified as ITS, even though only a portion of the system may actually be relied upon to perform a nuclear safety function.

ITWI Criteria

ITWI is defined in 10 CFR 63.2 (Ref. 8.3.1) as follows:

> *"Important to waste isolation*, with reference design of the engineered barrier system and characterization of natural barriers, means those engineered and natural barriers whose function is to provide a reasonable expectation that high-level waste can be disposed of without exceeding the requirements of § 63.113(b) and (c).

ITWI is a determination assigned to a barrier or a barrier's feature/component, based on its capability of preventing or substantially reducing the rate of movement of water or radionuclides from the Yucca Mountain Repository to the accessible environment, or preventing the release or substantially reducing the release rate of radionuclides from the waste. In addition, ITWI includes those engineered features/components of the geologic repository whose function is to prevent or mitigate the consequences of potential disruptive events (e.g., criticality), as well as consumable materials to be incorporated into any engineered item ITWI during fabrication of that item.

8. RESULTS AND CONCLUSIONS

This report documents the safety classification of the Yucca Mountain SSCs that are ITS and the natural and engineered barriers and other SSCs ITWI. This report supports the design and licensing activities for the Yucca Mountain Project. The safety classifications of SSCs and natural and engineered barriers are listed in Appendix A. As the design of the repository evolves, and further event sequence analyses and consequence analyses are performed, the supporting classification analyses for this report will be reviewed and revised as necessary.

9. REFERENCES

9.1 PROCEDURES/DIRECTIVES

9.1.1. BSC (Bechtel SAIC Company) 2007. *Quality Management Directive.* QA-DIR-10, Rev.2. Las Vegas, Nevada: Bechtel SAIC Company.

9.1.2. PA-PRO-0313, Rev. 6. *Technical Reports*. Las Vegas, Nevada: Bechtel SAIC Company.

9.1.3. IT-PRO-0011, Rev. 7. *Software Management.* Las Vegas, Nevada: Bechtel SAIC Company. ACC: DOC.20070905.0007.

9.1.4. LS-PRO-0203, Rev 3. *Preparation and Maintenance of the Q-List*. Las Vegas, Nevada: Bechtel SAIC Company.

9.2 DESIGN INPUTS

9.2.1. BSC 2008. *Preclosure Nuclear Safety Design Bases*. 000-30R-MGR0-003500-000-000. Las Vegas, Nevada: Bechtel SAIC Company.

9.2.2. SNL (Sandia National Laboratories) 2008. *Postclosure Nuclear Safety Design Bases*. ANL-WIS-MD-000024 REV 01. Las Vegas, Nevada: Sandia National Laboratories.

9.2.3. BSC 2004. *Classification of Exploratory Studies Facility Engineered Items.* 000-PSA-MGR0-00100-000-000. Las Vegas, Nevada: Bechtel SAIC Company. 9.2.4 BSC 2007. *Repository System Codes*. 000-30X-MGR0-01200-000 REV 00E. Las Vegas, Nevada: Bechtel SAIC Company.

9.3 DESIGN CONSTRAINTS

9.3.1. 10 CFR 63. 2007. *Energy: Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada*. Internet Accessible.

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APPENDIX A

Q-LIST

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Table A-1. Q-List

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Aging Facility	Aging Facility	Aging Pad	Yes	No
		Horizontal Aging Module (HAM) (170-HAC0-ENCL-00001)	Yes	No
		Mobile Platform (170-HAP0-PLAT-00001-2)	No	No
		Support Structures (including utility buildings, if applicable)	No	No
	Aging Handling/Cask Transfer	Cask Tractor (for use with the Cask Transfer Trailer) (170-HAT0-HEQ-00001)	Yes	No
		Cask Transfer Trailers (for use with Horizontal Shielded Transfer Cask) (PWR DPC: 170-HAT0-TRLY-00001) (BWR DPC: 170-HAT0-TRLY-00002)	Yes	No
		Mobile Cranes (170-HAT0-CRN-00001-2)	No	No
		Site Transporter (170-HAT0-MEQ-00001)	Yes	No
	Aging Handling/Aging Overpack	Horizontal Shielded Transfer Cask (STC) (for use with Horizontal Aging Module [HAM]) (170-HAC0-HEQ-00001)	Yes	No
		Aging Overpack (AO) (TAD: 170-HAC0-ENCL-00003) (Vertical DPC: 170-HAC0-ENCL-00002)	Yes	No
Balance of Plant Facilities	Balance of Plant facilities that include Administration, Security, Utilities, Emergency Response, Offsite, Warehouse and Non-Nuclear Receipt; Materials and Consumables, Maintenance and Repair, Transportation, Balance of Plant Construction, Central Control Center, and Infrastructure	Structures	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Balance of Plant Facilities (continued)	Balance of Plant (continued)	Roads, Rails for Commercial Railcars	No	No
		Surface Rails for the Transport and Emplacement Vehicle (TEV)	No	No
		Flood Control Features	Yes	No
Canister Receipt and Closure Facility	Canister Receipt and Closure Facility (CRCF)	Structure	Yes	No
		Rails for the Commercial Railcars (Inside the Building)	No	No
		Rails for the TEV (Inside the Waste Package Loadout Room)	Yes	No
		Shield Windows	No	No
		Shield Doors (Including Anchorages) and Equipment Confinement Doors	Yes	No
		ALARA Shielding Features[1]	No	No
		DOE Canister Slide Gates (060-HTC0-HTCH-00005, 6, 7, 8, 9)	Yes	No
		Cask Port Slide Gates (060-HTC0-HTCH-00001, 2)	Yes	No
		TAD Slide Gates (060-HTC0-HTCH-00010, 11)	Yes	No
		Waste Package Port Slide Gates (060-HTC0-HTCH-00003, 4)	Yes	No
		Cask Preparation Platform (060-HMH0-PLAT-00001)	Yes	No
		Waste Package Transfer Carriage Docking Stations (060-HL00-75-00001, 2)	No	No
		CRCF Loadout Platforms (060-HL00-PLAT-00001, 2, 3)	No	No
Cask/Canister/ Waste Package Process System	Cask Cavity Gas Sampling	Entire (IHF, RF, CRCF, WHF)	No	No
	Cask Cooling	Cask/DPC Overpressure Protection Features (WHF)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Cask/Canister/ Waste Package Process System (continued)	Cask Cooling (continued)	System Components Other than Cask/DPC Overpressure Protection Features (WHF)	No	No
	Cask, Canister, and Waste Package Inerting	Entire (IHF, CRCF, WHF)	No	No
	Decontamination Water Treatment	Entire (WHF)	No	No
	Waste Package Survey	Entire (IHF, CRCF)	No	No
	Waste Package Decontamination	Entire (IHF, CRCF)	No	No
	TAD Drying	Entire (WHF)	No	No
Communications System	Communications	Entire	No	No
Digital Control and Management Information System	Digital Control & Management Information System	Entire	No	No
DOE and Commercial Waste Package System	DOE and Commercial Waste Package	Entire See also: Engineered Barrier System	Yes	Yes
	Defense High-Level Waste/DOE SNF Codisposable	DOE Standardized Canister	Yes	No
		HLW Canister	Yes	No
	Canistered Spent Nuclear Fuel	Dual-Purpose Canister (DPC)	Yes	No
		TAD Canister	Yes	Yes
Electrical Power System	Switchyard and Standby Power	Entire	No	No
	ITS Power	ITS Distribution (Feeders Up to and including ITS Loads, ITS Direct Current Power, ITS Uninterruptible Power Supply Power)	Yes	No
		ITS Diesel Generators A and B (including ITS diesel generator fuel oil system, ITS diesel generator air start system, ITS diesel generator jacket water cooling system, ITS diesel generator lubricating oil system, ITS diesel generator air intake and exhaust system)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Electrical Power System (continued)	Emergency Power (Life Safety)	Entire	No	No
	Normal Power	Entire	No	No
	Normal Direct Current Electrical Power	Entire	No	No
	Normal Uninterruptible Power Supply Power	Entire	No	No
	Site Electrical Distribution (for Normal Power)	Entire	No	No
	Renewable Energy	Entire	No	No
	Standby Diesel Generator	Entire	No	No
Electrical Support System	Lighting	Entire	No	No
	Grounding	Entire	No	No
	Lightning Protection	Entire	No	No
	Cathodic Protection	Entire	No	No
	Heat Tracing	Entire	No	No
	Cable Raceway	Entire	No	No
Emergency Diesel Generator Facility	Emergency Diesel Generator Facility	Structure	No	No
Emplacement and Retrieval /Drip Shield Installation System	Emplacement and Retrieval /Drip Shield Installation System	Transport and Emplacement Vehicle (TEV)	Yes	No
		Drip Shield Gantry	No	No
		Inspection Gantry	No	No
Engineered Barrier System **(see also Subsurface Facility)**	Emplacement Drift - Non-emplacement Openings	Subsurface Facilities - Non-emplacement Openings	No	No
		Subsurface Facilities - Ground Support for Non-emplacement Openings	No	No
	Emplacement Drift - Closure	Borehole Closure	No	No
		Ramp and Shaft Closure	No	No
	Emplacement Drift	Emplacement Drifts	No	Yes

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Engineered Barrier System (continued)	Emplacement Drift (continued)	Ground Support for Emplacement Drift	No	No
		Subsurface Ventilation System	No	No
	Drip Shield	Drip Shield	No	Yes
	Waste Package	Waste Package Outer Corrosion Barrier See also: DOE and Commercial Waste Package System and Naval Waste Package System	Yes	Yes
		Waste Package Inner Vessel See also: DOE and Commercial Waste Package System and Naval Waste Package System	Yes	Yes
	Waste Form and Waste Package Internals – TAD Canister	TAD Canister See also: DOE and Commercial Waste Package System	Yes	Yes
	Waste Form and Waste Package Internals – Naval Canister	Naval SNF Canister See also: Naval SNF Waste Package System	Yes	Yes
	Waste Form and Waste Package Internals –DOE SNF Canister and HLW Canister	DOE-SNF Canister See also: DOE and Commercial Waste Package System	Yes	No
		HLW Canister See also: DOE and Commercial Waste Package System	Yes	No
	Waste Form and Waste Package Internals - Naval SNF Canister System Components	Naval SNF Baskets	No	Yes
		Naval SNF Basket Spacers	No	Yes
		Naval Neutron Absorber Assemblies (includes retention hardware)	No	Yes
		Naval Control Rods (includes retention hardware)	No	Yes
		Corrosion-resistant cans	No	Yes
	Waste Form and Waste Package Internals - Codisposal Waste Package Internals	Codisposal Packages Internals	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Engineered Barrier System (continued)	Waste Form and Waste Package Internals - Codisposal Waste Package Internals (continued)	Baskets, Spacers	No	No
	Waste Form and Waste Package Internals - TAD Canister Internals	Neutron Absorbers	No	Yes
	Waste Form and Waste Package Internals - DOE SNF Canister Internals	Neutron Absorbers	No	Yes
	Waste Form and Waste Package Internals – Commercial Spent Nuclear Fuel and High Level Glass	CSNF	No	Yes
		HLW	No	Yes
	Waste Form and Waste Package Internals – Naval Spent Nuclear Fuel	Naval SNF Structure (includes cladding)	No	Yes
	Waste Form and Waste Package Internals – DOE Spent Nuclear Fuel	DOE SNF	No	No
	Cladding – CSNF/ DOE SNF	Cladding (CSNF / DOE SNF)	No	No
	Waste Package Pallet	Pallet	No	No
	Invert	Emplacement Drift Ballast	No	No
		Invert Structure See also: Subsurface Facility	No	No
Environmental/ Meteorological Monitoring System	Environment and Meteorological Monitoring	Entire	No	No
Fire Protection System	Fire Water	Entire	No	No
	Fire Barriers	Entire	No	No
	Explosion Protection	Entire	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Fire Protection System (continued)	Fire Suppression	Preaction valves, sprinkler heads, and system actuation panels associated with double-interlock preaction suppression systems that protect areas where there is a potential for canister breach (CRCF, WHF)	Yes	No
		Fire suppression system components other than those associated with double-interlock preaction suppression systems for fire suppression that protect areas where there is a potential for canister breach	No	No
	Fire Detection	Fire Detection System for the ITS preaction valves with associated detectors and control box (CRCF, WHF)	Yes	No
		Fire Detection System or all other systems except the preaction valve with associated detectors and control box	No	No
	Fire Alarm	Entire	No	No
Initial Handling Facility	Initial Handling Facility (IHF)	Structure	Yes	No
		Rails for the Commercial Railcars (Inside the Building)	No	No
		Rails for the TEV (Inside the Waste Package Loadout Room)	Yes	No
		Shield Doors (Including Anchorages)	Yes	No
		ALARA Shielding Features[2]	No	No
		Cask Port Slide Gate (51A-HTC0-HTCH-00001)	Yes	No
		Waste Package Port Slide Gate (51A-HTC0-HTCH-00002)	Yes	No
		Cask Preparation Platform (51A-HMH0-PLAT-00001)	Yes	No
		Waste Package Transfer Carriage Docking Station (51A-HL00-75-00001)	No	No
		IHF Loadout Platforms (51A-HL00-PLAT-00001-2)	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Low-Level Radioactive Waste Management System	Low-Level Radioactive Waste Management	Entire	No	No
Low-Level Waste Facility	Low-Level Waste Facility	Structure	No	No
Lower Natural Barrier	Unsaturated Zone below the Repository	Entire	No	Yes
	Saturated Zone	Entire	No	Yes
Mechanical Handling System	Cask Handling	Transportation Cask	Yes	No
		Site Prime Mover	Yes	No
		Cask Handling Yoke (CRCF: 060-HM00-BEAM-00001; IHF: 51A-HM00-BEAM-00001; RF: 200-HM00-BEAM-00001; WHF: 050-HM00-BEAM-00001)	Yes	No
		Pool Cask Handling Yoke (WHF: 050-HM00-BEAM-00002)	Yes	No
		Platform Shield Plate (RF: 200-HM00-BUF-00001) (CRCF: 060-HM00-BUF-00001–2) (WHF: 050-HM00-BUF-00001)	No	No
		Cask Handling Crane (IHF: 300-ton; 51A-HM00-CRN-00001) (CRCF: 200-ton; 060-HM00-CRN-00001) (RF: 200-ton; 200-HM00-CRN-00001) (WHF: 200-ton; 050-HM00-CRN-00001)	Yes	No
		Decontamination Pit Equipment – Spray Nozzle (WHF: 050-HM00-NZL-00001)	No	No
		Decontamination Pit Equipment – Pump Module (WHF: 050-HM00-P-00001)	No	No
		Long Reach Tool Adapter (WHF: 050-HM00-TOOL-00001)	No	No
		Pool Yoke Lift Adapter (WHF: 050-HM00-TOOL-00002)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Mechanical Handling System (continued)	Cask Handling (continued)	Cask Transfer Trolley and Pedestals Trolleys: (IHF: 51A-HM00-TRLY-00001; CRCF: 060-HM00-TRLY-00001-2; RF: 200-HM00-TRLY-00001; WHF: 050-HM00-TRLY-00001) Pedestals: (IHF: 51A-HM00-PED-00001-2; CRCF: 060-HM00-PED-00001-2; RF: 200-HM00-PED-00001; WHF: 050-HM00-PED-00001-5) Naval Cask Pedestal: (IHF: [51A-HM00-PED-00003])	Yes	No
		Cask Preparation Crane; 30-ton (IHF: 51A-HM00-CRN-00002)	Yes	No
		Horizontal Cask Stand (RF: 200-HM00-RK-00001)	No	No
		Mobile Lift (CRCF: 060-HM00-ELEV-00001; RF: 200-HM00-ELEV-00001; WHF: 050-HM00-ELEV-00001)	No	No
	Cask Handling/Cask Receipt	Entrance Vestibule Crane; 20-ton (WHF: 050-HMC0-CRN-00001)	Yes	No
		Cask Tilting Frame (CRCF: 060-HMC0-FRM-00001; RF: 200-HMC0-FRM-00001; WHF: 050-HMC0-FRM-00001)	No	No
		Mobile Access Platform (IHF: 51A-HMC0-PLAT-00001; CRCF: 060-HMC0-PLAT-00001; RF: 200-HMC0-PLAT-00001; WHF: 050-HMC0-PLAT-00001)	No	No
		Impact Limiter Lifting Device (IHF: 51A-HMC0-HEQ-00001-2; CRCF: 060-HMC0-HEQ-00001-8, 19-20; RF: 200-HMC0-HEQ-00001, 3, 5, 7, 9, 11, 14; WHF: 050-HMC0-HEQ-00001-9)	No	No
		Personnel Barrier Lifting Device (IHF: 51A-HMC0-HEQ-00003-4; CRCF: 060-HMC0-HEQ-00010-17, 21-22; RF: 200-HMC0-HEQ-00002, 4, 6, 8, 10, 12, 13; WHF: 050-HMC0-HEQ-00010-18)	No	No
		Lid Bolting Room Crane; 10-ton (RF: 200-HMC0-CRN-00001)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Mechanical Handling System (continued)	Cask Handling/Cask Receipt (continued)	Naval Cask Lift Bail (IHF: 51A-HMC0-BEAM-00001)	Yes	No
		Naval Cask Lift Plate (IHF: 51A-HMC0-HEQ-00005)	Yes	No
		Horizontal Lifting Beam (RF: 200-HMC0-BEAM-00001)	Yes	No
	Cask Handling/Cask Preparation	Auxiliary Pool Crane; 10-ton (WHF: 050-HMH0-CRN-00001)	Yes	No
		Preparation Station Jib Cranes (1 and 2) (WHF: 050-HMH0-CRN-00002, 3)	Yes	No
		Cask Support Frame (Preparation Station #2) (WHF: 050-HMH0-FRM-00001)	Yes	No
		Cask Lid Lifting Grapples (CRCF: 060-HMH0-HEQ-00012; RF: 200-HMH0-HEQ-00008) Lid Lifting Grapples (WHF: 050-HMH0-HEQ-00001-4, 6) Truck Cask Lid Lifting Grapples (WHF: 050-HMH0-HEQ-00007-9)	Yes	No
		Truck Cask Lid Adapters (WHF: 050-HMH0-HEQ-00010-11; CRCF: 060-HMH0-HEQ-00001-2; IHF: 51A-HMH0-HEQ-00001) Rail Cask Lid Adapters (WHF: 050-HMH0-HEQ-00012-13; CRCF: 060-HMH0-HEQ-00003-4; RF: 200-HMH0-HEQ-00002; IHF: 51A-HMH0-HEQ-00002)	Yes	No
		Truck Cask Lid Adapters (CRCF: 060-HMH0-HEQ-00001-2; IHF: 51A-HMH0-HEQ-00001)	No	No
		Cask Lid Bolt Impact Wrench (RF: 200-HMH0-HEQ-00003)	No	No
		DPC Lid Adapter (CRCF: 060-HMH0-HEQ-00005-6; WHF: 050-HMH0-HEQ-00014; RF: 200-HMH0-HEQ-00001)	Yes	No
		Cask Shield Ring (WHF: 050-HMH0-HEQ-00015-19)	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Mechanical Handling System (continued)	Cask Handling/Cask Preparation (continued)	Long Reach Grapple Adapter (WHF: 050-HMH0-TOOL-00001-2)	Yes	No
	Cask Handling/Waste Package Preparation	Waste Package Handling Crane; 100-ton (IHF: 51A-HMP0-CRN-00001; CRCF: 060-HMP0-CRN-00001)	Yes	No
		Waste Package Pallet Yoke (IHF: 51A-HMP0-BEAM-00001; CRCF: 060-HMP0-BEAM-00001)	No	No
	Cask Handling/Cask Restoration	Entire	No	No
	Waste Transfer/Fuel Assembly Transfer	Spent Fuel Transfer Machine (WHF: 050-HTF0-FHM-00001)	Yes	No
		PWR Lifting Grapples (WHF: 050-HTF0-HEQ-00001) BWR Lifting Grapples (WHF: 050-HTF0-HEQ-00002)	Yes	No
		W74 Upper Basket Lifting Device (WHF: 050-HTF0-HEQ-00003)	No	No
		SNF Staging Racks (WHF: 050-HTF0-RK-00001) (WHF: 050-HTF0-RK-00010 [BWR SNF]) (WHF: 050-HTF0-RK-00011 [DFCA SNF])	Yes	No
		Truck Cask Handling Frame (WHF: 050-HTF0-RK-00007)	Yes	No
	Waste Transfer/ Canister Transfer	Canister Transfer Machine Maintenance Crane; 15-tons (IHF: 51A-HTC0-CRN-00001, CRCF: 060-HTC0-CRN-00001; WHF: 050-HTC0-CRN-00001)	No	No
		Canister Transfer Machine Maintenance Crane; 15-tons (RF: 200-HTC0-CRN-00001)	Yes	No
		Canister Transfer Machine (IHF: 51A-HTC0-FHM-00001; CRCF: 060-HTC0-FHM-00001-2; RF: 200-HTC0-FHM-00001; WHF: 050-HTC0-FHM-00001)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Mechanical Handling System (continued)	Waste Transfer/ Canister Transfer (continued)	Canister Grapples (IHF: 51A-HTC0-HEQ-00003, 4; CRCF: 060-HTC0-HEQ-00003-7) Canister Transfer Machine Grapples (IHF: 51A-HTC0-HEQ-00001; CRCF: 060-HTC0-HEQ-00001-2; RF: 200-HTC0-HEQ-00001; WHF: 050-HTC0-HEQ-00001)	Yes	No
		Naval Canister Lifting Adapter (IHF: 51A-HTC0-HEQ-00005)	Yes	No
		DOE Waste Package Inner Lid Grapple (IHF: 51A-HTC0-HEQ-00007)	Yes	No
		Naval Waste Package Inner Lid Grapple (IHF: 51A-HTC0-HEQ-00008)	Yes	No
		TAD Canister Staging Racks (and Thermal Barrier) (CRCF: 060-HTC0-RK-00011-12)	Yes	No
		DOE Canister Staging Racks (and Thermal Barrier) (CRCF: 060-HTC0-RK-00006-10)	Yes	No
		Shielded Transfer Cask (STC) (TAD: 050-HT00-HEQ-00001) (DPC: 050-HT00-HEQ-00002)	Yes	No
	Waste Package Closure	Robotic Arms. (IHF: 51A-HWH0-HEQ-00001-2; CRCF: 060-HWH0-HEQ-00001-2)	No	No
		Remote Handling System Bridge (IHF: 51A-HWH0-HEQ-00003; CRCF: 060-HWH0-HEQ-00003)	Yes	No
		Portions of Remote Handling System That Do Not Include The Bridge (IHF: 51A-HWH0-HEQ-00003; CRCF: 060-HWH0-HEQ-00003)	No	No
		Remote Handling System Manipulator Arm (IHF: 51A-HWH0-HEQ-00004; CRCF: 060-HWH0-HEQ-00004)	No	No
		Lid Handling Tool (IHF: 51A-HWH0-TOOL-00001; CRCF: 060-HWH0-TOOL-00001)	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Mechanical Handling System (continued)	Waste Package Closure (continued)	Waste Package Closure Room Crane; 15-ton (IHF: 51A-HW00-CRN-00001; CRCF: 060-HW00-CRN-00001)	No	No
		Closure Support Room Cranes; 5-ton (CRCF: 060-HW00-CRN-00002 [north]-3 [south])	No	No
		Process Opening Cover (IHF: 51A-HW00-HTCH-00001; CRCF: 060-HW00-HTCH-00001-2)	No	No
	TAD Closure	TAD Closure Jib Crane (WHF: 050-HC00-CRN-00001)	Yes	No
		Cask Support Frame (TAD Closure Station) (WHF: 050-HC00-FRM-00001)	Yes	No
		TAD Canister Welding Machine (WHF: 050-HC00-TOOL-00001)	No	No
	Waste Package Loadout	Waste Package Shield Ring Lift Beam (IHF: 51A-HL00-BEAM-00001; CRCF: 060-HL00-BEAM-00001)	No	No
		Waste Package Shield Rings (IHF: 51A-HL00-HEQ-00001-2; CRCF: 060-HL00-HEQ-00001-6)	Yes	No
		Waste Package Transfer Trolley (including Pedestals, Seismic Rail Restraints, and Rails) Trolleys: (IHF: 51A-HL00-TRLY-00001; CRCF: 060-HL00-TRLY-00001-2) Pedestals: (CRCF: 060-HL00-PED-00001-8; IHF: 51A-HL00-PED-00001-4)	Yes	No
		Waste Package Transfer Carriage (IHF: 51A-HL00-TRLY-00002; CRCF: 060-HL00-TRLY-00004-5)	No	No
	Dual-Purpose Canister Cutting	DPC Cutting Machine (WHF: 050-HD00-TOOL-00001)	No	No
		Siphon Tube Shear Tool (WHF: 050-HD00-TOOL-00002)	No	No
		DPC Cutting Jib Crane (WHF: 050-HD00-CRN-00001)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Mechanical Handling System (continued)	Dual-Purpose Canister Cutting (continued)	Cask Support Frame (DPC Cutting Station) (WHF: 050-HD00-FRM-00001)	Yes	No
		DPC Lid Receptacle (WHF: 050-HD00-RCP-00001)	No	No
		DPC Adapter Plate Types 1, 2, 3 (WHF: 050-HD00-HEQ-00002, 3, 4)	No	No
		DPC Shield Plug Lift Adapter (WHF: 050-HD00-HEQ-00005)	No	No
Naval SNF Waste Package System	Naval SNF Waste Package	Entire See also: Engineered Barrier System	Yes	Yes
	Naval SNF Canister	Entire	Yes	Yes
Non-Nuclear Handling System	Non-Nuclear Handling	Entire	No	No
Non-Radiological Waste Management System	Non-Radiological Waste Management	Entire	No	No
Plant Services System	Plant Services	Entire	No	No
Pool Water Treatment and Cooling System	Pool Water Treatment and Cooling	Entire	No	No
Radiation/ Radiological Monitoring System	Radiation/ Radiological Monitoring	Entire	No	No
Receipt Facility	Receipt Facility (RF)	Structure	Yes	No
		Rails for Railcars	No	No
		Shield Doors (Including Anchorages) and Equipment Confinement Doors	Yes	No
		ALARA Shielding Features[3]	No	No
		Cask Port Slide Gate (200-HTC0-HTCH-00001)	Yes	No
		AO Port Slide Gate (200-HTC0-HTCH-00002)	Yes	No
		Cask Preparation Platform (200-HMH0-PLAT-00001)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Receipt Facility	Receipt Facility (RF) (continued)	Lid Bolting Room Platform (200-HMC0-PLAT-00003)	Yes	No
Safeguards and Security System	Safeguards and Security	Entire	No	No
Subsurface Facility	Subsurface Facility	Rails	No	No
		Emplacement Drift Doors	No	No
	Emplacement	Nonemplacement Openings See Also: Upper Natural Barrier	No	No
		Ground Support for Emplacement Drifts See Also: Engineered Barrier System	No	No
		Ground Support for Nonemplacement Openings See Also: Upper Natural Barrier	No	No
		Emplacement Drifts See Also: Engineered Barrier System	No	Yes
		Emplacement Drift Invert (Steel and Ballast) See Also: Engineered Barrier System	No	No
		Waste Package Emplacement Pallet See Also: Engineered Barrier System	No	No
		Drip Shield See Also: Engineered Barrier System	No	Yes
		Drip Shield Emplacement Gantry	No	No
	Post-emplacement	Entire	No	No
	Subsurface Development	Excavation	No	No
Subsurface Ventilation System	Subsurface Ventilation	Entire	No	No
Surface Non-Confinement HVAC System	**Surface Non-Confinement HVAC**	Portions of the surface non-confinement HVAC system that do not support the cooling of ITS electrical equipment and battery rooms (IHF, CRCF, WHF, RF, EDGF)	No	No
		Portions of the surface non-confinement HVAC system that support the cooling of ITS electrical equipment and battery rooms. (EDGF)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Surface Nuclear Confinement HVAC System	**Surface Nuclear Confinement HVAC**	Portions of the surface nuclear confinement HVAC system that exhaust from areas with a potential for a breach (WHF and CRCF)	Yes	No
		Portions of the surface nuclear confinement HVAC system that support the cooling of ITS electrical equipment and battery rooms (WHF and CRCF)	Yes	No
		Portions of the surface nuclear confinement HVAC system that do not exhaust from areas with a potential for a breach or do not support the cooling of ITS electrical equipment and battery rooms, including SSCs that supply ITS confinement areas (IHF, RF, WHF, and CRCF)	No	No
Upper Natural Barrier	Topography and Surficial Soils	Entire	No	Yes
	Unsaturated Zone Above the Repository	Entire	No	Yes
Wet Handling Facility	Wet Handling Facility (WHF)	Structure	Yes	No
		Rails for Railcars	No	No
		Shield Doors (Including Anchorages) and Equipment Confinement Doors	Yes	No
		ALARA Shielding Features[4]	No	No
		Pool Structure	Yes	No
		Cask Port Slide Gate (050-HTC0-HTCH-00002)	Yes	No
		Overpack Port Slide Gate (050-HTC0-HTCH-00001)	Yes	No
		Aging Overpack Access Platform (050-HAC0-PLAT-00001)	Yes	No
		TAD Closure Station (050-HC00-PLAT-00001)	Yes	No
		DPC Cutting Station (050-HD00-PLAT-00001)	Yes	No
		Preparation Station #1 (050-HMH0-PLAT-00001)	Yes	No
		Preparation Station #2 (050-HMH0-PLAT-00002)	Yes	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Wet Handling Facility (continued)	Wet Handling Facility (WHF) (continued)	DPC Transfer Station (050-HTF0-RK-00002)	No	No
		Staging Shelf Transfer Station (050-HTF0-RK-00008)	No	No
		Staging Shelf Dual Transfer Station (050-HTF0-RK-00009)	No	No
		DPC Unloading Bay Gate (050-WH00-DR-00002)	No	No
		Deep Remediation Station (050-HR00-RK-00001)	No	No
		RC Transfer Station (050-HTF0-RK-00004)	No	No
		STC/TAD Transfer Station (050-HTF0-RK-00003)	No	No
		TC Transfer Station (050-HTF0-RK-00005)	No	No
		Pool Crush Pads (050-HM00-ABS-00001-5)	No	No
		Decontamination Pit; Decontamination Pit Seismic Restraints (050-HM00-BRAC-00001)	Yes	No
		Decontamination Pit Cover (050-HM00-HTCH-00001)	No	No

Table A-1. Q-List (continued)

System, Facility, or Barrier (as Applicable)	Subsystem, Function, or Feature (as Applicable)	Component[5]	Important to Safety?	Important to Waste Isolation?
Wet Handling Facility (continued)	Wet Handling Facility (continued)	Decontamination Pit Platform (050-HM00-PLAT-00002)	No	No

NOTE: ALARA = as low as is reasonably achievable; AO = aging overpack; BWR = boiling water reactor; CRCF = Canister Receipt and Closure Facility; DFCA = damaged fuel canister assembly; DOE = U.S. Department of Energy; DPC = dual-purpose canister; EDGF = Emergency Diesel Generator Facility; HAM = horizontal aging module; HLW = high-level radioactive waste; HVAC = heating, ventilation, and air-conditioning; IHF = Initial Handling Facility; ITS = Important to Safety; PWR = pressurized water reactor; RC = rail cask; RF = Receipt Facility; SNF = spent nuclear fuel; SSCs = systems, structures, and components; STC = shielded transfer cask; TAD = transportation, aging, and disposal; TC = transportation cask; TEV = transport and emplacement vehicle; WHF = Wet Handling Facility.

1. ALARA shielding features for the CRCF include the shielding function of the platforms.
2. ALARA shielding features for the IHF include the shielding function of the platforms.
3. ALARA shielding features for the RF include the shielding function of the platforms.
4. ALARA shielding features for the WHF include the shielding function of the platforms, the decontamination pit, and the Cask Preparation Area Equipment Confinement Door.
5. The numbers appearing in parentheses are component numbers.

Source: Refs. 8.2.1 (Table A-1) and 8.2.3 (Table 7-1).