OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT ANALYSIS/MODEL COVER SHEET

 1. QA: L
 Page: 1 of: 11

Complete Only Applicable Items

2. ☒ Analysis	☒ Engineering	3. ☐ Model	☐ Conceptual Model Documentation
	☐ Performance Assessment		☐ Model Documentation
	☐ Scientific		☐ Model Validation Documentation

 4. Title:
 Classification of the MGR Canister Transfer System

 5. Document Identifier (including Rev. No. and Change No., if applicable):
 ANL-CTS-SE-000001 REV 00

 6. Total Attachments:
 Three (3)

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	Printed Name	Signature	Date
8. Originator	Scott E. Salzman	<i>Scott E Salzman</i>	8/30/99
9. Checker	James A. Kappes	<i>James A Kappes</i>	8/30/99
10. Lead/Supervisor	Thomas D. Dunn	<i>Thomas D. Dunn</i>	8/30/99
11. Responsible Manager	Dealis W. Gwyn	<i>Dealis W. Gwyn</i>	8/31/99

 12. Remarks:
 This analysis contains To Be Verified (TBV) design input as follows: TBV-459, TBV-460.

The document number for this analysis was previously BCB000000-01717-0200-00016 REV00.

This analysis bases the classification of Monitored Geologic Repository structures, systems and components on the criteria of proposed rule 10 CFR 63 (64 FR 8640). A review has determined that the changes made to proposed rule 10 CFR 63 by Interim Guidance Pending Issuance of New U. S. Nuclear Regulatory Commission (NRC) Regulations for Yucca Mountain, Nevada (Dyer 1999) do not impact the classifications made in this analysis.

**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
ANALYSIS/MODEL REVISION RECORD**

1. Page: 2 of: 11

Complete Only Applicable Items

2. Analysis or Model Title:
Classification of MGR Canister Transfer System

3. Document Identifier (including Rev. No. and Change No., if applicable):

ANL-CTS-SE-000001 REV 00

4. Revision/Change No.

5. Description of Revision/Change

00

Initial issue. This system specific analysis was performed to supersede the applicable portion of B00000000-01717-0200-00134 Rev 01 (CRWMS M&O 1998d).

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1. PURPOSE

The purpose of this analysis is to document the Quality Assurance (QA) classification of the Monitored Geologic Repository (MGR) canister transfer system structures, systems and components (SSCs) performed by the MGR Safety Assurance Department. This analysis also provides the basis for revision of YMP/90-55Q, *Q-List* (YMP 1998). The Q-List identifies those MGR SSCs subject to the requirements of DOE/RW-0333P, *Quality Assurance Requirements and Description* (QARD) (DOE 1998).

This QA classification incorporates the current MGR design and the results of the *Preliminary Preclosure Design Basis Event Calculations for the Monitored Geologic Repository* (CRWMS M&O 1998a).

2. QUALITY ASSURANCE

This analysis is subject to the requirements of the QARD (DOE 1998) as determined by procedures QAP-2-0, *Conduct of Activities*, and NLP-3-18, *Documentation of QA Controls on Drawings, Specifications, Design Analyses, and Technical Documents*. *Design Basis Event Definition & Analysis/QA Classification Analysis (1.2.1.11) Activity Evaluation* (CRWMS M&O 1999a) presents the QAP-2-0 activity evaluation addressing the QA classification of MGR SSCs. This analysis is performed in accordance with procedures QAP-2-3, *Classification of Permanent Items*, and AP-3.10Q, *Analyses and Models*, and provides input to the design of SSCs included on the Q-List (YMP 1998). Unverified design inputs are identified and tracked in accordance with NLP-3-15, *To Be Verified (TBV) and To Be Determined (TBD) Monitoring System*.

3. COMPUTER SOFTWARE AND MODEL USAGE

This analysis uses no software which is required to be controlled in accordance with procedure AP-SI.1Q, *Software Management*.

4. INPUTS

4.1 PARAMETERS

The offsite radiological consequences of MGR Category 1 and 2 design basis events (DBEs), as calculated in *Preliminary Preclosure Design Basis Event Calculations for the Monitored Geologic Repository* (CRWMS M&O 1998a), are utilized in the QA classification of MGR SSCs. These results represent a conservative evaluation of MGR DBEs and the best information available. As discussed in Section 6.1 of this analysis, NUREG-1318, *Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements* (NRC 1998, Section 4.2(a)) allows the use of engineering judgement and conservative bounding assumptions in the QA classification of facility SSCs when data sources are limited. Also, procedure YAP-2.7Q, *Item Classification and Maintenance of the Q-List* (Attachment 3, Section a), directs the

use of the highest level of detail available to support the conclusion of the QA classification analysis.

Although MGR DBE calculations (CRWMS M&O 1998a) postulate a release of radioactive material for the canister transfer system and performs subsequent consequence analysis, the implementation of the MGR preclosure safety strategy (Hastings 1998) prevents (occurrence frequency less than 1×10^{-6} /year) the breach of canisters and the resultant release of radioactive. The MGR preclosure safety strategy is discussed in Sections 5.2 and 6.3.

4.2 CRITERIA

The criteria used in the QA classification of MGR SSCs are provided in procedure QAP-2-3 as discussed in Section 6.1. These criteria satisfy the requirement of Section 2.2.2, *Classifying Items*, of DOE/RW-0333P (DOE 1998).

4.3 CODES, STANDARDS, AND REGULATIONS

10 CFR (Code of Federal Regulations) 20. Energy: Standards for Protection Against Radiation. January 1, 1999.

64 FR (Federal Register) 8640. Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada. Proposed rule 10 CFR 63.

NRC (U. S. Nuclear Regulatory Commission) 1998. *Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements*. NUREG-1318. April 1988. Washington, D.C.: U.S. Nuclear Regulatory Commission.

5. ASSUMPTIONS

The following assumptions are made in the performance of this analysis.

- 5.1 This analysis assumes that system design, architecture and functions are established by the *Canister Transfer System Description Document* (CRWMS M&O 1998c). This analysis also assumes that the MGR architecture is established by *Monitored Geologic Repository Architecture* (CRWMS M&O 1999b) and that MGR operations and architecture are described by *Monitored Geologic Repository Concept of Operations* (CRWMS M&O 1998b). These documents represent the best available MGR design information. This assumption is utilized in Section 6.2 to define the canister transfer system design configuration and SSC functions.
- 5.2 This analysis assumes the implementation of guidance provided by the "Strategy to Mitigate Preclosure Offsite Exposure" (Hastings 1998, Attachment 3 [all]), hereafter referred to as the "safety strategy." The safety strategy proposes general guidance focused on reducing the risks associated with the handling of spent nuclear fuel, high-level waste and the associated

casks, canisters, and containers. This assumption is utilized in Section 6.5 for the classification of the canister transfer system. In the case of the canister transfer system, the safety strategy assumes that system design prevents (occurrence frequency less than 1×10^{-6} /year) impacts which exceed the canister design basis (TBV-460). This assumption requires that all disposable canisters be designed and licensed for a maximum lift height compatible with the canister transfer system design.

- 5.3 The 10 CFR Part 63 definition of *Important to Safety* invokes the 10 CFR Part 20 radiation exposure limits for Category 1 DBEs. However, the analysis of occupational exposures as a result of Category 1 DBEs has not been performed to date. This analysis assumes that the radiation doses to facility workers as the result of Category 1 DBEs associated with the canister transfer system, do not exceed the occupational dose limits of 10 CFR Part 20, Subpart C. This assumption is based upon protection of facility workers against external exposures by installed radiation shielding and internal exposures by the confinement functions of the Waste Handling Building (WHB) System and the WHB Ventilation System. This assumption is utilized in Section 6.5 for the classification of canister transfer system SSCs. (TBV-459)

6. ANALYSIS

6.1 METHOD

The basic process for classifying permanent MGR SSCs is provided by procedure QAP-2-3. Guidance provided by procedure YAP-2.7Q is also used in this analysis. The process consists of establishing the configuration and function of MGR SSCs and the effect of the SSC on MGR radiological safety. This information is then evaluated against criteria provided in QAP-2-3 to determine the QA classification of the particular item. The classification criteria are provided in the form of checklists in procedure QAP-2-3. A copy of these criteria checklists is provided in Attachment II. The following classification categories are specified by QAP-2-3 to meet the requirements of Section 2 of the QARD (DOE 1998).

Quality Level 1 (QL-1) Those SSCs whose failure could *directly* result in a condition adversely affecting public safety. These items have a high safety or waste isolation significance.

Quality Level 2 (QL-2) Those SSCs whose failure or malfunction could *indirectly* result in a condition adversely affecting public safety, or whose *direct* failure would result in consequences in excess of normal operational limits. These items have a low safety or waste isolation significance.

Quality Level 3 (QL-3) Those SSCs whose failure or malfunction would not significantly impact public or worker safety, including those defense-in-depth design features intended to keep doses ALARA (As Low As Reasonably Achievable). These items have a minor impact on public and worker safety and waste isolation.

Conventional Quality (CQ) Those SSCs not meeting any of the criteria for Quality Levels 1, 2, or 3. Conventional quality items are not subject to the requirements of QARD.

This analysis method is based on an iterative design-classification process where each analysis iteration is considered a final product for that phase of design. In this case, the system design and the DBE analysis (CRWMS M&O 1998a) are evaluated to determine which of the system's SSCs require design control under the QA program. The analysis presented in this document, therefore, will be reevaluated as necessary using a methodology appropriate to the level of DBE analysis and system design detail. This approach is consistent with NUREG-1318, *Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements* (NRC 1998, Section 4.2(a)), which allows engineering judgement and conservative bounding assumptions to be used in cases where data are limited.

6.2 MGR DESIGN CONFIGURATION AND ARCHITECTURE

Prior to the QA classification of MGR SSCs, the system design configuration as well as the function of system's SSCs are established. This classification analysis is based upon the system design and functions as established by the System Description Document (SDD) (CRWMS M&O 1998c) and the MGR Concept of Operations (CRWMS M&O 1998b). In the process of QA classification, if two or more subsystems perform similar functions or are similarly classified, these subsystems are classified as a group under the higher level system and not listed individually.

6.3 MGR SAFETY STRATEGY

The MGR safety strategy provides general guidance that limits or reduces the risks associated with the receipt, handling, packaging and emplacing of spent nuclear fuel and other high level wastes in the planned repository. The strategy is described in "Strategy to Mitigate Preclosure Offsite Exposure" (Hastings 1998 [all]) which suggests a combination of containment and event prevention concepts for the following functional areas of the MGR: (1) receipt of waste, (2) transfer of waste to WP, (3) packaging/sealing waste in WP, (4) transfer of the WP to the emplacement drift, and (5) emplacement of the WP.

Implementation of the safety strategy is assumed in this analysis to determine SSC QA classifications. If the proposed safety strategy is not or cannot be implemented, the QA classification of the affected SSCs will be reviewed and the SSCs reclassified appropriately.

The canister transfer system (CTS) functions to transfer spent nuclear fuel (SNF) and high level waste (HLW) canisters from the associated transportation cask to a disposal container (DC). The preclosure safety strategy assumes that a design basis impact will be determined for SNF and HLW canisters and that lifts or transfers that exceed this impact will not be performed. As a result of this assumption, no event resulting in a breach of SNF/HLW canisters is expected as part of canister transfer operations and the canister is assumed to maintain containment of radioactive material. To provide defense in depth, a confinement structure and a nuclear HVAC system is provided for the

canister transfer area.

It should be noted that Assumption 5.2 requires that all disposable canisters be designed and licensed for a maximum lift height compatible with MGR canister transfer system design. Ongoing analysis of Department of Energy (DOE) SNF, commercial, and naval disposable canisters may show that the canister design basis lift height may not be compatible with canister transfer system design. In that case, an important to safety HEPA-(High Efficiency Particulate Air) filtered HVAC system may be required in the canister transfer area.

6.4 DESIGN BASIS EVENT ANALYSIS

A preliminary analysis of MGR DBEs (CRWMS M&O 1998a) has been performed to determine the effects of internal and external events on facility radiological safety and is utilized by this analysis in the classification of MGR SSCs. The DBE analysis addresses both the DBE frequencies and dose consequences at the site boundary. This analysis utilizes the results of the DBE analysis to evaluate MGR SSCs against the classification criteria of procedure QAP-2-3.

As discussed in Section 6.3, the MGR preclosure safety strategy assumes that no release of radioactive material occurs in the canister transfer area.

6.5 QUALITY ASSURANCE CLASSIFICATION OF MGR SSCS

The MGR SSCs are evaluated against the criteria of QAP-2-3 to determine the item QA classification level. The results of the MGR preliminary DBE calculations (CRWMS M&O 1998a) are utilized in this evaluation.

7. CONCLUSIONS

7.1 MGR QA CLASSIFICATION

The results of this QA classification analysis are provided in Table 1. As the design of the MGR proceeds and further DBE analyses of MGR hazards are performed, this classification analysis will be reviewed for impact and revised as necessary. The MGR classification checklists included in procedure QAP-2-3 are reproduced in Attachment II. The basis for the classification evaluation is provided in Attachment III.

Table 1 Canister Transfer System QA Classification

Canister Transfer System (CTS)	QL-1	QL-2	QL-3	CQ	TBV
Canister Handling System					
Bridge Crane/Hoist		X			460
DC Loading Manipulator				X	N/A
Lifting Fixtures				X	459, 460
Small Canister Staging Racks	X				N/A
Cask Preparation System					
Cask Decontamination System		X			N/A
Cask Inspection and Sampling System				X	N/A
Cask Preparation Manipulator			X		N/A
Cask Transport System				X	459, 460
Control and Tracking System		X			460
DC Transport System				X	459, 460

7.2 IMPACT OF UNVERIFIED DATA

7.2.1 TBV-459

This analysis assumes that the radiation doses to facility workers as the result of Category 1 DBEs associated with the canister transfer system do not exceed the occupational dose limits of 10 CFR Part 20, Subpart C.

The basis of this assumption is provided in Section 5.3. TBV-459 requires that future DBE analysis verify this assumption. If the assumptions addressed by TBV-459 cannot be verified by MGR DBE analysis, some system SSC classifications may change from CQ to QL-3.

7.2.2 TBV-460

This analysis assumes the implementation of guidance provided by the “Strategy to Mitigate Preclosure Offsite Exposure” (Hastings 1998, Attachment 3 [all]). The following paragraph discusses the impacts of not implementing the strategy. It should be noted that these impacts are based upon preliminary DBE calculations (CRWMS M&O 1998a) and are dependent on the approach taken to prevent or mitigate the effects of an associated DBE. Further DBE analysis may have an effect on the impacts as discussed. The preclosure safety strategy is described in Sections 5.2 and 6.3.

The safety strategy assumes that a design basis impact is determined for the various canisters to be handled in the canister transfer area and impacts exceeding the design value are not exceeded. The impact of not achieving the strategy objective may include:

- Reclassification of canister transfer area bridge crane and control and tracking system from QL-2 to QL-1.

- Seismically qualified cask and DC transfer carts. Reclassification of cask and DC cart systems from CQ to QL-2.

8. REFERENCES

8.1 DOCUMENTS CITED

CRWMS M&O (Civilian Radioactive Waste Management System Management and Operating Contractor) 1998a. *Preliminary Preclosure Design Basis Event Calculations for the Monitored Geologic Repository*. BC0000000-01717-0210-00001 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19981002.0001.

CRWMS M&O 1998b. *Monitored Geologic Repository Concept of Operations*. B00000000-01717-4200-00004 REV 02. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19980810.0283.

CRWMS M&O 1998c. *Canister Transfer System Description Document*. BCB000000-01717-1705-00025, REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19980505.0087.

CRWMS M&O 1998d. *Classification of the Preliminary MGDS Repository Design*. B00000000-01717-0200-00134 REV 01. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19981103.0546.

CRWMS M&O 1999a. *Design Basis Event Definition & Analysis/QA Classification Analysis (1.2.1.11) Activity Evaluation*. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990325.0008.

CRWMS M&O 1999b. *Monitored Geologic Repository Architecture*. B00000000-01717-5700-00011 REV 02 ICN 01. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990713.0203.

DOE 1998. *Quality Assurance Requirements and Description*. DOE/RW-0333P, Rev. 8. Washington D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.19980601.0022.

Dyer, J.R. 1999. *Interim Guidance Pending Issuance of New U. S. Nuclear Regulatory Commission (NRC) Regulations for Yucca Mountain, Nevada*. Letter from J. Russell Dyer (DOE) to D. R. Wilkins (YMP), June 18, 1999. OL&RC:AVG:1435. ACC: MOL.19990623.0026 and MOL.19990623.0027.

Hastings, C. R. 1998. "Strategy to Mitigate Preclosure Offsite Exposure." Hastings (CRWMS M&O) Interoffice Correspondence to Distribution (CRWMS M&O). LV.SEI.CRH.7/98-024. July 21, 1998. ACC: MOL.19980916.0357, MOL.19980916.0358, MOL.19980916.0359, and MOL.19980916.0360.

YMP (Yucca Mountain Site Characterization Project) 1998. *Q-List*. YMP/90-55Q, Rev. 5. Las Vegas, Nevada: Yucca Mountain Site Characterization Office. ACC: MOL.19980513.0132.

8.2 CODES, STANDARDS, AND REGULATIONS

10 CFR (Code of Federal Regulations) 20. Energy: Standards for Protection Against Radiation. January 1, 1999.

64 FR (Federal Register) 8640. Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada. Proposed rule 10 CFR 63.

NRC (U. S. Nuclear Regulatory Commission) 1998. *Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements*. NUREG-1318. April 1988. Washington, D.C.: U.S. Nuclear Regulatory Commission.

8.3 PROCEDURES

AP-3.10Q, Rev. 0, ICN 0. *Analyses and Models*. ACC: MOL.19990225.0335.

AP-SI.1Q, Rev. 1, ICN 0. *Software Management*. ACC: MOL.19990520.0164.

NLP-3-15, Rev. 5. *To Be Verified (TBV) and To Be Determined (TBD) Monitoring System*. ACC: MOL.19981117.0148.

NLP-3-18, Rev. 04. *Documentation of QA Controls on Drawings, Specifications, Design Analyses, and Technical Document*. ACC: MOL.19960611.0170.

QAP-2-0, Rev. 5. *Conduct of Activities*. ACC: MOL.19980826.0209.

QAP-2-3, Rev. 10. *Classification of Permanent Items*. ACC: MOL.19990316.0006.

YAP-2.7Q, Rev. 1, ICN 1. *Item Classification and Maintenance of the Q-List*. ACC: MOL.19990115.0065.

9. ATTACHMENTS

Attachment I	Acronyms
Attachment II	MGR Classification Checklists
Attachment III	MGR QA Classification

Attachment I

Acronyms

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
CQ	Conventional Quality
CRWMS	Civilian Radioactive Waste Management System
CTS	Canister Transfer System
DBE	Design Basis Event
DC	Disposal Container
DOE	U. S. Department of Energy
HLW	High Level Waste
M&O	Management and Operating Contractor
MGR	Monitored Geologic Repository
NLP	Nevada Line Procedure
NRC	U. S. Nuclear Regulatory Commission
QA	Quality Assurance
QAP	Quality Administrative Procedure
QARD	Quality Assurance Requirements and Description
QL	Quality Level
SDD	System Description Document
SNF	Spent Nuclear Fuel
SSCs	Structures, Systems, and Components
TBD	To Be Determined
TBV	To Be Verified
TEDE	Total Effective Dose Equivalent
WHB	Waste Handling Building
WP	Waste Package
YAP	YMP Administrative Procedure
YMP	Yucca Mountain Site Characterization Project

Attachment II MGR Classification Checklists

CRWMS/M&O

Importance to Safety or Waste Isolation Evaluation Pre-Screening Checklist

QA: L

Page: 1 Of: 1

Complete only applicable items.

1. Classification Analysis I.D.:	2. SDD/SSC Evaluated:
3. Description of SDD/SSC (or reference):	

[illegible]

Attachment II MGR Classification Checklists

CRWMS/M&O

Importance to Safety or Waste Isolation Evaluation for MGR

QA: L

Page: 1 Of: 4

Complete only applicable items.

1. Classification Analysis I.D.:	2. SDD/SSC Evaluated:
3. Description of SDD/SSC (or reference):	

MGR Quality Level 1 Checklist

Yes   No

[illegible]

Attachment II MGR Classification Checklists

CRWMS/M&O

Importance to Safety or Waste Isolation Evaluation
for MGR

Complete only applicable items.

QA: L

Page: 2 Of: 4

MGR Quality Level 2 Checklist

Yes	No	
		8. Preclosure Phase: 2.1. Does the item function to provide control and management (i.e., collection and/or confinement) of site-generated liquid, gaseous, or solid low-level or mixed radioactive waste? NOTE: Systems with trace concentration of radionuclides, the failure of which could result in offsite doses less than 0.25 mrem per year, are not considered to perform radioactive waste management or control functions for the purpose of this quality level determination.
		2.2. Does the item provide fire detection, fire suppression, or otherwise protect the important-to-radiological safety or waste isolation functions of Quality Level 1 SSCs from the hazards of a fire?
		2.3. As a result of a DBE, could consequential failure of the item, which is not intended to perform a Quality Level 1 radiological safety function, prevent Quality Level 1 SSCs from performing their intended radiological safety function?
		2.4. Is the item required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE, per event, to any member of the public located on or beyond the site boundary [10 CFR 63.111(a) and 10 CFR 20.1301(a)(1)]? Category 1 DBE "per event" limits are interpreted as the sum of the normal operating dose and anticipated operational occurrences plus the consequences from any single additional low frequency Category 1 DBE. This sum is stated on an annual basis and consistent with 10 CFR 63.111(a) or 10 CFR 20.
		2.5. Is the item, in conjunction with an additional item or administrative control (i.e., indirect impact), required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem TEDE, per event, to any member of the public located on or beyond the site boundary? Category 1 DBE "per event" limits are interpreted as the sum of the normal operating dose and anticipated operational occurrences plus the consequences from any single additional low frequency Category 1 DBE. This sum is stated on an annual basis and consistent with 10 CFR 63.111(a) or 10 CFR 20.
		2.6. Is the item, in conjunction with an additional item or administrative control (i.e., indirect impact), required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep dose equivalent and committed dose equivalent to any individual organ or tissue (other than the lens of the eye), 15 rem dose equivalent to the lens of the eye, or 50 rem shallow dose equivalent to the skin, per event, to any individual located on or beyond any point on the boundary of the site?
		9. Postclosure Phase: 2.7. As a result of a DBE, could consequential failure of the item, which is not intended to perform a Quality Level 1 waste isolation function, result in: a. the inability of Quality Level 1 engineered barriers to perform their intended long-term waste isolation function in the postclosure phase?
		b. long-term changes to the hydrological characteristics of natural barriers by creating significant ponding or the possibility of drainage into the postclosure underground?
		c. the introduction of fluids or other materials that could adversely affect the long-term geo-mechanical characteristics of natural barriers in the postclosure phase?
		d. compromising the ability of the natural barriers to isolate waste in the postclosure phase?
		10. Do the answers to Blocks 8 and 9 qualify the item as a Quality Level 2 item?

Attachment II MGR Classification Checklists

CRW/MS/M&O

Importance to Safety or Waste Isolation Evaluation for MGR

Complete only applicable items.

QA: L

Page: 4 Of: 4

MGR Quality Level 3 Checklist

Yes   No

[illegible]

CTS

Canister Transfer System

SSC: Canister Handling System

Level 3: Bridge Crane/Hoist

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☒PS2 ☐ QL3 ☐PS CQ ☐ CQ ☐**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 460

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	This item is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the bridge crane/hoist does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The bridge crane/hoist is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE). Assumption 5.2, TBV-460
1.3	☐	☒	The bridge crane/hoist is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
1.4	☐	☒	a. The bridge crane/hoist does not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☒	This SSC does not perform a site-generated radioactive waste control function.
2.2	☐	☒	This SSC does not perform a fire protection function.
2.3	☒	☐	Failure of the bridge crane/hoist as a result of a DBE could result in an interaction with other QL-1 SSCs or impair their capability to perform their intended radiological safety function. Failure may result in the crane or portions of the crane impacting canisters or disposal containers.

Q-List Rationale

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE. Assumption 5.2, TBV-460
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem TEDE. Assumption 5.2, TBV-460
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
- 2.7 ☐ ☒ a. Failure of the bridge crane/hoist as a result of a DBE will not result in an interaction with other QL-1 SSCs or compromise their ability to perform their intended waste isolation function.
☐ ☒ b.
☐ ☒ c.
☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

Yes	No	Rationale:
3.1	☐ ☒	N/A
3.2	☐ ☒	N/A
3.3	☐ ☐	N/A
3.4	☐ ☐	N/A
3.5	☐ ☒	N/A
3.6	☒ ☐	N/A

CTS

Canister Transfer System

SSC: Canister Handling System

Level 3: DC Loading Manipulator

Level 4: N/A

CTSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This DC loading manipulator provides remote operating capability in the canister transfer area. Shielding is provided to maintain facility operator radiation doses within the limits of 10 CFR 63.111(a)(1) and As Low As Reasonably Achievable (ALARA). This item is not relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☐	☒	f.
PS2	☐	☒	This item is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: If only No answers are given, the item is not subject to QARD requirements. The item is classified as Conventional Quality and an Importance to Safety or Waste Isolation evaluation is not required. Stop Here.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☐	N/A
1.2	☐	☐	N/A
1.3	☐	☐	N/A
1.4	☐	☐	a. N/A
	☐	☐	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☐	N/A
2.2	☐	☐	N/A
2.3	☐	☐	N/A

CTS

Canister Transfer System

SSC: Canister Handling System

Level 3: DC Loading Manipulator

Level 4: N/A

CTSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

2.4	☐	☐	N/A
2.5	☐	☐	N/A
2.6	☐	☐	N/A
2.7	☒	☐	a. N/A
	☐	☐	b.
	☒	☐	c. N/A
	☐	☐	d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☐	N/A
3.2	☐	☐	N/A
3.3	☐	☐	N/A
3.4	☐	☐	N/A
3.5	☒	☐	N/A
3.6	☐	☐	N/A

CTS

Canister Transfer System

SSC: Canister Handling System

Level 3: Lifting Fixtures

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☐ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459, 460

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	This item is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the lifting fixtures does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The lifting fixtures are not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE). Assumption 5.2, TBV-460
1.3	☐	☒	The lifting fixtures are not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
1.4	☐	☒	a. The lifting fixtures do not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☒	This SSC does not perform a site-generated radioactive waste control function.
2.2	☐	☒	This SSC does not perform a fire protection function.
2.3	☐	☒	Failure of the lifting fixtures as a result of a DBE is not expected to result in an interaction with other QL1 SSCs or impair their capability to perform their intended radiological safety function.

Q-List Rationale

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE.
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or 100 mrem TEDE.
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
- 2.7 ☐ ☒ a. Failure of the lifting fixtures as a result of a DBE is not expected to result in an interaction with other QL1 High Waste Isolation Significant SSCs or compromise their ability to perform their intended waste isolation function.
☐ ☒ b.
☐ ☒ c.
☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

Yes	No	Rationale:
3.1 ☐	☒	This item does not function to provide an alarm to warn of significant increases in radiation levels or concentrations of radioactive materials.
3.2 ☐	☒	This item does not function to monitor variables to verify that operating conditions are within technical specifications.
3.3 ☐	☒	This item is not used in MGR emergency response to provide prompt evacuation of personnel, or to monitor variables used in helping to determine the cause or consequences of DBEs (during post accident investigations).
3.4 ☐	☒	This item does not function as part of the radiological, meteorological, or environmental monitoring systems required to assess radionuclide release or dispersion following a DBE.
3.5 ☐	☒	This item is not part of the design or design objectives for keeping levels of radioactive material in effluent to unrestricted areas as low as practicable during normal operations.
3.6 ☐	☒	This item is not required during normal operations, Category I DBEs, and planned recovery actions to limit onsite worker doses to less than 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.3, TBV-459

CTS

Canister Transfer System

SSC: Canister Handling System

Level 3: Small Canister Staging Racks

Level 4: N/A

CTSQL1 ☒PS1 ☒ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☐ CQ ☐**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This small canister staging racks are relied upon to provide criticality control during staging operations involving the small canisters.
	☒	☐	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☐	☒	f.
PS2	☐	☒	This item is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☒	☐	Failure of the small canister staging rack may directly result in loss of criticality control.
1.2	☐	☒	The small canister staging racks are not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE). Assumption 5.2, TBV-460
1.3	☐	☒	The small canister staging racks are not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
1.4	☐	☒	a. The small canister staging racks do not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☐	N/A
2.2	☐	☐	N/A
2.3	☐	☐	N/A

Q-List Rationale

2.4	☐	☐	N/A
2.5	☐	☐	N/A
2.6	☐	☐	N/A
2.7	☒	☐	a. N/A
	☐	☐	b.
	☐	☐	c.
	☐	☐	d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☐	N/A
3.2	☐	☒	N/A
3.3	☐	☐	N/A
3.4	☐	☐	N/A
3.5	☐	☐	N/A
3.6	☐	☐	N/A

CTS

Canister Transfer System

SSC: Cask Preparation System

Level 3: Cask Decontamination System

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☒PS2 ☐ QL3 ☐PS CQ ☐ CQ ☐**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	This item is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the cask decontamination system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The cask decontamination system is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE).
1.3	☐	☒	The cask decontamination system is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
1.4	☐	☒	a. The cask decontamination system does not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☒	☐	The cask decontamination system provides for control and management of site-generated radioactive wastes generated during cask decontamination operations.
2.2	☐	☒	This SSC does not perform a fire protection function.
2.3	☐	☒	Failure of the cask decontamination system as a result of a DBE is not expected to result in an interaction with other QL1 High Safety Significant SSCs or impair their capability to perform their intended radiological safety function.

CTS

Canister Transfer System

SSC: Cask Preparation System

Level 3: Cask Decontamination System

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☒PS2 ☐ QL3 ☐PS CQ ☐ CQ ☐**Q-List Rationale**

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE.
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem TEDE.
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
- 2.7 ☐ ☒ a. Failure of the cask decontamination system as a result of a DBE is not expected to result in an interaction with other QL1 High Waste Isolation Significant SSCs or compromise their ability to perform their intended waste isolation function.
- ☐ ☒ b.
- ☐ ☒ c.
- ☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☐	N/A
3.2	☐	☐	N/A
3.3	☐	☐	N/A
3.4	☐	☐	N/A
3.5	☐	☐	N/A
3.6	☐	☐	N/A

CTS

Canister Transfer System

SSC: Cask Preparation System

Level 3: Cask Inspection and Sampling System

Level 4: N/A

CTSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. Cask inspection and sampling system provides remote sampling capability in the canister transfer area. Shielding is provided to maintain facility operator radiation doses within the limits of 10 CFR 63.111(a)(1) and As Low As Reasonably Achievable (ALARA). This item is not relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☐	☒	f.
PS2	☐	☒	This item is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: If only No answers are given, the item is not subject to QARD requirements. The item is classified as Conventional Quality and an Importance to Safety or Waste Isolation evaluation is not required. Stop Here.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☐	N/A
1.2	☐	☐	N/A
1.3	☐	☐	N/A
1.4	☐	☐	a. N/A
	☐	☐	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☐	N/A
2.2	☐	☐	N/A
2.3	☐	☐	N/A

Q-List Rationale

2.4	☐	☐	N/A
2.5	☐	☐	N/A
2.6	☒	☐	N/A
2.7	☐	☐	a. N/A
	☐	☐	b.
	☐	☐	c.
	☐	☐	d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☐	N/A
3.2	☐	☐	N/A
3.3	☐	☐	N/A
3.4	☐	☐	N/A
3.5	☐	☐	N/A
3.6	☐	☐	N/A

CTS

Canister Transfer System

SSC: Cask Preparation System

Level 3: Cask Preparation Manipulator

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☐PS2 ☐ QL3 ☒PS CQ ☐ CQ ☐**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	This cask preparation manipulator is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the manipulators does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The manipulators are not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE).
1.3	☐	☒	The manipulators are not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
1.4	☐	☒	a. The manipulators do not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☒	The manipulators do not perform a site-generated radioactive waste control function.
2.2	☐	☒	The manipulators do not perform a fire protection function.
2.3	☐	☒	Failure of the manipulators as a result of a DBE does not impair the capability of a QL1 High Safety Significant SSC to perform its radiological safety function.

CTS

Canister Transfer System

SSC: Cask Preparation System

Level 3: Cask Preparation Manipulator

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☐PS2 ☐ QL3 ☒PS CQ ☐ CQ ☐**Q-List Rationale**

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE, per event, to any member of the public located on or beyond the site boundary [10 CFR 63.111(a) and 10 CFR 20.1301 (a)(1)].
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem TEDE, per event, to any member of the public located on or beyond the site boundary.
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to the more limiting of 10 CFR 63.111(b)(2) doses to any individual located on, or beyond, any point on the site boundary.
- 2.7 ☐ ☒ a. Failure of the manipulators as a result of a DBE does not compromise the ability of a QL1 High Waste Isolation Significant SSC to perform its waste isolation function.
☐ ☒ b.
☐ ☒ c.
☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☒	This item does not function to provide an alarm to warn of significant increases in radiation levels or concentrations of radioactive materials.
3.2	☐	☒	This item does not function to monitor variables to verify that operating conditions are within technical specifications.
3.3	☐	☒	This item is not used in MGR emergency response to provide prompt evacuation of personnel, or to monitor variables used in helping to determine the cause or consequences of DBEs (during post accident investigations).
3.4	☐	☒	This item does not function as part of the radiological, meteorological, or environmental monitoring systems required to assess radionuclide release or dispersion following a DBE.
3.5	☐	☒	This item is not part of the design or design objectives for keeping levels of radioactive material in effluent to unrestricted areas as low as practicable during normal operations.
3.6	☒	☐	This item functions to limit onsite worker doses from normal operations and during Category 1 DBEs, including planned recovery operations, to less than 10 CFR 63.111(a)(1) [10 CFR 20.1201] requirements. The manipulator permits remote operations and increased distance between facility operators and radiation source.

CTS

Canister Transfer System

SSC: Cask Transport System

Level 3: N/A

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☐ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459, 460

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. The cask transport system is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	This cask transport system is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the cask transport system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The cask transport system is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE). Assumption 5.2, TBV-460
1.3	☐	☒	The cask transport system is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
1.4	☐	☒	a. The cask transport system does not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☒	This SSC does not perform a site-generated radioactive waste control function.
2.2	☐	☒	This SSC does not perform a fire protection function.
2.3	☐	☒	Failure of the cask transport system as a result of a DBE is not expected to result in an interaction with other QL1 High Safety Significant SSCs or impair their capability to perform their intended radiological safety function.

CTS

Canister Transfer System

SSC: Cask Transport System

Level 3: N/A

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☐ CQ ☒**Q-List Rationale**

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE.
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or 100 mrem TEDE.
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
- 2.7 ☐ ☒ a. Failure of the cask transport system as a result of a DBE is not expected to result in an interaction with other QL1 High Waste Isolation Significant SSCs or compromise their ability to perform their intended waste isolation function.
- ☐ ☒ b.
- ☐ ☒ c.
- ☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☒	This item does not function to provide an alarm to warn of significant increases in radiation levels or concentrations of radioactive materials.
3.2	☐	☒	This item does not function to monitor variables to verify that operating conditions are within technical specifications.
3.3	☐	☒	This item is not used in MGR emergency response to provide prompt evacuation of personnel, or to monitor variables used in helping to determine the cause or consequences of DBEs (during post accident investigations).
3.4	☐	☒	This item does not function as part of the radiological, meteorological, or environmental monitoring systems required to assess radionuclide release or dispersion following a DBE.
3.5	☐	☒	This item is not part of the design or design objectives for keeping levels of radioactive material in effluent to unrestricted areas as low as practicable during normal operations.
3.6	☐	☒	This item is not required during normal operations, Category I DBEs, and planned recovery actions to limit onsite worker doses to less than 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.3, TBV-459

CTS

Canister Transfer System

SSC: Control and Tracking System

Level 3: N/A

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☒PS2 ☐ QL3 ☐PS CQ ☐ CQ ☐**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 460

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. The control and tracking system is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	The control and tracking system is not directly or indirectly relied upon to provide an important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the control and tracking system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The control and tracking system is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE). Assumption 5.2, TBV-460
1.3	☐	☒	The control and tracking system is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
1.4	☐	☒	a. The control and tracking system does not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☒	☐	This SSC supports canister transfer system site-generated radioactive waste control functions.
2.2	☐	☒	This SSC does not perform a fire protection function.
2.3	☐	☒	Failure of the control and tracking system as a result of a DBE is not expected to result in an interaction with other QL1 SSCs or impair their capability to perform their intended radiological safety function.

CTS

Canister Transfer System

SSC: Control and Tracking System

Level 3: N/A

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☒PS2 ☐ QL3 ☐PS CQ ☐ CQ ☐**Q-List Rationale**

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE.
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or 100 mrem TEDE.
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
- 2.7 ☐ ☒ a. Failure of the control and tracking system as a result of a DBE is not expected to result in an interaction with other QL1
☐ ☒ b. High Waste Isolation Significant SSCs or compromise their ability to perform their intended waste isolation function.
☐ ☒ c.
☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☐	N/A
3.2	☐	☐	N/A
3.3	☐	☐	N/A
3.4	☐	☐	N/A
3.5	☐	☐	N/A
3.6	☐	☐	N/A

CTS

Canister Transfer System

SSC: DC Transport System

Level 3: N/A

Level 4: N/A

CTSQL1 ☐PS1 ☒ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☐ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459, 460

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. The disposal container transport system is relied upon to provide operations support necessary for waste handling safety.
	☐	☒	b.
	☐	☒	c.
	☐	☒	d.
	☐	☒	e.
	☒	☐	f.
PS2	☐	☒	This disposal container transport system is not directly or indirectly relied upon to provide an Important to Waste Isolation function.

Note: A Yes answer has been selected for either PS1 or PS2, therefore, the item is subject to QARD requirements. An Importance to Safety or Waste Isolation evaluation is required. Please continue with the evaluation checklists below.

QL1 - Quality Level 1: High Safety or Waste Isolation Significance

	Yes	No	Rationale:
1.1	☐	☒	Failure of the disposal container transport system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The disposal container transport system is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 100 mrem total effective dose equivalent (TEDE). Assumption 5.2, TBV-460
1.3	☐	☒	The disposal container transport system is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.2, TBV-460
1.4	☐	☒	a. The disposal container transport system does not perform a waste isolation function.
	☐	☒	b.

QL2 - Quality Level 2: Low Safety or Waste Isolation Significance

	Yes	No	Rationale:
2.1	☐	☒	This SSC does not perform a site-generated radioactive waste control function.
2.2	☐	☒	This SSC does not perform a fire protection function.
2.3	☐	☒	Failure of the disposal container transport system as a result of a DBE is not expected to result in an interaction with other QL1 High Safety Significant SSCs or impair their capability to perform their intended radiological safety function.

Q-List Rationale

- 2.4 ☐ ☒ This item is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or equal to 25 mrem TEDE.
- 2.5 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 1 DBE that could result in offsite doses greater than or 100 mrem TEDE.
- 2.6 ☐ ☒ This item, in conjunction with an additional item or administrative control (i.e., indirect impact), is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses greater than or equal to 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin.
- 2.7 ☐ ☒ a. Failure of the disposal container transport system as a result of a DBE is not expected to result in an interaction with other QL1 High Waste Isolation Significant SSCs or compromise their ability to perform their intended waste isolation function.
- ☐ ☒ b.
- ☐ ☒ c.
- ☐ ☒ d.

QL3 - Quality Level 3: Minor Safety Significance or Occupational Exposure Significance

	Yes	No	Rationale:
3.1	☐	☒	This item does not function to provide an alarm to warn of significant increases in radiation levels or concentrations of radioactive materials.
3.2	☐	☒	This item does not function to monitor variables to verify that operating conditions are within technical specifications.
3.3	☐	☒	This item is not used in MGR emergency response to provide prompt evacuation of personnel, or to monitor variables used in helping to determine the cause or consequences of DBEs (during post accident investigations).
3.4	☐	☒	This item does not function as part of the radiological, meteorological, or environmental monitoring systems required to assess radionuclide release or dispersion following a DBE.
3.5	☐	☒	This item is not part of the design or design objectives for keeping levels of radioactive material in effluent to unrestricted areas as low as practicable during normal operations.
3.6	☐	☒	This item is not required during normal operations, Category I DBEs, and planned recovery actions to limit onsite worker doses to less than 5 rem TEDE, 50 rem combined deep and committed dose equivalents to any individual organ or tissue, 15 rem to the lens of the eye, or 50 rem shallow dose equivalent to the skin. Assumption 5.3, TBV-459