OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT ANALYSIS/MODEL COVER SHEET

1. QA: L

Page: 1 of: 10

Complete Only Applicable Items

2. ☒ Analysis ☒ Engineering
☐ Performance Assessment
☐ Scientific

3. ☐ Model ☐ Conceptual Model Documentation
☐ Model Documentation
☐ Model Validation Documentation

4. Title:
 Classification of the MGR Waste Treatment Building System

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

6. Total Attachments:
 Three (3)

7. Attachment Numbers - No. of Pages in Each:
 I-1, II-4, III-12

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12. Remarks:

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

The document number for this analysis was previously BCB000000-01717-0200-00011 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: 10

Complete Only Applicable Items

2. Analysis or Model Title:
Classification of MGR Waste Treatment Building System

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

ANL-TBS-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) waste treatment building 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. Currently, no DBEs associated with the system are evaluated by the DBE calculations (CRWMS M&O 1998a) and Section 5.6 of the calculations assumes that the small quantity of radiological material available for release does not exceed the offsite dose limits for Category 1 or 2 DBEs.

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 (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.

NRC Regulatory Guide 8.27, *Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants*, Rev. 0.

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 *Waste Treatment Building 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 waste treatment building system design configuration and SSC functions.
- 5.2 This analysis assumes that future DBE analysis will demonstrate that no events associated with the MGR waste treatment building system exceed the limits of 10 CFR 63.111(a) or (b). This assumption is based on the facility handling only low-level radioactive waste and Assumption 5.3. This assumption is utilized in Section 6.4 in the classification of system

SSCs. (TBV-459)

5.3 This analysis assumes that:

- An MGR radiation protection program is established in accordance with 10 CFR Part 20, Subpart B, Radiation Protection Programs.
- MGR operational and supervisory personnel are trained and qualified to perform assigned job requirements in accordance with 10 CFR 63, Subpart H.
- MGR personnel operate the facility in compliance with approved procedures for normal, off-normal and emergency operational modes.
- MGR personnel have received radiation protection training in accordance with the applicable guidance of Regulatory Guide 8.27, *Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants*.

This assumption is based upon the requirements of 10 CFR Part 63, Subpart H and is used in Section 6.4 for the classification of system SSCs.

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 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 stated in Section 4.1, the MGR DBE calculations (CRWMS M&O 1998a, Section 5.6), assume that the small quantity of radiological material available for release does not exceed the offsite dose limits for Category 1 or 2 DBEs.

6.4 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 Waste Treatment Building System QA Classification

Waste Treatment Building System (TBS)	QL-1	QL-2	QL-3	CQ	TBV
Electrical Systems				X	459
Fire Protection System				X	459
Piped Utility Systems				X	459
Process Supply Systems				X	459
Radiological Monitoring System			X		459
Waste Treatment Building		X			N/A

7.2 IMPACT OF UNVERIFIED DATA

7.2.1 TBV-459

This analysis assumes (Section 5.2, TBV-459) that no MGR DBEs associated with the waste treatment building system exceed the dose limits of 10 CFR 63.111(a) or (b). TBV-459 requires that future DBE analysis verify this assumption. If the assumptions addressed by TBV-459 cannot be verified by MGR DBE analysis, system SSCs may be reclassified from CQ to QL-2 or QL-3. The radiological monitoring system may be reclassified from QL-3 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. *Waste Treatment Building System Description Document*. BCB000000-01717-1705-00014, REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19981030.0192.

CRWMS M&O 1998d. *Classification of the Preliminary MGDS Repository Design*. B000000000-01717-0200-00134 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*. B000000000-01717-5700-00011 REV 02. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990409.0138.

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.

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 (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.

NRC Regulatory Guide 8.27, *Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants*, Rev. 0. 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
DBE	Design Basis Event
DOE	U. S. Department of Energy
FR	Federal Register
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
SSCs	Structures, Systems, and Components
TBD	To Be Determined
TBV	To Be Verified
TEDE	Total Effective Dose Equivalent
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):	

Yes No

4.		PS1. Is the item directly or indirectly relied upon to provide one of the following Important to Safety functions for radioactive wastes received or handled?
		a. Confinement or containment
		b. Criticality control
		c. Shielding
		d. Heat transfer
		e. Structural integrity
		f. Operations support necessary for waste handling safety (refer to Quality Level 3 checklists in Attachments II, III, or IV for guidance)
5.		PS2. Is the item directly or indirectly relied upon to provide an Important to Waste Isolation function?
6.		Do the answers to Blocks 4 and 5 indicate the need for an Importance to Safety evaluation?

7. Comments/Justification:

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	
		<p>8. Preclosure Phase:</p> <p>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?</p> <p>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.</p>
		<p>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?</p>
		<p>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?</p>
		<p>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.</p>
		<p>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.</p>
		<p>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?</p>
		<p>9. Postclosure Phase:</p> <p>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:</p> <p>a. the inability of Quality Level 1 engineered barriers to perform their intended long-term waste isolation function in the postclosure phase?</p>
		<p>b. long-term changes to the hydrological characteristics of natural barriers by creating significant ponding or the possibility of drainage into the postclosure underground?</p>
		<p>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?</p>
		<p>d. compromising the ability of the natural barriers to isolate waste in the postclosure phase?</p>
		<p>10. Do the answers to Blocks 8 and 9 qualify the item as a Quality Level 2 item?</p>

CRWMS/M&O

QA: L

Page: 4 Of: 4

Yes No

QAP-2-3 (Effective 05/26/1999)

0973 (Rev. 05/06/1999)

TBS

Waste Treatment Building System

SSC: Electrical Systems

Level 3: N/A

Level 4: N/A

TBSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is not directly or indirectly relied upon to provide one of the following Important to Safety functions for radioactive wastes received or handled at the MGR: confinement or containment, criticality control, shielding, heat transfer, structural integrity, or 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

TBS

Waste Treatment Building System

SSC: Electrical Systems

Level 3: N/A

Level 4: N/A

TBSQL1 ☐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.
☐ ☐ b.
☐ ☐ c.
☐ ☐ d.

N/A

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

TBS

Waste Treatment Building System

SSC: Fire Protection System

Level 3: N/A

Level 4: N/A

TBSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is not directly or indirectly relied upon to provide one of the following Important to Safety functions for radioactive wastes received or handled at the MGR: confinement or containment, criticality control, shielding, heat transfer, structural integrity, or 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

TBS

Waste Treatment Building System

SSC: Fire Protection System

Level 3: N/A

Level 4: N/A

TBSQL1 ☐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.
	☐	☐	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

TBS

Waste Treatment Building System

SSC: Piped Utility Systems

Level 3: N/A

Level 4: N/A

TBSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is not directly or indirectly relied upon to provide one of the following Important to Safety functions for radioactive wastes received or handled at the MGR: confinement or containment, criticality control, shielding, heat transfer, structural integrity, or 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

TBS

Waste Treatment Building System

SSC: Piped Utility Systems

Level 3: N/A

Level 4: N/A

TBSQL1 ☐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.
	☒	☐	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

TBS

Waste Treatment Building System

SSC: Process Supply Systems

Level 3: N/A

Level 4: N/A

TBSQL1 ☐PS1 ☐ QL2 ☐PS2 ☐ QL3 ☐PS CQ ☒ CQ ☒**Q-List Rationale**

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No	Rationale:
PS1	☐	☒	a. This item is not directly or indirectly relied upon to provide one of the following Important to Safety functions for radioactive wastes received or handled at the MGR: confinement or containment, criticality control, shielding, heat transfer, structural integrity, or 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

TBS

Waste Treatment Building System

SSC: Process Supply Systems

Level 3: N/A

Level 4: N/A

TBSQL1 ☐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.
	☐	☐	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

Q-List Rationale

SDD / SSC Reference: CRWMS M&O 1998c

TBVs Applicable to this Item: 459

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 WTB radiological monitoring system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The WTB radiological monitoring system is not required to prevent or mitigate a Category 1 DBE that could exceed established offsite dose limits.
1.3	☐	☒	The WTB radiological monitoring system is not required to prevent or mitigate a Category 2 DBE that could exceed established offsite dose limits.
1.4	☐	☒	a. This system is not part of the natural or engineered barriers important to waste isolation.
	☐	☒	b.

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

	Yes	No	Rationale:
2.1	☐	☒	This SSC does not perform any site-generated radioactive waste control or management function.
2.2	☐	☒	There are no QL1 SSCs in the WTB.
2.3	☐	☒	There are no QL1 SSCs in the WTB.

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)]. Assumption 5.2, TBV-459
- 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. Assumption 5.2, TBV-459
- 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. Assumption 5.2, TBV-459
- 2.7 ☐ ☒ a. There are no QL1 High Waste Isolation Significant SSCs in the WTF. Therefore, failure of this system as a result of a DBE will not impair any QL1 High Waste Isolation Significant SSCs from performing their waste isolation safety function.
- ☐ ☒ b.
- ☐ ☒ c.
- ☐ ☒ d.

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

Yes	No	Rationale:
3.1 ☒	☐	This item provides 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 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. Assumption 5.2, TBV-459

TBS

Waste Treatment Building System

SSC: Waste Treatment Building

Level 3: N/A

Level 4: N/A

TBSQL1 ☐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 WTB does not directly result in loss of waste package containment or criticality control.
1.2	☐	☒	The WTB is not required to prevent or mitigate a Category 1 DBE that could exceed established offsite dose limits.
1.3	☐	☒	The WTB is not required to prevent or mitigate a Category 2 DBE that could exceed established offsite dose limits.
1.4	☐	☒	a. This system is not part of the natural or engineered barriers important to waste isolation.
	☐	☒	b.

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

	Yes	No	Rationale:
2.1	☒	☐	The WTB provides a confinement function for site-generated radioactive waste.
2.2	☐	☒	There are no QL1 SSCs in the WTB.
2.3	☐	☒	There are no QL1 SSCs in the WTB.

TBS

Waste Treatment Building System

SSC: Waste Treatment Building

Level 3: N/A

Level 4: N/A

TBS

QL1 ☐

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. There are no QL1 High Waste Isolation Significant SSCs in the WTF. Therefore, failure of this system as a result of a DBE will not impair any QL1 High Waste Isolation Significant SSCs from performing their waste isolation safety 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