OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
ANALYSIS/MODEL COVER SHEET

1. QA: QA

Complete Only Applicable Items

2. [x] Analysis — Check all that apply

Type of Analysis:
- [x] Engineering
- [ ] Performance Assessment
- [ ] Scientific

Intended Use of Analysis:
- [ ] Input to Calculation
- [ ] Input to another Analysis or Model
- [ ] Input to Technical Document
- [x] Input to other Technical Products

Describe use:
QA Classification of the MGR Waste Handling Building Ventilation System for input to the *Q-List* and other technical documents as appropriate.

3. [ ] Model — Check all that apply

Type of Model:
- [ ] Conceptual Model
- [ ] Abstraction Model
- [ ] Mathematical Model
- [ ] System Model
- [ ] Process Model

Intended Use of Model:
- [ ] Input to Calculation
- [ ] Input to another Model or Analysis
- [ ] Input to Technical Document
- [ ] Input to other Technical Products

Describe use:

4. Title:
Classification of the MGR Waste Handling Building Ventilation System

5. Document Identifier (including Rev. No. and Change No., if applicable):
ANL-HBV-SE-000001 REV 01

6. Total Attachments:
3

7. Attachment Numbers - No. of Pages in Each:
I-1; II-4; III-8

	Printed Name	Signature	Date
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12. Remarks:
This analysis bases the classification of MGR 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 classification conclusions of this analysis.

WM-11
NMSS07

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
ANALYSIS/MODEL REVISION RECORD

Complete Only Applicable Items

2. Analysis or Model Title:
Classification of the MGR Waste Handling Building Ventilation System

3. Document Identifier (including Rev. No. and Change No., if applicable):
ANL-HBV-SE-000001 REV 01

4. Revision/Change No.	5. Description of Revision/Change
00	Initial issue.
01	This revision is a complete rewrite of the initial issue. The Waste Handling Building Ventilation System architecture has been expanded to include subsystems (that were not included in the initial issue) that are classified in this revision.

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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 handling building ventilation system structures, systems and components (SSCs) performed by the MGR Preclosure Safety and Systems Engineering Section. This analysis also provides the basis for revision of YMP/90-55Q, *Q-List* (YMP 2000). The *Q-List* identifies those MGR SSCs subject to the requirements of DOE/RW-0333P, *Quality Assurance Requirements and Description* (QARD) (DOE 2000).

This QA classification incorporates the current MGR design and the results of the *Design Basis Event Frequency and Dose Calculation for Site Recommendation* (CRWMS M&O 2000a) and "Bounding Individual Category 1 Design Basis Event Dose Calculation to Support Quality Assurance Classification" (Gwyn 2000). The content and technical approach of this analysis is in accordance with the Development Plan *QA Classification of MGR Structures, Systems, and Components* (CRWMS M&O 1999b).

2. QUALITY ASSURANCE

This analysis is subject to the requirements of the QARD (DOE 2000) as determined by procedure QAP-2-0, *Conduct of Activities*. Although QAP-2-0 has been superseded by AP-2.21Q, *Quality Determinations and Planning for Scientific, Engineering, and Regulatory Compliance Activities*, its conclusions remain valid. *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 2000). Unverified design inputs are identified and tracked in accordance with AP-3.15Q, *Managing Technical Product Inputs*. There is no electronic management of data associated with this document.

3. COMPUTER SOFTWARE AND MODEL USAGE

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

4. INPUTS

4.1 DATA AND PARAMETERS

The offsite radiological consequences of MGR Category 1 and 2 design basis events (DBEs), as calculated in CRWMS M&O (2000a) and Gwyn (2000), are utilized in the QA classification of MGR SSCs. The credible DBEs identified in CRWMS M&O (2000a) and Gwyn (2000) assume the safety strategy as defined in Hastings (1998) is implemented. 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* (Duncan et al. 1988, 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.

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 of the QARD (DOE 2000), "Classifying Items."

4.3 CODES, STANDARDS, AND REGULATIONS

10 CFR 20. Energy: Standards for Protection Against Radiation.

Interim Guidance Pending Issuance of New U. S. Nuclear Regulatory Commission (NRC) Regulations for Yucca Mountain, Nevada (Dyer 1999).

64 FR 8640. Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada. Proposed rule 10 CFR 63. February 22, 1999.

5. ASSUMPTIONS

This analysis assumes that system design, architecture, and functions are established by the *Waste Handling Building Ventilation System Description Document* (CRWMS M&O 2000b). This document represents the best available MGR design information. This assumption is utilized in Section 6.2 to define the ventilation system design configuration and SSC functions.

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. The following classification categories are specified by QAP-2-3 to meet the requirements of Section 2 of the QARD (DOE 2000).

> 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 as low as is 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 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 (Duncan et al. 1988, 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 *Waste Handling Building Ventilation System Description Document* (CRWMS M&O 2000b) (see Section 5). 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

Dose calculations of MGR DBEs (CRWMS M&O 2000a and Gwyn 2000) have been performed to determine the effects of internal events on public radiological safety and is utilized by this analysis in the classification of MGR SSCs. The DBE calculation addresses both the DBE frequencies and dose consequences at the site boundary. This analysis utilizes the results of the DBE calculations to evaluate MGR SSCs against the classification criteria of procedure QAP-2-3.

6.4 QUALITY ASSURANCE CLASSIFICATION OF MGR SSCs

The MGR SSCs are evaluated against the criteria of QAP-2-3 to determine the item's QA classification level. The results of the MGR DBE calculations (CRWMS M&O 2000a, Table 9; and Gwyn 2000) are the basis for the DBEs and doses used in this evaluation.

7. CONCLUSIONS

This analysis may be affected by technical product input information that requires confirmation. Any changes to the document that may occur as a result of completing the confirmation activities will be reflected in subsequent revisions. The status of the input information quality may be confirmed by review of the Document Input Reference System database.

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 checklist questions 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 Handling Building Ventilation System QA Classification

Waste Handling Building Ventilation System	QL-1	QL-2	QL-3	CQ
Confinement Area Ventilation System				
Primary Confinement Area Ventilation System		X		
Secondary Confinement Area Ventilation System		X		
Tertiary Confinement Area Ventilation System		X		
Non-Confinement Area Ventilation System				X

8. INPUTS AND REFERENCES

8.1 DOCUMENTS CITED

CRWMS M&O (Civilian Radioactive Waste Management System Management and Operating Contractor) 1999a. *Design Basis Event Definition & Analysis/QA Classification Analysis (1.2.1.11)*. Activity Evaluation, March 2, 1999. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990325.0008.

CRWMS M&O 1999b. *QA Classification of MGR Structures, Systems, and Components*. Development Plan TDP-MGR-SE-000007 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19991029.0155.

CRWMS M&O 2000a. *Design Basis Event Frequency and Dose Calculation for Site Recommendation*. CAL-WHS-SE-000001 REV 01. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.20000627.0214.

CRWMS M&O 2000b. *Waste Handling Building Ventilation System Description Document*. SDD-HBV-SE-000001 REV 01 ICN 01. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.20000807.0087.

DOE (U.S. Department of Energy) 2000. *Quality Assurance Requirements and Description*. DOE/RW-0333P, Rev. 10. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: MOL.20000427.0422.

Duncan, A.B.; Bilhorn S.G.; and Kennedy, J.E. 1988. *Technical Position on Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements*. NUREG-1318. Washington, D.C.: U.S. Nuclear Regulatory Commission. TIC: 200650.

Dyer, J.R. 1999. "Revised Interim Guidance Pending Issuance of New U.S. Nuclear Regulatory Commission (NRC) Regulations (Revision 01, July 22, 1999), for Yucca Mountain, Nevada." Letter from J.R. Dyer (DOE/YMSCO) to D.R. Wilkins (CRWMS M&O), September 3, 1999. OL&RC:SB-1714, with enclosure, "Interim Guidance Pending Issuance of New NRC Regulations for Yucca Mountain (Revision 01)." ACC: MOL.19990910.0079.

Gwyn, D.W. 2000. "Bounding Individual Category 1 Design Basis Event Dose Calculation to Support Quality Assurance Classification." Interoffice correspondence from Gwyn, D.W. (CRWMS M&O) to SA File 503.03, August 10, 2000, LV.SA.JAK.08/00-127, with attachments. ACC: MOL.20000814.0039.

Hastings, C.R. 1998. "Strategy to Mitigate Preclosure Offsite Exposure." Interoffice correspondence from Hastings, C.R. to Distribution, July 21, 1998, LV.SEI.CRH.7/98-024. ACC: MOL.19980916.0357.

YMP (Yucca Mountain Site Characterization Project) 2000. *Q-List*. YMP/90-55Q, Rev. 6. Las Vegas, Nevada: Yucca Mountain Site Characterization Office. ACC: MOL.20000510.0177.

8.2 CODES, STANDARDS, AND REGULATIONS

10 CFR (Code of Federal Regulations) 20. Energy: Standards for Protection Against Radiation. Readily Available.

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. Readily Available.

8.3 PROCEDURES

AP-2.21Q, Rev. 0. *Quality Determinations and Planning for Scientific, Engineering, and Regulatory Compliance Activities*. ACC: MOL.20000802.0003.

AP-3.10Q, Rev. 2, ICN 3. *Analyses and Models*. ACC: MOL.20000918.0282.

AP-SI.1Q, Rev. 2, ICN 4. *Software Management*. ACC: MOL.20000223.0508.

AP-3.15Q, Rev. 1, ICN 2. *Managing Technical Product Inputs*. ACC: MOL.20000713.0363.

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 2. *Item Classification and Maintenance of the Q-List.* ACC: MOL.19991214.0628.

9. ATTACHMENTS

Attachment I	Acronyms
Attachment II	MGR Classification Checklist Questions
Attachment III	MGR QA Classification

Attachment I

Acronyms

CQ	Conventional Quality
DBE	Design Basis Event
MGR	Monitored Geologic Repository
QA	Quality Assurance
QARD	Quality Assurance Requirements and Description
QL	Quality Level
SSCs	Structures, Systems, and Components
TEDE	Total Effective Dose Equivalent
WHB	Waste Handling Building

Attachment II
MGR Classification Checklist Questions

CRWMS/M&O

Importance to Safety or Waste Isolation Evaluation Pre-Screening Checklist

Complete only applicable items.

QA: L

Page: 1 Of: 1

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:

QAP 2.3 (Effective 05/26/1999)

0972 (Rev. 05/06/1999)

CRWMS/M&O

Importance to Safety or Waste Isolation Evaluation for MGR

Complete only applicable items.

QA: L

Page: 1 Of: 4

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

MGR Quality Level 1 Checklist

Yes	No	
4.		Preclosure Phase: 1.1. Can failure of the item directly result in loss of waste package containment or criticality control for the spent nuclear fuel, high-level wastes, or other radioactive materials received for emplacement at the MGR?
		1.2. Is the item 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), per event, to any member of the public located on or beyond the site boundary [10 CFR 63.111(b)(1) and 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.
		1.3. Is the item 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 [10 CFR 63.111(b)(2)] to any individual located on or beyond any point on the boundary of the site?
5.		Postclosure Phase: 1.4. Does the item perform a waste isolation function that is required to meet the performance objectives in 10 CFR 63.113(b) by:
		a. forming part of the natural barriers or an engineered barrier system required by 10 CFR 63.113(a)?
		b. being directly credited in the performance assessments required by 10 CFR 63.113(c) and 10 CFR 63.113(d) to demonstrate the ability of the geologic repository to limit expected annual dose to the average member of the critical group to less than 25 mrem TEDE at any time during the first 10,000 years after permanent closure?
6.		Do the answers to Blocks 4 and 5 qualify the item as a Quality Level 1 item?

7. Comments/Justification:

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

0973 (Rev. 05/06/1999)

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?

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

0073 (Rev. 05/06/1999)

CRWMS/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	
12.		Preclosure Phase: 3.1. Does the item function to provide an alarm to warn of significant increases in radiation levels or concentrations of radioactive material?
		3.2. Does the item function to monitor variables to verify that operating conditions are within technical specification limits?
		3.3. Is the item 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. Does the item function as a part of the radiological, meteorological, or environmental monitoring systems required to assess radionuclide release or dispersion following a DBE?
		3.5. Is the item 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. Is the item required to limit onsite worker doses from normal operations and during Category 1 DBEs, including planned recovery operations, to less than 5 rem per year TEDE, 50 rem per year combined deep dose equivalent and committed dose equivalent to any individual organ or tissue (other than the lens of the eye), 15 rem per year dose equivalent to the lens of the eye, or 50 rem per year shallow dose equivalent to the skin or any extremity?
13.		Do the answers to Block 12 qualify the item as a Quality Level 3 item?

14. Comments/Justification:

QAP-2-3 (Effective 05/26/1999) 0973 (Rev. 05/06/1999)

HBV

Classification Analysis Checklists

Classification Results	
	QL1 ☐
PS1 ☑	QL2 ☑
PS2 ☐	QL3 ☐
	CQ ☐

System: **Waste Handling Building Ventilation System**

SSC Classified **Primary Confinement Area Ventilation System**

SDD Reference: SDD-HBV-SE-000001 R1 ICN 1 Assumptions Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No		Rationale:
PS1	☑	☐	a	The waste handling building (WHB) primary confinement area ventilation system provides filtration of exhaust air (along with heating, ventilation and air conditioning) for those WHB areas where radioactive material or contamination is present during normal operations. The system maintains air flow paths and pressure zones that minimize the potential for spread of contamination and exhausts through HEPA filters to an exhaust outlet equipped with radiation monitors. This system is relied upon to provide confinement of radioactive material being processed and mitigate radioactive releases associated with MGR DBEs.
	☐	☑	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 primary confinement area ventilation system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☑		The primary confinement area ventilation 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). A dose calculation has determined that the bounding Category 1 DBE dose plus the yearly normal operations dose does not exceed the 100 mrem TEDE regulatory limit (Gwyn 2000, Attachment 1, pp 1-2).
1.3	☐	☑		The primary confinement area ventilation 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. A dose calculation has not identified any Category 2 DBEs in primary confinement zones that could result in exceeding Category 2 regulatory dose limits without filtration (CRWMS M&O 2000a, Table 9).
1.4	☐	☑	a.	The confinement area ventilation system does not perform a waste isolation function.
	☐	☑	b.	

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

	Yes	No	Rationale:
2.1	☑	☐	Failure of the primary confinement ventilation system could result in offsite doses greater than 0.25 mrem per year. The system is considered to perform radioactive waste management or control functions for the purpose of quality level determination. Airborne particulate contamination will be contained within the air filters.
2.2	☐	☑	This system does not perform a fire protection function.
2.3	☐	☑	Failure of the primary confinement area ventilation system as a result of a DBE is not expected to result in an interaction with other QL-1 SSCs that impair their capability to perform their intended radiological safety function.

HBV

Classification Analysis Checklists

Classification Results

		QL1	☐
PS1	☑	QL2	☑
PS2	☐	QL3	☐
		CQ	☐

System: **Waste Handling Building Ventilation System**

SSC Classified **Primary Confinement Area Ventilation System**

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)] (Gwyn 2000).
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 (Gwyn 2000).
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 that exceed regulatory limits. A dose calculation has not identified any Category 2 DBEs that could result in exceeding Category 2 regulatory dose limits without primary confinement area filtration (CRWMS M&O 2000a, Table 9).
2.7	☐	☑ a.	Failure of this SSC as a result of a DBE will not compromise the ability of QL-1 High Waste Isolation Significant SSCs 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

HBV

Classification Analysis Checklists

Classification Results:

		QL1	☐
PS1	☑	QL2	☑
PS2	☐	QL3	☐
		CQ	☐

System: **Waste Handling Building Ventilation System**

SSC Classified **Secondary Confinement Area Ventilation System**

SDD Reference: SDD-HBV-SE-000001 R1 ICN 1 Assumptions Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No		Rationale:
PS1	☑	☐	a	The waste handling building (WHB) secondary confinement area ventilation system provides filtration of exhaust air (along with heating, ventilation and air conditioning) for those WHB areas where the potential for radioactive contamination is high. The system maintains air flow paths and pressure zones that minimize the potential for spread of contamination. The system exhausts air through HEPA filters to an exhaust outlet equipped with radiation monitors. The WHB secondary confinement area ventilation system is not relied upon to mitigate the effects of MGR DBEs.
	☐	☑	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 secondary confinement area ventilation system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☑		The secondary confinement area ventilation 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). A dose calculation has determined that the bounding Category 1 DBE dose plus the yearly normal operations dose does not exceed the 100 mrem TEDE regulatory limit (Gwyn 2000, Attachment 1, pp 1-2).
1.3	☐	☑		The secondary confinement area ventilation system is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses that exceed regulatory limits. A dose calculation has not identified any Category 2 DBEs in secondary confinement zones that could result in exceeding Category 2 regulatory dose limits without filtration (CRWMS M&O 2000a, Table 9).
1.4	☐	☑	a.	The secondary confinement area ventilation system does not perform a waste isolation function.
	☐	☑	b.	

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

	Yes	No	Rationale:
2.1	☑	☐	A failure of this SSC may result in an offsite dose greater than 0.25 mrem/yr (Gwyn 2000, Attachment 1 and CRWMS M&O 2000a, Table 9). The system is considered to perform radioactive waste management or control functions for purposes of quality level determinations by containing possible airborne contamination within air filters.
2.2	☐	☑	This SSC does not perform a fire protection function.
2.3	☐	☑	Failure of the secondary confinement area ventilation system as a result of a DBE is not expected to result in an interaction with other QL-1 SSCs that impair their capability to perform their intended radiological safety function.

HBV

Classification Analysis Checklists

Classification Results:

		QL1	☐
PS1	☑	QL2	☑
PS2	☐	QL3	☐
		CQ	☐

System: **Waste Handling Building Ventilation System**

SSC Classified **Secondary Confinement Area Ventilation System**

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)] (Gwyn 2000).
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 equal to or greater than 100 mrem TEDE (Gwyn 2000).
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 that exceed regulatory limits. A dose calculation has not identified any Category 2 DBEs that could result in exceeding Category 2 regulatory dose limits without secondary confinement area filtration (CRWMS M&O 2000a, Table 9).
2.7	☐	☑ a.	Failure of this SSC as a result of a DBE will not compromise the ability of QL-1 High Waste Isolation Significant SSCs 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

HBV

Classification Analysis Checklists

Classification Results:

		QL1	☐
PS1	☑	QL2	☑
PS2	☐	QL3	☐
		CQ	☐

System: **Waste Handling Building Ventilation System**

SSC Classified **Tertiary Confinement Area Ventilation System**

SDD Reference: SDD-HBV-SE-000001 R1 ICN 1 Assumptions Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No		Rationale:
PS1	☑	☐	a	The waste handling building (WHB) tertiary confinement area ventilation system provides heating, ventilation and air conditioning to those WHB areas where the potential for radioactive contamination is low. The system maintains air flow paths and pressure zones that minimize the potential for spreading contamination. The system exhausts air through HEPA filters to an exhaust stack equipped with radiation monitors. The WHB tertiary confinement area ventilation system is not relied upon to mitigate the effects of MGR DBEs. The system provides 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 tertiary confinement area ventilation system does not directly result in loss of waste package containment or criticality control.
1.2	☐	☑		This 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). A dose calculation has determined that the bounding Category 1 DBE dose plus the yearly normal operations dose does not exceed the 100 mrem TEDE regulatory limit (Gwyn 2000, Attachment 1, pp 1-2). No dose calculation has not identified any Category 1 DBE in a tertiary zone.
1.3	☐	☑		The tertiary confinement area ventilation system is not required to prevent or mitigate a Category 2 DBE that could result in offsite doses that exceed regulatory limits. A dose calculation has not identified any Category 2 DBEs in tertiary confinement zones that could result in exceeding Category 2 regulatory dose limits without filtration (CRWMS M&O 2000a, Table 9).
1.4	☐	☑	a.	The tertiary confinement area ventilation system does not perform a waste isolation function.
	☐	☑	b.	

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

	Yes	No	Rationale:
2.1	☑	☐	Failure of the tertiary confinement ventilation system could result in offsite doses greater than 0.25 mrem per year. The system performs a radioactive waste management or control function for purposes of quality level determinations by containing possible airborne particulate contamination within air filters.
2.2	☐	☑	This SSC does not perform a fire protection function.
2.3	☐	☑	Failure of the tertiary confinement area ventilation system as a result of a DBE is not expected to result in an interaction with other QL-1 SSCs that impair their capability to perform their intended radiological safety function.

Classification Analysis Checklists

Classification Results:

		QL1	☐
PS1	☑	QL2	☑
PS2	☐	QL3	☐
		CQ	☐

System: **Waste Handling Building Ventilation System**

SSC Classified **Tertiary Confinement Area Ventilation System**

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)]. A dose calculation has determined that the bounding Category 1 DBE dose plus the yearly normal operations dose does not exceed 25 mrem (Gwyn 2000, Attachment 1, pp 1-2).
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 that exceed regulatory limits. A dose calculation has not identified any Category 2 DBEs that could result in exceeding Category 2 regulatory dose limits without tertiary filtration (CRWMS M&O 2000a, Table 9).
2.7	☐	☑	a.	Failure of this SSC as a result of a DBE will not compromise the ability of QL-1 High Waste Isolation Significant SSCs 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

HBV

Classification Analysis Checklists

Classification Results

		QL1	☐
PS1	☐	QL2	☐
PS2	☐	QL3	☐
		CQ	☑

System: **Waste Handling Building Ventilation System**

SSC Classified **Non-Confinement Area Ventilation System**

SDD Reference: SDD-HBV-SE-000001 R1 ICN 1 Assumptions Applicable to this Item: N/A

Pre-Screen - Importance to Safety or Waste Isolation Evaluation

	Yes	No		Rationale:
PS1	☐	☑	a	The Waste Handling Building (WHB) non-confinement area ventilation system provides heating, ventilation, and air conditioning to those WHB areas where there is no potential for radioactive contamination (e.g., offices, lunchrooms, clean maintenance areas). The system maintains the proper environmental conditions for equipment operation and personnel comfort. 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

HBV

Classification Analysis Checklists

Classification Results:

		QL1	☐
PS1	☐	QL2	☐
PS2	☐	QL3	☐
		CQ	☑

System: **Waste Handling Building Ventilation System**

SSC Classified **Non-Confinement Area Ventilation System**

	Yes	No		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