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ACRONYMS

BSC	Bechtel SAIC Company, LLC
CAD	computer-aided design
CHF	Canister Handling Facility
CR	Condition Report
HVAC	Heating, Ventilation and Air - Conditioning
SC	Safety Class
TBV	To be verified
VCZ	Ventilation Confinement Zone
WP	Waste Package

ABBREVIATIONS

None

1. PURPOSE

The purpose of this analysis is to establish the preliminary Ventilation Confinement Zone for the Canister Handling Facility (CHF). The results of this document will be used to determine the air quantities for each VCZ that will eventually be reflected in the development of the Ventilation Flow Diagrams.

The analyses contained in this document are developed by D & E / Mechanical HVAC and are intended solely for the use of the D & E / Mechanical HVAC in its work regarding Confinement Zoning Analysis for the Canister Handling Facility. Yucca Mountain Project personnel from D & E / Mechanical HVAC should be consulted before use of the analyses for purposes other than those stated herein or used by individuals other than authorized personnel in D & E / Mechanical HVAC.

2. QUALITY ASSURANCE

This technical product was prepared in accordance with AP-3.12Q, *Design Calculations and Analyses*. Surface Nuclear HVAC systems for the CHF have been classified as Non-SC in the Q-List (BSC 2005e); therefore, per procedure AP-3.13Q, *Design Control*, this document is not subject to the requirements of the *Quality Assurance Requirements and Description document (DOE 2004)*.

3. USE OF SOFTWARE

Computer software used, Microsoft Word 2000 and Microstation J (CAD), in this technical product is classified as exempt from procedure LP-SI.11Q-BSC, *Software Management* and is listed under Section 2.1, Software Not Subject To This Procedure.

4. INPUTS

4.1 DATA AND PARAMETERS

None

4.2 CRITERIA

4.2.1 Confinement Zoning versus Contamination Classification Correlation

Table 4.2-1 was developed to give a correlation between nuclear contamination classification and HVAC confinement classification.

Table 4.2-1 Ventilation Confinement Zoning and Contamination Classification Correlation

Contamination Characteristics	Confinement Classification ^a	Contamination Classification ^b
Normally Contaminated / High Levels of Contamination	Primary Confinement	C4/C5
High Potential	Secondary Confinement	C3
Low Potential / Normally Clean	Tertiary Confinement	C2
No Potential / Clean	Non-Confinement	C1

NOTES: ^a Project Design Criteria Document (BSC 2004a) Table 4.8.2-2

^b Classification of Radiation and Contamination Zones of Geological Repository Operations Area (BSC 2004b) and (BSC 2006e) (TBV 7142)

5. ASSUMPTIONS

5.1 BOUNDING ASSUMPTIONS

This calculation does not use bounding assumptions.

5.2 ASSUMPTIONS REQUIRING VERIFICATION

5.2.1 Canister Handling Facility Contamination Classifications First Floor Plan (TBV 7138)

It is assumed that the contamination classifications for the Canister Handling Facility at elevation 0'-0" are as shown in Revision B of this drawing.

Rational: The Contamination Classifications drawing 190-U00-AKRP-00201-000-00B is presently in Revision 00B (BSC 2005a). Since, this drawing is preliminary, it cannot be used as input. When this contamination classification drawing is issued for construction, contamination classification of the areas will be verified later (TBV 7138).

Where used: Section 6.2

5.2.2 Canister Handling Facility Contamination Classifications Second Floor Plan (TBV 7139)

It is assumed that the contamination classifications for the Canister Handling Facility at elevation 32'-0" are as shown in Revision B of this drawing.

Rational: The Contamination Classifications drawing 190-U00-AKRP-00202-000-00B is presently in Revision 00B (BSC 2005c). Since, this drawing is preliminary, it cannot be used as

input. When this contamination classification drawing is issued for construction, contamination classification of the areas will be verified later (TBV 7139).

Where used: Section 6.2

5.2.3 Canister Handling Facility Contamination Classifications Third Floor Plan (TBV 7140)

It is assumed that the contamination classifications for the Canister Handling Facility at elevation 64'-0" are as shown in Revision B of this drawing.

Rational: The Contamination Classifications drawing 190-U00-AKRP-00203-000-00B is presently in Revision 00B (BSC 2005d). Since, this drawing is preliminary, it cannot be used as input. When this contamination classification drawing is issued for construction, contamination classification of the areas will be verified later (TBV 7140).

Where used: Section 6.2

5.2.4 Canister Handling Facility Contamination Classifications Mezzanine Floor Plan (TBV 7141)

It is assumed that the contamination classifications for the Canister Handling Facility at elevation 16'-0" are as shown in Revision B of this drawing.

Rational: The Contamination Classifications drawing 190-U00-AKRP-00204-000-00B is presently in Revision 00B (BSC 2005b). Since, this drawing is preliminary, it cannot be used as input. When this contamination classification drawing is issued for construction, contamination classification of the areas will be verified later (TBV 7141).

Where used: Section 6.2

5.2.5 Site-Specific Cask/WP Loading Pits and Cask Preparation Pits (TBV 7176)

Site-Specific Cask/WP Loading Pits and Cask Preparation Pits are not shown on Canister Handling Facility Contamination Classifications drawing. The pits are located at lower elevation of Canister Transfer Area (elevation 0'-0") and are separated by lid cover. The pits are classified as Tertiary.

Rational: Future revision of the drawings will show Pits area and will indicate proper room number. Canisters are lifted and inserted into the WP or site-specific cask. This will expose pits to the Canister Transfer Area. Since, Canister Transfer Area is classified as Tertiary, it is reasonable to classify Pits as Tertiary.

Where used: Section 6.2

5.2.6 Canister Staging Pit (TBV 7176)

Canister Staging Pit is not shown on Canister Handling Facility Contamination Classifications drawing. The pit is located at lower elevation of Canister Transfer Area (elevation 0'-0") is separated by lid cover. The pit is classified as Non Confinement.

Rational: Future revision of the drawings will show Pit area and will indicate proper room number. The canisters are inside the tubes. HVAC system is designed such that air moves outside of tubes to remove heat and it does not come in contact with potential contamination inside the tubes. Therefore, it is reasonable to consider Canister Staging Pit as non-confinement zone.

Where used: Section 6.2

6. ANALYSIS

6.1 METHODOLOGY

6.1.1 Preliminary Ventilation Confinement Zoning

The preliminary ventilation confinement zoning is based on the contamination classification drawings by Radiological Engineering (BSC 2005a, BSC 2005b, BSC 2005c and BSC 2005d). The Contamination Classification is correlated to Confinement Zoning in Table 4.2-1.

6.2 VENTILATION CONFINEMENT ZONING CORRELATION

Table 6.2-1. Tertiary Confinement Zone

Room Names	Contamination Classification	References	Remarks
Site-Specific Cask/WP Loading Pit	C2		See Section 5.2.5
Site-Specific Cask/WP Loading Pit	C2		See Section 5.2.5
Cask Preparation Pit	C2		See Section 5.2.5
WP Positioning Cell	C2	BSC 2005a	
WP Cell	C2	BSC 2005c	
Gas Sampling	C2	BSC 2005a	
WP Transport Loadout	C2	BSC 2005a	
Canister Transfer	C2	BSC 2005a	
Crane Park	C2	BSC 2005c	
Crane Park	C2	BSC 2005c	
Tools/Parts	C2	BSC 2005a	
WP Positioning Cell	C2	BSC 2005a	
WP Cell	C2	BSC 2005c	
Closure Support	C2	BSC 2005a	

Room Names	Contamination Classification	References	Remarks
WP Loadout Galleries	C2	BSC 2005a	
Cart Recovery	C2	BSC 2005a	
Door Recovery	C2	BSC 2005a	
Canister Gallery	C2	BSC 2005a	
HVAC Filters	C2	BSC 2005a	
Closure Support	C2	BSC 2005a	
Cart Recovery	C2	BSC 2005a	
Door Recovery	C2	BSC 2005a	
HVAC Filters	C2	BSC 2005a	
HVAC	C2	BSC 2005a	
Closure Support	C2	BSC 2005c	
WP Gallery	C2	BSC 2005c	
HVAC	C2	BSC 2005c	
Closure Support	C2	BSC 2005c	
WP Gallery	C2	BSC 2005c	
HVAC	C2	BSC 2005c	
HVAC	C2	BSC 2005c	
Maintenance	C2	BSC 2005d	
Maintenance	C2	BSC 2005d	
Crane Maintenance	C2	BSC 2005d	
Crane Maintenance	C2	BSC 2005d	

Table 6.2-2: Non Confinement Zone

Room Names	Contamination Classification	References	Remarks
Canister Staging Pit	C1		See Section 5.2.6
HVAC	C1	BSC 2005a	
Electrical Rooms	C1	BSC 2005a	
Vestibule	C1	BSC 2005a	
Corridor	C1	BSC 2005a	
Support Areas	C1	BSC 2005a	
Stairs	C1	BSC 2005a	
Communication Center	C1	BSC 2005a	
Stairs	C1	BSC 2005a	
Stairs	C1	BSC 2005a	
Stairs	C1	BSC 2005a	
Walkway	C1	BSC 2005c	
Stairs	C1	BSC 2005a	

Room Names	Contamination Classification	References	Remarks
Vestibule	C1	BSC 2005a	
Corridor	C1	BSC 2005a	
Stairs	C1	BSC 2005a	
Stairs	C1	BSC 2005a	
Freight Elevator	C1	BSC 2005a	
Freight Elevator	C1	BSC 2005a	
Stack Monitoring Room	C1	BSC 2005a	
Impact Limiter Removal	C1	BSC 2005a	
Exit Vestibule	C1	BSC 2005a	
Support Area	C1	BSC 2005b	
Safeguard and Security	C1	BSC 2005b	
Break Room	C1	BSC 2005b	
Vending	C1	BSC 2005b	
Restrooms	C1	BSC 2005b	
Corridor	C1	BSC 2005b	
Stairs	C1	BSC 2005b	
Stairs	C1	BSC 2005b	
HVAC	C1	BSC 2005c	
Corridor	C1	BSC 2005c	
Vestibule	C1	BSC 2005c	
Corridor	C1	BSC 2005c	
Supplies	C1	BSC 2005c	
HVAC	C1	BSC 2005c	
HVAC	C1	BSC 2005c	
Restrooms	C1	BSC 2005c	
Corridor	C1	BSC 2005c	
Elevator	C1	BSC 2005c	
Stairs	C1	BSC 2005c	
Stairs	C1	BSC 2005c	
Stairs	C1	BSC 2005c	
Decontamination	C1	BSC 2005c	
Vestibule	C1	BSC 2005c	
Stairs	C1	BSC 2005c	
Stairs	C1	BSC 2005c	
Stairs	C1	BSC 2005c	
Vestibule	C1	BSC 2005c	
Vestibule	C1	BSC 2005c	
Decontamination	C1	BSC 2005c	
Unassigned	C1	BSC 2005d	Right of Vestibule elevation 64'-0"

Room Names	Contamination Classification	References	Remarks
Vestibule	C1	BSC 2005d	
Unassigned	C1	BSC 2005d	Below Crane Maintenance elevation 64'-0"
Freight Elevator	C1	BSC 2005d	
Stairs	C1	BSC 2005d	
Stairs	C1	BSC 2005d	
Freight Elevator	C1	BSC 2005d	
Stairs	C1	BSC 2005d	
Stairs	C1	BSC 2005d	

7. CONCLUSIONS

The following figures summarize the VCZ for the rooms listed in Table 6.2-1 and Table 6.2-2. The results are reasonable compared to the inputs and can be used for the intended use in the Ventilation Air calculation.

7.1 CONFINEMENT ZONING FIGURES

Figure 7.1-1: Confinement Zoning Ground Floor Plan (Elevation 0'-0")

LEGEND:		CONTAMINATION ZONES
SYMBOL		DESCRIPTION
C1		NON-CONTAMINATED AREA/NON-CONFINEMENT ZONE
C2		POTENTIAL CONTAMINATION AREA/TERTIARY CONFINEMENT ZONE
C3		CONTAMINATION AREA/SECONDARY CONFINEMENT ZONE
C4		HIGH CONTAMINATION AREA/PRIMARY CONFINEMENT ZONE
C5		AIRBORNE RADIOACTIVITY AREA/PRIMARY CONFINEMENT ZONE

Figure 7.1-2: Confinement Zoning Mezzanine Floor Plan (Elevation 16'-0")

Figure 7.1-4: Confinement Zoning Third Floor Plan (Elevation 64'-0")

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