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Discussion of Recovery-Driven Ventilation Changes and Regulatory Strategy

Presented to the EPA in Washington DC

October 9, 2014

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Contents for Discussion

- Provide update on Recovery-Driven Ventilation Changes Summary to the EPA
- Detailed Discussions on
  - Interim Ventilation
  - Supplemental Ventilation
  - Permanent Ventilation (New Shaft)

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Recovery-Driven Ventilation Changes Summary

Assumption: All potentially contaminated exhaust is HEPA filtered

- **Interim** – Two skid-mounted HEPA filters adding ~54,000 additional cfm to current 60,000 cfm system
  - · safety
  - · permit reg's
- **Supplemental** – increased flow in clean air circuit using an underground booster fan (preliminary design)
- **Permanent Shaft** – new shaft with new surface facilities for filtration and monitoring
  - · not part of recovery plan
  - · similar to HEPA/sampling station at current exhaust shaft

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Back-rad NESHAP at SRS

Standards that Apply

- 40 CFR Part 191, Subparts A & B
- 40 CFR Part 61, Subparts A & H
  - National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities
  - EPA determined that Subpart H is not applicable to WIPP
    - Subpart H exempts facilities subject to Part 191, Subpart B
    - 1998 memorandum confirms EPA's position
  - 1995 EPA/DOE MOU
    - DOE Policy that WIPP will implement the requirements of Subpart H

→ this is the driver

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Summary of Requirements

- 40 CFR 61.15
  - Increase in emissions is a modification
  - Modified source is a new source
- 40 CFR 61.96
  - If estimated effective dose equivalent (EDE) from modification is less than 0.1 mrem/yr and facility is in compliance, then the modification is exempt for Approval to Construct
- EPA 402-R-97-001
  - "Guidance For The Implementation of EPA's Standards for Management and Storage of Transuranic Waste (40 CFR Part 191, Subpart A) At the Waste Isolation Pilot Plant (WIPP)"
  - If estimated EDE from construction or modification is less than 0.25 mrem/yr, then prior notification is not required

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Summary of Requirements (continued)

Tom: What about accident assumptions
Charlie: Definition of member of public

- 40 CFR 61.93(f)
  - Monitoring/sampling requirements based on Potential EDE (normal operations assuming no control equipment)
    (all control devices fail)
- 40 CFR 61.93(e)
  - If estimated Potential EDE is greater than 0.1 mrem/yr then continuous sampling/monitoring
  - Otherwise periodic confirmatory measurements (reg does not specify)

? Ability to discontinue after a year

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Summary of Requirements (continued)

"Grandfathered method under Subpart H"
Alternative method under 1969 Standard (Pellettier letter)
EPA recognized ANSI 1999 in 2002

- 40 CFR 61.93(c)
  - New sources monitor/sample per ANSI/HPS N13.1-1999
  - Existing sources (not modified after 9/9/2002) monitor/sample per ANSI N13.1-1969
- EPA 402-R-97-001
  - Monitor/sample per ANSI N13.1-1969
- Methods in the 1999 version of N13.1 provide a more representative sample than the 1969 version

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Summary of Requirements (continued)

ANSI/HPS N13.1-1999 Example Graded Approach

PIC ~~Category~~ Potential Impact Category Level	Potential fraction of allowable limit	Based on 10 mrem limit (mrem/yr)	Sampling, monitoring and analysis requirements.
1	>0.5	5	Continuous sampling for retrospective analysis. Real time monitoring with alarm capability. Possible separate accident monitoring system.
2	>0.01 and ≤0.5	>0.1 and ≤5	Continuous sampling with retrospective off-line analysis.
3	>0.0001 and ≤0.01	>0.001 and ≤0.1	Periodic confirmatory sampling with off-line analysis.
4	≤0.0001	≤0.001	Annual administrative review.

DOE Limit

Stable → B, According to Appendix D

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INTERIM VENTILATION SYSTEM

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Interim Ventilation System

- Planned as part of the recovery operations
- Doubles the HEPA filtered ventilation
  - Add ~54,000 additional cfm
  - Result: an "increase in emissions" for Station B
  - Therefore a new source (40 CFR 61.15)
- Monitor at the existing Station B exhaust point

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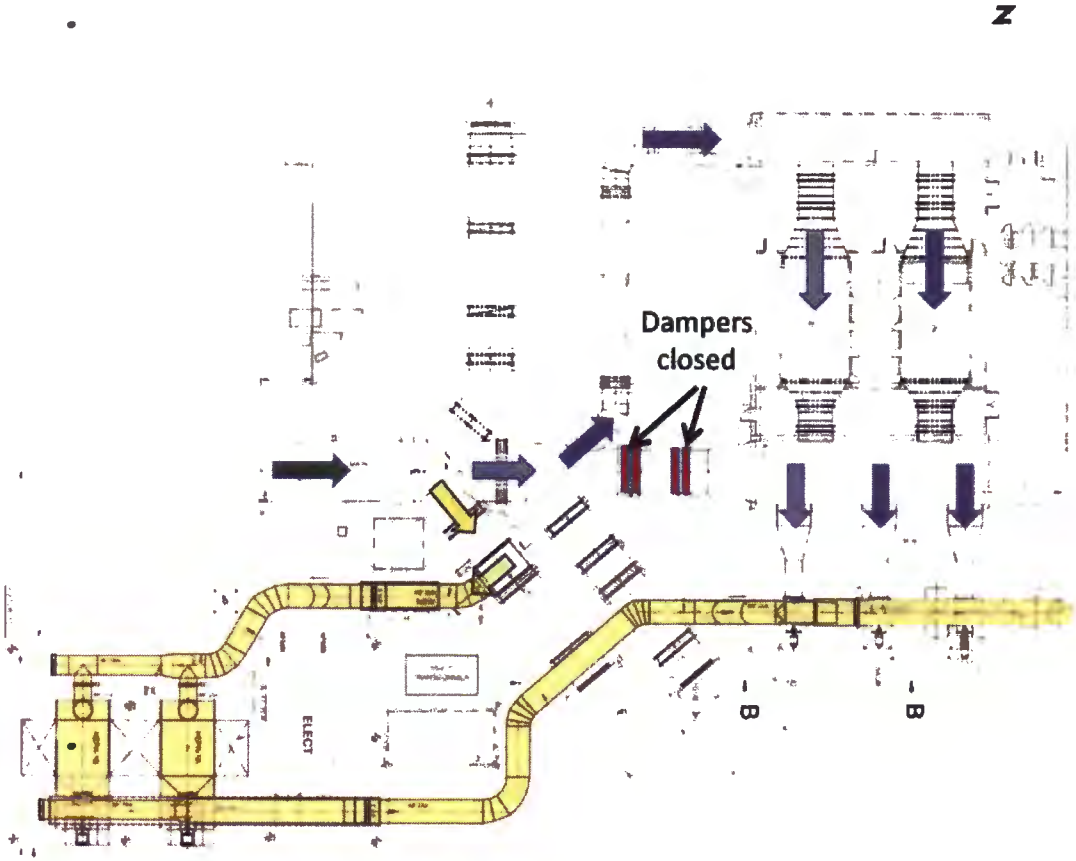
Preliminary Interim Ventilation

(Preliminary Plan View)



~54,000 additional cfm

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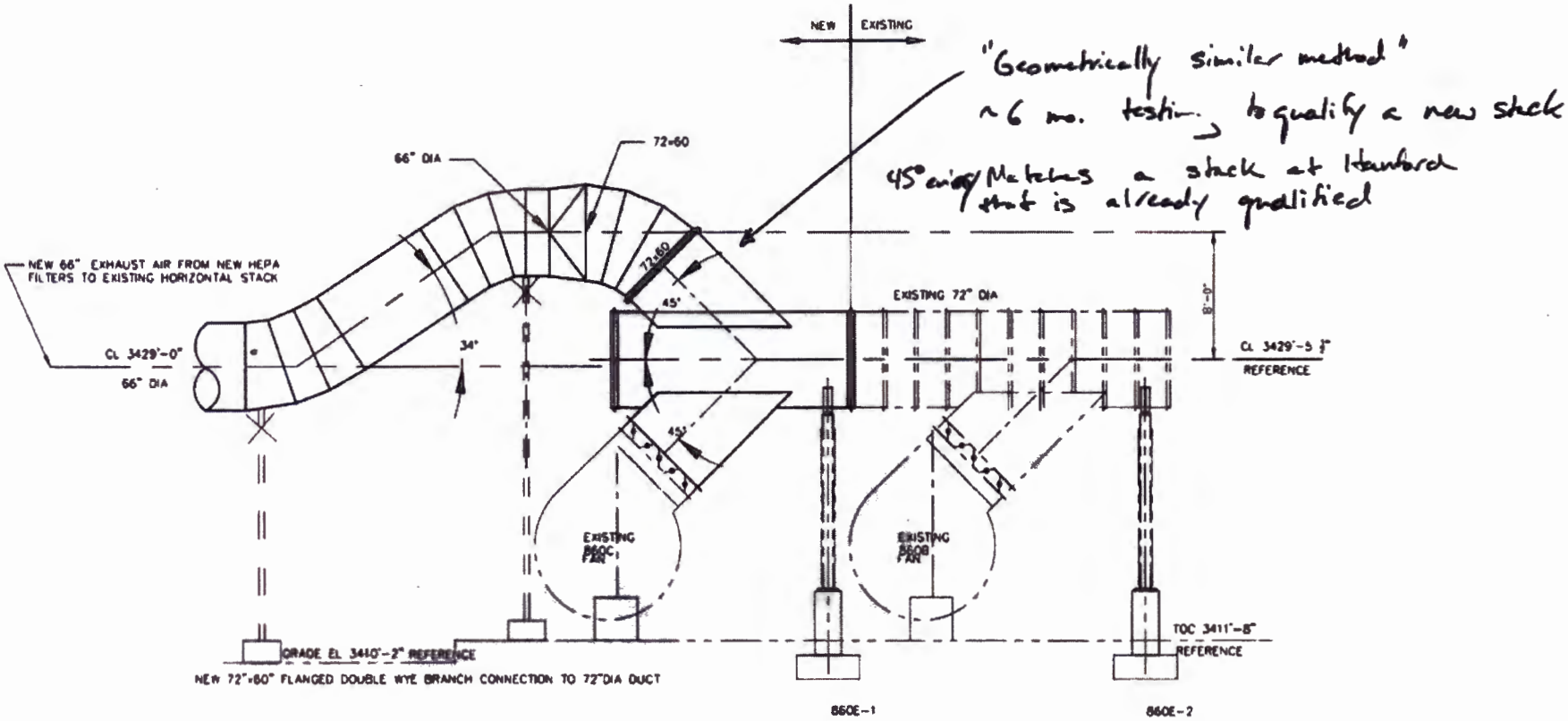
Preliminary Interim Ventilation

(Preliminary Section B - B)



B–B

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Regulatory Analysis

(Interim Ventilation)

Appendix D
· Inventory
· Throughput of "unsealed" materials

- Estimated EDE = 1E-04 mrem/yr per failed drum
  - 40 CFR 61 Appendix D Calculation
  - Exempt from Approval to Construct (40 CFR 61.96)

· physical state factor
· control factor

- Potential EDE = 1E-02 mrem/yr per failed drum
  - PIC 3 Source (with 10 mrem/yr Standard from 40 CFR 61 Subpart H)
  - Periodic Confirmatory Measurements

· 1 mrem/standards
(99% removal efficiency credit for HEPA)

- ANSI/HPS N13.1-1999 PIC 3 compliant sampling *System*
- ANSI/HPS N13.1-1999 PIC 3 compliant sampling *Location*

Tom: what is PEC of the ruptured drum?

Station B is currently PIC-1

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Three options to qualify the sampling location per ANSI/HPS N13.1-1999

1. **Geometrically Similar Design** (Selected Option) (low cost, low impact to schedule) ~$50K
2. **Scale Model Testing** (medium cost, high impact to schedule)
3. **Air Blender Option** (high cost, medium impact to schedule) ~$300K

   Would have required bigger fans to handle −ΔP

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Option #1
Geometrically Similar Design

- Design to conform to an existing model stack that has been qualified and is also geometrically similar
- Validate the installation per Section 5.2.2.2 of Standard: "The arithmetic difference between the velocity coefficient of variation (COV) in the proposed stack and the geometrically similar stack must be within 5%"
- Prepare a qualification report
- High probability of success
- The basis of Scale Model Testing (option 2)

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ANSI/HPS N13.1-1999 compliant Sampling System (PIC 3)

- Station B Probe meets the Aspiration Ratio (<1.5) and Transmission Ratio (0.8 to 1.3) criteria at all anticipated flow rates 1.08 ↓ 1.38 .97 ↓ 1.09
- Current system design minimizes sample loss (50% transmission of 10 μM particle limit)
- Sample flow rate continuously measured
- Exhaust flow rate continuously measured
- Evaluation against N13.1-1999 criteria in qualification report

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Compliance Activities for Interim Ventilation

Activity	Start Date	Finish Date	Duration (working days)	Comment
Select Design Option from Three Available Options	Completed		NA	Draft submitted for CBFO review on 8/16/2014.
Collect Data Needed to Qualify Station B and Prepare Draft Qualification Report	Completed		NA	This qualifies Station B for the increase in air flow in the filtration mode from 60,000 cfm to ~114,000 cfm. Tied to duct design; dimensions and distances.
Discuss Scope and Regulatory Approach with EPA Region 6 and ORIA	9/9/2014	12/1/2014	60	Defines a window to initiate discussions. First meeting – 10/9/2014
Perform Velocity COV Testing	4/2/2015	4/3/2015	1	Testing is tied to Startup Testing, but can be done once system is operational
Issue the Qualification Report to CBFO		4/24/2015	NA	Milestone

→ parallel process w/NMED

Planned Change Notice to NMED 9/2/14

Permit mod scheduled for 12/12 (ventilation reqs)

(260K annual average ventilation)

Would like EPA approval, but not legally required

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SUPPLEMENTAL VENTILATION SYSTEM

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Supplemental Ventilation

- Increased clean air circuit using an underground booster fan ~ 100k cfm
- Uses separate ventilation circuit for mining and maintenance
- Upcasting through Air Intake Shaft or Salt Shaft (one intake, one exhaust)
- Temporary system until Permanent Ventilation system is operational

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Supplemental Ventilation

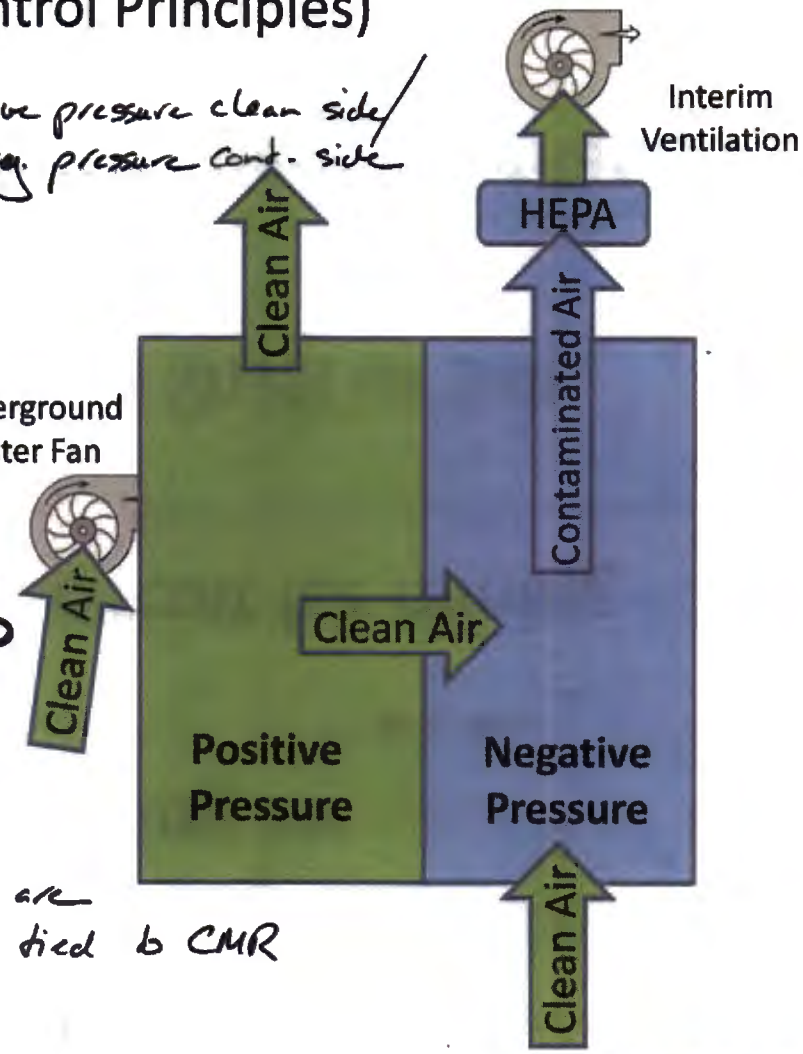
(Contamination Control Principles)

- Negative room pressure design principles
- Common design for contamination control at nuclear facilities
- Clean air circuit at positive pressure with respect to contaminated air side
- Engineering evaluating design considerations to monitor delta Pressure
- Use CAM to ensure no cross-contamination
- No source term

Positive pressure clean side / neg. pressure cont. side

Proposal in S-90, ~200

Steve: several CAMs are in the underground, tied to CMR



→ do we trust bulkhead configuration?

→ do we trust ΔP alarms?

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Regulatory Analysis

(Supplemental Ventilation)

Can have iCAM?
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- Estimated EDE <<< 1E-05 mrem/yr
  - Clean Air from uncontaminated activities
  - Exempt from Approval to Construct (40 CFR 61.96)
- Potential EDE <<< 1E-05 mrem/yr
  - PIC 4 Source (with 10 mrem/yr Standard form 40 CFR 61 Subpart H)
  - Administrative Review
    - Continuous Air Monitors (CAMs)
    - Delta Pressure indication being considered
- Continuous Sampling not required

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Compliance Activities for Supplemental Ventilation

Activity	Start Date	Finish Date	Duration (working days)	Comment
Discuss Scope and Regulatory Approach with EPA Region 6 and ORIA	9/9/2014	12/1/2014	60	Defines a window to initiate discussions. First meeting – 10/9/2014

Project teams have just started

RCRA - are there regulated materials in the clean air circuit?

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PERMANENT VENTILATION SYSTEM

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Permanent Ventilation

- New shaft with new surface facilities for filtration and monitoring (potentially return to clean facility)
- SNL to conduct an Impact Analysis of the new shaft on long term repository performance
- DOE to submit PCN to EPA to mine ~~a~~ (2) new access drift and to drill shaft - ~ half-mile drift, ~ S-90, W-2500
- DOE to submit a second PCN to EPA for new surface filtration and monitoring systems

Sandia is working on Impact Analysis

2 PCNs - two drifts + one shaft
- surface facilities

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Compliance Activities for Permanent Ventilation

Activity	Start Date	Finish Date	Duration (working days)	Comment
Discuss Scope and Regulatory Approach with EPA Region 6 and ORIA	9/8/2014	7/24/2017		Defines a window to initiate discussions. First meeting – 10/9/2014
SNL to Conduct a Impact Analysis	8/15/2014	11/17/2014	61	
Submit PCN to ORIA to Mine New Access Drift and Drill Shaft		2/19/2015	NA	Milestone
Submit PCN to EPA ORIA for New Surface Filtration and Monitoring Systems		11/30/2015	NA	Milestone

Nick: is this a Class 2 (<) or 3 permit mod (2 mo. vs. 3 years)

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Summary

- Continue design, installation and startup of the Interim Ventilation System
- Select approach for the Supplemental Ventilation system to allow for clean air exhaust and reduce the spread of underground contamination
- Impact Analysis for Permanent Ventilation

Shaft in 2017/2018
no earlier than 2016

Russ: drift in 2016
Shaft in 5/17, to 6/18

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