AGENDA
MEETING WITH NMED
JUNE 20, 1997

LOCATION: NMED Offices—Runnels Building, Santa Fe, NM
TIME: 9:30am

INTRODUCTION

PURPOSE OF MEETING

PRESENTATION OF STATUS OF THE MANAGEMENT OF UNDERGROUND WATER AT THE WIPP

DISCUSSION
Legend
Completed Excavation 10/23/92
Planned Excavation

Notes
1. Mine coordinates in feet from the center of the salt handling shaft
2. Contour interval = 1 foot
3. Contour elevations are above sea level contour

Figure B-11
Plan View of the Underground Showing Midheight Centers of Underground Disposal Area at the Orange Marker Band Relative to Sea Level
WIPP SAR

FIGURE 4.3-1. Waste Shaft and Waste Hoist Equipment Arrangements
January 1983
Management of Brine in the WIPP Underground: Status Report

New Mexico Environment Department
Harold Runnels Building
June 20, 1997
Purpose

• Bring the NMED up to date on what has transpired since the shaft liner leak was identified

  - Salt cake on probes at Station A
  - Increased flow in the Waste Shaft Sump
  - June '95 newspaper articles on the WIPP “leak”
  - September 1995 meeting with NMED
  - December 1996 conference call with NMED

June 20, 1997
Purpose

• Provide current status of activities to manage brine
  – brine collection
  – brine analysis
  – liner leak mitigation
  – brine disposition
Plan View of WIPP Underground Facility

June 20, 1997
Schematic Drawing WIPP Exhaust Shaft and Waste Shaft

June 20, 1997
Historical Summary
Sources of Water in the U/G

- Shaft leakage prior to grouting 1985
  - small volume leak
  - water used for dust control
- Concrete curing in the WHB/WS 1985
  - used for dust control
Historical Summary
Sources of Water in the U/G

- Air Intake Shaft 1989 - 1994
  - Flushing of the upreaning bit (progress was slowed by worn cutter bits) ~ 20,000 gallons
  - ceased using water for dust control (1992)
    - Inflow from water bearing strata prior to grouting (first large quantity of water pumped from the underground) 1990
Historical Summary
Sources of Water in the U/G

- Air Intake Shaft (cont.)
  - Prior to grouting, water was pumped into a "frac" tank — tested before disposal
  - Emergency permit to discharge into the salt pile evaporation pond

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Historical Summary of Water Pumped
(continued)

- Evaporation cell added to WIPP sewage lagoon for discharge of non-hazardous brines

- Discharge Permit (DP-831) obtained from NMED Groundwater Protection Bureau

must meet MCL's

June 20, 1997
Historical Summary of Water Pumped

• 1993 - No Records: quantities were generally small

• 1994 - 5,850 gallons: drought/full fan operations

• 1995 - 11,660 gallons
  • reduced fan operations
  • drought ending
  • increase in volume caused additional sampling

• 1996 - 10,373 gallons

• 1997 - 6,012 gallons \textit{to date}

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Water Sources

- Condensation
- Liner Leakage
Condensation

- Can produce large quantities but only during summer when relative humidity is high.
- Intake air contribution may reach 75% to 95% of water introduced when surface relative humidity is high, depending on amount of diesel equipment in use. Underground weather stations measure relative humidity.
Liner Leakage

- Small, consistent flow first noted May, 1995, during a video inspection of the ES. It may not reach shaft bottom except when ventilation flow rate is low or condensation rate is high. $\text{estimate } \sim \frac{1}{2} \text{ gallon/min}$
- Leakage is not significant compared to normal mine operations - simply adds to water balance.
- Ventilation reduced on weekends starting October 1994.
- Indications of moisture in shaft were observed as salt build-up on Station A probe.
Liner Leakage

Possible Sources - Fresh water not identified yet

- Precipitation infiltration
- Establishment of local recharge areas
- Domestic water line leakage

in a trench, since many lead to exhaust shaft.

Fire line is pressurized, pumps cycle on/off to maintain pressure - indicate minor leak
Exhaust Shaft Liner Leakage

- Catchment basin installed on 3/12/96 to facilitate operational efficiency to prevent brine from reaching WS sump in large volumes.
- At installation, there was no indication that catchment basin brine would contain Pb at hazardous levels.
Description of Catchment Basin

- High density polyethylene (HDPE) plastic
- 250 mil thick
- 19’ wide x 28’ long x 1’ deep - segmented
- Deflection shield connects the two segments as well as diverts condensation droplets away from the seam and into either side (500 mil thick)
- Welds visually leak detected by vacuum and soap solution &/or a spark tester

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Assembled Catchment Basin

- LIFT HOLE
- ATTACHED SIDE DEFLECTOR 2X
- CENTER DEFLECTOR

NOTE:
INTERNAL AND OR EXTERNAL SUPPORTS ALLOWED AS REQUIRED BY CONTRACTOR DESIGN
Plan View with Relationship to the Exhaust Shaft
Elevation View of Catchment Basin

- CABLE ATTACHMENTS
- DETAIL A
- SIDE DEFLECTOR
- DETAIL B
- 10'-0"
- 20'-0"
Detail of Catchment Basin

**Detail A**
CATCHMENT BASIN MODULE

**Detail B**
CENTER REFLECTOR SHIELD
Lead

- First noted any lead in WS Sump - August, 1993
  - no sampling in 94 (drought)
- First detected hazardous levels in WS Sump of Pb in February, 1995
- Discussed with NMED on 9/1/95 trip to Santa Fe.
- First detected hazardous levels of lead in ES catchment basin in May 1996

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Lead Sources

- Lead as impurity in galvanizing zinc on chain link mesh used for support.

- *Analysis of Corrosion Testing Results from Galvanized Mesh Material Obtained from the Waste Isolation Pilot Plant, New Mexico* (DOE/WIPP 96-2212)

  Lead/Zinc ratios indicate high probability that lead leached from galvanized shaft support material.

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The Lead/Zinc Ratio's Relationship with Boron

- High concentrations of boron indicate indigenous Salado Formation brine as in the case of Borehole EE37B

- Graph indicates Pb/Brine in ES basin WS sump and proximate boreholes are comprised of non-indigenous brine, i.e., brine results from inflow of condensation.
Lead/Zinc Ratios as a Function of Boron

- E0
- E-1
- E-2
- E-3
- E-4
- E-5

Boron (mg/L)

Range of Pb/Zn for digested mesh

Range of Pb/Zn for DI water bath
denititied

Range of Pb/Zn for NaCl corrosion solution

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Current Activities

• Brine
  - Removed on a weekly basis, checked daily
  - Managed under DP-831
  - Disposed of as hazardous waste - all of it

• Leak
  - Preparing de-watering holes
  - Investigating cause - drilled 3 holes to determine location of water, flow directions
    - will drill more "upstream" holes
dewater by pumping

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Current Activities

- Part B Permit Application - Changes to Corrective Action Chapter
  - closed ES Sump SWMU
  - added ES Catchment Basin
  - revised description to WS sump SWMU

- Increased fan usage
  - 3rd fan for reliability
Summary

• Managing brine to minimize impacts on operations
• Investigating source of water leaking through liner
• Disposing of all brine as hazardous waste
Summary

• If NMED has any questions or concerns please contact us
  – Kevin Donovan at 234-8325
  – Craig Snider at 234-7452
  – Cooper Wayman at 234-7329
  – Gloria Barnes at 234-8383
  – Bob Kehrman at 234-8690
  – Wille Most at 234-8961

• If the public raises issues which we can help resolve, please contact any of the above

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