ENTERED

Allen, Pam, NMENV

From: Kliphuis, Trais, NMENV
Sent: Monday, February 06, 2012 10:39 AM
To: Allen, Pam, NMENV
Subject: FW: Typographic corrections
Attachments: Typo Corrections 2-6-2012.pdf

For the record.... Thanks.

Oh, should I give you the CD or leave it with the admin staff?

From: Kliphuis, Trais, NMENV
Sent: Monday, February 06, 2012 10:35 AM
To: 'farok.sharif@wipp.ws'; 'edward.ziemianski@wipp.ws'
Cc: 'McCauslin, Susan - DOE'; 'Chavez, Rick - RES'; 'Basabilvazo, George - DOE'; Kieling, John, NMENV; Kliphuis, Trais, NMENV
Subject: Typographic corrections

Dear Messrs. Ziemianski and Sharif:

Attached is a letter addressing the correction of several typographic errors in the WIPP permit issued January 31, 2012. Our color copier has been out of service for several days and thus the attached copy does not show colors. A hard copy will be mailed that includes a CD with the electronic version of the corrected permit sections and the website versions will be updated by COB today.

If you have any questions, please feel free to contact me.

Trais Kliphuis
WIPP Staff Manager
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive E, Building 1
Santa Fe, New Mexico 87505

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SUSANA MARTINEZ
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Lieutenant Governor

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ENVIRONMENT DEPARTMENT

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DAVE MARTIN
Secretary

BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 6, 2012

Edward Ziemianski, Acting Manager
Carlsbad Field Office
Department of Energy
P. O. Box 3090
Carlsbad, New Mexico 88221-3090

M. Farok Sharif
Washington TRU Solutions LLC
P. O. Box 2078
Carlsbad, New Mexico 88221-5608

RE: CORRECTION OF TYPOGRAPHIC ERRORS FOR CLASS 2 MODIFICATION REQUEST ISSUED JANUARY 31, 2012, WIPP HAZARDOUS WASTE FACILITY PERMIT EPA I.D. NUMBER NM4890139088

Dear Messrs. Ziemianski and Sharif:

On January 31, 2012 the New Mexico Environment Department (NMED) issued a final decision the Class 2 permit modification. NMED has since been notified and has identified several non-substantive typographical errors to the modified permit.

Enclosed are the revised pages of the modified permit in redline-strikeout to help identify the corrections. Enclosed is an electronic version in CD format of the corrected permit. An electronic version of the corrected permit has also been posted for the public on the Department's WIPP Information Page at http://www.nmenv.state.nm.us/wipp/download.html

Please contact Trais Kliphuis at (505) 476-6051 or via e-mail at trais.kliphuis@state.nm.us if you have questions or need additional information.

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

Enclosures:
Redline/strikeout pages showing corrections
Electronic version of corrected permit dated January 31, 2012

cc: C. de Saillan, NMED OGC
Trais Kliphuis, HWB
Don Hancock, SRIC

PART 1 - GENERAL PERMIT CONDITIONS

1.1. AUTHORITY

This Permit is issued pursuant to the authority of the Secretary of the New Mexico Environment Department (**Secretary**) under the New Mexico Hazardous Waste Act (**HWA**), NMSA 1978, §§74-4-1 through 74-4-14, in accordance with the New Mexico Hazardous Waste Management Regulations (**HWMR**), 20.4.1 NMAC.

Pursuant to the Resource Conservation and Recovery Act (**RCRA**), 42 U.S.C. §§6901 to 6992k, and 40 CFR Part 271 and Part 272 Subpart GG, the State of New Mexico, through the Secretary, is authorized to administer and enforce the state hazardous waste management program under the HWA in lieu of the federal program.

This Permit contains terms and conditions that the Secretary has determined are necessary to protect human health and the environment, pursuant to 20.4.1.900 NMAC (incorporating 40 CFR §270.32(b)(2)).

Any violation of a condition in this Permit may subject the Permittees or their officers, employees, successors, and assigns to:

1) A compliance order under §74-4-10 of the HWA or §3008(a) of RCRA (42 U.S.C. §6928(a));

2) An injunction under §74-4-10 of the HWA or §3008(a) of RCRA (42 U.S.C. §6928(a)), or §7002(a) of RCRA (42 U.S.C. §6972(a));

3) Civil penalties under §§74-4-10 and 74-4-10.1 of the HWA or §§3008(a) and (g) of RCRA (42 U.S.C. §§6928(a) and (g)), or §7002(a) of RCRA (42 U.S.C. §6972(a));

4) Criminal penalties under §74-4-11 of the HWA or §§3008(d), (e), and (f) of RCRA (42 U.S.C. §§6928(d), (e), and (f)); or

5) Some combination of the foregoing.

The list of authorities in this paragraph is not exhaustive and the Secretary reserves the right to take any action authorized by law to enforce the requirements of this Permit.

1.2. EFFECT OF PERMIT

The Secretary issues this Permit to the United States Department of Energy (**DOE**), the owner and co-operator of the Waste Isolation Pilot Plant (**WIPP**) (EPA I.D. Number NM4890139088), and Washington TRU Solutions LLC, Management and Operating Contractor (**MOC**), the co-operator of WIPP. This Permit authorizes DOE and MOC (**the Permittees**) to manage, store, and dispose contact-handled (**CH**) and remote-handled (**RH**) transuranic (**TRU**) mixed waste at WIPP, and establishes the general and specific standards for these activities, pursuant to the HWA and HWMR.

Prior to disposal of TRU mixed waste in a newly constructed Underground HWDU, the Permittees shall comply with the certification requirements specified in Permit Section 1.5.11.

4.5.3. Repository Operation

4.5.3.1. Underground Traffic Flow

The Permittees shall restrict and separate the ventilation and traffic flow areas in the underground TRU mixed waste handling and disposal areas from the ventilation and traffic flow areas for mining and construction equipment, except that during waste transport in W-30, ventilation need not be separated north of S-1600.

The Permittees shall designate routes for the traffic flow of TRU mixed waste handling equipment and construction equipment as required by Permit Attachment A4 (Traffic Patterns), Section A4-4, "Underground Traffic." These routes will be recorded on a mine map that is posted in a location where persons entering the underground can read it. Whenever the routes are changed, the map will be updated. Maps will be available in facility files until facility closure.

4.5.3.2. Ventilation

The Permittees shall maintain a minimum running annual average mine ventilation exhaust rate of 260,000 standard ft^3/min and a minimum active room ventilation rate of 35,000 standard ft^3/min in each active room where waste disposal is taking place and workers are present in the room, as specified in Permit Attachment A2, Section A2-2a(3), "Subsurface Structures (Underground Ventilation System Description)" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)).

4.5.3.3. Ventilation Barriers

The Permittees shall construct ventilation barricades in active Underground HWDUs to restrict the flow of mine ventilation air through full disposal rooms, as specified in Permit Attachment A2, Section A2-2a(3), "Subsurface Structures (Underground Ventilation System Description)" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)).

4.6. MAINTENANCE AND MONITORING REQUIREMENTS

The Permittees shall maintain and monitor the Underground HWDUs as specified by the following conditions and as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.601 and 264.602):

4.6.4. Mine Ventilation Rate Monitoring

4.6.4.1. Implementation of Mine Ventilation Rate Monitoring Plan

The Permittees shall implement the Mine Ventilation Rate Monitoring Plan specified in Permit Attachment O (WIPP Mine Ventilation Rate Monitoring Plan) until the certified closure of all Underground HWDUs and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602 and §264.601(c)).

4.6.4.2. Reporting Requirements

The Permittees shall report to the Secretary annually in October the results of the data and analysis of the Mine Ventilation Rate Monitoring Plan.

4.6.4.3. Notification Requirements

The Permittees shall calculate the running annual average mine ventilation exhaust rate on a monthly basis. In addition, the Permittees shall evaluate compliance with the minimum active room ventilation rate specified in Permit Section 4.5.3.2 on a monthly basis. The Permittees shall report to the Secretary in the annual report specified in Permit Section 4.6.24.2 whenever the evaluation of the mine ventilation monitoring program data identifies that the ventilation rates specified in the Permit Section 4.5.3.2 have not been achieved.

4.6.5. Hydrogen and Methane Monitoring

4.6.5.1. Implementation of Hydrogen and Methane Monitoring

The Permittees shall implement the Hydrogen and Methane Monitoring Plan specified in Permit Attachment N1 (Hydrogen and Methane Monitoring Plan).

4.6.5.2. Reporting Requirements

The Permittees shall report to the Secretary semi-annually in April and October the data and analysis of the Hydrogen and Methane Monitoring Plan.

4.6.5.3. Notification Requirements

The Permittees shall notify the Secretary in writing, within seven calendar days of obtaining validated analytical results, whenever the concentration of hydrogen or methane in a filled panel exceeds the action levels specified in Table 4.6.5.3 below.

quality at each DMW specified in Table 5.3.1 to the background groundwater quality determined pursuant to Permit Section 5.6, in compliance with the statistical procedures specified in Permit Section 5.9.1, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.98(f)).

5.9.4. Data Evaluation Timeframe

The Permittees shall perform the data evaluations specified in Permit Section 5.9.3 within 120 calendar days after completion of DMP sampling, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.98(f)(2)).

5.10. RECORDKEEPING AND REPORTING

5.10.1. Operating Record Requirements

The Permittees shall enter all DMP monitoring, testing, and analytical data in the operating record as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.73(b)(6)). The Permittees shall enter these data, as measured and in a form appropriate for the determination of statistically significant evidence of contamination, into the operating record as specified in Permit Section 5.9.1 and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.98(c)).

5.10.2. Submittal of Results

5.10.2.1. Data Evaluation Results

The Permittees shall submit to the Secretary the analytical results required by Permit Sections 5.5.1 and 5.9.2, and the results of the statistical analyses required by Permit Section 5.9.3, in the Annual Culebra Groundwater Report by November 30 of each year as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.97(j)).

Analytical results of a sampling round may be included in the report specified in Permit Section 5.10.2.3 if publication of the report coincides with the 120 calendar day report submittal schedule.

5.10.2.2. Groundwater Surface Elevation Results

The Permittees shall submit to the Secretary groundwater surface elevation data specified in Permit Section 5.7. This submittal shall include both groundwater surface elevations calculated from field measurements and fresh-water head elevations calculated as specified in Permit Attachment L, Section L-4c(1). Water level data shall be submitted reported semiannually by- May 31 and November 30within 30 calendar days after data are collected. The November water level data report shall be combined with the Annual Culebra Groundwater Report specified in Permit Part 5.10.2.3.~~Water level data shall be submitted within 30 calendar days after data are collected.~~

5.10.2.3. Groundwater Flow and Radionuclide Sampling Results

The Permittees shall submit to the Secretary an evaluation of the ~~ground-water~~groundwater flow data (to include annotated hydrographs) specified in Permit Section 5.8 ~~and the results of radionuclide-specific analysis of groundwaters sampled from the DMWs~~ in the Annual Culebra Groundwater ~~Site Environmental~~ Report ~~by October 1~~ by November 30 of each calendar year.

~~The Permittees shall submit to the Secretary an evaluation of the groundwater flow data specified in Permit Section 5.8 and the results of radionuclide-specific analysis of groundwaters sampled from the DMWs in the Annual Site Environmental Report by October 1 of each calendar year.~~

5.10.3. Determination of Contamination

If the Permittees determine, pursuant to Permit Section 5.9 and 20.4.1.500 NMAC (incorporating 40 CFR §264.98(g)), that there is statistically significant evidence of contamination for any hazardous constituent specified in Table 5.4.b, the Permittees shall comply with the following:

5.10.3.1. Notification

The Permittees shall notify the Secretary in writing within seven calendar days, indicating what hazardous constituents have shown statistically significant evidence of contamination, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.98(g)(1)).

5.10.3.2. Appendix IX Sampling

The Permittees shall immediately, but no later than one month, sample the groundwater in all DMWs specified in Table 5.3.1 for which there was statistically significant evidence of contamination. The remaining DMWs shall be sampled within two months after statistically significant evidence of contamination is found in any DMW. All DMWs shall be sampled to determine the concentration of all substances identified in 20.4.1.500 NMAC (incorporating 40 CFR §264 Appendix IX), as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.98(g)(2)).

5.10.3.3. Verification Sampling

As specified by 20.4.1.500 NMAC (incorporating 40 CFR §264.98(g)(3)), for any substances found in the initial analysis pursuant to power is returned. As specified in Part 2, all waste handling equipment will "fail safe," meaning that it will retain its load during a power outage.

Underground Ventilation Normal Mode Redundancy

The underground ventilation system has been provided redundancy in normal ventilation mode by the addition of a third main fan. Ductwork leading to that new fan ties into the existing main exhaust duct.

Electrical System

The WIPP facility uses electrical power (utility power) supplied by the regional electric utility company. If there is a loss of utility power, TRU mixed waste handling and related operations will cease.

Backup, alternating current power will be provided on site by two 1,100-kilowatt diesel generators. These units provide 480-volt power with a high degree of reliability. Each of the diesel generators can carry predetermined equipment loads while maintaining additional power reserves. Predetermined loads include lighting and ventilation for underground facilities, lighting and ventilation for the TRU mixed waste handling areas, and the Air Intake Shaft hoist. The diesel generator can be brought on line within 30 minutes either manually or from the control panel in the Central Monitoring Room (CMR).

Uninterruptible power supply (**UPS**) units are also on line providing power to predetermined monitoring systems. These systems ensure that the power to the radiation detection system for airborne contamination, the local processing units, the computer room, and the CMR will always be available, even during the interval between the loss of off-site power and initiation of backup diesel generator power.

A2-2a(4) RH TRU Mixed Waste Handling Equipment

The following are the major pieces of equipment used to manage RH TRU mixed waste in the geologic repository. A summary of equipment capacities is included in Table A2-3.

The Facility Cask Transfer Car

The Facility Cask Transfer Car is a self-propelled rail car (Figure A2-14) that operates between the Facility Cask Loading Room and the geologic repository. After the Facility Cask is loaded, the Facility Cask Transfer Car moves onto the waste shaft conveyance and is then transported underground. At the underground waste shaft station, the Facility Cask Transfer Car proceeds away from the waste shaft conveyance to provide forklift access to the Facility Cask.

Horizontal Emplacement and Retrieval Equipment or Functionally Equivalent Equipment

The Horizontal Emplacement and Retrieval Equipment (**HERE**) or functionally equivalent equipment (Figure A2-15) emplaces canisters into a borehole in a room wall of an Underground HWDU. Once the canisters have been emplaced, the HERE then fills the borehole opening with a shield plug.

mudstone, claystone, siltstone, and interbedded sandstone (see Amended Renewal Application Addendum L1, Section L1-1c(6) ~~Application~~ (DOE, 2009)). This formation forms a 500-ft- (152-m) thick barrier of fine-grained sediments that retard the downward percolation of water into the evaporite units below. The Bell Canyon is the first water-bearing unit below the repository (see Amended Renewal Application Addendum L1, Section L1-1c(2) (DOE, 2009)) and is confined above by the thick evaporite deposits of the Castile. It consists of 1,200 ft (366 m) of interbedded sandstone, shale, and siltstone.

The Salado was selected to host the WIPP repository for several reasons. First, it is regionally extensive, underlying an area of more than 36,000 square mi (mi^2) (93,240 square kilometers [km^2]). Second, its permeability is extremely low. Third, salt behaves mechanically in a plastic manner under pressure (the lithostatic pressure at the disposal horizon is approximately 2,200 pounds per square inch [$lb/in.^2$] or 14.9 megapascals [MPa]) and eventually deforms to fill any opening (referred to as creep). Fourth, any fluid remaining in small fractures or openings is saturated with salt, is incapable of further salt dissolution, and has probably remained in place since deposition. Finally, the Salado lies between the Rustler and the Castile (Figure L-4), which contain very low permeability layers that help confine and isolate waste within and keep water outside of the WIPP repository (see Amended Renewal Application Addendum L1, Section L1-1c(5) and L1-1c(3) (DOE, 2009)).

L-1a(2) Groundwater Hydrology

The general hydrogeology of the area surrounding the WIPP facility is described in this section starting with the first geologic unit below the Salado. Addendum L1, Section L1-2a of the Amended Renewal Application (DOE, 2009) provides more detailed discussions of the local and regional hydrogeology. Relevant hydrological parameters for the various rock units above the Salado at WIPP are summarized in Table L-1.

L-1a(2)(i) The Castile

The Castile is a basin-filling evaporite sequence of sediments surrounded by the Capitan Reef. The Castile represents a major regional groundwater aquitard that effectively prevents upward migration of water from the underlying Bell Canyon. Fluid present in the Castile is very restricted because evaporites do not readily maintain pore space, solution channels, or open fractures at depth. Drill-stem tests conducted in the Castile during construction of the WIPP facility determined its permeability to be lower than detection limits; however, the hydraulic conductivity has been conservatively estimated to be less than 10^{-8} ft (3×10^{-9} m) per day. A description of the Castile brine reservoirs outside the WIPP facility area is provided in Addendum L1, Section L1-2a(2)(b) of the Amended Renewal Application (DOE, 2009).

L-1a(2)(ii) The Salado

The Salado is an evaporite sequence that filled the remainder of the Delaware Basin and lapped extensively over the Capitan Reef and the back-reef sediments beyond. The Salado consists of approximately 2,000 ft (610 m) of bedded halite, with interbeds or seams of anhydrite, clay, and polyhalite. It acts hydrologically as a regional confining bed. The porosity of the Salado is very low and naturally interconnected pores are probably nonexistent in halite at the depth of the disposal horizon. Fluids associated with the Salado occur mainly as very small fluid inclusions in the halite crystals and also occur between crystal boundaries (interstitial fluid) of the massive crystalline salt formation; fluids also occur in clay seams and anhydrite beds. Permeabilities

Potentiometric surfaces and groundwater flow directions defined for the Culebra prior to large-scale pumping in the WIPP facility area and the excavation of WIPP facility shafts suggests that flow was generally to the south-southeast from the waste disposal and shaft areas (Mercer, 1983; Davies, 1989). Potentiometric surface maps of the Culebra adjusted for density differences show very similar characteristics. The wells used for measuring the potentiometric surface of the Culebra are measured monthly and listed in Table L-4.

L-3b(1) Detection Monitoring Well Construction Specification

Diagrams of the six DMP wells are shown in Figures L-7 through L-12. Detailed descriptions of geology and construction methods may be found in DOE 1995.

The six DMP Culebra wells were drilled between September 13 and October 16, 1994. The total depth of each well is shown in Table L-5. The wells were drilled through the Culebra ~~and~~ into the Los Medaños as shown in Table L-5. The wells were drilled to the top of the Culebra using compressed air as the drilling fluid and a 9⅞-in. drill bit. The wells were then cored using a 5¼-in. core bit to cut 4-in. (0.1-m) diameter core to total depth. See Table L-5 for the drilling and coring intervals for each well. After coring, DMP wells were reamed to 9⅞ -in. (0.3 m) in diameter to total depth. After reaming, wells were cased from the surface to total depth with 5-in. (0.1-m) (0.28-in. [0.7-centimeter (cm)] wall) blank fiberglass casing with in-line 5-in.- (0.1-m) diameter fiberglass 0.02-in. (0.1-cm) slotted screen across the Culebra interval as shown in Table L-5 . The annulus between the borehole wall and the casing/screen is packed with sand and with 8/16 Brady gravel as indicated in Table L-5.

L-4 Monitoring Program Description

The WIPP DMP has been designed to meet the groundwater monitoring requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.90 through 264.101). The following sections of the monitoring plan specify the components of the DMP.

L-4a Monitoring Frequency

Groundwater surface elevations will be monitored in each of the six DMWs on a monthly basis. The groundwater surface elevation in each DMW will also be measured prior to each annual sampling event. The groundwater surface elevation measurements in the WLMP wells will also be monitored on a monthly basis when accessible. The characteristics of the DMW (sampling frequency, location) will be evaluated if significant changes are observed in the groundwater flow direction or gradient.

L-4b Analytical Parameters and Hazardous Constituents

The parameters listed in Part 5, Table 5.4.a and hazardous constituents listed in Part 5, Table 5.4.b are measured as part of the DMP.

Additional hazardous constituents may be identified through changes to the list of hazardous waste numbers authorized for disposal at the WIPP facility. If hazardous constituents are identified, these will be added to Part 5, Table 5.4.b, unless the Permittees provide justification for their omission (e.g. hazardous constituent not in 40 CFR §264 Appendix IX), and this omission is approved by NMED.

Head distribution in the Culebra (see Amended Renewal Application Addendum L1 (DOE, 2009)) is consistent with basin-scale groundwater basin modeling results indicating that the generalized groundwater flow direction in the Culebra is currently north to south. However, the fractured nature of the Culebra, coupled with variable fluid densities, can cause localized flow patterns to differ from general flow patterns.

Groundwater levels in the Culebra in the region around the WIPP facility have been measured in numerous wells. Water-level rises have been observed and are attributed to causes discussed in the Renewal Application Addendum L1, Section L1-2a(3)(a)(ii) (DOE, 2009). The extent of water-level rise observed at a particular well depends on several factors, but the proximity of the observation point to the cause of the water-level change appears to be a primary factor.

Hydrological investigations conducted from 2003 through 2007 provided new information, some of it confirming long-held assumptions and some offering new insight into the hydrological system around the WIPP site. A Culebra monitoring network optimization study was completed by McKenna (2004) and updated by Kuhlman (2010) to identify locations where new Culebra monitoring wells would be of greatest value and to identify wells that could be removed from the network with little loss of information.

As discussed in Amended Renewal Application Addendum L1, Section L1-2a(3)(a)(ii) (DOE, 2009), extensive hydrological testing has been performed in the new wells. This testing has involved both single well tests, which provide information on local transmissivity and heterogeneity, and long-term (19 to 32 days) pumping tests that have created observable responses in wells up to 5.9 mi (9.5 km) away.

Inferences about vertical flow directions in the Culebra have been made from well data collected by the Permittees. Beauheim (1987) reported flow directions towards the Culebra from both the underlying Los Medaños Member (**Los Medaños**) of the Rustler and the overlying Magenta Member (**Magenta**) of the Rustler across the WIPP site, indicating that the Culebra acts as a drain for the units around it. This is consistent with results of basin-scale groundwater modeling.

Use of water from the Culebra in the WIPP facility area is quite limited because of its varying yields and high salinity. The Culebra is not used for water supply in the immediate WIPP facility vicinity. Its nearest use is approximately 7 mi (11 km) southwest of the WIPP facility, where salinity is low enough to allow its use for livestock watering.

L-2 General Regulatory Requirements

Because geologic repositories such as the WIPP facility are defined under the Resource Conservation and Recovery Act (**RCRA**) as land disposal facilities and as miscellaneous units, the groundwater monitoring requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.600 through 264.603) shall be addressed. The requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.90 through 264.101) apply to miscellaneous unit treatment, storage, and disposal facilities (**TSDF**) only if groundwater monitoring is needed to satisfy 20.4.1.500 NMAC (incorporating 40 CFR §§264.601 through 264.603) environmental performance standards.

The New Mexico Environment Department (**NMED**) has concluded that groundwater monitoring in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264 Subpart F) at the WIPP

Potentiometric surfaces and groundwater flow directions defined for the Culebra prior to large-scale pumping in the WIPP facility area and the excavation of WIPP facility shafts suggests that flow was generally to the south-southeast from the waste disposal and shaft areas (Mercer, 1983; Davies, 1989). Potentiometric surface maps of the Culebra adjusted for density differences show very similar characteristics. The wells used for measuring the potentiometric surface of the Culebra are measured monthly and listed in Table L-4.

L-3b(1) Detection Monitoring Well Construction Specification

Diagrams of the six DMP wells are shown in Figures L-7 through L-12. Detailed descriptions of geology and construction methods may be found in DOE 1995.

The six DMP Culebra wells were drilled between September 13 and October 16, 1994. The total depth of each well is shown in Table L-5. The wells were drilled through the Culebra ~~and~~ into the Los Medaños as shown in Table L-5. The wells were drilled to the top of the Culebra using compressed air as the drilling fluid and a 9⅞-in. drill bit. The wells were then cored using a 5¼-in. core bit to cut 4-in. (0.1-m) diameter core to total depth. See Table L-5 for the drilling and coring intervals for each well. After coring, DMP wells were reamed to 9⅞ -in. (0.3 m) in diameter to total depth. After reaming, wells were cased from the surface to total depth with 5-in. (0.1-m) (0.28-in. [0.7-centimeter (cm)] wall) blank fiberglass casing with in-line 5-in.- (0.1-m) diameter fiberglass 0.02-in. (0.1-cm) slotted screen across the Culebra interval as shown in Table L-5 . The annulus between the borehole wall and the casing/screen is packed with sand and with 8/16 Brady gravel as indicated in Table L-5.

L-4 Monitoring Program Description

The WIPP DMP has been designed to meet the groundwater monitoring requirements of 20.4.1.500 NMAC (incorporating 40 CFR §§264.90 through 264.101). The following sections of the monitoring plan specify the components of the DMP.

L-4a Monitoring Frequency

Groundwater surface elevations will be monitored in each of the six DMWs on a monthly basis. The groundwater surface elevation in each DMW will also be measured prior to each annual sampling event. The groundwater surface elevation measurements in the WLMP wells will also be monitored on a monthly basis when accessible. The characteristics of the DMW (sampling frequency, location) will be evaluated if significant changes are observed in the groundwater flow direction or gradient.

L-4b Analytical Parameters and Hazardous Constituents

The parameters listed in Part 5, Table 5.4.a and hazardous constituents listed in Part 5, Table 5.4.b are measured as part of the DMP.

Additional hazardous constituents may be identified through changes to the list of hazardous waste numbers authorized for disposal at the WIPP facility. If hazardous constituents are identified, these will be added to Part 5, Table 5.4.b, unless the Permittees provide justification for their omission (e.g. hazardous constituent not in 40 CFR §264 Appendix IX), and this omission is approved by NMED.

Prior to collecting the final samples, the collection team shall consider the analyses to be performed so that proper shipping or storage containers can be assembled. Table L-6 presents the sample containers, volumes, and holding times for laboratory samples collected as part of the DMP.

The monitoring system will use dedicated pumping systems and sample collection lines from the sampled formation to the well head.

Sample integrity will be ensured through appropriate decontamination procedures. Laboratory glassware will be washed after each use with a solution of nonphosphorus detergent and deionized (DI) water and rinsed in DI water. Sample containers will be new, certified clean containers that will be discarded after one use. Groundwater surface elevation measurement devices will be rinsed with fresh water after each use. Non-dedicated sample collection manifold assemblies will be rinsed in accordance with SOPs after each use. The exposed ends will be capped off during storage. Prior to the next use of the sampling manifold, it will be rinsed a second time with DI water and a rinsate blank sample will be collected to verify cleanliness.

Water samples will be collected at atmospheric pressure using either the filtered or unfiltered sampling lines. Detailed protocols, in the form of SOPs (see Table L-3) define how final samples will be collected in a consistent and repeatable fashion for analyses.

Final samples will be collected in the appropriate type of container for the specific analysis to be performed. The samples will be collected in new and unused glass and plastic containers (refer to Table L-6). For each parameter analyzed, a sufficient volume of sample will be collected to satisfy the volume requirements of the analytical laboratory (as specified by laboratory SOPs). This includes an additional volume of sample water necessary for maintaining quality control standards. All final samples will be treated, handled, and preserved as required for the specific type of analysis to be performed. Details about sample containers, preservation, and volumes required for individual types of analyses are found in the applicable SOPs generated, approved, and maintained by the contract analytical laboratory.

Final samples will be sent to the analytical laboratories and analyzed for parameters and hazardous constituents specified in Part 5, ~~table~~ Tables 5.4a and 5.4b.

Duplicates of the final sample will be provided to WIPP Project oversight agencies when requested.

Wastes resulting from the sampling and field analysis of groundwater are disposed of in accordance with the WIPP SOPs (see Table L-3).

L-4c(2)(iv) Sample Preservation, Tracking, Packaging, and Transportation

Many of the chemical constituents measured by the DMP are not chemically stable and require preservation and special handling techniques. Samples requiring acidification will be treated as requested by the analytical laboratory.

The analytical laboratory receiving the samples will prescribe the type and amount of preservative, the container material type, the required sample volumes that shall be collected, and the shipping requirements. This information will be recorded on the Final Sample Checklist for use by field personnel when final samples are being collected. The Permittees will follow the

EPA "RCRA Ground-Water Monitoring Technical Enforcement Guidance Document," Table 4-1 (EPA, 1986), when laboratory SOPs do not specify sample container, volume, or preservation requirements. WIPP SOPs (see Table L-3) provide instructions to ensure proper sample preservation and shipping.

The sample tracking system at the WIPP facility uses uniquely numbered chain of custody/ request for analysis (CofC/RFA) forms. The primary consideration for storage or transportation is that samples shall be analyzed within the prescribed holding times for the analytes of interest. WIPP SOPs (see Table L-3) provides instructions to ensure proper sample tracking protocol.

L-4c(2)(v) Sample Documentation and Custody

To ensure the integrity of samples from the time of collection through reporting date, sample collection, handling, and custody shall be documented. Sample custody and documentation procedures for sampling and analysis activities are detailed in WIPP facility SOPs (see Table L-3).

Standardized forms used to document samples will include sample identification numbers, sample labels, custody tape, the sample tracking data, and CofC/RFA form. An example form is shown in Figure L-13.

Sample Numbers and Labels

A unique sample identification number will be assigned to each sample sent to the laboratory for analysis. The sample identification numbers will be used to track the sample from the time of collection through data reporting. Every sample container sent to the laboratory for analysis will be identified with a label affixed to it. Sample label information will be completed in indelible ink and will contain the following information: sample identification number with sample matrix type; sample location; analysis requested; time and date of collection; preservative(s), if any; and the sampler's name or initials.

Custody Seals

Custody seals will be used to detect unauthorized sample tampering from collection through analysis. For example, custody seals that are adhesive-backed strips are destroyed when removed or when the container is opened. The seal will be dated, initialed, and affixed to the sample container in such a manner that it is necessary to break the seal to open the container. Seals will be affixed to sample containers in the field immediately after collection. Upon receipt at the laboratory, the laboratory custodian will inspect the seal for integrity; a broken seal will invalidate the sample.

Sample Identification and Tracking

Sample tracking information will be completed for each sample collected. The sample tracking information includes the following information: CofC/RFA form number; date sample(s) were sent to the lab; laboratory name; acknowledgment of receipt or comments; well name and round number. Sample codes will indicate the well location; the geologic formation where the water was collected from, the sampling round number; and the sample number. The code is broken down as follows:

L-7a(2)(i) Accuracy

Accuracy is the closeness of agreement between a measurement and an accepted reference value. When applied to a set of observed values, accuracy is a combination of a random component and a common systematic error (bias) component. Measurements for accuracy will include analysis of calibration standards, laboratory control samples, matrix spike samples, and surrogate spike recoveries. The bias component of accuracy is expressed as percent recovery (%R). Percent recovery is expressed as follows:

$$\%R = \frac{(measured\ sample\ concentration)}{true\ concentration} \times 100$$

L-7a(2)(i)(A) Accuracy Objectives for Field Measurements

Field measurements will include pH, Specific Conductance (SC), temperature, specific gravity and static groundwater surface elevation. Field measurement accuracy will be determined using calibration ~~check~~ standards. Thermometers used for field measurements will be calibrated to the National Institute for Standards and Technology (**NIST**) traceable standard on an annual basis to ensure accuracy. Accuracy of groundwater surface elevation measurements will be checked before each measurement period by verifying calibration of the device within the specified schedule. WIPP document WP 13-1 outlines the basic requirements for field equipment use and calibration. WIPP facility SOPs contains instructions that outline protocols for maintaining current calibration of groundwater surface elevation measurement instrumentation.

L-7a(2)(i)(B) Accuracy Objectives for Laboratory Measurements

Analytical system accuracy will be quantified using the following laboratory accuracy QC checks: calibration standards, laboratory control samples (**LCS**), laboratory blanks, matrix and surrogate spike recoveries. Single LCSs and matrix spike and surrogate spike sample analyses will be expressed as %R. Laboratory analytical accuracy is parameter dependent and will be prescribed in the laboratory SOP.

L-7a(2)(ii) Precision

Precision is the agreement among a set of replicate measurements without assumption or knowledge of the true value. Precision data will be derived from duplicate field and laboratory measurements. Precision will be expressed as relative percent difference (**RPD**), which is calculated as follows:

$$RPD = \frac{|(measured\ value\ sample\ 1 - measured\ value\ sample\ 2)|}{average\ of\ measured\ samples\ 1 + 2} \times 100$$

L-7a(2)(ii)(A) Precision Objectives for Field Measurements

Specific conductance, pH, and temperature will be measured during well purging and after sampling. SC measurements will be precise to ±10% pH to 0.10 standard unit, specific gravity to 0.01 by hydrometer and temperature to 0.10 degrees Celsius (°C). Water-level measurements will be precise to ± 0.01 ft. The precision of water density measurements, when measured in the

The use of an average value of 730 hours per month in the monthly average calculation is reasonable, given that all the numbers involved are very large and that the final use of the monthly average flow is in an annual calculation.

O-3c Active ~~Disposal~~ Room Minimum Airflow

O-3c(1) Verification of Active Room Minimum Airflow

Whenever workers are present, the Permittees shall verify the minimum airflow through active room(s) where waste disposal is taking place of 35,000 scfm at the start of each shift, any time there is an operational mode change, or if there is a change in the ventilation system configuration.

O-3c(2) Measurement and Calculation of the Active Room Airflow

The Permittees shall measure the airflow rate and use the room cross-sectional area to calculate the volume of air flowing through a disposal room. The measurement of airflow shall use a calibrated anemometer and a moving traverse (McPherson, 1993). Airflow measurements shall be collected at an appropriate location, chosen by the operator to minimize airflow disturbances, near the entrance of each active room. The excavation dimensions at the measurement location are taken and the cross-sectional area is calculated. The flow rate is the product of the air velocity and the cross-section area. The value shall be entered on a log sheet (see Table O-3) and compared to the required minimum. The format and content of the log sheet may vary, but will always contain the data and information shown on Table O-3. Working values are in acfm and the conversion to scfm is described in section O-1 above. Measurements shall be collected, recorded, and verified by qualified operators.

The operator shall compare the recorded acfm value with the minimum acfm value provided at the top of the log sheet. The airflow shall be re-checked and recorded whenever there is an operational mode change or a change in ventilation system configuration. Once the ventilation rate has been recorded and verified to be at least the required minimum, personnel access to the room is unrestricted in accordance with normal underground operating procedures. If the required ventilation rate cannot be achieved, or cannot be supported due to operational needs, access to the room shall be restricted. Those periods when active disposal room access is restricted shall be documented on the log sheet for that active disposal room. Entry to restricted access active rooms for the purpose of establishing normal ventilation is allowed. Such entry shall be documented on the log sheet including a reference to the SOP used for reentry,

O-3d Quarterly Verification of Total Mine Airflow

The Permittees shall perform a quarterly verification of the total mine airflow to ensure that rates established by the Test and Balance for various operational modes are reasonably maintained. These checks are identified in Permit Attachment E, Table E-1, and are performed as indicated in Table E-1.

O-4 Equipment Calibration and Maintenance

Equipment used for the periodic Test and Balance, quarterly flow verification checks, and daily verification of active disposal room flow rate shall be calibrated in accordance with appropriate WIPP calibration and data collection procedures. Work performed by subcontractors shall also