



Department of Energy

Carlsbad Area Office
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Carlsbad, New Mexico 88221

May 23, 1997



Mr. Benito J. Garcia, Chief
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044-A Galisteo Street
Santa Fe, NM 87505

Subject: Final Response to NMED Letter of April 29, 1997: Modeling and Parameter Selection Information

Dear Mr. Garcia:

This letter includes the third and final portion of the information you requested in your letter of April 29, 1997. This information supplements the material previously supplied to the NMED relative to the WIPP RCRA Part B Permit Application. In your letter, you stated that certain additional information was needed by the NMED in order to determine if the DOE's application is administratively and technically complete with regards to the information requirements of 20 NMAC 4.1 Subpart V Section 264.601. This request is in regards to certain material found in the No-Migration Variance Petition (NMVP) and the Compliance Certification Application (CCA). Additionally, you stated the WIPP Land Withdrawal Act Amendment (LWAA) has adversely impacted the Bureau's permitting activities and will impact the timeliness of issuing the draft permit. I am disappointed at this last statement since we specifically requested a meeting in October 1996, to discuss the LWAA and its impact on the permitting process. Your reply at that time was that the change in the WIPP LWA would not affect your permitting activities.

The DOE believes that a complete application was submitted on April 12, 1996, and that the LWAA did not change that fact. To this end, the DOE is providing a copy of a checklist (Enclosure 1) developed to demonstrate that all of the essential elements for compliance to 20 NMAC 4.1 Subpart V Section 264.601 are present in the application. However, we understand your need to place certain documents in the Administrative Record to supplement the information in the application and to support our demonstration of compliance to the environmental performance standards of 20 NMAC 4.1 Subpart V Section 264.601.

The DOE is complying with your request and anticipates that this will accelerate the timely issuance of a draft permit and avoid any unnecessary delays; therefore, the following documents are transmitted for placement into the administrative record:



1. Chapter 8 from the NMVP,
2. Chapters 4, 6, and 8 from the CCA,
3. Appendices BIR, BRAGFLO, PAR, and WCA from the CCA,
4. References from the CCA dealing with the BSEP and one dealing with brine injection, and
5. Submissions No. 3 and 4 of DOE's responses to EPA ORIA Completeness Comments.

The following items have previously been determined by the DOE to be necessary for your review of the permit application and have been submitted to the NMED. These are already in the record and are not being resubmitted:

1. Appendix MASS, Attachment 8-2 from the CCA is in Appendix D16 (Section D16-9) of the Permit Application and
2. Appendix SEAL of the CCA was submitted to the NMED by DOE in October 1996 as a replacement for Appendix I2 of the permit application.

Additionally, since the NMED has requested the aforementioned material, the DOE suggests the following enclosed information also be placed in the administrative record:

1. Appendix SCR from the NMVP, which addresses the screening of natural features, events and processes that were either excluded from the modeling due to low consequence for low probability or were included in the development of the conceptual model of repository performance.
2. Appendix AIC from the CCA, which updates Appendix I4 in the Permit Application. This update was necessitated by the preparation of the CCA.

Many of the documents you requested are from the CCA. As you are aware, the information in the CCA may not directly correlate with the information used in the modeling in the permit application for the following reasons:

- The CCA and the RCRA Part B Permit Application were prepared to satisfy fundamentally different regulations, one addressing radionuclide contaminants, the other addressing hazardous constituents. The fundamental differences are evident in the approaches to modeling (probabilistic versus deterministic) and in the predominance of pathways (water versus air). In addition, other factors such as

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solubility and waste-contaminant-backfill-rock-brine interactions greatly influence the outcomes of the models.

- The CCA imposes the analysis of human intrusion on the disposal system, regardless of how effective the DOE believes the active and passive controls over the facility will be.
- The time periods are significantly different for the demonstration of compliance with the CCA extending for 10,000 years after closure, compared to the post closure care period modeled for the RCRA Part B permit application.

Because of these differences, you are urged to use caution in extending the information from the CCA to the modeling documented in the permit application.

If you have any questions regarding this supplemental information, please call Mr. Craig Snider of my staff at 234-7452.

Sincerely,


George E. Dials
Manager

Mr. Benito J. Garcia

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cc w/encl:
C&C File

cc w/o encl:
M. McFadden, CAO
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K. Donovan, WID

ENCLOSURE 1

Checklist of Information Needs for the RCRA Subpart X Modeling

Information Need	Addressed in Chapter-Section
Facility Description	
Name of facility and address of facility	Part A
Name of owner/operator	Part A
Anticipated period of operation	B-Introduction
Location map	Figure B-18
Detailed site plan	Figures B-2 and B-6
Aerial surveys	Figure B-1
Advantages/disadvantages of location	B-3, Appendix D1 and D6
Evaluation of disposal unit	
Design description	D-9, Appendix D2
Design performance projection	D-9, Appendix D2
Materials specifications	D-9a(1), Appendix D1
Detailed drawings and specifications	Appendix D3
Documentation of unit construction	Appendix D3
Documentation of unit operation	D-10
Closure plans	I, Appendix I1 and I2
Post-closure plans	I, Appendix I1 and I2
Design QA/QC demonstration (testing and inspection)	Appendix D6
Facility operation QA/QC demonstration	D-10
Waste Characteristics	
Waste type by name	C-1b
Processes that produced the waste	C-1b
Hazardous properties	C-2
Physical and chemical characteristics	C-2
Constituents and percentages of constituents	C-2
Analytical methods and results	C-4a

Information Need	Addressed in Chapter-Section
Projection of waste volume to be disposed	Part A
Frequency of disposal	D-10
Period of time waste has been and will be disposed	D-10
Handling procedures	D-10a(3)
Liquid phase mobility information	C-1b
Gas/particulate mobility	C-1b
Solid phase mobility	C-1b
Dust generation potential	C-1b
Gas-liquid phase interactions	C-1b
Persistence/degradation potential in unit and environment	D-9, Appendix D11
QA/QC demonstration	C-1b, C-4
Waste/waste compatibility, interaction, reaction products	Appendix C1
Assessment of biodegradation potential	Appendix D11
Site Characterization	
Surficial geology and soils	Appendix D6 Section D6-1c(10)
Bedrock geology	
Stratigraphy and lithology	Appendix D6 Section D6-1c
Seismic activity of area	Appendix D6 Section D6-4
Assessment of ground motion potential and degree	Appendix D6 Section D6-4
Geologic cross-sections	Appendix D6 Section D6-1c
Degree of bedrock faulting and fracturing	Appendix D6 Section D6-1e
Rock characterization	Appendix D6 Section D6-5
Groundwater hydrology	
Water table map	Appendix D6 Section D6-2a
Seasonal variations in the water table	Appendix D6 Section D6-2a ^a
Identification of all aquifers and aquitards	E, Appendix D6 Section D6-2a
Characterization of all aquifers	E, Appendix D6 Section D6-2a
Vertical and horizontal hydraulic conductivity	Appendix D6 Section D6-2a

Information Need	Addressed in Chapter-Section
Aquifer interconnection	Appendix D6 Section D6-2a
Description of groundwater monitoring program	D-10d, Appendix D18
Monitoring QA/QC documentation	Appendix D6 and D18
Surface-water hydrology	
Location of all watersheds	Appendix D6 Section D6-2b
Map of drainage patterns	Appendix D6 Section D6-2b
Meteorology/climatology	
Wind rose	Figure D-13
Wind Data	Appendix D10
Monitoring Plan	
Media to be monitored	D-10d(1), Appendix D5, D18, and D20
Type of monitoring to be conducted at the unit	D-10d(1), Appendix D5, D18, and D20
Location of monitoring stations	D-10d(1), Appendix D5, D18, and D20
Frequency of monitoring at each station	D-10d(1), Appendix D5, D18, and D20
Specific hazardous chemicals to be monitored	D-10d(1), Appendix D5, D18, and D20
Implementation schedule for the monitoring program	D-10d(1), Appendix D5, D18, and D20
Equipment used at the monitoring stations	D-10d(1), Appendix D5, D18, and D20
Sampling and analytical techniques employed	D-10d(1), Appendix D5, D18, and D20
Data recording/reporting procedures	D-10d(1), Appendix D5, D18, and D20
Waste Mobility	
Unsaturated zone soils^c	
Soil samplings	Appendix D6 and D16
Soil testing	Appendix D6 and D16
Unsaturated zone physical properties^c	
Volumetric water content	D-9b(1)(b)(l), Appendix D1 and D6
Degree of water saturation	D-9b(1)(b)(l), Appendix D1 and D6
Bulk density	D-9b(1)(b)(l), Appendix D1 and D6

Information Need	Addressed in Chapter-Section
Pressure potential	D-9b(1)(b)(l), Appendix D1, D6, and D16
Relative permeability	D-9b(1)(b)(l), Appendix D1, D6, and D16
Unsaturated hydraulic conductivity	D-9b(1)(b)(l), Appendix D1, D6, and D16
Water capacity	Appendix D16 ^b
Leachate characteristics affecting mobility	
Leachate characterization	D-9b(1)(c) ^c
Evaluation of transport mechanisms	D-9b(1)(c) ^c
Evaluation of fate of contaminants in unsaturated zone	D-9b(1)(c) ^c
Vapor concentration of constituents at the source	D-9b(4), Appendix D9
Vapor pressure of constituents	D-9b(4), Appendix D9
Solubility data for constituents	D-9b(1)(c) ^c
Activity coefficients	D-9b(1)(c) ^c
Henry=s Law constant	D-9b(1)(c) ^c
Background measurements for air	Appendix D15 and D21
Assessment of volatilization potential	Appendix D9 and D12
Modeling Evaluation	
Model accounts for all transport mechanisms	D-9b
Model appropriate for waste	D-9b
Data input accurate and verified	D-9b, Appendix D10 and D16
Model tested under field conditions ^l	D-9b, Appendix D10 and D16
Limitations of model	D-9b(1)(c)
Model inputs adequately documented	Appendix D10 and D16
Model outputs appropriate and reasonable	D-9b, Appendix D10 and E1
Assessment of Environmental Risk	
Identification of all exposure pathways and routes	D-9b
Identification /Assessment of potential receptors	D-9b(1)(c)(l)

Information Need	Addressed in Chapter-Section
Uncertainty Analysis	
Natural events	
Climatic fluctuations	Appendix D1 and D6
Glaciation	Appendix D1 and D6
Stream erosion	Appendix D1 and D6
Magmatic activity	Appendix D1 and D6
Epeirogenic displacement	Appendix D1 and D6
Orogenic diastrophism	Appendix D1 and D6
Diagenesis	Appendix D1 and D6
Static fracturing	Appendix D1 and D6
Dissolution	Appendix D1 and D6
Sedimentation	Appendix D1 and D6
Flooding	Appendix D1 and D6
Undetected features (i.e., faults, lava tubes)	Appendix D1 and D6
Meteorites	Appendix D1 and D6
Fires	Appendix D1 and D6
Hurricanes	Appendix D1 and D6 ^d
Tornadoes	Appendix D1, D2, and D6
Earthquakes	Appendix D1, D2, and D6
Ground motion	Appendix D1, D2, and D6
Waste-induced or facility-induced events	
Chemical effects	Appendix C1
Mechanical effects	D-9b
Modification of hydrologic regime	D-9b ^e
Human-induced events	
Intrusions	I-2a(1), Appendix I4
Perturbation of groundwater system	I-2a(1), Appendix I4

^a During the operational phase and post-closure care period, the WIPP facility will not be affected by seasonal variations in water table.

^b Water (or field) capacity is addressed indirectly in the modeling: two-phase flow properties (e.g., residual brine saturation) and effective porosities used in the model are related to the field capacity of porous media.

- c Modeling shows that insufficient brine is available to form leachate.
- d The region in which the WIPP facility is located has no history of hurricanes.
- e Discussion is limited to the disturbed rock zone (DRZ) in the underground.