NMED Request for Modeling and Parameter Selection Information
May 16, 1997
9:00 a.m. - 12:00 noon

AGENDA

- Regulatory Requirements for 40 CFR Part 264 Subpart X Modeling
- Checklist of Information Needs for RCRA Subpart X Modeling
- NMED Clarification of Request for Additional Information
- Comparison of CCA vs. NMVP

MAY 16, 1997 MEETING NMED/DOE/WESTINGHOUSE

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Susan McMichael	NMED (OGC)	827-2990	
Ed Kelley	NMED/WIPP	827-2855	
Karen Day	Westinghouse	234-8720	
Bob Kehrman	Westinghouse	234-8390	
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Gloria Barnes	Westinghouse	234-8383	
Benito J. Garcia	NMED/HRMB	827-1557	
Teri Davis	NMED/HRMB	827-1558	
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WIPP F 6

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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

COPY

April 29, 1997

Mr. George Dials, Manager
Carlsbad Area Office
Department of Energy
P. O. Box 3090
Carlsbad, New Mexico 88221

Mr. Joe Epstein, General Manager
Westinghouse Electric Corporation
P.O. Box 2078
Carlsbad, New Mexico 88220

Dear Messrs. Dials and Epstein:

RE: Request for WIPP modeling and parameter selection information
EPA I.D. Number NM4890139088

The New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau (HRMB) is developing a draft permit based upon the RCRA Part B Permit Application (DOE/WIPP 91-005, Revision 6) submitted by the Department of Energy (DOE) and Westinghouse (WID) for the Waste Isolation Pilot Plant (WIPP) on April 12, 1996. Subsequent updates were submitted May 29, 1996, editorial page changes were submitted June 3, 1996, and a revised groundwater monitoring plan was submitted on March 20, 1997. The permit will address the management of transuranic mixed waste in portions of the Waste Handling Building and the adjacent parking lot, and the disposal of this waste into an underground miscellaneous unit.

The WIPP Land Withdrawal Act Amendments (LWAA, Public Law 104-201) exempted under federal law all WIPP-designated transuranic mixed waste from treatment standards and land disposal prohibitions promulgated pursuant to the Solid Waste Disposal Act. Besides rendering the Final No-Migration Variance Petition (DOE/CAO-96-2160) superfluous, the LWAA also adversely impacted HRMB's permitting activities and, as a result, will impact the timeliness of issuing a draft permit. The RCRA Part B permit application was predicated on EPA Office of Solid Waste's (OSW) full and favorable evaluation of the No-Migration Variance Petition. In order to demonstrate compliance with 20 NMAC 4.1, Subpart V, §264.601, the applicants directly relied upon technical data and assumptions which were presumably substantiated in the Petition, but only summarized in the RCRA Part B permit application, such as Chapter E and Appendix E1. Following the exemption, OSW ceased all work on the Petition. However, as our legal staff has discussed with the applicants' legal counsel, NMED does not believe the exemption alleviates the need for DOE/WID to demonstrate "Protection of human health and the environment [including]...prevention of any releases that may have adverse effects on human health and the environment..." as required in §264.601.

As a consequence, HRMB must obtain and evaluate additional supporting technical information to determine whether the application is administratively complete and technically adequate as required by 20 NMAC

4.1, Subpart V, §264.601. Pursuant to 20 NMAC 4.1.1103, HRMB and its technical contractor have identified specific documents needed to satisfy this requirement, as indicated in Attachment 1.

Please submit this information to HRMB as soon as possible. Furthermore, submit any other information that you determine as necessary for the administrative record prior to the issuance of the draft permit. For each item of additional information, clearly indicate whether the information "clarifies, modifies, or supplements previously submitted material," and if so, the corresponding location of the previously submitted material in the permit application. Under 20 NMAC 4.1.1103, the application is complete so long as the additional information is necessary to "clarify, modify or supplement previously submitted material." If the additional information renders the application incomplete, HRMB will rescind the June 27, 1996, completeness determination while the new information is being reviewed for technical adequacy. Following HRMB's administrative and technical review, a new completeness determination will be issued.

Please provide HRMB with three hardcopies and an electronic copy (in WordPerfect 5.2 format) of all submitted information. After receipt, HRMB will need time to review and evaluate the adequacy of the information for completeness and technical adequacy prior to issuance of the draft permit. The direct result of submitting new and additional technical information is to create a potential delay in the issuance of the draft permit for public comment. To avoid further delay, HRMB urges you to submit the requested information as soon as possible. You may coordinate shipment of the hardcopies to our office and that of our technical contractor with Mr. Steve Zappe of my staff.

Thank you for your cooperation in this permitting process. If you have any questions, please contact Mr. Zappe at (505) 827-1561.

Sincerely,

Benito J. Garcia, Chief
Hazardous and Radioactive Materials Bureau

Attachment

cc: Ed Kelley, NMED
Stu Dinwiddie, HRMB
Steve Zappe, HRMB
Susan McMichael, NMED OGC
David Neleigh, EPA Region 6
Matt Hale, EPA OSW
Frank Marcinowski, EPA ORIA
Connie Walker, A.T. Kearney
File: Red WIPP '97
Track: WIPP, 4/18/97, Dials, Garcia, RE:

Attachment 1
Modeling and Parameter Selection Information/Documents

DOE/WID must provide the following documents, and additional information not contained in those documents, for inclusion in the administrative record.

DOCUMENTS

From the *Final No-Migration Variance Petition* (DOE/CAO-96-2160):

- Chapter 8

From the *Title 40 CFR Part 191 Compliance Certification Application for the Waste Isolation Pilot Plant* (DOE/CAO-1996-2184):

- Chapter 4
- Chapter 6 (primarily Section 6.4)
- Chapter 8
- Appendix BIR
- Appendix BRAGFLO
- Appendix MASS, Attachment 8-2
- Appendix PAR
- Appendix SEAL
- Appendix WCA

References from the CCA on the BSEP program and the effects of brine injection:

- Deal and Case, 1987 (Ref. # 166)
- Deal *et. al.*, 1989 (Ref. # 167)
- Deal and Roggenthen, 1989 (Ref. # 168)
- Deal *et. al.*, 1989a (Ref. # 169)
- Deal *et. al.*, 1991a (Ref. # 170)
- Deal *et. al.*, 1991b (Ref. # 171)
- Deal *et. al.*, 1993 (Ref. # 172)
- DOE, 1995 (Ref. # 197)
- Stoezel and O'Brien, 1996 (Ref. # 611)

DOE's response to EPA ORIA Completeness Comments:

- Submission No. 3, dated February 7, 1997
- Submission No. 4, dated February 14, 1997

INFORMATION

1. Clarify whether gas generation rate assumptions in Appendix E1, Table E1-1, assume the presence of MgO in the repository.

2. Provide references to specific experimental data that support the assumption of assigning a value of 1.0 to the Anoxic Corrosion Stoichiometric Factor, as indicated Appendix E1, Table E1-1.

3. DOE/WID asserts in Appendix E1, page E1-1, lines 28 - 30, that they are "... seeking to demonstrate, to a reasonable degree of certainty, that there will be no migration of hazardous waste or hazardous constituents via groundwater for as long as the waste remains hazardous." In Appendix E1, Tables E1-3 and E1-4, Note "a" indicates that **median** values for Salado formation halite and anhydrite parameters were used in modeling calculations, based upon the data and parameter distributions contained in Appendix D16, Section D16-6. However, 20 NMAC 4.1, Section V, §264.90(b)(4) states that, "In order to provide an adequate margin of safety in the prediction of potential migration of liquid, the owner or operator must base any predictions made under this paragraph on assumptions that **maximize** the rate of liquid migration." It is not clear how the use of median values maximize the rate of liquid migration, and it appears that worst- case assumptions have not been modeled in a single realization. Section 8.1.1 of the CCA identifies Salado anhydrite interbeds as a potential pathway to the facility boundary, and demonstrates that nine out of 300 realizations indicate releases are possible. Justify how the use of median values maximize the rate of liquid migration in modeling calculations. Alternately, submit modeling results based on worst-case assumptions that maximize the rate of liquid migration.

4. Appendix E1, Figure E1-12, and text on page E1-33, lines 35-43, shows that average pressure in the waste disposal region increases with time. Comparison of the threshold values for each shaft seal component with the anticipated gas generation values indicates that approximately 50 years after shaft seal emplacement, the repository pressure will exceed the threshold pressure for seal components. Provide additional information that discusses the effects of pressure build-up in the subsurface relative to the individual and cumulative effect of shaft seals, and how this might influence contaminant migration.

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
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

Checklist of Information Needs for the RCRA Subpart X Modeling (continued)

Information Need	Addressed in Chapter-Section
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
Aquifer interconnection	Appendix D6 Section D6-2a
Description of groundwater monitoring program	D-10d, Appendix D18
Monitoring QA/QC documentation	Appendix D6 and D18

Checklist of Information Needs for the RCRA Subpart X Modeling (continued)

Information Need	Addressed in Chapter-Section
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)(I), Appendix D1 and D6
Degree of water saturation	D-9b(1)(b)(I), Appendix D1 and D6
Bulk density	D-9b(1)(b)(I), Appendix D1 and D6
Pressure potential	D-9b(1)(b)(I), Appendix D1, D6, and D16
Relative permeability	D-9b(1)(b)(I), Appendix D1, D6, and D16
Unsaturated hydraulic conductivity	D-9b(1)(b)(I), Appendix D1, D6, and D16
Water capacity	Appendix D16[b]

Checklist of Information Needs for the RCRA Subpart X Modeling (continued)

Information Need	Addressed in Chapter-Section
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[j]	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)(I)
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

Checklist of Information Needs for the RCRA Subpart X Modeling (continued)

Information Need	Addressed in Chapter-Section
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.