



EEG 64

**REVIEW OF THE DRAFT SUPPLEMENT TO THE WIPP  
ENVIRONMENTAL IMPACT STATEMENT DOE/EIS-0026-S-2**

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New Mexico

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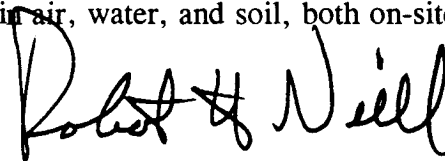
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## FOREWORD

The purpose of the New Mexico Environmental Evaluation Group (EEG) is to conduct an independent technical evaluation of the Waste Isolation Pilot Plant (WIPP) Project to ensure the protection of the public health and safety and the environment. The WIPP Project, located in southeastern New Mexico, is being constructed as a repository for the disposal of transuranic (TRU) radioactive wastes generated by the national defense programs. The EEG was established in 1978 with funds provided by the U.S. Department of Energy (DOE) to the State of New Mexico. Public Law 100-456, the National Defense Authorization Act, Fiscal Year 1989, Section 1433, assigned EEG to the New Mexico Institute of Mining and Technology and continued the original contract DE-AC04-79AL10752 through DOE contract DE-ACO4-89AL58309. The National Defense Authorization Act for Fiscal Year 1994, Public Law 103-160, continues the authorization.

EEG performs independent technical analyses of the suitability of the proposed site; the design of the repository, its planned operation, and its long-term integrity; suitability and safety of the transportation systems; suitability of the Waste Acceptance Criteria and the generator sites' compliance with them; and related subjects. These analyses include assessments of reports issued by the DOE and its contractors, other federal agencies and organizations, as they relate to the potential health, safety and environmental impacts from WIPP. Another important function of EEG is the independent environmental monitoring of background radioactivity in air, water, and soil, both on-site and off-site.



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## TABLE OF CONTENTS

FOREWORD	iii	
EEG STAFF	iv	
ACKNOWLEDGEMENTS	v	
OUTSTANDING CONCERNS	1	
SUMMARY	5	
GLOSSARY	9	
ACRONMYNS	11	
SUMMARY CHAPTER	12	
CHAPTER 1	19	
CHAPTER 2	21	
CHAPTER 3	24	
CHAPTER 4	31	
CHAPTER 5	37	
CHAPTER 6	49	
LIST OF ACRONYMS	50	
APPENDIX A	WASTE INVENTORY	A-1
APPENDIX B	SUMMARY OF WM PEIS AND ITS USE IN DETERMINING HUMAN HEALTH IMPACTS	B-1
APPENDIX C	AIR QUALITY	C-1
APPENDIX D	LIFE-CYCLE COSTS AND ECONOMIC IMPACTS	D-1
APPENDIX E	TRANSPORTATION	E-1
APPENDIX F	HUMAN HEALTH	F-1

APPENDIX G	FACILITY ACCIDENTS . . . . .	G-1
APPENDIX H	LONG-TERM CONSEQUENCE ANALYSIS FOR PROPOSED ACTION AND ACTION ALTERNATIVES .	H-1
APPENDIX I	LONG-TERM CONSEQUENCES OF NO ACTION ALTERNATIVE 2 . . . . .	I-1
LIST OF EEG REPORTS . . . . .		RL-1

**LIST OF TABLES**

Table 1.	EEG Summary of Expected and Possible Deaths Listed in SEIS-II. . . . .	17
Table 2.	EEG Comparison of SEIS-II and SAR WIPP Accident Consequences . . . . .	40
Table 3.	EEG Comparison of Accident Scenario Frequencies in SEIS-II and 1996 SAR . . . . .	41
Table A-1	EEG Comparison of Inventories Used in Different DOE Documents . . . . .	A-5

**LIST OF FIGURES**

Figure 1.	Proven and Probable Hydrocarbon Reserves for Brushy Canyon. .	32
Figure 2.	Formation production . . . . .	32
Figure 3.	Interest in resources near WIPP . . . . .	33
Figure 4.	Estimated areal extent of potash reserves. . . . .	34
Figure 5.	Actual growth of oil production. . . . .	34
Figure 6.	Solution mining of the Salado Formation. . . . .	35
Figure 7.	Postulated correlation between oil field salt water injection and water level rises . . . . .	36

## OUTSTANDING CONCERNS

EEG has published reviews of the previous DOE Environmental Impact Statements (EIS) on WIPP including:

EEG-3 *Radiological Health Review of the Draft Environmental Impact Statement (DOE/EIS-0026-D) Waste Isolation Pilot Plant, U.S. Department of Energy, August 1979*

EEG-10 *Radiological Health Review of the Final Environmental Impact Statement (DOE/EIS-0026) Waste Isolation Pilot Plant, U.S. Department of Energy, January 1981*

EEG-41 *Review of the Draft Supplement Environmental Impact Statement, DOE Waste Isolation Pilot Plant, July 1989.*

Written comments also were provided to DOE on the Final 1990 Supplement to the EIS on WIPP in April 1990. The 1996 Draft Supplement to the EIS (SEIS-II), DOE/EIS-0026-S-2, was received on November 25, 1996, and this review contains our analysis of that document. The 90 day deadline for comments established by DOE was not adequate to do a thorough job since it was necessary to also review the final DOE Compliance Certification Application (CCA) as well as the Safety Analysis Report (SAR) in the same time frame.

### **Our principal concerns are as follows**

- The long-term disposal impact of the Proposed Action is being addressed in much more detail through the DOE Compliance Certification Application (CCA) which provides one year for review. Evaluating alternatives to the Proposed Action outlined in the SEIS cannot be meaningfully addressed in sufficient detail in 90 days.



- Chapter 6 lists all regulatory agencies and the status of permits for WIPP. One regulatory agency is notably absent. It is DOE. The Department has the legal authority to self regulate operational activities at WIPP. The status of WIPP's compliance with DOE Orders or even a list of DOE Orders is conspicuously absent. Indeed, DOE has the authority to self-approve the Draft Supplement to the EIS but fails to describe the internal system to be used. As an example, the DOE long-term disposal calculations in the SEIS are approved by DOE and in the CCA by EPA.
- Parameters and analyses differ in the various DOE WIPP documents such as the SEIS-II, the Compliance Certification Application (CCA) and the Safety Analysis Report (SAR).
- The alternatives are not reasonably viable. As DOE notes, alternative #1 and alternative #3 are in violation of the WIPP Land Withdrawal Act. Alternative #2 exceeds the limits of RH-TRU in the NM/DOE C&C Agreement. The problems of underground stability in leaving the repository open for 150 to 190 years (which would also require new shafts and surface facilities) are not addressed. It would make more sense to complete WIPP and then propose a second repository, tailored to the unique needs of RH-TRU waste emplacement including limits on thermal loading and criticality. The SEIS should address this alternative.
- The alternatives include almost doubling the authorized waste volume, bringing non-defense TRU waste and commercial TRU waste. Increasing the curie inventory would increase the amount of transuranics allowed to be released.
- While several EEG documents are cited, there are a number of relevant EEG publications that the SEIS-II authors have not cited that are directly relevant to the environmental impact of WIPP.
- The text indicates that DOE has a need to dispose of all TRU wastes and does not consistently recognize that only defense TRU wastes can be disposed at WIPP according

to law. Transuranic wastes generated by non-defense activities or civilian nuclear activities of the Department are not eligible for disposal at WIPP. (This point is recognized later by DOE on page 5-7, lines 5 and 6). To avoid confusion, non-authorized waste issues should be clearly identified.

- The document acknowledges that the expected quantity of RH-TRU waste of 35,000 m<sup>3</sup> far exceeds the WIPP design capacity of 7,080 m<sup>3</sup>. But the Basic Inventory Table for the Proposed Action shows 35,000 m<sup>3</sup> and the Draft PEIS shows all TRU waste as coming to WIPP. Since RH-TRU waste is not scheduled for shipment for several years, the effective capacity for RH-TRU will only be about 4,300 m<sup>3</sup> with the present design. SEIS-II makes no mention of the need to modify the waste emplacement design in order to accommodate 7,080 m<sup>3</sup> of RH-TRU. Again, footnotes indicate that only the authorized amounts would be disposed at WIPP but it is needlessly confusing.
- EEG is pleased that DOE is seriously considering treatment of radioactive wastes. For years EEG has noted that waste is respirable, soluble and confined by a carbon steel Type A drum. The 20 year longevity requirement for the drum has been deleted by DOE from the WAC as has the 1% limit on respirable particles. In contrast, certain low level wastes are required by NRC to have a 300 year design life for the waste container or the waste form. We believe that modifying the waste form through thermal treatment and shredding and grouting should be vigorously pursued to accommodate the anticipated volume of TRU waste which is twice the capacity of WIPP.
- The inhalation risks to people on the surface from future human intrusion were deemed inconsequential and not calculated in the SEIS-II despite earlier work by both EEG (EEG-11) in January 1982 and DOE (TME 3151) in July 1982 that concluded inhalation is a significant concern.
- Unwarranted claims of conservatism for long-term performance calculations are made in the SEIS-II.

- EEG compared the results of the routine and accidental risks from truck transportation to WIPP with findings in EEG-46 ("Risk Analysis of the Transport of Contact Handled Transuranic (CH-TRU) Wastes to WIPP Along Selected Highway Routes in New Mexico Using RADTRAN IV," Anthony F. Gallegos and James K. Channell, EEG-46, August 1990). Agreement was quite close when allowance was made for differences in miles traveled and other assumptions. Therefore we believe the assessment of transportation risks in SEIS-II is reasonable and adequately conservative.
- For over 20 years, the Department's policy has been to dispose of defense transuranic waste at WIPP rather than leave it at the generator sites indefinitely. The August 1995 DOE Draft Waste Management Programmatic Environmental Impact Statement provides calculations that indicate leaving the waste at the generating sites indefinitely rather than disposal at WIPP would result in fewer cancer fatalities, a smaller collective radiation dose, and a cheaper cost. The SEIS-II needs to explain the reasons why technical objections have not been raised by CAO on these 8/95 DOE conclusions. It is important for credibility that a detailed analysis of the basis of these diametrically opposed conclusions be provided. (SEIS-II, page 3-46 and PEIS, page 8-86).
- Calculations of the long-term consequences should use the analyses submitted in the EPA Application. SEIS-II used methods and data in the Draft Application. EEG had extensive comments on the draft and published them in EEG-61.

## **SUMMARY**

EEG's review of the WIPP Disposal Phase Draft Supplemental Environmental Impact Statement (SEIS-II) concentrated on the radiological aspects of the Proposed Action, including transportation. The alternatives were reviewed in less detail. Some calculations were checked, mostly for the Proposed Action. Because of time constraints, there was little review of Hazardous Chemicals, Economics, or other Environmental Assessments.

SEIS-II was written as a pre-decision document with the Alternatives all plausible and eligible to be selected. Also, the inventory of TRU waste for disposal went well beyond that portion of TRU waste that has been historically considered to be the WIPP inventory. This broadened scope is probably appropriate for an EIS but it is confusing to the reviewer who is aware of the statutory limits of wastes that are allowed to come to WIPP at the present time. EEG has attempted to keep the broadened scope of SEIS-II in mind during our review.

A number of calculations, logic, and perhaps typographical errors were found and are pointed out in the detailed comments. Also, omissions that we believe should be included are mentioned. The more important issues are discussed below.

### **Alternatives**

EEG is bothered by the choice of Alternatives considered. Compared to the Proposed Action, they deal with larger volumes of TRU waste, continue over a much longer period of time and have been evaluated in a more preliminary manner. There is a question of whether these were intended to be viable options. Certainly there is a need for real options to dispose of TRU wastes not included in the WIPP statutory limits.

EEG recommends that short-term, partial solution options be included in the Final SEIS-II and be considered in the Record of Decision (ROD).

## **Related Documents**

SEIS-II recognizes and refers to other important WIPP related documents such as the Compliance Certification Application (CCA), Baseline Inventory Report (BIR - Revisions 2 and 3), and the Safety Analysis Report (SAR). However, SEIS-II, which was published after the CCA and the latest SAR, does not incorporate the latest information or use the same methodology as these documents. The use of different methodology and results in DOE documents published around the same time is inconsistent, confusing and unnecessary. EEG recommends that the Final SEIS-II use methodologies and results from the CCA and the latest SAR because these documents contain more detailed and peer reviewed analyses.

## **Transportation**

EEG checked the transportation calculations in Appendix E and compared these results to those contained in EEG-46. It is concluded that the assessment of transportation risks in SEIS-II is reasonable and adequately conservative.

Analyses in SEIS-II indicated potential advantages to using rail rather than truck transportation for wastes. The rail analyses were not as rigorous as those for truck transportation. However, the findings were consistent with analyses in the FEIS, SEIS-I, and other documents. There appears to have been no serious re-evaluation of WIPP's "truck only" policy in the approximately 12 years since it was established. EEG believes that DOE should take this opportunity to seriously re-evaluate the merits of a "truck/rail mix" or a "maximum rail" policy for WIPP wastes.

## **Questionable Assumptions**

There are a number of questionable assumptions, omissions, or errors in SEIS-II. These are mentioned in the page-by-page comments. The more important ones are given below. The page location in SEIS-II is given in parenthesis.

**Human Intrusion at 100 years.** The assumption is made that drilling into the repository 100 years after repository closure would lead to maximum consequences. This determination cannot

yet be made. Increased releases from higher pressures in the repository after 100 years may more than offset radionuclide reductions due to radioactive decay. (page 5-45).

**Use of 75th Percentile Values.** It is argued that the use of 75th percentile parameter values in modeling of long-term releases due to human intrusion will yield consequences that fall in the "upper tail of a full probabilistic analysis." In the actual analysis SEIS-II used median values for most of these parameters and came up with values of radionuclide releases to the surface that were identical to those with median values (Table H-24). We conclude that these are not upper tail releases. (page 5-40).

**Family Farm Scenario and Inhalation Doses.** The decision was made in SEIS-II that a family farm scenario with inhalation doses from resuspended drilling mud pit material was inappropriate. This is directly contrary with conclusions in SEIS-I as well as EEG and Westinghouse reports. (page 5-41).

**Modification of BRAGFLO Volumes.** The z distance in a two-dimensional grid was increased by factors of approximately 8 (see Table H-8) in order to accommodate the larger waste volumes in Action Alternatives 1, 2, and 3. This violates the two-dimensional assumption of the BRAGFLO grid. A three-dimensional analysis may be needed to give reliable results. Table H-8 is confusing.

**Emplacement of RH-TRU Wastes.** Values are given for the volumes of CH-TRU and (especially) RH-TRU wastes that will have to be put into Panels 9 and 10 in order to meet design capacity for the Proposed Action. There is no indication of whether such an increase is possible. (page 3-12).

**Conversion Error.** Numerous Figures in the Summary Chapter, Chapter 5, and appendix H show the wrong conversion factor from  $\text{Ci}/\text{m}^3$  to  $\text{pCi}/\text{l}$ . The correct conversion factor is  $1 \text{ pCi}/\text{l} = 10^{-9} \text{ Ci}/\text{m}^3$ . There is uncertainty about which value is used in the plots and this is potentially important. (pages S-51 and 5-43).

**RH-TRU Cask.** The statement is made that "The Department is currently awaiting NRC certification of the RH-72B cask. DOE had not submitted an application to NRC for certification of the RH-72B cask at the time the SEIS-II was published.

## GLOSSARY

**Page GL. Line 1.**

The definition of backfill as "materials placed in storage panels or drifts" is too ambiguous. CH-TRU waste and RH-TRU waste as well as the drums and containers are placed in storage panels, but they do not qualify as backfill.

**Page GL-2. Line 4.**

The definition of background radiation does not include global fallout as it exists in the environment. Global fallout is considered to be man made radiation.

**Page GL-2. Line 12.**

The glossary should include a definition for the Becquerel since it includes a definition for the curie.

**Page GL-3. Lines 28-32.**

The definition of contact-handled transuranic waste should start with the term "TRU waste" instead of the word "waste".

**Page GL-3. Line 13.**

The spelling of sievert is incorrect. Also, the sievert is abbreviated as Sv.

**Page GL-5.** The definition of disposal should use the definition in the WIPP Land Withdrawal Act.

**Page GL-5.** The definition of disposal phase should use the definition in the WIPP Land Withdrawal Act.



**Page GL-5. Lines 33-36.**

The definition of absorbed dose should also include the mks unit known as the gray and abbreviated as Gy.

**Page GL-5. Lines 37 through 39.**

The definition of dose conversion factor should use "resultant dose equivalent" instead of "resultant radiation dose."

**Page GL-9. Lines 4 through 7.**

The definition of high-level waste should include unprocessed spent fuel.

**Page GL-9. Lines 22 through 26.**

The definition of the phrase "immediately dangerous to health" only includes "maximum airborne concentration". The phrase also applies to a dose rate, e.g. 1,000 rem/hour.

**Page GL-14. Lines 16 through 20.**

The definition of remote-handled transuranic waste should start with the term "TRU waste" instead of the word "waste". Also, while the radiation level at the outer surface of the container is less than 1,000 rem/hour, there is a volume limit of 12,500 cu ft for wastes that have radiation doses that are greater than 100 rem/hr at the outer surface.

**Page GL-18. Lines 1 through 4.**

The definition of WIPP should be changed. WIPP is no longer an experimental facility.

## ACRONYMS

**Page AC-1. Line 19.**

Only BIR-2 is defined. BIR-3 should also be defined since it is described on page 1-8.

**Page AC-1. Line 42.**

The AC-section has an acronym for design-basis earthquake, but it does not have an acronym for design-basis criteria.

**Page AC-3. Line 46.**

PA stands for Performance Assessment. The acronym for Preliminary Performance Assessment would be PPA.

**Page AC-4. Line 15.**

At present the RH-72B cask is only a proposed RH-TRU shipping container. The design was not submitted by the DOE to the NRC until 12/96.

**Page AC-4. Line 33.**

The definition of SWIFT-II should indicate that it is computer software.

**Page MC-2. Table MC-1.**

The table should include other conversion factors such as a conversion factor from Psi to Pa and conversion factors from darcy to other units of permeability.

## SUMMARY CHAPTER

### **Page S-1. Lines 40 and 41.**

The statement "DOE subsequently decided to perform the tests in aboveground laboratories instead of at WIPP" is misleading. Most of the tests planned for the test phase (e.g. the alcove tests, which comprised the majority of the wastes in the experiments) are not being performed anywhere.

### **Page S-2. First Full Paragraph.**

The relation of SEIS-II to the Draft WM PEIS is described in this paragraph. DOE apparently believes they need to follow the approach of the WM PEIS and also to consider the disposal of all DOE TRU wastes. This goes beyond the portion of the defense TRU wastes that has historically been considered for disposal at WIPP and includes commercial TRU as well as non-defense TRU. The desire of DOE to consider the universe of TRU waste is understandable and it could probably be argued that NEPA requires it. But it is confusing to the reader who is aware of the statutory limits of wastes that are allowed to come to WIPP at the present time. Also, additional wastes and alternatives have not been evaluated in the detail that the Proposed Action has been. It is realized that a Draft EIS is supposed to be written as a pre-decisional document.

### **Page S-3. Related Documents.**

The major planning and compliance documents that are integrated with SEIS-II that are related to decisions on WIPP are listed and described briefly. A generic comment is that the contents of SEIS-II are not current with the latest DOE documents that were issued before the SEIS (e.g. the CCA and Baseline Inventory Report, Revision 3). Also, SEIS-II developed its own assumptions and methodology rather than using that developed in other official WIPP Project documents (e.g. WIPP Operational Accident modeling was different than that in the Safety Analysis Report). These differences are confusing and unnecessary.

**Page S-4. Comprehensive Disposal Recommendations.**

The Comprehensive Disposal Recommendations (in preparation, schedule uncertain) document will recommend "disposal options and the time tables for all TRU waste under DOE control." It is unclear how the ROD that is expected with the Final SEIS-II will relate to the Comprehensive Disposal Recommendations. Are these expected before Final SEIS-II? If not, wouldn't the ROD be preempting the Recommendations? Or, is SEIS-II the first step in preparing for the disposition of all TRU wastes under DOE control at WIPP?

**Page S-4. List of DOE Decisions.**

Although this is mentioned later, it would be helpful to mention here those potential decisions which could be made under current WIPP Authorization and those which would require new Congressional Authorization.

Extensive comments are made later on the truck vs. rail issue. It is hoped that this decision is open and will be seriously re-evaluated.

**Page S-9. Emplacement Volumes.**

The text and various tables give different values for emplaced volumes of waste in No Action Alternative 2. Table S-3 says 135,000 m<sup>3</sup> CH, 35,000 RH (32,000 being treated). Figures S-2 and S-3 show 143,000 m<sup>3</sup> CH-TRU and 50,000 m<sup>3</sup> RH-TRU (both post-treatment). The text (page S-16) says 170,000 m<sup>3</sup> total. Table 3-16 and the text (on page 3-42) say 135,000 m<sup>3</sup> CH and 35,000 m<sup>3</sup> RH. It is unclear what becomes of the additional 15,000 m<sup>3</sup> of RH-TRU in NAA 2 (which is included in the Proposed Action as excess RH-TRU). This is confusing and needs to be clarified.

**Page S-13. Lines 19-20.**

The berm is to be constructed around the perimeter of the waste panel footprint (not of the Site).

**Pages S-13 to S-19. Alternative Actions.**

A general conclusion on the alternatives evaluated is that they are so different from the proposed action as to stretch credibility. The entire TRU waste universe is included. Implementation times of 150-190 years that use present-day technology are mind boggling and there is no indication that the SEIS-II analysis has seriously considered the problem of keeping the underground, shaft, and surface facilities at WIPP open until the latter half of the 22th Century. Nor have the institutional problems that might occur over such long time periods been mentioned.

Three of the Alternatives not considered (deep borehole disposal, greater confinement, and geologic repositories at sites other than WIPP) appear to be as reasonable as the ones chosen.

The concept of making piece meal decisions on solving the TRU waste disposal problem is as reasonable as the Alternatives listed here. For example: (1) make the decision of how to dispose of those wastes that are authorized to come to WIPP; (2) then evaluate how all or a portion of the remaining TRU wastes will be disposed of. It may be better to evaluate these remaining wastes in more than one category (e.g., RH-TRU as one category and buried waste as another).

**Page S-14. Text Box.**

See comments on this text box (Conservatism of TRU Waste Inventory Estimate) under page 3-6.

**Page S-16.**

It is noted that No Action Alternative 1, which would have thermally treated wastes, provides for overpacking of waste at 20-year intervals. No Action Alternative 2, which does not have treated wastes, has no plans for repackaging. This is an example of how the alternatives provide different levels of assurance that must be kept in mind when making decisions between alternatives.

**Page S-23. Sixth Paragraph.**

The value of 0.3 LCF reported for the population dose around the Hanford Site is incorrect. The Hanford Site Environmental Report for Calendar Year 1994 (PNL 10574) reports a total dose of 0.6 person-rem to the population of 380,000 persons. This would be  $3 \times 10^{-4}$  LCF. The values for INEL and NTS also seem to be too high but have not been checked.

**Page S-29.**

See comments on this text box (Long Disposal Periods and SEIS-II Results) under page 5-49.

**Page S-32. Noise.**

It would be useful to state the normal non-WIPP truck traffic through Carlsbad as a comparison to the relative noise effect of WIPP traffic.

**Page 5-33. Socioeconomics.**

The life-cycle cost analyses for Action Alternatives 1, 2, and 3 apparently does not include the cost of exhuming the CH-TRU waste disposed of before 1970.

**Page S-34. Table S-5.**

It is surprising that No Action Alternative 2 (NAA2) waste treatment costs are only 16% of those for the proposed Action. There is no itemized waste treatment cost in Appendix D for the No Action Alternative 2. However, NAA2 is planning to treat all newly generated waste to WAC standards (73,000 m<sup>3</sup> CH and 32,000 m<sup>3</sup> RH). The proposed action would treat 168,500 m<sup>3</sup> CH and 50,000 m<sup>3</sup> RH. This needs to be explained. The sum of the parts of the proposed action is \$18.7B while the total cost is \$19.1B. While rounding off is expected, this fails to account for \$0.4B or 2.2% of total.

**Pages S-42 through S-44.**

The analysis for Alternatives 1, 2, and 3 apparently do not include the radiological health impacts from exhuming the pre-1970 disposed TRU waste, which is not considered in the

WM PEIS either, and which in the past was considered important. These radiological health impacts could be important when comparing Alternatives 1, 2, and 3 with the Proposed Action and No-Action Alternatives 1 and 2.

**Pages S-51 through S-55.**

The conversion factor on Figures S-5 through S-9 relating Ci/m<sup>3</sup> to pCi/l is incorrect. The correct value is 1 pCi/l = 10<sup>-9</sup> Ci/m<sup>3</sup>. This is important. See comment under page 5-43.

**Page S-61 to S-68. Table S-7.**

This table summarizes all the calculated health and safety effects from transportation, routine treatment and disposal operations, and from accidents. Deaths from transportation and operational accidents, Latent Cancer Fatalities (LCFs) from radiation exposure, cancer incidence from hazardous chemicals, and fatalities from truck pollution are all considered. Presumably, this information will be used in deciding on alternatives. However, SEIS-II does not discuss the relative merits of the alternatives in light of these estimated health and safety effects. Neither is any indication given of how they will be used in decision making. We have several observations.

The estimated cancer incidence from exposure to hazardous chemicals is below 0.05 in all alternatives. This is less than 5% of the expected radiological LCFs in NAA2 and is less than 1% in all other alternatives. The effect of hazardous chemical exposure can be ignored in choosing between alternatives.

**EEG Summary of Health and Safety Effects.**

EEG has condensed from the Table S-7 tabulation the expected deaths (of all kinds) for each of the Alternatives as shown in Table 1. Also included are the more significant high consequence/low probability accidents (which are not expected to happen) and the consequences of long-term releases.

Table 1

## EEG Summary of Expected and Possible Deaths Listed in SEIS-II

Effect	Alternative									
	Proposed	AA1	AA2a	AA2b	AA2c	AA3	NAA1a	NAA1b	NAA2	
<u>Routine Radiation (LCFs)</u> Truck Transportation Operations	3.3 2.6	12 3.8	5.4 11	5.4 8.5	6.6 4.3	15 4.3	0.11 11	0.57 8.7	-- 1.1	
<u>Accidents</u> Truck Fatalities Other Fatalities Agg. Rad. (LCFs) Truck	6 6 0.4	19 10 0.8	9 15 0.4	9 13 0.4	12 12 0.7	25 12 1.2	0 1.3 .0068	1 1.1 .02	-- 1.3 --	
TOTAL DEATHS	18	46	41	36	36	58	12	11	2.4	
<u>High Consequence Accident Deaths LCFs)</u> Storage Facilities WIPP Disposal	2 4	300 4	10 24	10 24	2 24	10 24	10 --	10 --	300 --	
<u>Long Term Releases (LCFs)</u> 10,000 year Aggregate	<0.9	--	--	--	--	--	<2325	<2325	2325	
Original Waste Volume(10 <sup>3</sup> m <sup>3</sup> )	218	336	313	313	313	312	313	313	170	
Deaths/10 <sup>3</sup> m <sup>3</sup>	.084	0.14	0.13	0.12	0.11	0.18	.040	.036	.014	

All values from Table S-7, pages S-62 through S-68, SEIS-II.



If these estimates are assumed to reasonably reflect the differences between the Alternatives one can come to several conclusions:

- The Proposed Action disposes of waste at a lower expected death per volume of waste ratio than any of the Action alternatives. However, all of these ratios are within a factor of about two. The primary variables affecting the deaths/volume ratio are the miles of transportation and amount of treatment required;
- AA1 and NAA2 have very high consequence storage accidents. This is because of long-term above ground storage of waste treated only to WAC standards;
- The aggregate LCFs from long-term release for NAA2 are very high because of assumed loss of institutional control of WAC standard wastes stored above or near the surface. NAA1 LCFs were not calculated but would also be substantial. The thermal treatment of wastes would be expected to provide some reductions during the early part of the 10,000 year period because of greater waste stability.

The Health and Safety aspect of the decision on alternatives would seem to basically reduce to a trade-off between a few expected deaths during the disposal period and a possibility of a much larger number of future LCFs from accidents or environmental releases. A secondary consideration is whether some types of death (e.g. a transportation accident fatality rather than a radiation caused LCF) and the effects on some population groups (workers versus the general public) are more acceptable than others.

In making this decision one needs to keep in mind the uncertainty in these comparative estimates. Also, these various alternatives are not identical and provide different levels of assurance.

## CHAPTER 1

### **Page 1-1. Lines 5 through 16.**

The section does not make it clear that only defense TRU can be disposed at WIPP. Instead, the section discusses the need to dispose of all TRU wastes generated by the Department.

### **Page 1-1. Lines 37 through 39 or Footnote 1.**

The footnote indicates that the DOE has sole authority to decide if waste should be disposed of at WIPP. In 1992 Congress reassigned the authority to approve disposal at WIPP from the DOE to the EPA.

### **Page 1-1. Box entitled TRANSURANIC WASTE.**

Since the description of TRU waste includes the maximum dose rate for CH-TRU waste, the description of TRU wastes should also include the maximum dose rate for RH-TRU waste, which is 1,000 rem/hour.

### **Page 1-1. Box entitled TRANSURANIC WASTE.**

The material in the box defines transuranic waste but fails to incorporate the adjective "defense" to modify the noun. The inference is that non-defense DOE TRU waste is eligible for disposal at WIPP.

### **Page 1-1. Section 1.2 OVERVIEW.**

Since the SEIS describes the history to TRU waste disposal, it should include the history of the unilateral decision by the DOE to redefine the threshold of TRU from 10 nCi/g to 100 nCi/g.

### **Page 1-5. Table 1-2.**

The fifth WIPP NEPA document notes that a 1982 deviated gas well at WIPP was discovered by the DOE in 1991.

### **Page 1-7. Footnote.**

Statement: "Overpacking involves placing the 55-gallon drums inside another container and essentially provides double containment of the TRU waste."

The statement is incorrect. Overpacking does not provide "double containment" of a Type A drum in the context of the NRC packaging regulations 10 CFR Part 71.

**Page 1-8. Lines 23 through 26.**

The purpose of the WIPP/SAR is summarized, but does not do justice to the formal commitment by DOE and the State of New Mexico.

*Waste Isolation Pilot Plant Safety Analysis Report, Revision 1 (SAR) Rev. 1 (DOE 1995 i)*

"The intent of this document is to demonstrate the safe disposal of CH-TRU waste in compliance with DOE orders."

The Consultation and Cooperation Agreement between NM and DOE states that the SAR "... constitutes the most comprehensive document concerning WIPP both in general and specifically as related to public health and safety as well as other matters." Include this statement as well as a commitment for RH-TRU waste as well.

## CHAPTER 2

### **Page 2-1. Lines 9 through 19.**

The Geography of the nuclear weapon complex is described.

States that contain the 10 additional sites are identified in *Identification of Additional TRU Waste Generator Sites*. It appears that the TRU waste generated at the 10 additional sites is not defense TRU waste and is thus not eligible for disposal at the WIPP under the current law.

### **Page 2-2. Section 2.1.1 Introduction.**

The SEIS includes plans to dispose of non-defense TRU waste at WIPP which violates the existing laws. DOE should include a discussion on their plans to modify the law to include commercial and non-defense TRU wastes.

### **Page 2-2. Section 2.1.1.**

The DOE states that the total inventory will now be almost double the amounts authorized for disposal under the WIPP Land Withdrawal Act. The total expected inventory is 312,500 m<sup>3</sup>. The authorized volume is 175,000 m<sup>3</sup>. Describe the plans for dealing with this excess volume, including amendments to the law.

### **Page 2-2. Text Box entitled WASTE ACCEPTANCE CRITERIA (WAC). Lines 17 and 18.**

Statement: "For the purposes of SEIS-II analyses, all waste would be treated at a minimum to the current planning-basis WAC."

Since the current WAC does not require treatment of most wastes, it is misleading to describe untreated waste as "treated at a minimum to the current planning-basis WAC."

### **Page 2-2. Text Box entitled WASTE ACCEPTANCE CRITERIA (WAC). Line 1.**

It is stated that the WAC was first developed in 1989.

The statement is incorrect. The first set of criteria were issued in 1979. There is no recognition of the work the EEG has done on the WAC (for example, the report EEG-4, Little, Marshall S., *Review Comments on the Report of the Steering Committee on Waste Acceptance Criteria for the Waste Isolation Pilot Plant* dated February 1980).

**Page 2-3. Section 2.1.2 TRU Waste.**

The section fails to show that there is a volume limit of 12,500 ft<sup>3</sup> for disposal at WIPP of RH-TRU waste between 100 rem/hour and 1,000 rem/hour.

**Page 2-3. Text Box entitled *TRU WASTE TRANSPORTATION PACKAGING*.**

Lines 10 and 11. Statement: "The Department is currently awaiting NRC certification of the RH-72B cask."

The statement is misleading, since the Department did not submit an application to the NRC for certification until December 1996.

**Page 2-3. The text refers to a "specially adapted rail car".**

EEG is unaware of an existing rail car nor have we received plans of a design. Please provide them in text.

**Page 2-5. 1,800 PE-Ci/Drum.**

It is correct that the WAC allows 1,800 PE-Ci CH-TRU drums if the waste is over packed or solidified. EEG has expressed some reservations about this limit. Also, an 1,800 PE-Ci drum could not be shipped in TRUPACT-II because the drum would exceed the 40 watt thermal limit.

**Page 2-5. Footnote.**

The text cites an August 1995 Draft PEIS which has not been issued in final form and an unidentified undated more recent estimate. Provide specifics.

**Page 2-6. Table 2-2.**

Statement: "There is uncertainty in the total waste volume figures presented in Table 2-2 and 2-3."

The discussion should include numbers that provide an indication of the uncertainties in the waste volumes of the six alternatives.

**Page 2-7. Table 2-3.**

Commercial/Non-defense TRU waste is not eligible for disposal at WIPP and should be deleted from the Table.

## CHAPTER 3

### **Page 3-1. Lines 31 through 37.**

Statement: "Decisions based on SEIS-II may be a combination of the option presented within alternatives analyzed. This means that portions of two or more of the alternatives analyzed in SEIS-II may be combined and used by the Department for the management or disposal of TRU waste." It would help to clarify this statement if the Final SEIS-II provided hypothetical examples of how the different Alternatives might be combined. The text box on page 5-51 does not provide this clarification.

### **Proposed Action**

#### **Page 3-2.**

While there is a clear understanding of the Proposed Action, the description includes activities not in the Proposed Action described in the SEIS. The RH-TRU waste increased considerably, from 7,000 m<sup>3</sup> to 35,000 m<sup>3</sup>, and the volume projections show thermal treatment of the waste reduces the volume. These are not included in the Proposed Action submitted by DOE to EPA in the 10/28/96 Compliance Certification Application. Revise this section on the Proposed Action to only include items that are in the Proposed Action.

#### **Page 3-2.**

Paragraph 2. The text indicates that the proposed volume of RH-TRU is much less than that allowed by the WIPP Land Withdrawal Act. Not so. While the expected number of curies in RH-TRU are less than the LWA permits, the volume of RH-TRU is considerably greater and the WIPP repository's current design will not accommodate the greater volume.

#### **Page 3-5.**

"All waste has been assumed to be treated and packaged to planning basis WAC." There are no requirements in the WAC to treat waste.

**Page 3-6. Text Box.**

The conservatism of TRU Waste Inventory Estimates text box is limited to the volumes of estimated TRU waste. There is no discussion of the radioactive inventory (in curies or PE-Ci) and its uncertainty. Also, credit is taken for conservatism when the reverse is true. For example:

First bullet. It is more accurate to consider the inventory as uncertain, rather than overestimated. Also, overestimating the TRU waste volume (and of the alpha emitting inventory) permits a larger quantity of plutonium to be released in meeting the EPA 40 CFR 191 Containment Requirements. Update the reference from Rev. 2 to Rev. 3 of the BIR.

Second bullet. The additional Inventory includes TRU waste burial prior to 1970 when the definition of the threshold was 10 nCi/g rather than the current 100 nCi/g. Although DOE indicates that 80,000 m<sup>3</sup> would be excavated from the 141,000 m<sup>3</sup> that was previously disposed, no indication is provided as to whether it is the higher or lower concentration waste. Logically it would be the higher, making the calculation less conservative. No explanation is provided why 80,000 m<sup>3</sup> of buried waste would be exhumed and 60,000 m<sup>3</sup> of other buried waste left in place.

Third bullet. Assuming that 7,000 m<sup>3</sup> of RH-TRU will be emplaced in the repository, when the available capacity may be only 4,300 m<sup>3</sup>, may overestimate the amount of actinides allowed to be released.

Fifth bullet. The assumption that 100% of the TRU waste would be treated as TRU mixed waste is no longer true.

**Page 3-8.**

Since the text cites U.S. DOT regulations (49 CFR Part 391) for driver qualification, also cite the appropriate U.S. DOT regulations for routing (49 CFR 177) and the type A container certification (49 CFR 173).



**Page 3-9. 3.1.3.1**

"The Department estimates that it would require up to three years to excavate a panel."

Why would it take 3 years to excavate 7 rooms when 4 rooms were excavated in 6 weeks for the SPDV Program? Revise the estimate.

**Page 3-9.**

"The facility would be inspected a minimum of 4 times a year by the Mine Safety and Health Administration." State that the WIPP Land Withdrawal Act requires this.

**Page 3-9.**

Shipping Routes. It would be helpful to specify the DOT regulations to change routes including public hearing procedures.

**Page 3-12. 3.1.3.4 Emplacement of RH-TRU Waste.**

This section states that RH-TRU waste will need to be placed in the access tunnels (Panels 9 and 10). In order to reach design capacity Panels 9 and 10 will each have to be modified to accommodate 944 m<sup>3</sup> of RH-TRU (compared to 649 m<sup>3</sup> in a panel) and 17,500 m<sup>3</sup> of CH-TRU (compared to 16,700 in a panel). Is it physically possible to do this? Please specify the necessary design changes to the repository.

**Page 3-12.**

Please provide information for a seal that would prevent water from entering the repository and impede gas and brine from migrating out.

**Page 3-12.**

Closure and decommissioning. Use the definitions of disposal phase and disposal used in the WIPP Land Withdrawal Act. The definitions in the text do not match those in the Act.

**Page 3-12.**

The projected area above the 10 panel equivalent is said to be 100 acres. It is about 125 acres.

**Page 3-12.**

Is the proposed fence outside of the 150 acre berm?

**Page 3-13.**

The commitment to place markers at the site makes no mention that they are required by (PL102-579) and need to be approved by EPA (40 CFR 191).

**Page 3-14.**

The text states that it is reasonable to examine alternatives that include disposing of all DOE-owned and controlled TRU waste at WIPP. It should also be reasonable to discuss plans to amend the law and explain why DOE did not ask Congress to amend the WIPP LWA at the same time this section was written.

**Page 3-14.**

Action Alternative 1 would nearly double the repository waste volume. However the SEIS-II does not address the necessary redesign nor operational problems associated with keeping the repository open for 160 years.

**Page 3-14.**

Problems associated with storage at Consolidation Sites for 160 years are not discussed. DOE has taken the position that such storage would be impracticable and offering this as a viable alternative appears to reverse the Department's position totally.

**Page 3-15 and A-14. Tables 3-2 and A-6.**

The total volume for column 2, Additional Inventory, should be 139,000 not 136,000.

**Page 3-18.**

While the text states that the number of panels would be increased from 8 to 68, no specifics are provided on the design to accommodate this. We question whether the current design would be optimum if CH-TRU was not going to be emplaced in the rooms.

**Page 3-19.**

The surface projection for 68 panels would be about 850 acres rather than the 680 acres estimated if the design is unchanged.

**Page 3-19. Text Box, Long Disposal Periods and SEIS Results.**

Statement: "The long disposal periods could be shortened by constructing additional shafts, employing additional shifts, or changing the design criteria for thermal loading." The assumptions mentioned in the statement are more reasonable than the assumptions of 160-190 year disposal periods. The analysis of AA1, 2, 3 should contain more detailed and quantitative information about how the periods could be shortened.

**Page 3-43.**

The SEIS states that alternatives such as transmutation, co-processing with high level waste, and disposal in space were not considered in detail. The desire to use current technology for projects to be completed in 30 or 40 years is understandable. However, it seems unwise for 160-190 year projects. The alternatives that are discussed in the text are also not considered in detail. Problems associated with keeping the mine open for 180 years are not discussed nor are plans to increase the number of panels from 8 to 68.

An alternative not considered at all, which is similar to Action Alternatives 2 and 3, would consist of acid digestion of certain TRU waste followed by volume reduction and solidification. During the 1970s and 1980s the DOE had a research program at Hanford on the acid digestion of TRU waste. The alternative might be preferable to Action alternative 2, which involves a costly thermal treatment process.

**Page 3-44. Lines 2 through 8.**

Statement: *"While the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement (DOE 1996b) considered this process to be a reasonable alternative for analysis the relative large volume of TRU waste (compared to the volume of fissile material) would produce much more waste than the currently planned high-level waste repository could dispose of. This alternative would further delay TRU waste disposal until such a time as sufficient high-level waste*

repository space was available. In addition, transportation and safety concerns associated with high level waste would need to be addressed."

The statement is not correct. Because of thermal loading constraints, a high-level repository is mostly empty space that may have to be back-filled. The currently planned high-level waste repository at Yucca Mountain will have over 100 miles of tunnel. However, a high-level waste repository is not expected to be operational for more than 10 years. The transportation and safety concerns associated with high-level waste will be addressed in the licensing of a high-level waste repository. The major difficulty with this alternative is that a high-level waste repository will be licensed by the NRC and Congress does not want the disposal of defense TRU waste to be under the jurisdiction of the NRC.

**Page 3-44. Lines 18 and 19.**

Statement: "*Underground detonation*. Such detonations would produce a large amount of hazardous fission products."

The statement implies that the underground detonation can only be carried out with nuclear devices. This is not correct and the statement should be clarified.

**Page 3-45. Lines 17 through 22.**

The following statement is made in the discussion entitled *Alternative Engineered Barriers*: "The Department examined these as alternatives and determined based on the evaluation conducted in the *Engineered Alternatives Cost/Benefit Study Final Report* (DOE 1995c) that they were less effective than the engineered barriers examined in SEIS-II."

There is no discussion of engineered barriers in SEIS-II. However, of the 4 disposal options analyzed, Action Alternatives 2 and 3 include an engineered barrier (waste treatment).

**Page 3-45. Lines 11 through 16.**

In the discussion entitled *Geologic Repositories at Sites Other than WIPP*, it is implied that salt is a more favorable disposal media than granite, basalt, and tuff. The reference for this conclusion is the 1980 FEIS for WIPP.

Much has been written on the disposal of nuclear waste since 1980. With regards to spent fuel and high level waste, the DOE maintains that the unsaturated zone in tuff is the most favorable medium. Also, Sweden has successfully constructed and is successfully operating a repository in granite for intermediate level waste.

**Page 3-46.**

"The SEIS-II Proposed Action is similar to the Draft WM PEIS Decentralized Alternative". The Decentralized Alternative described in the WM PEIS is more expensive than the No Action Alternative (\$1.7B vs. \$7.4B). It also has more worker deaths (4 vs. less than 0.5) and a larger collective dose to workers (1,500 person-rem compared to 20 person-rem). These PEIS findings are similar to those in SEIS-II. The text should clearly explain why these results are totally opposite the DOE conclusion to consolidate the material for disposal at a particular site.