



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

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June 20, 2000

MEMORANDUM TO: Thomas H. Essig, Chief  
Uranium Recovery and Low-Level Waste Branch  
Division of Waste Management, NMSS

FROM: Cheryl A. Trottier, Chief *CT*  
Radiation Protection, Environmental Risk  
and Waste Management Branch  
Division of Risk Analysis and Applications, RES

SUBJECT: TECHNICAL ASSISTANCE REQUEST FOR CHECKLIST BASED  
ON GENERIC ENVIRONMENTAL IMPACT STATEMENT FOR  
LICENSE TERMINATION

The purpose of this memorandum is to respond to the technical assistance request in your memo of May 3, 2000, by transmitting the attached Generic Environmental Impact Statement (GEIS) Checklist. The checklist was developed using the 1997 GEIS supporting the License Termination Rulemaking (10 CFR 20, Subpart E), specifically as part of the implementation of Section VI of the July 1997 Federal Register Notice on the license termination rule which stated that the NRC staff would rely on the GEIS to satisfy NEPA obligations for unrestricted use sites. This checklist is intended for use by NRC staff in satisfying NEPA obligations for decommissioning sites being released for unrestricted use, specifically related to dose assessments.

Drafts of this checklist have been discussed with Phyllis Sobel of your staff, to ensure that the final document meets the needs described in the May 3, 2000 memo. At Ms. Sobel's request, this checklist was held beyond the May 31 due date to allow additional review by NRC staff. If you have any questions, please contact Christine Daily, of my staff, at 415-6026.

Attachment: As stated

License Termination Rule  
GEIS Reference Facilities<sup>1,2</sup> Checklist

The GEIS reference facilities were developed to broadly and generically represent categories of licensee facilities. Specific facilities will not exactly match the descriptions of the reference facilities. The primary purpose of comparing a specific facility to the reference facility with regard to dose assessment is to determine whether the specific facility has important contaminants, potential scenarios, or pathways that were not analyzed for the reference facilities or which may be sufficiently different from those in the GEIS to change conclusions regarding environmental impacts. In general, if a specific facility has contaminants, concentrations, and spacial distributions less than or generally equivalent to those used for the reference facilities, the GEIS should be applicable. Potential limitations of the GEIS dose assessments, as well as a summary of the characteristics of the reference facilities, are shown below.

1. GEIS Dose Assessment Scenarios: Potential Limitations
  - a. Building Occupancy (structures)
    - i. Structures are assumed to have a 70-year life span following license termination. A shorter expected life span is acceptable. Expected life spans significantly longer than 70 years may require additional analysis if long-lived radionuclides are involved.
    - ii. If Radon (Rn-222) due to licensee activities or co-mingled material is expected to approach or exceed the EPA guideline of 4 pCi/l indoor air concentration, additional dose assessment may be required.
    - iii. Contamination significantly more extensive than that analyzed in the GEIS should be evaluated on a site-specific basis. Areas and concentrations analyzed in the GEIS are shown in the tables in the following sections.
    - iv. Radionuclides present on the site that contribute significantly to dose but which were not analyzed in the GEIS for the subject facility type will need to be evaluated separately.

Checklist for Structures

- | Yes                      | No                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Additional analysis required due to expected >70 year building lifespan following decommissioning <u>and</u> long-lived contaminants                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | Indoor Radon (Rn-222) concentration expected to approach or exceed the EPA guideline of 4 pCi/l  |
| <input type="checkbox"/> | <input type="checkbox"/> | Contamination significantly more extensive than that shown in Tables 1 through 6 in the following sections   |
| <input type="checkbox"/> | <input type="checkbox"/> | Radionuclides present that contribute significantly to dose, were not analyzed in the GEIS, and could change the conclusions in the GEIS regarding environmental impacts |

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<sup>1</sup>Overview from NUREG-1496, Volume 1, Section 3

<sup>2</sup>Note: The GEIS does not apply to uranium mills or tailings, low level waste, or high level waste.

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2. Residential (soil)

- i. Assumes people live and work on site over a 1,000 year period.
- ii. If the site is subject to weather or other events (tornadoes, flash floods, etc) that could result in extensive redistribution or mass movement of contaminants, additional analysis may be required.
- iii. Pre-existing contamination of ground water must be evaluated on a site-specific basis.
- iv. 10 CFR 20.302/20.2002 or other burials or disposal areas may need additional site-specific evaluation.

Checklist for Soil

Yes No

- Site subject to weather or other events that could redistribute contaminants in ways not analyzed in the GEIS
  - Contaminated groundwater present
  - On-site burials or disposal areas
- 

3. Example fuel cycle facilities: power, test, and research reactors; uranium fuel fabrication; uranium hexafluoride conversion facilities; and independent spent fuel storage installations (ISFSI).

The power, test, and research reactors, and the ISFSI have been consolidated into a single analysis in the GEIS based on common radionuclide contaminants (<sup>60</sup>Co and <sup>137</sup>Cs), and are represented by the analysis for the power reactor.

The uranium fabrication facility is used as the reference for both the fabrication and hexafluoride facilities.

Facility Characteristics Applicable to Dose Modeling

1. Soil Surface Activities for the Radionuclides of Interest <sup>(1)</sup>	
Radionuclide	Surface Concentration (pCi/g)
Co-60	60
Cs-137	20
Uranium	1,000

<sup>(1)</sup> From NUREG-1496, Table C.7.1.2

2. Total and Contaminated Surface Areas for Structures and Soils at Reference Sites <sup>(1)</sup>							
Reference Facility	Structures Radionuclide Activity <sup>(2)</sup> , dpm/100 cm <sup>2</sup>	Structures Surface Areas				Soil Surface Area, ft <sup>2</sup>	
		ft <sup>2</sup>		% Contaminated			
		Floor	Wall	Floor	Wall	Total Site	Contaminated
PWR	7.5 x 10 <sup>6</sup> Co60 2.4 x 10 <sup>6</sup> Cs137	250,000	300,000	10	2	50 x 10 <sup>6</sup>	3,000
Uranium Fuel Fab	18,000 U	240,000	240,000	50	5	4.7 x 10 <sup>6</sup>	100,000

(1) The estimated surface areas listed above (reproduced from NUREG-1496, Appendix C) are based on limited information and in many cases represent an engineering judgment based on the size of the building structural facilities and types of operation. These estimates are considered to be conservatively large, i.e., they probably overestimate the actual areas involved.

(2) Radionuclide activity shown is for building surfaces. Radionuclide activity for soil surfaces is given below.

3. Contamination Distribution Used in the GEIS <sup>1</sup>					
Reference Facility	Soil Area	Soil Depth	Soil Volume	Below-Building Soil Depth	Below-Building Soil Volume
	ft <sup>2</sup>	cm	m <sup>3</sup>	cm	m <sup>3</sup>
Nuclear Power Plant	3,000	4 - 100	12 - 250	3 - 21	15 - 100
Uranium Fuel Fabrication	100,000	44 - 300	4,000 - 28,000	18 - 29	82 - 129

<sup>(1)</sup> From NUREG-1496, Table C.1.10 and C.2.6

4. Example Non-Fuel-Cycle facilities: universities; medical institutions; sealed source manufactures; industrial users of radioisotopes; research and development laboratories; and rare metal refineries.

The sealed source manufactures and R&D laboratories are consolidated into a single analysis. The analysis of the rare metals processing facility is used to represent all other non-fuel-cycle facilities with low to medium to significant contamination.

Materials licensees who use only sealed sources or short-lived radioactive materials are not expected to require decontamination of buildings or soil, and therefore the impacts and costs of decommissioning are expected to be minimal. The GEIS does not include a detailed analysis of these licensees. If a licensee in this category does require more extensive analysis, the applicability of the GEIS should be evaluated by comparison to the other non-fuel-cycle reference facilities based on the radioisotopes and contamination levels involved.

## Facility Characteristics Applicable to Dose Modeling

4. Total and Contaminated Surface Areas for Structures and Soils at Reference Sites <sup>(1)</sup>							
Reference Facility	Structures Radionuclide Activity <sup>(2)</sup> , dpm/100 cm <sup>2</sup>	Structures Surface Areas				Soil Surface Area, ft <sup>2</sup>	
		ft <sup>2</sup>		% Contaminated			
		Floor	Wall	Floor	Wall	Total Site	Contaminated
Sealed Source Manufacturer	102,000 Co60 33,300 Cs137	6,000	4,600	10	5	40,000	5,000
Rare Metal Extraction	18,000 Thorium	150,000	180,000	40	10	740,000	100,000

(1) The estimated surface areas listed above (reproduced from NUREG-1496, Appendix C) are based on limited information and in many cases represent an engineering judgment based on the size of the building structural facilities and types of operation. These estimates are considered to be conservatively large, i.e., they probably overestimate the actual areas involved.

(2) Radionuclide activity shown is for building surfaces. Radionuclide activity for soil surfaces is shown below.

5. Soil Surface Activities for the Radionuclides of Interest <sup>(1)</sup>	
Radionuclide	Surface Concentration (pCi/g)
Co-60	60
Cs-137	20
Thorium	200

(1) From NUREG-1496, Table C.7.1.2

6. Contamination Distribution Used in the GEIS <sup>1</sup>					
Reference Facility	Soil Area	Soil Depth	Soil Volume	Below-Building Soil Depth	Below-Building Soil Volume
	ft <sup>2</sup>	cm	m <sup>3</sup>	cm	m <sup>3</sup>
Sealed Source	5,000	4 - 90	20 - 425	3 - 21	0 - 2
Rare Metals Extraction	100,000	10 - 60	1,000 - 5,700	0 - 2	0 - 6
	Slag Pile Volume: 7,000 m <sup>3</sup>				

(1) From NUREG-1496, Table C.3.6 and C.4.6