



10 CFR 52.79

December 07, 2011
NRC3-11-0044

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

References: 1) Fermi 3
Docket No. 52-033
2) Letter from Jerry Hale (USNRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 69 Related to Chapter 1.0 for the Fermi 3 Combined License Application," dated November 9, 2011

Subject: Detroit Edison Company Response to NRC Request for Additional Information Letter No. 69

In Reference 2, the NRC requested additional information to support the review of certain portions of the Fermi 3 Combined License Application (COLA). The response to the Request for Additional Information (RAI) associated with Reference 2 is provided as Attachment 1 of this letter. Information contained in this response will be incorporated into a future COLA submission as described in the Attachment.

If you have any questions, or need additional information, please contact me at (313) 235-3341.

I state under penalty of perjury that the foregoing is true and correct. Executed on the 7th day of December 2011.

Sincerely,

A handwritten signature in black ink, appearing to read "PWS", with a long horizontal flourish extending to the right.

Peter W. Smith, Director
Nuclear Development – Licensing and Engineering
Detroit Edison Company

Attachment: 1) Response to RAI Letter No. 69, RAI Question No. 01-7

cc: Jerry Hale, NRC Fermi 3 Project Manager
Raj Anand, NRC Fermi 3 Project Manager (w/o attachments)
Michael Eudy, NRC Fermi 3 Project Manager (w/o attachments)
Bruce Olson, NRC Fermi 3 Environmental Project Manager (w/o attachments)
Fermi 2 Resident Inspector (w/o attachments)
NRC Region III Regional Administrator (w/o attachments)
NRC Region II Regional Administrator (w/o attachments)
Supervisor, Electric Operators, Michigan Public Service Commission (w/o attachments)
Michigan Department of Natural Resources & Environment, Radiological Protection
Section (w/o attachments)

Attachment 1

NRC3-11-0044

Response to RAI Letter No. 69

**RAI Question No. 01-7
(eRAI Tracking No. 6146)**

(8 pages)

NRC RAI 01-7

Provide specifics types of sources, byproducts, and special nuclear material (SNM), the chemical or physical form, and the maximum amount at any one time for the requested material license under Title 10, Code of Federal Regulations (10 CFR) Parts 30, 40, and 70. Provide specific material information in accordance with requirements for 10 CFR 30.32, 10 CFR 40.31, and 10 CFR 70.21 and 70.22. Specific to the request for a SNM licensed pursuant to 10 CFR 70, identify the category or class of SNM (Category I – strategic, Category II – moderate strategic significance, Category III – low strategic significance) based on the requested types, form, and maximum total quantities of SNM.

(U) Regulatory Basis: The applicant requests a material license pursuant to 10 CFR 30, 10 CFR 40, and 10 CFR 70 to receive possess, and use byproduct, source, and SNM. The applicant is required to provide specific descriptions of the nuclear materials to include the types, chemical or physical form, and the maximum quantities, in accordance with the applicable requirements of 10 CFR 30, 10 CFR 40, and 10 CFR 70 for the license requested. 10 CFR 30.32 and 10 CFR 40.31 for license of byproduct and source material requires the applicant to include specific information of nuclear material requested and their use or purpose for the license. In accordance with 10 CFR 70.22(a)(4), applicants must include, the name, amount, and specifications (including the chemical and physical form and, where applicable, isotopic content) of the special nuclear material the applicant request to possess and use for a 10 CFR Part 70 license.

Response

As described in COLA Part 1, this application is for the necessary licenses issued under 10 CFR Part 30, 10 CFR Part 40, and 10 CFR Part 70 to receive, possess, and use byproduct, source, and special nuclear material. Special nuclear material shall be in the form of reactor fuel and spent fuel, in accordance with limitations for storage and amounts required for reactor operation, as described in COLA Part 2. Additionally, byproduct, source, and special nuclear material shall be in the form of sealed neutron sources for reactor startup and sealed sources for reactor instrumentation, radiation monitoring equipment, calibration, and fission detectors in amounts as required. In preparation for the initial fuel loading, limitations on byproduct material and Part 40 specifically licensed source material will be as described in this response. Pursuant to 10 CFR 52.8, this application also seeks licenses, which would be incorporated into the COL, to possess, but not separate, such by-product, and special nuclear material, as may be produced by the operation of the facility. Following the 10 CFR 52.103(g) finding, byproduct, source, and special nuclear material in amounts as required, without restriction to chemical or physical form, shall be for sample analysis, instrument and equipment calibration, or associated with radioactive apparatus or components.

10 CFR Part 40 Material

No 10 CFR Part 40 specifically licensed material, including natural uranium, depleted uranium, and uranium hexafluoride, will be received, possessed, or used during the period between issuance of the COL and the 10 CFR 52.103(g) finding.

10 CFR Part 30 Material

The radioactive material identified below represents nominal values of projected materials that will be used for the Radiation Monitoring System and laboratory/portable monitoring instrumentation.

Radioactive Licensee Material (Element and Mass Number)¹	Chemical and/or Physical Form¹	Maximum Quantity that Licensee May Posses at Any One Time¹
Any byproduct material with atomic numbers 1 through 93	Sealed Sources ²	No single source to exceed 100 millicuries 5 Curies total
Americium - 241	Sealed Sources ²	No single source to exceed 300 millicuries 500 millicuries total

- Notes: 1. This information remains in effect between issuance of the COL and the 10 CFR 52.103(g) finding and will be designated historical information after that time.
 2. Includes calibration and reference sources.

10 CFR Part 70 Non-Fuel Special Nuclear Material

The radioactive material identified below represents nominal values of known non-fuel special nuclear material specifically required for use at Fermi 3:

(a) Element and Mass Number	(b) Chemical or Physical Form	(c) Maximum Amount
U-234 (approx. 78%) U-235 (approx. 22%)	Local Power Range Monitor Assemblies – Each Assembly includes Four Fission Chambers - (64 assemblies, and 4 spares)	0.0104 grams of Uranium per assembly. Total of approx. 0.71 grams.
U-234 (approx. 78%) U-235 (approx. 22%)	Startup Range Nuclear Monitor Assemblies – Fission Chambers (12 installed assemblies and 1 spare)	0.0129 grams of Uranium per assembly. Total of approx. 0.17 grams.
Cf-252	Neutron Source Wire (Total of six sources)	0.5 to 0.822 mg per source capsule Total of 3 to 5 mg of material.

Based on the type, quantity and form, the special nuclear material identified in the above table is below the threshold of Category III, low strategic significance, as defined in 10 CFR 70.4.

Appendix 13CC of Fermi 3 COLA FSAR (provided in the Detroit Edison response to NRC Request for Additional Information Letter No. 61, dated July 15, 2011, [ML11200A042]) describes the Fermi 3 SNM material control and accountability (MC&A) program.

Proposed COLA Revision

Attached are proposed revisions to FSAR Section 12.2.2 to provide the specific information for the 10 CFR Part 30, 10 CFR Part 40, and 10 CFR Part 70 materials.

Markup of Detroit Edison COLA Part 2
(following 4 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next submittal of the Fermi 3 COLA. However, the same COLA content may be impacted by other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

The same consideration applies to solid and liquid radionuclide sources of exempt quantities or concentrations which are used to calibrate or check the portable and laboratory radiation measurement instruments.

Instrument calibrators are normally used for calibrating gamma dose rate instrumentation. These may be self-contained, heavily shielded, multiple source calibrators. Beta and alpha radiation sources are also available for instrument calibration. Calibration sources are traceable to the National Institute of Standards and Technology, or equivalent.

Radiography sources are surveyed upon entry to the site. Radiation protection personnel maintain copies of the most recent leak test records for owner-controlled sources. Contractor radiography personnel provide copies of the most recent leak test records upon radiation protection personnel request. Radiography is conducted in accordance with approved procedures.

Insert A

The Condensate Storage Tank (CST) potentially contains radioactive fluids. Estimated conservative radionuclide inventories in the CST are provided in Table 12.2-207. Using conservative assumed parameters for the CST, the exposure rate is less than 5 mrem/hr at 30 cm from the CST and would not be considered a radiation area per 10 CFR 20.1003.

12.2.2.1 Airborne Releases Offsite

Replace this section with the following.

EF3 COL 12.2-2-A

Airborne sources are calculated using the source terms given in Section 11.1.

The bases for these calculations are shown in Table 12.2-15R.

The ESBWR standard design employs three ventilation stacks (airborne release points). Individual stacks service the ventilation flows from the Reactor/Fuel Buildings (RB/FB), the Turbine Building (TB) and the Radwaste Building (RWB). The offsite airborne release analysis of the ESBWR ventilation stack design employs conservative long term atmospheric dispersion (X/Q) and deposition (D/Q) parameter values for each release location. Fermi site-specific values for these parameters are shown in Table 12.2-15R.

The subject X/Q and D/Q values in Table 12.2-15R are used in the calculation of the gaseous effluent normal operation doses in Table

This markup supersedes Insert A in the markup included with the response to RAI 13.03-62 Attachment 7 provided in the Detroit Edison Response to NRC Request for Additional Information Letter No. 52 dated March 29, 2011, ML110900094.

Insert A

No 10 CFR Part 40 specifically licensed material, including natural uranium, depleted uranium, and uranium hexafluoride, will be received, possessed, or used during this period.

During the period prior to the implementation of the Emergency Plan (in preparation for the initial fuel loading following the 10 CFR 52.103(g) finding), no specific by-product, source, or special nuclear material related emergency plan will be necessary because:

- a) No by-product material will be received, possessed, or used in a physical form that is "in unsealed form, on foils or plated sources, or sealed in glass," that exceeds the quantities in Schedule C in 10 CFR 30.72;
- b) ~~The source material to be received, possessed, or used does not involve uranium hexafluoride in excess of 50 kilograms in a single container or 1000 kilograms total; and~~
- c) The special nuclear material to be received, possessed, or used does not involve enriched uranium for which a criticality accident alarm system is required, uranium hexafluoride in excess of 50 kilograms in a single container or 1000 kilograms total, or in excess of 2 curies of plutonium in unsealed form or on foils or plated sources.

Table 12.2-208 identifies radioactive sources that will be used for the Radiation Monitoring System and laboratory/portable monitoring instrumentation.

In accordance with the regulatory requirements of 10 CFR 70.22(a)(4), each application for a 10 CFR Part 70 Special Nuclear Material (SNM) License shall include the name, amount, and specifications (including the chemical and physical form and, where applicable, isotopic content) of the special nuclear material the applicant proposes to use or produce. The radioactive material identified in Table 12.2-209 represents nominal values of known non-fuel special nuclear material specifically required for use at Fermi 3.

**Table 12.2-207 Bounding Radionuclide Concentration and Inventory in the
 Condensate Storage Tank (Sheet 2 of 2) [STD COL 12.2-4-A]**

Radionuclide	CST Source Term Concentration	CST Source Term Inventory
	$\mu\text{Ci/cc}$	Curies
Ba-137m	5.1E-08	2.47E-04
Cs-138	5.4E-06	2.62E-02
Ba-140	4.6E-06	2.26E-02
La-140	2.8E-07	1.36E-03
Ce-141	2.1E-08	1.02E-04
Ce-144	2.1E-09	1.02E-05
Pr-144	2.1E-09	1.02E-05
Np-239	1.1E-05	5.49E-02
Na-24	1.4E-06	6.78E-03
P-32	2.8E-08	1.36E-04
Cr-51	2.1E-06	1.02E-02
Mn-54	2.5E-08	1.21E-04
Mn-56	1.5E-05	7.26E-02
Fe-55	6.9E-07	3.39E-03
Fe-59	2.1E-08	1.02E-04
Co-58	6.9E-08	3.39E-04
Co-60	1.4E-07	6.78E-04
Ni-63	6.9E-10	3.39E-06
Cu-64	2.0E-06	9.68E-03
Zn-65	6.9E-07	3.39E-03
Ag-110m	6.9E-10	3.39E-06
W-187	2.1E-07	1.02E-03

← Insert B Here

Table 12.2-208 Radioactive Sources Used for Radiation Monitoring and Laboratory and Portable Monitoring Instrumentation¹

Radioactive Licensee Material (Element and Mass Number)¹	Chemical and/or Physical Form¹	Maximum Quantity that Licensee May Posses at Any One Time¹
Any byproduct material with atomic numbers 1 through 93	Sealed Sources ²	No single source to exceed 100 millicuries 5 Curies total
Americium – 241	Sealed Sources ²	No single source to exceed 300 millicuries 500 millicuries total

- Notes: 1. This information remains in effect between issuance of the COL and the 10 CFR 52.103(g) finding and will be designated historical information after that time.
2. Includes calibration and reference sources.

Table 12.2-209 Non-Fuel Special Nuclear Material for Use

The radioactive material identified below represents nominal values of known non-fuel special nuclear material specifically required for use at Fermi 3.

(a) Element and Mass Number	(b) Chemical or Physical Form	(c) Maximum Amount
U-234 (approx. 78%) U-235 (approx. 22%)	Local Power Range Monitor Assemblies – Each Assembly includes Four Fission Chambers - (64 assemblies and 4 spares)	0.0104 grams of Uranium per assembly. Total of approx. 0.71 grams.
U-234 (approx. 78%) U-235 (approx. 22%)	Startup Range Nuclear Monitor Assemblies – Fission Chambers (12 installed assemblies and 1 spare)	0.0129 grams of Uranium per assembly. Total of approx. 0.17 grams.
Cf-252	Neutron Source Wire (Total of six sources)	0.5 to 0.822 mg per source capsule Total of 3 to 5 mg of material.