DTE Energy

Fermi 1 License Termination Plan

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Agenda

- Introduction
- Purpose of the Meeting
- Fermi 1 Decommissioning Status
- Follow-up on Previous Items
- Site Characterization Methodology

Agenda (Continued)

- Sensitivity Analysis
- DCGLs
- Historical Site Assessment (HSA)
- EPA Interface
- Future Meeting Topics/Dates
- Meeting Summary/Action Items

Purpose of the Meeting

- Update the NRC on the status of the Fermi 1 decommissioning project
- Provide the NRC with Fermi 1 Characterization/HSA processes
- Provide methodology and results of:
  - Radionuclide Selection
  - Sensitivity Analysis
  - DCGLs
- Obtain NRC feedback

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Fermi 1 Decommissioning Status

- Primary system sodium reacted
- NaK lines removed or flushed
- Graphite block weathering
- Liquid waste system removal starts this year
- Reactor Building cleanup and decon.

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Fermi 1 Decommissioning Status

- Energy Solutions on site for large component and vessel removal
  - Schedule shows work complete Jan. 2010
- Draft 50.59 for reactor vessel does not result in a need for license amendment

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Follow-up Items

- Fermi 1 site being within Fermi 2 Owner Controlled Area
- Results of Excavations Samples and Surveys

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Site Characterization

- Performed to support the HSA and LTP
  - Provide data supporting the initial classification
- Surveys
  - Beta fixed-point measurements
  - Beta scans
  - Gamma scans
  - Loose surface contamination surveys (smears)
  - Excavation survey/sampling
- Results
  - No unexpected results

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Sensitivity Analysis

- RESRAD-Build Version 3.4 for Building Surfaces (Building Occupancy)
  - Pathways: 1) direct external exposure from the source (i.e., the floor, walls, and ceiling), 2) external exposure from deposited material, 3) external exposure due to air submersion, 4) exposure due to inhalation of airborne radioactive material, and 5) inadvertent ingestion of radioactive material.
- RESRAD Version 6.4 for Soil (Resident Farmer)
  - Pathways: 1) direct radiation exposure, 2) inhalation of airborne dust, 3) ingestion of plants, 4) ingestion of meat, 5) ingestion of milk, 6) ingestion of groundwater, and 7) ingestion of aquatic foods, and 8) inadvertent ingestion of soil contaminates.

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Sensitivity Analysis (continued)

- Initial Parameter Selection
- Parameter Classification
- Priority Ranking Assignment
- Deterministic or Stochastic
- Behavioral and Metabolic Parameters: Deterministic
- Physical Parameters: Stochastic
  - Priority 1 & 2: Use Distribution Values In NUREGS
  - Priority 3: Use Default Values

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Sensitivity Analysis (continued)

- Used the Probabilistic Modules of RESRAD-Build and RESRAD
- Latin Hypercube Sampling (LHS) technique (300 & 2000 observations)
- Sensitivity Criteria (PRCC-Partial Rank Correlation Coefficient)
  - $|PRCC| \geq 0.10$ for RESRAD-Build and $|PRCC| \geq 0.25$ for RESRAD
- Negative Correlation use 25 Percentile
- Positive Correlation use 75 Percentile

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Proposed Values for Sensitive Parameters

- "Proposed Values for Input Parameters for Building Surface DCGLs", is available upon request
- "Proposed Values for Input Parameters for Soil DCGLs", is available upon request

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DCGLs

- Building occupancy scenario
  - Modified inputs to account for moderate to heavy work activities
    - 365 day exposure duration
    - Breathing rate 45.6 m^3/d
    - Inadvertent ingestion
- Resident farmer
  - If groundwater is an influence, the DCGLs will be scaled back to reflect the dose contribution from this source
    - No groundwater contamination present at Fermi 1

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DCGLs (Continued)

- Building surface DCGLs

Nuclide	Building Surface (dpm/100cm^2)
Ag-108m	1.8E+04
Am-241	6.0E+03
C-14	1.0E+07
Cm-242	3.1E+05
Cm-243	7.2E+03
Co-60	1.1E+04
Cs-134	1.7E+04
Cs-137	3.9E+04
Eu-152	2.2E+04
Eu-154	2.0E+04
Eu-155	3.6E+05
Fe-55	4.1E+07

Nuclide	Building Surface (dpm/100cm^2)
H-3	2.9E+08
Mn-54	4.2E+04
Na-22	1.3E+04
Nb-94	1.5E+04
Ni-59	6.0E+05
Ni-63	3.6E+07
Pu-238	5.7E+03
Pu-239	5.0E+03
Pu-240	5.0E+03
Pu-241	2.7E+05
Sb-125	5.9E+04
Sr-90	1.4E+05
Tc-99	1.4E+07

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DCGLs (Continued)

- Soil DCGLs

Nuclide	Soil (pCi/g)
Ag-108m	7.8E+00
Am-241	1.3E+02
C-14	4.5E+02
Cm-242	7.7E+03
Cm-243	7.8E+01
Co-60	5.1E+00
Cs-134	8.3E+00
Cs-137	1.7E+01
Eu-152	1.1E+01
Eu-154	1.1E+01
Eu-155	4.0E+02
Fe-55	3.4E+04

Nuclide	Soil (pCi/g
H-3	3.1E+04
Mn-54	2.1E+01
Na-22	6.2E+00
Nb-94	1.2E+02
Ni-59	1.1E+04
Ni-63	4.0E+03
Pu-238	1.6E+02
Pu-239	1.4E+02
Pu-240	1.4E+02
Pu-241	5.2E+03
Sb-125	3.4E+01
Sr-90	1.2E+01
Tc-99	1.2E+02

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Historical Site Assessment (HSA)

- Documents a comprehensive investigation that:
  - Describes the site's physical configuration
  - Identifies the radioactive constituents of site contamination
  - Assesses the migration of contaminants
  - Identifies contaminated media
  - Considers impacts of continuing decommissioning activities
  - Classifies impacted areas
- HSA is nearing completion

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Radionuclide Selection

- Develop theoretical suite of nuclides
  - NUREG/CR-3474
  - Previous analyses
  - Activation analyses
- Radionuclides with $T_{1/2} < 2$ years omitted
- Radionuclides contributing <0.1 percent to the total activity omitted
- Evaluate compliance with dose criteria for discounting
  - DandD (0.51% residential and 0.02% occupancy)
  - FGR 11 (.03% inhalation and 0.004% ingestion)
  - FGR 12 (no external dose component > 0.006%)

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Key Upcoming Dates

- LTP Draft complete – February 2009
- LTP Submittal – Spring 2009
- LTP Public meeting – Summer 2009
- Reactor vessel and large component shipping ~July - November 2009

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