Attachment 4
Power Point Presentation
(Non-Proprietary Information)

Overview of Licensing Action: Subsurface DCGLs

Presented by

Nuclear Fuel Services, Inc.

to the

United States Nuclear Regulatory Commission

March 8, 2005

Rockville, Maryland

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Outline

- Proposed Action
- Background Information
- Need
- Supporting Regulatory Basis
- Proposed Schedule & Milestones
- Technical Basis
- Discussion

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Proposed Action

- NFS proposes a technical basis to adjust approved cleanup criteria
  - Based on scaling factors and limited to subsurface soils
  - Includes alternate methods (Appendix B) for conducting Final Status Survey (FSS) limited to subsurface contamination
- Cleanup criteria previously approved for surface soils are not included within the scope of this licensing action
- If approved, this methodology will be helpful to other licensees having difficulty remediating to levels allowing "unrestricted use"

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Background

- North Site Decommissioning Plan approved by NRC on June 19, 2001
  - Cleanup criteria excluded drinking water pathway as inapplicable
  - Included MARSSIM-based FSS Methods
- Initially proposed use of "mixing ratio" to account for "unintentional mixing" clean with contaminated soil
  - Inadvertent intruder scenario based on *Licensing Requirements for Land Disposal of Radioactive Waste, Draft Environmental Impact Statement (DEIS) for 10 CFR Part 61* (NUREG-0782), dated September 1981
- NRC agreed with conceptual approach to develop subsurface cleanup criteria, but challenged the basis of using DEIS (NFS letter dated October 19, 2000)

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Need

Cleanup criteria for Th-232 Problematic

Cleanup Criteria Approved for the North Site

Radionuclide	DCGL pCi/g	Radionuclide	DCGL pCi/g
U-238	306	Pu-239	140
U-235	74	Pu-238	155
U-233/234	642	Am-241	130
Pu-242	148	**Th-232***	**3.7**
Pu-241	4365	Th-230	17
Pu-240	141	Tc-99	414

*** Th-232 background concentrations ranges from 1.6 to 1.7 pCi/g.**

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Need

- United States Government contractually responsible for providing funds for decommissioning related activities
- Completed excavating large volumes of soil/debris from North Site
  - Disposal volumes to date exceeding 4.5 million ft^3 of soil and debris
  - Depths exceeding 15-17 feet at many locations
- Former "Ponds Areas' most problematic
    - Average Th-232 concentrations ~15 pCi/g (post-remediation)
    - Excavations are several feet below water table
- Approximately 1.26 million ft^3 of soil still to remediate at North Site

Need

Aerial Photograph

Need

Site Layout

Supporting Regulatory Basis

Provides Workable Solution for Demonstrating Compliance With License Termination Rule for Difficult Sites

- NMSS Consolidated Guidance (NUREG-1757 – Appendix G)
  - When appropriate DCGLs and mixing volumes based on acceptable site-specific dose assessment are established, the FSS is performed by taking core samples to the measured depth of radioactivity.
- Kaiser Aluminum - Decommissioning Plan - June 2003
  - Allowed excavation, sorting and replacement of Th-232 contaminated slag/soils at concentrations of 31.1 pCi/g at depths greater than 10 feet (See 69 FRN 110, June 9, 2003)
- Regulatory Issues Summary (RIS) 2004-08 (May 28, 2004)
  - Recommended allowing intentional mixing of clean with contaminated soil on a case-by-case basis (also see SECY-04-0035)

Supporting Regulatory Basis

Continued

- NFS' approach is consistent with NUREG-1757, but more conservative than approach listed in RIS and that approved for Kaiser Aluminum
  - Proposal does not include re-use (emplacement) of excavated contaminated soil
  - More conservative than practice of "intentional mixing"
- Absent specific guidance, approach is technically sound and defensible
  - Technical basis includes mixing volumes based on acceptable site-specific dose assessment
  - Technical approach has attributes similar to Data Quality Objective process defined in MARSSIM

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Schedule and Milestones

Licensing Plan of Action

- February 9, 2005 – NFS submitted license amendment request
- March 8, 2005 – NFS and NRC Discussion of technical basis
- May 8, 2005 – NFS and NRC Conduct "Focus Group Meeting"
- June 8, 2005 – NFS Submit responses to "Focus Group" questions for NRC review
- July 8, 2005 – NRC Issues Request for Additional Information (if needed)
- August 8, 2005 – NFS Submits Responses to RAI Questions
- September 8, 2005 – NRC Approved license amendment request

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Derivation and Application of Subsurface Soil DCGLs

NFS' North Site Decommissioning Project

MACTEC

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OBJECTIVES

- Establish conceptual framework for the development of subsurface soil DCGLs for use at NFS' North Site Decommissioning Project
  - Describe the need for subsurface DCGLs
  - Describe the regulatory guidance and its conceptual application
  - Describe the technical approach for development of subsurface DCGLs
  - Describe the process and metrics used to demonstrate compliance with the decommissioning criteria

The Need for Subsurface DCGLs

- Characterization and remedial support surveys have confirmed the presence of residual radioactivity in subsurface soils at NFS' North Site
  - To date, NFS has conservatively chosen to apply surface soil criteria to each successive subsurface soil layer encountered during excavation
  - While average concentrations of residual radioactivity are generally low, discrete soil samples have exceeded the surface soil DCGLs, necessitating deeper excavations
  - Groundwater and boulders have been encountered in many of these excavations, precluding the direct application of surface soil criteria
  - Significant over-excavation is occurring due to the application of surface soil criteria

Applicable Regulatory Guidance for Subsurface Soil DCGLs

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NUREG-1575

- MARSSIM nominally discounts its applicability to subsurface soils for Final Status Survey

  - "MARSSIM does not cover other media, including construction materials, equipment, *subsurface soil*, surface or subsurface water, biota, air, sewers, sediments or volumetric contamination." *(Table 1.1)*

NUREG-1757, Vol. 2

- The latest NRC decommissioning guidance, "*Consolidated NMSS Decommissioning Guidance, Vol. 2—Characterization, Survey, and Determination of Radiological Criteria*" does provide basic guidance on the assessment of residual radioactivity in subsurface soils.
  - Guidance is contained in Appendix G, Section G.2
  - Consistent with previous guidance contained in NUREG-1727 (Appendix E)

General Guidance from NUREG-1757

- *"The [subsurface soil] DCGL may be based on the assumption the residual radioactivity [in the subsurface] may be excavated some day"* and brought to the surface where exposure occurs.
- *"...mixing of the residual radioactivity [in subsurface soil layers] will occur during excavation."*
- Subsurface soil *"DCGLs and mixing volumes should be based on an acceptable site-specific dose assessment."*

NUREG-1757 Guidance *Continued*

- Compliance with subsurface soil criteria is based on core sampling
  - *"Number of cores to be taken is initially the number (N) required for the WRS or Sign test, as appropriate"*
  - *"Core samples should be homogenized over a soil thickness that is consistent with the assumptions made in the dose assessment, typically not exceeding 1 meter in depth"*
    - *"It is not acceptable to average radionuclide concentrations over an arbitrary soil thickness."*
  - *"Adjustment of the grid spacing is more complicated than for surface soils because scanning is not applicable"*

10 CFR 20

- The subsurface soil DCGL derivation method is a performance-based, risk-informed process, in keeping with current U.S. NRC decision-making rulemaking policy.
- It is compliant with requirements of the license termination rule for decommissioning as specified in 10 CFR 20.1402