

# **SNEC Decommissioning Project**

**NRC Public Meeting**

**April 8, 2002**

# Submittal History

- April 1998 - License Amendment 15 authorizes decommissioning
- February 2000 - License Termination Plan submitted to NRC for review and approval.
- August 2000 - RAI 1 (Request for Additional Information) issued by NRC
  - 27 Questions
  - GPU responses to 20 of 27 questions accepted by NRC
  - Remaining 7 questions carried over into RAI 3
- November 2000 - RAI 2 issued by NRC
  - 10 Questions
  - GPU response to 5 of 10 questions accepted by NRC
  - Resolution of remaining 5 questions in progress

# Submittal History (cont..)

- January 2001 - RAI 3 issued by NRC
  - 7 Questions
  - GPU responses to 4 of 7 questions accepted by NRC
  - Currently awaiting NRC acceptance of remaining 3 questions.
    - Classification of area under CV saddle (Needs updated by GPU on latest angle well installation & results of over 700 soil samples.)
    - Groundwater behavior issues
    - Area characterization /  $K_d$  study / dose modeling (covered in RAI 2)
- Characterization Submittals
  - July 2001 - Phase 1 - DSF, CV Pipe Tunnel subsurface soil, & pavement/subpavement soil.
  - September 2001 - Phase 2 - SSGS, Discharge Tunnel & Surrounding Environs
  - January 2002 - Phase 2&3 - River Sediment, Yard Drains, & Intake Tunnel

# Key Technical Support

<b>Contractor Name</b>	<b>Technical Area</b>
1. URS	Subsurface dose modeling
2. Haley & Aldrich	Hydrogeology
3. Argonne National Lab (ANL)	- RESRAD training - $K_d$ development
4. Dames & Moore	MARSSIM training
5. ENERCON	River sediment sampling
6. Shonka & Associates	Large Area Surveys

## **6 - RAI2 Key NRC Concerns**

- Concerns with the analyses used to develop DCGLs used for soil, concrete debris and sediments
  - Particularly, there is insufficient basis to support the approach used for conducting the sensitivity analyses to identify key parameter and for analyzing subsurface material.
- Insufficient documentation and information to allow a clear understanding of how the analysis was done.
- Concerns with transparency and reproducibility of the analysis.

# RAI 2 GPU Response

- Our RAI2 responses raise numerous concerns on methodology expectations and GPU seeks to obtain further clarification from NRC.
- GPU believes we have sufficient justifications on information used for answer RAI2 questions. We agree that the information needs to be communicated more effectively to the NRC for verification.
- Recommend that NRC and GPU staffs take more time to review jointly what we have done and determine what needs to go on the docket.

## GPU vs NRC Soil DCGLs (pCi/g)

Isotope	GPU DCGL <sup>3</sup>	NRC DCGL <sup>1 2</sup>	GPU/NRC Ratio
Am-241	18	2.1	8.6
C-14	27	12	2.3
Cm-243	25	3.2	7.8
Cm-244	39	*	*
Co-60	3.9	3.8	1.0
Cs-134	5.1	5.7	0.9
Cs-137	8.7	11	0.8
Eu-152	10.8	8.7	1.2
Eu-154	10	8	1.3
Eu-155	415	*	*
Fe-55	2.30E+04	1.00E+04	2.3
H-3	1400	110	12.7
Nb-94	7.6	5.8	1.3
Ni-59	3216	5500	0.6
Ni-63	1175	2100	0.6
Pu-238	6.7	2.5	2.7
Pu-239	1.5	2.3	0.7
Pu-240	1.6	*	*
Pu-241	1021	72	14.2
Pu-242	1.6	*	*
Sb-125	16	*	*
Sr-90	1.3	1.7	0.8
Tc-99	11.4	19	0.6
U-234	1.9	13	0.1
U-235	1.9	0.29	6.6
U-238	2	0.5	4.0
* No NRC DCGLs available			
1. Reference Federal Register: December 7, 1999 (Volume 64, Number 234)			
2. NRC DCGL values for U-235/238 account decay progeny in equilibrium.			
3. Shaded areas denote primary radionuclides found at SNEC.			

# 1 - RAI2 Q3 Issues

- DCGL justification for embedded piping.
- Clarify which DCGLs (surface or volumetric) apply to releasing the CV.
- Provide area factor calculation (SNEC Calculation #E900-01-005) to facilitate NRC review.
- Update volumetric area factors based on latest modeling. (Ref. SNEC Calc. #6900-02-008, Attachment 6-1)

## 2 - RAI2 Q4 Issues

- NRC unable to duplicate surface soil DCGLs based on information submitted.
- NRC needs to obtain electronic copies of the RESRAD input/output files.
- Describe clearly how DCGLs were developed, how sensitivity analysis was performed and how the sensitivity results are being used.
- Justify sensitive parameters listed in Table 4, i.e.:
  - indoor time fraction (M, metabolic, B, behavior) = 0.5
  - external gamma shielding factor (P, physical) = 0.7
  - contaminated fraction of plant food (B, P) = 1
  - contaminated fraction of meat (B, P) = 1
  - depth of roots (P) = 0.9 meters
  - livestock fodder intake for meat (P) = 68 kg/day
  - contaminated zone thickness (P) = 1 meter

## 2 - RAI2 Q4 Issues (cont.)

- Clarify use of national data as central tendency.
  - OK if non-sensitive parameter
  - If sensitive parameter need to justify
- Need to provide greater detail for sensitivity analysis.
  - Cutoff criteria
  - Sensitivity analysis performed on each radionuclide
  - Expand Table 4 to include sensitive parameters that are not listed:
    - Plant, meat, and milk transfer factors
    - Saturated zone hydraulic conductivity
    - Depth of soil mixing
    - Wind velocity
- Need to provide RESRAD output reports on sensitivity analysis.
- Explain why contamination in the shallow and deep systems are independent and mutually exclusive.

## 2 - RAI2 Q4 Issues (cont.)

- Discuss rationale for using lowest  $K_d$  value.
- Review hydraulic slope range values.
- Provide statistical parameter for the sensitivity analysis, i.e. min/max values only useful for the uniform, normal-b and lognormal-b distributions.
- Justify the issue: 75% of the livestock and irrigation is derived from on-site sources. Why is this a conservative and acceptable assumption?
- Explain why contaminated fraction of food and meat parameters are sensitive and include in probabilistic analysis.
- Use of DandD defaults for behavior parameters - Inputs recommended by NRC from a February 2001 meeting w/SNEC.
- Justify and bound the use of the 10,000 m<sup>2</sup> contaminated zone area. Is this consistent with assumptions made in developing survey units. NRC needs to clarify.

### 3 - RAI2 Q5 Issues

- Indicate why  $K_d$  is the only factor considered in determining DCGL values applied to site media.
- Show why the lowest  $K_d$  value provides a conservative assessment of dose. (Also asked for in RAI2 Q4.)

## 4 - RAI2 Q6 Issue

- Clarify the term “or an equivalent form.”
  - SNEC plans to use MARSSIM Equation 4-4 to calculate gross DCGLs. Equation is in the SNEC LTP, section 5.2.3.2.4.
  - Equivalent denotes using Eq. 4-4 in its exact form or extending the series to include multiple fractions and radionuclide types.
- Explain when and how gross activity DCGL values will be provided.

## 5 - RAI2 Q8 Issues

- Need to provide electronic copy of subsurface dose model.
  - Explain how subsurface DCGLs were derived.
- Discuss why SNEC chose non-dispersion (ND) vs mass balance (MB) when withdrawing contaminants from a hypothetical well.
- Explain use of  $K_d$  values for the following:
  - Justify default  $K_d$ 's for Ac, Pa, Po, Ra, Th
  - Justify use of upper-end  $K_d$  of 5 for C and H
- Provide statistical parameters for sensitivity analysis. Use of min/max values only useful for uniform, normal-b, and lognormal-b distributions.
- Determine basis for dilution factor of 1/5 for contaminants in overburden material assumed to be brought to the surface.
- Justify rationale for deriving irrigation water from diluted shallow zone vs undiluted deep zone.

# 7 - NRC Site Visit Comments

- SNEC has decided to completely remove CV concrete.
  - Requires revision to LTP Sections 2,3,4 & 5.
  - Requires revision of survey units described in LTP Table 5-2.
  - New survey units will need to be created for exposed steel surfaces.
  - To avoid CV wall collapse steel reinforcement rings will be installed. Need to evaluate ring interferences for characterization and FSS surficial measurements.
  - Provide to NRC figures describing new survey units and tables indicating the nature and extent of contamination. Also, describe new survey/sampling techniques including automated advanced technology devices used for characterization and FSS surveys. Provide to NRC DQOs for such devices.
  - For CV dome removal describe the radiological controls to avoid recontamination of lower CV structure. Also, provide protocols to ensure clean fill is used.

## **8 - Review of Phase 1,2 & 3 Characterization Data**

- NRC concerns on minimal or no TRU/HTD radionuclide data.
- Clarify sample/measurement data needs.
  - Use of confidence levels
  - Analytical techniques for identifying TRUs need to be stated.
  - Explain why majority of data is specific to Cs-137.
- Provide survey unit figures for the SSGS and indicate the location of samples of significant activity.
- Provide rational for classifying Intake Tunnel as a Class 3 area.
- Reflect the reclassification of weir outfall from class 1 to class 2 in LTP Table 5-2. Survey unit size is defined as 25 m<sup>2</sup>.

## **9 - Key Additional Issues from Current LTP**

- Figures need to indicate specific survey units with appropriate sampling and measurement locations depicted and correlated to classification tables.
  - Discuss use of Figure 5-1 and treatment of survey areas containing multiple survey units.
- Discuss content of Final Survey Report adequacy as per LTP Section 5.7.2.
- Status of CV Tunnel classification. This structure is to be removed and therefore does not need to be classified.