

License Termination Plan Dose Modeling Issues Meeting

Saxton Nuclear Experimental
Corporation (SNEC)
Rockville, MD
July 31, 2002

Dose Modeling Issues

- Radionuclide reduction
- Dose modeling logic
- Parameter justification
- Subsurface regions
- Dilution factor
- Exposure pathways
- DCGLs

Radionuclide Reduction

- SNEC Calculation E9000-01-030
 - Eleven nuclides identified
 - Seven nuclides deselected
 - Based on <1% of the mix and <10% of the dose
 - Totaling 3.45% or 0.86 mrem of the 25 mrem limit
 - This dose will be accounted for during the FSS survey planning phase

Radionuclide Reduction

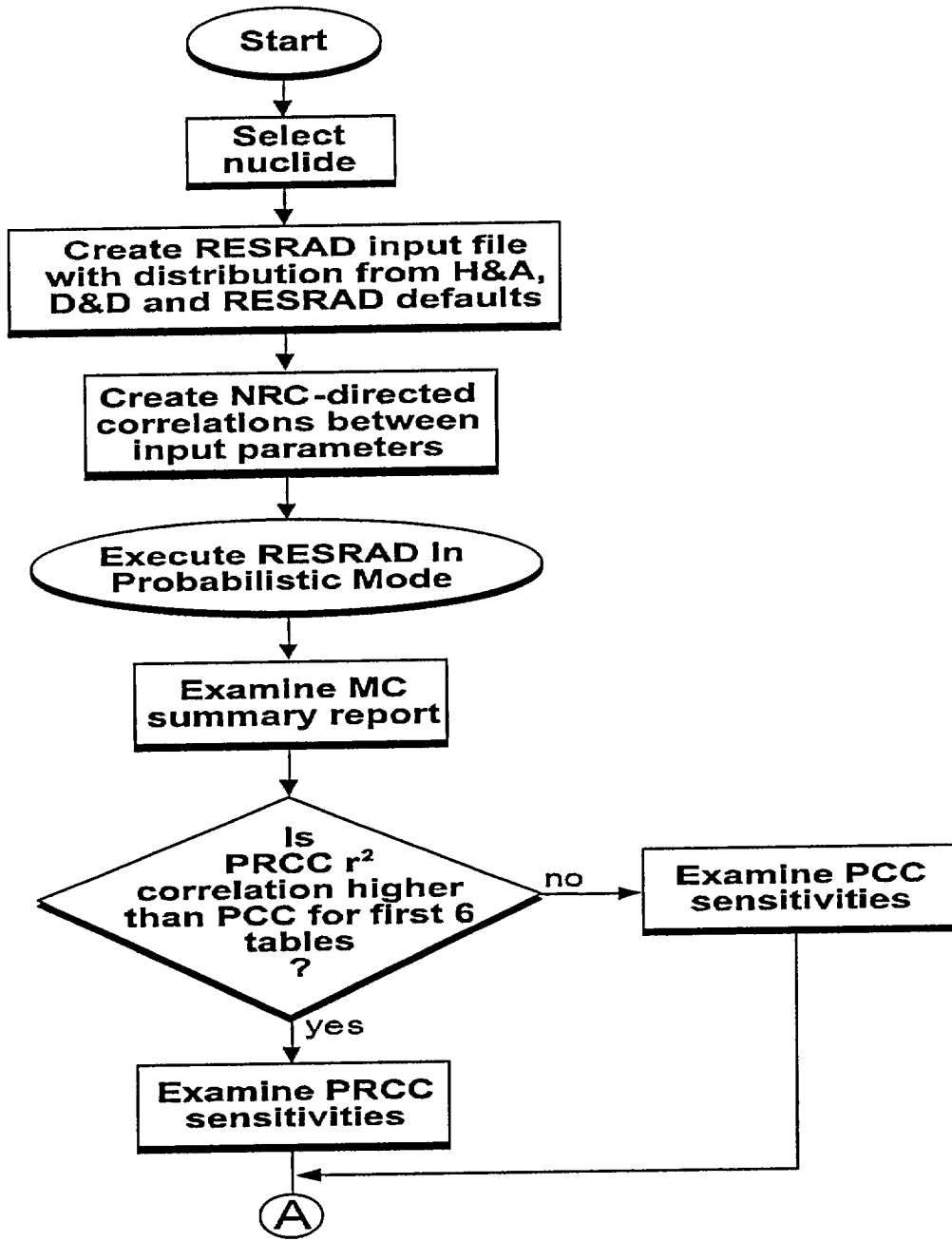
SNEC Radionuclide List	
H-3	Eu-152
C-14	Pu-238
Co-60	Pu-239
Ni-63	Pu-241
Sr-90	Am-241
Cs-137	

Dose Modeling Logic

- Used RESRAD 6.1
 - Probability used for Sensitivity Analyses
 - Deterministic used to calculate the DCGLs

Parameter Justification

- Selected based on our previous meeting
 - DandD Metabolic and Behavioral (M/B) default parameters used
 - Parameter justification will be described in Chapter 6 of the LTP



(A)

Identify those input parameters for which:
Sensitivity Coefficient
>0.25 from 6 tables

Print sensitive variables for calc. package

Begin to rerun RESRAD-Default case in probabilistic mode with only sensitive parameters varying

Halt RESRAD analysis after Latin - Hypercube sampling completed

Import LHSBIN.DAT table into Excel and identify means, 25% and 75% values for sensitive parameter distributions

Print mean, 25, 75 values for calc. package

(B)

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Edit RESRAD input file to include 25% value as base-deterministic input for each sensitive parameter that is negatively correlated (sens.parameter <-0.25)

Edit RESRAD file to Include 75% value as base-deterministic value input for each sensitive parameter that is positively correlated (>0.25)

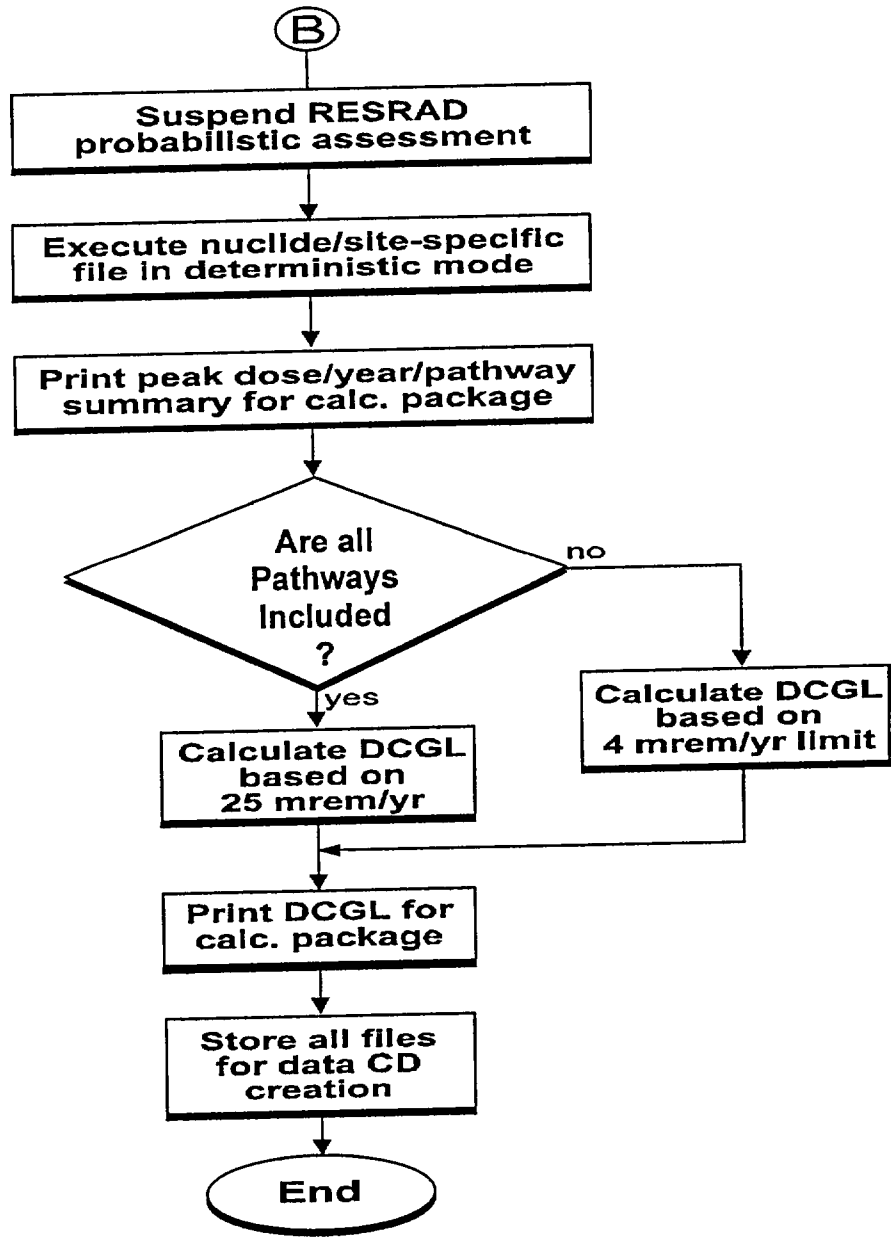
Replace base-deterministic value for sensitive parameters with statistical mean value for those parameters for which mean is not bounded by 0.25 & 0.75 %

Is K_D coefficient >0.25 % ?

yes
Replace base-deterministic K_D with 75% sample statistic value

no
Replace base-deterministic K_D with lowest Argonne value





Approach Conservatisms

- 4 mrem per year drinking water
- Including subsurface excavation scenario
- Lowest K_d value
- By using 25 & 75 % versus the mean

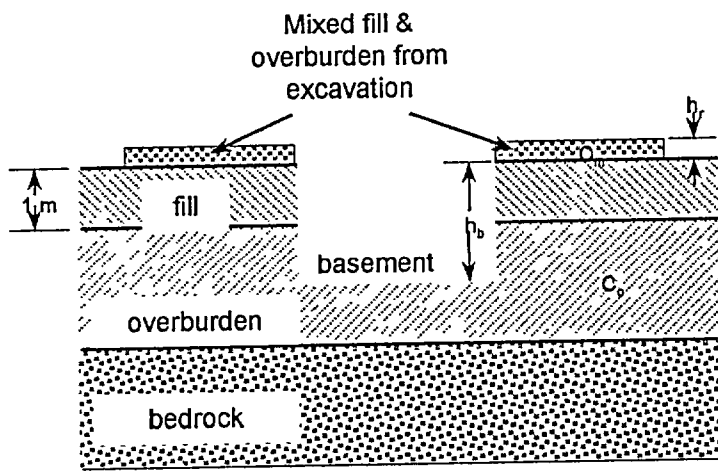
Modeling Assumptions

- Fill
- Overburden
- Bedrock

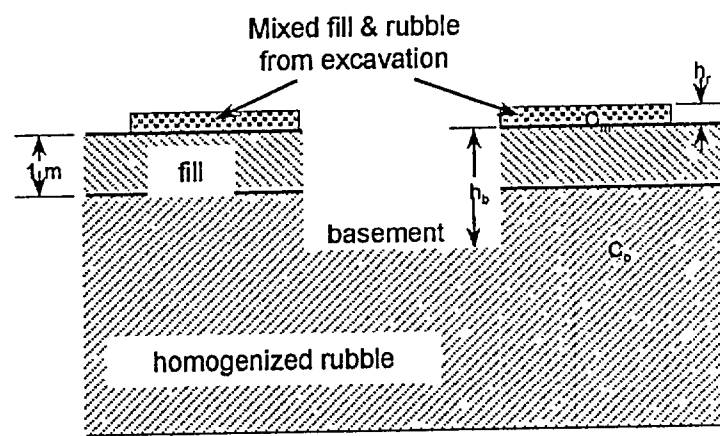
Subsurface Modeling

- Broken into three regions and seven pathways
 - Bedrock
 - Drinking water only
 - SSGS backfill
 - All pathways
 - Drinking water (Excavated / undisturbed)
 - Spray pond (overburden)
 - All pathways
 - Drinking water (Excavated / undisturbed)

Excavation Scenario



*Spray Ponds
& Most of the SNEC Site*

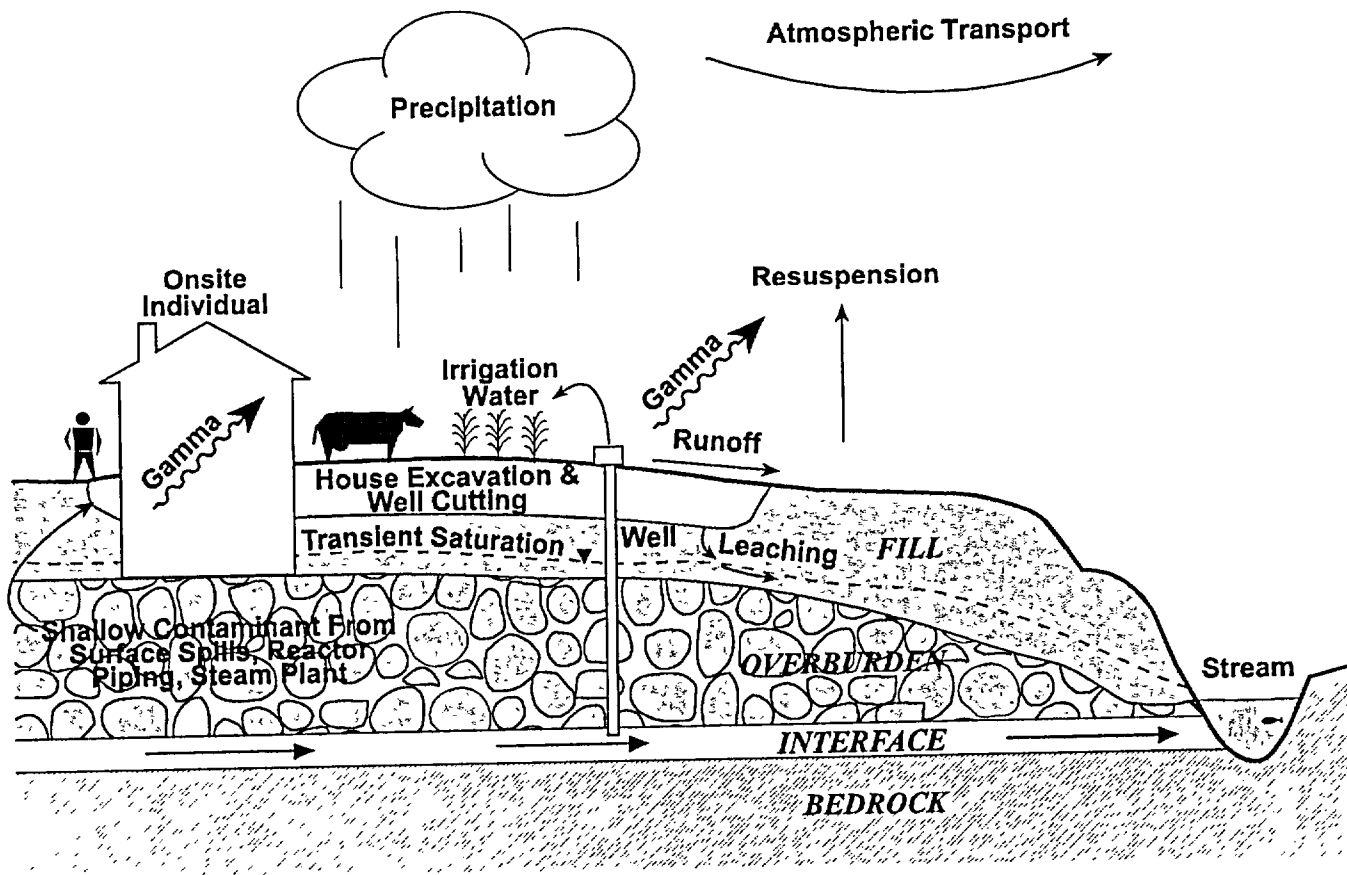


SSGS Basement

Dilution Factor

- 50 % dilution based on:
 - NRC 1986 “Update of Part 61 Impacts Analysis Methodology”
 - NRC 1999 “Preliminary Guidelines for Evaluating Dose Assessment in Support of Decommissioning”

Exposure Pathways



DCGLs

	Proposed Composite DCGL's		SNEC RESRAD 6.1 Deterministic Values (pCi/g)		URS Developed Subsurface Values	
	July-02		July-02		July-02	
	25 mrem/y Limit	4 mrem/y DW Limit	25 mrem/y Limit	4 mrem/y DW Limit	25 mrem/y Limit	4 mrem/y DW Limit
Am-241	25.7	2.3	25.7	207	107	2.3
C-14	26.8	5.4	26.8	450	42.1	5.4
Co-60	3.5	66.7	3.5	7.1E+10	8	66.7
Cs-137	6.6	397	6.6	1.7E+17	21.1	397
Eu-152	10.1	1443	10.1	1.8E+15	20.7	1443
H-3	645	31.1	645	279	2185	31.1
Ni-63	747	19249	747	1.9E+08	3220	19249
Pu-238	2.6	0.42	30.1	23.5	2.6	0.42
Pu-239	6.8	0.37	6.8	1.4	45.7	0.37
Pu-241	866	19.8	866	4803	4072	19.8
Sr-90	1.2	0.61	1.2	7.9	5.6	0.61

Proposed DCGLs

	Proposed Composite DCGL's	NRC screening DCGL's (pCi/g)
	July-02	May-99 <i>25 mrem/y Limit</i>
Am-241	2.3*	2.1
C-14	5.4*	12
Co-60	3.5	3.8
Cs-137	6.6	11
Eu-152	10.1	8.7
H-3	31.1*	110
Ni-63	747	2100
Pu-238	0.42*	2.5
Pu-239	0.37*	2.3
Pu-241	19.8*	72
Sr-90	0.61*	1.7
* Based on the 4 mrem limit		

Next Steps

- NRC feedback
- SNEC LTP submittals
- Next meeting dates