

NRC MEETING ON THE STATUS OF LOW-LEVEL RADIOACTIVE WASTE DISPOSAL RULEMAKING AND THE BRANCH TECHNICAL POSITION ON CONCENTRATION AVERAGING AND ENCAPSULATION

Chip Cameron, Facilitator

March 20, 2015
NRC Public Meeting
Phoenix, AZ



Agenda

8:00 - 8:30 am	Registration	
8:30 - 8:45	Facilitator opening comments	C. Cameron, Facilitator
8:45 - 9:00	NRC Welcome	L. Camper, NRC/NMSS ¹
9:00 - 9:15	Discussion of rulemaking process and comment process	S. Dembek, NRC/NMSS
9:15 - 9:45	Overview of Part 61 proposed rule	D. Esh, NRC/NMSS
9:45 - 10:00	Break	
10:00 - 11:30	Facilitated public discussion	C. Cameron and NRC Staff
11:30 - 12:15 pm	Implementation Plan for the Branch Technical Position on Concentration Averaging and Encapsulation	G. Suber, NRC/NMSS
12:15 - 12:30	Closing comments	C. Cameron and L. Camper

¹Office of Nuclear Material Safety and Safeguards

NRC MEETING ON THE STATUS OF LOW-LEVEL RADIOACTIVE WASTE DISPOSAL RULEMAKING AND THE BRANCH TECHNICAL POSITION ON CONCENTRATION AVERAGING AND ENCAPSULATION

Larry W. Camper, CEP, CIPM, Director

Division Of Decommissioning, Uranium Recovery, and
Waste Programs

Office of Nuclear Material Safety and Safeguards

March 20, 2015
NRC Public Meeting
Phoenix, AZ



Objective

To discuss the proposed revisions to the Commission's low-level radioactive waste disposal regulations and encourage the submittal of comments on the proposed rule language and also discuss the Branch Technical Position on Concentration Averaging and Encapsulation.

Insights from today's meeting

QUESTIONS?

10 CFR Part 61 Rulemaking Process and Comment Submittal

Stephen Dembek, Project Manager

Division of Decommissioning, Uranium Recovery, and
Waste Programs

Office of Nuclear Material Safety and Safeguards

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Phoenix, AZ



Part 61

- Why Rulemaking?
- Rule Objective
- Timeline
- Comment Submittal
- Guidance



Why Rulemaking?

- Implement Commission policy
- Make provisions generally applicable
- Public process
- Address lessons learned
- Address various recommendations



Rule Objective

- Require low-level radioactive waste (LLW) disposal licensees or license applicants to ensure that LLW streams that are significantly different from the LLW streams considered in the current 10 CFR Part 61 regulatory basis can be disposed of safely.



Part 61 - Timeline

- Published March 26, 2015 (draft at ML15076A373)
- Accepting comments 120 days from date of publication (July 24, 2015)
- Final rule to Commission – approximately 12 months after comment period closes
- Rule effective 1 year after final rule published
- Agreement States - 3 years to develop compatible regulations



Comment Submittal: Proposed Rule – Low-Level Radioactive Waste Disposal

- Please include Docket ID NRC-2011-0012 in the subject line of your comments.
- **Federal Rulemaking Website:** Go to <http://www.regulations.gov> and search for documents filed under Docket ID NRC-2011-0012.
- **Mail comments to:** Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.
- **E-mail comments to:** Rulemaking.Comments@nrc.gov. If you do not receive a reply e-mail confirming that we have received your comments, contact us directly at 301-415-1677.
- **Hand-deliver comments to:** 11555 Rockville Pike, Rockville, Maryland 20852, between 7:30 am and 4:15 pm Federal workdays. (Telephone 301-415-1677)
- **Fax comments to:** Secretary, U.S. Nuclear Regulatory Commission at 301-415-1101.



Part 61 Guidance

Draft NUREG – 2175,

“Guidance for Conducting Technical Analyses for 10 CFR Part 61”

- Draft implementation guidance has also been issued for public comment
 - Can be found in ADAMS at ML15056A516
 - Comments due within 120 days after publication of proposed rule
 - Final implementation guidance to be published with final rule



Comment Submittal Implementation Guidance for 10 CFR Part 61

- Please include Docket ID NRC-2015-0003 in the subject line of your comments.
- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for documents filed under Docket ID NRC-2015-0003. Click on the comment icon and complete the Web form.
- **Mail comments to:** Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Office of Administration, Mail Stop: 3WFN-06-A44M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.



Questions?

Stephen Dembek
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Gary Comfort
gary.comfort@nrc.gov
(301) 415-8106



Overview of Proposed 10 CFR Part 61 Technical Requirements and Guidance

David Esh

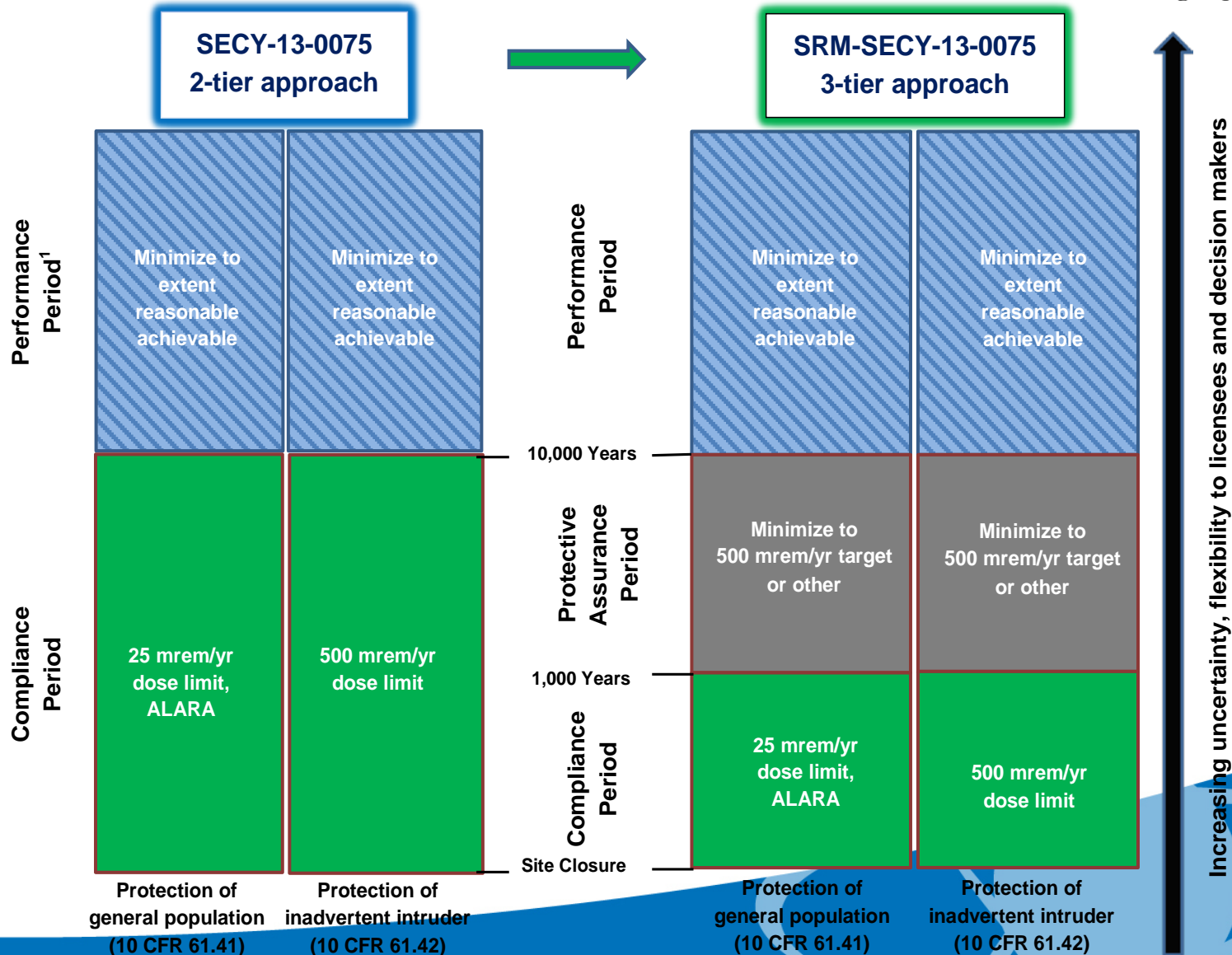
Division of Decommissioning, Uranium Recovery, & Waste Programs
Office of Nuclear Material Safety and Safeguards

March 20, 2015 NRC Public Meeting, Phoenix, AZ

Overview

- Rule Topics
 - Analyses timeframes
 - Performance assessment (PA)
 - Intruder assessment (IA)
 - Safety case / Defense-in-depth (DID)
 - Waste acceptance criteria (WAC)
- Guidance
 - Overview
 - Select examples

Analyses Timeframes



¹ Only applicable if concentrations on a facility-averaged basis are above Class A

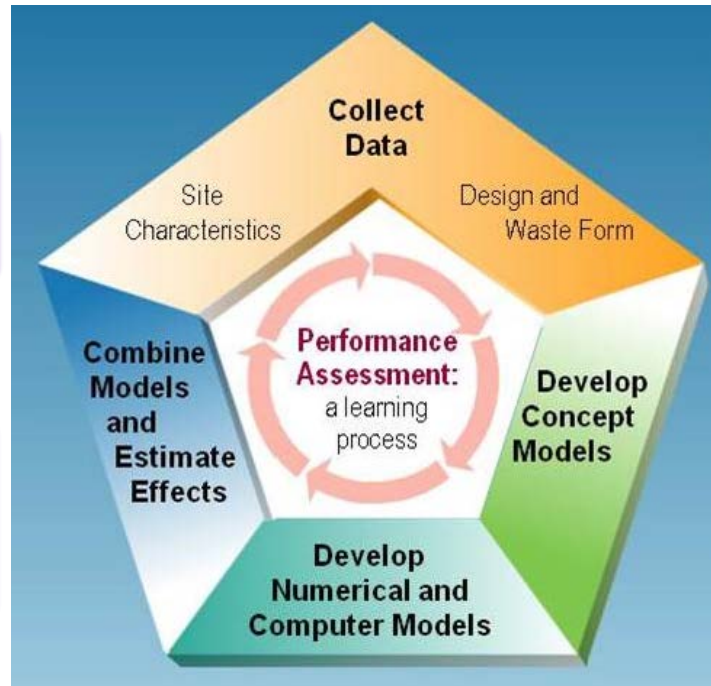
Performance Assessment

61.28: Updated PA at closure

61.50: Modified as a result of PA requirements for long-lived waste disposal

61.58: WAC “or” approach developed that allows the use of PA results

61.13: Provide model support and consider alternative conceptual models

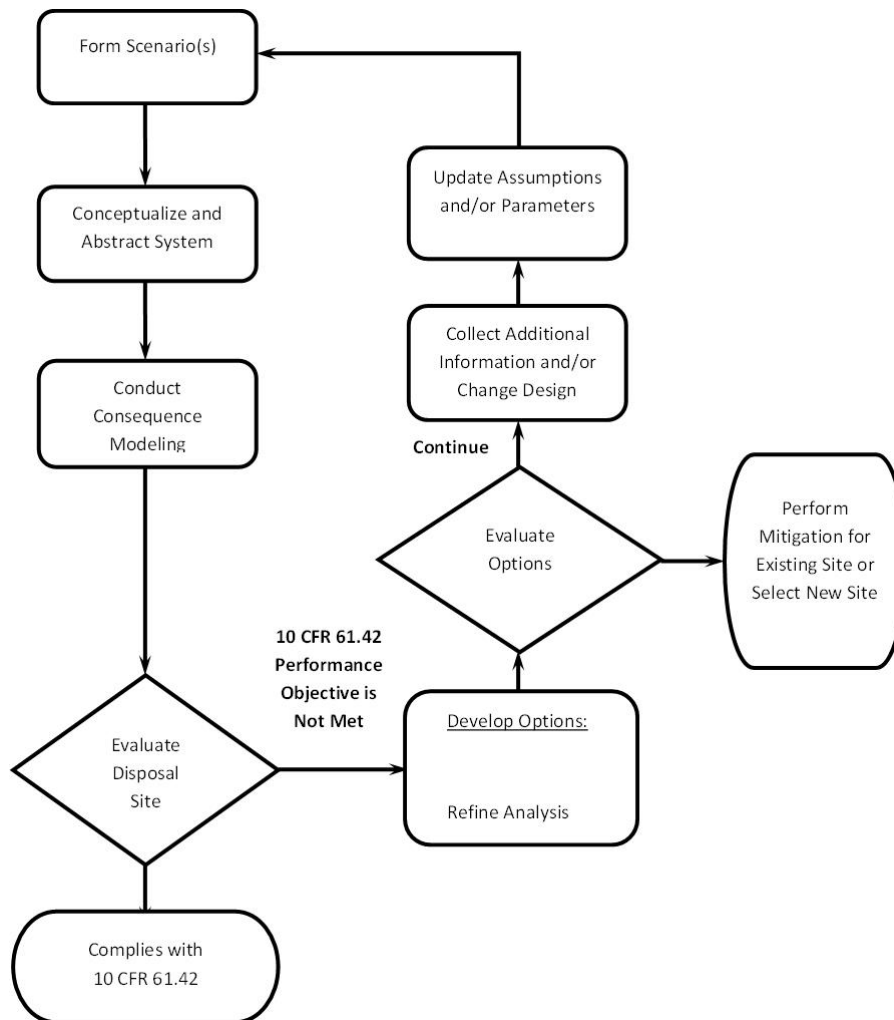


61.13: Features, events, and processes (scope)

61.13: Results of PA used in DID analysis

61.13: Explicit consideration of uncertainty and variability

Intruder Assessment



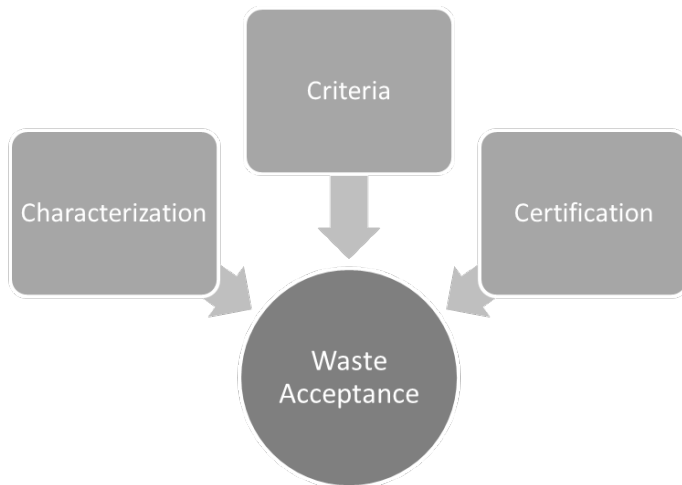
- Requires an intruder assessment analysis
- Based on intrusion scenarios that are realistic and consistent with expected activities in and around the disposal site at the time of site closure
- Dose limit of 500 mrem

Safety Case (for long-term safety) in 10 CFR Part 61

- Proposed rule includes discussion of safety case and defense-in-depth (DID) protections
- Explains how the combination of DID and performance assessment (i.e., safety case) should be used to support the licensing decision



Waste Acceptance Criteria



- New requirements for developing WAC using either:
 - 61.55 waste classification system, or
 - Site-specific WAC
- New 61.58 focuses on three areas:
 - WAC
 - Waste Characterization
 - Waste Certification

Guidance Document

- Overview/context (Chapter 1)
- Examples, tables, figures
- Use of other NRC guidance documents (Chapter 11)
- 434 pages, 18 pages of references
- Glossary
- Appendices (e.g. hazard maps, FEPs)

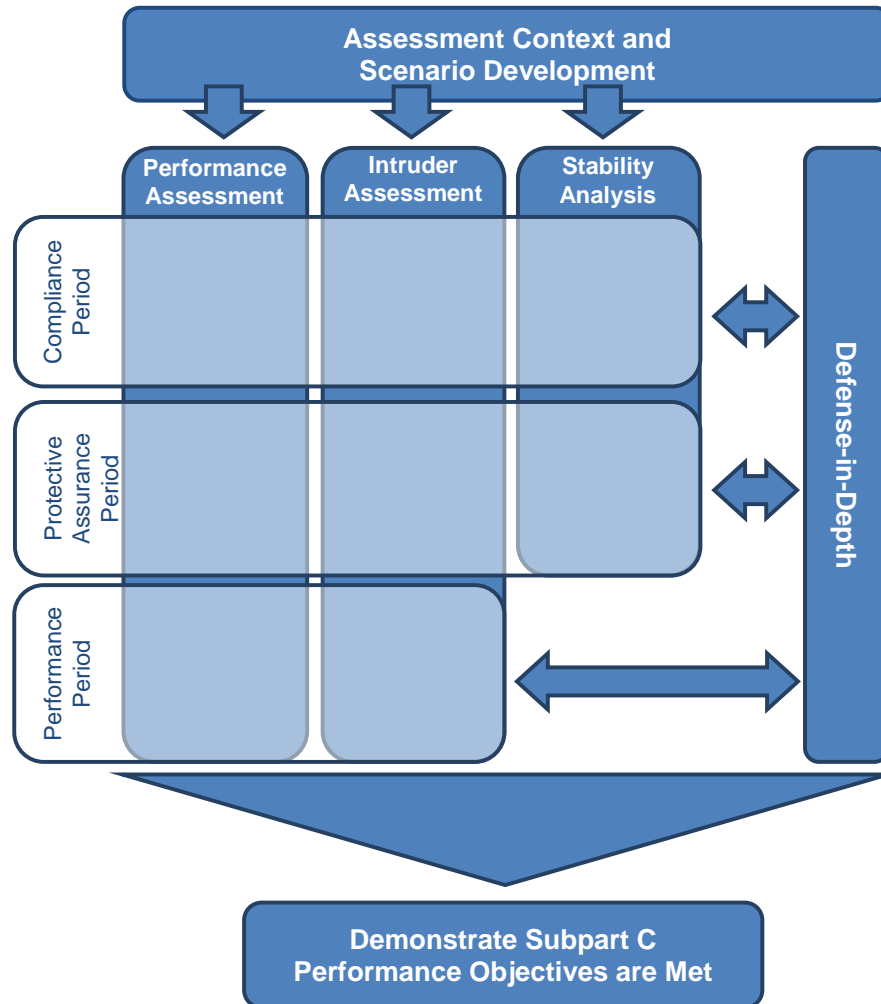
Guidance for Conducting
Technical Analyses for
10 CFR Part 61

Draft Report for Public Comment

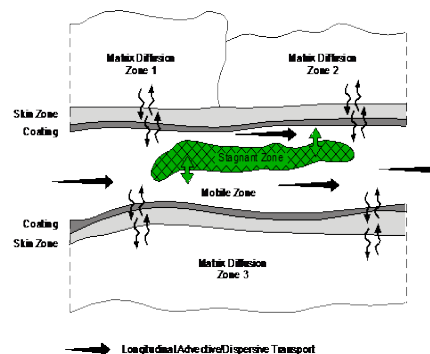
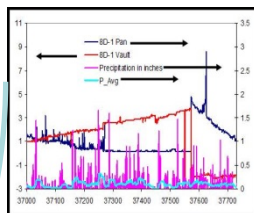
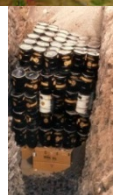
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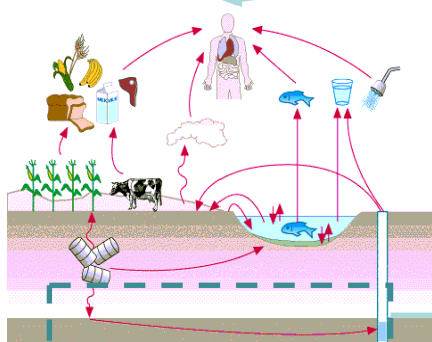
Context for Analyses



Example - PA



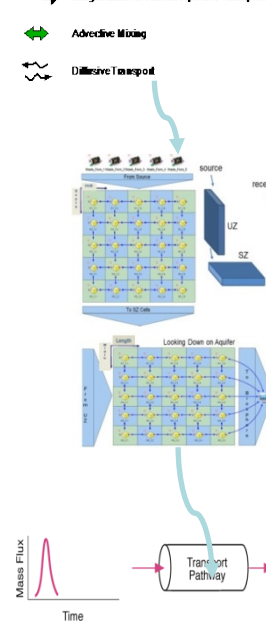
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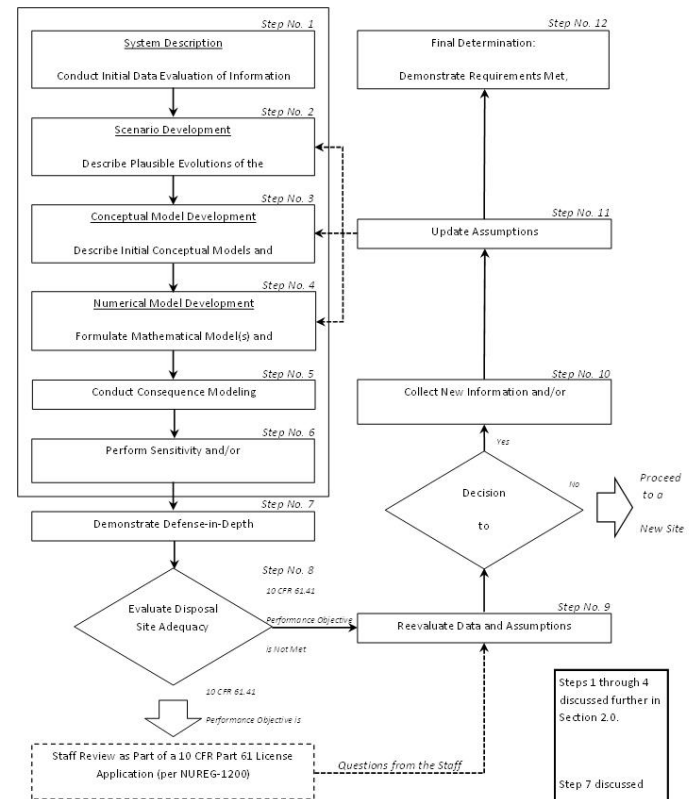
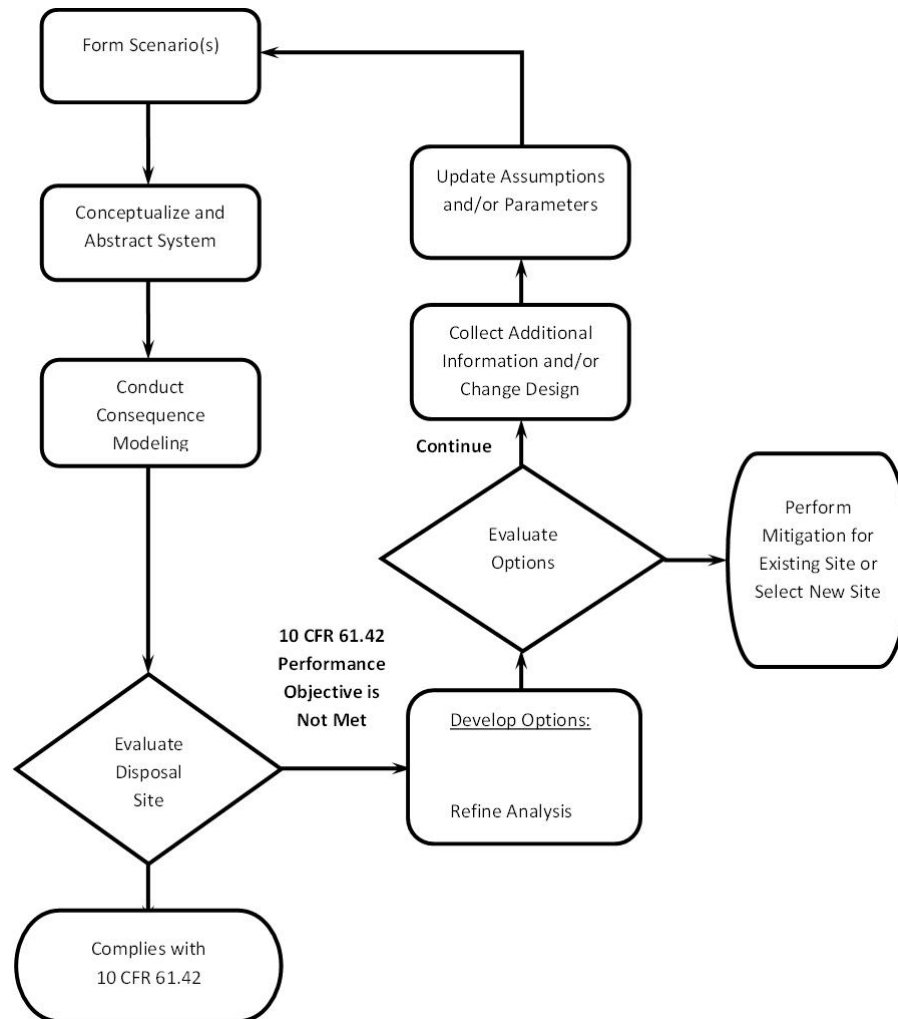
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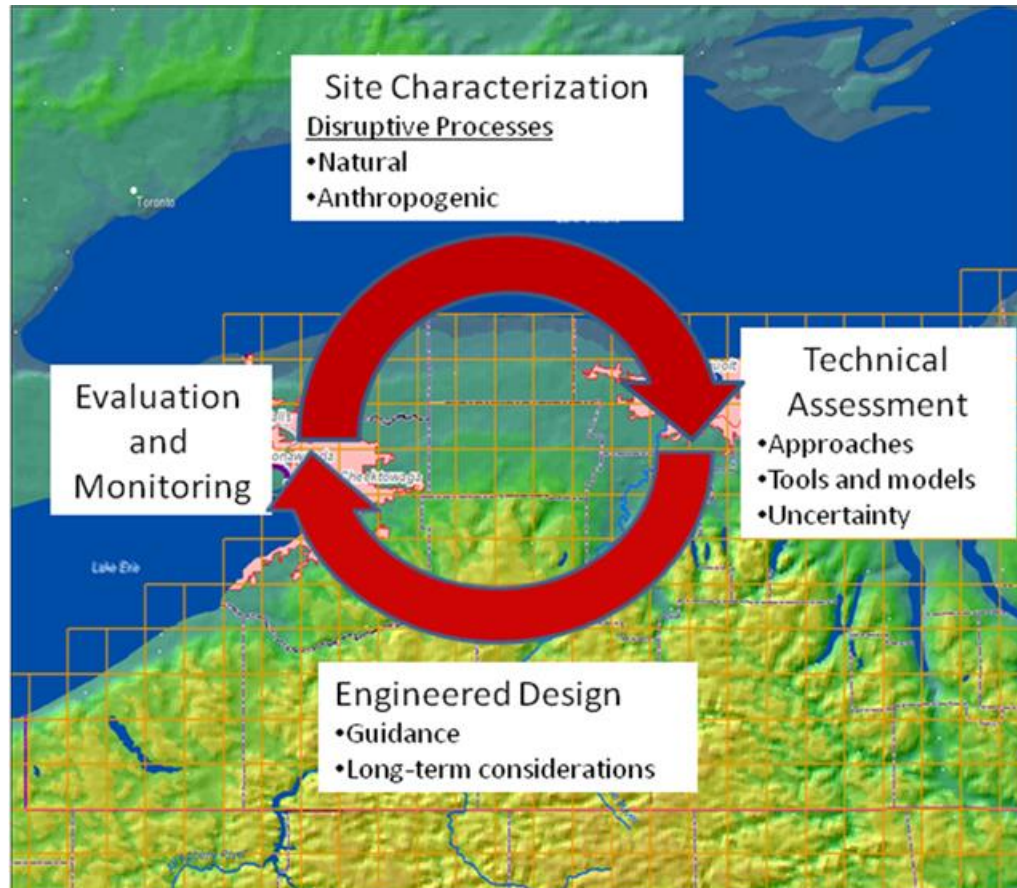
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$$m'_{is} = -m_{is}\lambda_s + \sum_{p=1}^{Np} m_p \lambda_p f_{ps} R_{sp} (A_s/A_p) + \sum_{c=1}^{Nc} f_{cs} + S_s$$

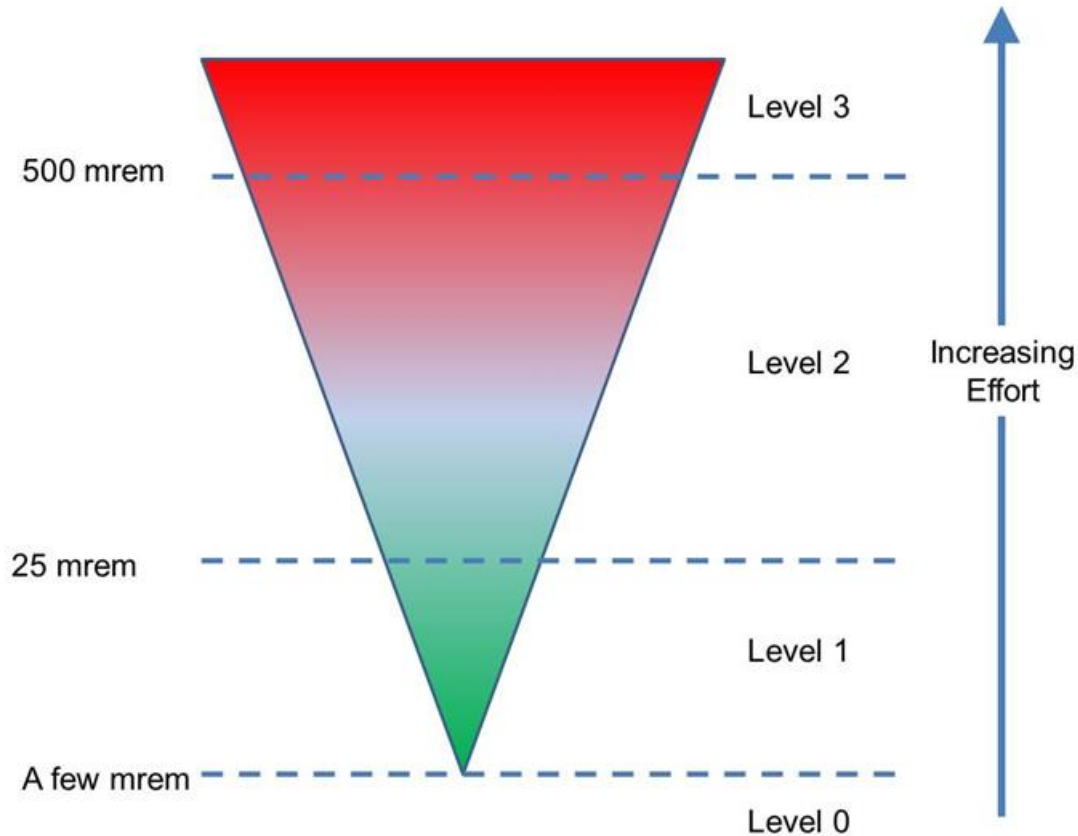
Flowcharts



Site-Stability Example



Protective Assurance Example



Performance Period Example

Table 7-1 Long-lived Isotopes Potentially Present in LLW Performance Assessment Inventories

Isotope	Half-life (yr)	Long-lived		LLW PA Inventory ¹	Isotope	Half-life (yr)	Long-lived		LLW PA Inventory ¹
		Parent	Progeny ²				Parent	Progeny ²	
Al-26	7.17×10^5	X			U-233	1.59×10^5	X	Th-229	Yes
C-14	5,730	X		Yes	U-234	2.45×10^5	X	Th-230	Yes
Cl-36	3.01×10^5	X		Yes	U-235	7.038×10^8	X	Pa-231	Yes
K-40	1.3×10^9	X			U-236	2.342×10^8	X	Th-232	Yes
Ni-59	7.5×10^4	X		Yes	U-238	4.468×10^9		U-234	Yes
Se-79	1.1×10^6	X			Np-237	2.14×10^6	X	U-233	Yes
Zr-93	1.53×10^6	X			Pu-238	87.7		U-234	Yes
Nb-94	2.0×10^4	X			Pu-239	2.41×10^4	X	U-235	Yes
Tc-99	2.14×10^5	X		Yes	Pu-240	6.54×10^3	X	U-236	Yes
Pd-107	6.56×10^6	X			Pu-241	14.4		Np-237	Yes
Sn-126	1×10^5	X			Pu-242	3.76×10^5	X	U-238	Yes
I-129	1.6×10^7	X		Yes	Pu-244	8.26×10^7	X	Pu-240	
Cs-135	3×10^6	X			Am-241	432		Np-237	Yes
Sm-146	1×10^8	X			Am-242m	16 hr		U-234	Yes
Pm-147	2.62		Sm-147		Am-243	7.38×10^3	X	Pu-239	Yes
Sm-147	1.06×10^{11}	X			Cm-242	0.446		U-234	
Eu-152	13.3		Gd-152		Cm-243	28.5		Am-243	
Gd-152	1.08×10^{14}	X			Cm-244	18.1		Pu-240	
Ra-226	1,600	X		Yes	Cm-245	8.5×10^3	X	Np-237	
Th-229	7.3×10^3	X		Yes	Cm-247	1.56×10^7	X	Am-243	
Th-230	7.7×10^4	X	Ra-226	Yes	Cm-248	3.39×10^5	X	Pu-244	
Th-232	1.41×10^{10}	X		Yes	Cf-249	351		Cm-245	
Pa-231	3.28×10^4	X			Cf-251	898		Am-243	
U-233	1.59×10^5	X	Th-229	Yes	Cf-252	2.64		Cm-248	

Hazard Map Example



Questions?

Branch Technical Position on Concentration Averaging and Encapsulation

Gregory F. Suber, Branch Chief

Division of Decommissioning, Uranium Recovery,
and Waste Programs

Office of Nuclear Material Safety and Safeguards

March 20, 2015
NRC Public Meeting
Phoenix, AZ



Background

- On February 25, 2015, BTP was issued
 - *Federal Register* Vol. 80, No. 37, 10165
- BTP has 2 volumes
 - Vol. 1 technical positions
 - Vol. 2 Stakeholder comments, staff responses and technical basis



Major Changes to BTP

- Reorganized to improve readability
- Removed factor of 10 constraint for mixing blendable waste
- Revised application of factors of 2 and 10 for discrete items
- Increased Cs-137 sealed source activity limit
- Added Alternative Approaches section



Implementation Plan

- Goal of Implementation Plan
 - Facilitate uniform successful implementation of revised BTP
- Meeting with sited Agreement State
 - Conference call and possible visit to Agreement State
- Developing training program for NRC staff and Agreement State regulators



Implementation Plan

– cont'd

- Presentation on Revised BTP
 - (e.g. LLW Forum, Radwaste Summit and Organization of Agreement States Annual Meeting)
- Develop Q & A database online
 - Highlights questions NRC has received from training and/or presentations
- BTP Training for NRC and Agreement State regulators
 - Multiple trainings starting May 2015
- Training presentation for regulatory staff covering new positions in detail and example problems

Resources

- BTP in ADAMS
 - Vol. 1 ML12254B065
 - Vol. 2 ML12326A611
- Any Questions contact Maurice Heath 301-415-3137
or Email: Maurice.Heath@nrc.gov

Closing Comments