

Facilitator Introduction

Bret Leslie, PhD

**NRC Public Meeting on Potential Changes to Commercial
LLW Regulation: 10 CFR Part 61**

March 2, 2012

**Marriott Renaissance Phoenix Downtown Hotel
Phoenix, Arizona 85004**

NRC Public Meeting on Potential Changes to Commercial LLW Regulation: 10 CFR Part 61

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Division of Waste Management and Environmental Protection

March 2, 2012

**Marriott Renaissance Phoenix Downtown Hotel
Phoenix, Arizona 85004**

Welcome

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Part 61

Public Meetings

- Recent Commission Direction (01/19/2012)
 - [SRM-COMWDM-11-0002/COMGEA-11-0002](#)
- Emergent Policy/Technical Issues
- SECY-10-0165 Options/Other Options
- Stakeholder Feedback
- First of Several Public Meetings
- Impact on Future Direction

Recent Commission Direction (01/19/2012)

- Process
- Policy
- Timeline
- Public Outreach

Emerging Policy/ Technical Issues

- Role of Institutional Controls
- Exposure Scenarios
- 61.55 Concentration Tables
- Engineered Barriers System Performance
- Clearance
- Revise Part 61 EIS Assumptions
- Protection of Intruder

SECY-10-0165 Options/ Other Options

- Risk-Inform the Current Part 61 Waste Classification Framework
- Comprehensive Revision
- Site-Specific Waste Acceptance Criteria
- International Alignment
- Supersede Direction in SECY-08-0147

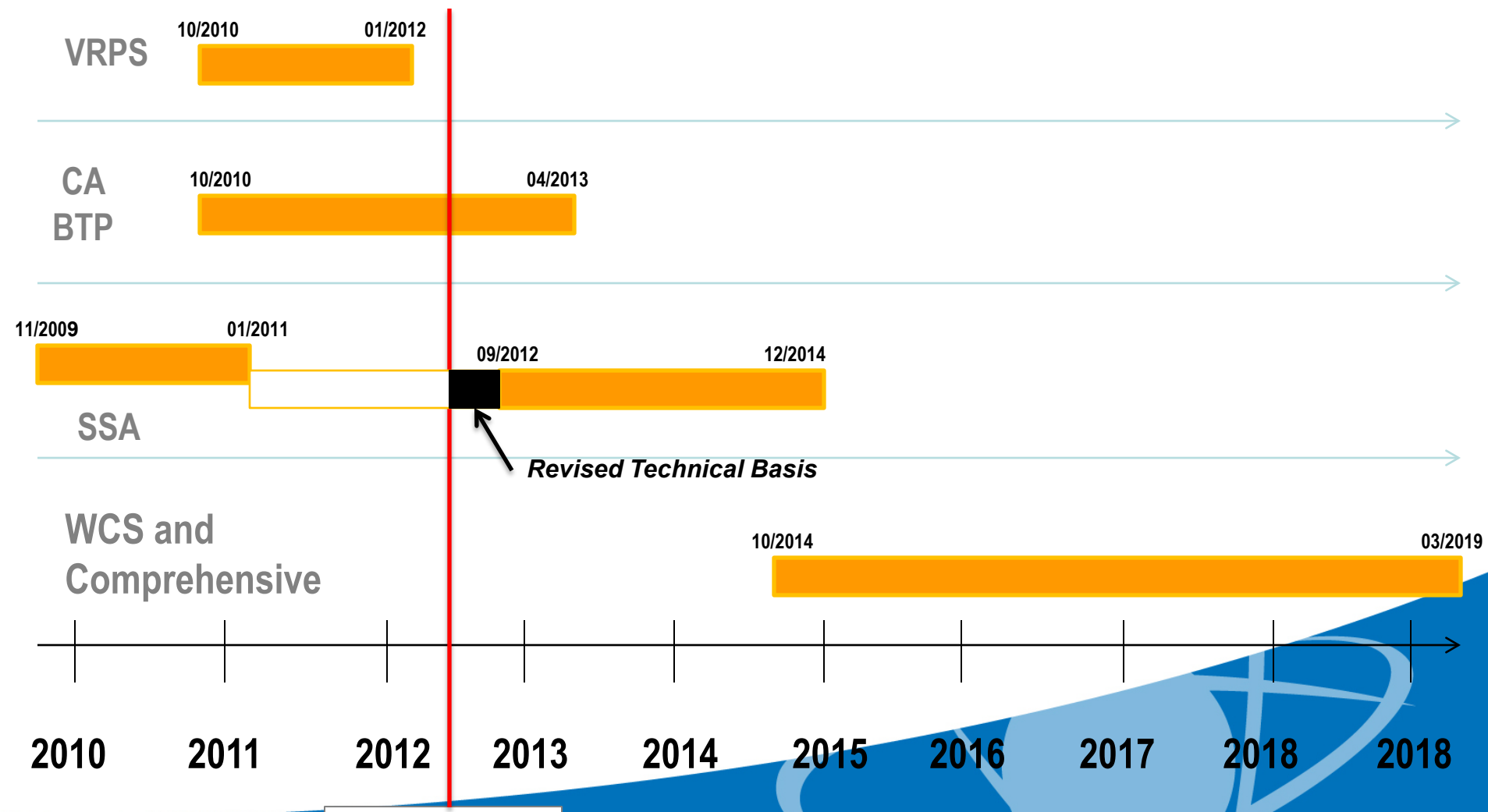
Maximizing Stakeholder Input (Recent Events)

EVENT	DATE
Conduct public workshop on CA BTP *	February 2011
DOE/NRC workshop on Part 61 Revision (Phoenix) *	March 2011
Issue blending Interim Guidance	March 2011
Close comment period on CA BTP *	April 2011
Conduct public meeting on Part 61 Period of Performance *	May 2011
Brief ACRS on Part 61 SSA Rulemaking (2x)	July/August 2011
Brief ACRS on CA BTP (2x)	June/December 2011
Issue draft VRPS for public comment *	October 2011
Conduct public workshop on CA BTP (Albuquerque) *	October 2011
Issue Commission paper with proposed final VRPS	January 2012

Maximizing Stakeholder Input (Future Events)

LOCATION	DATE	EVENT
Phoenix, AZ	March 2, 2012	NRC-Sponsored Public Meeting #1 (following WM2012 Meeting)
San Francisco, CA	April 23, 2012	LLW Forum Spring Meeting
Orlando, FL	May 7, 2012	CRCPD Annual Meeting
Dallas, TX	May 15, 2012	NRC-Sponsored Public Meeting #2
Tucson, AZ	June 22, 2012	EPRI Annual LLW Meeting
Rockville, MD	Mid-July, 2012	NRC-Sponsored Public Meeting #3
Sacramento, CA	July 22, 2012	HP Society Annual Meeting

LLW Program Timeline



03/2012

Site-Specific Analyses Rulemaking

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Overview

- Background
- Commission Direction
- Site-Specific Analyses
- Issues
- Path Forward



BACKGROUND

10 CFR Part 61

- Requirements for land disposal of LLW
- Performance objectives assure safe disposal
 - Protection of general public
 - Protection of inadvertent intruders
 - Protection of individuals during operations
 - Stability after site closure
- Demonstrate performance via technical analyses and waste classification



Recent Developments



- Waste classification limits based on 1980's understanding of low-level waste streams¹
- Recent waste streams not envisioned during development of Part 61
- Disposal may be appropriate, but not under all conditions²

¹ NUREG-0945, NUREG-0782

² SECY-08-0147, SECY-10-0043



COMMISSION DIRECTION

Initial Commission Direction

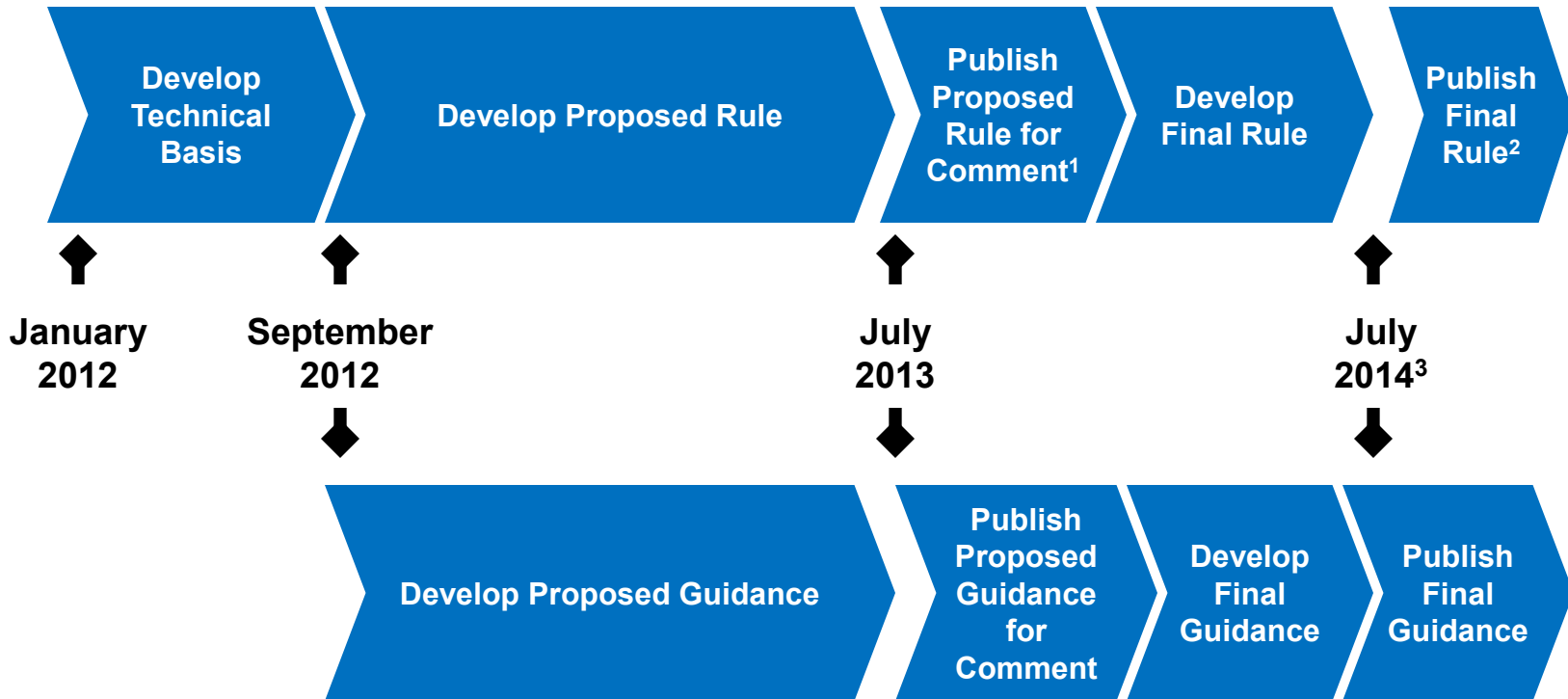
- Require site-specific analyses to demonstrate compliance with the performance objectives
- Specify technical requirements of the analyses
- Develop accompanying guidance
- Other Assignments

New Commission Direction

- Consider:
 - Flexibility to use current International Commission on Radiological Protection (ICRP) dose methodologies
 - Two-tiered period of performance:
 - Reasonably foreseeable compliance period
 - Longer period of performance that is not *a priori*
 - Flexibility to establish site-specific waste acceptance criteria
 - Balance Federal-State alignment and flexibility

Path Forward

Rulemaking

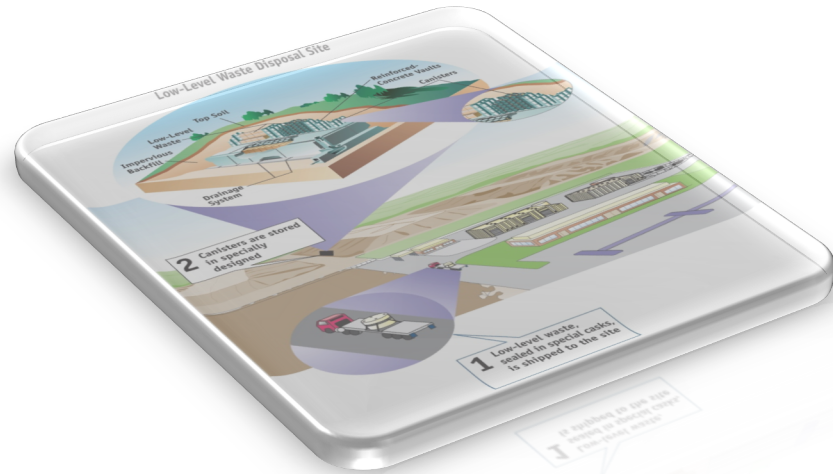


Guidance

¹ Pending Commission approval; Comment period lasts approximately 75 days

² Pending Commission approval

³ Dependent upon the complexity of public comments received



SITE-SPECIFIC ANALYSES

Overview of Performance Assessment

What is Performance Assessment?

- Systematic analysis of what could happen at a site

What is assessed?

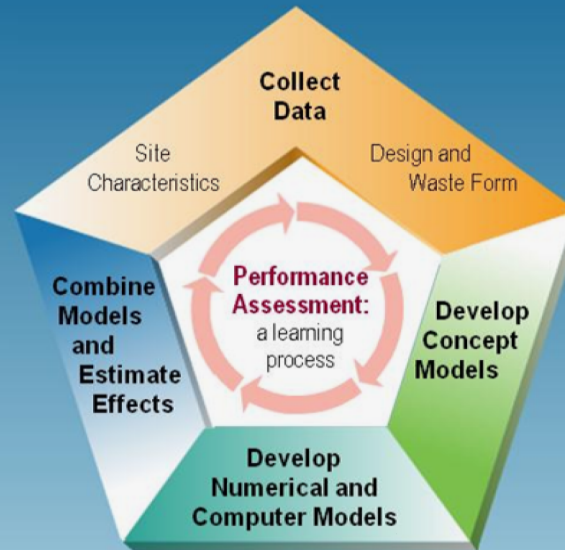
- What can happen?
- How likely is it?
- What can result?

Why use it?

- Complex system
- Systematic way to evaluate data
- Internationally accepted approach

How is it conducted?

- Collect data
- Develop scientific models
- Develop computer code
- Analyze results



NRC would require a Performance Assessment to:

- Provide site and design data
- Describe barriers that isolate waste
- Evaluate features, events, and processes that affect safety
- Provide technical basis for models and inputs
- Account for variability and uncertainty
- Evaluate results from alternative models, as needed

Intruder Assessment

- Demonstrate protection of inadvertent intruder
 - Currently Part 61 relies on waste classification
- Identify design and control measures to:
 - Preclude intrusion
 - Limit radiological impacts
- Similar to PA, except assumes intrusion

Long-Term Assessment



- Estimates potential performance beyond compliance period
- Identify features to reduce long-term impacts



NEW DIRECTION

ICRP Methodology: *Direction*

- Consider allowing licensees the flexibility to use ICRP dose methodologies in a site-specific performance assessment for the disposal of all radioactive waste

ICRP Methodology: Context



- NRC regulations based on various methodologies
- Commission policy¹ presently allows exemption for current methodology

ICRP Methodology: *Feedback*

- Commission is seeking stakeholder feedback on allowing licensee's the flexibility to use ICRP dose methodologies in a site-specific performance assessment for the disposal of radioactive waste

Period of Performance: *Direction*

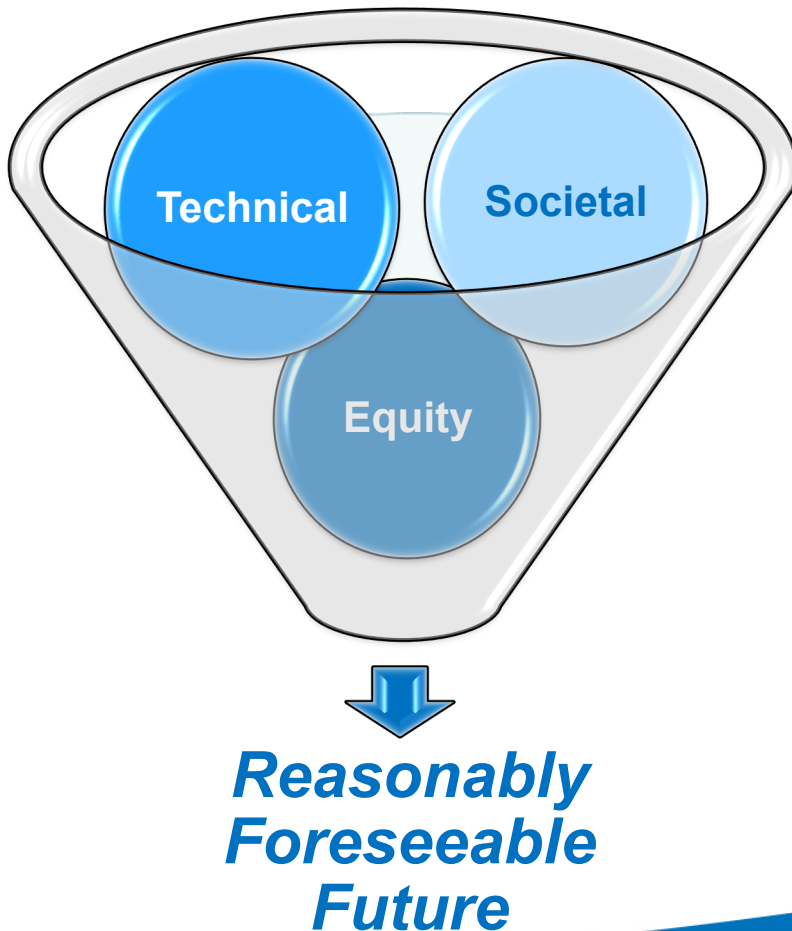


- Consider a two-tiered PoP for analyses:
 - *Tier 1*: Compliance period covering reasonably foreseeable future
 - *Tier 2*: Longer period based on site characteristics and peak dose to a designated receptor

Period of Performance: *Context*

- Part 61 does not currently specify a PoP
- In response to initial direction, NRC staff developed technical analysis of factors for Commission to consider in selecting PoP¹
 - Recommended a two-tiered approach

Tier 1: Compliance Period



- Possible factors
 - **Societal** – human activities
 - **Technical** – hazard, site characteristics
 - **Equity** - inter- and intra-generational
- Fixed, Site-specific, Combo

Compliance Period Comparisons

Material	Hazard	Hazard Duration	Action	Compliance Period
EPA RCRA	Chem	∞	Disposal	30+ yrs
Uranium Mill Tailings	Rad	LL	Remediate	200 yrs (<1000 yrs)
Part 20 Decommission Criteria	Rad	VSL	Release	1000 yrs
DOE Order 435.1	Rad	SL	Disposal	1000 yrs
LLW Disposal Facility	Rad	SL	Disposal	[10,000 yrs]
EPA Underground Injection	Chem	∞	Disposal	10,000 yrs
DOE WIR Determinations	Rad	SL-LL	Remediate	DOE: 1000 yrs NRC: 10,000 yrs
DOE Siting Guidelines (10 CFR 960)	Rad	LL	Screening Action	100,000 yrs
EPA HLW/SNF/TRU Generic Standards	Rad	LL	Disposal	10,000 yrs
EPA HLW/SNF Site-Specific Standards	Rad	LL	Disposal	10,000 yrs – 15 mrem 1,000,000 yrs – 100 mrem

Tier 2: Site Characteristics

- Commission identified characteristics for consideration:
 - Waste Package
 - Waste Form
 - Disposal Technology
 - Cover Technology
 - Hydrogeology
- §§61.50 and 61.51 specify site suitability and design requirements
- Uncertainty in characteristics over time

Tier 2: Designated Receptor

- Receptor Characteristics
 - Metabolic
 - Behavioral
 - Physical
- Fixed, site-specific, combination
 - Current biosphere

Tier 2: Performance Metric

- Should NRC consider metrics for a second tier?
- What metrics should NRC consider?
 - Quantitative (Dose, Risk)
 - Qualitative

Period of Performance: *Feedback*

Commission is seeking public feedback on a two-tiered approach:

- Defining a reasonably foreseeable compliance period
- Defining a longer period of performance that is not a *priori*, but developed based on site characteristics and the peak dose to a designated receptor

Waste Acceptance Criteria: *Direction*

Commission directed staff to consider flexibility to establish site-specific WAC based on the results of the site's performance assessment and intruder assessment

Waste Acceptance Criteria: *Context*

- General WAC specified in §§61.55-61.57
- §61.58 currently allows requests for alternative waste classification
 - Site-specific exemption
 - Compatibility: H&S (i.e., State adoption not required)
- Generic or site-specific; other ways?

Waste Acceptance Criteria: *Feedback*

Commission is seeking public feedback on adding flexibility for disposal facilities to establish site-specific waste acceptance criteria based on the results of the site's performance assessment and intruder assessment

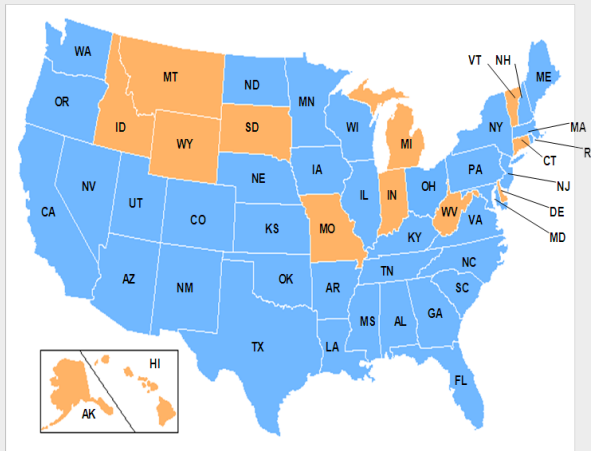
Compatibility: *Direction*

- Category for the site-specific analyses and site-specific WAC requirements that:
- Ensures alignment between the States and Federal government on safety fundamentals
- Provides States with the flexibility to determine how to implement these requirements

Compatibility: Context

THE AGREEMENT STATES

As of October 2011



■ Agreement States (37)
■ NRC States (13)

- Section 274 of the Atomic Energy Act
- Promote orderly regulatory pattern
- Discontinuation of certain NRC authorities
- NRC maintains oversight

Compatibility: Context

- **Essentially Identical Categories**
 - A – Basic standards and related definitions
 - B – Direct trans-boundary implications
- **Essential Objective Categories**
 - C – Required to avoid conflicts, duplications or gaps
 - H&S – Particular health and safety significance
 - States can be more restrictive
- **Other Categories**
 - D – Not required for compatibility
 - NRC – Cannot be relinquished to States

Compatibility: *Feedback*

- Commission is seeking public feedback on a compatibility category for the elements of the revised rule that establish:
 - the requirements for site-specific performance assessments and
 - the development of site-specific waste acceptance criteria
- Alignment between States and Federal government on safety fundamentals
- Providing the States with the flexibility to determine how to implement these safety requirements

Public Feedback

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Part 61 Emerging Technical Issues

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Outline

- Background
- Stakeholder Involvement
- Emerging Issues
- Path Forward

Stakeholder Involvement

- Public Workshop on BTP (February 2011)
- Public Comment on Updated Volume Reduction Policy Statement (August 2011)
- ACRS Meetings on BTP (October and December 2011)
- Rulemaking Development (DU Workshops 2009, Waste Management 2011)

Emerging Issues

- Inadvertent Intruder Protection
 - Concept of an Inadvertent Intruder is flawed
 - Assumption that intrusion will occur is not risk-informed (probability of 1)
 - Need to protect future generations is over emphasized

Emerging Issues (continued)

- Institutional Control Period
 - Current 100 Year control period too short
 - Financial Assurance requirements for some states preclude loss of control indefinitely

Emerging Issues (continued)

- Definitions and Concepts
 - “Reasonably Foreseeable” is not understood or well defined
 - “*De minimus*” or clearance levels should be established
 - Separate disposal requirements and criteria should be established for depleted uranium, distinct from classic ‘LLW’

Emerging Issues (continued)

- Definitions and Concepts
 - Compatibility category for 10 CFR Part 61.58 should be changed to 'B' from 'D'
 - Changes should be restricted to new sites (Grandfather current sites)
 - Eliminate the 10 CFR Part 61.55 Waste Classification Tables

Emerging Issues (continued)

- Definitions and Concepts
 - Explicitly account for uranium and its daughter products in waste classification tables
 - Reflect latest ICRP dosimetry
 - Expand tables to include a more comprehensive suite of isotopes

Path Forward

- Engage Stakeholders and Public
 - Gather comments to inform decision-making
 - Facilitate information exchange through web page
 - Docket # **NRC-2011-0012** at www.regulations.gov
- Report Back to the Commission

Public Feedback

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Summary of SECY-10-0165

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Background

- Part 61 Revision First Suggested in LLW Strategic Assessment (SECY-07-0180)
 - Low priority item
- SECY-08-0147
 - Near-surface of DU may be appropriate
 - Recommend introducing an explicit performance assessment requirement to Part 61
- SECY-10-0165
 - Outline approach to initiate activities to revise Part 61

Background (continued)

- First Public Meeting: March 4, 2011 in Phoenix, AZ
 - Concepts for comprehensively revising Part 61 introduced
 - Briefing materials and transcript posted on NRC web-site
 - <http://www.nrc.gov/about-nrc/regulatory/rulemaking/potential-rulemaking/potential-part61-revision.html>
- Questions for Stakeholders
 - Should existing Part 61 be revised or left as is?
 - What recommendations do you have for specific changes to the current rule?
 - What are your suggestions for possible new approaches to commercial LLW management?

Challenges to Change

- Part 61 is fully protective of public health and safety
- Four decades of operations/regulatory experience
 - Adopted by all Agreement States
 - Implemented at 4 disposal sites (WA, UT, TX, SC)
 - Waste classification system understood by thousands of waste generators
 - Other Federal/State laws invoke Part 61

SECY-10-0165

Options

1. Risk-Inform Part 61 Waste Classification Framework
2. Comprehensive Revision Option
3. International Alignment Option
4. Site-Specific Waste Acceptance Criteria (WAC) Option
5. Maintain *Status Quo* Option

1. Risk-Inform Waste Classification Framework

- Original Regulatory Motivation
 - Address shortcomings in earlier disposal practices
 - Provide uniform set of standards for operation of future multiple disposal sites nationally
- Regulatory Thesis
 - Dose exposures managed by controlling source term
 - Radiological hazard diminishes with time

1. Waste Classification (continued)

- What-if Dose Studies Examining Influence of:
 - Dominant LLW isotopes
 - Engineering measures
 - Institutional controls
 - Administrative practices (waste segregation)
- Dose Calculations Yielded Tables 1 and 2 at §61.55
 - Based on inverse calculations (max 500 mrem)
 - Considered both activity- and exposure-limited pathways
 - Assumed exposure scenarios
 - Considered only humid sites

1. Waste Classification (continued)

- Option Consistent with Previous Commission Direction (SECY-08-0147)
 - Revisions Limited to Tables 1 and 2 at §61.55
 - Preserve existing waste classification system
 - Introduce additional radionuclides
 - Re-evaluate using updated ICRP dosimetry
 - §61.55 Table Revision Decisions
 - Rely on original Sandia Laboratory computer codes?
 - Conduct new generic modeling?
 - Conduct new generic modeling and consider receptor scenario?

2. Comprehensive Revision to Part 61

- Clean Slate Approach
- Embrace RI/PB Regulatory Philosophy
 - Focus on performance objectives
 - Strike a balance between regulations and guidance
- Re-visit Basic Questions Raised When Part 61 was First Developed
 - Identify types of LLW to be managed
 - Determine appropriate management method
 - Decide on *de minimis* provision

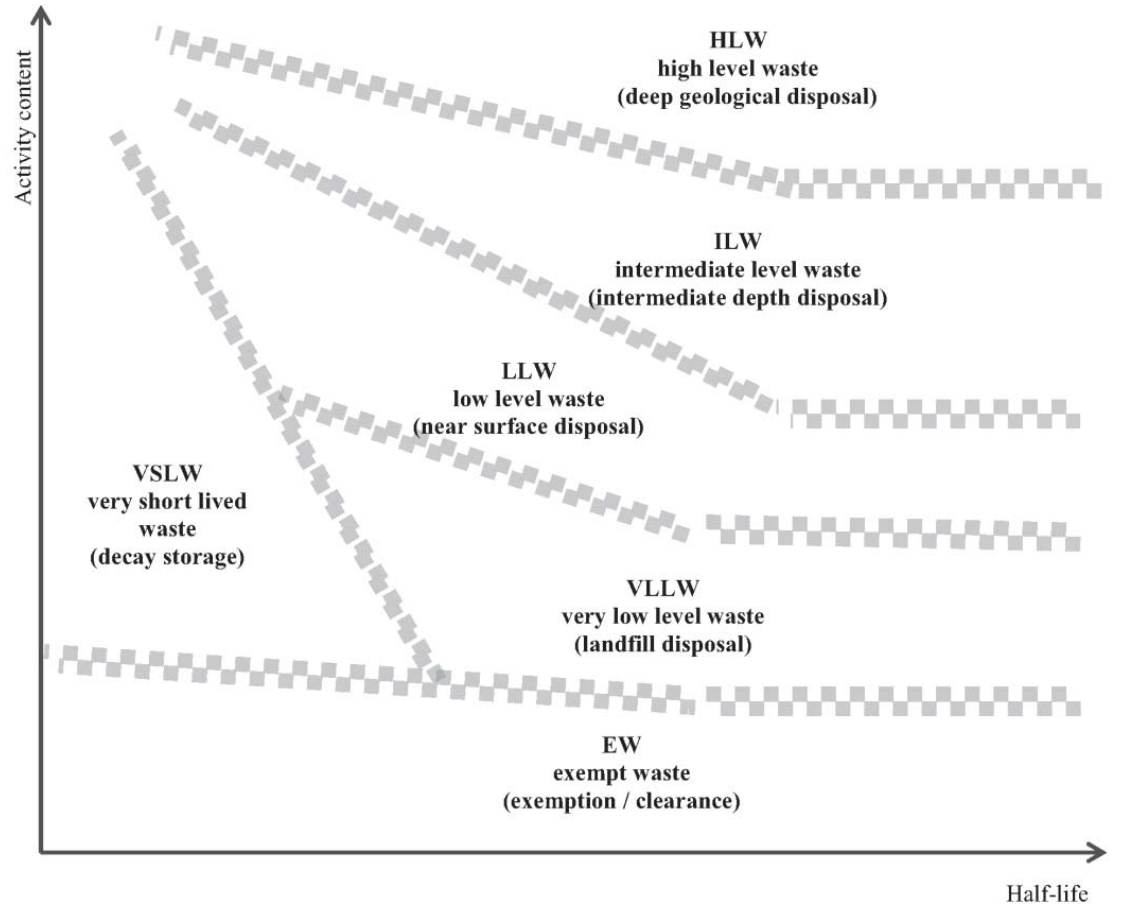
2. Comprehensive Revision (continued)

- Approach Likely to Include
 - Updated waste generator survey, including consideration of DOE inventory
 - One or more generic performance assessments
 - Updated Environmental Analysis
 - Review of engineering ‘best practices’ in waste management
 - Consideration of international experience
 - Revised and/or updated guidance

3. International Alignment Option

- Adopt Recommendations of the International Atomic Energy Agency (IAEA)
 - IAEA system focuses on entire nuclear fuel cycle
 - Spent nuclear fuel and other high-level radioactive waste
 - Greater-than-Class-C LLW (or transuranic radioactive wastes)
 - Naturally occurring radioactive material
 - Wastes amendable to decay in storage
 - Disposal strategy defined by nature of radiological hazard
 - Depleted uranium not classified by IAEA

3. International Alignment (continued)



3. International Alignment (continued)

- IAEA Guidance Documents
 - Classification of Radioactive Waste: General Safety Guide-1
 - Disposal of Radioactive Waste: Specific Safety Requirements-5
- <http://www-pub.iaea.org/MTCD/publication>

4. Site-Specific Waste Acceptance Criteria Option

- Part 61 Intended as a ‘One-Size-Fits-All’ Regulation
 - Applicable to any geographic/geologic setting
 - Relies on generic waste acceptance criteria
- Regulatory Framework Based on:
 - Assumed waste streams
 - Static disposal practices/technology
 - Conservative site performance scenario

4. Site-Specific WAC (continued)

- Eliminate §61.55 waste classification tables
- Each site develops site-specific WAC
 - Concentration limits
 - Inventory limits (if necessary)
 - Waste form requirements
- Site-specific WAC consistent with:
 - Part 61 performance assessment
 - Subpart C performance objectives

4. Site-Specific WAC (continued)

- Increased Flexibility
 - Rely on site characteristics
 - Site-specific engineered features
 - Current operational approaches/practices
- Reflects RI/PB Regulatory Approach
 - Performance assessment informs acceptability of waste stream
 - Focus on management of radiological hazard
 - Improved nexus between WAC and risk assessment
- Compacts could site and design a disposal for wastes with specific radiological properties

4. Site-Specific WAC (continued)

- Increased Flexibility
 - Rely on site characteristics
 - Site-specific engineered features
 - Current operational approaches/practices
- Reflects RI/PB Regulatory Approach
 - Performance assessment informs acceptability of waste stream
 - Focus on management of radiological hazard
 - Improved nexus between WAC and risk assessment
- Compacts could site and design a disposal for wastes with specific radiological properties

5. No Action Option

- No additional changes to Part 61
 - Complete site-specific analysis rulemaking (SECY-08-0147)
- No update of Tables 1 and 2 at §61.55

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Summary of Stakeholder Comments and Opportunity for Public Exchange

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Recap and Closing

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