

# *Please stand by - Public Meeting*

## Implementation of NUREG/BR-0204, Revision 3, and Uniform Waste Manifest Forms

February 11, 2021

Thank you for joining us! The meeting will start shortly.

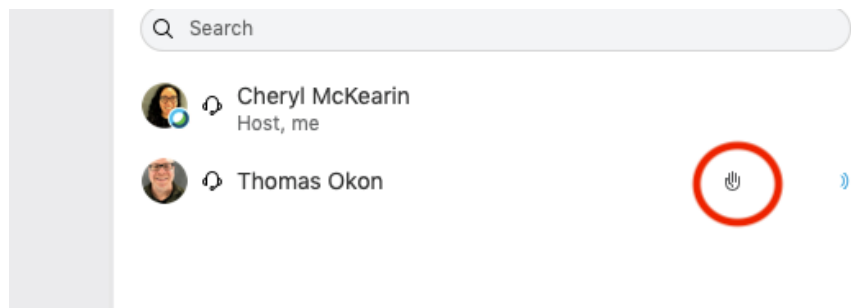
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# Implementation of NUREG/BR-0204, Revision 3, and Uniform Waste Manifest Forms

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Slides are available in the NRC’s ADAMS at ML21039A763 and attached to NRC meeting notice



# Opening Remarks

Patricia Holahan, Ph.D

Director

Division of Decommissioning, Uranium  
Recovery, And Waste Programs

Office of Nuclear Material Safety and Safeguards

# Agenda

Topic	Speaker
Introduction/Logistics	Priya Yadav
Opening Remarks	Patricia Holahan, Ph.D.
Background and Summary of Changes	Priya Yadav
Implementing Guidance in NUREG/BR-0204	Karen Pinkston, Ph. D
Next Steps	Stephen Koenick
Public Input	All
Closing Remarks	Stephen Koenick

# Purpose of Meeting

Seek public input on the status of implementation of the changes to the Uniform Waste Manifest (UWM) Forms

Summarize Changes and Clarifications to the UWM Forms and Instructions Guidance

Rev 3 (6/2020) vs Rev 2 (1998)

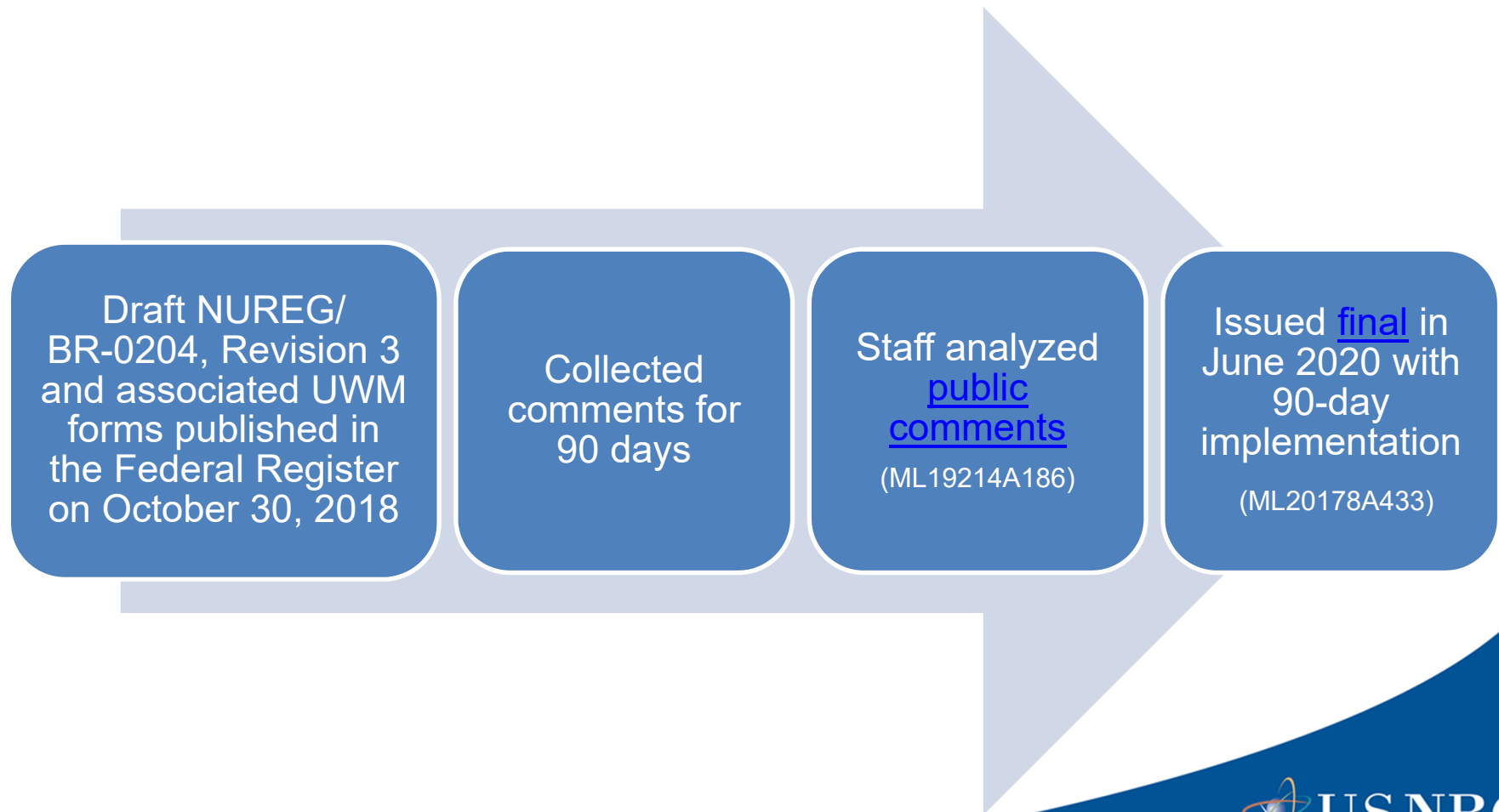
Provide examples and answer questions

Collect Frequently Asked Questions (FAQs) to post answers to on the NRC website

# Background – Why did we revise the Instructions???

- [SECY-13-0001](#), "Staff Recommendations for Improving the Integration of the Ongoing 10 CFR Part 61 Rulemaking Initiatives" (ML12199A412)
  - NRC staff noted stakeholders' suggestion that NUREG/BR-0204 be rewritten and that assumptions concerning the reporting of certain hard-to-detect isotopes (i.e., H-3, C-14, Tc-99 and I-129) on the UWM be revisited
- Two public workshops, in March and June of 2013, to collect comments specifically on NUREG/BR-0204 and the associated UWM forms
- Issued [RIS-2015-02](#) on the use of indirect methods (ML14272A217)

# Background – Timeline of Revision Process



# Current Status

Received several industry requests for extension to implement new forms

September 14, 2020, announced delay (ML20268C223)

Informal discussions: received questions about implementing the guidance

**Today:** Receive update on the status of forms implementation and answer questions

Not making revisions to NUREG/BR-0204, Rev 3



# What are the changes to the Forms described by NUREG/BR-0204, Rev 3?

- NRC Form 540/540A
  - Revised certification statement
  - Deleted column 17 on Form 540 (duplicate request for LSA/SCO class)<sup>1</sup>
- NRC Form 541/541A
  - Additional column for waste weight on Form 541
- NRC Form 542/542A
  - Minor formatting changes (applies to all forms)

<sup>1</sup> Low Specific Activity/Surface Contaminated Object

# Do I need to use the NRC version of the UWM Forms?

- Waste shippers may use the NRC UWM Forms located in the Forms Library

<https://www.nrc.gov/reading-rm/doc-collections/forms/index.html>

- **Unless....**

- Shipping to a disposal or processing facility that is located in an Agreement State
- ***Check with the recipient disposal facility to get the Agreement State regulator approved forms***

# What if I am shipping to an “Agreement State”?

- Agreement States
  - Maintain a program that is adequate to protect public health and safety, and the environment, and is compatible with the NRC’s program
- TX, UT, WA, and SC all have Agreement State programs
  - Adopt 10 CFR Part 20, Appendix G, but have flexibility with the UWM Forms

# Agreement State Forms

Agreement State UWM forms should be **equivalent** to the NRC forms in respect to **content, clarity, size, and location of information**

Agreement State UWM forms should **not** be labeled “NRC Form 540 (541, or 542)”

# What if I want to use the NRC Forms?

- NRC must comply with the Paperwork Reduction Act (PRA)
  - Renew UWM forms clearance every 3 years
  - Reflect OMB clearance number and expiration date
  - All information requests from federal agencies must have an OMB clearance/approval
- **So...**
- ***Shippers may use NRC forms as they appear on the NRC website***

# Paperwork Reduction Act (PRA)

OMB Clearance Number

PRA Statement

APPROVED BY OMB: NO. 3150-0164  
EXPIRES: 01/31/2023

Estimated burden per response to comply with this information collection request: 45 minutes. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-D A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [infocollections.Resource@nrc.gov](mailto:infocollections.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (2150-0164), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503, e-mail: [pia\\_submission@omb.eop.gov](mailto:pia_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

NRC FORM 540 U.S. NUCLEAR REGULATORY COMMISSION UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER		5. Shipper - Name and Facility		Shipper ID Number		7. NRC Form 540 and 540A, Page 1 of <input type="text"/> Page(s) Electronic <input type="checkbox"/>		8. Manifest Number	
See NUREG/BR-0204 for detailed instructions for completing this form: <a href="http://www.nrc.gov/reading-m/doccollections/nuregs/brochures/br0204/">http://www.nrc.gov/reading-m/doccollections/nuregs/brochures/br0204/</a>		User Permit Number		Shipment Number		NRC Form 541 and 541A <input type="checkbox"/>		Contact	
1. Emergency Telephone Number (Include area code)		Collector <input type="checkbox"/> Processor <input type="checkbox"/> Generator Type (Specify) <input type="text"/>		Additional Information <input type="text"/>		NRC Form 542 and 542A <input type="checkbox"/>		Phone No (Include Area Code)	
2. Is this an "Exclusive Use" Shipment? <input type="checkbox"/> Yes <input type="checkbox"/> No		3. Total Number of packages identified on this manifest? <input type="text"/>		4. Does EPA regulated waste requiring a manifest accompany this shipment? (If "Yes," provide Manifest Number). <input type="checkbox"/> Yes <input type="checkbox"/> No		5. Carrier - Name and Address		Signature - Authorized consignee acknowledging waste receipt	
6. EPA Manifest Number		EPA I.D. Number		Shipping Date		10. CERTIFICATION		Date	
11. U. S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)		12. DOT Labels		13. Transport Index		14. Physical and Chemical Form		15. Individual Radionuclides	
16. Maximum Package Activity in SI Units		17. Total Weight or Volume (Use appropriate units)		18. Identification Number of Package					
For Consignee Use Only									

NRC FORM 540 (06-2020)

NRC Form Number and date

# What are the changes in NUREG/BR-0204, Revision 3?

- Changes to correspond with revisions to UWM forms
- Updated references to current U.S. Department of Transportation (DOT) regulations
- Clarified the intent of the certification statement on Form 540
- Improved clarity (Guidance vs regulation)
- Additional discussion:
  - Reporting of inventories based on lower limit of detection (LLD) values
  - The potential use of indirect methods to determine these inventories (e.g., scaling factors)
  - The use of indirect methods in waste classification calculations

# Data Markings or Flags

Table 1 Examples for Reporting a 10,000-MBq Activity on the UWM Forms

Method Used to Develop Radionuclide Specific Activity for Shipment	How To Mark Activity	
Reported activity is based on actual measurements	10,000	
Reported activity is developed based on LLD values	(10,000)	
Reported activity is developed based on the use of indirect methods	10,000#	Scaling factors
Reported activity for shipment is calculated based on a combination of both indirect methods and LLD values*	5,000# / (5,000)	Scaling factors + LLDs
Reported inventory is developed based on a combination of actual measurements, indirect methods, and LLD values**	5,000 / 2,500# / (2,500)	Actual, Scaling factors + LLDs

\* In this example, half of the reported activity is based on LLD values and half is based on indirect methods (such as scaling factors).

\*\* In this example, half of the reported inventory is based on actual measurements, a quarter of the inventory is based on LLD values, and a quarter is based on indirect methods.



BY OMB:  
01/31/2023

541

UNITED STATES NUCLEAR REGULATORY COMMISSION

EXPIRES: 01/31/2023

Estimated burden per response to comply with this information collection request: 3.3 hours. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and regulatory Affairs, (3150-0166), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: [ora\\_submission@omb.eop.gov](mailto:ora_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

**Enter 0.0008# if  
using scaling factors**

# Are shippers required to use the new guidance on marking inventory?

- Using the Data Flags is **guidance** and **not** required by regulation
  - Staff included these flags in attempt to respond to public comments that it would be useful to reduce uncertainty in the reporting of hard-to-detects
  - Flagging data could add transparency and provide the disposal facilities with better information to support inventory estimates
  - ***Check with the recipient disposal facility to get the Agreement State regulator requirements for flagging data***

# Why should I use the flags to mark inventory?

- ***Using Data flags could assist the disposal facility reduce uncertainty in compliance dose estimates and increase disposal capacity***
- Total inventory is a key parameter in the estimation of dose
- How to handle  $< \text{LLD}$  values in the disposal facility inventory is challenging
  - Generally **not** acceptable to assume an activity of 0 for radionuclides present at  $< \text{LLD}$  **without a basis**
  - Assuming the radionuclide is present at the LLD could **overestimate** the dose
  - See NUREG-2175, “Draft Guidance for Conducting Technical Analyses for 10 CFR Part 61 (ML14357A072)”

# What is the status of **generic** scaling factors? (1 of 2)

- NRC has not endorsed the use of any **generic** scaling factors
- Licensees can use scaling factors, to determine the concentrations of radionuclides in waste
  - Generic or site-specific scaling factors
  - ***if there is reasonable assurance that the indirect methods can be correlated with actual measurements (10 CFR 61.55(a)(8))***
- [RIS 2015-02](#) provides guidance on the use of indirect methods and scaling factors

# What is the status of generic scaling factors? (2 of 2)

- EPRI submitted the report, “Development of Generic Scaling Factors for Tc-99 and I-129 in Low and Intermediate Level Waste” to the NRC for review
  - On March 1, 2019 NRC sent an RAI to EPRI on the submitted report
  - EPRI requested for the NRC to suspend its review
  - The NRC review will remain suspended unless EPRI requests staff to continue the review and provides a response to the RAI
- Licensees that use generic scaling factors should:
  - Demonstrate whether the generic information is applicable to their waste streams
  - Periodically evaluate if the generic scaling factors remain appropriate

# What is considered to be a significant radionuclide?

- Significant radionuclides **should** be reported on the UWM and **included** in the waste class calculation
- A radionuclide is “significant” if:
  - RN concentration  $> 0.01 \times$  Table 1 of 10 CFR 61.55, or
  - RN concentration  $> 0.01 \times$  the smallest concentration in Table 2 of 10 CFR 61.55, or
  - RN concentration  $> 0.01 \times$  the receiving disposal facility Waste Acceptance Criteria (WAC), or
  - the radionuclide is not listed in either the 10 CFR 61.55 tables or a land disposal facility WAC, and it is present in the waste in concentrations  $> 0.26$  MBq per  $\text{cm}^3$

## Does a **significant** radionuclide that is $\leq$ LLD have to be included in the calculation of the waste class? (1 of 4)

- The [NRC 1983 BTP](#) on Waste Classification (ML033630755):
  - LLDs for radionuclides identified in 10 CFR 61.55 should be
    - $< 0.01 \times$  the Table 1 value or
    - $< 0.01 \times$  the lowest Table 2 value for that radionuclide
  - The thresholds used to identify radionuclides that are “significant for the purposes of waste classification” are the same as the LLD thresholds
  - ***Radionuclides that are “significant for the purposes of waste classification” should be included in the waste classification calculations***

## Does a **significant** radionuclide that is <LLD have to be included in the calculation of the waste class? (2 of 4)

- ***If LLD values > 1983 guidance levels, then the radionuclide may be significant for classification***
- The licensee may
  - 1) Assume the radionuclide is present at the <LLD value achieved by the laboratory and include it in the waste classification calculation at that concentration;
  - 2) Improve the analysis capability such as to meet the LLD value in the 1983 BTP guidance; or
  - 3) Justify using an indirect method to quantify the radionuclide concentration and include that calculated value in the waste classification calculation



# Does a **significant** radionuclide that is <LLD have to be included in the calculation of the waste class? (3 of 4)

- For radionuclide concentrations below the 1983 BTP LLD guidance values:
  - For § 61.55 Table 2 radionuclides:
    - Threshold recommended = 1% of the Class A value
    - Even if several radionuclides were present at that level, they would be unlikely to change the waste classification
  - For § 61.55 Table 1 radionuclides:
    - Threshold recommended = 1% of the Class C concentration
    - Threshold recommended = 10% of the Class A concentration
    - If several radionuclides were present less than that LLD threshold for Class A waste, but present in the waste (e.g., each at 9% of the Class A limit), excluding those radionuclides **theoretically** could have a more significant impact on the waste classification. However, **practically**, NRC staff does not expect all of the Table 1 radionuclides to be present at those concentrations.

## Does a **significant** radionuclide that is $< \text{LLD}$ have to be included in the calculation of the waste class? (4 of 4)

- Including LLDs in a scaling factor could lead to uncertainty of whether the radionuclide is significant
  - Additional analysis to determine if the radionuclide is present may be needed
- ***Waste needs to be characterized well enough to understand the waste class –***
  - If including or excluding the  $< \text{LLD}$  values could change the waste class, then additional characterization may be warranted
  - Generator is responsible for ensuring the information is correct

# Example: Classification Calculation (1 of 4)

Hypothetical measured concentrations in a waste sample:

	Measured Concentration ( $\mu\text{Ci}/\text{cm}^3$ )	LLD in 1983 BTP Guidance ( $\text{Ci}/\text{m}^3$ )	Class A Limit ( $\text{Ci}/\text{m}^3$ )	SOF
Cs-137	0.02	0.01	1	0.02
I-129	<0.0008	0.0008	0.008	0.1

- LLD for Cs-137 and I-129 are consistent with 1983 BTP guidance
- Waste is Class A
- Scaling factor calculated based on this sample (assuming I-129 present at LLD):

$$\text{Scaling factor} = \text{I-129} / \text{Cs-137} = 0.0008 / 0.02 = 0.04$$

# Example: Classification Calculation (2 of 4)

Hypothetical reported concentrations in a second waste sample:

- Cs-137 is directly measured
- I-129 was scaled using the scaling factor and the Cs-137 concentration ( $0.04 * 0.5$ )

	Concentration ( $\mu\text{Ci}/\text{cm}^3$ )	LLD in 1983 BTP Guidance ( $\text{Ci}/\text{m}^3$ )	Class A Limit ( $\text{Ci}/\text{m}^3$ )	SOF
Cs-137	0.5	0.01	1	0.5
I-129	<0.02#	0.0008	0.008	2.5

- LLD for Cs-137 is consistent with 1983 BTP guidance, but the I-129 upper bound concentration projected based on the scaling factor is not
- It is unclear if waste is Class A, and additional analysis to determine the concentration of I-129 may be needed

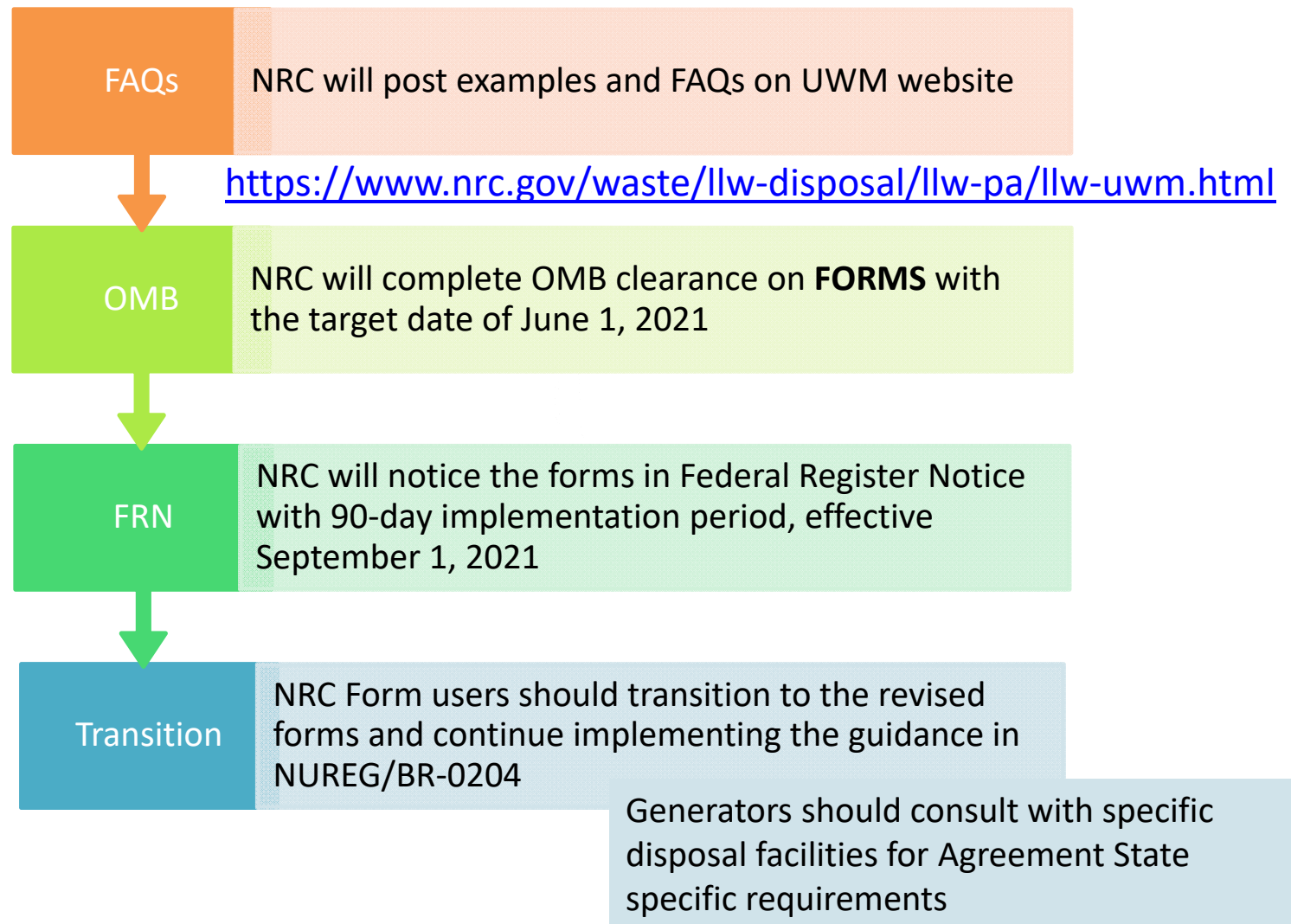
## Example: Classification Calculation (3 of 4)

- The calculation indicates that the waste is Class C, but the I-129 concentration is not well understood and is likely much lower than assumed
- The waste shipper could:
  - Analyze a sample of the waste for I-129 and use result to calculate waste class
  - Develop a more accurate scaling factor for their waste streams
  - Use a different indirect method to better estimate the I-129 concentration

# Example: Classification Calculation (4 of 4)

- To avoid this problem, waste shippers should be careful when developing scaling factors from samples with LLD values
  - Analyze the sample for longer count times to achieve a lower LLD
  - Use “hotter” samples as a basis for scaling factors, if practical (e.g., if there is not an unacceptable worker dose)
- *Waste needs to be characterized well enough to understand the waste class*

# Next Steps



# Public Input

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Would you be ready to implement the forms by June 1, 2021, with a 90-day implementation period?



Are there specific questions you would like to see answers to on the NRC website as FAQs?

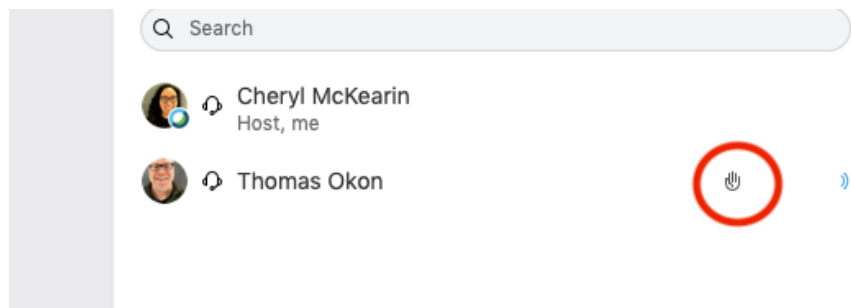


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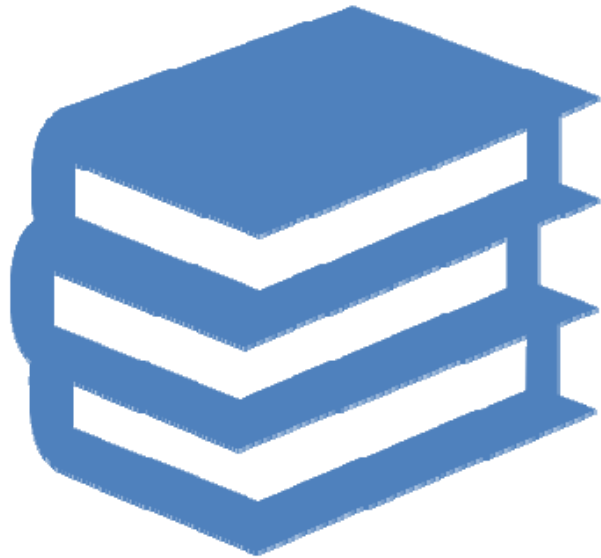
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## Background Information

# Current NRC Regulations

10 CFR Part 20, Appendix G, Definitions:

*NRC Forms 540, 540A, 541, 541A, 542, and 542A* are official NRC Forms referenced in this appendix.

Licensees need not use originals of these NRC Forms as long as any substitute forms are equivalent to the original documentation in respect to content, clarity, size, and location of information.

# Agreement State Compatibility Categories of Regulations

A	B	C
State regulation needs to be identical	State regulation needs to be essentially identical	State regulation needs to meet essential objective of regulation
D	H&S	NRC
Not required compatibility	Needs to meet health and safety objective	States cannot adopt regulations

**10 CFR Part 20,  
Appendix G**

**Forms 540, 541, and 542 (and Form A's)**