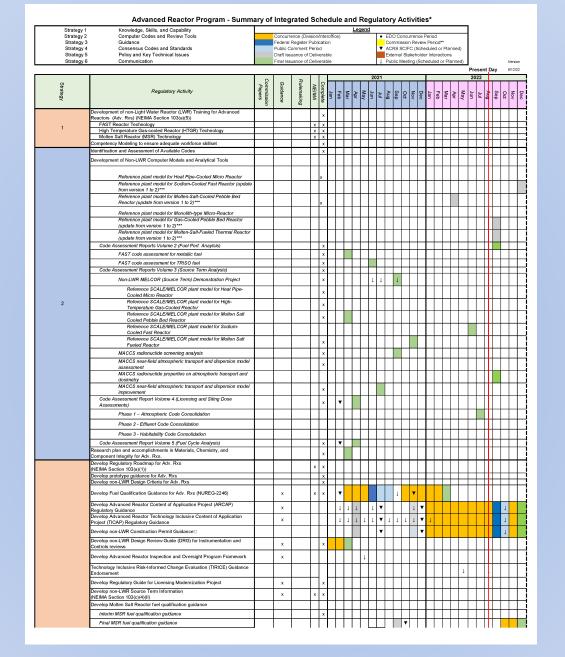


### Advanced Reactor Stakeholder Public Meeting

August 18, 2022

Microsoft Teams Meeting Bridgeline: 301-576-2978 Conference ID: 951 216 02#

Time	Agenda	Speaker
10:00 – 10:15 am	Opening Remarks/ Adv. Rx Integrated Schedule	NRC
	(Shelley Pitter - Logistics, Steve Lynch)	
10:15 – 10:30 am	Population-Related Siting Considerations for Advanced Reactors (next	NRC
	steps, including NRC path forward, role(s) for stakeholders)	
	(Steve Lynch)	
10:30 – 11:00 am	Part 53 Update: Status and Path Forward	NRC
	(Steve Lynch)	
11:00 am – 12:00	Part 53 - Stakeholder Perspectives	Stakeholders
pm	(TBD)	
12:00 – 1:00 pm	Lunch Break	All
1:00 – 1:45 pm	IAEA Safeguards, the Additional Protocol, and its reporting	NRC
	requirements (Eduardo Sastre Fuente)	
1:45 – 2:30 pm	Technology Inclusive Risk Informed Change Evaluation	Southern
	(TIRICE) Guidance	Company
	(Michael Tschiltz)	
2:30 – 2:35 pm	Future Meeting Planning and Concluding Remarks	All



https://www.nrc.gov/reactors/new-reactors/advanced/integrated-review-schedule.html

Population-Related Siting Considerations for Advanced Reactors (next steps, including NRC path forward, role(s) for stakeholders) (Steven Lynch)



## **Population-Related Siting**

Considerations

Steven Lynch, Chief

**Advanced Reactor Policy Branch** 

## **Commission Direction**

- In Staff Requirements Memorandum (SRM)-SECY-20-0045, the Commission approved the staff's recommendation to revise the guidance in Regulatory Guide (RG) 4.7, "General Site Suitability Criteria for Nuclear Power Stations" related to implementation of Title 10 of the Code of Federal Regulations Part 100, Section 100.21(h).
  - The SRM also states: "With respect to the traditional dose assessment approach, the staff should provide appropriate guidance on assessing defense-in-depth adequacy and establishing hypothetical major accidents to evaluate."

## **Proposed Path Forward**

- The NRC staff are working on an update to RG 4.7 to include guidance for:
  - assessing population density out to a distance equal to twice the distance at which a hypothetical individual could receive a calculated dose of 1 rem over a period of 1 month from the release of radionuclides following postulated accidents, and
  - design approaches using the Licensing Modernization Project approach, as well as others following more traditional analysis approaches
- The NRC staff are planning to complete the updated guidance by February 2024

Part 53 Update: Status and Path Forward (Steven Lynch)



# Part 53 Rulemaking Status and

## **Consideration of Feedback**

Steven Lynch, Chief

**Advanced Reactor Policy Branch** 

### **RULEMAKING STATUS**

### 🔦 Rule Language

- <u>2021</u>: definitions (A), safety criteria (B), design and analyses (C), siting (D), construction/manufacturing (E), operations and programs (F), decommissioning (G), licensing processes (H), maintenance of the licensing basis (I), reporting (J), security, access authorization, FFD, traditional alternatives.
- <u>2022</u>: consolidated rule package (Feb.), 2<sup>nd</sup> iteration
   Framework A (May, June), 1<sup>st</sup> iteration Framework B
   (June), updated consolidated rule package with
   statements of consideration (September)

#### Industry Input

 $\circ$  Over 1500 public comments received

#### Stakeholder Engagement

- 21 public meetings, 2 Commission Meetings, and 18 ACRS meetings
- <u>Recent</u>: 5/25 public meeting on Framework A, 6/11
   public meeting on Framework B, 6/30 stakeholder
   meeting on stakeholder feedback and Subpart F, 7/28
   public meeting on Framework B and key technical topics
- <u>Future</u>: October ACRS Subcommittee Meeting on integrated rulemaking, November ACRS Full Committee Meeting

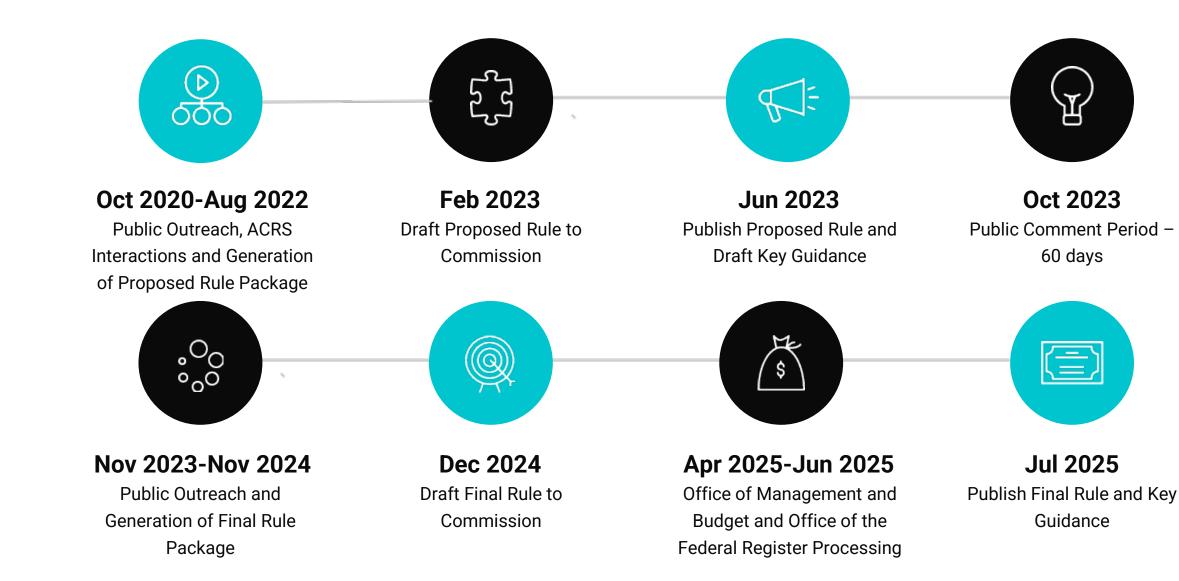
#### Focus Areas



202

- Finalize rule language
- Develop rule package (SOCs, regulatory analysis, etc.)
- Develop guidance

## **CURRENT PART 53 TIMELINE**





### Continued Consideration of Stakeholder Feedback on Part 53 Framework B

Safety functions from Framework A should be employed in Framework B.

Framework B should have its own set of siting requirements and should not rely on Part 100

Framework B should incorporate a RIPB alternative for seismic design requirements.

The draft requirements for fire protection in Framework B need to be more performancebased.

Referencing 10 CFR 50.155 (mitigation of beyond design-basis events (BDBE)) could be a

challenge in Framework B because these requirements are not technology-inclusive.

Use of Generally Licensed Reactor Operators (GLROs) should be permitted in Framework B.

Linked probabilistic risk assessment requirements in 10 CFR 50.44 (combustible gas control) could be a challenge for an Alternative Evaluation of Risk Insights (AERI).

The proposed requirements in 10 CFR 53.4730(a)(12) [from the Three Mile Island requirements in 10 CFR 50.34(f)] are not technology-inclusive.

IAEA Safeguards, the Additional Protocol, and its reporting requirements (Eduardo Sastre Fuente)



**Protecting People and the Environment** 

## Implementation of IAEA Safeguards within the United States

Material Control and Accounting Branch U.S. Nuclear Regulatory Commission (NRC)



## History

- The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) requires non-nuclear weapon states to accept IAEA safeguards on <u>all</u> source and special nuclear material in all peaceful nuclear activities
  - The United States, as one of five nuclearweapon states, or P5, was <u>not obligated</u> to conclude a safeguards agreement with the IAEA
- Since the early 1960's the U.S. has permitted the application of IAEA safeguards on a variety of nuclear facilities



NPT Signing, 1968



NPT RevCon, 2010



## **Overview of U.S.-IAEA Agreements**

- U.S. IAEA Safeguards Agreement (INFCIRC/288)
  - "The U.S. Voluntary Offer Agreement"
  - Entry Into Force 1980
- Protocol to the U.S. IAEA Safeguards Agreement (INFCIRC/288)
  - "The Reporting Protocol"
  - Entry Into Force 1980
- Protocol Additional to the U.S. IAEA Safeguards Agreement (INFCIRC/288 Add.1)
  - "The Additional Protocol"
  - Entry Into Force 2009
- U.S.-IAEA Caribbean Territories Safeguards Agreement (INFCIRC/366)
  - Includes a Small Quantities Protocol
  - Entry Into Force 1989
  - Modified Small Quantities Protocol Entry Into Force 2018



•Atomic Energy Act of 1954, as amended

-Primary U. S. law on nuclear energy to ". . . promote world peace, improve the general welfare, increase the standard of living and strengthen free competition in private enterprise."

•Energy Reorganization Act of 1974

-Established the United States Nuclear Regulatory Commission and Energy Research and Development Administration (eventually the Department of Energy)

•Nuclear Nonproliferation Action of 1978

-Establish a more effective framework for international cooperation on peaceful nuclear activities

-Codifies support to the IAEA

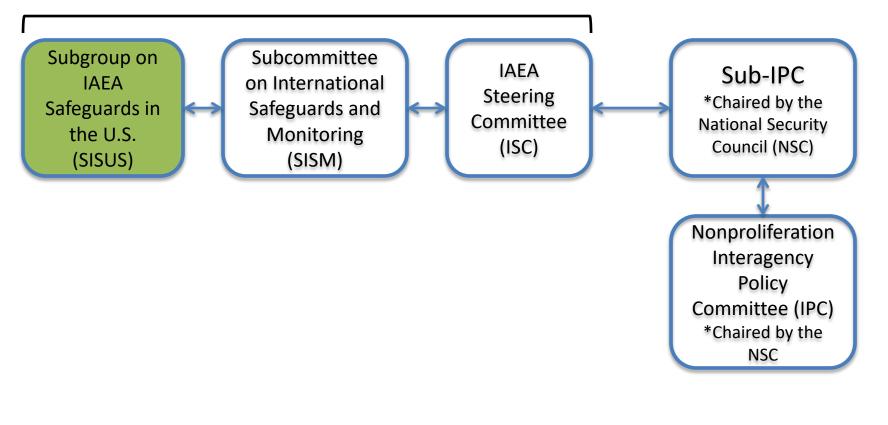
•Title 10 of the Code of Federal Regulations Part 75

-Requires NRC licensees to comply with U.S. obligations to the IAEA



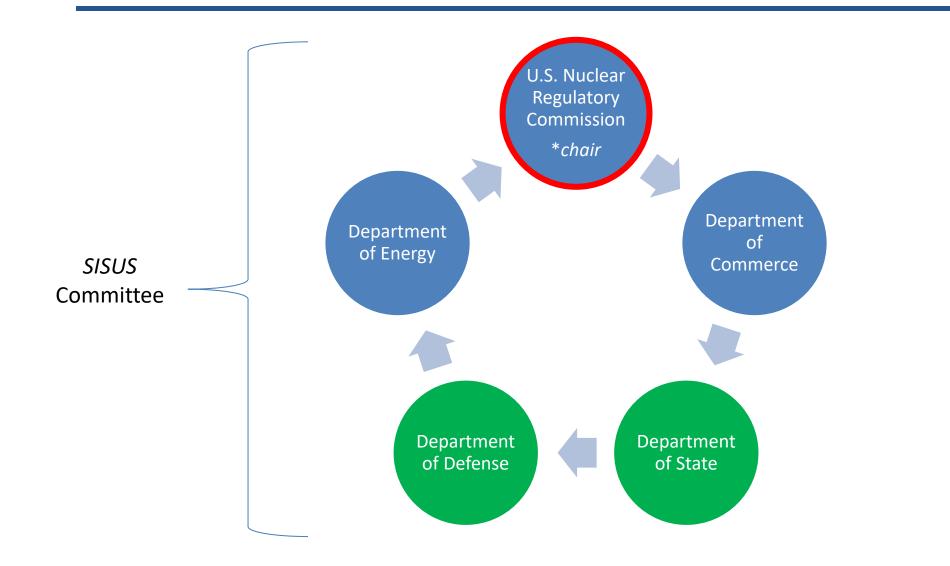
### **U.S. Government Oversight**

#### Defined in Federal Register





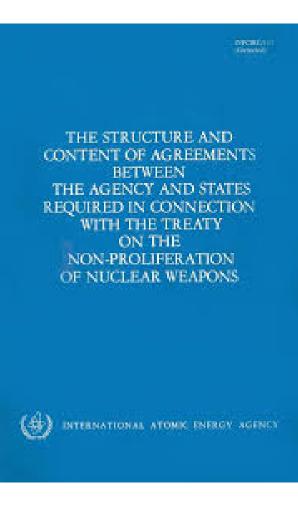
### Who Implements in the U.S.? Who are the Players?





## **U.S. Voluntary Offer Agreement**

- Based on INFCIRC/153
- Selection-based approach to safeguards
  - Eligible Facilities List (EFL)
- National Security Exclusion
- Includes all typical safeguards activities including inspections, completion of Design Information Questionnaire (DIQ) and Design Information Verification (DIV), sampling, technical visits, etc...
- Allows for the application of safeguards in a manner similar to that of non-nuclear weapon states (NNWS)





U.S. Voluntary Offer Agreement (VOA) – Reporting Protocol

- Allows for limited safeguards activities to be performed at facilities with minimal cost to the IAEA
  - Unique to the United States
- Includes activities such as completion of DIQs and DIVs
- Monthly and annual material accountancy reports (e.g., Physical Inventory Listing (PIL), Inventory Change Report (ICR), etc...)
- 4 sites (all NRC licensees) currently selected under this 'Protocol'
- NO INSPECTIONS



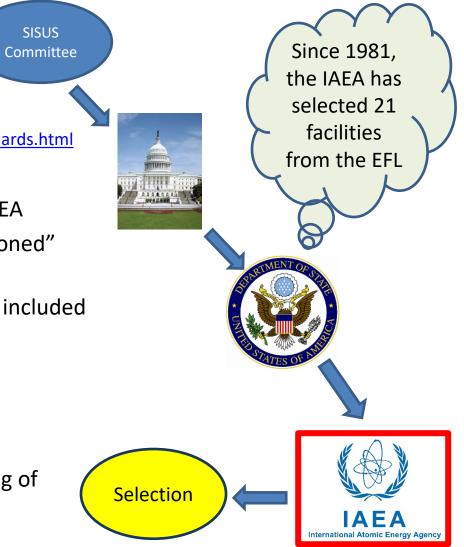
## U.S. VOA or Comprehensive Safeguards Agreement (CSA)

U.S. VOA	Comprehensive Safeguards	
Selection-based approach based on the Eligible Facilities List	Safeguards are applied on all nuclear material in the territory (all facilities)	
Completion of Design Information Questionnaire and Design Information Verification	Completion of Design Information Questionnaire and Design Information Verification	
Monthly and annual material accountancy reports (e.g., Physical Inventory Listing (PIL), Inventory Change Report (ICR), etc.)	Monthly and annual material accountancy reports (e.g., Physical Inventory Listing (PIL), Inventory Change Report (ICR), etc.)	
Inspections at selected facilities under full scope safeguards (one in the U.S.)	Inspections at all facilities	
National Security Exclusion	No Exclusions	



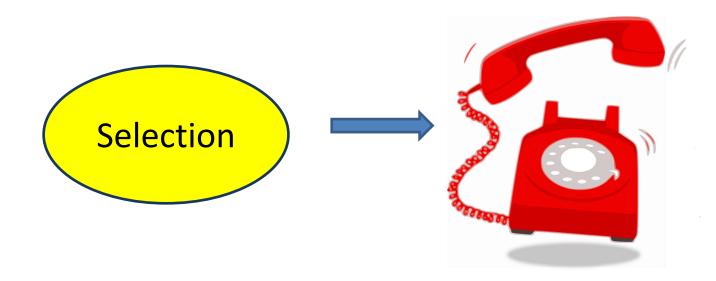
## **Eligible Facilities List (EFL)**

- Two portions of the U.S. EFL
  - DOE facilities (non-public)
  - NRC facilities (public)
    - <u>http://www.nrc.gov/about-nrc/ip/intl-safeguards.html</u>
- ~300 facilities on EFL
  - "Facility" is formally defined by the IAEA
  - Facilities removed when "decommissioned" (per IAEA's definition)
  - Locations Outside Facilities (LOFs) not included on EFL
- Updated annually
- Updates are vetted through the U.S.
   Government
  - Security evaluation to remove anything of "direct national security significance"





### **Implementation Contd.**



- After the facility has been notified of selection, the following documents are completed:
  - Design Information Questionnaire (DIQ)
  - Facility Attachment
- U.S. and IAEA negotiate terms of implementation



#### Present

- K-Area Material Storage (KAMS) at Savannah River Site (SRS)
  - Only facility currently under routine inspections by the IAEA
  - Incorporates remote monitoring
  - Allow for installation of IAEA equipment
  - Reporting
- Westinghouse Fuel Fab. Facility (Columbia, SC)
- Framatome Fuel Fab. Facility (Richland, WA)
- Global Nuclear Fuel Americas Fuel
   Fab. Facility (Wilmington, NC)
- URENCO USA Gas Centrifuge
   Enrichment Plant (Eunice, NM)

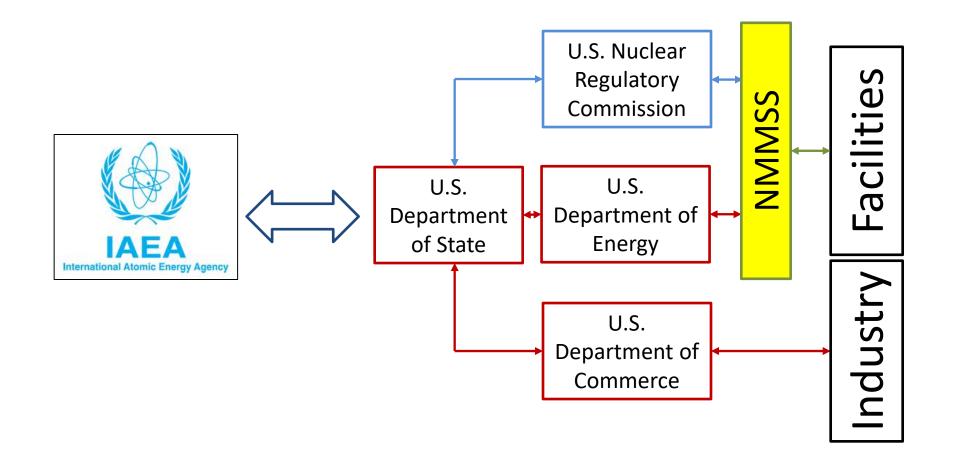
Reporting ONLY, NO INSPECTIONS

#### Reporting AND Inspections



### **Flow of Information through NMMSS**

(Nuclear Materials Management & Safeguards System)





## U.S. Additional Protocol (AP) 2009 - Present

- Signed in 1998, entry into force 2009
- Provides the IAEA with additional information and access rights on nuclear fuel cycle related activities
- Contains a national security exclusion
- "Locations" and "Sites" must submit:
  - Annual updates
  - Quarterly export reports
- The U.S. AP applies to everyone within the U.S.
  - Excluding anything of national security significance
  - No "selection" is required





**Reporting Requirements** 

- Annual reporting requirements (10 CFR 75.6)
  - (2.a.i) Nuclear fuel cycle research and development (15 CFR 781)
    - Approximately 75% of the total number of U.S. declarations are 2.a.i. declarations
  - (2.a.iii) Site declaration including description of activities
    - Only relevant for facilities that are currently or have previously been selected for IAEA safeguards
    - Not applicable to a vast majority of the industry
  - (2.a.iv) Nuclear fuel cycle related manufacturing and assembly (15 CFR 781)
    - Annex I items from the U.S. Additional Protocol
  - (2.a.v) Uranium and thorium mines, mills, and concentration plants
  - (2.a.vi) Possession of large quantities of impure source material (15 CFR 781)
    - Source material that is not yet suitable for fuel fabrication or enrichment
  - (2.a.x) Ten year plan
    - Input is not requested from the industry
- Quarterly reporting requirements [10 CFR 110.54(a)(1)]
  - (2.a.ix) Exports of Annex II items



Nuclear Fuel Cycle Research and Development

- The R&D activities captured by AP are those are funded either by the U.S. Government or privately. (15 CFR 783.1(a)(1))
- Reportable privately funded R&D activities:
  - Enrichment,
  - Reprocessing of nuclear fuel or
  - Processing of intermediate or high-level waste containing plutonium, high enriched uranium or uranium-233
- Reportable U.S. Government funded R&D specifically related to:
  - Conversion of nuclear material
  - Enrichment of nuclear material
  - Nuclear fuel fabrication
  - Reactors
  - Critical facilities
  - Reprocessing of nuclear fuel
  - Processing of intermediate or high level waste containing plutonium and/or high enriched uranium.



Snapshot of Licensees Who Report Under the U.S. AP...and many more!





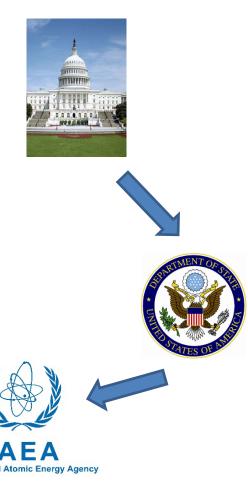
## Quarterly Export Reports Explained (2.a.ix)

- For licensees using NRC general or specific license authorizations for exports of specified equipment and non-nuclear material as listed in Annex II of the Additional Protocol
  - This reporting requirement is also reflected in 10 CFR Part 110.54(a)(1) for Agreement State licensees.
- Most NRC licensees should report as a "location" using AP-13 found on <u>www.AP.gov</u>, to report directly to Department of Commerce, Bureau of Industry and Security (BIS) every quarter (forms are joint DOC/NRC forms).
- Quarterly deadlines to BIS are: January 15, April 15, July 15, and October 15 of each year
- Exporters shall follow 10 CFR 110.54(c) for reporting items exported under Part 110.26 (General License)



### **Additional Protocol Reporting Process**

- Information is sent to DOC by Jan 31<sup>st</sup>
  - Can be sent via facsimile, mail, or email
- NRC receives licensee's forms from DOC and performs a review
- NRC compiles data and submits a report to DOC for inclusion in the overall U.S. Government declaration
- U.S. declaration must sit before Congress for a 60 day review period (for annual report only)





**Additional Protocol Webpage** 

- The Department of Commerce manages a webpage that contains the handbooks and forms for the U.S. Additional Protocol
  - Handbooks and forms are joint use for both DOC and NRC
  - The majority of companies use the "Report Handbook for Locations."
- Assistance in determining your obligations (15 CFR 782.4)
  - apdr@bis.doc.gov
  - <u>Santiago.Aguilar@nrc.gov</u>



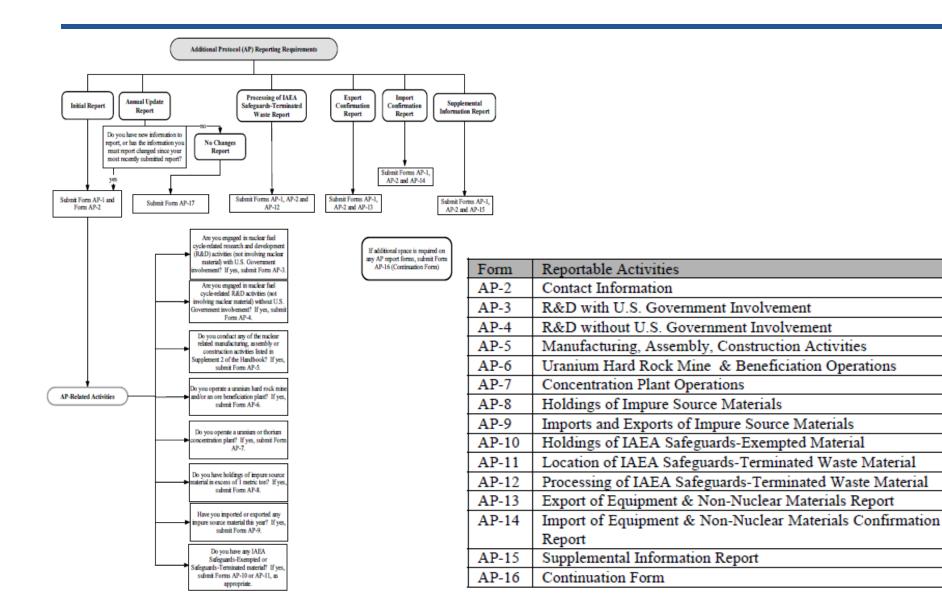


### **Additional Protocol Webpage**

Bureau of Industry and Security U.S. Department of Commerce Where Industry and Security Intersect			
Home About BIS ⊗ Regulation	ons × Licensing × Enforcement × Compliance & Training × Policy Guidance × Add	I Programs × Reform × Additional Protocol Related Documents	
Additional Protocol (AP)     Report Handbook for     Locations	Additional Protocol (AP)	Additional Protocol Treaty	
<ul> <li>Report Handbook for Sites</li> <li>Outreach Events</li> <li>Informational Publications</li> <li>Press Releases</li> </ul>	<ul> <li>U.S. Additional Protocol</li> <li>Welcome to the U.S. Additional Protocol (AP) Homepage. This page provides resources and educational tools to assist locations engaged in nuclear fuel cycle-related activities to comply with the Bureau of Industry and Security's (BIS) Additional Protocol Regulations (APR).</li> <li>All entities subject to the reporting requirements of the APR must submit to BIS, by January 31, a Report of nuclear fuel cycle-related activity carried out during the previous year.</li> </ul>	Eegislation 109-721 Executive Order 13458 Final AP Rule Report Handbook for Locations Report Handbook for Sites	
Additional Protocol Links	<ul> <li>If you started a new nuclear fuel-related activity during the previous calendar year <u>and</u> your location has not previously been reported to BIS, you must submit an Initial Report.</li> <li>If you previously submitted an Initial Report to BIS for your location, you must submit an Annual Update Report or a No Change Report.</li> <li>Any new nuclear fuel-related activity started during the previous year at a location previously reported to BIS can be included in an Annual Update Report.</li> </ul>		
epartment of Energy (DOE)	<ul> <li>Any nuclear fuel-related activity that ceased during the previously year at a location previously reported to BIS must be included in the Annual Update Report.</li> <li>For additional information on APR reporting requirements, contact BIS's Treaty Compliance Division at 202-482-1001.</li> </ul>		
	<ul> <li>The APR applies to all persons and locations in the United States, except:</li> <li>1. Locations that are subject to the regulatory authority of the Nuclear Regulatory Commission or one of their Agreement States.</li> </ul>	Internet   Protected Mode: On	



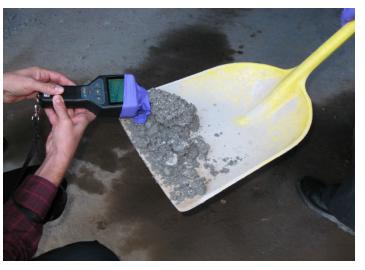
### **Additional Protocol Webpage**





## **Complementary Access (CA)**

- Complementary access is an essential aspect of the IAEA's expanded authorities
- Complementary access allows the IAEA to:
  - Verify the absence of undeclared nuclear materials and activities
  - Resolve a question or inconsistency
- Access for IAEA with 24 hours advance notice
  - 2 hours if IAEA is already onsite
- CAs are rare in the U.S.
- Only 2 CAs have been conducted in the U.S. (2010)
  - AREVA Inc., Fuel Fabrication Facility (Lynchburg, VA)
  - Global Advanced Metals (Boyertown, PA)







- Please ask questions early and often!
  - NRC Office of Nuclear Material Safety and Safeguards (NMSS); Material Control and Accounting Branch (MCAB)
    - Eduardo Sastre <u>Eduardo.Sastre@nrc.gov</u>
    - Santiago Aguilar <u>Santiago.Aguilar@nrc.gov</u>
    - Oleg Bukharin <u>Oleg.Bukharin@nrc.gov</u>
    - James Rubenstone <u>James.Rubenstone@nrc.gov</u>
  - Department of Commerce, Treaty Compliance Division, Bureau of Industry and Security, U.S. Department of Commerce
    - Hung Ly <u>Hung.Ly@bis.doc.gov</u>
- Additional resource:
  - <u>http://www.nrc.gov/about-nrc/ip/intl-safeguards.html</u>





Technology Inclusive Risk Informed Change Evaluation (TIRICE) Guidance (Michael Tschiltz) Technology-Inclusive Risk-Informed Change Evaluation (TIRICE) for Facilities Utilizing NEI 18-04 (Methodology) and NEI 21-07 (Content of Application) guidance

**NRC Advanced Reactor Stakeholder Meeting** 

August 18, 2022

Mike Tschiltz Consultant to Southern Company





- -Project Overview
- -Objectives
- -Schedule
- -Questions

### **Project Overview, Objectives and Schedule**

- The TIRICE project builds upon the work accomplished by LMP(NEI 18-04) and TICAP (NEI 21-07) to create guidance for evaluating changes to the facility as described in the UFSAR for those licensees that have used these guidance documents.
- Advanced non-LWRs may elect to follow NEI 18-04 for selection of licensing basis events; safety classification of structures, systems, and components and associated special treatments; and determination of Defense-in-Depth (DID) adequacy.
- The resulting <u>LMP-based affirmative safety case</u> is substantially different from the traditional deterministic, compliance-based safety cases in place for LWRs licensed by the NRC.
- During development of TICAP guidance it became clear that there is a need to develop technologyinclusive, risk-informed, performance-based guidance for evaluating changes to a facility as described in the Updated Final Safety Analysis Report (UFSAR) (10 CFR 50.59).
- The attributes of the <u>LMP-based affirmative safety case</u> require additional guidance for efficient application of an <u>alternative change evaluation process</u>.
- The proposed change evaluation process would be invoked through a license condition in combination with an exemption to 10 CFR 50.59.

The project will develop guidance for a <u>change evaluation process</u> for reactors that are licensed under 10 CFR Part 50 or 52 that utilize NEI 18-04 to develop safety case and NEI 21-07 guidance to determine application content.

The objectives of the guidance are to:

- Establish a process and criteria for evaluating changes to the facility as described in the final safety analysis report and determine which changes can be implemented without prior NRC approval
- Ensure that the changes that require NRC prior approval are properly identified
- Minimize the unnecessary burden to the regulator and operators

### **Project Overview, Objectives and <u>Schedule</u>**

#### Overall project schedule

- Develop Draft Guidance document to be provided for the NRC for review in August 22
- NRC review and endorsement FY23

#### Develop Project Plan and establish Project Team (Dec 21-Jan 22) complete

#### • **Develop Scope and Process papers** (Feb-Mar 22) complete

- Utilized as inputs to white paper

#### • Develop White Paper (Apr-July 22) complete

- Identify specific steps to be performed during the change evaluation process
- Summarize efforts to date and obtain ARRTF feedback
- Provide draft white paper to NRC for review
- Meeting with NRC to obtain staff feedback
- Revise white paper in support of Table Top exercises
- Utilize white paper in performing Table Top exercises

#### Develop Table Top Guidelines and Objectives (Apr-June 22) complete

 To improve the efficacy of the proposed process, some elements of the recommended guidance will be subjected to trial use tests.

### **Project Overview, Objectives and <u>Schedule</u>**

- Develop Annotated Outline for Guidance (Apr Jul) complete
- Conduct Tabletop Exercises (Jun Jul) complete
  - Conduct Table Tops with 2 Advanced Reactor Developers
  - Obtain NRC observations from Table Tops
  - Develop Lessons Learned and incorporate into Draft Guidance document
- Develop Southern Co. Draft Guidance document (Jul Aug) ongoing
  - ARRTF review of Draft Guidance
  - Address ARRTF comments provide revised Draft Guidance to ARRTF
  - NRC review of Draft Guidance
  - Revise Draft Guidance to address NRC comments and provide to ARRTF and NRC

#### Convert to NEI document and submit for NRC review/endorsement (Sep 22- FY23)

- ARRTF review of draft NEI guidance
- Address ARRTF comments and finalize for formal submittal for NRC review/endorsement



Thank you for your time and attention