



# **Public Meeting on Possible Regulatory Process Improvements for Advanced Reactor Designs**

October 10, 2019

Telephone Bridge: (877) 918-6704  
Passcode: 6012241



# Public Meeting

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- Telephone Bridge  
(877) 918-6704  
Passcode: 601224
- Opportunities for public comments and questions at designated times

# Outline

- 9:00 – 9:10 am Opening Remarks
- 9:10 – 10:30 am 10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking
- 10:30 – 10:40 am Break
- 10:40 – 11:30 am 10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking
- 11:30 – 12:30 pm Export-Controlled Information Technology
- 12:30 – 1:30 pm Lunch
- 1:30 – 2:00 pm Volcanic Hazards Regulatory Guide and Upcoming Public Meeting
- 2:00 – 2:30 pm Environmental Topics
- 2:30 – 3:00 pm Draft Documents and Electronic Reading Rooms
- 3:00 – 3:10 pm Break
- 3:10 – 3:25 pm Manufacturing Licenses
- 3:25 – 3:40 pm Nuclear Energy Innovation and Modernization Act (NEIMA) – Research and Test Reactor Licensing
- 3:40 – 4:00 pm Future Meetings planning and Open Discussion

- ☐ Advanced Reactor Stakeholders Meeting:  
Opening Remarks  
– Steven Lynch, NRC

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- ❑ 10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking
    - William Reckley, NRC
  - ❑ 10 CFR Part 53: Ideas for Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking
    - Jeffrey Merrifield, NIC

# Break

*Meeting/Webinar will begin shortly*

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# □ 10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking

□ Export-Controlled Information Technology  
– Krystee Ervin, NNSA

# Lunch

*Meeting/Webinar will begin shortly*

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- Volcanic Hazards Regulatory Guide and Upcoming Public Meeting  
– Jenise Thompson, NRC

- ❑ Advanced Reactor Preparations for Environmental Reviews  
– Mallecia Sutton, NRC
  
- ❑ Recommendations for Streamlining NRC Environmental Reviews  
– Kati Austgen, NEI

- ❑ Discussing Draft Documents and Use of Electronic Reading Rooms
  - Lucieann Vechioli Feliciano, NRC

# Break

*Meeting/Webinar will begin shortly*

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## Manufacturing Licenses

– Adrian Muñiz, NRC

- Nuclear Energy Innovation and Modernization Act (NEIMA) – Research and Test Reactors Licensing  
– William Kennedy, NRC

# Open Discussion and Closing

# Advanced Reactor Stakeholders Meeting: Opening Remarks

Steven Lynch

Acting Chief, Advanced Reactor Licensing Branch  
Division of Advanced Reactors

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# ***New* New Organization, Familiar Approach**

- Division of Advanced Reactors and Non-power Production and Utilization Facilities (DANU)
  - Advanced reactor technical, policy, and licensing branches
  - Non-power production and utilization facility licensing and oversight branches
- Continued commitment to facilitating successful pre-application interactions, providing regulatory transparency, encouraging open communication, and ensuring coordination between the NRC and stakeholders

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# Elements of Success

- A shared understanding of what to expect and when to expect it supports effective pre-application interactions and application reviews
- Goals for engagement:
  - Frequent communication
  - Consistent expectations and experiences
  - Early identification and resolution of technical, policy, and licensing issues

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# Priorities

- Preparing for near-term application submittals
  - Micro-reactor environmental guidance
  - Non-Light Water Reactor Review Strategy  
(Draft, ADAMS Accession No. ML19275F299)
- Addressing long-term licensing, policy, and technical questions
  - Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking (“Part 53”)
  - Micro-reactor policy and regulatory issues
  - Licensing Modernization Project
  - Other technical topics, including security, siting, emergency preparedness, code development

# 10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking: Introduction

Advanced Reactor Stakeholder Meeting  
October 10, 2019

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# Agenda

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- Opening Remarks
- Stakeholder Presentations
- NRC Staff Presentation
- Open Discussion
- Closing Remarks

# Meeting Purpose

- Discuss the reasons the NRC is pursuing the “Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors” rulemaking.
- Solicit public feedback on the rulemaking scope to assist the NRC in developing the rulemaking plan.
- Present initial NRC thoughts on the rulemaking scope and framework.

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# Why is the NRC pursuing this rulemaking?

- The NRC was directed by Congress to complete this rulemaking in the Nuclear Energy Innovation and Modernization Act (NEIMA), signed into law on January 14, 2019
- However, the NRC was already considering the potential need for rulemaking, as noted in the “NRC Vision and Strategy: Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness”

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# Nuclear Energy Innovation and Modernization Act (NEIMA)

- NEIMA Section 103 requires that the NRC “complete a rulemaking to establish a technology-inclusive, regulatory framework for optional use by commercial advanced nuclear reactor applicants for new reactor license applications.”
- Rulemaking is to be completed no later than December 31, 2027.

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# NEIMA

- NEIMA defines “advanced nuclear reactor” as “a nuclear fission or fusion reactor, including a prototype plant . . . with significant improvements compared to commercial nuclear reactors under construction” as of January 14, 2019, including improvements such as additional inherent safety features; significantly lower levelized cost of electricity; lower waste yields; greater fuel utilization; enhanced reliability; increased proliferation resistance; increased thermal efficiency; or ability to integrate into electric and nonelectric applications.

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# Rule Applicability

- NRC staff interprets NEIIMA's definition of "advanced nuclear reactor" as covering
  - Light-water small modular reactors
  - Non-light-water reactors (non-LWRs)
  - Fusion reactors
- Rule would not apply to current operating reactors or Generation III+ large LWRs

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# Stakeholder Insights

Advanced Reactor Stakeholder Meeting

October 10, 2019

# 10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking: Initial Thoughts

Advanced Reactor Stakeholder Meeting  
October 10, 2019

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# Scope & Framework of Rulemaking

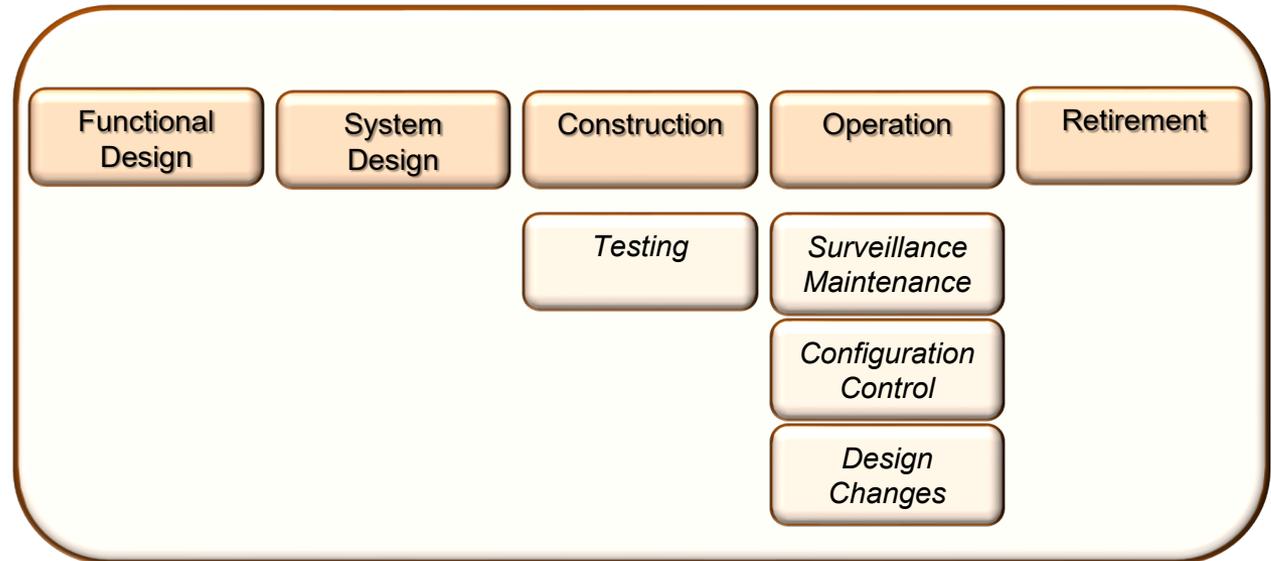
- Within new 10 CFR Part 53, address:
  - Technical requirements equivalent to the light-water reactor requirements in 10 CFR Part 50 (including performance requirements for use in such areas as emergency preparedness)
- Create new provisions, as needed, within existing Parts for
  - Security
  - Environmental protection
  - Operator licensing

# Technology Inclusive Regulatory Framework

Project Life Cycle

**Requirements Definition**

- Fundamental Safety Functions
- Prevention, Mitigation, Performance Criteria (e.g., F-C Targets)
- Normal Operations (e.g., effluents)
- Other



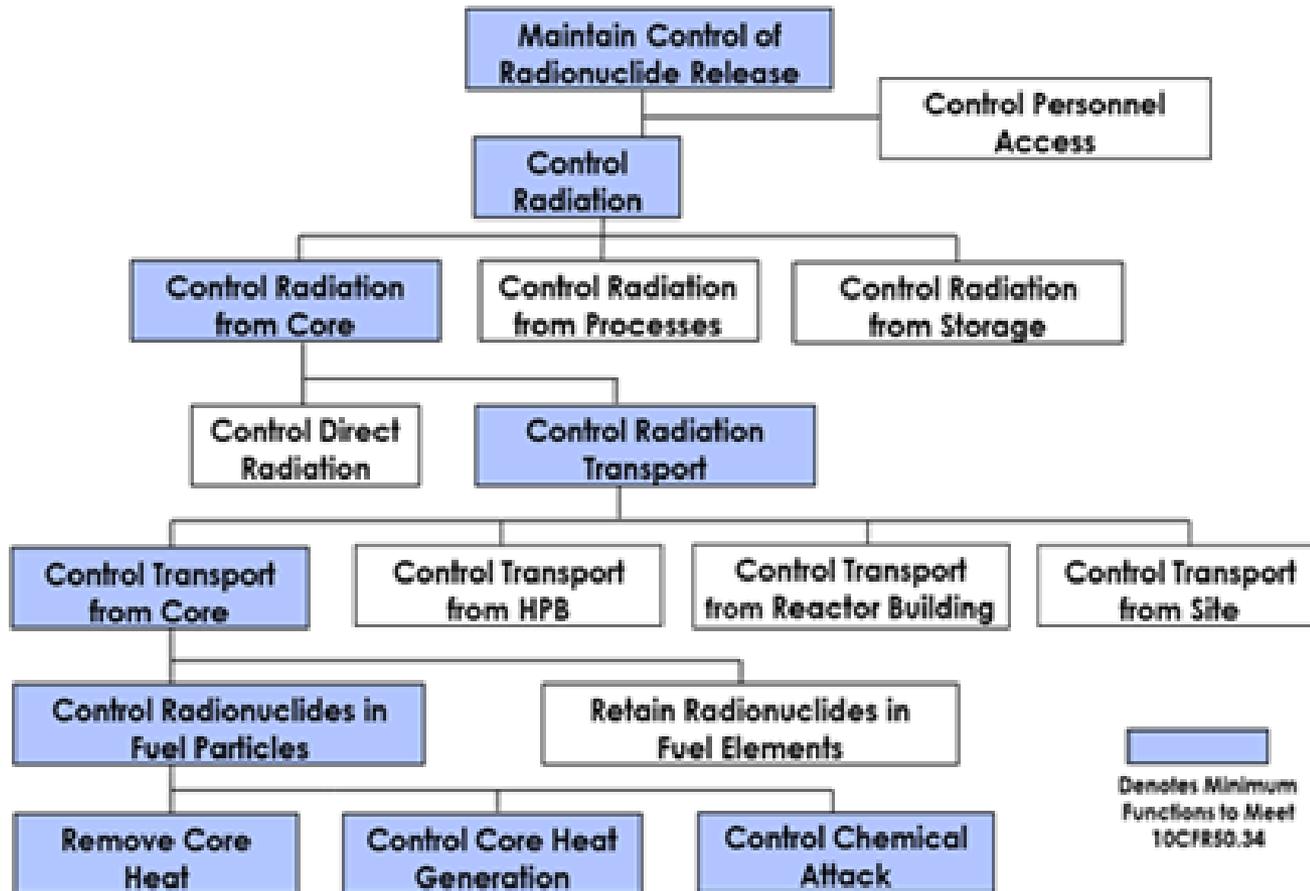
Clarify Controls and Distinctions Between

Plant/Site (Design, Construction, Configuration Control)

Analyses (Prevention, Mitigation, Compare to Criteria)

LB Documents (SAR, TS, etc.)

# Keep requirements at the safety function level



NGNP Concept

# Adopt Concepts from DG-1353 & NEI 18-04

Recent NRC activities related to advanced reactors (e.g., functional containment performance criteria, possible changes to emergency planning & security, and DG-1353) recognize the limitations of existing LWR-related guidance, which requires a return to first principles such as fundamental safety functions supporting the retention of radionuclides

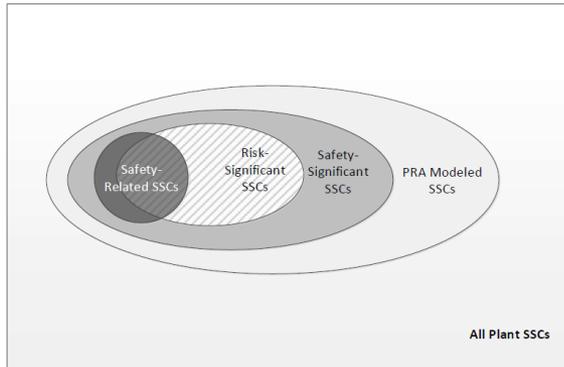
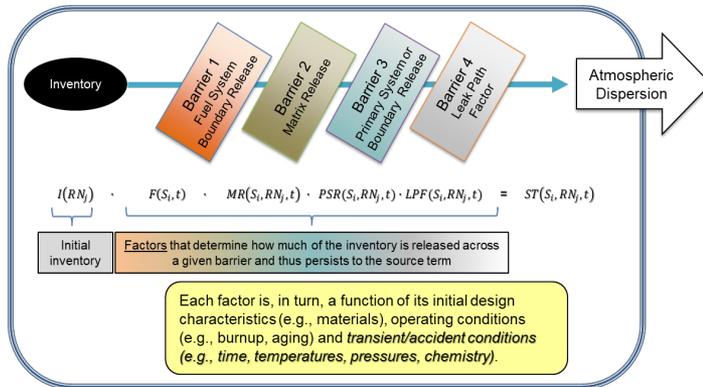
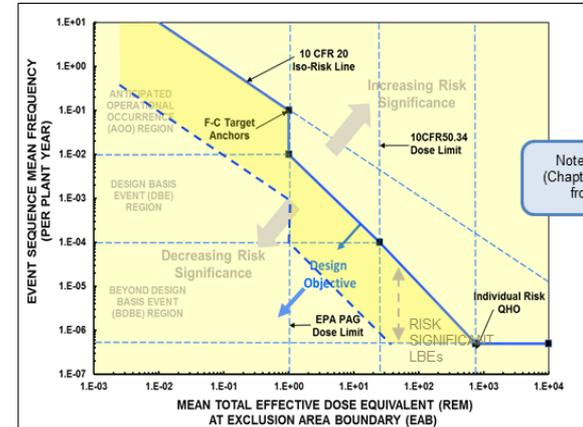
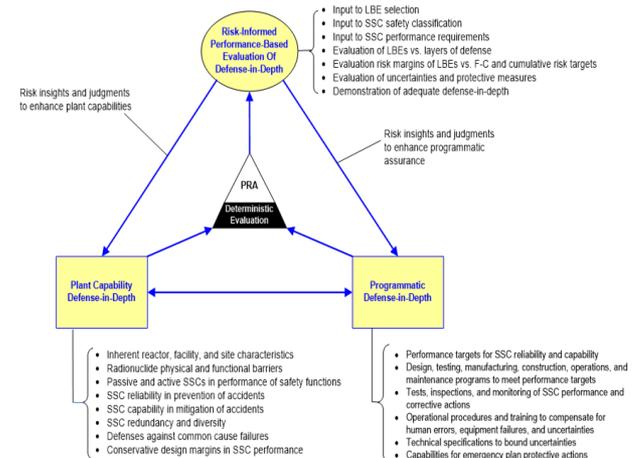


Figure 4.2. Definition of Risk-Significant and Safety-Significant SSCs

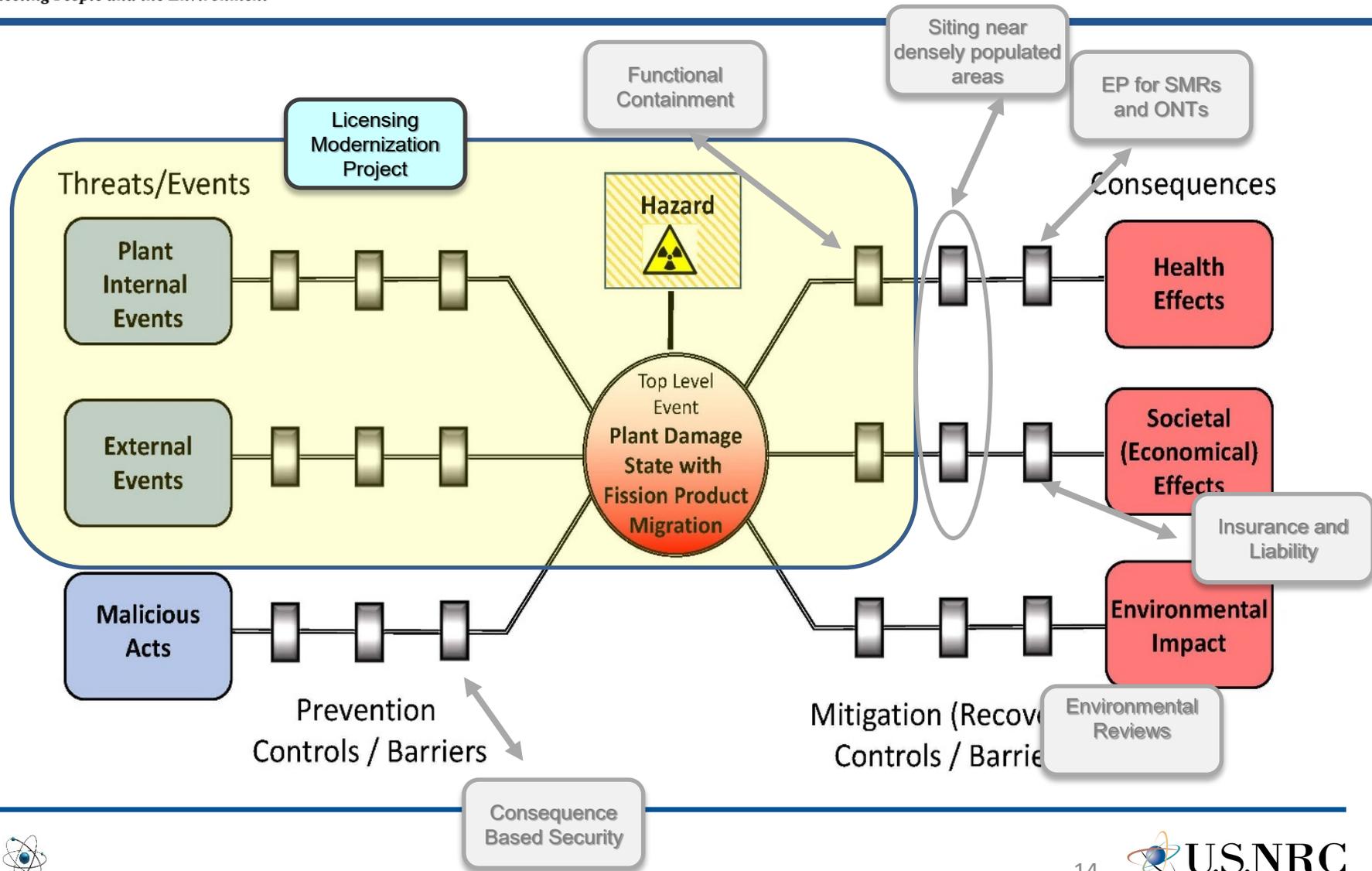


Note that DBAs (Chapter 15) derived from DBEs

- F-C Target considered along with cumulative risk metrics, safety classification, and assessment of defense in depth



# Pursue an Integrated Approach



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# NRC Path Forward

- Finalize a rulemaking plan, taking into consideration feedback received today
- Draft associated Commission paper requesting Commission approval of the rulemaking scope
- Send rulemaking plan to Commission before April 2020
- Begin routine stakeholder meetings to support developing proposed rule and related guidance.



# 10 CFR Part 53: Ideas for Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking

**The Honorable Jeffrey S. Merrifield**  
**Chairman, US Nuclear Industry Council Advanced Reactors Task Force**  
**&**  
**Energy Section Leader, Pillsbury**  
**&**  
**NRC Commissioner, 1998-2007**

October 10, 2019

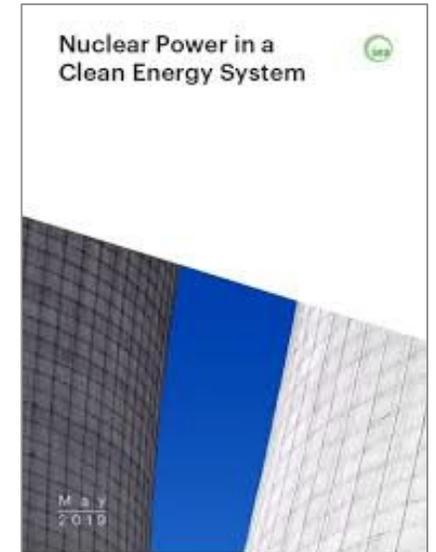


# Overview

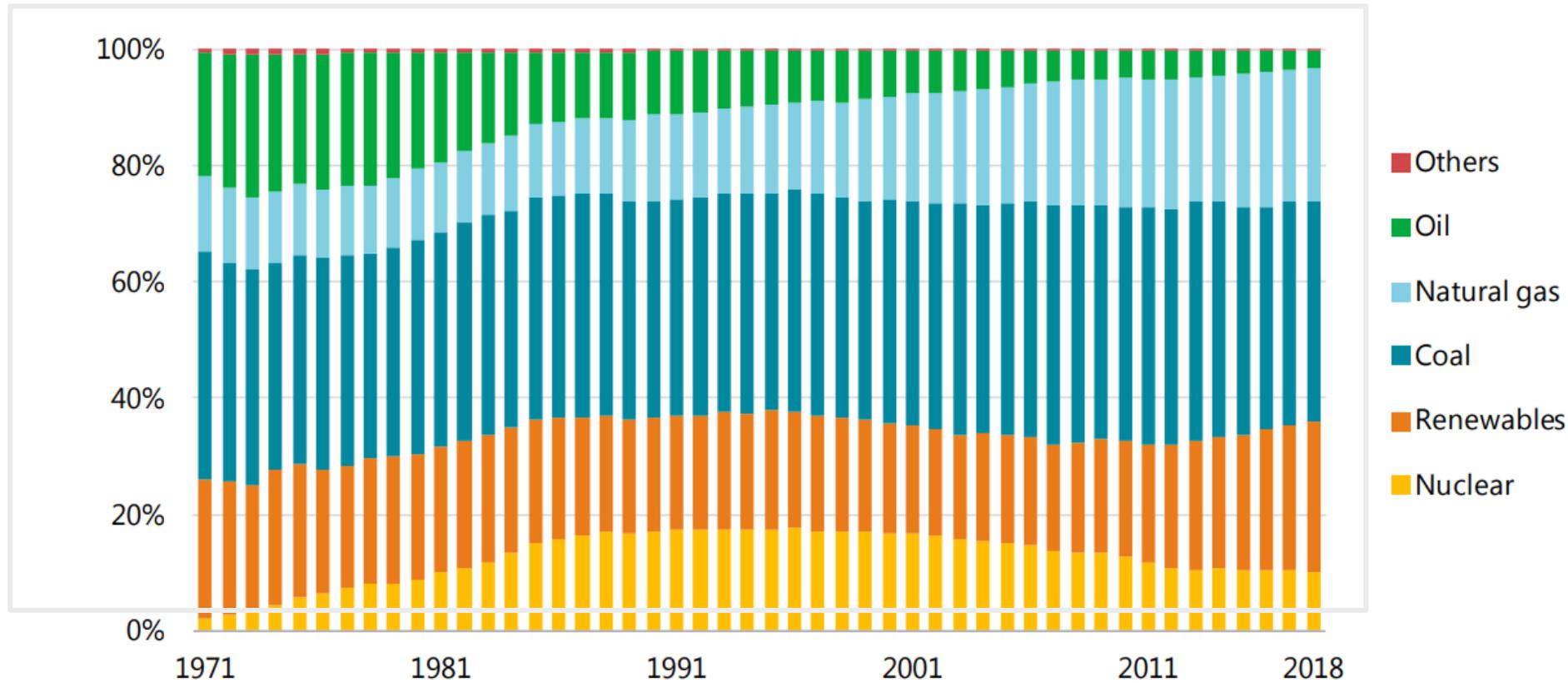
- USNIC commends NRC staff for seeking external comments from advanced reactor stakeholders on Part 53
- This presentation is intended to set the stage for discussions of how Part 53 can be scoped and crafted
- This includes importance of Part 53 presented with a brief update of policy and market developments in advanced nuclear
- The ideas offered are intended, in part, to address questions raised at August 15, 2019 NRC Advanced Reactor Stakeholder Meeting

# Importance of Part 53: Recognition by International Energy Agency of the Importance of Nuclear in Controlling Green House Gasses

- Released in May 2019 at Clean Energy Ministerial 10 in Vancouver, Canada
- Recognizes that nuclear is the second-largest low-carbon power source in the world today
  - 10% of global electricity generation
  - Second only to hydropower at 16%
- Without policy changes, advanced economies could lose 25% of their nuclear capacity by 2025 and as much as two-thirds of it by 2040
- Without lifetime extensions of existing plants could add an additional 4 billion tons of CO<sub>2</sub>



# Importance of Part 53: Nuclear Capacity Erosion and Global Warming Impacts



- The decline in nuclear power’s share in electricity generation has *entirely* offset the growth in the share of renewables since the late 1990s. Source: Nuclear Power in a Clean Energy System, IEA (May 2019)

# Importance of Part 53: Broad Opportunities Exist Beyond Baseload Power



Diesel generator and tank farm in Alaska – opportunities for Micro Reactors in remote areas (including for the US Department of Defense)



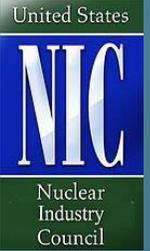
Jebel Ali Desalination Plant – Dubai  
2,060 MW and 140 Million gallons per day



Combined heat and power opportunities at petrochemical facilities worldwide

# Importance of Part 53: Interest in New Reactors by U.S. Pro-Clean Energy NGOs

(Note: Not Intended to Suggest Endorsement of These Remarks)

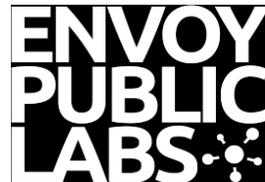


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CLEARPATH



Energy Innovation Reform Project  
Affordability · Reliability · Safety · Security



# Principles in Adopting a New Part 53

- Timely development and implementation of Part 53 is will be crucial in providing greater certainty for future advanced reactor applicants
- Part 53 development should not interfere with ongoing reviews by establishing new requirements that applications under review would not meet – recognizing the years it will take to implement the rule
- Transformation of NRC licensing to move toward IAEA Safety Principles based approach would provide a simpler licensing process
- Harmonization of approaches between regulators would also enable easier adoption of U.S. technologies
- Need top down leadership to assure all parts of NRC are responsive to needs of small reactors with passive safety features

# Principles in Adopting a New Part 53 (2)

- Part 53 should provide the certainty that a Part 50 or 52 certification of design approval process enables, but it should avoid the baggage that was “lesson-learned” such as tier 1, change process
- Many technical requirements are inappropriate, overly prescriptive (sometimes too focused on code requirements) unnecessarily detailed (see fire protection) or do not align with non-light water reactor technologies
- Eliminating or streamlining requirements that are overly prescriptive or not relevant will reduce the need for future exemptions
- Support greater use of risk insights, including the frequency consequence framework included in the Licensing Modernization Project
- Part 53 would also benefit from utilizing the LMP methodology for other regulatory topic areas

# Principles in Adopting a New Part 53 (3)

- New Part 53 should be focused on technical requirements and should minimize administrative requirements inconsistent with efficient licensing
- Greater clarity in the findings that need to be made to support the AEA no undue risk provision versus the specific technical requirements that are viewed as establishing adequate protection
- Need to avoid putting too much detail in the FSAR – simplicity is the key
- Revisit the content of application requirements to right-size the FSAR to reflect the safety-significance of the systems, structures or components. Also applies to operational programs like maintenance rule, QA, radiation protection, in service inspection, startup, etc.
- Consider required reviews in a fixed period of time (e.g. 2-3 years for Small Modular Reactors; 6 months for micro-reactors) once initial SMRs and micro-reactors have been approved

# Principles in Adopting a New Part 53 (4)

- While Probabilistic Risk Assessments will be important in deploying advanced reactors, the NRC needs to avoid bringing these PRAs into a new Part 53 rule
  - Appropriate balance between evolving PRA over 40 license and license amendment requirements. Balance needs to reflect relative contribution of the change to impact on risk to eliminate frivolous amendment reviews that have no real impact on safety
- New Part 53 should recognize the reduced source term for advanced reactors brings with it significant opportunities to reduce unnecessary requirements in line with providing adequate protection
- Part 53 licensing framework should recognize that advanced nuclear reactors may be used for other applications than power generation – needs to be built to be more flexible and efficient than those of parts 50 or 52

# Principles in Adopting a New Part 53 (5)

- Commission needs to address ongoing policy questions associated with security and emergency planning zone requirements to recognize the reduced source term and size of these designs in order to avoid potential conflicts in a future Part 53.
- One size fits all approach to security and EPZ are not applicable to this variety of designs and must be avoided
- Striving toward international collaboration in advanced reactor licensing is desired – and the Commission’s initiative with Canada is a great first step
- Appreciate that the NRC consider the views of pro-nuclear NGOs that are committed to nuclear as a critical element of successful reductions in greenhouse gas emissions

# Other comments

- Current regulatory approval process should continue, including appropriate licensing modernization efforts, so no momentum is lost
  - Do not slow current regulatory efforts
- We continue to believe that Part 53 should be technology neutral to the extent practicable
- Advanced nuclear receives strong bi-partisan support with the executive and legislative branches of the U.S. government and among pro-nuclear stakeholders
- US Nuclear Industry Council will be engaging our members to provide additional input to the NRC on Part 53

# Conclusions

- Significant nexus between the need to address global climate change and the deployment of advanced nuclear technologies
- From an environmental standpoint, the NRC enabling the efficient and rapid approval of these reactor designs, consistent with achieving adequate protection, can result in significant environmental benefits
- Part 53 is an important NRC step to enable the safe and rapid deployment of needed advanced nuclear reactors that can be used for power, desalination and other applications
- Ongoing dialog with industry and advanced-nuclear NGO stakeholders is welcomed

# About the US Nuclear Industry Council

USNIC is the leading business consortium advocate for increased U.S. nuclear energy use and global deployment of U.S. nuclear technologies and services

USNIC represents over 80 member companies encompassing wide representation of the nuclear energy supply chain and key movers

Member of the Civil Nuclear Trade Advisory Committee and the U.S. DOE Nuclear Energy Advisory Board

Steward of Advanced Reactors Task Force and Advanced Reactor Summit



# Thank you

## Jeffrey S. Merrifield

Chairman, US Nuclear Industry  
Council Advanced Reactors Task  
Force

Partner, Energy Section Leader  
U.S. NRC Commissioner (1998-2007)

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# Appendix (1) - USNIC Framework for Advanced Reactor Licensing Modernization

In February 23, 2016, the US Nuclear Industry Council (*then called US Nuclear Infrastructure Council*) prepared a seven page detailed issue brief regarding the need for expedited development of Advanced Nuclear Reactors. It recommended:

- A series of actions to revitalize US Advanced Reactor Development Mission
- Congress should authorize funds to review and approve Advanced Reactor technology designs
- Scaled and proportionate license fee burden
- Graduated licensing model congruent with graduated capital commitment

# Appendix (2) - USNIC Framework for Advanced Reactor Licensing Modernization

- Advance Licensing Framework to quickly address Emergency Planning Zone based on source term, reduced security requirements based on source term, reduce control room staffing requirements for passively cooled non-light water reactors, lack of need for traditional containment based on source term, and establishment of non-LWR generic design criteria
- NRC should develop a risk informed licensing process for Advanced Reactors that recognizes their reduced source term risk, and avoids the unnecessary implementation of regulatory requirements that are more appropriate for large light water reactor technologies



OFFICE OF  
**NONPROLIFERATION AND  
ARMS CONTROL (NPAC)**

# Export Controlled Technology - Review, Identification and Marking of Documents

Krystee Ervin and Dave Snider  
Export Compliance Assistance Program (ECAP)  
DOE/NNSA Office of Nonproliferation and Arms Control  
supported by Oak Ridge National Laboratory

-  **SAFEGUARD** NUCLEAR MATERIALS TO PREVENT THEIR DIVERSION OR THEFT
-  **CONTROL** THE SPREAD OF WMD-RELATED MATERIAL, EQUIPMENT AND TECHNOLOGY
-  **NEGOTIATE, MONITOR AND VERIFY** COMPLIANCE WITH INTERNATIONAL NONPROLIFERATION AND ARMS CONTROL TREATIES AND AGREEMENTS
-  **DEVELOP** PROGRAMS AND STRATEGIES TO ADDRESS EMERGING NONPROLIFERATION AND ARMS CONTROL THREATS AND CHALLENGES



# Objectives

- What is technology?
- Who controls technology?
- How do these controls relate to commodities?
- How do you review, mark and control technology?



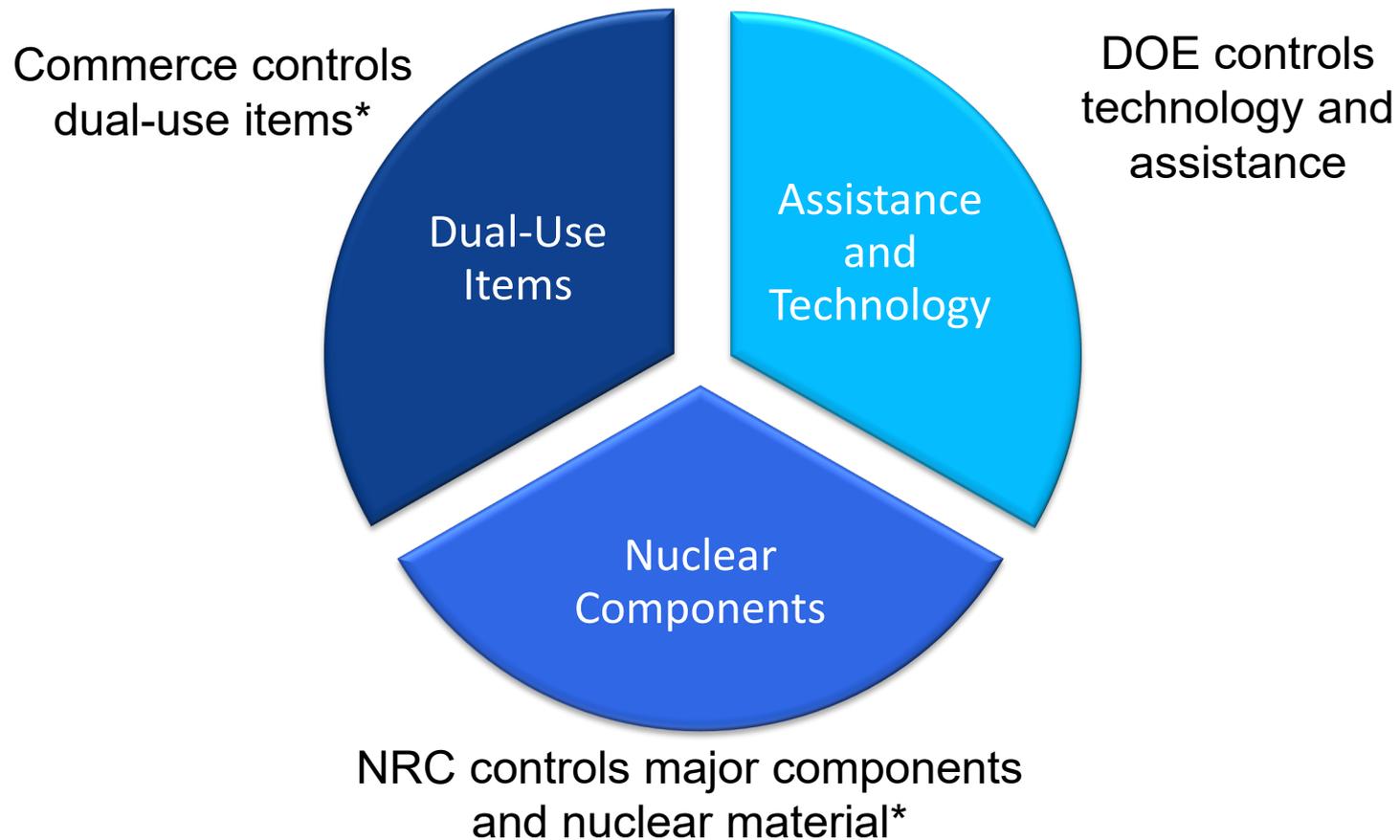
# Export-controlled technology

## Technology falling under the export licensing authorities of the United States government, including:

- Defense articles and services
  - U.S. Department of State
    - Directorate of Defense Trade Controls (DDTC)
- Dual-use (*and some other*) commodities and technologies
  - U.S. Department of Commerce
    - Bureau of Industry and Security (BIS)
- Controlled nuclear technologies
  - U.S. Department of Energy
    - Nonproliferation and Arms Control Policy Office (NA-24)



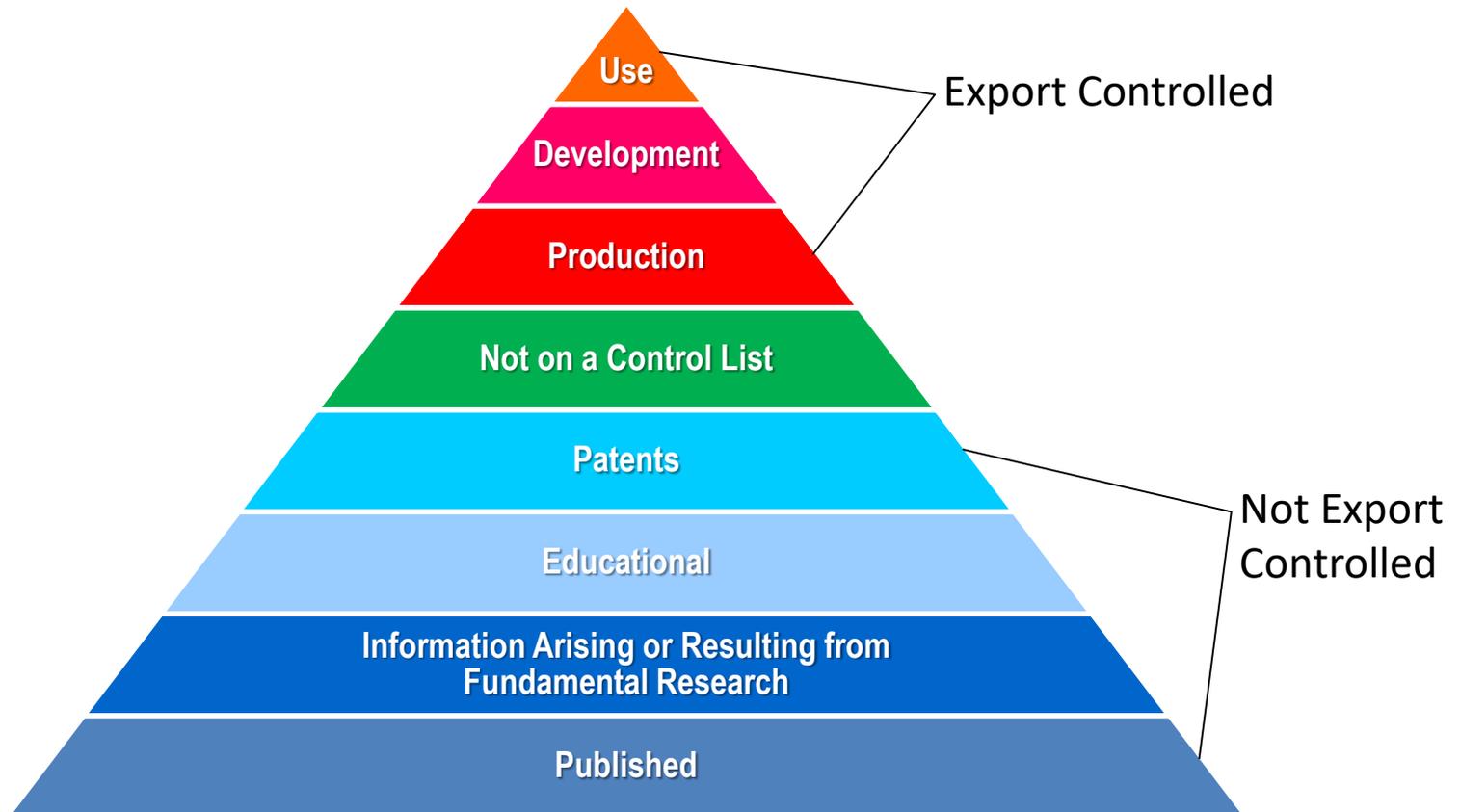
# Three agencies administer nuclear export controls



\*some unique circumstances fall under the Dept. of State



# What Technologies are Controlled Today?





# Forms and Methods of Technology Transfer

- Tangible transfers
  - includes CDs or printed documents which are mailed or shipped
- Intangible transfers
  - includes emails, FAX, phone, or in-person conversations, internet downloads, visual inspections, etc.





# Who Controls Technology?

- Department of Commerce
  - Technology associated with dual-use items
    - Export License
    - Deemed Export License
- Department of State
  - Technology related to items on the munitions list
    - Technical Assistance Agreement
    - Manufacturing License Agreement



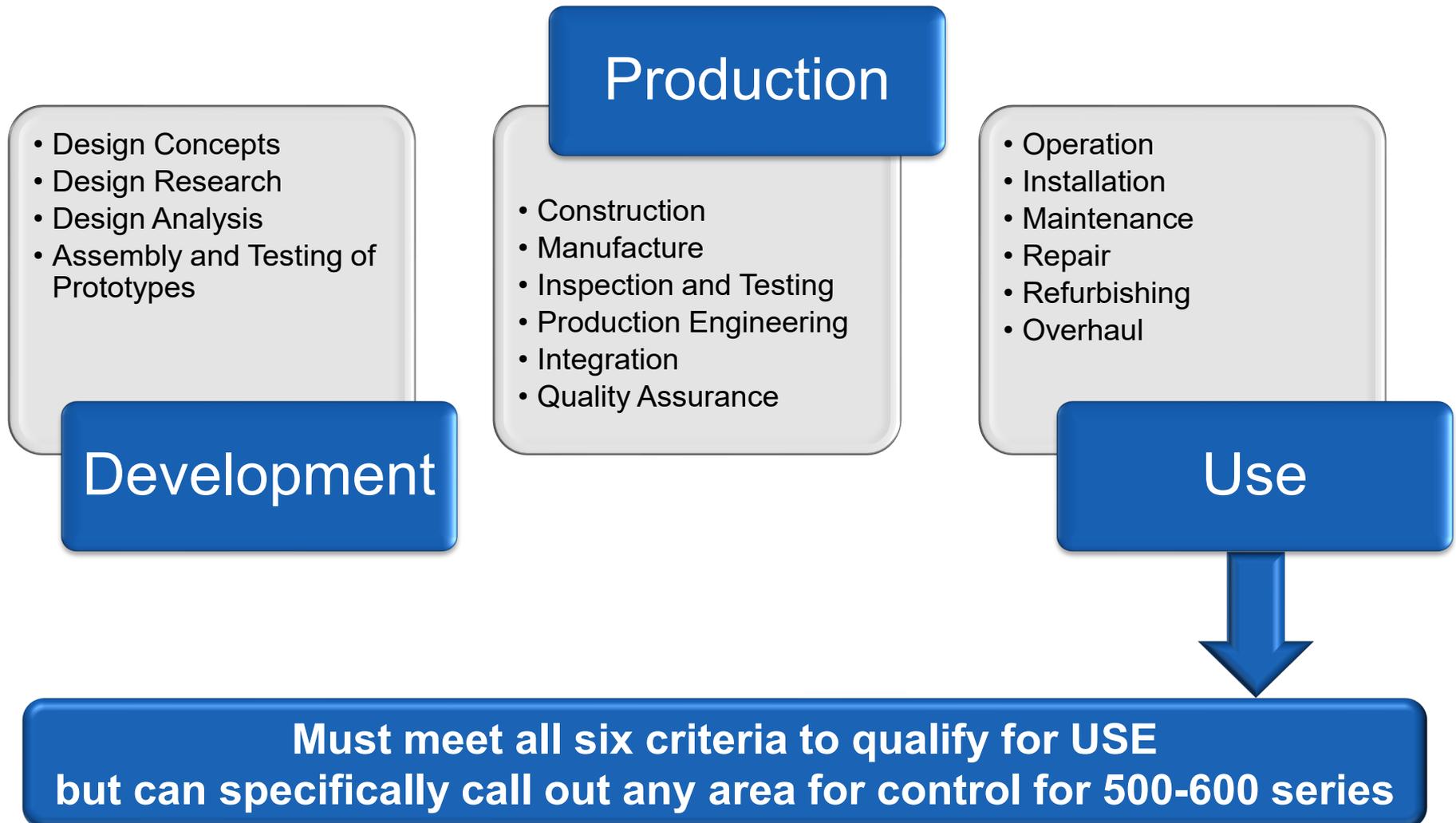
# Who Controls Technology?

- Nuclear Regulatory Commission
  - Technology inherent with nuclear equipment
    - General License
    - Specific License
- Department of Energy
  - Technology related to nuclear activities and the production of special nuclear material
    - General Authorization
    - Specific Authorization
  - Technology related to nuclear weapons and associated equipment



# Development, Production, or Use

## Department of Commerce





# Department of Commerce

- 2B001 “Numerical Control” (CNC) Machine Tools
  - Machines for milling have five or more axes that can be coordinated simultaneously for “contouring control”
  - 2E001 – Technology for “Development”
  - 2E002 – Technology for “Production”
  - 2E201 – Technology for “Use”





# Department of Commerce Technology Rules for 500 and 600 Series

## 9E619

“Technology” “required” for the “development,” “production,” operation, installation, maintenance, repair, overhaul, or refurbishing of military gas turbine engines and related commodities controlled by 9A619, equipment controlled by 9B619, materials controlled by 9C619, or software controlled by 9D619 (see List of Items Controlled).

- Development
- Production
- Operation
- Installation
- Maintenance
- Repair
- Overhaul
- OR Refurbishing





# Commodity/Technology Relationship: DOC

- Technology is information necessary for the development, production or use of controlled commodities
  - For technology to be controlled, the associated commodity must be controlled, at least for now.....



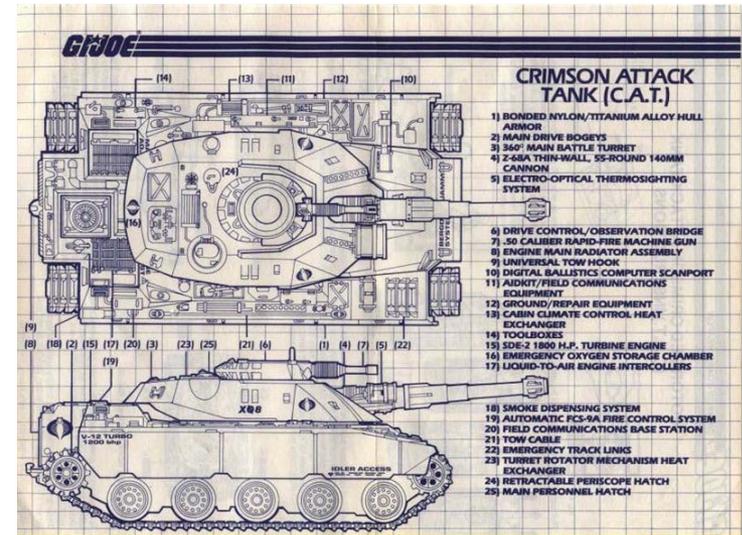
## Example:

- Mass spectrometers are controlled by the Department of Commerce under ECCN 3A233
- Development, production and use technology for mass spectrometers is export controlled by the Department of Commerce under ECCNs 3E001 and 3E201



# Department of State, USML

- Technical Data
  - Information required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance, or modification of defense articles
  - Classified information relating to defense articles and services
  - Information covered by an invention secrecy order
  - Software directly related to defense articles
  - Must relate to an item on the USML
  - Includes visual access



# Department of State Defense Service



**NNSA**  
National Nuclear Security Administration

OFFICE OF  
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ARMS CONTROL (NPAC)**



**CONTROL** THE SPREAD OF WMD-RELATED  
MATERIAL, EQUIPMENT AND TECHNOLOGY

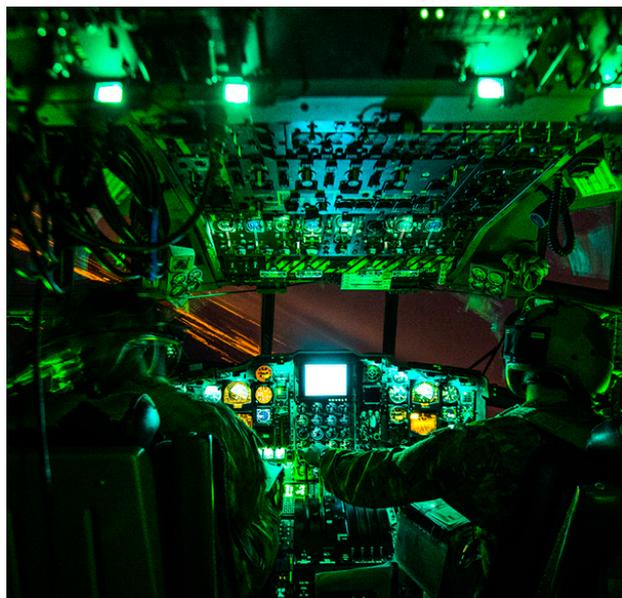
- Defense Service
  - Furnishing of assistance (including training) to foreign persons
    - Design, development, engineering, manufacture, production, assembly, testing, repair, maintenance, modification, operation, demilitarization, destruction, processing, or use of defense articles
  - Furnishing to foreign persons any controlled technical data
  - Military training of foreign units or forces
    - By correspondence courses, technical, educational, or information publications and media of all kinds, training aid, orientation, training exercise, and military advice

NOTE: be careful with publicly available information on defense services



# Commodity/Technology Relationship: DOS

- Technical data is information required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles



## Example:

- Guidance and navigation systems are controlled by the Department of State under USML Category XII
- Tech data for design, development....., also controlled by USML Category XII

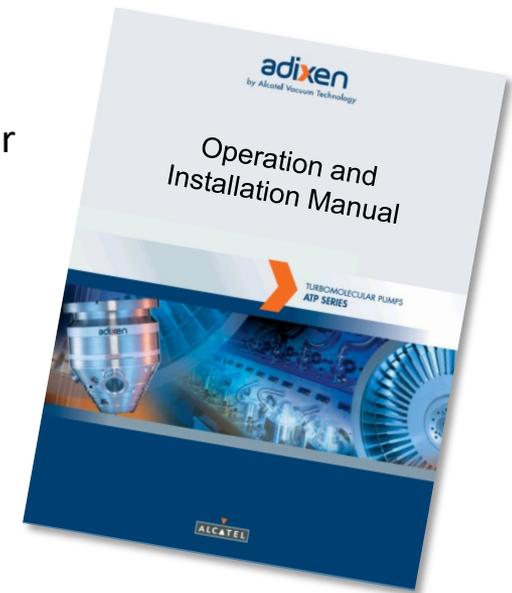
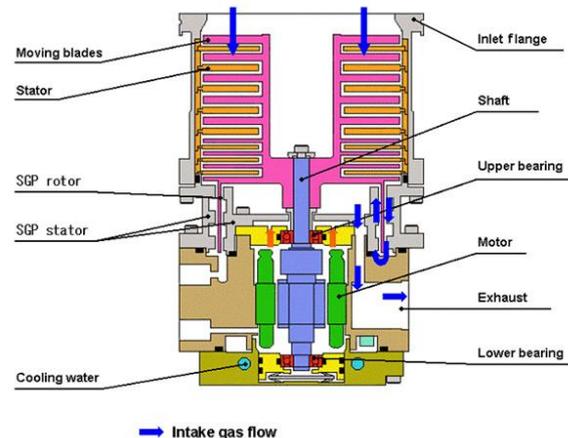


# Nuclear Regulatory Commission

Technology that is embedded with nuclear equipment at the time the commodity is transferred

- Manuals
- Blueprints
- Diagrams
- Instructions

Manual for vacuum pump





# Department of Energy, 10CFR810

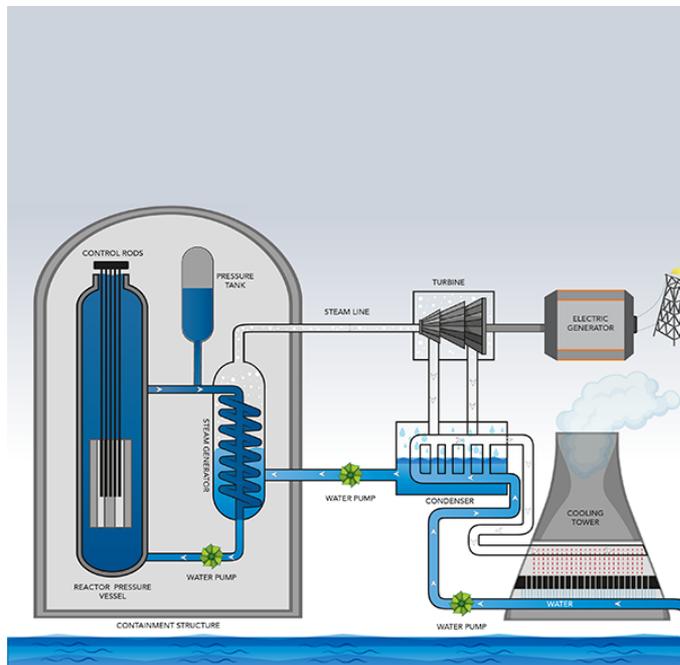
- Controls technology associated with the following:
  - Nuclear reactors
  - Enrichment facilities
  - Reprocessing facilities
  - Fuel fabrication facilities
  - Special nuclear material





# Commodity/Technology Relationship: DOE/NRC

- Technology is assistance or technical data required for the development, production or use of any plant, facility, or especially designed or prepared equipment for activities in 10CFR810.2



## Example:

- Reactor pressure vessels are export controlled by NRC under 10CFR110
- Development, production and use technology for reactor pressure vessels is export controlled by DOE under 10CFR810



# Guidance on Visual Inspection

## DOC

- Visual inspection by foreign persons of US-origin equipment and facilities

## DOS

- Disclosing (including oral or visual disclosure) or transferring technical data to a foreign person

## DOE

- The transfer of technology directly associated with any item on the List will be subject to as great a degree of scrutiny and control as will the item itself, to the extent permitted by national legislation
- Interpreted by NNSA to include visual inspection



# Technology Not Subject to Export Control

- Publicly available
  - Generally accessible to the interested public
  - Periodicals, books, print, electronic other media forms
  - Libraries (university, public, etc.)
  - Open conferences
- Fundamental Research
  - Basic and applied research where **resulting\*** information is ordinarily published and broadly shared within the scientific community
- Educational information
  - Released by instruction in catalog courses
  - Associated teaching laboratories of academic institutions
- Patent information
  - Public information available on patent application

\*Reference module on fundamental research/publicly available



# Nuclear-related activities controlled under the DOS/ITAR/USML

- **International Traffic in Arms Regulations (ITAR)/ 22 CFR 120-130/United States Munitions List (USML)**
  - Example: Space-based systems, and specially designed parts and components therefor

nuclear reactors and associated power conversion systems

- e.g., liquid metal or gas-cooled fast reactors

radioisotope-based power systems

- e.g., radioisotope thermoelectric generators

nuclear thermal propulsion systems

- e.g., solid core, liquid core, gas core fission

certain electric (Plasma/Ion) propulsion systems

- e.g., that operate at an input power of more than 15k



# Nuclear-related activities controlled under the DOS/ITAR/USML (*cont'd*)

- **International Traffic in Arms Regulations (ITAR)/ 22 CFR 120-130/United States Munitions List (USML)**
  - Example: Vessels of war, submersible vessels and special Naval equipment

\*Naval nuclear propulsion plants, their land prototypes, and special facilities for their construction, support, and maintenance

- e.g., any machinery, device, component, or equipment specifically developed, designed or modified for such use

\* Significant Military Equipment



# Nuclear-related activities controlled under the DOC/CCL

- ECCN 0A002
  - Power generating or propulsion equipment “specially designed” for use with space, marine or mobile “nuclear reactors”
    - these items are “subject to the ITAR”
- ECCN 0D001
  - “Software” “specially designed” or modified for the “development,” “production,” or “use” of commodities described in 0A002
    - these items are “subject to the ITAR”
- ECCN 0E001
  - “Technology,” for the **development, production, or use** of items described in 0A002, or 0D001



# Nuclear-related activities controlled under the DOC/CCL

- ECCN 2E001
  - See ECCNs 2E001 (“development”), 2E002 (“production”), and 2E290 (“use”) for technology for items controlled under this entry. (3) Also see ECCN 2A291.
  
- ECCN 2A290
  - Generators and other equipment “specially designed,” prepared, or intended for use with nuclear plants.
    - a. Generators, turbine-generator sets, steam turbines, heat exchangers, and heat exchanger type condensers designed or intended for use in a nuclear reactor;
    - b. Process control systems intended for use with the above



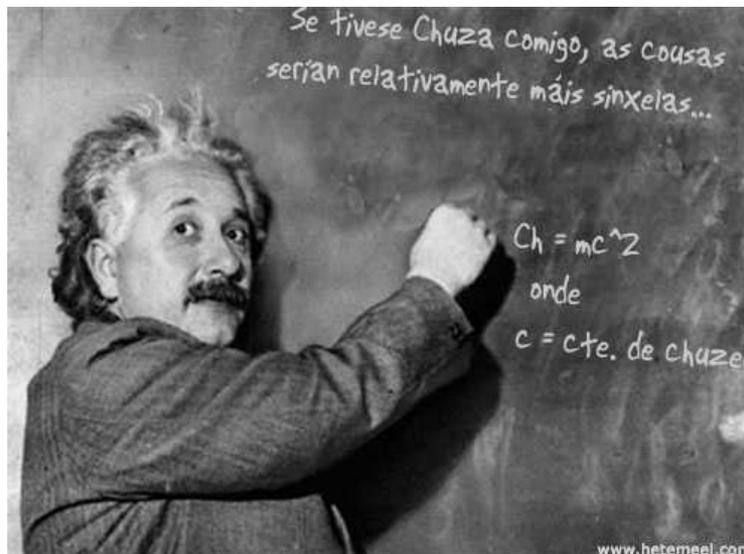
# Nuclear-related activities controlled under the DOC/CCL (*cont'd*)

- ECCN 2A291
  - Equipment, except items controlled by 2A290, related to nuclear material handling and processing and to nuclear reactors, and “parts” and “components” and “accessories” therefor
    - a) Process control systems intended for use with nuclear reactors.
    - b) Simulators “specially designed” for “nuclear reactors”.
    - c) Casks that are “specially designed” for transportation of high-level radioactive material and that weigh more than 1,000 kg.
    - d) Commodities, “parts,” “components” and “accessories” “specially designed” or prepared for use with nuclear plants
      - a) snubbers, airlocks, pumps, reactor fuel charging and discharging equipment, containment equipment such as hydrogen recombiner and penetration seals
      - b) reactor and fuel inspection equipment, including ultrasonic or eddy current test equipment
    - e) Radiation detectors and monitors “specially designed” for detecting or measuring “special nuclear material” or for nuclear reactors



# The Secret to ECI Reviews

- There is no list
  - REPEAT: There is no list
- Must use a common sense approach/process
- Narrow it down as much as possible
- **Then seek out an SME**





# The Secret to ECI Reviews

- Otherwise, the result is a defective or indefensible product
  - Wrong determination and categorization
  - Inadvertent release of controlled technology
  - Unnecessary risks to U.S. economic and national security
- Could result in fines, penalties or jail time
- GOAL: recordable, repeatable, defensible results



# Current Guidance for ECI Reviews

- Latest guidance is DOE Acquisition Guide 25\* on Export Controls

Acquisition Guide	Chapter 25	June 2016
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Compliance with U.S. Export Control Laws, Regulations and Policies



Guiding Principles

- DOE contractors are subject to applicable U.S. export control laws, regulations and policies when exporting materials and technical information resulting from the performance of their contracts.
- Technology is a critical part of the DOE's mission and requires special consideration in identifying and protecting sensitive technologies including intellectual property and pending patents.

\*(replaces 1999 Guidelines)



# What is ECI?

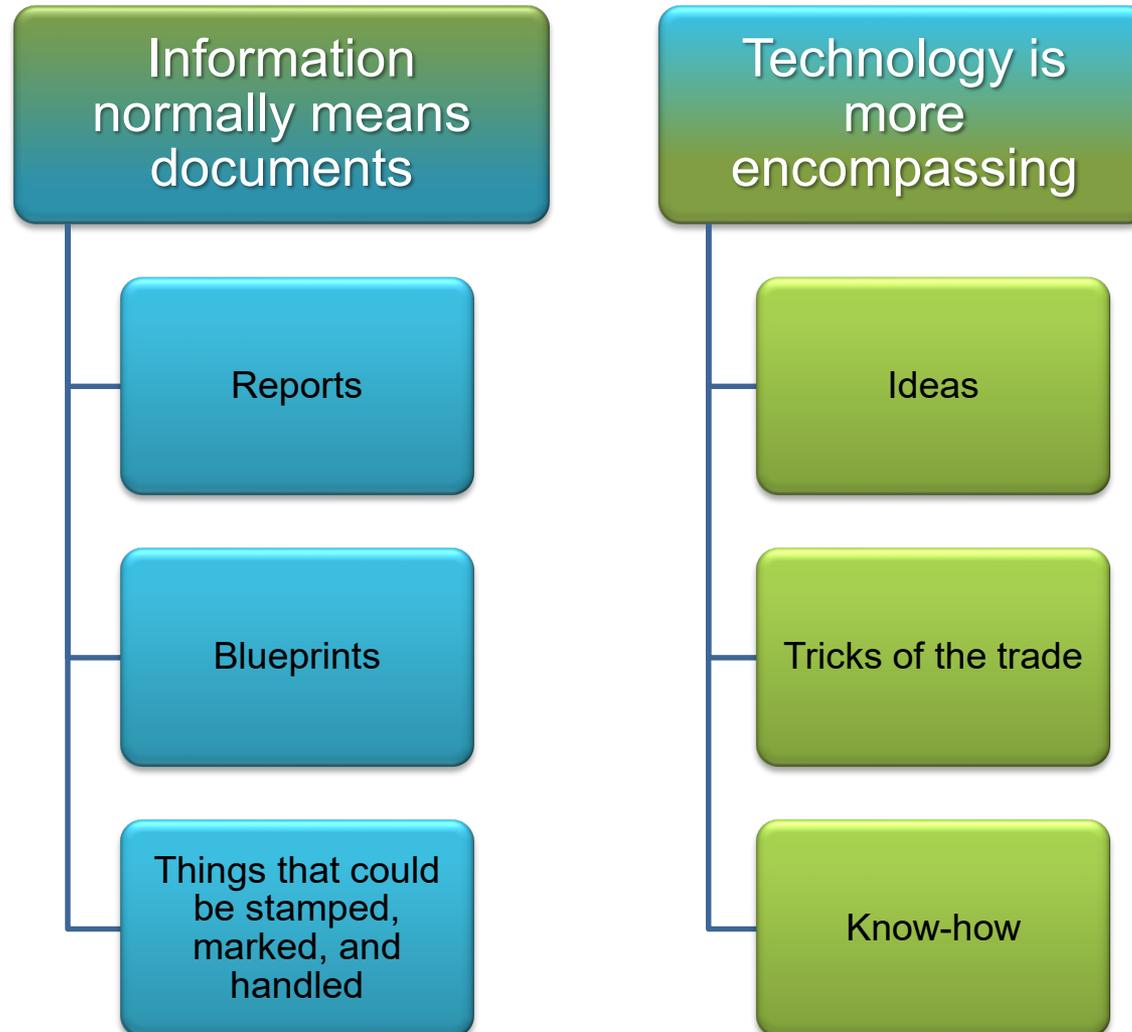
ECI (DOE is the only agency to use this term)

TECHNOLOGY  
(tangible and intangible)

TECHNOLOGY THAT IS  
EMBEDDED IN INFORMATION



# Information vs. Technology



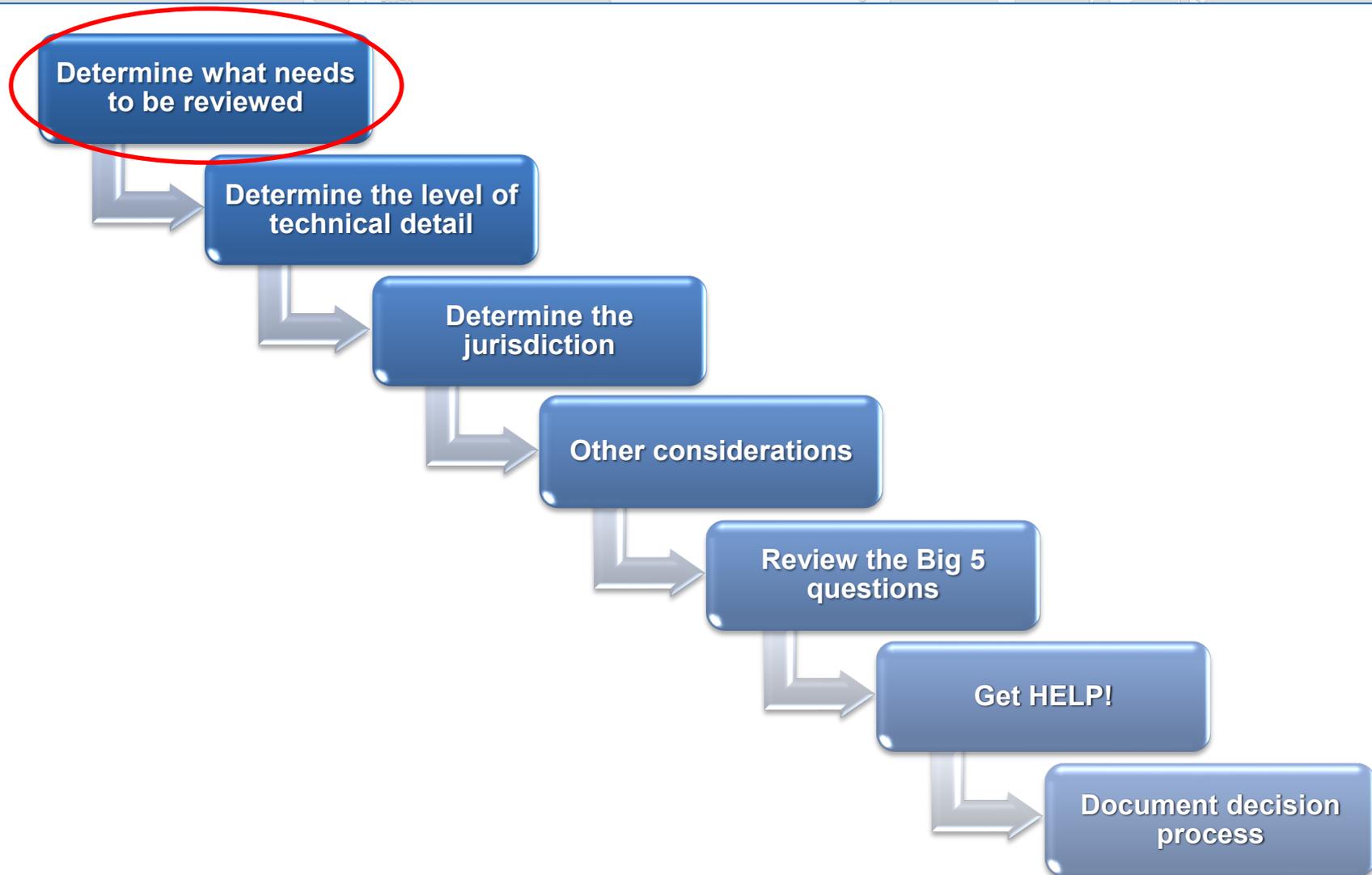


# Technology and Commodities

- There must be a controlled item in order for the technology to be controlled
  - Pop Quiz
    - Driveway concrete technology?
    - Nuclear reactor technology?
    - Valve technology?
    - Nano-technology?



# Steps for Conducting an ECI Review

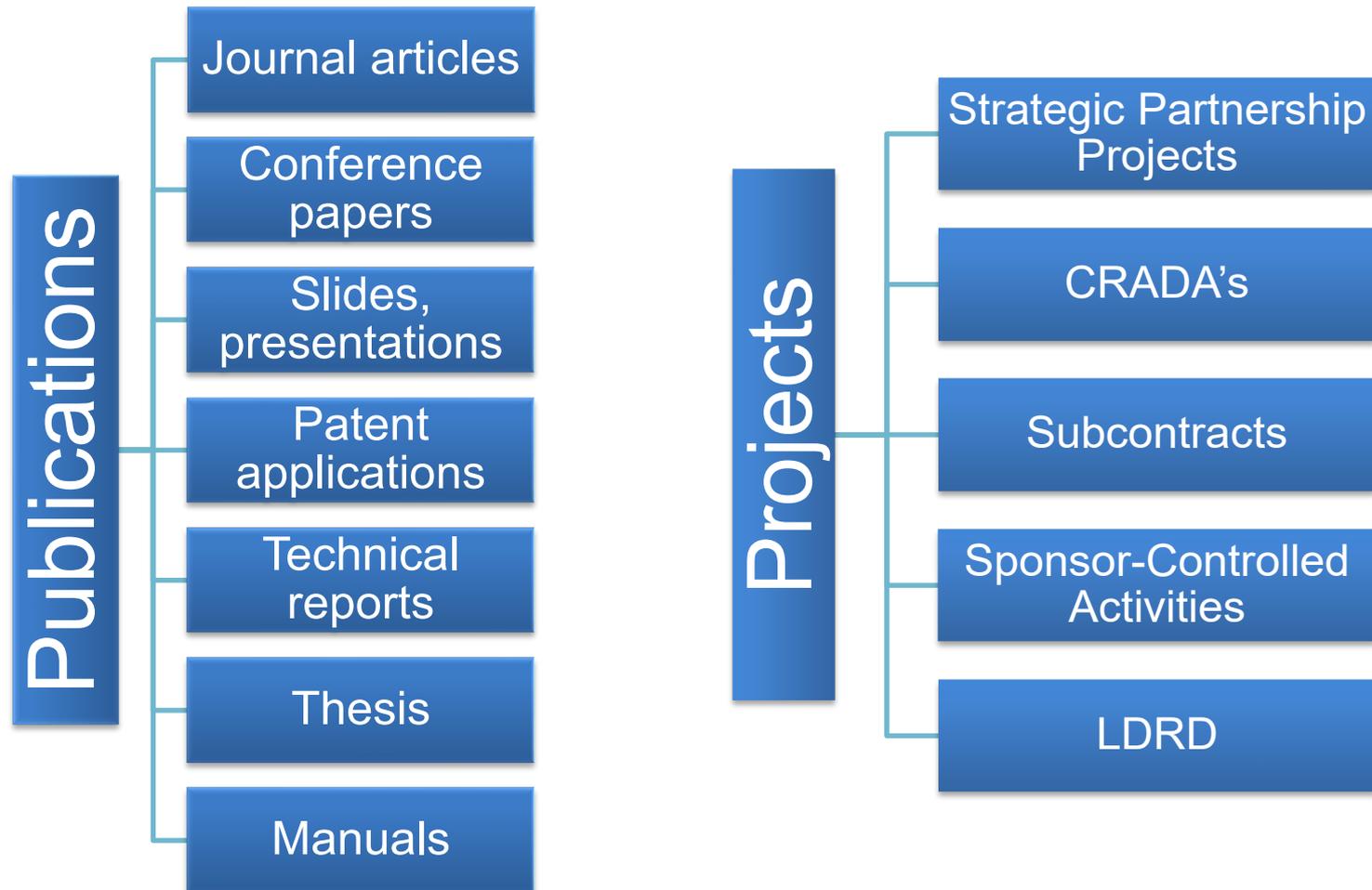


# Determine What Needs to Be Reviewed



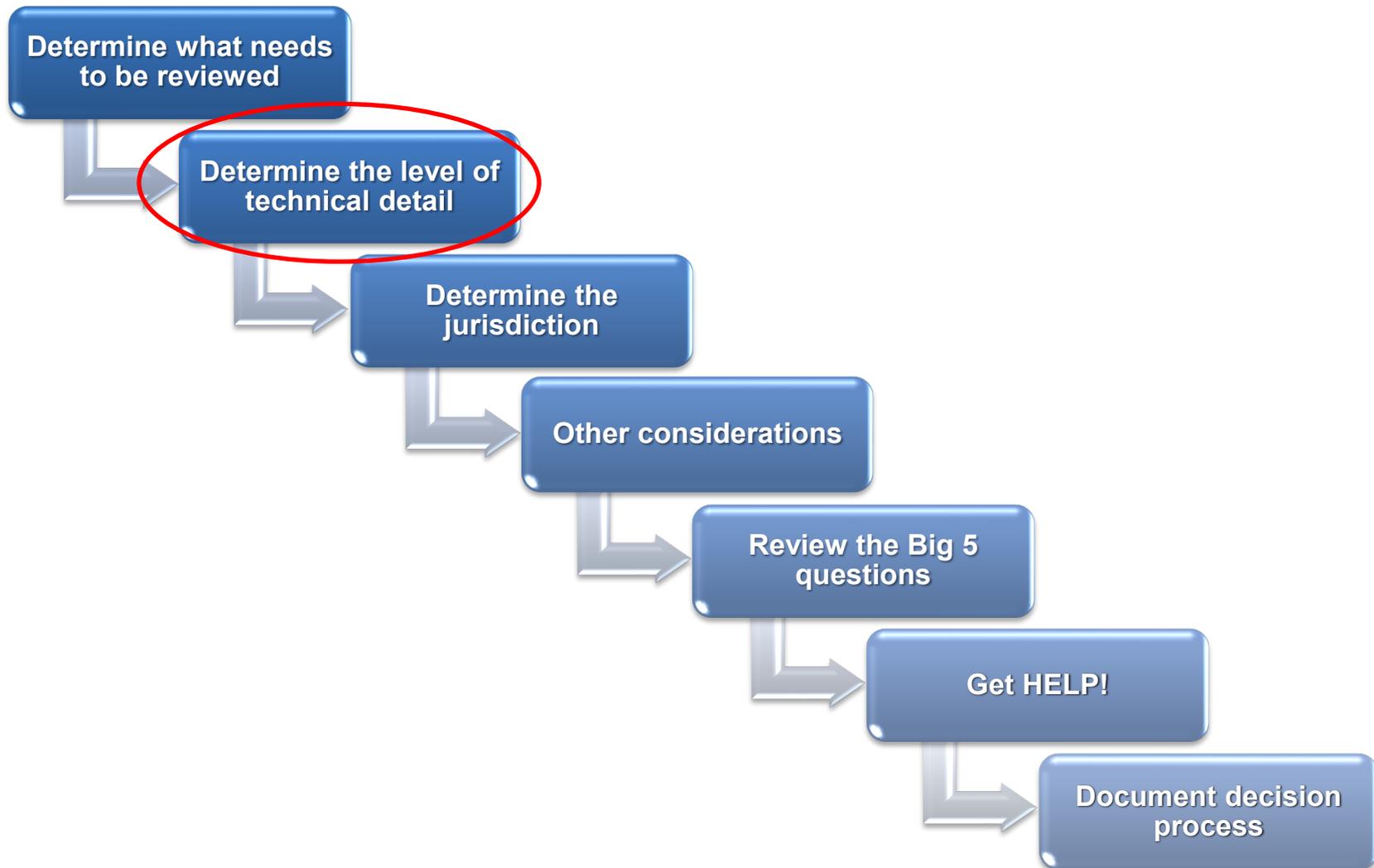


# Most Common Avenues of Release





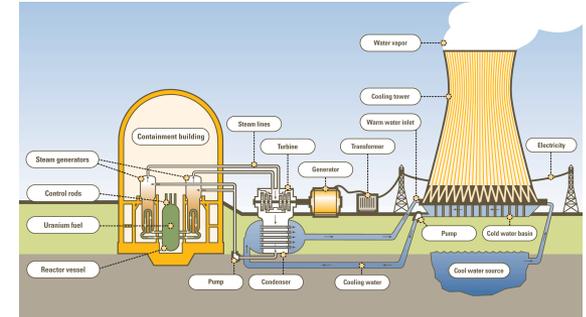
# Steps for Conducting an ECI Review



# When Is There Enough Detail to Constitute a Transfer of Technology?

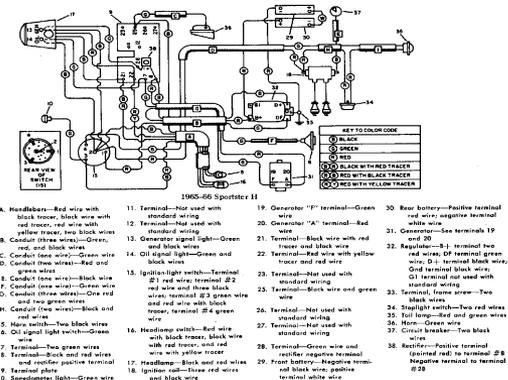
- Documents that describe
  - here's what we are thinking about
  - here's what it looks like
  - here's what it does

normally considered high-level documents that would not contain ECI



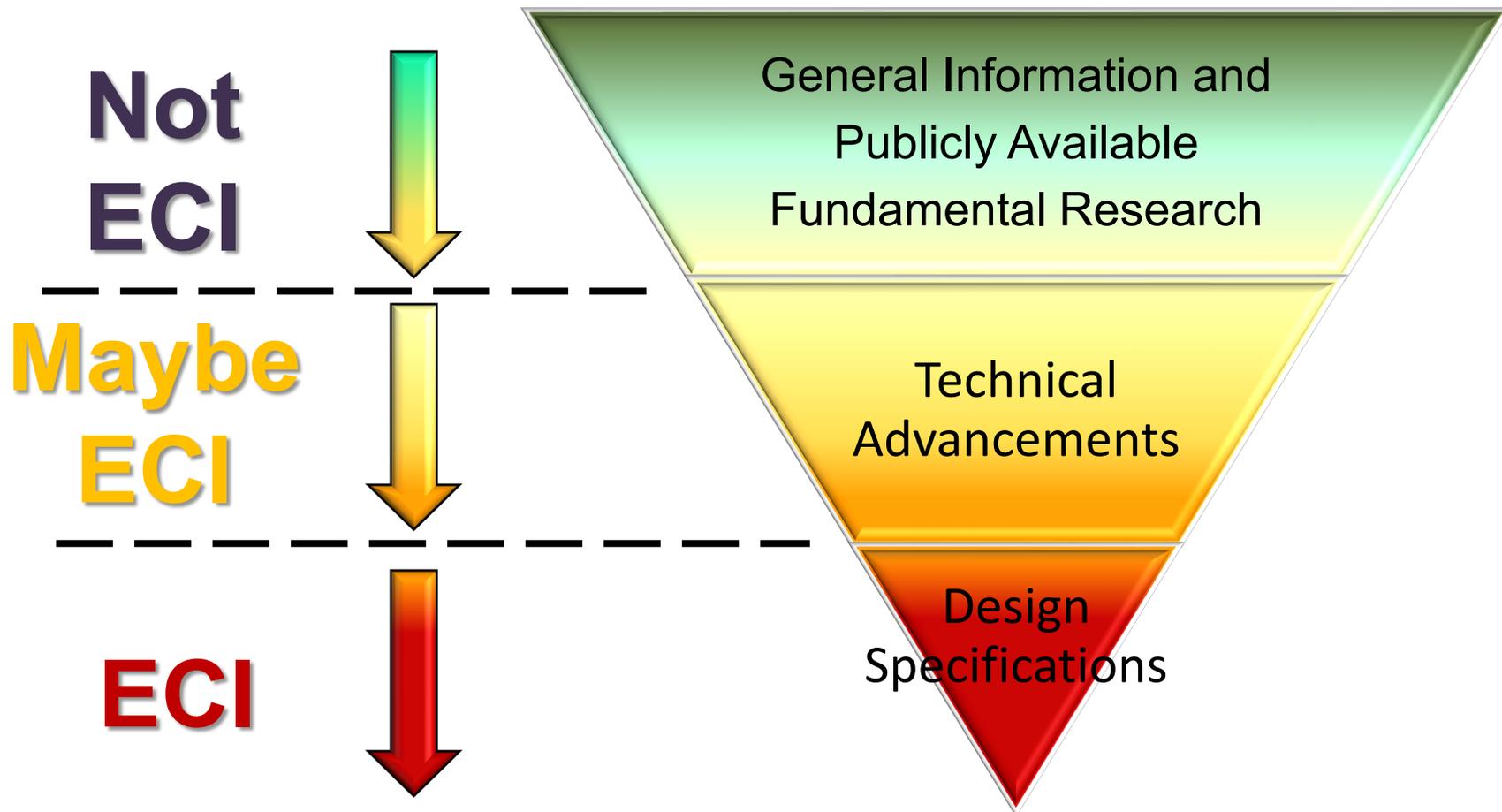
- Documents that say
  - here's how you can build one
  - here's how we got it to work

are most likely transferring technology and could contain ECI



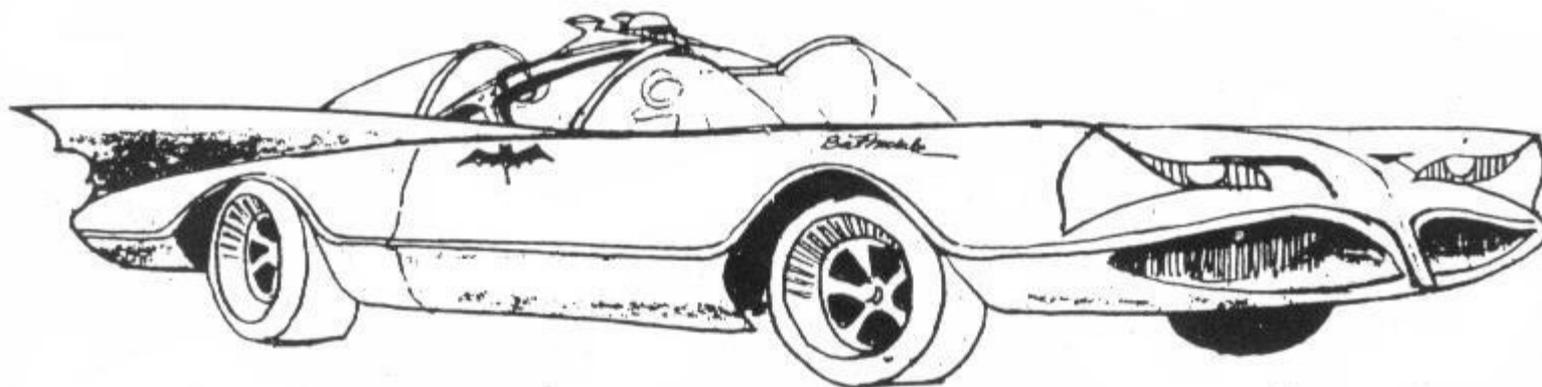


# What's the Level of Detail?





# Not Enough Detail to Contain ECI



REVISED : 9-23-65

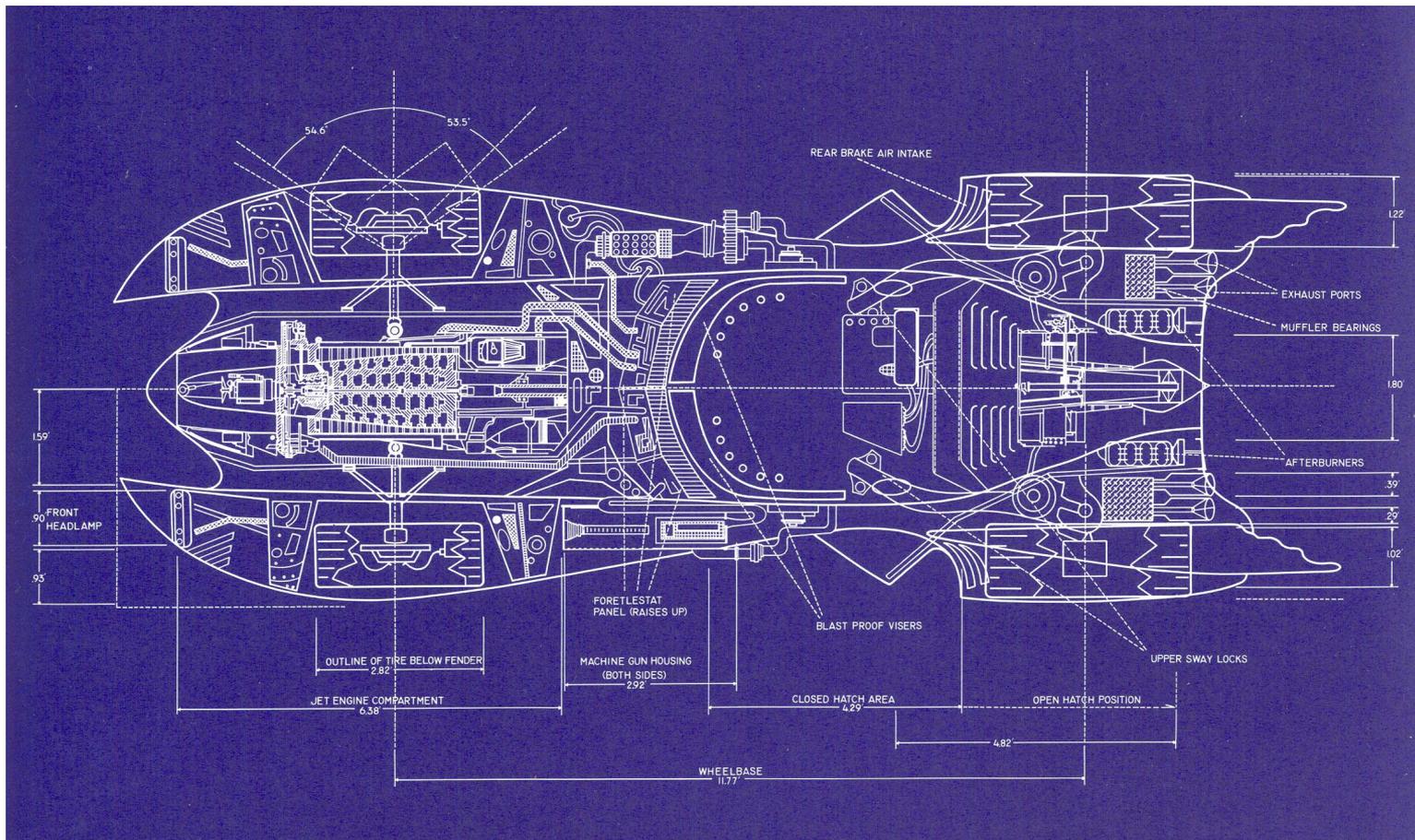
ACCEPTED BY:

Barris Custom City



**CONTROL** THE SPREAD OF WMD-RELATED  
MATERIAL, EQUIPMENT AND TECHNOLOGY

# Enough Detail to Contain ECI





# A General Description

- Please build me a new Batmobile
  - **It should have the following performance features:**
    - Top speed of 220 MPH
    - Seat ejection feature
    - Hardened exterior
    - Oil-slick-deploying device
    - Small turning radius
    - Missile deploying system
    - Invisibility feature





# Actual Specifications

- Please build me a new Batmobile
  - **Use the following manufacturing process:**
    - Use titanium 245 that has been milled to a thickness of .234 mm and coated with number 4 Teflon using a chemical vapor deposition process at 376.5°F to achieve the desired level of exterior hardening





# To Proceed or not to Proceed?

- Is it General Information? YES
- Is it Publicly Available? YES
- Is it Qualified Fundamental Research Results? YES
- Is the Technology at a High Level? YES





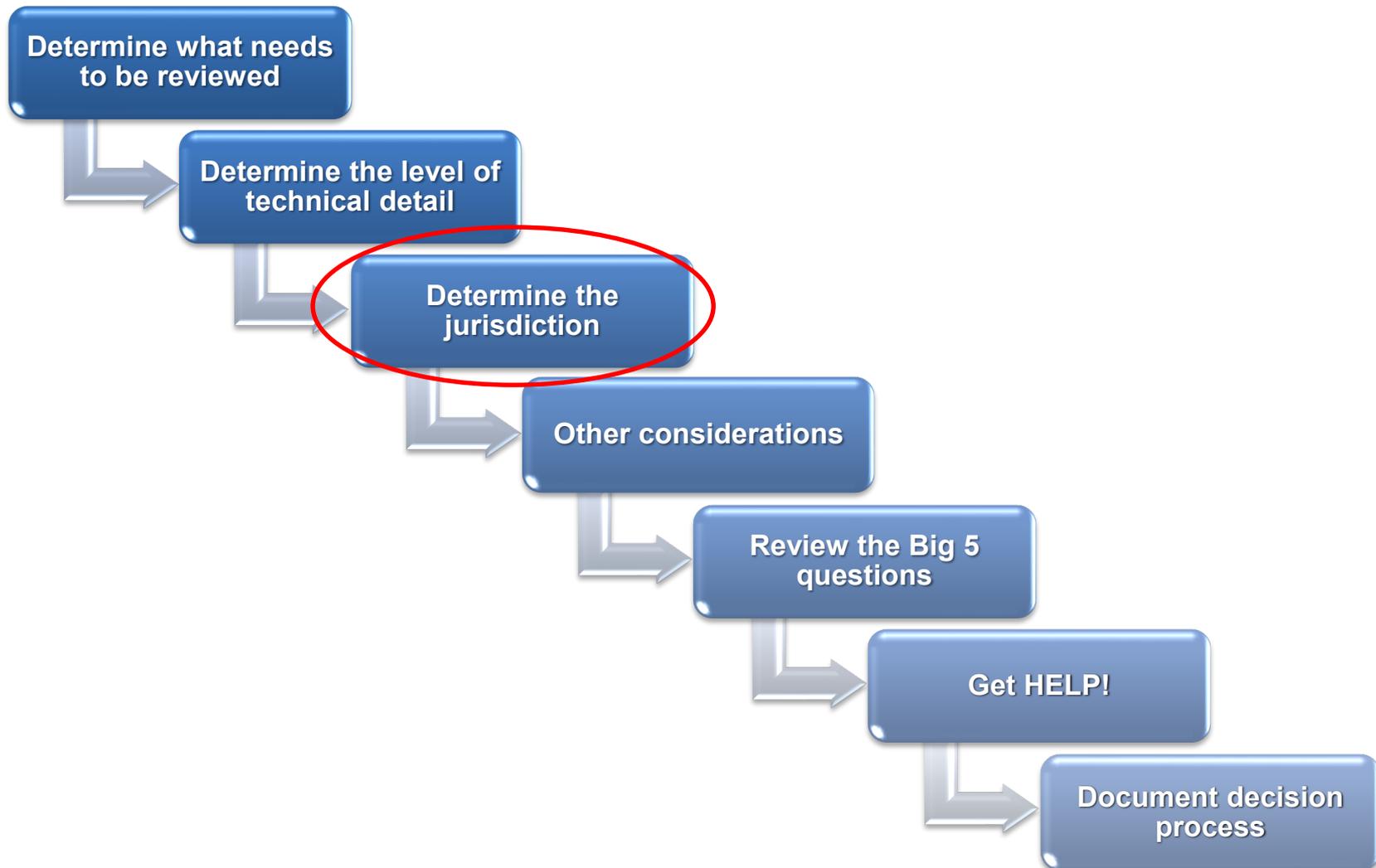
# To Proceed or Not to Proceed

- Otherwise, move ahead





# Steps for Conducting an ECI Review



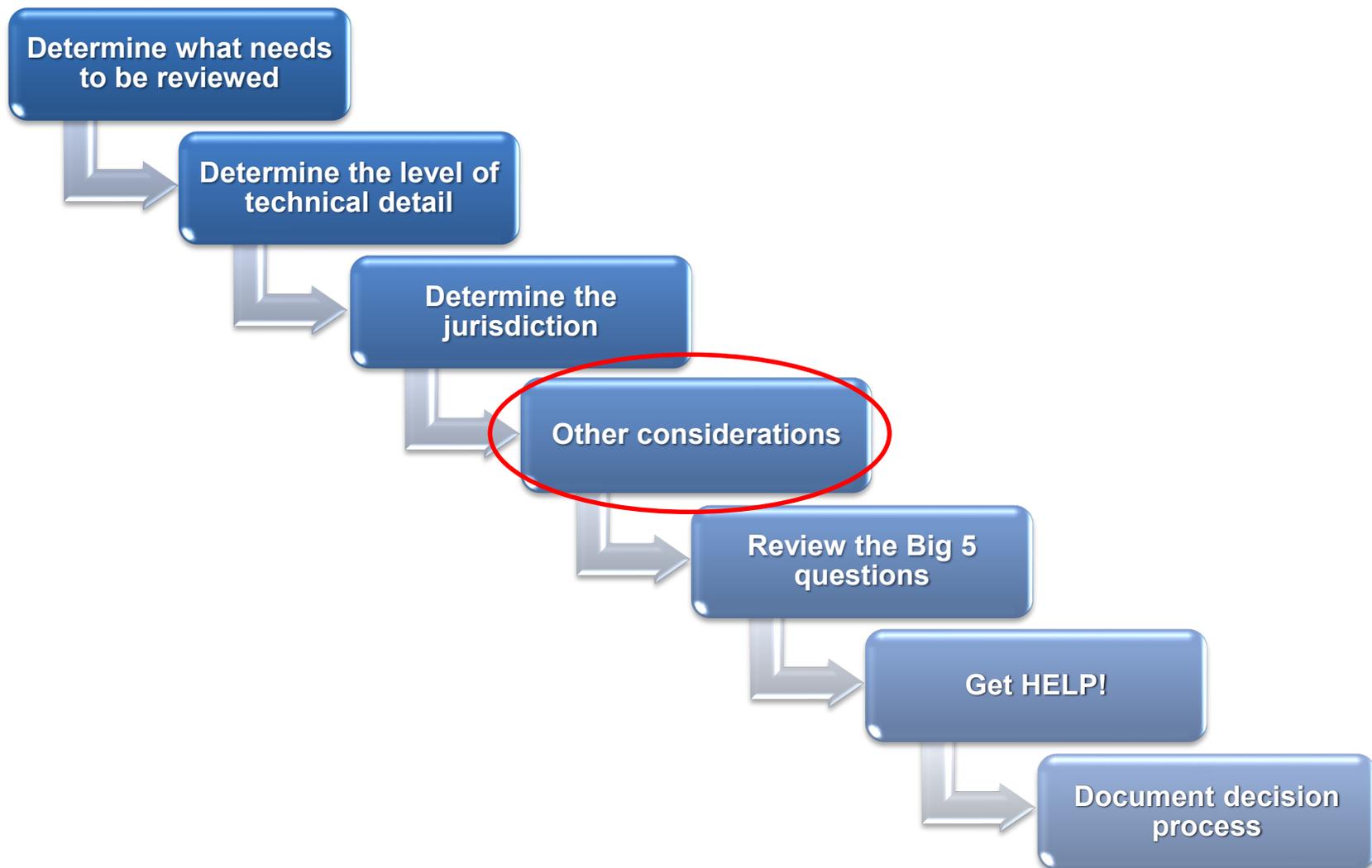


# Determine who has US Jurisdictional Authority?

- Department of Commerce (DOC)
  - Commodity classification
  - Advisory opinion
- Department of State (DOS)
  - Commodity jurisdiction
- Nuclear Regulatory Commission (NRC)
  - Send e-mail and ask
- Department of Energy (DOE)
  - Send e-mail and ask



# Steps for Conducting an ECI Review



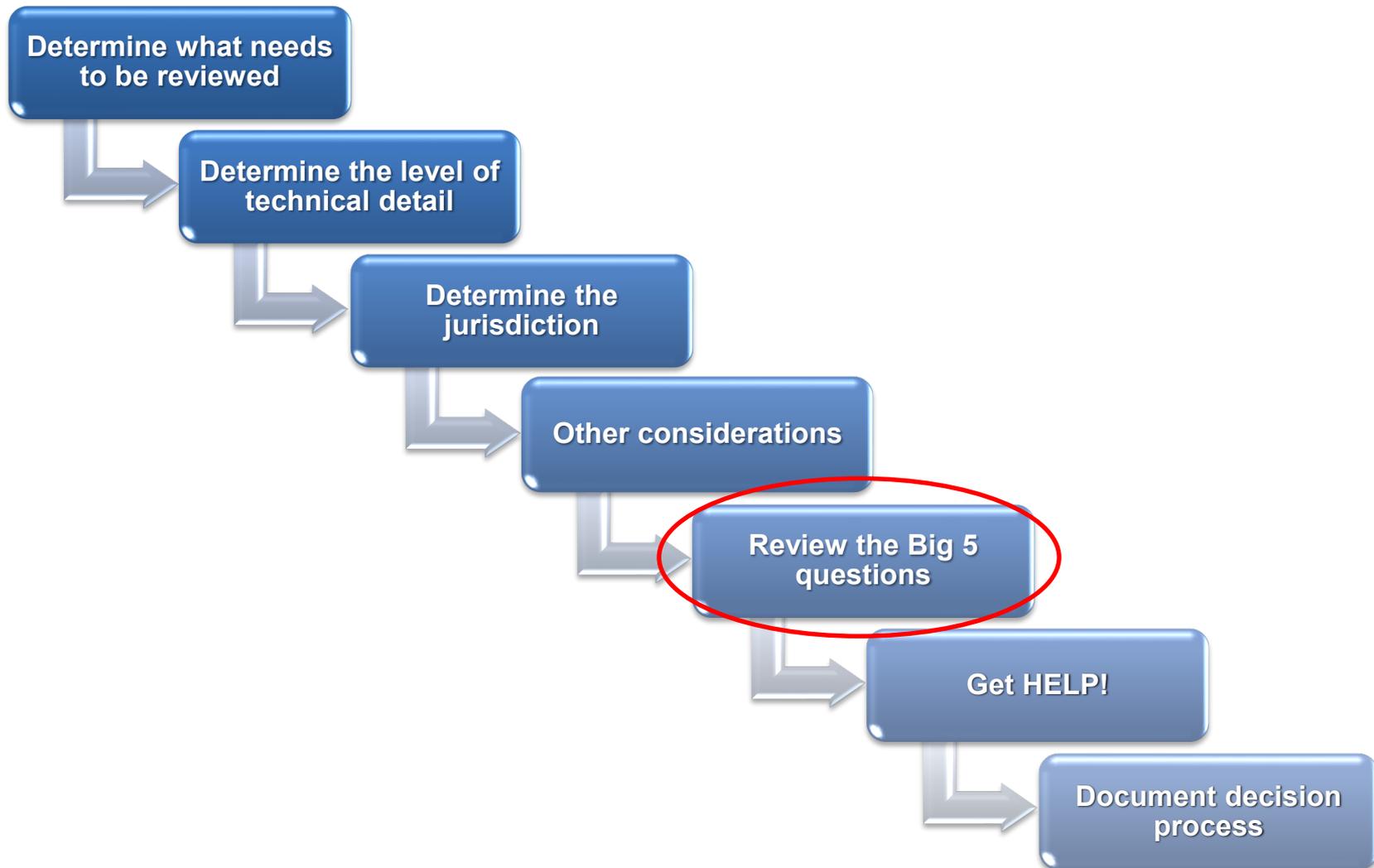


## Other Pertinent Questions to Ask

- Who funded this work? Was it DOE or another agency?
  - Has sponsor given authorization to release
- Has the funding agency already made an EC determination?  
If not, can you request one?
  - Some sponsors will make determination in request for proposals or contracts
- Have previous documents in this technology area been marked as EC?
  - Has the author previously published this type of information
  - Can they provide you with public domain sources
- Don't assume it was marked correctly
  - The original determination may not be correct today



# Steps for Conducting an ECI Review





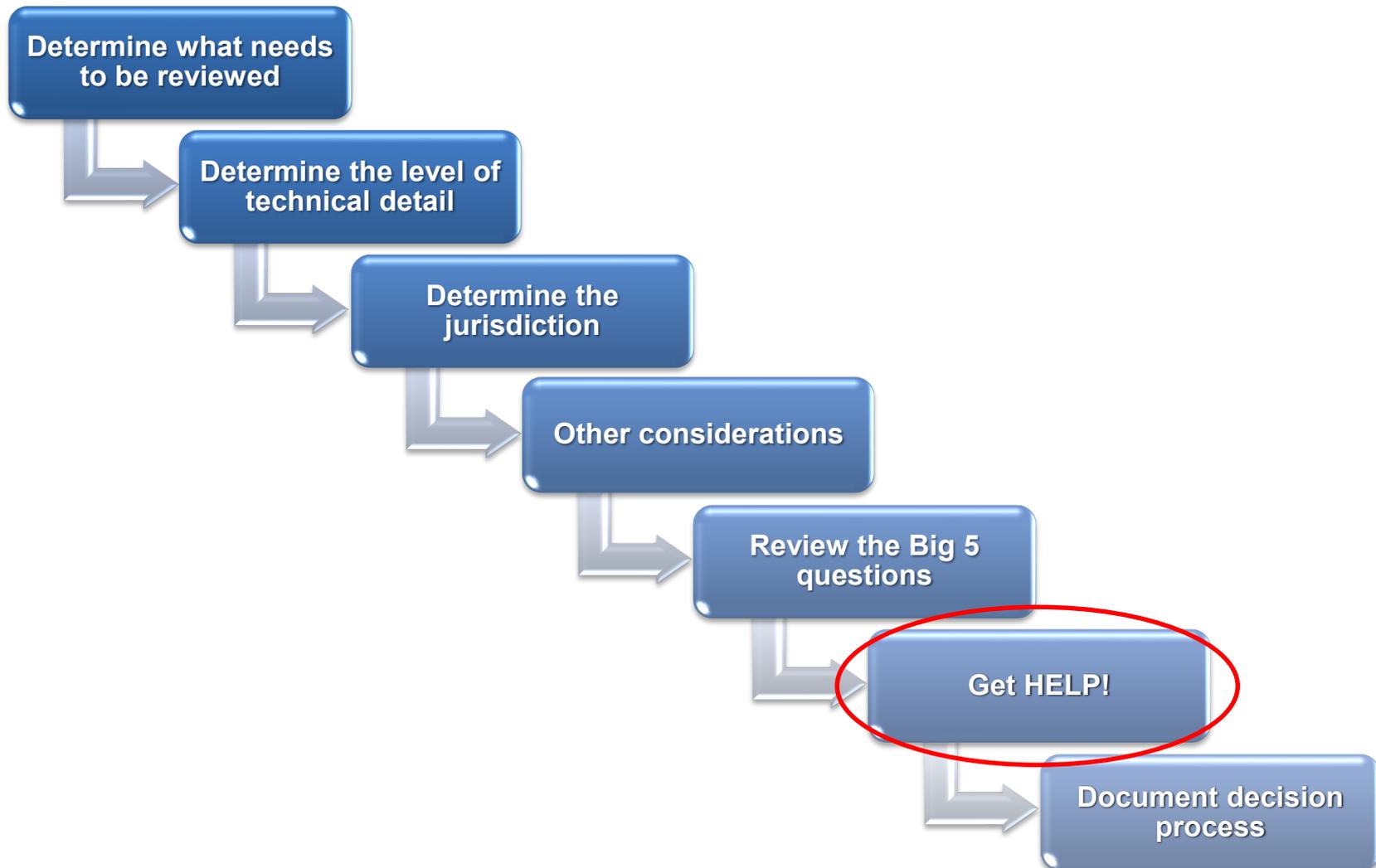
# Proliferation Review Questions

## “The Big 5”

1. Could uncontrolled release reasonably be expected to contribute to proliferation?
2. Could it help a proliferant significantly to improve its ability to develop weapons or gain know-how for producing or preparing weapons materials?
3. Could uncontrolled release reasonably be expected to adversely affect U.S. national security?
4. Could an adversary gain significant technical advantage, negate a U.S. advantage, or find it significantly easier to develop advanced weapons or make other military progress?
5. Is the technical information of such character that association with its source — for example, a DOE weapons laboratory — would implicitly enhance its value to a proliferant or adversary?



# Steps for Conducting an ECI Review





# Sources for Technical Details

- Technical Detail (not a regulatory licensing requirement)
  - Nuclear Suppliers Group (NSG) control lists (Trigger and Dual-Use)
  - Australia Group List (AG)
  - Missile Technology Control Regime (MTCR)
  - Wassenaar Arrangement (WA)
  - Nuclear Technology Reference Book (NTRB) — a classified document
  - Militarily Critical Technologies List (MCTL)
- Regulatory Guidance (licensing authority) and Restricted Party Lists
  - DOC EAR Commodity Classification List (CCL)
  - Munitions List (ITAR)
  - NRC Appendix Lists
  - DOE 10 CFR 810
  - Treasury's OFAC Regulations



## Who to Call for Help?

- Technical experts
  - Develop a list of SME's from your facility and across the DOE complex
- The ECAP (Export Compliance Assistance Program) sponsored by NA-242
  - Evelyn Prestosh, Program Manager, ECRC/I
    - [evelyn.prestosh@nnsa.doe.gov](mailto:evelyn.prestosh@nnsa.doe.gov), 202-586-0986
    - Krystee Ervin, ECAP Support, 865-574-7920, [ervinkp@ornl.gov](mailto:ervinkp@ornl.gov)
- DOE facility internal export compliance office or your site releasing official
- Jurisdictional governing agencies

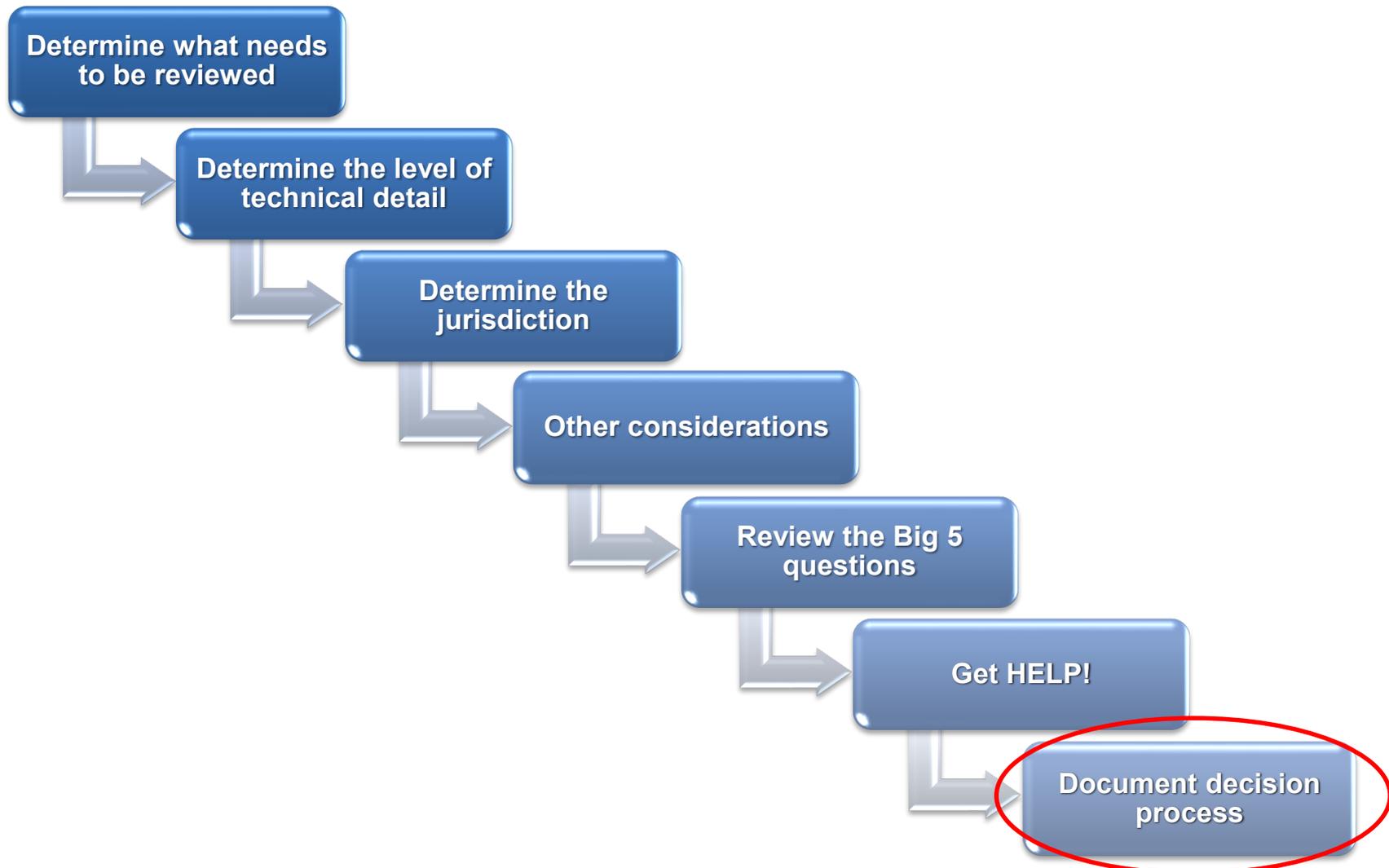


## Getting Assistance

- Don't hesitate to get help
- Develop a good relationship with SMEs and U.S. government agencies
- Don't try to "know it all." It is an impossible goal to achieve
- Sometimes it is quicker to get a formal agency response than it is to sort it out yourself



# Steps for Conducting an ECI Review





# The Last Hurdle

- Make a decision
  - May be the hardest part of the process
- Document it
  - Write down your thought process
  - Who you contacted
  - What was your basis for the decision
  - Keep the records
    - 5 years or
    - Match term of the license
- Mark it
  - Ensure documents are appropriately marked and protected
- Relax
  - You've shown due diligence
  - Move on to the next case





# Markings for ECI

The following format is preferred:

## EXPORT CONTROLLED INFORMATION

*Contains technical information whose export is restricted by \*. Violations may result in administrative, civil, and/or criminal penalties. Limit dissemination to U.S. persons. The cognizant program manager must approve other dissemination. This notice shall not be separated from the attached document.*

\_\_\_\_\_  
Reviewer (signature)

\_\_\_\_\_  
Date

\*Fill in the appropriate export control regulation, e.g., DOC Export Control Classification Number (ECCN) xxxxx, DOS ITAR Category xx, NRC 10 CFR Part 110.xx, DOE 10 CFR 810.xx, or other justification classification as appropriate.



# DOE O241.1B Requirements

Review STI generated under the contract

- determine appropriate release and handling
- apply any necessary statutory or program-driven announcement and/or availability restrictions, including those related to nonproliferation, national security, export control, intellectual property, protected Personally Identifiable Information and privacy
- apply any restrictive markings required
- include any required legal disclaimers
- for STI products resulting from DOE-funded work, identify the sponsor as follows: U.S. Department of Energy, [name of DOE program office], [name of DOE subprogram]



# Questions or Comments?

# Development of a Volcanic Hazards Regulatory Guide

Advanced Reactor Stakeholder Meeting

October 10, 2019

# Overview

- NRC anticipates one or more new nuclear power reactor applications, including advanced reactors applications, for proposed sites with known volcanic hazards.
- 10 CFR 100.23(c) includes the geological and seismological siting factors, including volcanic activity, that each applicant shall investigate to permit an adequate evaluation of the proposed site.
- An IAEA safety guide for volcanic hazards was issued in 2012.
- An ANS working group, which includes NRC staff, is developing a standard with an estimated completion time in the next few years.
- Staff determined that the best path forward is to develop a draft Regulatory Guide (RG) with input from interested stakeholders.

# 21 October 2019 Public Meeting

- The purpose of the public meeting is:
  - to share the regulatory bases for the decision to develop the RG,
  - to inform stakeholders about the RG process and planned timeline for development of the RG, and
  - to explain and solicit feedback on the outline of technical information planned for inclusion in the draft RG.
- On 7 October 2019, NRC staff issued a public meeting notice that included a draft outline of the proposed RG
- Stakeholder comments will be solicited at the public meeting and can also be sent via email to [VolcanicHazards-RG@nrc.gov](mailto:VolcanicHazards-RG@nrc.gov)



# Advanced Reactor Preparations for Environmental Reviews

Mallecia Sutton  
Division Advanced Reactors  
Office of New Reactors  
October 10, 2019

# Major Activities

- Developing Interim Staff Guidance for the environmental review of micro- reactors
  - ✦ Leverages existing environmental guidance documents
  - ✦ Identifies unique considerations in resource areas
- Developing guidance on addressing fuel cycle impacts for non-LWRs
  - ✦ Informed by report developed by Pacific Northwest National Laboratory
- Initiating exploratory process to inform the development of a GEIS for advance reactors

# GEIS Information Gathering

- Preparation of a GEIS could accelerate and streamline the environmental review process for advanced nuclear reactors
- Two public meetings on environmental impacts for all advance reactors
- Seeking input from designers, vendors, DOE, Tribes, and the public
- Approach informed by development of previous GEIS, experience with other environmental reviews, and site- and design-specific information

# Questions

# Recommendations for Streamlining NRC Environmental Reviews

October 10, 2019



# Overview of Recommendations

- 1) Revise 10 CFR 51.22 by eliminating the list of NRC's licensing actions that require an environmental impact statement (EIS) and allow for the flexibility to use environmental assessments (EA) for those licensing actions if appropriate.
- 2) Strengthen the regulations and guidance to require NRC Staff to review and incorporate existing environmental analysis into a project's EA or EIS.
- 3) Incorporate into guidance a directive to allow for an applicant's environmental review (ER) to serve as the basis for the draft EIS.
- 4) Reduce burdensome alternatives analysis.

# Schedule

- Oct. 2019 – NEI finalize paper
- Nov. 2019 – NEI provide paper to NRC
- Dec. 2019 – Discuss final NEI paper in 12/12/2019 Public Meeting

# Discussing Draft Documents and Use of Electronic Reading Rooms

Lucieann Vechioli Feliciano  
October 10, 2019

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- **Formal Interactions –**

Technical and licensing information supporting an action requested of the NRC staff (e.g. permits, licenses, certifications)

- **Informal Interactions –**

General and administrative for the purpose of planning and coordination.

# Submittals to the NRC

- Documentation or other materials supporting formal interactions with then NRC staff (e.g., public meetings) or regulatory decisions should be submitted to the document control desk:

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

- Informal and reference documents, including courtesy copies, may be shared with the NRC staff using:
  - NRC Box
  - Electronic reading rooms
  - E-mails

# Draft Documents

- Draft documents may be discussed with the NRC as part of presentation materials or docketed correspondence
- Draft information intended to be the subject of a meeting or for which written feedback is to be provided should be sent to the Document Control Desk to enable NRC staff to:
  1. determine to what extent information, including discussions, should be withheld from public disclosure, as requested
  2. reference relevant public meeting conversations, and
  3. cite material when preparing summaries of interactions or other written feedback

# Draft Documents (Continued)

- During discussions of draft documents, NRC staff will...
  - Identify aspects of draft information that may be inconsistent with applicable review guidance and regulations
  - Identify areas that appear to need clarification to support a complete technical review, such as where the level of detail appears to be different than what is described in regulatory guidance
  - Identify reference documents that would support the review of a formal submission
  - Identify regulations and current guidance that may be related to an identified issue or information gap

*...and will not...*

- Provide any guidance to the prospective applicant on what to write to make the information “acceptable” or provide written revision for consideration
- Provide regulatory determinations (i.e., safety findings) on draft information
- Maintain copies of draft information obtained at a prospective applicant site or accessed through an electronic reading room

# Electronic Reading Rooms

- **Electronic Reading Rooms...**
  - Are externally-controlled virtual spaces
  - Use to share background/reference information
  - Not to be used as a substitute for submitting information supporting regulatory decisions or other formal engagements with the NRC staff
  - Use to provide courtesy copies of identical to formal submissions made to the Document Control Desk
- NRC staff is developing an electronic reading room agreement template to be shared with prospective applicants

# References

- Management Directive 3.5 , “Attendance at NRC Staff-Sponsored Meetings” (ADAMS Accession No. ML18073A094)
- LIC-204, “Handling Requests to Withhold Proprietary Information from Public Disclosure” (ADAMS Accession No. ML093240489).
- LIC-500, “Topical Report Process” (ADAMS Accession No. ML18016A217)
- “Preparing for Advanced Reactor Reviews: Pre-application Interactions,” prepared for the Advanced Reactor Stakeholder Meeting on June 28, 2019 (ADAMS Accession No. ML19179A181)
- “Protecting Sensitive Information,” prepared for the Advanced Reactor Stakeholder Meeting on August 15, 2019 (ADAMS Accession No. ML19228A263)



# **Manufacturing Licenses: What are the Advanced Reactors Applicants Interests and Needs?**

October 10, 2019

Adrian Muñiz, Project Manager



# Manufacturing Licenses

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- Manufacturing licenses may be a regulatory process of interest to advanced reactor applicants, especially for micro reactors
- NRC is soliciting feedback
  - Interest in manufacturing licenses
  - Any changes needed to current regulations

# Manufacturing Licenses

- 10 CFR 52, Subpart F
  - License to authorize manufacture of reactors
    - Manufacturing license application may reference a standard design certification or standard design approval.
  - Reactor may only be transported to and installed at a site with a construction permit (CP) or combined license (COL)
    - Manufacturing license application must contain proposed shipping procedures (preparation, conduct, and verification of condition upon receipt)
    - CP or COL must authorize construction of a nuclear power facility using the manufactured reactors

# Manufacturing Licenses

- Previous NRC Experience
  - Application to manufacture reactors at a facility in Florida to be shipped unfueled by barge to a location in NJ
    - Approved manufacture of eight reactors in 1982 that were never built
- Discussion with Stakeholders
  - What are the near/long term interest and needs?
  - Are any changes to the regulations needed?

# Nuclear Energy Innovation and Modernization Act (NEIMA): Preparing the Licensing Process for Research and Test Reactors

William B. Kennedy, Project Manager

October 10, 2019

# NEIMA Requirements

- Section 103 of NEIMA requires the NRC to submit to the appropriate congressional committees a report for preparing the licensing process for research and test reactors within the existing regulatory framework by January 14, 2020, and
- develop and implement strategies for licensing research and test reactors, including the issuance of guidance by January 14, 2021.

# NEIMA Definition

- NEIMA defines “research and test reactor” as a reactor that:
  - (i) falls within the licensing and related regulatory authority of the Commission under section 202 of the Energy Reorganization Act of 1974 (ERA);
  - (ii) is useful in the conduct of research and development activities as licensed under section 104 c. of the Atomic Energy Act of 1954, as amended (AEA); and
  - (iii) is not a commercial nuclear reactor.

# Proposed Licensing Strategy

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- Use the 2-stage licensing process in Part 50
- License as either a research reactor or a testing facility under 10 CFR 50.21(c)
- Apply NUREG-1537, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors”
- Apply additional guidance for commercial advanced reactors, as appropriate
- Develop additional guidance based on NUREG-1537 for new technologies

# Unique Aspects of Licensing

---

- Show compliance with the cost recovery criteria in section 104c of the AEA
- Describe capabilities for conducting research and development activities in the fields specified in section 31 of the AEA
- If the facility is a DOE facility, show that it is a “demonstration reactor” as described in section 202 of the ERA

# Questions?

# Advanced Reactor Stakeholders Meeting: Upcoming Meetings and Open Discussion

Steven Lynch

Acting Chief, Advanced Reactor Licensing Branch  
Division of Advanced Reactors

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# Upcoming Meetings

Meeting Subject	Date
Micro-Reactor Policy and Regulatory Issues	October 17
Volcanism	October 21
Exploratory Meetings on Viability of Generic Environmental Impact Statement (GEIS)	October 30 and November 6
Alternative Physical Security Measures	November 14
Workshops on GEIS Viability	First Week of December
Advanced Reactor Stakeholders Meeting	December 12

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# How are we Doing?

- Engagement is crucial to success
- What would make stakeholders meetings more useful?
  - Seeking feedback on format, discussion topics, and other aspects
- What challenges could impact the ability to prepare or review an application?
- What do *you* need from the NRC?
  - What's going well? Not so well?