

# U.S. NRC Safety Requirements

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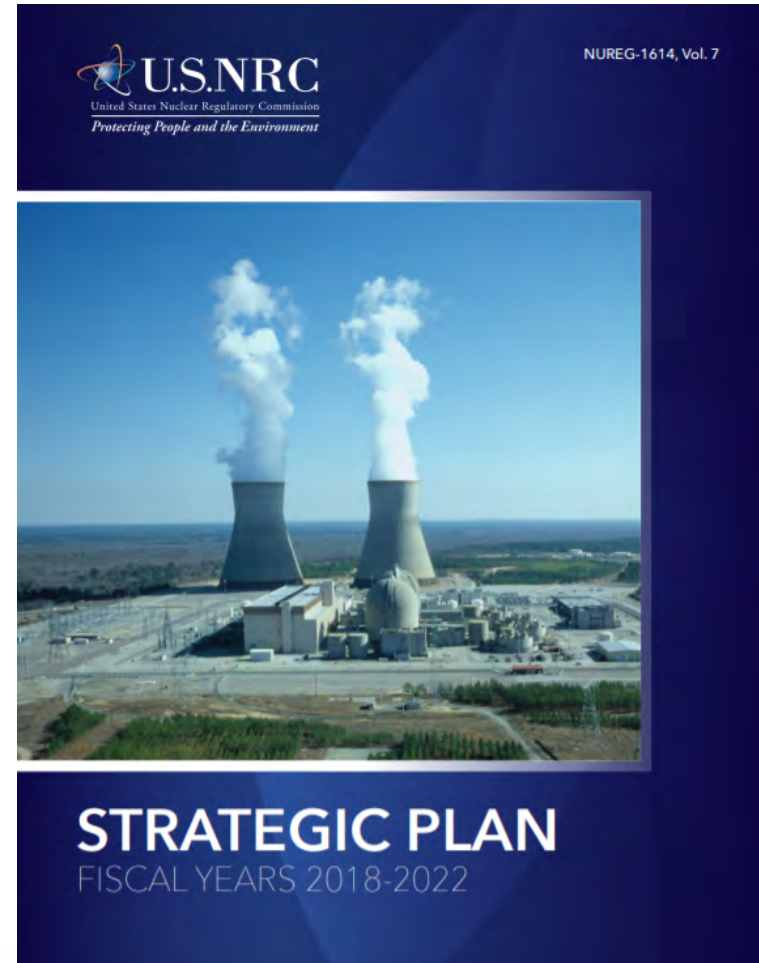
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# Objectives for NRC Safety Requirements Presentation

- To introduce the foundation for NRC's Mission and Regulations as they apply to well logging
- To review the basics for the applicable regulations and where to find them
- To identify the basics and basis for licensing and applicable NRC guidance documents

# NRC Mission

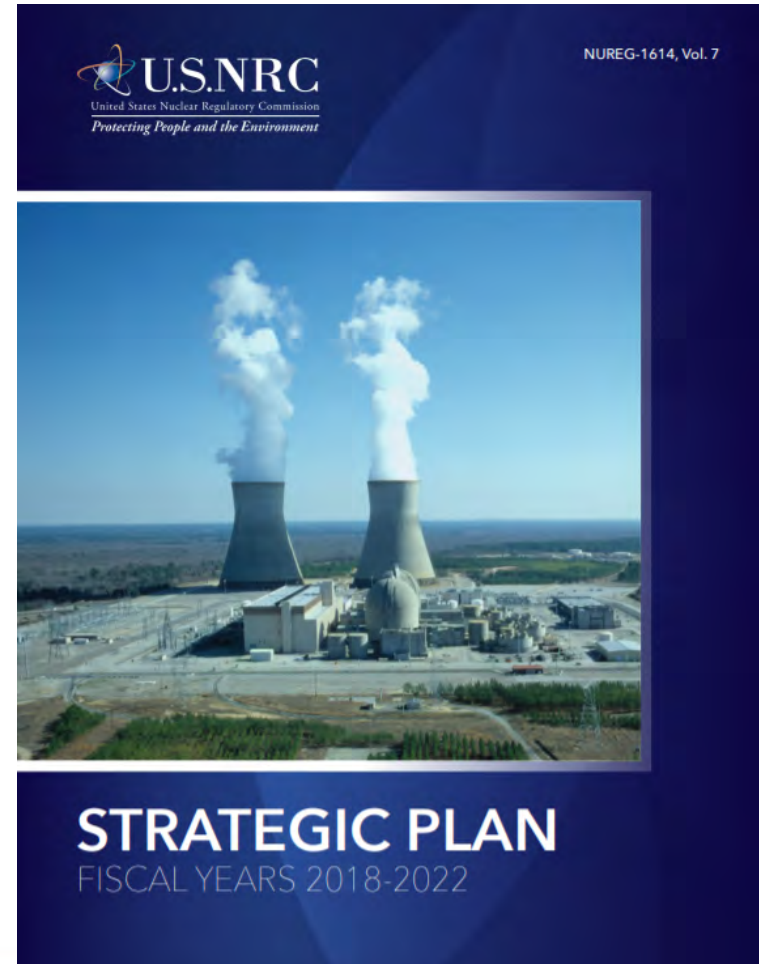
*The NRC's mission is to license and regulate the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment.*



# Principles of Good Regulation

- *Independence*
- *Openness*
- *Efficiency*
- *Clarity*
- *Reliability*

NRC Strategic Plan  
FY2018-2022,  
NUREG-1614, Volume 7



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# Columns of Safety – Well Logging

- NRC Regulations – Title 10 of the *Code of Federal Regulations* (10 CFR) Parts 19, 20, 30, and 39
- DOT Regulations – 49 CFR 172-179
  - NRC Reference 10 CFR 71.5
- License Conditions and Guidance Documents
  - NUREG-1556, Volume 14, Revision 1

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# Brief Overview – 10 CFR Part 19

## “Notices, Instructions, and Reports to Workers: Inspection and Investigations”

- Posting of Notices
- Instructions to Workers (hazard awareness)
- Notifications and Reports to Individuals
- NRC/Licensee Inspection Interface
  - Rights and responsibilities for workers, the licensee, et cetera

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# Brief Overview – 10 CFR Part 20

“Standards for Protection Against Radiation”

- Subpart A – General Administration
  - Definitions, units, et al.
- Subpart B – Radiation Protection Program
- Subpart C – Occupational Dose Limits
- Subpart D – Public Dose Limits
- Subpart E – Radiological Criteria for License Termination
- Subpart F – Surveys and Monitoring
- Subpart G – Restricted Area/Controlling External Exposure

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# Brief Overview – 10 CFR Part 20

*Continued*

- Subpart H – Controlling Internal Exposure (Respiratory)
- Subpart I – Basic Security Provision
- Subpart J – Precautionary Procedures
  - Posting and labeling rooms/containers
  - Package receipt and opening
- Subpart K – Waste Disposal
- Subpart L – Records Creation & Retention
- Subpart M – Reports to the NRC



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# Brief Overview – 10 CFR Part 30

“Rules of General Applicability to Domestic licensing of  
Byproduct Material”

- 30.3 – Activities Requiring a License
- 30.7 - Employee Protection
- 30.9 / 30.10 – Completeness and Accuracy of Information & Deliberate Misconduct
- 30.12 / 30.13 - Exemptions for DOE, Common and Contract Carriers

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# Brief Overview – 10 CFR Part 30

*Continued*

- 30.14 – 30.22 – Exempt concentrations, quantities, and devices
- 30.31 / 30.22 – Types of licenses and Applications for licenses
- 30.34 – General Terms and Conditions
- 30.35 – Financial Assurance
- 30.36 – Expiration, Termination, and Decommissioning

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# Brief Overview – 10 CFR Part 30

## *Continued*

- 30.41 – Transfer of Radioactive Material
- 30.50 – Reporting Requirements
- 30.51 – Record Creation and Retention
- 30.52 – Inspection responsibility
  - Afford the opportunity to inspect at all reasonable times,
  - Shall make available records kept pursuant to the NRC's requirements upon reasonable notice

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# Overview – 10 CFR Part 39 (1)

“Licenses and Radiation Safety Requirements for Well Logging”

- Subpart A – General Administration (e.g. definitions)
- Subpart B – Specific Licensing Requirements
  - Application Requirements
  - Well Owner Agreement
- Subpart C - Equipment
  - Labels, Security, and Transportation
  - Radiation Detection Instruments
  - Leak Testing of Sealed Sources (later: see License Condition)

# Overview – 10 CFR Part 39 (2)

## *Continued*

- Subpart C – Equipment (Continued)
  - Physical Inventories
  - Records of Use (Utilization or Use Log)
  - **Design and Performance Criteria for sources**
    - Double encapsulation
    - Insoluble and nondispersible (as practical)
    - “Grandfathered” or ANSI/HPS N43.6-1997 requirements
    - Exceptions for sources in gaseous form and energy compensation sources
  - Inspection & Maintenance
  - Subsurface Tracer Studies
    - Protections, precautions, and fresh-water aquifer prohibition

# Overview – 10 CFR Part 39 (3)

## *Continued*

- Subpart C – Equipment (Continued)
  - Radioactive Markers/Uranium Sinker Bars
  - Add'l Requirement for sealed sources in fresh water aquifer without surface casing
  - Energy Compensation Sources & Tritium Neutron Generator provisions/exceptions
- Subpart D – Radiation Safety Requirements
  - Training for Logging Supervisor, Logging Assistant, initial & refresher

# Overview – 10 CFR Part 39 (4)

## *Continued*

- Subpart D – Rad Safety Req (Continued)
  - Operating and Emergency Procedures
    - Handling and use of RAM
    - Handling and use of radioactive tracer materials
    - Methods and occasions for surveys
    - Minimization of radiation exposure, incl. from inhalation/ingestion
    - Security of RAM
    - Personnel monitoring & PM equipment
    - Transportation (packaging, placarding, security)
    - Receipt and opening of radioactive packages
    - Decontamination (for tracers)
    - Maintenance of records generating at temporary job sites
    - Inspection & maintenance program
    - Reporting to NRC 10 CFR Part 21 defects
    - Actions/reporting in case of an event (e.g. lodged sealed source)
    - Actions for a ruptured sealed source

# Overview – 10 CFR Part 39 (5)

## *Continued*

- Subpart D – Rad Safety Req (Continued)
  - Personnel Monitoring
  - Radiation Surveys (Specific)
  - Radiation Contamination Control
- Subpart E – Security, Records, Notifications
  - Security at Temporary Job Sites
  - Record Requirements at Field Offices and Temporary Job Sites
  - \*\*\*Required Notifications (e.g. ruptured source, pre-notify for approval to abandon sources in-hole)



# U.S. Department of Transportation Regulations



- The U.S. NRC and U.S. DOT Memorandum of Understanding: July 2, 1979
- Cooperation between U.S. DOT, NRC, and Dept. of Homeland Security
- Provides authority for the NRC to inspect licensees against DOT requirements
- NRC Regulation: 10 CFR 71.5
- References: 49 CFR Parts 107, 171-180, and 390-397

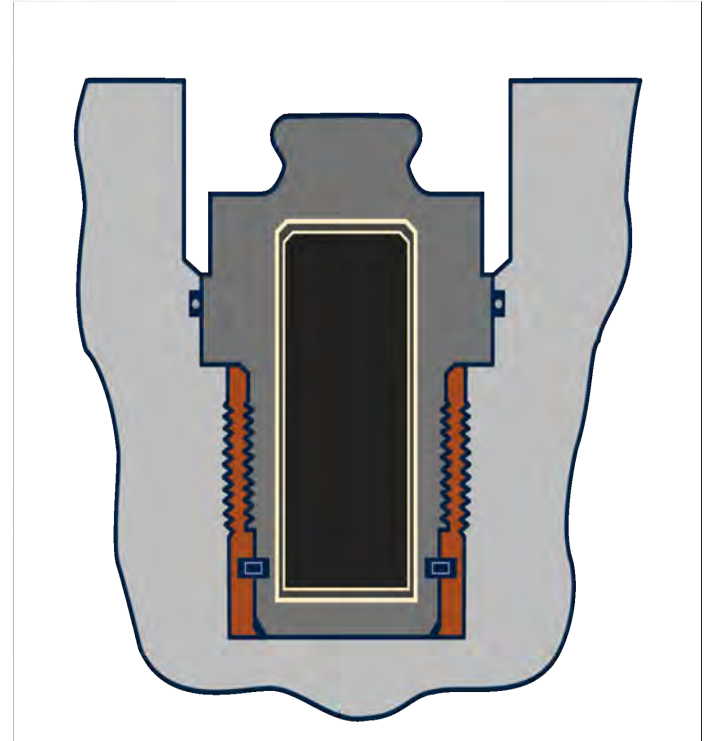
# Shipping & Transporting Radioactive Material

- Primary Considerations:
  - Types of sources being shipped
  - Activity of sources being shipped
  - Physical Form of radioactive material
  - Type of package required



# Shipping & Transporting Radioactive Material

- Form of Material:
  - Special Form
    - Non-dispersible
    - Encapsulated, solid metal, etc.
    - High physical integrity
  - Normal Form
    - Readily Dispersible to environment
    - Liquids, gasses, etc.
    - Pose definite contamination hazard



# Shipping & Transporting Radioactive Material

- Package Requirements
  - Type A
    - Less stringent testing
    - Activity limits apply ( $A_1$  &  $A_2$ )
  - Type B
    - Very stringent testing & certification
    - Requires special approval and registration for use





# License Conditions

Official Use Only - Security-Related Information			
NRC FORM 374		U.S. NUCLEAR REGULATORY COMMISSION	
		PAGE 1 OF 11 PAGES Amendment No. 90	
<b>MATERIALS LICENSE</b>			
<p>Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 70 and 71, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.</p>			
<b>Licensee</b> 1. [REDACTED] 2. [REDACTED]		In accordance with email dated June 19, 2017; and letters dated June 19, 2017, and August 09, 2017 3. License number: [REDACTED] is amended in its entirety to read as follows:	
		4. Expiration Date: May 31, 2025 5. Docket No.: [REDACTED] Reference No.:	
6. Byproduct, source, and/or special nuclear material A. Cobalt-60 B. Iodine-131 C. Americium-241/Beryllium	7. Chemical and/or physical form A. Metal B. Liquid C. Sealed Neutron Source (Eckert & Ziegler Isotope Products, Model BP Series 4163; Gamma Industries, Inc., Model NB(HP); Gammatron, Inc., Model AN-HP; DA-20; DA-5; QSA Global, Inc., Model AMN.Cyn Series)	8. Maximum amount that licensee may possess at any one time under this license A. 5 microcuries per PIP® strip and 1 microcurie per PIP® tag, and 10 millicuries total B. 50 millicuries per injection and 500 millicuries total C. 16 curies per source except 5 curies per source for DA-5 and 900 curies total	9. Authorized use A. For use in depth control location markers in wells. An individual Cobalt 60 marker (PIP® strip or PIP® tag) must not exceed 1 microcurie each at the time of installation into pipe threads. B. For use in single injection well tracer studies during oil and gas well logging. C. For use in oil and gas well logging.
Official Use Only - Security-Related Information			

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# License Conditions

- The NRC license provides additional restrictions and authorizations beyond the specificity of the regulations
- These include:
  - Isotopes, form (sealed/unsealed, model of source/device if applicable), quantity, and authorized use
  - Locations of use/storage (i.e. fixed facilities), Temporary Job Site authorization
  - Identify the “Radiation Safety Officer” – normally the principle contact for the NRC
  - Leak Test Requirement

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# License Conditions

- Other conditions restrict licensee:
  - prevent non-routine maintenance or processes not normally authorized
  - Limits *Conditions of Use* from the **Sealed Source and Device Registry**
- “Tie Downs” – Additional commitments made in License Application, Renewal, or Amendments
  - Operating and Emergency Procedures
  - Commitments to follow certain “guidance” document sections
  - Decommissioning Records

# NUREG-1556, Volume 14, Revision 1

- 293 pages of well-logging specific guidance
- How to file an application (Pg 33-127)
- Appendices (pg. 128-293):
  - Forms for application
  - Summaries of training and survey requirements
  - Summary of notification requirements, and more



NUREG-1556  
Volume 14, Rev. 1

## **Consolidated Guidance About Materials Licenses**

Program-Specific Guidance About  
Well Logging, Tracer, and Field Flood  
Study Licenses

### **Final Report**

Manuscript Completed: April 2018  
Date Published: April 2018

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Office of Nuclear Material Safety and Safeguards



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# Questions?

