

Federal Regulations Governing Disposal of Residuals Containing Radionuclides

Overview

- **Abbreviations & Acronyms**
- **Waste Disposal Restrictions**
- **Key Regulations**
- **Key Definitions**
- **TENORM**
- **EPA Regulations**
- **NRC Regulations**
- **DOT Regulations**
- **Additional Considerations**

Abbreviations & Acronyms

AEA	Atomic Energy Act
BAT	Best Available Technology
CWA	Clean Water Act
DOT	U.S. Department of Transportation
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
pCi/g	Picocuries per Gram
pCi/L	Picocuries per Liter
POTW	Publicly Owned Treatment Works

Abbreviations & Acronyms

RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SSCT	Small System Compliance Technology
TCLP	Toxicity Characteristic Leaching Procedure
TENORM	Technologically Enhanced Naturally Occurring Radioactive Material
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water
WET	Waste Extraction Test

Waste Disposal Restrictions

- Federal regulations
 - EPA
 - NRC
 - DOT
- State & local regulations
- Disposal facility policies



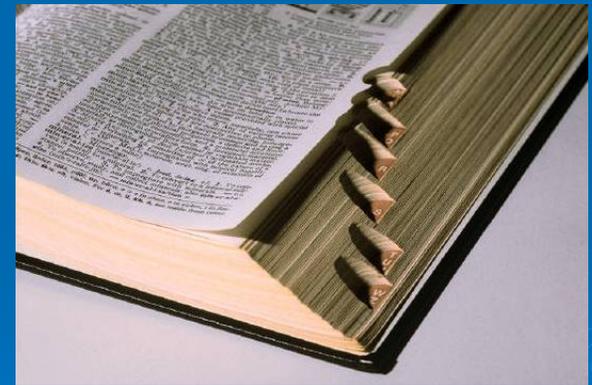
Key Regulations

- Safe Drinking Water Act (EPA)
- Clean Water Act (EPA)
- Resource Conservation and Recovery Act (EPA)
- Atomic Energy Act (NRC)
- Department of Transportation Regulations



Key Definitions

- Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)
- Hazardous Waste
- Mixed Waste



TENORM

- Naturally occurring radioactive materials
- Concentrations or exposure potential enhanced by human activities
- All residuals containing radionuclides
- Regulations may apply



EPA/SDWA – UIC Requirements

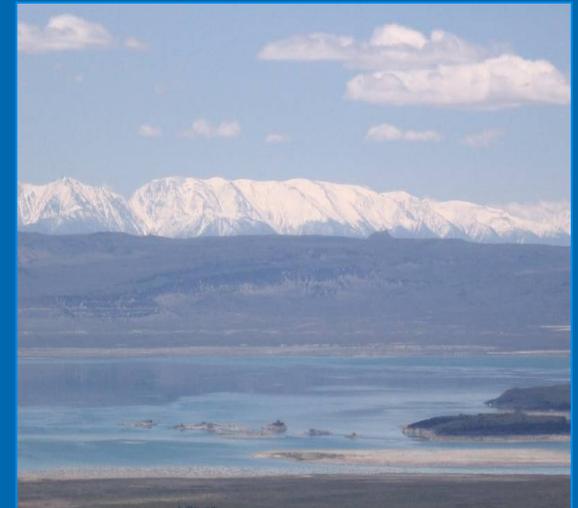
- Uses NRC limits to regulate radionuclide levels in injected waste
 - Ra-226: 60 pCi/L
 - Ra-228: 60 pCi/L
 - Uranium: 300 pCi/L
- Unity rule applies
- Single family waste disposal systems are exempt



EPA - Clean Water Act

➤ Direct discharge

- Accessible & appropriate receiving body
- NPDES permit restrictions
 - No federal NPDES limits for radionuclides



➤ Discharges to a POTW

- No federal regulations on radionuclides in sludge

➤ Co-occurring contaminants can limit options

EPA - RCRA

➤ Regulates non-hazardous & hazardous solid waste:

- Identification
- Classification
- Management
- Disposal



EPA/RCRA – Hazardous Waste

➤ Solid waste:

- Exhibits hazardous characteristics
- Listed by EPA as hazardous
- Not excluded under 40 CFR 261.4(b)



➤ Radionuclides alone do not make waste hazardous

EPA/RCRA – Hazardous Waste, cont.

- Testing is required
 - Analytical testing (e.g., TCLP or WET)
 - Process knowledge
 - Free liquid testing
- Requirements based on amount
 - Produced monthly
 - Stored on-site
- “Cradle to grave liability”



NRC/AEA – Source Material

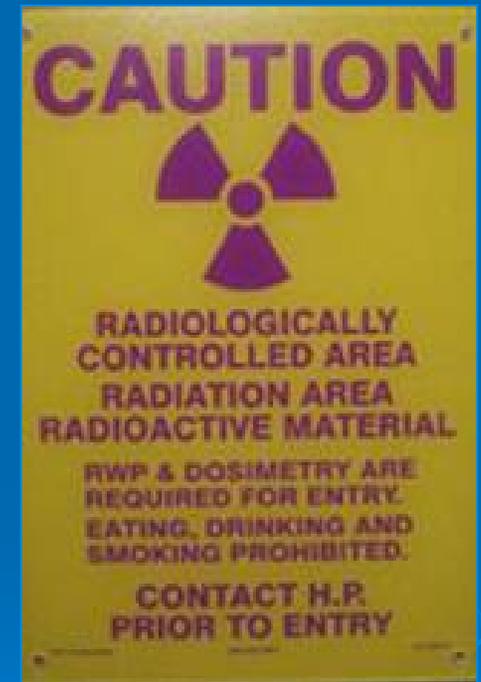
- Uranium (or thorium) in residuals
 - Does not apply to radium



- Licensing requirements may apply
- Unimportant quantities exempted

AEA & RCRA - Mixed Waste

- Classified as hazardous waste AND contains source material
- Exceptions
 - Unimportant quantities
 - Waste excluded under RCRA or AEA



DOT: 49 CFR 171 to 180

- Governs shipping, labeling, and transport of hazardous materials
- Radioactive materials are considered “hazardous”
- Exemption thresholds apply



Considerations

- Numerous federal regulations
 - No federal waste disposal regulation specifically for TENORM
- States, localities, and waste disposal facilities may have additional requirements
- Key definitions vary among regulations

Questions?