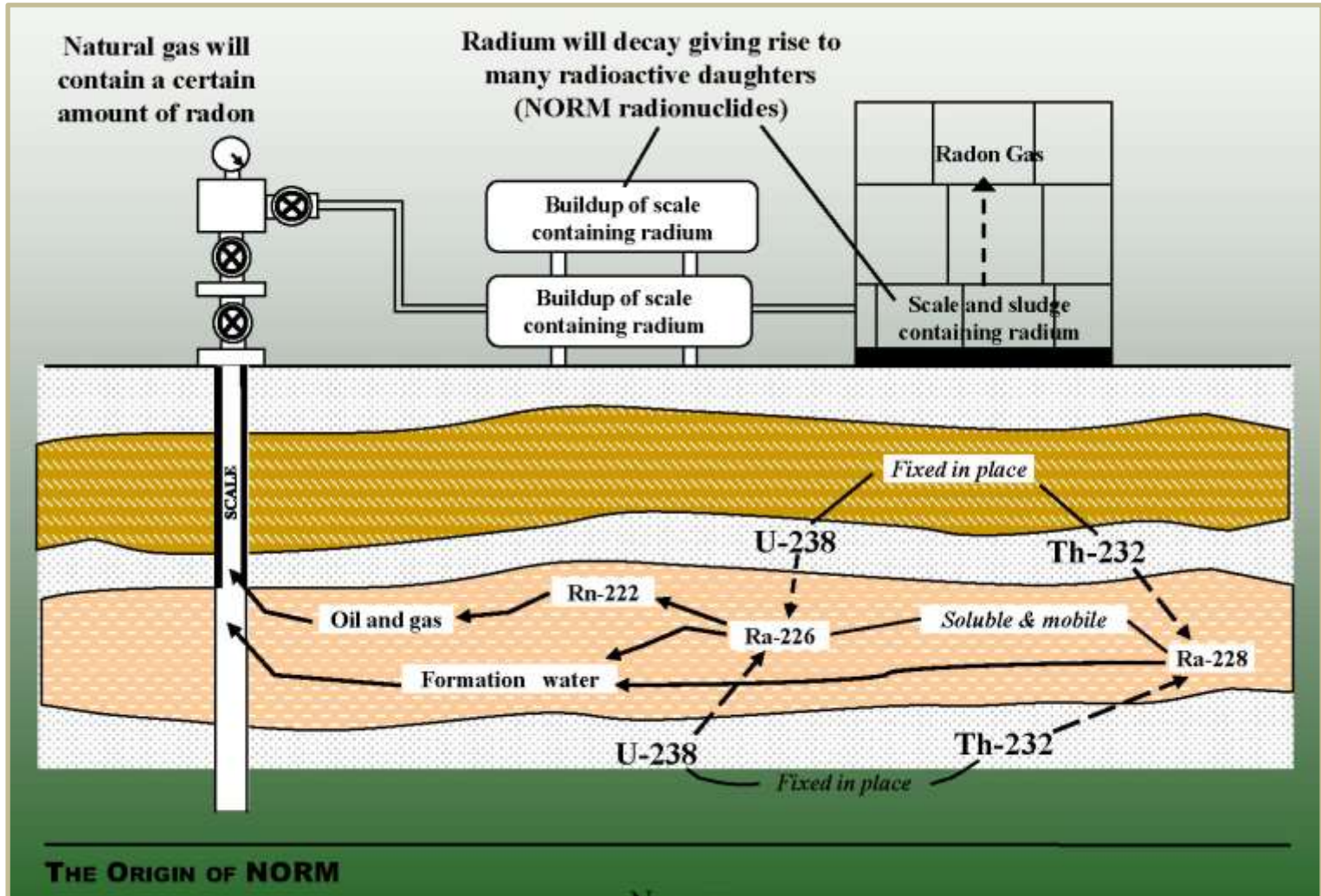




TENORM Management and Disposal

What is TENORM?



TENORM Waste Streams



Filter Socks



Tank Bottoms



Impacted Pipe/Tubing



Pigs and Pipeline Inspection Tools

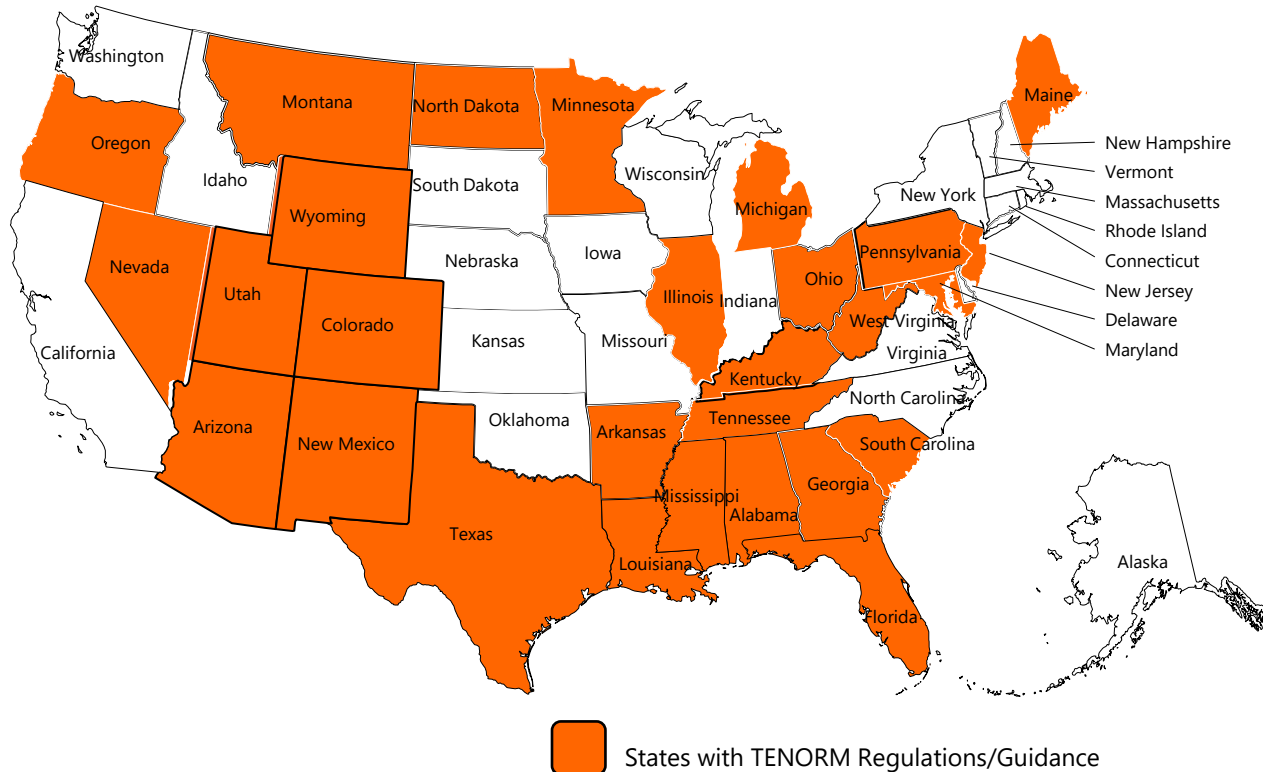


Industries Impacted

- Oil & Gas Production
- Mining/Ore Processing
- Municipal Water Treatment
- Metal Recycling
- Forest Product Combustion
- Thermal Electric Production
- Fertilizer Production
- Ceramics



U.S. Regulation of TENORM Waste



The Good and Not So Good

Disposal Options Have Increased

- More approved landfills (at low levels)
- New slurry injection well
- New gateway



The Offset

- MT Rules – slowed acceptance at Oaks
- Colorado Rules – real complexities
- New Mexico - in development
- Rocky Mountain Compact
- Mixed waste is still a challenge



Colorado Entities Impacted

Water Treatment Facilities

- **2,000 Drinking Water**
- **600** Wastewater
- **10** Active Mine



Others Impacted

- **300 Oil & Gas Operators**
- **49** E & P Waste Management Facilities
- **55** Landfills (& Municipalities)
- **5,000,000** Residents Who Rely on Public Drinking Water and Wastewater Treatment Facilities (85% of population)

U.S. Shale Formations



Long-Standing U.S. TENORM Disposal Options

Licensed NORM Disposal Sites in the United States



What's New?

Landfills

- **SECURE Energy** in North Dakota
- Republic Services in Colorado
- Waste Management in Colorado



Other Options

- Federal NORM Services – consolidation/facilitation
- KT Enterprises - slurry injection in North Dakota



13-Mile Landfill



SECURE
energy services

What Do Special Waste Landfills Look Like?

- Dirt
- No tires, refrigerators, plastic bags, or rotting food
- Much cleaner and tidier than a municipal landfill
- Cells closed as soon as possible



What's New?

Other Landfill News

- Republic Services in Colorado
- Waste Management in Colorado
- Republic Services' acquisition of US Ecology – increased footprint and increased prices for higher level TENORM waste



Other Options

- Federal NORM Services – consolidation/facilitation
- KT Enterprises - slurry injection in North Dakota



Eco-Friendly Recovery Facilities



DAWSON CREEK



KOTCHO



**SECURE
ENERGY**

IN-FIELD DETECTION AND HISTORY ARE VITAL

- **Field detection provides insight!**
- Get the right analytical the first time
- Start to narrow your disposal options
- **Must use proper survey techniques and sample collection procedures!**





NOT ALL WASTE FACILITIES ARE CREATED EQUAL

- **Waste acceptance criteria** is very different
- **# of samples required**
- **Analytes and data analysis requirements**
- **Costs and surcharges – know the minimums**
- **Transportation Requirements** (they may require registration, endorsements, or other permits)
- **Manifest scrutiny**
- **Online profiling and scheduling or manual**
- **Waste packaging requirements**

Mixed Waste Streams are Problematic

- Did the waste get sampled properly?
- What can the targeted landfill accept?
- Do they recognize the E & P exemption?
- **Treatment and Disposal Options Significantly Narrow!**



ANALYTE LIST FOR RCRA AND RADIOCHEMISTRY

1. ICR (Ignitability, Corrosivity, Reactivity)
2. TCLP Metals
3. Total Metals (Hg)
4. VOCs/SVOCs TCLP
5. VOCs/SVOCs Totals
6. Reactive Sulfide
7. Reactive Cyanide
8. PCBs



Radiochemistry:

- Radium-226
- Radium-228
- Polonium-210
- Lead-210
- Total Thorium
- Total Uranium
- TDS/TSS or % Moisture



LICENSED TENORM CONTRACTORS – BUYER BEWARE!

- **Pretenders** – a 40-hour certificate and a license doesn't make someone an expert

HOW TO GET A GOOD REFERRAL

- A regulator
- Ask the biggest disposal facilities
- Ask for references



Radiation Pros

Trusted by major producers, waste facilities, regulators, environmental engineers and insurance companies across the U.S.

- Major event, demo/remediation, and reclamation projects
- Straight forward cost structure & billing of true experts
- Recognized around the country as the best in the business

OUTSOURCING WASTE MANAGEMENT CAN SAVE YOU MONEY

- **Better rates at the landfills and treating facilities** because of relationships, process knowledge, and volume discounting
- **Velocity of management can be increased**
- **Baseline knowledge of options**
- **Regulatory relationships & compliance**



- **Protection from frivolous litigation**
Better documentation of context, levels, and exposure/dose

DOING THE RIGHT THING

- **Individual and Corporate Integrity**
- Doing the right thing regardless of:
 - Political climate or trends
 - Corporate or governmental directives
 - International pressure
 - Expense
 - Propaganda

We can be better. It starts with each of us.

- Discernment
- Personal Commitment
- Courage

RAD PROS

Field Services

- Radioactive Materials Management
- Remediation and Demolition
- Containment and Spill Management
- Boneyard Cleanup
- Monitoring
- Pig Decon and Pipeline/Midstream Support
- Waste Transport and Brokering Expertise



Consulting Division

- Radiation Protection Programs and SOPs
- Regulatory Support
- TENORM Surveyor Training
- Consulting
- Dose Measurement/Modeling

***Your TENORM
management and
waste brokering
experts!***



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QUESTIONS?

