



# Understanding TENORM

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# NORM → TENORM

- ▶ **NORM = Naturally Occurring Radioactive Material**
  - ▶ **Uranium – 232, 235, 238**
  - ▶ **Radium - 226 & 228**
  - ▶ **Lead – 210**



# NORM → TENORM

➤ **TENORM** = Technologically Enhanced Naturally Occurring Radioactive Material

“naturally occurring radioactive material whose radionuclide concentrations are increased by or as a result of past or present human practices”



# **NORTH DAKOTA RADIOLOGICAL HEALTH RULES**

## **▶ CHAPTER 33-10-23**

### **▶ REGULATION AND LICENSING OF TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIAL**



# Oil Field Solids

- ▶ The Department does not regulate materials that are less than **5 pCi/gram** above background
- ▶ Drill Cuttings are not regulated unless they are being processed
- ▶ Solids such as used Filter Socks and materials found in them are regulated
- ▶ Pipe Scale is regulated, therefore maintenance and repair operations may be regulated, and damaged materials and waste materials may also be regulated
- ▶ Materials processed by treating plants are regulated
- ▶ Filter Socks must be left on site to be transported by licensed transporter



# Oil Field Fluids



- ▶ Flowback that is transported to disposal wells is not regulated, but the filter socks and material in the socks is regulated and must remain on site
- ▶ Filter socks may not be cleaned for reuse
- ▶ Fluids such as waste oils or tank bottoms that are transported to a treatment facility are regulated and must be transported by a licensed transporter.

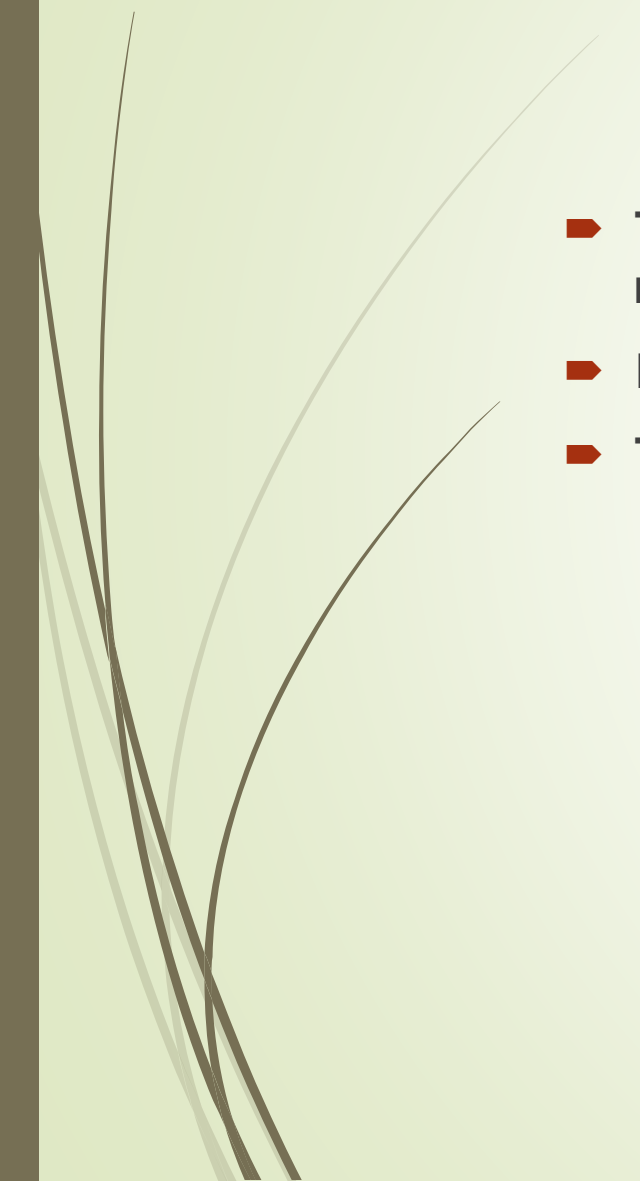


# Decontamination

- Decontamination operations conducted either on or off of the well pad are regulated activities and require licensure
- Vacuum trucks cleaning out tanks and hauling materials such as tank bottoms must be licensed
- Pigging operations in most cases require licensure
- Tank decontamination either on or off of the well pad requires licensure



# Purpose of Licensure

- ▶ To assure proper cleaning of tanks and vessels to prevent unknown radiation exposure to workers
  - ▶ Prevention of exposure to other workers or the public
  - ▶ To assure proper disposal of materials
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# License Types

- **Transporters**
  - **Treatment facilities**
  - **Decontamination activities**
  - **Work Over Rigs**
  - **Testing Companies**
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# Licensing Information Required

- ▶ **General information**
  - ▶ Owner
  - ▶ Responsible party
  - ▶ Location
  - ▶ Background checks
  - ▶ Type of operation
  - ▶ Training
  - ▶ Personal Protection
  - ▶ Personal Monitoring
  - ▶ Disposal
  - ▶ Trained Radiation Safety Officer (RSO)



# Radiation Limits

- ▶ **Background Radiation in North Dakota**
  - ▶ 4.2 pCi/gram average (Varies from 2.8 to over 9pCi/gram)
  - ▶ We use 5.0 pCi/gram
- ▶ **As stated earlier, anything that measures 5 pCi/gram or higher over background is regulated**
- ▶ **The new disposal limit for a Special Waste Landfill that is approved to handle TENORM is 50pCi/gram**
- ▶ **When we talk of these numbers we are talking about Radium-226 plus Radium-228**



# Measurement



- ▶ Readings on a microR meter only give you a reading of what the exposure rate is for the material that you are measuring.
  - ▶ You can measure volume of a liquid in a container, but you have use a scale to weight the liquid
- ▶ If you want to know how much of the material you have, you will need to have a laboratory analysis done to quantify the material in pCi/gram

# Analytical Test Results

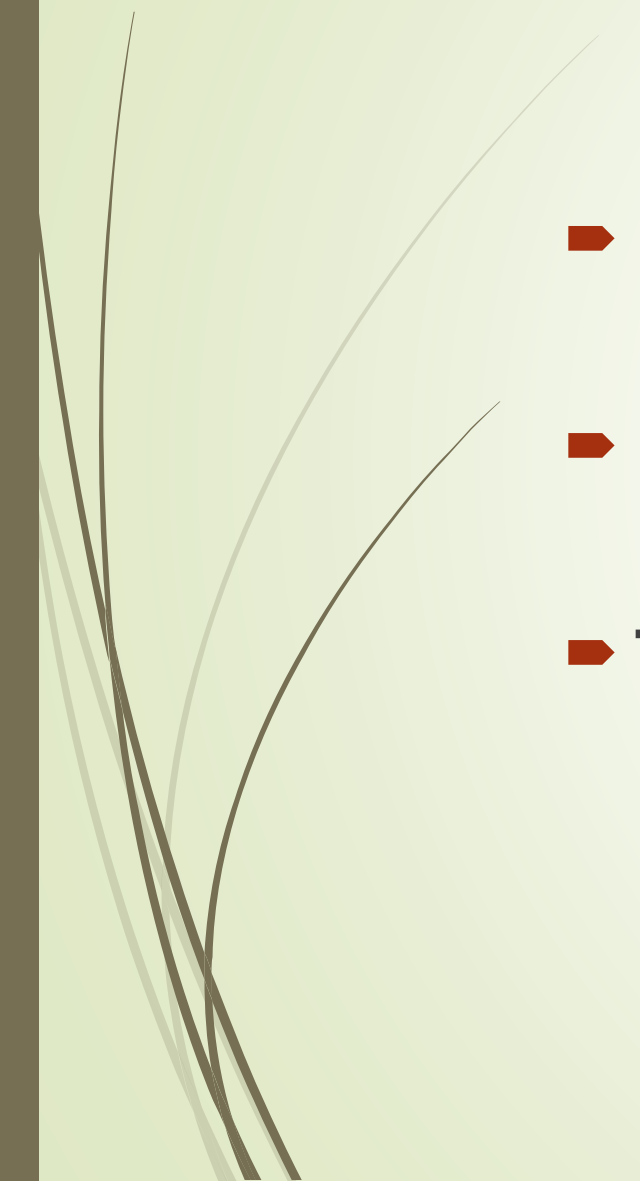
► Results reported on a "wet-weight" basis

► Parameters	Method	Act ± Unc (MDC)	Units
► Radium-226	EPA 901.1	<b>3.568 ± 0.637 (0.272)</b>	pCi/g
► Radium-228	EPA 901.1	<b>2.515 ± 0.536 (0.274)</b>	pCi/g

Add - 3.568 and 2.515 = **6.083 pCi/g**




# What Levels are we Finding?

- ▶ Pipe Scale > 30,000 pCi/gram
  - ▶ Filter Socks > 500 pCi,gram
  - ▶ Tank Bottoms > 8,300 pCi/gram
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# Transportation of Materials

- ▶ **Drilling pipe, sucker rods, and like materials may be transported by the oil company from their drilling pad to another drilling pad or to storage as long as they own those properties.**
  - ▶ **Any other transportation of material must be completed by a licensed TENORM transporter.**
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# Decontamination Required

- ▶ All materials that will be released/sold for unrestricted use, must be decontaminated before it is released
  - ▶ Includes drill pipe released for recycling
  - ▶ Includes drill pipe that will be used for fencing





# Questions?

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