

# **Railroad Commission of Texas**

## **Oil & Gas Radiation Regulation**

**Texas Radiation Regulatory  
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# Radiation Associated with O&G in Texas

## – TDSHS

- Texas radiation control agency
- Regulates possession, use, transfer, transport, and storage of NORM; recycling of NORM; and decontamination of equipment
- Sets/enforces standards for worker protection

## – RRC

- Regulates disposal of Oil & Gas NORM waste
- Regulates identification of NORM contaminated equipment
- Abandonment of radioactive logging tools in wells

## – TCEQ

- Radioactive tracer waste disposal

# Radiation Associated with O&G in Texas

- Texas Radiation Advisory Board

- MOUs

  - DSHS

  - TCEQ

# Radiation Associated with O&G in Texas

- NORM
  - Radium is dissolved and carried to surface, where it concentrates in scale and sludges when precipitated with Ba-, Sr-, or CaSO<sub>4</sub>
  - Radon decay elements (Pb-210) accumulates on inner surfaces of piping at gas processing facilities
- Radioactive well logging tools
- Radioactive tracer wastes

- Radiation Associated with O&G in Texas

- TDSHS

- If an O&G operator possesses, uses, transfers, transports, or stores O&G equipment that contains NORM with an emanation rate of 50  $\mu\text{R/hr}$  at any accessible point, then the operator is a general licensee of the TDSHS and subject to 25 TAC §289.259
- An operator that decontaminates NORM-contaminated equipment is a specific licensee of the TDSHS and subject to 25 TAC §289.259

# Chapter 4 Subchapter F

(16 TAC §4.601- §4.632)

Addresses identification of NORM-contaminated equipment and disposal of oil and gas NORM waste to protect public health, safety, and the environment

# What is Oil and Gas NORM Waste?

- Anything that constitutes, is contained in, or has contaminated oil and gas waste and exceeds the TDSHS exemption criteria of 50  $\mu\text{R/hr}$  emanation rate or
- has a concentration of greater than 30 pCi/gm

# Chapter 4 Subchapter F

## Purpose §4.601

- Establish requirements for identification of NORM contaminated equipment and disposal of oil and gas NORM waste to protect public health, safety and environment
- Provisions do not supercede rules of the TDSHS

# Chapter 4 Subchapter F

## Exclusions and Exemptions §4.602

- Exclusions—recycling O&G NORM; decontamination; possession, use, transfer, transport, and storage; and worker protection standards all are under TDSHS
- Exemptions—disposal of produced water by well or discharge to surface water; disposal of decontaminated equipment

# Chapter 4 Subchapter B

## Identification of Equipment §4.605

- NORM-contaminated equipment must be identified with NORM tag
- Radiation survey instruments must comply with TDSHS regulations in 25 TAC §289.259(e)
- Detector sensitivity must be between 1  $\mu\text{R/hr}$  and 500  $\mu\text{R/hr}$
- Instruments must be calibrated, appropriate, and operable

# Chapter 4 Subchapter B

## Identification of Equipment §4.605

- Must identify NORM-contaminated equipment with securely attached, clearly visible tag or by marking with paint or ink
- Interconnected equipment may be identified with a single tag while in service.
- Out-of-service contaminated equipment, removed from its prior interconnected status, must be identified individually or as bundled or containerized group

# Chapter 4 Subchapter F

## Worker Protection Standards §4.608

- Persons who dispose of O&G NORM must comply with provisions of TDSHS regulation 25TAC§289.202 including
  - Radiation protection program
  - Occupations dose control
  - Surveys and monitoring
  - Signs and labels
  - Record keeping
- TDSHS worker protection standards are not adopted by reference because RRC staff is not trained to enforce TDSHS regulations; however, operators must comply with appropriate TDSHS regulations when disposing of NORM

# Chapter 4 Subchapter F

## Prohibited Disposal §4.611

- Disposal by discharge to surface or subsurface water prohibited
- Disposal by spreading on public roads prohibited
- Burial or landfarming on lease where generated authorized by rule
- All other disposal requires a permit

# Chapter 4 Subchapter F

## Authorized Disposal §4.614

- Placement in P&A wellbore
- Burial or Landfarming on lease where NORM waste is generated
- Disposal at licensed facility or injection at facility licensed by TDSHS, if authorized to receive such waste

# Chapter 4 Subchapter F

## Authorized Disposal §4.614

### Method—Placement in a P&A wellbore

- **Authorized disposal in P&A wellbore**
  - At least 250 ft below usable quality water
  - If placed in tubing, must be retrievable
  - Nature of tubing must be known (size, grade, weight, depth)
  - Cement plug must be set above CIBP or tagged
  - Cement must be dyed with red iron oxide
  - Well must be marked with radiation symbol
  - Surf. owner consent if waste is from off lease
  - Form W-3A-nature, volume, level, and source

# Chapter 4 Subchapter F

## Authorized Disposal §4.614

- **Authorized disposal by burial**
  - On site where generated
  - After mixing, concentration of NORM waste must be less than 30 pCi/g of Ra-226 and Ra-228 or 150 pCi/g of other radionuclides before burial
  - Contaminated equipment may not be buried

# Chapter 4 Subchapter F

## Authorized Disposal §4.614

- **Authorized disposal by landfarming**
  - On site where generated
  - Concentration of NORM waste must be less than 30 pCi/g of Ra-226 and Ra-228 or 150 pCi/g of other radionuclides after mixing

# Chapter 4 Subchapter F

## Authorized Disposal §4.614

- Authorized disposal by injection of O&G NORM waste treated at a TDSHS licensed facility in a RRC Rule 9 permitted well:
  - Operator must notify RRC in writing that waste meets exemption criteria
  - Operator must include copy of TDSHS license
  - Operator must obtain documentation that waste meets exemption criteria

# Chapter 4 Subchapter F

## Permit Required for Injection §4.617

- **Standards for issuance of permit**
  - Must reasonably protect public health & safety and environment
  - Must meet standards for Rule 9 injection well
  - Must supply following information:
    - Physical nature, volume, and level of NORM
    - Notice requirements must include NORM information

# Chapter 4 Subchapter F

## Permit for Surface Disposal §4.620

- **Standards for issuance of permit**
  - Reasonably protect public health & safety, and environment; and meet application requirements of §3.8
  - Concentration of NORM waste must be less than 30 pCi/g of Ra-226 + Ra-228 or 150 pCi/g of other radionuclides after mixing  
Concentration of NORM waste must be less than 30 pCi/g of Ra-226 + Ra-228 or 150 pCi/g of other radionuclides before burial
  - Must supply following information
    - Physical nature, volume, level of NORM, and background
    - Dust control methods
    - Written authorization from surface owner
    - Notice requirements must include NORM information

# Chapter 4 Subchapter F

## Alternatives §4.623

- RRC may approve alternatives to conditions in permitting NORM disposal by injection or surface disposal if alternative methods are protective of public health & safety, and the environment

# Chapter 4 Subchapter F

## Recordkeeping §4.626

- Operator must maintain records on the exposure level of equipment, date, location, and identification of equipment
- Operator that generates NORM waste must maintain records on
  - Identity of generating property & producing formation
  - Identity of facility/lease receiving waste
  - Nature, volume, and level (in pCi/gm) of NORM waste

# Chapter 4 Subchapter F

## Recordkeeping §4.626

- Records must be retained for 5 years
- Retention period extended during any pending RRC enforcement proceeding
- Records must be made available for examination and copying during reasonable working hours and must file such records on request

# Chapter 4 Subchapter F

## Penalties §4.632

- A person who violates requirements of this subchapter may be subject of penalties and remedies as specified in Texas Natural Resources Code (§85.0531) and be subject of revocation of the certificate of compliance
- Penalties up to \$10,000/day/violation

# Radioactive Well Logging Tools

- Procedures for Identification and Control of Wellbores in Which Certain Logging Tools Have Been Abandoned 16 TAC 3.35
  - “All reasonable effort” must be expended to retrieve tool
  - Notice of tool loss to RRC
  - Permanent surface marker as a visual warning to any person who may reenter the hole for any reason, showing that it contains a radioactive source.
  - Color-dyed cement plug to alert re-entry operator
  - Deflection device above cement plug

# Radioactive Tracer Wastes

- NRC/DSHS analysis determined disposal would not result in a significant risk to public health and safety or to the environment
- TCEQ adopted §336.227 to exempt radioactive tracers from the radioactive licensing and disposal rules in Chapter 336 if the waste meets the criteria specified in §336.227(b)
  - possession, transportation, use of radioactive tracers are licensed or otherwise authorized by TDSHS
  - tracers are in fluids retrieved from a well authorized by RRC;
  - total concentration of radioactivity for all isotopes does not exceed 1,000 pCi/g;
  - half-life of each isotope is 120 days or less; and
  - the radioactive tracers are non-water soluble

# Radioactive Tracer Wastes

- TCEQ §336.227(c) authorizes disposal of qualifying radioactive tracer material in an on-site shallow earthen pit permitted by RRC with at least 2' of clean soil
- TCEQ §336.227(d) authorizes disposal in a Class II injection well permitted by RRC if the permit specifically authorizes disposal of radioactive tracers.
- TCEQ §336.227(e) requires any person who disposes of radioactive tracers to maintain records related to the disposal.