

Railroad Commission of Texas

NORM Seminars

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Railroad Commission of Texas

NORM Seminar Series

- Presenters
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 - Lotus LLC—Geri Cooley
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Railroad Commission of Texas

New Rules Governing Oil and Gas NORM

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Chapter 4 Subchapter F
(16 TAC §4.601- §4.632) Replaces
Statewide Rule 94
(previous rule)

- Previous Commission authority (Statewide Rule 94) addressed disposal of oil and gas NORM 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

Oil and Gas NORM

Chapter 4 Subchapter F

(16 TAC §4.601- §4.632)

- Why Amend Rule?
 - SB 1338 authorized the Commission to require operator/owner to determine if oil and gas equipment is contaminated with NORM and to identify contaminated equipment
 - Bring RRC regulations back in conformance with TDSHS radiation regulations
 - Simplify rule structure

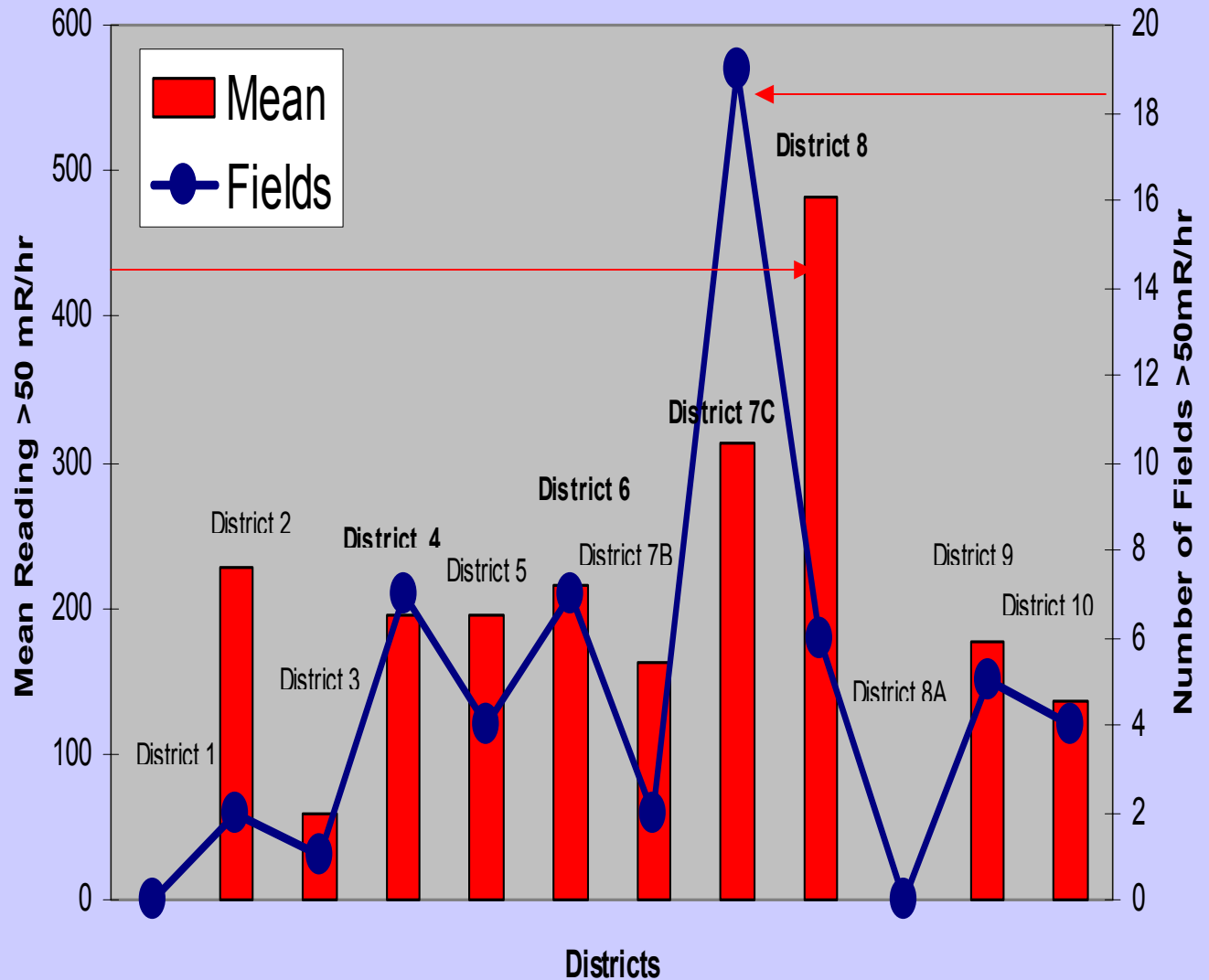
Background

RRC NORM Survey

- In 1998 Legislature required RRC to perform NORM survey
- In 2000, the RRC surveyed +600 leases
- 59 leases had equipment $> 50 \mu\text{R/hr}$
- Of 6000 measurements 3.4% were above $50 \mu\text{R/hr}$
- Maximum reading $>1000 \mu\text{R/hr}$
- Water tanks, gun barrels, and flow lines had highest readings

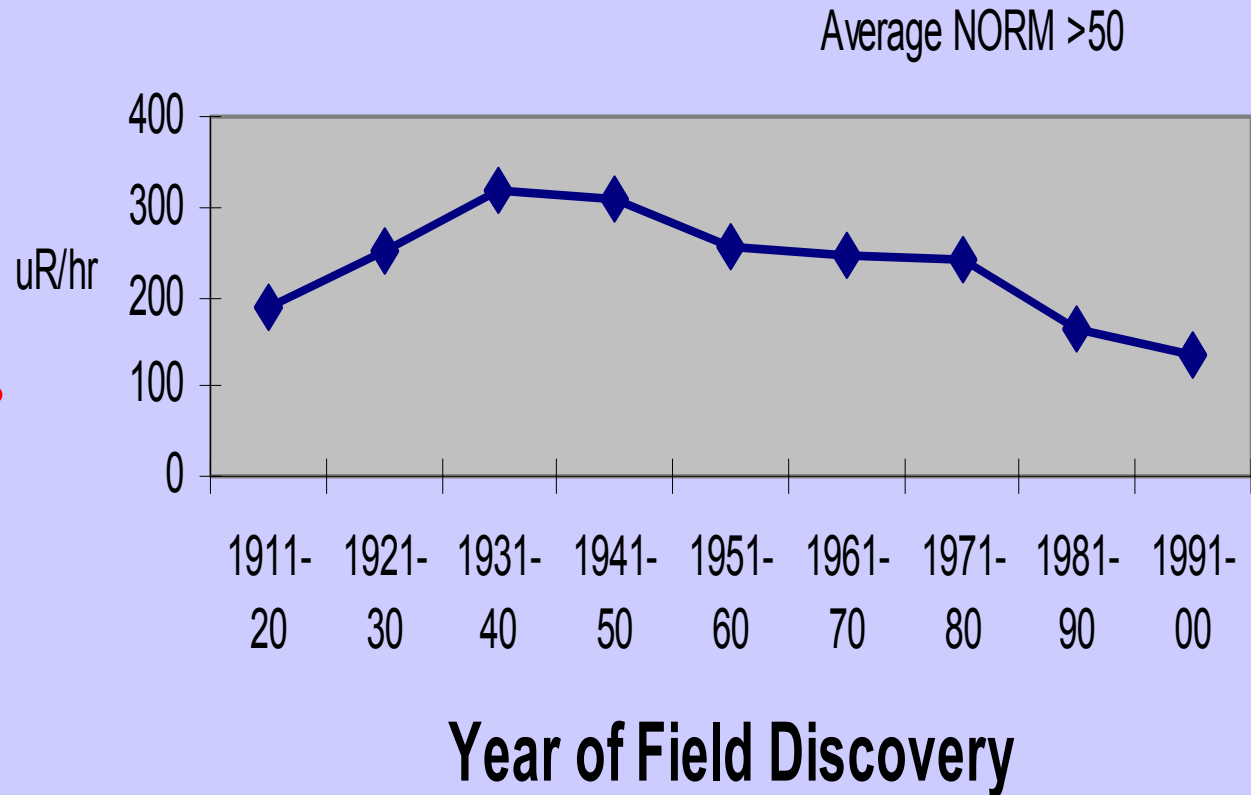
RRC NORM Survey Results

- **Dist 7C**
Many
Fields
- **Dist 8**
High
Intensity



NORM Survey— Older Fields = Higher NORM

- Average NORM (all > 50 uR/hr) reading of field increases with age of field



NORM Pathway into O&G Waste

- NORM primarily accumulates in o&g waste when radium is dissolved and carried to surface by produced water
- Radium is concentrated in scale and sludge when precipitated with Ba-, Sr-, or Ca-SO₄
- NORM also accumulates in gas processing facilities when radon decays to lead-210.
- Radon decay elements accumulate on inner surface of gas processing piping (propane-ethane processing)

Thanks to Nuclear Radiation Industry for Confusion

- Units
 - $\mu\text{Roentgen/hr}$ (radiation exposure)
 - $\mu\text{Rem/hr}$ (also units of Sv or sieverts) (human dosage)
 - pCi/g (concentration per mass)
 - $\text{pCi/m}^2/\text{s}$ (concentration per area over time)
 - Rads (also units of grays)
 - μ = micro = millionth
 - p = pico = billionth

Chapter 4 Subchapter F

Purpose §4.601

- Establish requirements for identification of NORM contaminated equipment and disposal of oil and gas NORM to protect public health, safety and environment
- Provisions do not supercede rules of the Texas Department of Health (new TDSHS)

Chapter 4 Subchapter F

Exclusions and Exemptions §4.602

- Exclusions—recycling oil and gas 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 water; disposal of decontaminated equipment

Chapter 4 Subchapter B

Identification of Equipment §4.605

- NORM-contaminated equipment must be identified with NORM tag
- If RRC has previously identified NORM contaminated equipment, then effective date is September 3, 2003
- Otherwise effective date is March 3, 2005

Chapter 4 Subchapter B

Identification of Equipment §4.605

- Radiation survey instruments shall comply with TDSHS regulations in 25 TAC 289.259(e)
- Detector sensitivity shall be from 1 $\mu\text{R/hr}$ to 500 $\mu\text{R/hr}$
- Instruments shall be calibrated, appropriate, and operable

Chapter 4 Subchapter B

Identification of Equipment §4.605

- Operator must identify NORM-contaminated oil and gas equipment with a securely attached, clearly visible tag or by marking with paint or ink
- If appropriate tag may include acronym for NORM in additional languages

Chapter 4 Subchapter B

Identification of Equipment §4.605

- Interconnected equipment (ie wellhead) that is NORM contaminated may be identified with a single tag while in service.
- Out-of-service, contaminated equipment, removed from its prior interconnected status, shall be identified individually or as bundled or containerized group

Chapter 4 Subchapter F

Worker Protection Standards §4.608

- Persons who dispose of oil and gas NORM shall comply with provisions of TDSHS regulation 25TAC§289.202 including
 - Radiation protection program
 - Occupations dose control
 - Surveys and monitoring
 - Signs and labels
 - Record keeping

Chapter 4 Subchapter F

Worker Protection Standards §4.608

- TDSHS worker protection standards are not adopted by reference because staff is not trained to enforce TDSHS regulations
- However, operators shall 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 is prohibited
- Disposal by spreading on public roads is prohibited
- Burial or landfarming on lease where generated is 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
- By disposal at licensed facility or by injection at facility licensed by the 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 died with red iron oxide
 - Well marked with radiation symbol
 - Surf. owner consent required 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 notifies Commission in writing that waste meets exemption criteria
 - Operator includes copy of TDSHS license
 - Operator obtains documentation that waste meets exemption criteria

Chapter 4 Subchapter F

Permit Required for Injection §4.617

- Standards for issuance of permit
 - Required to reasonably protect public health, safety, and environment
 - Must meet standards for Rule 9 injection well
 - Must supply following NORM 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
 - Required to 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 NORM 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

- The Commission may approve alternatives to conditions in permitting NORM disposal by injection or surface disposal if alternative methods are protective of public health, safety, and environment
 - Applicant must submit alternatives in writing
 - Review will be completed in 30 days

Chapter 4 Subchapter F

Recordkeeping §4.626

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

Chapter 4 Subchapter F

Recordkeeping §4.626

- The operator of a unit that generates NORM waste shall maintain records on:
 - Operator of lease where waste was generated
 - Generating property & producing formation
 - Facility/lease receiving waste
 - Nature, volume, & level of NORM (in pCi/gm)
 - on the exposure level of equipment, date, location, and identification of equipment

Chapter 4 Subchapter F

Recordkeeping §4.626

- Records shall be retained for 5 years
- Retention period shall be extended during any pending Commission enforcement proceeding
- The operator who maintains the records shall make them available for examination and copying during reasonable working hours and shall file such records on request.
- Recordkeeping requirements effective 3/3/2003

Chapter 4 Subchapter F

Inspection §4.629

- The Commission shall have access to properties as provided by the Texas Natural Resources Code

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 the Texas Natural Resources Code (§85.0531) and be subject of revocation of the certificate of compliance
- Penalties are up to \$10,000/day/violation

Texas Department of Health

- If an oil and gas operator possesses, uses, transfers, transports, or stores oil and gas 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 requirements of 25 TAC §289.259

Texas Department of Health

- TDSHS is the Texas state radiation control agency
- TDSHS regulates possession, use, transfer, transport, and storage of NORM; recycling of NORM; and decontamination of equipment
- TDSHS sets and enforces standards for worker protection

NORM Information Resources

- American Petroleum Institute
 - <http://api-ep.api.org/filelibrary/ACF1BE.pdf>
- Interstate Oil & Gas Compact Commission
 - <http://www.iogcc.state.ok.us/NORM>
- U.S. Dept of Energy
 - http://www.ead.anl.gov/pub/dsp_detail.cfm?pubId=37
- U.S. Geological Survey
 - <http://pubs.usgs.gov/fs/fs-0142-99/>
- U.S. Environmental Protection Agency
 - <http://www.epa.gov/radiation/tenorm/about.htm>
- Railroad Commission of Texas
 - <http://www.rrc.state.tx.us>