

## NORM/TENORM

Dade Moeller has extensive experience dealing with NORM (naturally occurring radioactive material) and technologically enhanced NORM (TENORM) issues. We have performed numerous radiological site characterizations for NORM at oil and natural gas facilities as well as human health risk assessments, independent reviews, and evaluation of remediation options. Staff members have served as expert witnesses on behalf of clients due to litigation involving allegations related to various types of radioactive materials, including NORM/TENORM.

Dade Moeller has the capability to develop radiological safety assessments related to NORM, TENORM, and other radioactive materials. We also can prepare sampling and analysis plans based on guidance provided in the Multi-Agency Site and Survey Implementation Manual (MARSSIM) for surface and subsurface soil sampling of NORM/TENORM constituents. These plans typically include sampling plans for NORM/TENORM in multiple environmental media, including sediments, soil, surface water, ground water, and vegetation. As part of our Training Academy, Dade Moeller offers a hands-on workshop designed for people who have to deal with NORM at sites including waste treatment facilities, sites that handle oil or gas drilling equipment, and natural gas and propane processing facilities.

### NORM/TENORM EXPERIENCE

#### Subject Matter Expertise

- Provided technical expertise on NORM/TENORM issues for California landfill
- Evaluated and responded to State of California's NORM concerns at oil pad site
- Acted as City's technical expert for NORM-impacted chemical plant decommissioning

#### Licensing

- Prepared application and supporting basis for NORM/TENORM disposal at Colorado landfill
- Prepared air emissions application for decommissioning of NORM-impacted alum plant
- Radiological Site Characterization
- Performed site characterizations for NORM at numerous oil and natural gas facilities

#### Radiological Risk Assessment

- Developed, implemented, and documented radiation-related components of Remedial Investigation/Feasibility Study for three NORM-impacted Superfund sites

#### Sampling

- Prepared SOP for NORM measurements during environmental sampling at California well pads
- Conducted NORM sampling at Washington alum processing plant
- Provided health physics support for removal of iron ore fines and remediation of areas associated with former titanium oxide manufacturing site
- Supervised staff performing radiological surveys of soil, ground water, and buildings at more than 300 properties near three NORM-impacted Superfund sites

#### Training

- Provided TENORM meter training for safety department staff at a gas processing company
- Provided several NORM safety courses for well logging licensees

## NORM/TENORM

### OTHER OIL & GAS EXPERIENCE

#### Subject Matter Expertise

- Served as radiological expert during federal review of proposed natural gas storage project
- Peer reviewed Health Physics Journal manuscript on radiation exposure from pipe in oil industry

#### Licensing

- Prepared radioactive materials license applications and sealed source and device registration certificates for well services companies
- Consulted on acquisitions and consolidations of radioactive materials licensees in several states

#### Audits and Assessments

- Conducted third party assessments and radiation safety program audits for natural gas storage project, well logging company, and petroleum refinery
- Performed audit of chemicals testing conducted during well drilling in various states
- Conducted audits of laboratory in Trinidad refinery
- Prepared federal Environmental Impact Statement for natural gas pipeline in Washington

#### Radiation Safety Officer

- Provided RSO consulting services for a radioactive material detection technology company

#### Dose Reconstruction

- Reconstructed workers' radiation doses from exposure to a well logging source

#### Training

- Provided on-site radiation safety training in Texas, Colorado, Montana, Scotland, and Malaysia, and nuclear safety gauge training in Houston

### CORPORATE RESOURCES AND COMPETENCIES

#### Associations

- National Council on Radiation Protection and Measurements: Board of Directors, Committee
- National Academy of Sciences: Committee
- American National Standards Institute: Authors
- U.S. Department of Energy Laboratory Accreditation Program: Oversight Board
- Health Physics Society: Presidents, Board of Directors, lecture series, scholarships
- American Academy of Health Physics: President, Committees

#### Licenses

- Washington: Health physics, waste brokerage
- Maryland: Radioactive material license

## NORM/TENORM

### Radiation Protection Programs

- Establish, audit, and implement radioactive material licensees' radiation protection programs

### Training Academy

- NORM
- Radioactive materials shipping in compliance with DOT, NRC, IATA
- Radiation Safety Officer

### Monitoring/Instrumentation

- Maintain inventory of radiation detection instruments used to characterize radiation levels at NORM/TENORM facilities, including ratemeters, GM detectors, NaI detectors, ion chambers, hand-held gamma spectrometers
- Licensed calibration facility to perform contamination and exposure calibrations

### Radioanalytical Laboratory

- Licensed analytical laboratory equipped with liquid scintillation and gamma counters for analysis of removable activity and bioassay samples
- Working relationship with several licensed commercial full service radioanalytical laboratories capable of alpha- and gamma spectrometry analyses

### Dosimetry

- Supplier of Mirion Technologies dosimetry products, including Instadose monitors and Thermoluminescent Dosimeters (TLDs) to measure possible exposures to workers

## NORM/TENORM POINT OF CONTACT

### Dr. Alan Fellman

438 N. Frederick Avenue, Suite 220  
Gaithersburg, MD 20877

alan.fellman@moellerinc.com

301.990.6006