

The NORM Report

Naturally Occurring Radioactive Material Contamination Fall 96

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Regulations for the Control of NORM - Update

The status of regulations for the control of NORM is summarized below for 16 states and the federal government (EPA). Significant developments have occurred in Arkansas, California, Oklahoma and the CRCPD. Each regulatory agency was contacted during November 18-27.

The last states to enact NORM regulations were New Mexico and South Carolina. Their regulations were summarized in the Summer 1995 issue of **The NORM Report**. Arkansas, Georgia, Louisiana, Mississippi, Oregon and Texas have previously enacted specific regulations for the control of NORM.

Enactment of regulations specifically for the control of NORM will require compliance by industries and companies with NORM contamination and NORM waste materials. Such companies should also be in compliance with state general regulations for the control of radiation and the OSHA radiation regulations.

The status of NORM regulations in all 50 states, the federal government and Canada will be summarized in the Winter 97 issue of **The NORM Report**.

ARKANSAS

The revisions to the Arkansas NORM regulations have been completed and sent to the governor for his signature. After the Secretary of State's certification of the revised NORM regulations, they will be printed and become effective January 1, 1997 or shortly thereafter. The revisions codify many of the provisions in the Louisiana NORM regulations. Significant changes in the revised Arkansas NORM regulations are summarized below.

The Arkansas NORM regulations constitute Section 7 of the *Arkansas Rules and Regulations for Control of Sources of Ionizing Regulations*.

RH-6004. General Definitions

Several new definitions have been

added. Specifically, definitions have been added for:

- Breathing zone
- Confirmatory survey
- Designated facility
- NORM facility identification number
- NORM field supervisor
- NORM general license number
- NORM Radiation Safety Officer
- NORM surveyor
- NORM waste management plan
- NORM worker
- Notifier
- Release survey

RH-6005. Exemptions

The exempt level for radium-226 and/or radium-228 remains at 5 picocuries per gram. The exempt levels for uranium and thorium and other NORM radionuclides also

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ARKANSAS (Continued)
remain the same as previously.

There are no changes in other exemptions in the revised regulations.

RH-6010. General License

a.1. Persons subject to the general license shall notify the Department by filing a *Notification of a NORM Facility Form*.

Note: The Department recommends a general licensee under RH-6010.a.1 conduct or arrange to have conducted a confirmatory survey to determine the extent and magnitude of the NORM contamination at the general licensee's facility.

2. Each general licensee performing on-site maintenance of contaminated facilities, sites, or equipment or the excavation of land shall establish and submit to the Department for approval written procedures as outlined in RH-6019 to ensure worker protection and survey (or screening) of sites and equipment as outlined in RH-6018.
3. On-site maintenance is authorized only if the maximum radiation level does not exceed 2 millirem per hour at any accessible point of the work area.

b. Facilities and equipment contaminated with NORM in excess of the levels set forth in Appendix A of this Section, or if the maximum radiation exposure level exceeds 50

microroentgen per hour including background at any accessible point shall not be released for unrestricted use. The decontamination of equipment and facilities shall be performed by persons specifically licensed by the Department or another Licensing State to conduct such work. Each general licensee shall establish for approval written procedures for the evaluation (or screening) of equipment, components, and facilities prior to release for unrestricted use to ensure that the levels in Appendix A of this Section are not exceeded.

d. Equipment contaminated with NORM is exempt from the requirements of these Regulations if the maximum radiation exposure level does not exceed 50 microroentgen per hour including background at any accessible point, and radioactive contamination levels do not exceed levels set forth in Appendix A of this Section.

g. Storage of NORM and NORM waste from remediation.

1. A general licensee is authorized to store NORM waste generated during remediation in a container for ninety (90) days from the date of generation. After such time, the NORM waste must be transferred to an authorized facility for the purposes of treatment, stor-

age, or disposal unless otherwise exempted in writing by the Department.

2. To store NORM waste in an approved container for up to one (1) year from generation, a general licensee must first submit a written NORM waste management plan to the Department and receive authorization from the Department. The general licensee may store NORM waste in an approved container up to one (1) year (365 days) from generation under the written NORM waste management plan while waiting for Department determination unless otherwise exempted in writing by the Department.

RH-6014. Containers.

Section RH-6014 details specifications for containers for NORM waste.

RH-6015. Tanks Containing NORM.

This new Section details requirements for tanks containing NORM.

RH-6016. Transportation of NORM.

This new Section details the requirements for the transportation of NORM contaminated equipment and/or NORM waste.

RH-6017. Radiation Survey and Counting Instrumentation.

This new Section details the requirements for radiation surveying and counting instrumentation including subjects that individuals must demonstrate competence in

(Continued on page 3)

ARKANSAS (continued)
prior to being approved as a NORM surveyor.

RH-6019. Worker Protection Plan.

This section details the material which must be included in the Worker Protection Plan. The Plan must include:

- Posting procedures
- Dosimeter procedures/program
- Contamination control procedures
- Training programs

RH-6032. Vacating Premises.

Each specific licensee shall, no less than thirty (30) days before vacating or relinquishing possession or control of premises which may have been contaminated with NORM as a result of the activities, notify the Department in writing of intent to vacate. When deemed necessary by the Department, the licensee shall decontaminate the premises in such a manner as the Department may specify.

RH-6033. Financial Assurance and Recordkeeping for Decommissioning.

Each specific licensee shall be subject to the financial assurance and recordkeeping for decommissioning under RH-409.h of these Regulations.

The sections in the revised Arkansas NORM regulations not summarized above are essentially the same as in the original NORM regulations.

CALIFORNIA

In 1987, the California oil and gas industry conducted a statewide survey of production facilities to determine the extent of elevated levels of Naturally Occurring Radioactive Material (NORM), if any. The industry survey consisted

predominantly of external gamma radiation meter readings. Of the 10,000 measurements taken, about 93 percent were at background levels. The remaining readings were above background levels, but low enough that only routine safety measures were considered necessary to minimize employee exposure and protect human health and the environment.

In 1993, California underwent a peer review of its oil and gas exploration and production waste-management regulatory programs. The review was coordinated by the Interstate Oil and Gas Compact Commission (IOGCC), in cooperation with the U.S. Environmental Protection Agency and other interested groups. One recommendation of the review team was for a thorough evaluation of the industry NORM survey data by the appropriate State agencies to verify the extent of oil and gas field NORM in California.

Subsequent to the IOGCC peer review, and following increased public and governmental interest in NORM issues, the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division) and the Department of Health Services, Radiological Health Branch (RHB) conducted a more comprehensive survey of selected sites. This effort was in cooperation with the oil and gas industry. The sites chosen for the study were selected because they were points where NORM was expected to occur; the sites were not selected randomly.

All six oil and gas districts in the State were sampled in this study. Four hundred seventy-five radiation measurements were taken in 70 oil and gas fields. In addition to gamma radiation meter readings, 124 samples of pipe scale, pro-

duced water, tank bottoms, and soil were collected and analyzed by the Sanitation and Radiation Laboratory of the Department of Health Services to assess the actual concentrations and radionuclides present.

The results of this study indicate that NORM is not a serious problem in California oil- and gas-producing operations -- confirming findings in the 1987 study. Seventy-eight percent of the measurements in this study were at background levels. A few sites had elevated levels of NORM. Further study of those sites or facilities should be considered. Routine protective measures may be all that is necessary to minimize exposure in these particular areas.

Survey results and laboratory analyses of samples are reported in: *A Study of NORM Associated with Oil and Gas Production Operations in California*. The report was issued by:

Department of Health Services
Radiological Health Branch
and
Department of Conservation
Division of Oil, Gas and
Geothermal Resources

The study confirmed most of the findings of the 1987 survey. Elevated levels of NORM were found in material from some of the production facilities. The NORM was found in water filters and softeners, gas processing equipment, pipe scale, and tank bottoms. However, these elevated levels were not high enough to be of immediate health concern.

In gas processing facilities, high activities relative to background were discovered in the gas lines after the methane and ethane had

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California (continued)

been removed from the gas stream and where the propane was being distilled. Since propane and radon have similar boiling points, higher activities were expected from these lines.

Summary/Recommendations

1. Since this was a focused survey, conclusive assessment of the status of NORM for every California oil and gas operation cannot be made. However, since some levels of NORM were found, further study of those sites or facilities should be evaluated for potential problems.
2. Sites or facilities with levels less than 5pCi/g need no further study at this time. Sites/facilities with levels between 5pCi/g and 15 pCi/g may require further study to review possible pathways to humans and to determine the extent of control that may be needed. Sites/facilities with levels greater than 15 pCi/g should be evaluated to determine if protective safety measures are necessary to control the ingestion or inhalation of the stated materials by workers.
3. Simple protective measures should be taken, where necessary, to minimize exposures and keep exposures as low as reasonably achievable.
4. In gas processing facilities where separation of the more volatile fractions occur, personnel should not remain for long periods near the propanizer reflux pumps while those pumps are in operations.
5. American Petroleum Institute (API) Bulletin E2, *Bulletin on Management of Naturally Occurring Radioactive Materials (NORM) in Oil and Gas Production*, should be adhered to

by all operators, as necessary, and used as the primary guidance document. However, the appropriate State agency should be contacted before any disposal of NORM occurs.

6. The Division should develop a field/formation matrix, where possible, to assist oil and gas operators in identifying potential areas of concern.

7. The promulgation of NORM guidelines or basic regulations may lead to better control of this source of radiation exposure to workers and to the public in California. Levels of cleanliness can be specified for the decontamination of equipment and land, when considering the possible future use of both, and for the disposal of produced water (if NORM is an issue).

8. This study demonstrated the ability of the State of California and its oil and gas industry to work cooperatively to address an important issue and deal with it at the state level, in the absence of generic, national directives and regulations that may not be applicable nationwide.

Copies of the report are available from:

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FLORIDA

The 18 month study of phosphate NORM, funded by the Florida Institute of Phosphate Research at the state's request, began in July. The study's goal is to identify and evaluate the extent of occupational

and public radiation exposure risks related to phosphate NORM. The Institute, located in Bartow and affiliated with the University of South Florida, selected the Polk County Public Health Unit and a private consulting firm to conduct the study as a joint project. Florida hopes the data provided by the study will provide guidance on the extent of regulatory intervention needed to address phosphate NORM in the state.

The Florida Advisory Council on Radiation Protection's NORM Committee, formed in response to the state's request for recommendations on regulatory approaches to NORM, met in October regarding its efforts to provide recommendations regarding potential NORM regulations.

The Advisory Council on Radiation Protection has the following future schedule:

Schedule for additional tasks

- a. November 1996
 - i. Draft proposed recommendations
 - ii. Consider concentration guidelines
 - iii. Discuss assessment guidelines
- b. January 1997 - Meet with Department of Health
- c. March 1997 - Finalize draft recommendations
- d. Present final draft to Florida Advisory Council on Radiation Protection at subsequent meeting
 - i. Report on status of CRCPD draft regulations
 - ii. Report on status of Florida Institute of Phosphate Research
- e. Summer 1997 - finalize recommendations

The following is a report submitted to the CRCPD by the Florida

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FLORIDA (continued)

NORM Advisory Committee on its efforts to provide recommendations to the Florida Advisory Council on Radiation Protection regarding potential NORM regulations in Florida.

Summary Submitted to the CRCPD Commission on NORM

The Florida NORM Advisory Committee (FNAC) does not support concentration-based regulations, but rather a dose-based standard. The consensus at this point is that the dose standard would probably be 500 mrem/year including the existing 100 mrem/year from licensed activities and operations. The FNAC believes this standard to be consistent with the recommendations of the ICRP and the NCRP. While concentration-based standards are not believed to be appropriate, concentration-based guidelines are believed to be appropriate as an alternative to demonstrating compliance with the dose-based standard.

The dose-based standard would apply to the total dose received by a member of the public from licensed activities and materials (already limited to 100 mrem/year) and the dose from "regulated NORM." Regulated NORM would be limited to NORM which has been chemically enhanced by man's activities. Thus NORM which has been enhanced by physical activities alone would not be regulated. The FNAC's rationale for this limitation is that the public already has access to physically-enhanced NORM. In addition, this limitation would eliminate the need to evaluate trivial activities such as earth-moving, building construction, etc.

As with most public doses, compliance is usually demonstrated by calculation. The FNAC is concerned about the use of ultra-con-

servative modeling for such demonstrations, citing differences of up to two orders of magnitude for results of the same evaluation using different levels of conservative assumptions. The FNAC is considering requiring the inclusion of the probability of occurrence of assumed parameters in such evaluations, in accordance with the recommendations of the ICRP. (See *Dose Assessments* on page 11.)

In an on-going effort to improve the characterization of NORM in Florida, state personnel have been conducting informal site surveys of NORM generators. Surveys of oil-fields located in the Panhandle and southwest part of the state remain in the planning stage.

GEORGIA

Georgia's regulations for the control of NORM became effective in October 1994. There have been no changes in the rules since. Revisions to the general rules and regulations for the control of radiation have been drafted and are expected to be adopted by the Board in early 1997. However, there are no changes in the NORM rules in this revision.

ILLINOIS

Illinois's approach to NORM regulations is being reviewed to decide if general NORM regulations should be proposed. Or as an alternative, should rules be written to address the NORM problems in selected industries where the potential exists for NORM contamination. No decision as to the approach to be proposed has been made yet. The Department of Nuclear Safety may go with the approach of identifying known NORM problems and writing specific rules for those problems. As new NORM problem areas are identified, new rules will be written to cover them. This approach may

be preferable to generic rules which cover the whole world of NORM and results in too much unnecessary regulations without much benefit. This approach to NORM rule making is the result of reviewing the in-depth comments made on the latest (1994) CRCPD draft. There is no time schedule for NORM rule making in Illinois.

KENTUCKY

The Kentucky Department of Environmental Protection is in discussions with Ashland Exploration to find a satisfactory long term disposal site for the NORM that needs to be remediated from the Martha Oil Field.

While arrangements are being made for the long-term storage of the remediated material removed from the oil field, the Kentucky Department of Environmental Protection has given permission to Ashland to allow moving the contaminated soil to temporary storage.

More than 1,300 former well sites have been released for unrestricted use. Remediation is now being done on 200 contaminated well sites in the Martha Oil Field. Approximated 20,000 tons of contaminated dirt will be removed to allow the sites to be used for unrestricted activities.

An additional 20 sites tied up in state and federal litigation are not involved in the present cleanup.

LOUISIANA

The Louisiana DEQ has an application from an oil company for permission to dispose of their own NORM in an injection well. This is the first proposal for injection received by the new administration in Louisiana and it is not known what the Secretary of the DEQ will do. The issues have been outlined

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Louisiana (continued)

for him but there has been no decision yet whether legislative action will be required.

A statute enacted by the legislature many years ago prohibits any disposal of radioactive waste in salt domes or on land that is not owned by the state or federal government. The statute was enacted to prevent the DOE and/or DOD from disposing of their wastes in salt domes in Louisiana. The problem it created is that at the time it was enacted NORM wasn't regulated. The language used in the statute, however, clearly prevents the disposal of NORM also. It may require an amendment to the law to exempt NORM.

The oil company requesting approval to dispose of their own NORM wastes in an injection well has given the DEQ further information. After review, the request will be sent to the Secretary of the DEQ with recommendations.

Another proposal was received by the DEQ from a petrochemical company looking for a disposal site for non-oilfield NORM. They wanted a rules change which would allow this kind of waste to go to a Class D landfill. The DEQ is studying the proposal. The DEQ Legal Division has been asked to make a legal analysis of the request.

The petrochemical company wants to modify the regulations so that there will be provisions for the disposal of non-oilfield NORM in a landfill. The Legal Division leans towards arguing the acceptability of the present law. However, it has been pointed out to them that there are materials that are exempted in the regulations, but often contain as much radium as the non-oilfield

NORM. For example, "Black Beauty", a metal abrasive cleaner, contains natural radium since it is mined from a slate or shale formation. After use it is usually disposed of in a landfill. The question has been asked --- what is the difference between this material which can be disposed of in a landfill and non-oilfield NORM which contains similar concentrations of radionuclides but cannot be put into a landfill? Also refractory bricks which often contain radioactive materials are disposed of in landfills. This situation remains at a standstill. Legal has not yet responded.

MICHIGAN

There have been further reorganizations within the Department of Environmental Quality. These include staffing changes and new responsibilities. Responsibilities for radioactive materials, etc. are in the newly created Radiological Protection Section. The telephone number for contacting the new section is (517) 335-8198 or 335-8190.

There have been no changes in the draft of the Michigan guidance documents for the control of NORM.

A new "high" in NORM contamination in pipe scale has been seen. A sample recently analyzed contained 200,000 picocuries per gram. Concentrations over 100,000 pCi/gm are commonly seen.

Most attention at present is still focused on radium luminous products of military origin and radium-contaminated warehouses. EPA superfund cleanup should begin in December 1996. EPA has allotted over 12 million dollars toward the cleanup of the warehouses and

other contaminated buildings. It is expected that after the removal of the gauges the building contamination will be small and much of the remaining debris might be able to be disposed of in a landfill under the new landfill guidelines. The Michigan guidelines for disposal in a type 2 municipal solid waste landfill allow up to 50 pCi/gm radium-226 to be disposed. This can be a large cost saving. Analyses have shown that this level shows insignificant risk to the public.

MINNESOTA

There has been no legislative action with regard to the disposal of radium and other NORM-type materials. Minnesota has no regulations for the specific control of NORM. The general regulations for the control of radiation are currently being revised. Specifically the revisions cover the regulations dealing with x-ray and other devices in medical settings that may use NORM as a source of radiation. The revisions may be published for public comment by January 1997. They are currently under review by Legal.

MISSISSIPPI

Responsibility for NORM in Mississippi is divided between the Department of Health and the Oil and Gas Board. The Oil and Gas Board has authority for NORM at the wellsite (effective July 1, 1995). Currently, after the petroleum leaves the wellsite, the Department of Health has jurisdiction for any NORM contamination.

However, there is a controversy about this division of responsibility for NORM. Some time ago, the legislature enacted legislation giving the Oil and Gas Board jurisdiction over all oil and gas wastes. The Oil and Gas Board's NORM rules which became effective July 1, 1995 assumes jurisdiction only

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