

# The NORM Report

Naturally Occurring Radioactive Material Contamination  
SUMMER 1995

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## Regulations for the Control of NORM - Update

The status of regulations for the control of NORM is summarized below for all 50 states. Since NORM contamination is not limited to the petroleum industry, some of the non-petroleum states are also drafting or preparing to draft NORM regulations. The status of NORM regulations in the federal government as well as in Canada is also summarized below. Each regulatory agency was contacted during the last two weeks of September, 1995. (

The last states to enact NORM regulations were New Mexico and South Carolina. Louisiana, Mississippi, Arkansas, Texas and Georgia also have enacted specific regulations for the control of NORM. Several states are in various stages of drafting NORM regulations.

The CRCPD draft of suggested guidelines for the control of NORM continues to be reviewed after receiving voluminous comments on its latest draft.

Several states are continuing to revise their general regulations for the control of radiation to include the revised 10 CFR 20 regulations that became effective January 1, 1994. The revised 10 CFR 20 incorporates modern radiation protection philosophy for the establishment of new dose limits and ALARA programs. The changes closely follow the recommendations of the International Commission of Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP).

There currently are no federal regulations specifically for the control of NORM.

The *Guidelines for the Handling of NORM in Western Canada* were issued in August 1995. See pages 12-14 for comments on this excellent document.

Enactment of regulations specifically for the control of NORM will require compliance by companies with NORM contamination. Companies should already be in compliance with state general regulations for the control of radiation and the OSHA radiation regulations.

A summary of the status of NORM regulations in the individual states, the federal government and Canada follows:

### ALABAMA

Alabama is still redrafting their proposed NORM regulations. There is no timetable for the regulations to be adopted. There

has been some recent interest in plugging wells, but there have been no requests for NORM regulations.

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**ALASKA**

Alaska is attempting to get a radiation program going. It is being proposed that the lack of specific NORM regulations be addressed in the fiscal year starting July 1, 1996, by starting to develop NORM regulations and working with all affected parties on the regulations. In addition to the NORM contamination in the petroleum industry, Alaska has other NORM problems including such areas as welding flux. Alaska's general regulations for the control of radiation were written in 1973 and amended in 1978 and haven't been revised since.

**ARIZONA**

All radioactive materials, including NORM, are addressed in Arizona's general regulations for the control of radiation. At present, NORM is not specifically addressed, but consideration is being given to enacting NORM regulations at a later date, possibly in 1996.

**ARKANSAS**

There have been no changes in the Arkansas NORM rules and regulations. However, one change under consideration is to change the NORM exemption from 25 microR/hr above background to 50 microR/hr including background. This will make the Arkansas regulations similar to the Texas and Louisiana NORM regulations in this respect.

**CALIFORNIA**

A meeting was held with the Department of Oil and Gas on September 19th to discuss the draft report detailing the results from the survey of petroleum facilities for NORM contamination. Water, brine, soil and other appropriate samples were taken for laboratory analysis. The survey was made as a preliminary to drafting NORM regulations. Each affected agency has modified the survey draft

report and meetings are being held in an attempt to arrive at a final version acceptable to all the parties. None of these draft report versions have been released to the public yet. Although California doesn't appear to have NORM problems in the petroleum area as severe as in other states, e.g., Louisiana, Mississippi, and Texas, it does have areas that need attention. Other areas such as some of the state mining operations, also have NORM problems.

**COLORADO**

There has been no progress in the enactment of the proposed NORM regulations in Colorado.

**CONNECTICUT**

The Connecticut Department of Environmental Protection is currently reviewing a prepared draft of NORM regulations. It is slowly working its way through the approval process. After the DEP has approved the draft, the proposed regulations will be sent to Legal and then to the State Legislature for enactment. There is no timetable for final enactment of the Connecticut NORM regulations.

**DELAWARE**

There are no specific regulations for the control of NORM in Delaware. NORM, NARM and other radioactive materials are considered to be covered in the general regulations for the control of radiation enacted in 1983. A revision of the general regulations became effective September 1, 1995. This revision tightened the compliance aspect of the regulation. No specific NORM regulations are proposed at present.

**FLORIDA**

Florida's Office of Radiation Control in the Department of Health and Rehabilitation Services

has recently hired a new staff member who is in the process of researching NORM prior to preparing a draft of NORM regulations. There is no timetable for NORM regulations. The need to have specific regulations is still under consideration.

**GEORGIA**

Georgia's regulations for the control of NORM became effective in October, 1994. Since then only very minor changes have been made, e.g., correction of typos, etc. No revisions of the regulations are planned in the near future.

**HAWAII**

Hawaii has no specific regulations for the control of NORM. The state has a set of proposed rules that are slated to replace the antiquated rules for the control of radiation. These rules are expected to cover NORM. The timetable for finalizing these rules is uncertain. The proposed rules have been in the administrative review process for two years. The designated attorney is expected to "work" on the rules in the very near future. Hawaii is expecting to have the new rules for controlling radiation (and NORM) within two years.

Hawaii doesn't have any particular problems with NORM at this time. Although Hawaii does not have petroleum production, it does have geothermal wells on the big island. Possible NORM contamination in these geothermal wells has not been addressed.

There is also some concern about radioactivity and radiation contamination in the states military posts and bases, including old radium gauges and instruments. There may additionally be some NORM associated with the dry dock activities in the state.

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**IDAHO**

Idaho has no regulations for the control of NORM and none are planned for the near future. There has been no indication from the state legislature or anybody else concerning interest in the regulations. There are provisions in the general regulations for the control of radiation that can be used for NORM problems if the need arises.

**ILLINOIS**

The Division of Radioactive Materials in the Illinois Department of Nuclear Safety has prepared a draft of proposed NORM regulations.

The comments received by the CRCPD on their latest draft of suggested regulations for the control of NORM are being reviewed to determine if changes in Illinois's draft of proposed NORM regulations are warranted.

It had earlier been thought that the final proposal would be ready earlier this year but now there is no timetable for final approval of the NORM regulations.

**INDIANA**

No new regulations for the control of NORM have been enacted or proposed in Indiana. There have been a few incidents involving NORM contaminated materials in scrap yards, etc.

**IOWA**

Iowa is reviewing the Part N draft and comments from the CRCPD. At the present time Iowa has not done anything on NORM and has no timetable for action on rules and regulations.

**KANSAS**

It is not known yet if any legislation will be introduced in the new legislative session concerning NORM.

With the present funding situation it is a struggle to keep up with the basic NORM inquiries and problems. The oil and gas industry is being encouraged to fund a study to determine the magnitude of the NORM problem in Kansas. The Department of Health and Environment has regulatory jurisdiction over NORM and recently issued a license to a company in Lawrence to clean up NORM but it would be easier if there were specific oil and gas NORM regulations.

**KENTUCKY**

At present there is nothing new in promulgating NORM regulations. There is considerable work in the Martha Oil Field to make and confirm measurements in the least contaminated areas hoping to be able to release some of the land for unrestricted use.

**LOUISIANA**

Louisiana has proposed a new draft of an implementation manual that reflects the 1995 revisions to the NORM regulations that went into effect January 20, 1995. It should be available now. There are significant differences from the previous implementation manual. Comments on the draft are welcome.

At the present time, Louisiana does not allow disposal of NORM wastes by injection into abandoned wells. This is predicated on legislation passed many years ago to prevent the DOE or DOD from bringing radioactive wastes into Louisiana for injection into salt domes. The wording of the legislation also prevents the injection of NORM wastes for disposal.

**MAINE**

Maine has general regulations for the control of radiation, but does not have specific NORM regulations. There may be an

apparent need for NORM regulations, however, especially for the control of water treatment wastes. Many water supplies in Maine contain significant concentrations of radium and radon.

Chemicals, e.g., ion exchange resins used in water treatment, can become quite "high" in radium. Carbon filters used to remove radon from water are becoming "hot" with radon daughter products, lead-210, bismuth-210, and polonium-210.

**MARYLAND**

Maryland has no specific regulations for the control of NORM. NORM is handled under the general radiation regulations. Scrap dealers sometimes report problem with radium-226, but NORM is not considered to be a large problem in the state.

**MASSACHUSETTS**

Massachusetts hasn't done anything about NORM yet. The state is planning and proceeding to become an Agreement State and NORM is considered to be of lower priority. The state is unaware of any major NORM problems in the state at the present time.

**MICHIGAN**

The status quo is being maintained in Michigan as far as the draft of NORM standards and guidelines is concerned. A decision is still being awaited as to whether to proceed with regulations.

**MINNESOTA**

Minnesota has no specific regulations for the control of NORM. The Pollution Control Agency has adopted by reference a statute in the Environmental Quality Board which says that natural materials may be buried.

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**MINNESOTA** (continued)

The statute does not give any concentrations of these natural materials which may be disposed of by burying. There have been no other statutes or regulations enacted in Minnesota recently relating to NORM.

**MISSISSIPPI**

The Mississippi Legislature recently passed legislation giving the state Oil and Gas Board authority for NORM at the wellsite effective July 1, 1995. Once the petroleum leaves the wellsite, the Mississippi Department of Health has continued authority for NORM contamination.

The Department of Health has no new developments in its area of responsibility for NORM. The Department continues to be heavily involved in NORM.

The Oil and Gas Board has prepared a draft of their proposed NORM regulations. There will be a public hearing on the proposed rules in October prior to their approval by the Board.

**MISSOURI**

There are no specific NORM regulations in Missouri and none are planned at present. Occurrences of NORM problems are handled under the state's general regulations for the control of radiation. Some NORM regulations may be required in the future.

**MONTANA**

There have been no new developments applicable to NORM regulations in Montana. The regulations for the control of radiation have not been revised since 1980. NORM is not considered to be included in the radiation regulations. The Montana Department of Health and Environmental Sciences does have the statutory authority for NORM

regulations, but there is no funded program for their development.

**NEBRASKA**

There has been no change in the status of NORM regulations in Nebraska. Nebraska believes that NORM is included in their general regulations for the control of radiation. There are no plans for specific NORM regulations.

**NEVADA**

No specific NORM regulations have been proposed. Comprehensive statutes for the general control of radiation address NORM and NARM similarly.

**NEW HAMPSHIRE**

New Hampshire considers NORM to be a subset of NARM and the state has always regulated NARM in the same manner as by-product, source, and special nuclear materials are regulated as an Agreement State. One area that may not presently be regulated and may have to be is water treatment systems. There are significant quantities of radon in New Hampshire water supplies. Some water treatment facilities become quite "hot". Another potential NORM problem area is the granite sources in the state. Regulations similar to those adopted in Texas may be adopted in the future.

**NEW JERSEY**

New Jersey has prepared a draft of NORM standards that is currently under review by the Deputy Attorney General's office. It is hoped that their comments will be received shortly and the draft can be released as "an interested party" draft. Interested party means that everybody gets to comment, but it is not formal in the sense of a proposal yet-- it is a pre-proposal. This allows any comments to be addressed before it goes to the formal stage. It is expected that the review will be completed within a few months and it can be released

as an interested party draft around the first of the year. Meetings will be held in New Jersey for comments and the draft will be sent to anyone who wishes to provide input. Contact:

Dr. Jill Lipoti  
Radiation Protection Programs  
Division of Environmental  
Quality  
CN 415  
Trenton, NJ 08625-0415  
609-984-5636

for a copy.

**NEW MEXICO**

*Subpart 14: Naturally Occurring Radioactive Materials (NORM) in the Oil and Gas Industry* became effective August 3, 1995. Some of the pertinent sections in the regulations are given below:

**1400. PURPOSE.**

This Subpart establishes radiation protection standards for the possession, use, transfer, transport, storage and disposal of naturally occurring radioactive material (NORM) associated with the oil and gas industry, and which are not subject to regulation under the Atomic Energy Act of 1954, as amended. Nothing in these regulations relieves a licensee from abiding by the regulations of the New Mexico Water Quality Control Commission, other applicable state and federal law and regulations including those of the New Mexico Oil Conservation Commission, or the terms and conditions of the Rocky Mountain Low Level Radioactive Waste Compact.

**1401. SCOPE.**

A. The regulations of this Subpart and other applicable subparts of this Part apply to any person who engages in the extraction, transfer, transport, storage or disposal of NORM, or in the enhancement of NORM, in the oil and gas industry by altering the chemical properties, physical state or concentration of

(Continued on page 5)

**NEW MEXICO** (continued)  
the NORM or its potential exposure pathways to humans.

B. The regulations of this Subpart and other applicable subparts of this Part also apply to sludges and scale deposits in tubulars and equipment and to scale deposits from cleaning added to the environment. The regulations of this Subpart and other applicable subparts of this Part also apply to NORM deposits in soil, water and the environment unless otherwise regulated.

C. The regulations of this Subpart and other applicable subparts of this Part also address Regulated NORM management, transfer, storage, and disposal with regard to facilities involved in storage and/or cleaning of tubulars and equipment.

#### 1403. EXCEPTIONS.

A. For release for unrestricted use, persons who receive, possess, use, process, transfer, distribute, transport, store or dispose of NORM are exempt from the requirements of these regulations if: the NORM present is at concentrations of 30 picocuries per gram or less of radium 226, above background, or 150 picocuries per gram or less of any other NORM radionuclide, above background, in soil, in 15 cm layers, averaged over 100 square meters. Samples should be taken if gamma radiation readings (microR/hr) are equal to or exceed twice background readings when surveyed at a distance of 1 cm from the surface of the soil, in accordance with department guidelines.

B. The possession and use of natural gas and natural gas products and crude oil and crude oil products as fuels are exempt from the requirements of this Subpart.

C. NORM not otherwise exempted and equipment from oil, gas, and water production containing NORM are exempt from the requirements of this Subpart if the maximum radiation exposure reading at any accessible point does not exceed 50 microroentgens per hour (microR/hr) (0.5microSv/hr), including background radiation levels. Sludges and scales contained in oil, gas and water production equipment are exempt from the requirements of this Subpart if the maximum radiation exposure reading within 1 cm of the surface of the sludge or scale does not exceed 50 microroentgens per hour (50microR/hr) (0.5 microSv/hr), including background radiation levels. If the radiation readings exceed 50 microR/hr (0.5microSv/hr), removable sludges and scales are exempt from the requirements of these regulations if the concentration of Radium 226, in a representative sample, does not exceed 30 picocuries per gram.

D. NORM not otherwise exempted and equipment from gas processing, fractionation, and dry gas distribution containing NORM are exempt from the requirements of this Subpart if the removable surface NORM contamination does not exceed 1000 dpm/per 100 sq cm and otherwise conforms with the requirements of (S)1403.A. Removable scale from gas processing fractionating, and dry gas distribution is exempt from the requirements of this Subpart if the concentration of Lead 210, in a representative sample, does not exceed 150 picocuries per gram.

E. Produced water is exempt from the requirements of these regulations if it is reinjected into a Class I or Class II Underground Injection Control(UIC) well permitted by the Division and/or

stored or disposed in a double, synthetically lined surface impoundment permitted by the Division.

#### 1405. PROTECTION OF WORKERS DURING OPERATIONS.

A. All general and specific licensees shall conduct operation  
1. in compliance with the standards for radiation protection set forth in Subparts 4 and 10, except for releases of radioactivity in effluents, which shall be regulated under (S)1406, and disposal, which shall be regulated under (s)1407, and;  
2. pursuant to a Worker Protection Plan prepared according to applicable Department guideline and maintained by the licensee made available upon request of employees or representatives of the Department. The licensee shall post official notices to employees in areas where employees will have sufficient access to notification of the Plan.

B. The Department will prepare and issue worker protection guidelines and notices to employees no later than six (6) months from the effective date of these regulations. The Worker Protection Plan prepared by the licensee pursuant to (S)1405 A 2 shall be no less stringent than the Department's worker protection guidelines.

C. Licensees shall incorporate hazard identification and training into their hazard communication programs as required by the Occupational Safety and Health Administration(OSHA) or by the Board pursuant to the Occupational Health and Safety Act, and as required under Subpart 10 for personnel working on or around equipment and materials that contain Regulated NORM. Regulated NORM material that h

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**NEW MEXICO** (Continued)  
been removed from equipment and containerized shall be labeled as per the requirement of (S)430 and (S)431.

D. Licensees operating at more than one location may prepare a single Worker Protection Plan to cover all facilities and operations in New Mexico, provided that the Plan is readily accessible to all employees.

E. The total radiation dose in any one year to any General Licensee employee from Regulated NORM shall not exceed the standards for exposure to members of the public as set forth in Subpart 4.

Employees engaged in an activity subject to a Specific License as required by (S)1411, shall not exceed the limits for radiation workers as specified in Subpart 4. Any worker engaged in an activity subject to a Specific License and who is likely to receive in one year an accumulative dose in excess of 500 mrem (5mSv) shall be monitored.

#### **1406. PROTECTION OF THE GENERAL POPULATION FROM RELEASES OF RADIOACTIVITY.**

A. All licensees shall conduct operations in compliance with the standards for radiations protection set forth in Subpart 4. and in such a manner that concentrations of radioactive materials which are released to the general environment do not result in an annual dose exceeding 100 mrem (1 mSv) in a year. The dose in any unrestricted area from external sources shall not exceed 2 mrem (20microSv) in any one hour. If the license permits members of the public to have access to restricted areas the limits for members of the public continue to apply to those individuals.

B. All licensees shall assure that any equipment released for

unrestricted use shall not exceed the exposure limits specified in (S)1403.

C. The licensee shall provide the recipient of transferred equipment, the inside of which is not accessible through any opening, plate, lid, or hatch, with a notice that required surveys have been performed, that equipment meets the standards of (S)1403 C or D, and that further surveys may be necessary if the equipment is structurally modified following transfer. The licensee shall retain copies of all notices of transfer.

#### **1407. DISPOSAL AND TRANSFER OF REGULATED NORM FOR DISPOSAL.**

A. Disposal of Regulated NORM on or near the surface of the ground shall be done pursuant to a general license issued under (S)1410 and Subpart 13 and pursuant to NMOCD Rule 711. A general licensee may blend or disc Regulated NORM contaminated soils in place provided that:

1. the soils were contaminated at that site and prior to promulgation of this Subpart; and
2. the limits established in (S)1403 A are met.

B. Disposal of Regulated NORM in nonretrieved flowlines and pipelines, in plugged and abandoned wells or by deep-well injection shall be done pursuant to a general license issued under (S)1410 and pursuant to applicable Division rules and regulations.

C. All licensees shall store, transfer and-or dispose of Regulated NORM in accordance with the Worker Protection Plan required under (S) 1405. All requirements of this Worker Protection Plan shall be available for inspection by the Department.

D. Regulated NORM shall only be disposed by the methods

enumerated below, except that the Department will consider and approve alternative methods of disposal if the applicant demonstrates that such alternative method(s) will protect the environment, public health and fresh waters, and otherwise is consistent with this Subpart, with other provisions of this Part and with applicable Division rules and regulations.

1. Disposal in Nonretrieved Flowlines and Pipelines. Nonretrieved flowlines and pipelines which are buried are authorized by the Department to be left in place in accordance with Division rules and regulations.

2. Disposal at Commercial and Centralized Facilities. Before a commercial or centralized facility may accept Regulated NORM for treatment and-or disposal, the operator of the facility shall obtain both a specific license issued by the Department pursuant to the requirements of this Subpart and a permit from the Division, and must be in compliance with Subpart 13.

3. Disposal in Plugged and Abandoned Wells. The Department allows downhole disposal of NORM solids and NORM contaminated equipment in wells which are to be plugged and abandoned, provided such procedures are performed in a manner to protect the environment, public health, and fresh waters, are conducted in accordance with applicable Division rules and regulations; and occur below the lowermost underground source of drinking water. The allowable form shall be media-laden fluid with a minimum density of nine (9.0) pounds per gallon and with the allowable volume for disposal dependent on the plug location required for a specific well.

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**NEW MEXICO** (continued)

4. Disposal by Injection. The Department allows the injection of Regulated NORM into Underground Injection Control (UIC) Class I nonhazardous and Class II wells pursuant to NMOCD rules and regulations. All UIC Class I nonhazardous and Class II injection wells shall be permitted by the Division.

5. Other Disposal Methods. Each person subject to general or specific license requirements shall manage and dispose of Regulated NORM:

a. in accordance with the applicable requirements of subparts 4 and 10;

b. in accordance with the applicable requirements of the U.S. Environmental Protection Agency for disposal of such wastes;

c. by transfer of the wastes for disposal to a land disposal facility licensed by the U.S. Nuclear Regulatory Commission, an Agreement State, or a Licensing State; or

d. in accordance with alternate methods authorized in this Subpart or by the Department in writing upon application or upon the Department's initiative and in accordance with division Regulations.

**1409. REQUIREMENTS FOR STORAGE OF REGULATED NORM.**

A. Storage of Regulated NORM, whether under a general or specific license, will be done in such a manner as to prevent, to the extent practicable, release of NORM to unrestricted areas, and otherwise to protect human health and the environment.

B. Storage of Regulated NORM will be done in such a manner as to comply with the limits set forth in

(S)413 and (S)425, including those specified in Appendix B, Table II of Subpart 4, of the New Mexico Radiation Protection Regulations.

C. Regulated NORM will be stored at all times:

1. In accordance with the recommended practices of Section 6 of the American Petroleum Institute's Bulletin E2 (edition of April 1, 1992, or most recent edition), including practices specified for facility security, management of uncontained NORM, containerization and labeling, signage and record keeping, except that the dose limits specified in Section 6 or Bulletin E2 shall not apply;

2. NORM storage facilities must be designed to minimize or prevent release of Regulated NORM to the environment, and

3. In accordance with applicable Department guidelines.

D. Licensing of Regulated NORM Storage Facilities:

1. Effective August 2, 1995, storage of Regulated NORM for longer than one year must be under a specific license unless the Department grants an extension of a general license issued pursuant to (S) 1410 A. Such an extension must be requested by the licensee on an annual basis and may be granted by the Department on an annual basis, not to exceed 10 years of storage under a general license; and

2. In granting an extension of a general license for storage of Regulated NORM, the Department must certify that the licensee is in compliance with Subparts A., B., and C., of (S) 1409 and has a valid reason or reasons why the Regulated NORM under his or her ownership will not be disposed within the next year. Factors the Department should consider in determining whether the licensee

has a valid reason or reasons for receiving an extension include, but are not limited to, the volume and radioactivity of the Regulated NORM, and-or the location of the storage facility and its proximity to populated areas or sensitive environments.

E. Storage of Regulated NORM under a specific license will be done in accordance with the requirements of this Subpart, any other applicable requirements of this Part and any other conditions as may be imposed by the Department to ensure compliance with these regulations.

Sections of Subpart 14 not summarized above include:

1402. DEFINITIONS.

1404. RADIATION SURVEY INSTRUMENTS

1408. RADIATION SURVEY REQUIREMENTS.

1410. GENERAL LICENSE.

1411. SPECIFIC LICENSE.

Complete copies of Subpart 14 can be obtained from:

Bill Floyd  
Hazardous and Radioactive  
Materials Bureau  
Department of Environment  
P.O. Box 26110  
Santa Fe, NM 87502  
(505) 827-1558

**NEW YORK**

Any licensed NORM in New York comes under their Part 380 regulations for disposal. New York also has a soil cleanup and decommissioning standard that was adopted in September, 1994. This standard was sent to the EPA for their consideration for use as a federal standard.

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**NORTH CAROLINA**

Nothing presently is being proposed on NORM regulations for North Carolina. The state recognizes that NORM is an issue that may need attention, but there are many other priority things going on, not the least of which is the low level waste disposal facility. The state is aware of NORM contamination within the state, particularly in scrap metal yards. For the present North Carolina is on the sidelines and is advocating a constructive relationship between the regulated community and the would-be regulations.

**NORTH DAKOTA**

North Dakota continues to hold off on adopting NORM regulations. The draft rules are not quite in the desired shape yet. There is no timetable for adopting the rules.

NORM incidents recently have included the shipment of scrap metal by rail cars to Colorado. One of the cars set off the radiation alarm and the car is being sent back to the scrap dealer in North Dakota.

Another incident involved a call from a company who had a NORM contaminated treater who wanted to know how to get rid of it. It was recommended that a licensed decontamination company in Louisiana or Texas be contacted to clean the equipment.

**OHIO**

The statutory authority for becoming an Agreement State became effective September 8, 1995. As part of this process the radiation regulations are being revised so that not only the Agreement State program can be implemented, but a NARM/NORM licensing program as well. It is hoped the regulation can be approved by Spring, 1996.

**OKLAHOMA**

The Oklahoma Radiation Management Advisory Council met September 7, 1995 to consider the proposed NORM rules. There were some comments by members of the public and discussions by the Council, but no action was taken. The next meeting of the Council will be December 7, 1995. The draft of the proposed rules was summarized in the Winter 95 issue of *The NORM Report*.

**OREGON**

Oregon is still looking at revising their radiation rules, but this has been on hold waiting for the CRCPD Part N guidelines to be finalized. One of the NORM issues in Oregon is in the zircon sand industry.

**PENNSYLVANIA**

There has been no progress in the development of regulations for the control of NORM in Pennsylvania and nothing is planned at present.

**RHODE ISLAND**

Rhode Island has no specific regulations for the control of NORM and none are in the planning stage. NORM is considered to be covered under the state's general radiation regulations.

**SOUTH CAROLINA**

*Part IX-Licensing of Naturally Occurring Radioactive Material (NORM)* became effective June 30, 1995 in South Carolina. The new NORM rules are summarized below:

**RHA 9.1 PURPOSE AND SCOPE.**

This part establishes radiation protection standards for the possession, use, transfer, and/or storage of naturally occurring radioactive material (NORM) or the recycling of NORM

contaminated materials not subject to regulation under the Atomic Energy Act of 1954, as amended. The requirements of this part are in addition to and not in substitution for other applicable requirements of Parts I, II, III, VI, and VII of these regulations. Except as otherwise specifically provided, these regulations apply to all persons who engage in the extraction, mining, beneficiating, processing, use, transfer, transport, and/or storage of NORM or the recycling of NORM contaminated materials in a manner that alters the chemical properties or physical state of natural sources of radiation or the potential exposure pathways to humans or environment.

**RHA 9.3 EXEMPTIONS.**

9.3.1 Persons who receive, possess, use, process, transfer, transport, store, and/or commercially distribute NORM are exempt from the requirements of the provisions of this Part if the materials contain, or are contaminated at, concentrations of:

9.3.1.1 30 picocuries per gram or less of TENR due to radium 226 or radium 228 in soil, averaged over any 100 square meters and averaged over the first 15 centimeters of soil below the surface, provided the radon emanation rate is less than 20 picocuries per square meter per second.

9.3.1.2 30 picocuries per gram or less of TENR due to radium 226 or radium 228 in media other than soil, provided the radon emanation rate is less than 20 picocuries per square meter per second, or

9.3.1.3 5 picocuries per gram or less of TENR due to radium 226 or radium 228 in soil, averaged over any 100 square meters and averaged over the first 15 cm of soil below the

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**SOUTH CAROLINA**

(continued)

surface, in which the radon emanation rate is equal to or greater than 20 picocuries per square meter per second,

9.3.1.4 5 picocuries per gram or less of TENR due to radium 226 or radium 228 in media other than soil, in which the radon emanation rate is equal to or greater than 20 picocuries per square meter per second; or

9.3.1.5 150 picocuries or less per gram of any other NORM radionuclide in soil, averaged over any 100 square meters and averaged over the first 15 centimeters of soil below the surface,

9.3.1.6 150 picocuries or less per gram of any other NORM radionuclide in media other than soil;

9.3.1.7 Materials in the recycling process contaminated with scale or residue not otherwise exempted, and other equipment containing NORM are exempt from the requirements of these rules if the maximum radiation exposure level does not exceed 50 microentgens per hour including the background radiation level at any accessible point; or

9.3.2 Persons who possess facilities, equipment or land contaminated with NORM in quantities less than the following levels are exempt from the requirements of the provisions of this part:

9.3.2.1 Surface contamination which averages 5000 disintegrations per minute per 100 centimeters squared over the entire measured surface;

9.3.2.2 Not to exceed a maximum reading of 15000 disintegrations per minute per 100 centimeters

squared to an area of not more than 100 centimeters squared, notwithstanding the maximum aforementioned limit. The maximum radiation exposure level shall not exceed the limit specified in RHA 9.3.1.7; or

9.3.2.3 Removable contamination not to exceed 1000 disintegrations per minute per 100 centimeters squared.

**RHA 9.6 TRANSFER OF WASTE FOR DISPOSAL.**

9.6.1 Each person subject to the general license in RHA 9.5 shall manage and dispose of wastes containing NORM:

9.6.1.1 By transfer of the wastes for disposal to a facility specifically licensed to receive waste containing NORM;

9.6.1.2 By transfer of wastes for disposal to a land disposal facility licensed by the U.S. Nuclear Regulatory Commission, an Agreement State, or a Licensing State; or

9.6.1.3 In accordance with RHA 3.27 of these regulations or alternate methods authorized by the appropriate regulatory agency.

9.6.2 Records of disposal, including waste manifests, shall be maintained according to the provisions of RHA 3.41 of these regulations.

9.6.3 Transfers of waste containing NORM for disposal shall be made only to a person specifically authorized to receive such waste.

The Sections of the regulations not summarized above include:

**RHA 9.2 DEFINITIONS**  
**RHA 9.4 RADIATION**  
**SURVEY INSTRUMENTS**  
**RHA 9.5 GENERAL LICENSE**  
**RHA 9.7 SPECIFIC LICENSE**

Copies of the regulations are available from:

Bureau of Radiological Health  
 Department of Health and  
 Environmental Control  
 2600 Bull Street  
 Columbia, SC 29201  
 (803) 737-7400

**SOUTH DAKOTA**

South Dakota has regulations for the control of radiation, but nothing specific to NORM. No legislation has been proposed to regulate NORM at this time.

**TENNESSEE**

NORM contamination in Tennessee is handled basically like any other radioactive material. If it is enhanced above background levels, an assessment is made as to whether it constitutes a problem or not. If it does, it is dealt with similarly to any other radioactive material, i.e., by using the general radiation regulations. There are no specific regulations for the control of NORM and none are planned. It appears that as more people learn about NORM more instances of NORM contamination are being reported.

**TEXAS**

Some modifications to the NORM rules are being planned. A draft of the proposed changes should be available later this year. The changes will primarily be classifications and adding some requirements for processors of NORM from other persons. Efforts are being coordinated with the Railroad Commission on jurisdictional issues, particularly where processing and desizing is being done at the same time.

NORM-contaminated material is being sent to China through the Port of Houston. The Department of Health wants to be kept

(Continued on page 10)

**TEXAS** (continued)

informed even though it doesn't fall under any regulations that would require a license. The Department wants to know if it is going to be stored temporarily for any time in the Houston area.

Statewide Rule 94- Disposal of Oil and Gas NORM Waste took effect February 1, 1995. This rule sets forth requirements for the safe disposal of NORM that constitutes, is contained in, or has contaminated oil and gas wastes. Rule 94 was summarized in the Winter 1995 issue of *The NORM Report*. There are no plans at present for revising Rule 94.

The Texas Natural Resources Conservation Commission hopes to start writing a draft rule for the disposal of non-oil and gas materials in the near future. They will be concerned with such NORM wastes as phosphogypsum, etc.

**UTAH**

NORM is considered to be included in Utah's comprehensive radiation control regulations. No specific NORM regulations have been proposed at the present time in Utah.

**VERMONT**

There are no developments in NORM legislation at the present time. Vermont has a problem with thorium alloyed with magnesium-where the thorium concentration approaches 4%. This particular alloy was apparently processed in Minnesota, in turn sent to New Jersey and finally sold to a machine shop in Vermont.

A 55-gallon drum of scrap from the machine shop was sent for disposal and triggered the radiation detector. Subsequently, the drum was returned to the machine shop.

Vermont also has NORM problems in their stone industries. There are thousands of tons of granite wastes which contain significant concentrations of NORM materials.

**VIRGINIA**

Virginia has no specific regulations for the control of NORM. NORM is considered to be covered in the general regulations for the control of radiation. These latter regulations are in the process of being revised.

**WASHINGTON**

The Washington rule for the disposal of NORM wastes in the state became effective July 22, 1995. This rule WAC 246-249-080 Naturally occurring and accelerator produced radioactive material (NARM), excluding source material is summarized below.

The section impacting the disposal of NORM is section (4) which states: Naturally occurring and accelerator produced radioactive material, excluding source material, shall be limited to a total site volume of no more than eight thousand six hundred cubic feet per calendar year (8,600), and individual generators shall be limited to an annual total volume of one thousand cubic feet per calendar year, provided that there shall be no annual site limit or individual generator volume limit for:

- (a) Accelerator produced radioactive material excluding decommissioning waste; and
- (b) Discrete sealed sources. For purposes of this section, sealed sources means any device containing naturally occurring radioactive material or accelerator produced radioactive material to be used as a source of radiation which has been constructed in such a manner as to prevent the escape of

any radioactive material. This rule sharply reduces the volume of NORM which can be disposed of in Washington, particularly by US Ecology whose disposal site is in Hanford, Washington. US Ecology has filed a lawsuit attempting to overturn the rule.

**WEST VIRGINIA**

There are no specific regulations for the control of NORM in West Virginia. NORM is considered to be adequately covered by other regulations that require registration of facilities that own, possess, etc. NORM. There are no plans at present for the specific regulation of NORM.

**WISCONSIN**

Wisconsin has no specific regulations for the control of NORM except those imposed by the Department of Natural Resources for the disposal of materials containing radium-226, etc. The state has general regulations for the control of radiation. These regulations don't include some of the NORM-specific issues, e.g., contaminated scrap. The regulations may or may not cover NORM problems. Wisconsin is working on a revision to its maximum radioactivity standards in community water treatment facilities, primarily radium-226.

**WYOMING**

Wyoming has no regulations for the control of NORM and none have been proposed at this time. There is a restriction on produced water. Produced water cannot be discharged if it contains more than 60 pCi radium per liter. Wyoming no longer has legislation that requires the registration of radioactive materials.

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## FEDERAL ACTIONS

### U.S. ENVIRONMENTAL PROTECTION AGENCY

The EPA is restricting the low level wastes rule to federal facilities rather than to all facilities. There was concern among the states that it might interfere with the licensing process. EPA accepted that concern and issued a notice that the focus would be on federal facilities.

If a facility covered by the clean-up rule has NORM co-mingled with source and by-product material, and contributes to the risk, the NORM must be included in the clean-up strategy. It is only in that specific and limited context that the EPA is dealing with NORM.

There are no plans at present to extend EPA regulations to other areas of NORM contamination. With the EPA budget situation, NORM is not considered to be a high priority area.

Senator Johnson (Louisiana) very recently introduced an amendment on the senate floor to an EPA appropriations bill. Senator Johnson's amendment concerns radon and NORM. The concern is that the EPA's recommendations and guidelines concerning radon and NORM are often very different from recommendations of such astute bodies as the National Council on Radiation Protection and Measurements (NCRP), which is a very distinguished group of scientists. What Senator Johnson's amendment will do is have the National Academy of Sciences (NAS) look at what the EPA's public guidelines are in these areas and compare them to what the NCRP and other scientific and technical groups have had to say about radon and NORM.

The relevant peer reviewed information would also be studied

and the NAS would come up with a technical evaluation and answer the question as to why there are differences between the EPA and what other scientific groups believe to be sensible. The National Academy of Sciences would report their technical evaluation to the Congress in a year or two.

There does not appear to be any serious objections to the amendment.

### U.S. MINERAL MANAGEMENT SERVICE

So far this year, MMS has issued only two permits for off-shore disposal of NORM. Most NORM wastes are being brought on-shore for disposal.

### NUCLEAR REGULATORY COMMISSION

The NRC continues to monitor NORM developments but is doing nothing specific on NORM at this time.

### CONFERENCE OF RADIATION CONTROL PROGRAM DIRECTORS (CRCPD)

A Blue Ribbon Commission reporting directly to the Board of Directors has been set up to work more efficiently and effectively to finalize the Part N Suggested State Regulations for the Control of NORM. This Blue Ribbon Commission will take over the responsibilities of the Part N and E-4 Committees. E-4 is the Committee on Natural Radioactivity Contamination. Edd Kray, the present chair of the Part N Committee has resigned from the Commission because of work responsibilities in Colorado. Ray Paris of Oregon will be the chair of the new Commission.

An advisory committee will assist the Commission with advice and recommendations from those not affected by the regulations.

The Blue Ribbon NORM Commission will consist of radiation control program directors on staff. The Commission will be assisted by a NORM Advisory Committee. The intent of the advisory committee is to obtain experts in a variety of fields affected by NORM, e.g., oil and gas and phosphate industries. The advisory committee will provide advice, assistance to the Commission that makes good sense relative to suggested state regulations. Ultimately the Commission will take that advice coupled with their wisdom and other resources to establish suggested state regulations for NORM, that people will use. Basically, the Commission will begin with the latest draft of Part N and the comments received on the draft.

Jim Hickey, a former program director with Rhode Island and voting member of CRCPD will be the CRCPD staff person on the Commission. (Jim is now an emeritus member of CRCPD). The following persons will be members on the NORM Advisory Committee--

Michael Ryan who is a member of the NCRP subcommittee on NORM, Max Scott who is at the Center of Energy Studies at LSU, Jean Claude Dehmel, Chairman of the Health Physics Society NORM Committee, Bill Geurard, Chairman of Environmental Affairs for the Oil and Gas Compact Commission, Michael Mataya, Director of Risk Management Institute of Scrap, Recycling Industries, Al Rafiti of Envirocare of Utah, Charles

(Continued on page 12)



**CRCPD** (continued)

Simmons Law Office of Kilpatrick and Cody, representing the zirconium industry, the Florida Phosphate Council is represented by Mary Lou Rajchel, Gary Mauers of the Fertilizer Institute, William Geiger of IMC Agro Company, Elizabeth Kraft of the League of Women Voters, and National Mining Association's Jame Gilchrist. Other persons are still being recruited.

The Commission met in Houston prior to the API/GRI NORM meeting in mid-October.

**CANADA****HISTORY OF NORM REGULATION IN CANADA**

Prior to 1988, all aspects of radioactivity fell under the jurisdiction of the federal government as administered by the AECB. In March 1988, NORM-related activities were deregulated from federal jurisdiction. Due to its environmental origins, NORM by default, reverted to provincial and territorial jurisdiction. A variety of departments within each province/territory, each exercise their mandate over NORM in very specific and often unique ways. These approaches are neither mutually exclusive nor consistent in areas of overlap from one province/territory to the next.

Because of this, Canada has an inconsistent and fragmented network of NORM regulations which sharply contrasts with the AECB's regulation of nuclear fuel cycle activities.

**THE NORM COMMITTEE/GUIDELINES DEVELOPMENT**

Alberta has NORM concerns in two major industry sectors; fertilizer manufacturers and petroleum producers. Other provinces could have concerns in

these and other industry sectors. In 1990, as head of Alberta's radiation protection program, Dennis Novitsky approached Alberta based fertilizer and petroleum industries, to propose the formation of a bi-partite government/industry NORM Committee. Industry representatives recommended that the Committee mandate be expanded to other provinces, as well, having recognized that each province/territory had its own unique set of NORM concerns. Dennis approached the other western provinces to participate in the Committee's work.

On October 8, 1991 representatives from fertilizer manufacturers and the Canadian Association of Petroleum Producers, met with several Alberta government agencies and representatives from the provinces of British Columbia and Saskatchewan to discuss the establishment of a western Canadian NORM committee. A complement of 15 people met and established the Terms of Reference for this committee. From this first meeting the "Western Canadian Committee on Naturally Occurring Radioactive Materials (NORM)", was officially formed.

An appreciation of the philosophical approach desired by the Committee can be seen by reviewing the Committee's Mission and Main Objective Statements.

**The Committee's Mission:**  
"Develop guidelines for the control of NORM, designed to ensure the same degree of protection for all workers and members of the general public, as those standards which have been Internationally accepted."

**The Committee's Main Objective:**  
"Development of a set of guidelines around; Classification

of NORM, Worker Protection, Transportation, Waste Management and an Overview (What is NORM/Where is it found?)."

The Committee agreed that a consensus guideline at this time, would better serve the process to;

- (a) Develop a consistent set of NORM standards for reference by each provincial agency in each western Canadian province and,
- (b) Provide affected industries with one reference guideline document from which, site specific procedures could be developed based upon the adoption of the NORM Guidelines as Industry Codes of Practice.

The Committee met 12 times over three and a half years to coordinate development of these guidelines. The Committee anticipates that the guidelines will become the defacto NORM standard across western Canada for industry and government regulators. Both Health Canada and the AECB, have expressed their support of these guidelines with the expressed intent to provide a mechanism for the development of National NORM Guidelines based upon the Western Canada document. Hopefully such national guidelines will harmonize the interpretation and application of multi-jurisdictions for the; classification, handling, management, worker protection, and transport of NORM and NORM contaminated equipment. This in turn, will provide direction to government regulators both provincially and federally, to develop a more consistent approach to managing NORM across Canada.

**THE NORM GUIDELINES**

The guidelines are by design, a reference for two specific

(Continued on page 13)

**CANADA** (continued)  
industries affected by NORM; petroleum producers and fertilizer manufacturers. We divided the guidelines into three parts to provide appropriate information, tailored to three distinct groups of readers:

**Part I, The General Reader,** provides information to senior managers and administrators who may need to know what NORM is, what responsibilities their company has in managing possible NORM problems, and what their budgetary implications for managing NORM may be. Part I therefore provides general background information.

**Part II, Technical References Manual,** provides more detailed technical information to persons who have responsibility for preparing detailed plans for handling NORM. These persons are technical specialists such as Engineers, Occupational Hygienists and other Safety Professionals who may have no direct experience in dealing with radioactive material. Part II provides specific information on;

- \* NORM Classification and Criteria
- \* Detection Assessment and Monitoring of NORM
- \* Worker Protection
- \* Transportation of NORM
- \* Environmental Protection and Waste Management

Whenever possible, international standards were referenced including the recent ICRP recommendations on dose limits and the latest amendments to the IAEA's Safety series documents. The Committee recognized the increasingly global nature of business and government and felt that the reference of any national standard be it foreign or Canadian, could restrict the flexibility of the guidelines.

**Part III, Operational Guidelines,** provides more specific information to worksite foremen and line supervisors who, upon encountering NORM problems, must make decisions on what precautions to take. Industry specific information has been prepared for this group of readers. Part III has sections on;

- \* NORM Operational Guidelines: Introduction
- \* NORM and the Upstream Oil And Gas Industry
- \* NORM Management in the Phosphate Fertilizer Industry

Part III can be updated by other industries who may wish to establish their own industry Codes of Practice.

The Appendix includes a glossary of radiation terminology, a listing of radiation monitoring instruments and manufacturers, and examples of field survey forms.

The guidelines allow for separation of parts I, II and III into standalone references. In particular, this format allows subsequent expansion of Part III as explained earlier.

The "Western Canadian Committee on Naturally Occurring Radioactive Materials(NORM)", required that the guidelines provide a holistic treatment of NORM in all its aspects rather than focussing on specific NORM Management issues. This is a reflection of the diverse representation of NORM stakeholders on the Committee.

This process represents a new way for government and industry in western Canada, to solve a relatively new and complex radiation problem. By involving all affected groups in the process, our Committee has developed a

practical NORM guideline that provides the needed framework for future development of more formal national standards or regulations. To order copies of the guidelines you can contact;

Alberta Labour, Professional & Technical Services  
Occupational Health & Safety,  
9th floor, 10808-99 Avenue  
Edmonton, Alberta, Canada  
T5K 0G5

Telephone: (403)427-2691  
Fax: (403)427-3410

For additional information about the guidelines, Dennis can be reached at:

Telephone: (403)730-8286 or  
297-2188  
Fax: (403)297-7854

The above history was prepared by:  
Dennis Novitsky  
Chair, Western Canadian  
Committee on Naturally Occurring  
Radioactive Materials (NORM)

#### Editor's Comments on the Canadian NORM Guidelines:

The guidelines for the Handling of NORM in Western Canada is excellent and the Western Canadian NORM Committee is to be congratulated.

The guidelines are essentially a course on NORM, covering all aspects of NORM including recommended radiation and radioactivity limits. These limits are referenced to known scientifically defensible sources, such as the latest IAEA data and ICRP 68.

This document is not a scientific treatise on NORM radiation protection-- it is designed to offer

(Continued on page 14)

## Editor's Comments on the Canadian NORM Guidelines (continued)

guidance to industry on NORM contamination problems. A large part of the credit for the document goes to the industry participation on the Committee. The industry participants were involved with the document preparation from the very beginning.

In addition to the industry participation, most of the regulatory agencies with responsibilities for any aspect of NORM were also active participants on the Committee.

Part III of the guidelines, which deals with NORM operational guidelines for the oil and gas and fertilizer industries were essentially written by the industry members on the Committee themselves. They identified the problems and used Parts I and II to develop the operational guidelines for the two industries.

It is strongly recommended that persons (both industrial and governmental) working with NORM obtain a copy of these guidelines.

Dennis Novitsky would like to receive comments, corrections, suggestions for improvements, etc. to the NORM guidelines. ■

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**It is easier to ask forgiveness than permission**

## Export and Import of Radwaste

Due to the escalating cost of radioactive waste disposed in the United States and "opportunities" in some former rigidly controlled economies, entrepreneurs are interested in striking a deal for disposal of radioactive wastes.

In one recent case enterprising entrepreneurs tried to develop interest in Guineau Biseau, a cash poor African country with a population of 1,000,000 and a per capita income of \$200 per year.

In another case, entrepreneurs from the Russian Republic were inquiring of generators here about the possibility of flying radwaste to one of the other former Soviet republics because the Russian Republic has a prohibition on importing radwaste. Even with the reopening of Barnwell such deals may be economically attractive. ■

### Lionhead Engineering and Consulting Ltd.

Naturally Occurring Radioactive Barium Sulfate Scales present major environmental and health hazard problems in parts of Western Canada. Lionhead Engineering and Consulting Ltd. specializes in the SAFE HANDLING, REMOVAL AND DISPOSAL OF RADIOACTIVE BARIUM SULFATE SCALES.

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In addition to removal, collection and disposal of radioactive scales, Lionhead Engineering and Consulting Ltd. specializes in the design of well bore abandonment programs including regulatory clearance for sub-surface disposal.

For more information or to discuss your needs, call or write:

**Lionhead Engineering and Consulting Ltd.**  
203, 622-5th Avenue S.W.  
Calgary, Alberta T2P 0M6  
Tel: (403) 262-2694; FAX: (403) 237-7111



## Selective Tools, Inc. (STI)

STI was incorporated under the laws of Texas in 1986. The primary activities of the company are oilfield related and over 100 oil and gas firms have been serviced during the past eight years. On August 20, 1993, STI received the first Specific License granted by the Bureau of Radiation Control, Texas Department of Health for the decontamination of NORM-contaminated equipment, facilities and land including the containerization of NORM wastes. Under their license, STI is authorized to handle NORM as defined in the Texas Regulations for the Control of Radiation, both liquids and solids of unlimited maximum activity. In addition to the petroleum industry, STI has serviced the phosphoric acid industry as well as tanker loading and offloading facilities. Relative to their Specific License, STI services include:

- Soil remediation
- Pipe and equipment decontamination
- Automated tank/enclosed vessel decontamination
- Pipeline descaling
- NORM slurrification and disposal operations
- NORM surveys
- Worker training and certification
- Project design and implementation relating to unique NORM problems

For additional information on these services, please contact our office:

**Mike McClure**  
**Selective Tools, Inc.**  
**2401 Fountainview, Suite 600**  
**Houston, TX 77057**  
**(713) 780-1944 or FAX (713) 780-1964**

## Barnwell Reopens For Disposal Services

South Carolina has amended its law to allow, effective 1 July 1995, Chem-Nuclear Systems, Inc's low-level radioactive waste management facility in Barnwell, South Carolina, to accept waste from LLRW generators in all states except North Carolina. The change also withdraws South Carolina from the Southeast Compact and establishes a committee to negotiate formation of a new compact. This continued operation will make use of previously unused disposal capacity that exists within the licensed area of the disposal facility. As part of the extended use of the facility the State of South Carolina imposed a fee of \$235 per cubic foot for waste disposal. It is expected that the revenues generated in the first full year of operation will be \$140 million per year. These revenues will be applied to education.

Over the next six months, Chem-Nuclear will begin fulfilling new disposal requirements imposed by the South Carolina Department of Health and Environmental Control. These requirements will center on the implementation of improved waste

disposal using structural concrete overpack technology for all wastes. These requirements are scheduled for completion by 1 January 1996. As reported by the media, the South Carolina Legislature decided to ban North Carolina waste from the Barnwell facility because of delays in opening a North Carolina facility that would have replaced Barnwell. A North Carolina facility was scheduled to open in 1996, but delays have resulted in a two-year delay.

The North Carolina Low-Level Radioactive Waste Management Authority is conducting a comprehensive assessment of the proposed Wake County site, south of Raleigh, to be completed in the fall of 1995. This assessment will provide a basis for the North Carolina and the Southeast Compact to determine the future direction and pace of the North Carolina program to provide a second-generation disposal facility for the Compact's states. Six key technical issues are being evaluated by Chem-Nuclear and other authority contractors as part of the assessment:

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The following appeared as a Letter to the Editor in the July 1995 issue of the Health Physics Society Newsletter. It is reprinted here with the kind permission of the author.

## EPA Seeks to Include NORM in Proposed Guidelines

by  
David S. Gooden, Ph.D., J.D., CHP  
Tulsa, Oklahoma

To the Editor:

In December 1994, (FR, vol 59, No.246, 12/23/94) the U.S. Environmental Protection Agency (EPA) proposed new Radiation Protection Guidelines (RPGs) for the public.

### Summary of Proposed RPGs

There should be no exposure of the general public to ionizing radiation unless it is justified by the expectation of an overall benefit from the activity causing the exposure. A sustained effort should be made to ensure that doses to individuals and to populations are maintained as low as reasonably achievable. The combined radiation doses incurred in any single year from all sources of exposure covered by these recommendations should not normally exceed 1 mSv (100 mrem) per yr effective dose equivalent to an individual. The limit may be exceeded temporarily in unusual situations that are not anticipated to recur chronically. Authorized limits that constitute only fractions of the 1 mSv (100 mrem) per yr may be developed for categories of sources or for specific sources. Risks associated with exposure of the general public to radiation that may occur due to Federal agency decisions, and the policies upon which these decisions, are based, should be made known to the public in a timely fashion as part of the decision process.

For the first time EPA seeks to include technologically enhanced naturally occurring radioactive material (NORM) in the proposed guidelines. Important industries including petroleum production and refining, mining, power generation (coal), paper mills, water treatment, cause increased levels of NORM as a part of industrial processes. The proposed RPGs will reduce the existing annual exposure limit of the public from 5 mSv (500 mrem) per yr to 1 mSv (100 mrem) per yr. Reducing the NORM-related limit to this level may have upward and detrimental effects on important industries and result in no improvement in health and safety.

The petroleum and other industries question if the EPA has the appropriate legal authority or a sound, fundamental scientific basis to federally regulate technologically enhanced natural radiation sources. From a scientific perspective, EPA ignores relevant scientific data in order to justify its continued use of the linear, no-threshold model as a basis for setting science policy. For example, EPA relies too heavily on the Hiroshima and Nagasaki, Japan, atomic bomb survivors while ignoring the highly relevant studies on the radium watch dial painters and other pertinent data.

One of the more frightening aspects of the proposal is that the RPGs will empower agencies to apportion annual radiation exposure limits for sites and/or industries. Federal agencies have demonstrated a willingness to apportion this level as low as 0.15 mSv (15 mrem) per yr in an attempt to achieve a hypothetical lifetime cancer risk in the range of  $10^{-4}$ . Hypothetical cancer risks as low as  $10^{-6}$  have been discussed in some contexts. Risks below one in a hundred or one in a thousand constitute no more than value judgement. No radiogenic cancer risks below these values can be measured scientifically. Costs associated with protecting against these unidentified, unquantifiable, hypothetical dangers are staggering, with estimates running as high as \$1-2 trillion for the federal government alone over the next 30 years. Science policy that spends \$12 billion to avert one hypothetical cancer may not be proper and reasonable.

EPA's implications that the Proposed Guidelines conform to the International Commission on Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP) principles are misleading. The proposal to allow apportionment of authorized limits for specific sources or categories of sources at a percentage of the RPGs is at odds with key principles of guidelines of the ICRP and the NCRP. For example, EPA's Proposed Guidelines fail to incorporate the critical distinctions that the ICRP and NCRP make regarding

(Continued on page 17)

**EPA Seeks to Include NORM in Proposed Guidelines**  
(Continued)

the 1 mSv (100 mrem) per yr effective dose equivalent limitation, including, but not limited to, the distinction between continuous exposures from normal operations and exposures caused by past or unusual practices where remedial intervention is required

EPA likewise overlooks the higher dose limit set by NCRP for remedial action. The NCRP in Section 16 of Report 116 sets the remedial action level of 5 mSv (500 mrem) per yr for continuous exposures from natural sources of radiation, excluding radon. Hopefully, EPA will get off the "fast track" and reconsider this proposal. Significant input regarding NORM is required from industry and knowledgeable scientific professionals before this matter can be properly addressed.

\* Editor's Note:  
Interested parties wishing to write the EPA with support for Dr. Gooden should express their thoughts in a letter to:

The Honorable Carol Browner  
Administrator  
U.S. Environmental Protection Agency  
401 "M" Street SE  
Washington, DC 20460

A copy should be forwarded to the EPA's "point man" for the radiation protection guidance:

Allan C. B. Richardson, Deputy Director  
Federal Guidance, Criteria and Standards Division  
Office of Radiation and Indoor Air [6602]  
U. S. EPA  
Washington, D. C. 20460

**CIRMS Issues "National Needs in Ionizing Radiation"**

During the second annual meeting of the Council on Ionizing Radiation Measurements and Standards (CIRMS) in November 1993, The Science and Technology Committee agreed to prepare what is expected to become a regular series of reports titled "National Needs In Ionizing Radiation Measurements." It was prepared by the Science and Technology committee and was approved by the CIRMS Executive Committee and the CIRMS membership for general distribution. It is the first in a series that will examine and document the national physical measurement and standards needs in the ionizing radiation community. Those needs arise from expanding applications of ionizing radiation and the increasing general interest.

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- Applicable Regulations
- One-hour course
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- Characteristics of Radiation
- Biological Effects
- Likely Sources of NORM
- Radiation Protection
- Applicable Regulations
- One-hour course
- Testing services available

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The following appeared in the July 1995 issue of the Health Physics Society Newsletter. It is reprinted here with the kind permission of the author.

## The Emperor Has No Clothes

by  
Al Tscheache, CHP

### Statement of the Problem

Members of the Health Physics Society are permitting an untruth to be perpetuated, namely: a little radiation can and will harm you (in a way that you can see or experience). The truth of that statement is not known based on any evidence accepted by the majority of health physicists today.

The result of permitting this untruth to exist widely in the world is the expenditure of huge amounts of money to fix a problem that does not need fixing because there is no evidence that one exists. Low levels of ionizing radiation (and also of low frequency electromagnetic radiation) are not demonstrated to be harmful. It is time for the profession of health physics, its member societies, and associations to say no!

### Rationale

The most feared harmful effect of radiation today is cancer production. However, there are no data that demonstrate that low doses of radiation will cause a particular individual to develop a cancer.

Contrariwise, there are no data demonstrating that low doses of radiation DO NOT cause cancer. And there is the rub. Humans do not know on the basis of their experience whether or not low doses of radiation cause cancer, or any other harmful effect.

But -- do professional health physicists tell the public that fact? No. At least most of them don't. The current paradigm for health physicists is that low doses of radiation MAY cause harmful effects (e.g. cancer). If you were a member of the public and not knowledgeable about radiation effects, what would your reaction to that paradigm be? I suspect it would be "Well, IF it MAY cause an effect it WILL cause an effect." And that's exactly what has happened, even in "good" health physics literature. ■

## CORPEX Technologies Inc.

Dale McCord has joined CORPEX Technologies Inc. as Vice President and Manager of the Southern Region. Dale McCord was most recently employed by Halliburton Industrial Services. His area of expertise in the refinery industry will lead CORPEX growth in the OEM and Process Industries including a focus on broadening the application of the CORPEX NORM Decon Process.

Lee P. Coll has been appointed Director of Engineering at CORPEX Technologies Inc. He will provide technical support for tailoring the CORPEX Decontamination Processes to each customer's needs. Lee Coll will be responsible for developing and supervising application procedures in markets such as Oil & Gas, Transportation and Pulp & Paper where the CORPEX surface active technologies are used to clean a wide range of contaminants. ■

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## MEETINGS CALENDAR

The following is a listing of meetings that may be of interest. These meetings either contain sessions or papers dealing with NORM, or they are of a related subject matter. It is intended to make the Meeting Calendar a regular feature of *The NORM Report*. I would very much appreciate receiving notices of upcoming meetings.

**JANUARY 7-10, 1996**

**The 29th Midyear Topical Meeting of the Health Physics Society, Naturally Occurring and Accelerator-Produced Radioactive Material (NARM): Regulation and Risk Assessment**

Location: Scottsdale, Arizona

The following technical sessions are currently planned:

**NARM: What is it and where is it?** This session will provide an overview of NARM sources and applications.

**NARM: Should it be a federal responsibility?** This session will address the issue of potential federal intervention due to the ubiquitous nature of the material.

**State regulatory measures.** This session will highlight the progress that states have made in developing regulations applicable to NARM-related activities.

**Challenges associated with discrete sources.** This session will review the radiation protection challenges associated with the generation, use and disposal of discrete sources of NARM.

**Challenges associated with diffuse sources.** This session will review the radiation protection challenges associated with the generation, use and disposal of diffuse sources of naturally occurring radioactive materials (NORM).

**Decontamination and decommissioning.** This session will focus on the issues surrounding the decontamination and decommissioning of NARM facilities and sites, including risk assessment.

**Occupational Radiation Protection.** This session will consider the factors that influence occupational exposure and methods to monitor and reduce that exposure at NARM facilities.

**JANUARY 29-FEBRUARY 2, 1996**

**ENERGY WEEK Conference & Exhibition.**

The Conference will focus on the future of the oil, gas and petrochemical industries, featuring 7 information conferences, including PETRO-SAFE.

Location: Houston, Texas

The American Society of Mechanical Engineers International-Petroleum Division and the American Petroleum Institute are issuing a call for participation at the ENERGY WEEK conference & Exhibition. As organizing sponsors of this 7th annual international event, both the ASME and the API are seeking papers relating to business, regulatory and technical changes effecting the oil, gas and petrochemical industries.

For further information contact:

Michelle Chappell  
(713) 963-6215

**FEBRUARY 26-27, 1996**

**Basic Radiation Safety and Management Seminar**  
Presented by Stan A. Huber Consultants, Inc. New Lenox, Illinois

Location: Las Vegas, Nevada

Seminar topics include:

Types of Radiation Used in Industry  
NRC and Agreement State Regulations  
Licensing of Radioactive Materials  
Radiation Biology

DOT Regulations and Transportation  
Effective Radiation Safety Programs  
Emergency Response to Radiation Incidents  
Termination & Expansion or Reduction of  
Radioactive Materials

For further information contact April Carson at:  
(815) 485-6161 or Fax (815) 485-4433

**MAY 1996**

**American Industrial Hygiene Conference**

Location: Washington, DC

The Ionizing Radiation Committee of the American Industrial Hygiene Association is soliciting papers, round table discussion topics, and training seminars (Professional Development Courses) to be presented at the Conference. Ionizing radiation has traditionally been the domain of health physicists; however, now many industrial hygienists are being asked to be radiation safety officers or to become more involved with radioactive materials in their assignments.

Deadline for submittal of abstracts was Oct. 18, 1995 with notification of acceptance in early December. Additional information is available from Tom Roundtree at (904) 771-4711, or Norri Johnson at (803) 725-3018. Fax: (803)-725-701

(Continued on page 20)

## Stan A. Huber Consultants, Inc. (SAHCI)

Stan A. Huber Consultants, Inc. (SAHCI) has specialized for 25 years in providing full health physics support services to industrial facilities that use or may be contaminated with radioactive materials or NORM. We offer a full range of professional services including, but not limited to:

1. Providing professionally recognized radiological surveys of materials, equipment and facilities to define the true scope of any NORM contamination that may exist.
2. Preparing or assisting with licensing, permits, and regulatory compliance needs and documentation.
3. Providing health physics services, such as:
  - a. Decontamination/decommissioning projects. Termination of licensed facilities require that a close-out radiation survey be made to ensure that the facility is free of NORM contamination and can be released for unrestricted use.
  - b. Certified calibration of NORM survey meters (required by regulations to be done every 6 or 12 months).
  - c. Soil and water analyses.
  - d. Routine radiation surveys.
  - e. Radiation safety programs.
4. Drum or container packaging and transport arrangements (including manifesting, labeling, load preparation, etc.) can be done for each shipment of NORM wastes.
5. Providing on-the-job training for your personnel to assume the radiation survey requirements and the shipping functions for continuing NORM disposal projects.
6. Coordinating decontamination projects and acting as liaison between waste removal personnel, facility management, and regulatory agencies.

We can provide references of previous projects.

If any of these services are of interest, or if you would like a no-obligation discussion or additional information, please contact our office by phone (815/485-6161), FAX (815/485-4433), or by letter to:

**Stan A. Huber Consultants, Inc.**  
**200 North Cedar Road**  
**New Lenox, IL 60451-1751**

### Meetings Calendar (Continued)

**JUNE 9-12, 1996**

**The 3rd International Conference on Health, Safety & Environment in Oil and Gas Exploration and Production** sponsored by the Society of Petroleum Engineers

Location: New Orleans, Louisiana

The conference theme is "Sustaining Global Progress" and the aims of the conference are:

1. to promote progress in occupational health, safety and environmental concerns in exploration and production of oil and gas
2. to exchange experiences and to stimulate discussion on these topics between experts and line managers responsible for these key aspects of exploration and production

3. to encourage active participation and cooperation of all stakeholders in the upstream industry

**JUNE 23-28, 1996**

**Air & Waste Management Association's 89th Annual Meeting and Exhibition**

Location: Nashville, Tennessee

Original papers for presentation are invited on a wide range of environmental topics, including the theme of the Annual Meeting: Technologies for Sustainable Environment.

Additional information can be obtained from:

Wayne Davis @ (412) 232-3444; Fax (412) 232-3450



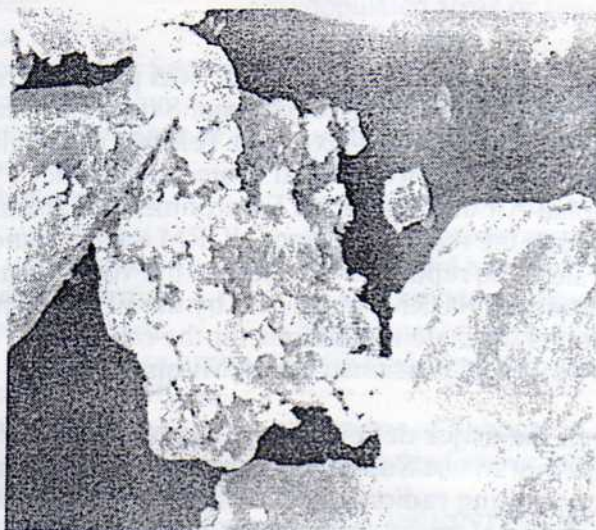
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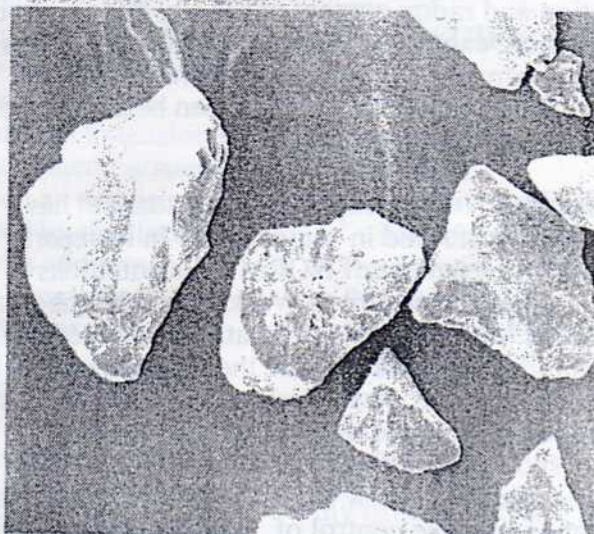
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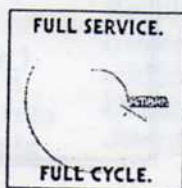


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## Comments on "Radiological Characterization and Assessment Study of a Coal Slag Used for Abrasive Blasting"

This report, issued July 12, 1995, was prepared for the National Institute for Occupational Safety and Health (NIOSH) by Clinton Cox, Scott Telofski and Paula Goode of the Environmental Protection Agency's National Air and Radiation Environmental Laboratory. Although the report discusses NORM contamination in coal slag, the report never refers to the voluminous literature on NORM, much of it by the EPA, and never mentions the state regulations for the control of NORM, e.g., Louisiana, Texas, Mississippi, etc.

One of the major deficiencies of the NIOSH report is its attempt to use Superfund chemical risks as a basis for controlling radionuclide/radiation contamination. The chemical tradition of regulating risks is to keep the risks at  $10^{-4}$  or less, that is a cancer incidence rate of less than one in 10,000 (EPA, 1992). This can be achieved in the regulation of chemicals, but cannot be used in the regulation of radiation. For example, the risk from natural background radiation is about  $3 \times 10^{-3}$  for background radiation exclusive of radon and nearly one in a hundred when radon is included (EPA, 1992). Because of natural variations in background radiation and radon content of the air, these risks, due to radiation, cannot be lowered significantly. This disparity can and has led to considerable lack of understanding and conflicts between health physicists and chemical risk managers.

The issue of NORM exposure from coal ash has already been studied in some detail. In its report entitled "Assessment of NORM Concentrations in Coal Ash and Exposure to Workers and Members of the Public", the Radian Corporation examined NORM exposure for workers who are the most exposed to coal ash, such as power plant workers and abrasive blasters. The report concluded that for all such workers, "... the results show that radiation dose rates from NORM in coal ash are well below the limit specified in proposed regulations for the control of NORM (Radian, 1988).

Equally disturbing with trying to reduce radiation risks to those risks posed by chemical controls is that there will be no significant public health benefits despite tremendous federal expenditures as well as cost impacts on the private sector which could reach from ten to a hundred times the federal cost. This equates to

(Continued on page 23)

## NORM WASTE MANAGEMENT SERVICES

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### FIELD SERVICES

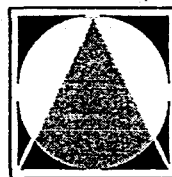
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- ♦ The Most Cost-Effective NORM Disposal Alternative Available
- ♦ Over 40 miles from Nearest Town in an Arid Desert Environment
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*Envirocare of Utah, Inc. operates the nation's first and largest diffuse NORM disposal facility. We have safely disposed of over 15 million cubic feet of NORM for EPA and DOD as well as major exploration and production companies. As EPA prepares to finalize federal NORM regulations, Envirocare presents the least liability concern of any licensed NORM facility in the country. For more information, please contact the Business Development Group at (801) 532-1330.*

### Comments on "Radiological Characterization and Assessment Study of a Coal Slag Used for Abrasive Blasting" -- continued

nearly \$12 billion per cancer averted -- a number over 1,000 times greater than the average cost of federal programs for automobile safety, occupational health and safety, and environmental health protection (EOP Group, 1994).

Reducing radiation exposure so as to reduce the risk of cancer to 10(-6) equates to an exposure of 50 microrem/year. This is about 7,000 times smaller than the natural background radiation of Washington, D.C. (EOP Group, 1994).

This discussion is presented to indicate the absurdity of the NIOSH report. If the recommendations in the report were used, the economic impact on small business would be huge. Businesses could be faced with prohibitively high clean-up and disposal costs for

wastes which are not significantly different from NORM in natural soil and rocks.

#### References

EOP Group, 1994 -- Superfund Radionuclide Proposal - Trillion Dollar Impact Would Overspend the Budget Cap. A report prepared for Alice Rivlin, Director of the Office of Management and Budget by the EOP Group, Washington, D.C., August 3, 1994.

EPA, 1992 -- Letter and commentary from Dr. Raymond Loehr, Chair of the Executive Committee of EPA's Science Advisory Board and Dr. Oddvar Nygaard, Chair of the Science Advisory Board's Radiation Advisory Committee to William Reilly, Administrator of the U.S. Environmental Protection

(Continued on page 24)

**Comments on  
"Radiological  
Characterization and  
Assessment Study of a  
Coal Slag Used for  
Abrasive Blasting"**  
(continued)

Agency, May 8, 1992. The commentary is entitled *Harmonizing Chemical and Radiation Risk-Reduction Strategies*.

Radian, 1988. *Assessment of NORM Concentrations in Coal Ash and Exposure to Workers and Members of the Public*. Prepared by Radian Corporation, Austin, Texas for the Utility Solid Waste Group of Washington, D.C., June, 1988

**Barnwell Reopens For Disposal Services (Continued)**

1. Develop an intergrated hydrogeologic conceptual model of the site and unified approach to remodeling groundwater flow supported by "multiple lines of evidence." This involves integrating the results of hydrogeologic, hydrogeochemical, and groundwater-flow modeling activities.
2. Demonstrate that the performance assessment will yield complaint doses (Performance Assessment).
3. Identify the relationship between the natural site characteristics and design features and their interactions during the life of the facility. Showing this relationship will (1) identify and quantify the critical pathways for water movement and water managemnet and (2) support meeting the regulatory performance objectives through work to be performed after September 1995.
4. Establish a monitoring approach that provides reasonable assurance that the facility can be (1) monitored through early detection of unanticipated releases and (2) remediated throughout the operations and institutional control periods.

(Continued on page 25)



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## Campbell Wells Corporation

Campbell Wells Corporation, a wholly owned subsidiary of Sanifill Inc. began receiving NORM wastes for treatment and disposal in May 1994 at its facility located near Lacassine, Louisiana. The Lacassine facility is designed to treat non-hazardous oilfield waste (NOW) contaminated with naturally occurring radioactive material (NORM). This commercial facility, the first of its kind in the United States, is permitted to receive NOW-NORM generated throughout Louisiana, other states, and the Outer Continental Shelf.

The permits issued to the Lacassine facility by the Louisiana Department of Natural Resources and the Louisiana Department of Environmental Quality (LADEQ) specify that the facility may receive NOW-NORM that contains not more than 200 picocuries of radium per gram (pCi/gm). The waste material will be treated at the Lacassine facility to (i) bring the NOW element of the wastes to the "reusable material" standards as specified in Order 29-B and monitored by the LADEQ, and (ii) reduce the radium content of the NORM wastes to levels that do not exceed 5 pCi/gm above radium background concentrations in the vicinity. This will qualify the treated waste materials for "unrestricted transfer" as defined in the LADEQ's regulations for the control of NORM.

NOW-NORM waste materials containing radium in excess of 200 pCi/gm, other NORM-contaminated oilfield wastes, and NORM-contaminated materials not associated with oilfield wastes may be managed through Campbell Well's Sunrise Supply Limited facility. Sunrise Supply is the only LADEQ licensed commercial storage facility in Louisiana. Through the combination of the new Lacassine NORM facility and the Sunrise Supply storage facility, Campbell Wells provides the oil and gas industry with a comprehensive program for compliance with NORM regulations.

For additional information on the NORM services provided by Campbell Wells, contact:

**Sammy Cooper or Jerry Brazzel at (318) 981-4004**

## Barnwell Reopens For Disposal Services (Continued)

5. Demonstrate that sufficient hydrologic, geologic, and geochemical data must exist to support an integrated-site hydrogeologic conceptual model for use in groundwater-flow modeling, performance assessment, facility design, and monitoring.

information is available from John Zawacki, General Manager of Disposal Operations, and Jimmy Still, Regulatory Affairs Manager at the Barnwell Site, 803-259-1781.

6. Develop a licensing strategy that defines the work to be performed after September 1995 that will allow the Division Radiation Protection (DRP) to make a licensing decision. A description of the key work elements to be completed after September 1995 to support the DRP licensing decision must be prepared. Field work, analyses, and design activities must be described along with their individual budgets and schedules. The earliest date for an operating site in North Carolina is 1998.

In Pennsylvania, Governor Tom Ridge's Administration is evaluating alternative approaches to siting the disposal facility for the Appalachian Compact. The current site-screening approach was to identify for further study three proposed potentially suitable sites late in 1995. In May 1994, 75 percent of Pennsylvania's land area had been identified as disqualified based on the Commonwealth's stringent siting criteria. The details of this siting program, which apparently will focus on identifying a community or communities that will volunteer to host the facility, remain to be determined by the Administration, the Commonwealth's Department of Environmental Protection, its contractors, and the Appalachian Compact. ■

Detailed information regarding Barnwell's pricing and the implementation schedule for the use of overpacks is available from Jack Harrison, Vice President of Marketing and Sales, 803-758-1847. Scheduling

## Radioactive Matter and the Insurance Industry

The following has been excerpted from a June 21, 1995 letter from Peter MacDowell (St. Helen's Trading Ltd.) to Ruth McBurney, Director of the Division of Licensing, Registration and Standards with the Bureau of Radiation Control under the Texas Department of Health. Ruth is also the current Chairperson of the Conference of Radiation Control Program Directors (CRCPD). Peter very kindly also sent me a copy of the letter.

Accompanied with the usual Nuclear Energy Liability Exclusion Endorsement (Broad Form) and as an attachment to the Comprehensive General Liability Policy was the following exclusion endorsement, (a sanitized copy of which was attached to the letter to Ruth):

### Radioactive Matter Exclusion Endorsement

This policy does not apply to:

"Bodily injury" or "Property Damage" arising out of the actual, alleged or threatened exposure of person(s) or property to any radioactive matter.

Of interest here is that there was no definition provided for the term - exposure. Considering that we are all continually exposed to radioactive matter, I assumed that the sentence should be completed with the phrase - "...which results in radioactive contamination". A written inquiry was made to the insurance carrier (one of the largest insurance companies in the world) and a written response was received which stated that the Exclusion stands as written. Further contact with a personal acquaintance in the re-insurance industry resulted in a similar response.

In these discussions and each of my subsequent contacts within the insurance industry on the matter, there was an admitted awareness of the growing volume of NORM litigation in Louisiana, Mississippi and Kentucky. However, I was unable to confirm that these financially significant BI/BD actions were indeed a motivational consideration in the implementation of this exclusion. However, my guess is that this growing case load of NORM litigation has in fact, had a profound impact on the insurance industry's interest in liability avoidance for all radioactive matter including NORM.

In short, regardless of the selective nature of the NRC, EPA, CRCPD, IAEA, etc. regarding isotopic threshold exposures and linear, no-threshold (LNT) theory, the insurance (re-insurance) industry has tilted toward the adoption of a plain and simple no threshold-no liability

theory (NTNL). The insurers' simplistic approach to liability avoidance is astounding - and if I might paraphrase the API's chastisement of the EPA on RPG matters, in effect this exclusion endorsement is rulemaking of the highest order, but unfortunately by an independent body outside the reach of special interest lobbys. In fact, too much industry displeasure might serve to further substantiate this unilateral action. Though on its face, the exclusion simply transfers all financial liability to the policy holder. But in reality, this briefly worded exclusion speaks volumes in terms of the future potential impact of the public perception of risk assessment and regulatory response to and about radioactive material (NORM).

Those extractive industries which produce NORM wastes and/or pass along NORM containing raw materials to their customer base could be faced in the near future, not only with financing these types of exposure risks absent any insurance coverage, but also be forced to confront a general population with an attitude. Prudence dictates that identification of a corporate communications response to the public and shareholder reaction to explain the dichotomy of this risk assessment discrepancy between the corporate board room and the underwriters. Also a technical review of surety documents would seem advisable in order to maximize corporate awareness of such contractual constraints.

### The NORM Report

The NORM Report is published four times a year by Peter Gray & Associates. It is available by subscription for \$95 a year or \$49 a year for government and non-profit organizations. Single copies are available for \$35 an issue.

Peter Gray & Associates

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## Comparison of NORM Rules by State

<u>Radium Exemption Concentration</u>		<u>Radium Cleanup Standard</u>	
AR	5 pCi/g	AR	5/15 pCi/g <sup>(3)</sup>
GA	5 pCi/g with high radon factor <sup>(1)</sup> 30 pCi/g with low radon factor <sup>(2)</sup>	GA	5/15 pCi/g with high radon factor 30/15 pCi/g <sup>(4)</sup> with low radon factor
LA	5 pCi/g above background		
MS	5 pCi/g with high radon factor 30 pCi/g with low radon factor	LA	5/15 pCi/g, or 30 pCi/g if the effective dose equivalent to members of the public does not exceed 100 millirem per year
TX	5 pCi/g with high radon factor 30 pCi/g with low radon factor		
CO (proposed)	5 pCi/g	MS	5/15 pCi/g with high radon factor 30/15 pCi/g with low radon factor
MI (proposed)	5 pCi/g		
NM	30 pCi/g	TX	5/15 pCi/g with high radon factor 30/15 pCi/g with low radon factor
OK (proposed)	30 pCi/g		
SC	5 pCi/g with high radon factor 30 pCi/g with low radon factor	CO (proposed)	5 pCi/g
CRCPD (proposed)	5 pCi/g	MI (proposed)	5/15 pCi/g
		NM	30/15 pCi/g
		OK (proposed)	30/15 pCi/g
		SC	5/15 pCi/g with high radon factor 30/15 pCi/g with low radon factor
		CRCPD (Proposed)	5/15 pCi/g

(1) High radon factor is a radon emanation rate greater than 20 pCi per square meter per second.

(2) Low radon factor is a radon emanation rate less than 20 pCi per square meter per second.

(3) 5/15 pCi/g is 5 pCi/g of radium in soil, averaged over any 100 square meters and averaged over the first 15 centimeters of soil below the surface.

(4) 30/15 pCi/g is 30 pCi/g of radium in soil, averaged over any 100 square meters and averaged over the first 15 centimeters of soil

### About Quality

Quality is like oats ---

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that comes cheaper.

(Continued on page 25)



## NORM Training Course Offered by OGCI & Peter Gray

OGCI (Oil & Gas Consultants International, Inc.), a world leader in petroleum training, has scheduled training courses in NORM control for the balance of 1995 and 1996. The course *NORM Contamination in the Petroleum Industry* will cover all aspects of NORM contamination and its control, including:

- Fundamentals of Radiation
- Fundamentals of NORM
- NORM (Radium) Contamination
- NORM (Radon) Contamination
- State and Federal Regulations
- NORM Surveys including hands-on practice
- Maintenance Procedures
- Disposal of NORM Wastes
- Decontaminations
- Release of Facilities
- Recommended Programs

This course builds a rigorous and complete foundation for the control of NORM contamination. The in-depth course is taught by Peter Gray who has a background in nuclear and radiochemistry and 25 years experience in the petroleum industry. Dr. Gray has a Ph.D. in Nuclear Chemistry from the University of California at Berkeley. He took early retirement from Phillips Petroleum Company in 1985 after 25 years with the company. Since 1985, Dr. Gray has been a consultant in NORM contamination in the petroleum industry. During his tenure with Phillips, Dr. Gray was in charge of the company's NORM control program from the discovery of NORM contamination in natural gas and natural gas liquids in 1971 until his retirement in 1985. This background uniquely qualifies Dr. Gray as an instructor of the course -- an instructor who understands the origins of NORM, why it contaminates nearly every oil and gas facility, where the contamination occurs, how to set up programs which protect employees, company facilities, the environment and the public, how to survey for NORM contamination, the available options for the disposal of NORM contaminated wastes, and the federal and state regulations for the control of NORM. The course meets all requirements for Radiation Safety Officer training as outlined by Louisiana's DEQ.

Peter Gray is the editor/publisher of *The NORM Report*.

The 1995/96 schedule for the course *NORM Contamination in the Petroleum Industry* is:

Nov. 7-10, 1995	Houston
Feb. 22-23, 1996	Houston
Apr. 25-26, 1996	Calgary
Oct. 3-4, 1996	Houston

For further information about the course, contact Joseph Goetz, Vice President, OGCI, 1-800-821-5933 Or contact Peter Gray at 918-492-5250 for additional information about the course content. ■

## Comparison of NORM Rules by State (Continued)

### Exemption for Contaminated Equipment

AR	Concentration limit only (5 pCi/g)		disintegrations per minute <sup>(5)</sup>
GA	50 $\mu$ R/hr including background	NM	50 $\mu$ R/hr including background
LA	50 $\mu$ R/hr including background	OK (Proposed)	50 $\mu$ R/hr including background
MS	25 $\mu$ R/hr above background	SC	50 $\mu$ R/hr including background
TX	50 $\mu$ R/hr including background	CRCPD (Proposed)	Concentration in dpm
CO (Proposed)	Concentration limit only (5 pCi/g)		(5) Before release for unrestricted use, facilities or equipment contaminated with NORM should not exceed specified contamination limits in dpm/100 sq. centimeters.
MI (Proposed)	Concentration limit only in .		