

**BRANCH TECHNICAL POSITION**  
**for the Preparation of an Application for**  
**Processing of Naturally Occurring Radioactive Material (NORM)**  
**and/or Decontamination of**  
**Equipment, Facilities and Land Contaminated with NORM**  
**(Revised July 2005)**

This document is to assist a person in preparing a Department of State Health Services application for a license issued pursuant to Title 25 Texas Administrative Code (TAC) Section (§) 289.252 of §289.259 (authorizing the processing of naturally occurring radioactive material (NORM) received from other persons, and/or the decontamination of equipment, facilities, and land owned, possessed or controlled by other persons).

For the purpose of this document, “decontamination” means the process of physical removal of NORM from an object (e.g., equipment, facilities, land) such that the limits specified in 25 TAC §289.259(d)(1), (2), and (3); and §289.259(f)(2) are not exceeded, and “processing” means the storage, extraction of materials, transfer, volume reduction, compaction, incineration, solidification, or other separation and preparation of NORM or NORM-contaminated materials or items for reuse or disposal, including any treatment or activity that renders the waste less hazardous, safer for transport, or amenable to recovery, storage, or disposal.

Applicable regulations will include the following: §289.201, §289.202, §289.203, §289.204, §289.205, §289.252, §289.257 and §289.259. These sections can be accessed by links from the agency’s web site at the following URL: <http://www.dshs.state.tx.us/radiation/rules.shtm>. To pursue the Railroad Commission’s rules of Oil and NORM disposal, see Title 16 (Part 1), Chapter 4 (Sub-Chapter F) Sections §4.601-632, at: [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.viewtac](http://info.sos.state.tx.us/pls/pub/readtac$ext.viewtac). For TCEQ’s regulatory involvement in other NORM disposal, see: [http://www.tceq.state.tx.us/permitting/waste\\_permits/rad\\_waste/norm\\_rad\\_waste.html](http://www.tceq.state.tx.us/permitting/waste_permits/rad_waste/norm_rad_waste.html).

An application for a radioactive material license should consist of the Application for a Radioactive Material License (BRC Form 252-2), Business Information Form (BRC Form 252-1), application fee, and supporting information. The following guidelines are intended to assist a person in preparing an application, that when reviewed will allow a determination to be made as specified in 25 TAC § 289.259(k).

**I. APPLICATION FORM**

The application form, in pdf format, can be obtained on line at the agency’s web site at the following URL: <http://www.dshs.state.tx.us/radiation/forms.shtm>.

Item 1 - Indicate the name and mailing address of the applicant. The applicant should be the corporation or other legal entity applying for the license. If the applicant is an individual, the individual should be acting in a private capacity and the use of the radioactive material should not be connected to the individual's employment with a corporation or other legal entity. Licenses are issued only to persons located in Texas. The Department of State Health Services (DSHS) will not issue a license to a person who does not have physical presence in Texas from which business is conducted.

Item 2 - The applicant should provide the street address for each location where decontamination activities are conducted on a permanent basis (i.e., greater than 90 days). If a street address is not available, then a description of the location of the facility with respect to landmarks should be provided. If the applicant will also conduct decontamination activities at temporary job sites, then the appropriate line should be checked in Item 2.B. If the applicant will engage only in mobile operations at temporary job sites, it should be so indicated in this item.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

Item 3 - Check the appropriate box.

Item 4 - Indicate where records are to be maintained. If temporary job sites are being requested, records for each site's operation must be maintained at that site and at the main Texas facility location as indicated in Item 2. If the applicant will not have a fixed-facility where NORM will be received from other persons for processing or decontamination, but will engage only in decontamination activities at the customer's site, then a permanent location in Texas must be designated where records are maintained for inspection by the DSHS.

Item 5 - Persons whom the applicant wishes to be listed on the license as authorized to engage in processing and/or decontamination activities should be listed here. However, if the applicant prefers to have the Radiation Safety Officer (RSO) designate the workers rather than have them listed on the license, then it should be so indicate here on the application. The applicant should document that the RSO and workers meet the criteria specified in Section III.

Item 6 - The applicant should list the person designated as the RSO. The RSO is the person who is delegated the responsibility for the radiation safety program, who maintains the license and associated records, and who, in most instances, is the primary contact with the DSHS in administering the license. The RSO must have the authority to; maintain an ALARA program, enforce radiation safety policies and procedures, suspend activities deemed unsafe, implement remedial action when necessary, make a decision relative to any and all licensed activities, and if designated as the primary contact with the DSHS be delegated the authority to act as a duly authorized person to act for and on behalf of the applicant.

Item 7 - The applicant should identify the radionuclide(s), the chemical or physical form that they are in, the maximum activity requested, and the use to be made of the radionuclide(s) under the appropriate column on the application form. If the information will not fit on the form, another sheet should be used with a reference on the form to the other page. Since NORM may consist of a variety of radionuclides, column (a) may be completed with the entry "NORM as defined under 25 TAC § 289.259". Column "b" should specify the physical state(s) that the material will be in. These usually are solid, liquid, or in an intermediate form such as slurried. In addition to the physical state(s), the form that the NORM is in (e.g., contamination on metal in the form of scale, contaminant of soil, etc.) should be stated. In column "c" the applicant should specify the maximum activity which the applicant requests that they be authorized to handle in their work. Column "d" should specify the use(s) which the applicant wishes to be authorized to pursue. As an example of the manner in which the application form should be completed for Item 7, please refer to the following:

(a) element and mass number	(b) chemical or physical form	(c) maximum activity requested	(d) use of each form
NORM as defined under 25 TAC § 289.259	solid as a scale on metal pipe	Not to exceed 300 pCi/g. Total not to exceed 10 Ci.	removal of NORM contaminated scale from pipe and packaging of removed scale

## Branch Technical Position

### NORM Processing/Decontamination (7/05)

Item 8 - For a fixed-facility decontamination operation (that is, where the customer brings the NORM-contaminated item to the licensee for decontamination, as opposed to the licensee going to the customer's site to perform the decontamination) the applicant should provide a description (e.g., drawing) of the facility showing the location of the equipment used in the processing or decontamination activities. Additionally, a description of the facility design and dimensions should be provided. Indicate in this description the restricted and unrestricted areas. If decontamination activities are conducted in an enclosed area (i.e., building) provide a description of the area and details of the ventilation system for that area. Describe any equipment (e.g. containment system, spray system, retention tanks, storage facilities, etc.) proposed for use during the processing or decontamination activities. However, if the application is only for work to be performed at the customer's facility, then this item does not need to be addressed in the application and the applicant may skip this section and go to Item 9 in this guide.

The applicant should provide a complete and accurate description of the site and facilities located on the site. Those items required to describe the site include the following:

- A. Provide a map identifying the location of the proposed site and any landmarks (e.g., highway intersections, distances from community, etc.) used to identify the location of the site.
- B. Provide a description of the site (plot drawings). The description of the site should provide the dimensions of the property and accurately depict the location of the facility structure(s). The description of the site must also indicate the nature of the adjacent properties (e.g., vacant land, businesses, residences, etc.) and the distance of the proposed facility structure(s) to the property line and adjacent businesses or residences. The site description must also indicate the location of and distance from creeks, culverts and drainages.
- C. The site description should identify the soil types under the facility with respect to compatibility with foundation and structural design.
- D. The applicant should provide evidence that the proposed site is not located in a 100-year floodplain, as designated by the Texas Commission on Environmental Quality (TCEQ), or in a wetland. A map of the proposed site showing floodplain boundaries, obtained from the TCEQ, or a letter from the TCEQ certifying that the site is not located in a 100-year floodplain is satisfactory evidence. A map or letter from the United States Army Corps of Engineers is satisfactory to document that the proposed facility is not sited in a wetland.
- E. The applicant should provide evidence that the proposed facility is not located in the recharge area of a sole source aquifer or a major aquifer. A letter or a map from the TCEQ is satisfactory documentation.
- F. The applicant should provide a description of the hydrogeologic environment of the proposed site. This would entail identifying aquifers or groundwater beneath or in the vicinity of the proposed site, the depth of the groundwater, nature of the geology overlying the aquifer, and direction and rate of flow of the groundwater.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

Item 8 - (continued)

- G. The applicant should describe how the combination of the hydrogeologic environment and the engineering design of the facility will serve to minimize and control potential waste migration into surface waters and groundwaters.
- H. Provide a description (e.g., accurate drawings) of the proposed facility. The facility description should provide the dimensions of the proposed facility structure(s). The description of the facility must include a detailed floor plan. The floor plan must identify intended uses of areas adjacent to areas where NORM will be located. The descriptions of the facility must accurately identify and describe the NORM handling, processing and storage areas. These descriptions must provide the dimensions of the facility and include construction and foundation details; ventilation, plumbing, and fire suppression systems (including drawings of these systems and their specifications); and physical security systems. The construction details must also identify and describe the shielding used in various areas where NORM is received, stored and processed.

Specify the maximum volume of NORM that can be stored in the proposed facility.

- J. Provide a description of the equipment to be installed to maintain control over maximum concentrations of radioactive materials in gaseous and liquid effluents produced during normal operations and the means to be employed for keeping levels of radioactive materials in effluents to unrestricted areas as low as reasonably achievable and within the limits prescribed in 25 TAC §289.202.
- K. Describe the measures employed to minimize the release of radioactive materials into the soils, waters, and atmosphere. This description should state how the facility is designed to confine spills.
- L. Describe how the design and operation of the facility will minimize releases of non-radiological noxious materials from the facility.
- M. The applicant should provide a copy of the report from the City Fire Marshall or local fire control authority, if available, finding that the facility meets the city or local fire codes for the storage of radioactive materials or a letter stating that the city or local authority either has no fire codes pertaining to the storage of radioactive materials or no inspection program for such.
- N. The applicant should either provide proof (e.g., copy of title) that the applicant owns the facility where NORM will be located or provide an original signed statement from the owner of the facility attesting to the following:
  - 1. that the person is the owner of the facility and property at [ENTER ADDRESS AND NAME OR DESCRIPTION OF FACILITY/PROPERTY];
  - 2. that the person is aware that [ENTER NAME OF APPLICANT] will store radioactive waste at the aforementioned property;
  - 3. that the person consents to [ENTER NAME OF APPLICANT] storage of radioactive waste on the aforementioned property; and

## **Branch Technical Position**

### **NORM Processing/Decontamination (7/05)**

Item 8 - (continued)

4. that the person acknowledges that the use of the property may be limited until such time as the limits for unrestricted use, as specified in the prevailing regulatory requirements, are met.

Item 9 - The application should include a copy of the applicant's Operating, Radiation Safety and Emergency Procedures (ORSEP). Please refer to Section III of this document for a discussion of the topics that should be addressed by the ORSEP.

Item 10 - The applicant should provide the manufacturer and model number of survey and radiation detection instruments that will be used. Include the sensitivity range, a description of any accessories, and the type of detectors used. Also, state how often survey meters will be calibrated and by whom. If a commercial service is to be used to calibrate survey instruments, the name of the commercial service should be specified, or a statement in the applicant's procedures that instrument calibrations will be performed by a person licensed by the agency, the NRC or another Agreement State to perform such calibrations. If the applicant plans to calibrate its own instruments, procedures for doing so must be submitted for DSHS approval. (Regulatory Guide 5.2, "Guide for the Preparation of Survey Instrument Calibration Applications," may be obtained from the DSHS). Specify the calibration interval. (Instruments should be calibrated at intervals not exceeding one year).

Item 11 - The applicant should indicate how the test for removable surface contamination (i.e., leak or wipe test) would be performed. The description of this procedure should also be included in the ORSEP, which is discussed in Section III of this document. As a minimum, the applicant/licensee will need to describe how the sample is collected, how it is handled, and how or who performs the analysis of the sample. If a commercial service is to be used to perform leak tests, the name of the commercial service should be specified, or a statement in the applicant's procedures that analysis will be performed by a person licensed by the agency, the NRC or another Agreement State to perform such tests. If the applicant plans to perform the analysis of the samples, procedures for doing so must be submitted to the DSHS for approval. (Regulatory Guide 5.1, "Guide for the Preparation of Leak Test Applications," may be obtained from the DSHS). Records of each test must be maintained.

Item 12 - In addition to the resume of the RSO, a description should be included of the minimum radiation safety training to be given to employees who will work with or around NORM.

Item 13 - The applicant should discuss the method for disposal of radioactive waste generated as a result of their operations. If all waste will be returned to the applicant's client, then it should be so stated. However, if the applicant proposes to retain any of the waste generated, a viable method for disposal of the waste must be presented in the application. This waste management method should also be included in the ORSEP discussed in Section III of this document.

Item 14 - Financial Qualifications and Financial Assurance    Self-Explanatory

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

Item 15 - The application must be signed by a person duly authorized to act for and on behalf of the applicant. The applicant should provide documentation that the person signing the application is duly authorized to act for and on behalf of the applicant. This may be accomplished by submitting a copy of a corporate resolution, certified by the Corporate Secretary, delegating that authority to the person signing the application.

**II. BUSINESS INFORMATION FORM**

An application for a license must be accompanied by the Business Information Form (BRC Form 252-1). The Business Information Form can be obtained, in pdf format, on-line at the agency's web site at the following URL: <http://www.dshs.state.tx.us/radiation/forms.shtm>.

In addition to the information pertaining to the name and address of the applicant, the Business Information Form is also used to assess and certify the financial qualification of the application as required by 25 TAC §289.252(d)(6). The methods of certifying the financial qualifications of the applicant are prescribed at 25 TAC §289.252(ii)(8). The method used should be specified by checking the appropriate box at the bottom of the first page of the Business Information Form, and providing the appropriate supporting information, if applicable.

**III. OPERATING, RADIATION SAFETY AND EMERGENCY PROCEDURES**

Under Item 9 of the application, a description of the applicant's operating, radiation safety and emergency procedures (ORSEP) is requested. The ORSEP should be commensurate with the scope and extent of activities for the use of radioactive materials. The description of the ORSEP should be provided in the form of a formal set of procedures. The ORSEP should specify the duties and responsibilities of persons engaged in the use of radioactive material (e.g. NORM processing, NORM decontamination, etc.), and provide a description of the procedures to be followed to ensure that radioactive material is handled in a safe manner. The ORSEP should, as a minimum, consist of the following elements (if applicable):

**A. ORGANIZATIONAL STRUCTURE**

An application should contain an organizational chart. The organizational chart should depict the positions in the corporation responsible for ensuring day-to-day oversight of the radiation safety program, and clearly indicate the lines of authority. The position of RSO should be indicated to occupy a position to exercise authority over operations involving radioactive material.

**B. PERSONNEL AND QUALIFICATIONS**

**1. Radiation Safety Officer (RSO)**

**a. Duties/responsibilities**

The ORSEP should delineate and describe the duties and responsibilities assigned to the RSO. Those duties should, as a minimum, consist of the following:

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. B. 1. a. (continued)

- (1) to establish and oversee operating, emergency, and as low as reasonably achievable (ALARA) procedures, and to review them at least annually to ensure that the procedures are current and conform with the requirements of 25 TAC Chapter 289;
- (2) to oversee and approve all phases of the training program for operations and/or personnel so that appropriate and effective radiation protection practices are taught;
- (3) to ensure that required radiation surveys are performed and documented in accordance with the requirements of the procedures, the license and 25 TAC Chapter 289, including any corrective measures when levels of radiation exceed established limits;
- (4) to ensure that personnel monitoring is used properly, that records are kept of the monitoring results, and that timely notifications are made as required by 25 TAC §289.203;
- (5) to investigate and cause a report to be submitted to the DSHS for each known or suspected case of radiation exposure to an individual or radiation level detected in excess of limits established by the 25 TAC Chapter 289 and each theft or loss of source(s) of radiation, to determine the cause(s), and to take steps to prevent a recurrence;
- (6) to investigate and cause a report to be submitted to the DSHS for each known or suspected case of release of radioactive material(s) to the environment in excess of limits established by the 25 TAC Chapter 289;
- (7) to have a thorough knowledge of management policies and administrative procedures of the licensee;
- (8) to assume control and have the authority to institute corrective actions including shutdown of operations when necessary in emergency situations or unsafe conditions;
- (9) to ensure that records are maintained as required by the 25 TAC Chapter 289;
- (10) to ensure the proper storing, labeling, transport, and use of sources of radiation, storage, and/or transport containers;
- (11) to ensure that all inventories are performed in the specified interval and in accordance with the activities for which the license application is submitted; and
- (12) to ensure that personnel are complying with the 25 TAC Chapter 289, the conditions of the license, and the operating and emergency procedures of the licensee.

b. Authorities

The operational procedures should clearly state the authorities delegated to the RSO. These should include, as a minimum, the authority to execute and implement the duties and responsibilities described above. The RSO may also be delegated the authority to act for and on the behalf of the licensee, if the RSO is a position which the licensee deems appropriate for making binding commitments for the licensee.

c. Qualifications

The RSO should have training and experience with handling/use of, all contaminated materials or equipment proposed in Item 7 of the application and all of the radiological and other safety principles necessary to work with such materials and equipment. As a minimum, the RSO should have 24 to 40 hours of instruction in radiation safety/health physics and six (6) to 12 months of experience in conduct of a radiation safety program of comparable size and scope.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. B. 1. c. (continued)

(1) Training

Appropriate training of the RSO should be demonstrated by submitting a description of the formal training received by the RSO. The description should include the name of the institution or facility where the training was received, the person providing the training, the dates of the training and the topics covered in the training.

The topics covered in an RSO's training should, as a minimum, include the following:

1. Fundamentals of Radiation
  - a. types and characteristics of radiation  
electromagnetic  
particulate
  - b. units of radiation quantity and dose
2. Sources of Radiation or NORM and radiation levels
3. Biological Effects of Radiation
  - a. stochastic effects
  - b. non-stochastic effects
4. Radiation Protection Principals
  - a. shielding  
particulates  
electromagnetic
  - b. time
  - c. distance
  - d. ALARA philosophy
5. Radiation Detection and Measurement
  - a. survey instruments and probes  
alpha radiation  
beta/gamma radiation
  - b. use and limitations of instruments
  - c. instrument calibration
6. Survey Techniques, Instrumentation and Regulatory Limits
  - a. equipment
  - b. land
  - c. buildings
7. Sampling Techniques, Methodologies, and Equipment
  - a. air
  - b. soil
  - c. water



**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. B. 1. c. (1) (continued)

8. Analytical Methodologies and Equipment

- a. air samples
- b. soil samples
- c. water samples

9. Dose Assessment

- a. external  
film badges  
thermoluminescent dosimeters  
pocket chambers
- b. Internal  
air monitoring  
bioassays  
whole body counting
- c. calculation of total effective dose equivalent (TEDE)

10. Regulatory Requirements

- a. Records  
instrument calibrations  
receipt, transfer and disposal  
dose assessments  
dose to general public  
surveys  
analytical results  
radiation protection program and review
- b. Postings
- c. Labeling
- d. Notice to workers
- e. Licensing requirements and restrictions
- f. Worker rights

(2) Experience

The experience of the proposed RSO should be presented in the form of a resume that indicates the name of the institution or company for which the proposed RSO worked, the dates of employment, the position or title held by the proposed RSO, and the duties and responsibilities of the proposed RSO.

2. Users of Radioactive Material

The user is the person who engages in handling or processing NORM and NORM-contaminated materials or performs the decontamination activities. The ORSEP should clearly describe the following for each position involved with the use (i.e., handling of NORM or NORM-contaminated materials, processing of NORM, and/or decontamination of NORM-contaminated items) of radioactive materials:

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

- III. B. 2. (Users of Radioactive Material -continued)
- a. duties
  - b. responsibilities
  - c. authorities

Training

Users should have a minimum of 8 to 12 hours instruction in radiation safety. In addition, the person should have 4 to 6 hours practical experience in performing these activities. The instruction should, as a minimum, consist of the following topics:

1. Types of Radiation and Means of Detection
2. Sources of Radiation and NORM at the Job Site  
Including the storage, transfer, or use of sources of radiation in the workplace.
3. Biological Effects of Radiation  
Including the health protection problems associated with exposure to sources of radiation, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed.
4. Radiation Protection Principals
5. Licensee's Procedures
6. Locations of Postings
7. Worker Rights  
To request inspections and consult privately with agency inspectors without discrimination by the licensee pursuant to the provisions of 25 TAC §289.203.  
Presence of a workers representative with an agency inspector during an inspection.  
Advised as to the radiation exposure reports that workers may request in accordance with subsection 25 TAC §289.203(d).
8. Worker Responsibilities  
To report promptly to the licensee any condition that may constitute, lead to, or cause a violation of agency requirements, license conditions, or unnecessary exposure to sources of radiation.

Instructed in, and instructed to observe, to the extent within the worker's control, the applicable provisions of agency requirements and the license for the protection of personnel from exposures to sources of radiation occurring in the work area.

Instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to sources of radiation;

Classroom training may be acquired through accredited colleges or universities or training courses accepted by the DSHS, the United States Nuclear Regulatory Commission (NRC) or another Agreement State. The applicant may provide this training, if the training program to be used by the applicant is acceptable to the THD. In order for the DSHS to make determination as to the acceptability of the training, the applicant should submit the following items to the DSHS:

1. a detailed outline of each topic to be covered in the course, the amount of time spent on each topic should be included on the outline, a description of each demonstration, and a list of prerequisites of attendees;

## Branch Technical Position

### NORM Processing/Decontamination (7/05)

#### III. B. 2. (Users training –continued)

2. a description of any equipment or visual aids to be used (these may include filmstrips, video tapes, movies, survey instruments, and contaminated material handling equipment);
3. a copy of any books, training manuals, and/or workbooks used in the course;
4. a resume for each instructor showing academic training (especially as applicable to radiation safety) and any teaching or training experience; and
5. a description as to how the students performance will be assessed and what will be considered acceptable performance.

#### C. RESTRICTED AREA DESIGNATION AND ACCESS CONTROL

The ORSEP should describe the criteria that the licensee will use to define a restricted area and how access to the restricted area is controlled. A restricted area is any area to which entry is restricted for the purpose of controlling exposure to radiation. A restricted area may or may not coincide with a boundary established to ensure compliance with the dose limits for the general public. If the licensee uses radiation exposure or dose rates derived from a survey instrument as the means of establishing a restricted area, the ORSEP should specify the exposure or dose rate and either describe the instrument that is used to define the restricted area or make reference to where the instrument is described else where in the ORSEP.

This description should also include the following:

##### 1. Signs/Postings

Describe the signs/postings that will be used to identify the restricted area. Additionally, indicate where the signs/postings will be positioned and located. Signs used to identify a restricted area are at the discretion of the licensee. However, the sign should be legible and clear as to intent.

##### 2. Restraints

The method used to restrict access to the restricted area should be described. Access may be restricted by the use of physical barriers such as fencing or barricades, or it may be enforced by defining the boundary and empowering personnel to prohibit non-workers from crossing the boundary. In any event, the method of controlling access to the restricted area should be described.

#### D. DESIGNATION OF RADIATION AREAS

The ORSEP should describe what areas are designated radiation areas and how they receive this designation. Additionally, the ORSEP should describe the postings that are used to identify radiation areas. Postings of restricted areas should comport to the requirements specified in 25 TAC §289.202(aa) for the type of posting.

#### E. MONITORING TO DETERMINE COMPLIANCE WITH OCCUPATIONAL DOSE LIMITS

25 TAC § 289.202(q) requires the licensee to monitor exposures from sources of radiation in accordance with the requirements of 25 TAC § 289.202(q)(1) and (2). 25 TAC § 289.202(q)(1) and (2) requires monitoring only if it is likely that a person will exceed 10% of the specified dose limits.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. E. (continued)

If the applicant/licensee determines that it is unlikely that 10% of the dose limit will be exceeded, then procedures for monitoring do not need to be provided. However, the applicant should provide justification to substantiate this decision. Justification would include dose measurements made under identical circumstances (i.e., same type of material, same NORM concentration, same quantity, same use procedure) or calculations of dose.

If it is determined that it is likely that 10% of the dose limits will be exceeded, monitoring in accordance with the requirements of 25 TAC §289.202(q)(1) may entail the use of individual monitoring devices, or if the applicant/licensee can demonstrate that the radiation fields can be readily determined by measurement with a survey instrument and a calculation made to determine dose, then the use of individual monitoring devices may not be necessary. Additionally, the monitoring requirement specified under 25 TAC §289.202(q)(2) may be dismissed if the applicant/licensee can adequately demonstrate that workers will not be exposed or subject to loose radioactive materials. An adequate demonstration would be a commitment to handling only material that is securely packaged or containerized to preclude the release of loose material and assurance that workers will not engage in the handling of material should the integrity of the package or container be compromised.

If it is determined that the licensee is required to provide individual monitoring devices and/or to monitor the occupational intake of radioactive material, you will need to determine what method or methods you will use to assess the uptake of radionuclides, and subsequently the committed effective dose equivalent. Per 25 TAC §289.202(i)(1) monitoring for internal dose may be done by measurement of the quantities of radionuclides in or excreted from the body, or a combination of those and/or air concentrations. Therefore, if you choose, you may elect to use any one or any combination of the methodologies below. Whichever method or methods you elect to use, the procedures should address the following items:

1. External Dose - Individual Monitoring Devices

- a. Specify the type of monitoring device used (e.g., film badge, thermoluminescent dosimeters, etc.).
- b. Specify the exchange frequency for the monitoring device.
- c. Specify the monitoring device provider (either identify the provider of the dosimetry service or commit to using a provider that is accredited by the National Voluntary Laboratory Accreditation Program).
- d. Provide the instructions for use of the monitoring device, addressing at least the following items:
  - (1) Describe the assignment of a monitoring device. Each device should be assigned to one and only one person during the devices period of issuance.
  - (2) Describe when the monitoring device will be used.
  - (3) Describe where and how the monitoring device will be worn on the person using the device.
  - (4) Describe where the monitoring devices will be stored when not in use. It should be specified that the monitoring devices will be stored in an area determined to be low background.
- e. Specify who will be provided individual monitoring devices or make a commitment to use a provider who is a participant in the National Voluntary Laboratory Accreditation Program (NVLAP).
- f. Specify where the records of the results of the individual monitoring devices will be retained for inspection by the DSHS.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. E. (continued)

2. Quantities of radionuclides in the body or quantities of radionuclides excreted from the body (bioassays).

The type of analysis will be dependent on the radionuclide(s) of concern. For example, if the radionuclide of concern is radium-226, then the type of analysis selected should be appropriate for detecting that radionuclide in the body or that radionuclide in material excreted from the body. Include in this section a discussion or justification for the selection of the particular assay used. American National Standard HPS N13.30-1996 (Performance Criteria for Radiobioassay) and National Council on Radiation Protection and Measurement Report No. 65 (Management of Persons Accidentally Contaminated with Radionuclides) are appropriate references for selection of assay methodologies for the particular radionuclide of interest. In addition, the following should be addressed in the procedures for a description of the bioassay program:

- a. Specify the type of analysis (e.g., whole body count, radon breath analysis, urinalysis, etc.) that will be conducted,
  - b. Specify who participates in the analysis program.
  - c. Specify the use of a baseline determination and when the baseline determination is made.
  - d. Specify the frequency of conducting the analysis.
  - e. Specify the analysis provider. If the applicant/licensee will be performing the analysis, describe the equipment to be used in the analysis and specify the procedures employed in the analysis. If the applicant/licensee will use an analytical service provider, provide the criteria required of the service provider.
  - f. For assays of quantities of radionuclides excreted from the body, specify the type of sample collected (e.g., urine, feces, etc.) and describe the instructions provided for collection of the sample. The instructions on sample collection should also include the time of collection following suspected uptake.
  - g. Specify the information that will be recorded to document the conduct of the bioassay and the retention of such records for review by the DSHS.
  - h. Specify the methodology used to interpret the data derived from the assay procedures and the use of that data in determining a dose. If the applicant/licensee will use a qualified dosimetrist acceptable to the DSHS to evaluate and interpret the assay data and determine a dose, this should be so stated in the procedures.
3. Concentration of radioactive material in air in work areas (occupational air monitoring)

The determination of concentration of radioactive material in the air is one method specified under 25 TAC §289.202(i) for the purpose of determining compliance with the occupational dose equivalent limits. In developing an appropriate air-sampling program NUREG-1400 (Air Sampling in the Workplace) may be consulted. NUREG-1400 is a technical resource and is not to be used as a regulatory compliance document.

- a. Specify when occupational air monitoring will be conducted. The procedures should specify the times or situations when air monitoring is conducted.
- b. Specify where occupational air monitoring will be conducted. The procedures should specify where air-monitoring devices would be located for collection of the sample.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. E. 3. (continued)

- c. Specify the monitoring method or type of air sampler, including the type and specifications of the filter (i.e., filter medium, diameter, pore size, face velocity, etc.). The procedures should specify the type of air monitoring/sampling conducted and the type of equipment used.
- d. Provide the instructions for use of the air sampler. The procedures should provide instructions sufficiently detailed for the persons responsible for conducting the air monitoring to operate the air monitoring equipment.
- e. Provide the procedure for handling of the sample. The procedures should describe the protocol for handling and transfer of the samples.
- f. Describe the method used to analyze the sample or provide the name of the analytical service provider. The procedures should describe the analytical procedure and the type of equipment used in analyzing the air samples or indicate who will analyze the samples and specify the lower limit of detection that will be employed.
- g. Describe the information that will be recorded to document the air sample results. The procedures should specify the information that will be recorded to document the collection and analysis of an air sample. The information should consist of, as a minimum, the following: the date of collection, start and stop time of the sampler, flow rate of the air sampler, job site, location at job site, identity of person collecting the sample, date of analysis of sample, identity of person analyzing the sample, and calculations for determining concentration.
- h. An example of the report form should also be included in the ORSEP.

F. SURVEYS

The ORSEP should identify the surveys that will be performed and described the particulars involved with the performance of the surveys. As a minimum, the surveys and the descriptions of their performance should include the following:

1. Personnel

Procedures describing the surveying of personnel should, as a minimum, contain the following:

- a. Specify when and where (frequency and location) surveys of personnel are conducted. As a minimum, personnel surveys should be conducted when persons leave the restricted area.
- b. Specify the appropriate type of instrument and probe to use in performing the survey.
- c. Describe what a person surveys and how the survey is conducted, including how the detection portion of the instrument is held and its distance from the surface of the person being surveyed.
- d. Specify what readings will be considered as satisfactory for indicating an acceptable level of contamination and what levels will indicate that decontamination efforts should be employed.
- e. Describe what information will be recorded to document the survey; as a minimum, date, identify of person surveyed and performing survey, unique identification of instrument, and results.

2. Area

Regulatory Guide 5.10 (Guidelines for Conducting Close Out Surveys of Open Lands and Requesting Release for Unrestricted Use) may be consulted for developing survey procedures of open lands. The procedures describing the surveys of areas should include, as a minimum, the following items:

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. F. 2. (Area -continued)

- a. Specify which areas are subject to surveys. Area surveys could involve only that area where the applicant/licensee engages in storage of NORM if the NORM is packaged or containerized. However, if the NORM will be loose at any time, then other areas where NORM workers go from the storage area should be included in the area survey program.
- b. Specify how often or when specific areas will be surveyed.
- c. Describe the method for conducting surveys of an area. The description should provide a systematic method for surveying the area of interest, using as a minimum 10 by 10 meter grids, use of the survey instruments (e.g., position of detector with respect to area being surveyed), and method for recording results.
- d. Specify the appropriate type of instrument and probe combination to use in performing the survey.
- e. Specify the limits appropriate for indicating release to unrestricted use, or a reference to the portion of the procedures where the limits are specified.
- f. Describe the information that will be recorded to document the survey; as a minimum, date, identity of area surveyed, identity of person performing survey, unique identification of instrument used, and results.

3. Equipment

Procedures describing the surveys of equipment should include, as a minimum, the following items:

- a. Describe the area where surveys are conducted to determine whether or not an item of equipment meets limits for release to unrestricted use. The location where these surveys are conducted should be away from areas or items that could contribute to the survey readings of the item being surveyed. The procedures should describe how such a location is selected and maintained free from interference.
- b. Specify the appropriate survey instrument or combination of meter and probe for conducting surveys of equipment items.
- c. Describe the method for using the survey instrument to survey the equipment items, or refer the reader to the portion of the procedures that contains the appropriate instructions.
- d. Specify the limits for determining if an item of equipment meets the standards for release to unrestricted use, or refer to the portion of the procedures where the limits are specified.
- e. Specify the information that is recorded to document the survey. As a minimum, the record should contain the following information: date, item surveyed, person performing survey, unique identification of survey instrument used, and results.

4. Facilities

The ORSEP should contain procedures describing the surveys performed at the facility. The procedures should include, as a minimum, the following items:

- a. Specify when and where surveys of facilities are conducted (e.g., upon departure from a job site, in the course of a job involved with decontaminating a customer's facility, routine surveys at permanent facility where decontamination or processing is conducted, etc.).
- b. Specify the appropriate type of instrument and probe combination to use in performing the survey.

## Branch Technical Position

### NORM Processing/Decontamination (7/05)

#### III. F. 4. (Facilities -continued)

- c. Describe how a person conducts a survey of a facility (e.g., gridding off the floor and walls of the facility, including specifying the size of the grids), recording survey readings at grid intersection points, and surveying facility features such as sinks, wash rooms, etc., and, how the survey instruments are used in conducting the surveys.
- d. Specify the limits that will indicate an acceptable level of contamination for release to unrestricted use, or refer to the section of the procedures where such limits are specified.
- e. Specify the information that is recorded to document the survey; as a minimum, date, identity of facility and portion of the facility surveyed, person(s) performing surveys, unique identification of instrument, and results.

#### 5. Background Determination

If background levels of radiation will be used as a basis for established limits for release to unrestricted use, the ORSEP should describe the method for determining background. As a minimum, the description of the background determination method should address the following:

- a. Specify the type of instrument(s) to be used in determining background. As a rule, the same type instrument used in making radiation measurements should be used to determine background radiation levels.
- b. Identify the location where background determinations are made or if locations change, describe how a particular location is selected to make the background determination.
- c. Specify when background determinations are made. As a rule, background determinations are made at each job site prior to initiating decontamination activities.
- d. As a minimum, specify the documentation of the background determination should consist of the date, location where the determination was made, person making the determination, unique identification of the instrument used, and the results.

#### G. SURVEY/RADIATION DETECTION INSTRUMENTATION

The ORSEP should contain, as a minimum, the following information regarding the survey/radiation detection instruments available for use:

##### 1. Type of Instrument

The ORSEP can either specifically identify the types of instruments available by manufacturer and model number, for both meter and probe, or specify the capabilities of the instruments used. Those specifications of the instrument capabilities should include the following:

- a. Types of radiation detected
- b. Response range of instrument  
(minimum of 1 to 500 microroentgens)

##### 2. Calibration Frequency

The ORSEP should specify the frequency at which the survey instruments are calibrated. As a minimum, survey instruments should be calibrated at intervals not to exceed twelve months or when the instrument is repaired, which ever occurs first.



**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. G. (continued)

3. Calibration Service Provider

The ORSEP should either specify the person or persons (i.e., persons specifically licensed to perform instrument calibrations) who will be employed to calibrate the survey instruments, or commit to using only persons licensed by the Agency, the United States Nuclear Regulatory Commission or an Agreement State to perform instrument calibrations.

4. Instructions On Use

The ORSEP should describe the situations appropriate for use of the specific instruments and contain detailed instructions on the proper manner for use of a particular meter and probe combination.

H. MONITORING TO DETERMINE COMPLIANCE WITH THE GENERAL PUBLIC DOSE LIMITS

The applicant/licensee must implement a program to demonstrate that members of the general public do not receive a dose in excess of the limits prescribed in 25 TAC § 289.202(n) as a result of the licensee's activities. In accordance with 25 TAC § 289.202(o), the licensee is required to make or cause to be made surveys of radiation levels in unrestricted areas and radioactive materials in effluents released to unrestricted areas to demonstrate compliance with the dose limits.

1. To address the external component of the dose to the general public, the procedures should describe the surveys or measurements (e.g., posting boundary of restricted area with TLDs) that are made to determine radiation levels in unrestricted areas for the purpose of demonstrating compliance with the dose limits to the general public. This description should include where the surveys are made, when they are made, and the instrument(s) used to make the surveys, or in the case of TLD, where and when they are posted, processed and who provides the service.
2. To address the internal component of the dose to the general public, the procedures should describe the sampling and analysis of air or liquid samples obtained from such fluids released from the site where radioactive material are used. The following should be addressed in the procedures:

a. Air Monitoring

Air monitoring should be conducted at least at the restricted area boundary to assess the concentration of airborne radionuclides entering unrestricted areas where members of the general public could be present. The applicant/licensee's procedures should describe an air monitoring program which addresses the following areas:

- (1) Specify the times or situations when air monitoring is conducted.
- (2) Specify where air monitoring devices will be located for each type of monitoring method. The procedures should also indicate that the wind direction will be determined and recorded each day for each job site and the air monitoring device located at the downwind side of the operations (usually at the restricted area boundary). If a wind direction change should occur, that should also be recorded, and the air monitoring device's location changed accordingly. The procedures should further specify that the location of the air monitoring device will be recorded for each job site.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. H. 2. a. (continued)

- (3) Specify the type of air monitoring/sampling conducted and the type of equipment used.
- (4) Provide instructions sufficiently detailed for the persons responsible for conducting the air monitoring to operate the air monitoring equipment.
- (5) Describe the protocol for handling and transfer of the samples.  
This should indicate the use of an appropriate container for the sample and a means of uniquely identifying the sample.
- (6) Describe the analytical procedure and the type of equipment used in analyzing the air samples or indicate who will analyze the samples and specify the lower limit of detection that will be employed. As a minimum, the lower limits of detection should be one-tenth, or less, of the value to which compliance is to be demonstrated. As an example, if gross alpha counts are being used to demonstrate compliance with the limits specified at 25 TAC § 289.202(o)(2)(B)(i), that is,  $1 \times 10^{-15}$   $\mu\text{Ci/ml}$ , then the lower limit of detection should be  $1 \times 10^{-16}$   $\mu\text{Ci/ml}$  or less.
- (7) Specify the limits that will be indicative of an airborne contamination problem and the actions that will be taken.
- (8) Specify the information that will be recorded to document the collection and analysis of an air sample. The information should consist of, as a minimum, the following: the date of collection, start and stop time of the sampler, flow rate of the air sampler, job site, location at job site, identity of person collecting the sample, date of analysis of sample, identity of person analyzing the sample, and calculations for determining concentration. An example of the report form should also be included in the ORSEP.

b. Liquid Monitoring

The ORSEP should contain procedures describing the method(s) for determining that any liquids released from the facility to unrestricted areas meets the standards for release to unrestricted use. As a minimum, the liquid monitoring program should include the following items:

- (1) Specify the times or situation when liquid monitoring is conducted.
- (2) Describe the method for collecting, handling, and transferring a liquid sample.
- (3) Describe the analytical methodology and the type of equipment used in analyzing the liquid samples or indicate who will analyze the samples and specify the lower limit of detection that will be employed.
- (4) Specify the limits that will be indicative of liquids unsuitable for release to unrestricted use or areas.
- (5) Specify the information that will be recorded to document the collection and analysis of a liquid sample. That information should consist of, as a minimum, the following: the date of collection, identity of person collecting the sample, identity of sample (i.e., date and location of collection), job site, identity of person analyzing the sample, and calculations (including formula used) for determining concentration. An example of the report form should also be included in the ORSEP.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. (continued)

I. SOIL MONITORING

The ORSEP should describe how the licensee would verify that the soil where decontamination or processing operations are conducted at the customer's site has not been contaminated as a result of the decontamination activities or has been successfully decontaminated and meets the appropriate limits for release to unrestricted use. The procedures should contain, as a minimum, the following items:

1. Specify when soil samples should be collected.
2. Describe how the location for the collection of the soil sample(s) is selected.
3. Describe the protocol for obtaining the soil sample (e.g., equipment used, depth to which sample is taken, size of sample, sample container and identification, etc.).
4. Describe the protocol for sample identification and transfer to other persons.
5. Describe the equipment and methodology used in analyzing the soil samples, or identify the provider of the analytical service, and specify the lower limits of detection employed.
6. Specify the limits appropriate for release of the area to unrestricted use or for engaging in soil decontamination or remediation efforts.
7. Specify the information that is recorded to document the analysis of soil samples. That information should include, as a minimum, the following: date of collection, job site, location where collected, location at job site, identity of person collecting the sample, date of analysis of sample, identity of person analyzing the sample, and calculations (including formula used) for determining concentration. A copy of the report form should also be included in the ORSEP.

J. RESPIRATORY PROTECTION

If no credit will be taken for the protection from inhalation of radionuclides afforded by the use of respirators, then this section should not be addressed in the application. A statement that respirators will be used, but not taking credit for the protection afforded by the use of respirators will only confuse matters. However, if credit is taken for any protection afforded by the use of respirators, the elements specified in 25 TAC §289.202(x)(1) should be described and discussed in the procedures. Those elements include the following: air sampling to identify the hazard; selection of respirators; estimates of exposure; surveys and bioassays to evaluate actual intakes; testing of respirators; procedures for selection, fitting, issuance, maintenance, and testing of respirators for operability; supervision and training of personnel; and recordkeeping; and a written policy statement that includes the use of process or other engineering controls instead of respirators, the routine, nonroutine and emergency use of respirators, and the length of periods of respirator use and relief from respirator use. Specific guidance on information that should be provided for each of those elements may be obtained from NRC's NUREG-0041.

K. RECEIPT PROCEDURES

If all activities are conducted at the customer's site and any NORM waste generated will be left with the customer then procedures for the receipt of radioactive material do not need to be addressed. However, if radioactive materials are received from other persons and possession is taken, the following items should be addressed in the ORSEP:

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. K. (continued)

1. Procedures for complying with 25 TAC §289.202(ee)(1) (arrangements for picking up packages and being notified of arrival of packages with radioactive material in excess of Type A limits [for Ra-226: 50 millicuries]).
2. Procedures for complying with 25 TAC §289.202(ee)(2) and (3) (monitoring packages for contamination and radiation levels). Not necessary for NORM, unless the package warrants a White I, Yellow II or Yellow III label.
3. Procedures for complying with 25 TAC §289.202(ee)(4) (notification of the final delivery carrier and the DSHS)
4. Procedures for complying with 25 TAC §289.202(ee)(5) (written procedures for safely opening packages in which radioactive material is received and ensuring that the procedures are followed).

L. OPERATIONAL PROCEDURES

The ORSEP should describe the process involved with each category of activity requested in the application. This description should describe the process in sufficient detail so that a person can conduct the procedure by referencing this ORSEP. Specific activities may vary, however, the following are listed as a start to identify possible activities that should be included in the ORSEP:

1. Equipment decontamination
  - a. process and equipment description
  - b. process flow diagram
  - c. release limits
2. Facility decontamination
  - a. process and equipment description
  - b. process flow diagram
  - c. release limits
3. Soil remediation
  - a. process and equipment description
  - b. process flow diagram
  - c. release limits
4. Fluid decontamination
  - a. process and equipment description
  - b. process flow diagram
  - c. release limits
5. NORM processing

For each type of processing activity requested (i.e., storage, extraction of materials, transfer, volume reduction, compaction, incineration, solidification, or other separation and preparation of NORM or NORM-contaminated materials or items for reuse or disposal, including any treatment or activity that renders the waste less hazardous, safer for transport, or amenable to recovery, storage, or disposal) the following should be provided to describe that activity:

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. L. 5. (NORM processing –continued)

a. Process description

Describe the type(s) of process(es) that will be employed with the NORM or NORM-contaminated materials.

b. Equipment description

For each type of process employed, describe the equipment, preferably by inclusion of a drawing that provides the dimensions of the features of the equipment item that will be used to conduct the process. The description should also include the operating parameters of the equipment. As an example, for an incineration unit a description, including a detailed drawing, should be provided of the incinerator. The description should depict the features of the incinerator such as means of introducing material in to the combustion chamber, how the chamber is sealed to preclude escape of solid or gaseous products, means of removing gaseous products from the chamber, features of the incinerator that handle gaseous products (e.g., condensation chambers, stack, etc.), through the stack, provide the temperatures and burn time of the incineration chamber, and the temperatures and residence time in any exhaust features. The description should also indicate any portal of exit from the burn chamber of either solids or fluid effluents. In the case of gaseous effluents, the description should indicate the path that the gases take through the incinerator, the dimensions of the exhaust system (e.g., stack), and the location of flow and air sampling.

c. Process flow diagram

For each type of process provide a diagram of the treatment process. The diagram should indicate receipt of materials, where specific equipment items are located in the treatment process, where NORM or NORM-contaminated materials are introduced into the equipment, where NORM is removed from the equipment item, where effluents that are generated from or that were in contact with the NORM or NORM-contaminated material are removed from the equipment item.

**M. WASTE MANAGEMENT**

The ORSEP should describe how radioactive waste (i.e., removed NORM) is managed. If the sole method of waste management is storage, the ORSEP should address, as a minimum, the following topics:

1. Containers

The type of containers used to store radioactive material should be described. If different types of containers will be used due to incompatibility of some radioactive materials with certain types of containers, the ORSEP should specify the type of containers appropriate for use under specific conditions.

2. Storage Conditions

The ORSEP should specify the manner in which the containers of radioactive material may be stored (e.g., on pallets, off the ground, under cover, etc.) in a manner consistent with the limitations of the storage container (e.g., steel drums would not be stored on the ground due to the effects of corrosion, polypropylene drums would not be stored in the open exposed to sunlight due to embrittlement, etc.).

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. M. (continued)

3. Labeling of Containers and Posting of Location

The ORSEP should describe the type of labeling that will be used on the containers of radioactive material and the type of postings used to identify the area where the containers are stored. The ORSEP should also indicate how the location of the postings is determined and how the type of labeling to be used is determined.

4. Security to Prevent Access to or Unauthorized Removal

The ORSEP should describe the security measures to be employed to prevent unauthorized access to or removal of containers of radioactive material from the storage location.

5. Inventory

The ORSEP should describe the frequency of performing an inventory of the containers of radioactive material and contain a copy of the form used to record the results of the inventory.

N. RADIATION WORK PERMIT (RWP) PROCEDURES

Activities involving the use of radioactive material not specifically described by the ORSEP which could result in exposure to airborne radionuclides in excess of the regulatory limits (e.g., entry or work in a confined space) or exposure to radiation levels that could easily result in an overexposure should include the use of the radiation work permit system. The ORSEP should specify, as a minimum, the following:

1. when RWPs are to be used,
2. the procedure for the issuance of an RWP,
3. how the issuance of an RWP will be documented, and
4. actions to be taken to verify that the requirements of the RWP are followed.

O. CONTAMINATION CONTROL

1. Protective Clothing

a. Type

The ORSEP should identify and describe the types of protective clothing available and the appropriate uses for each. If special instructions are required for the use and handling of the item(s), these should also be included in this section.

b. Reuse

1. how long used
2. surveyed
3. cleaned
4. stored

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. O. (continued)

2. Personnel Surveys

This section can refer the reader to the portion of the ORSEP that addresses the procedures for conducting surveys of personnel.

3. Personnel Hygiene

- a. Prohibitions on eating, smoking, chewing, and drinking in the restricted areas,
- b. Requirements to remove protective clothing prior to exiting the restricted area,
- c. Requirements to wash hands prior to eating, smoking, chewing, drinking, urinating and defecating.

4. Inspection of Stored NORM

- a. Specify the frequency for conducting surveys.
- b. Specify the radiation levels that will dictate that action be taken and specify the action to be taken in response to those radiation measurements.
- c. Describe the procedures for conducting a survey of the stored NORM or refer to the section of the ORSEP that contains that description.
- c. Describe the information that shall be recorded to document the survey. As a minimum, the date, person performing the survey, area or item surveyed, unique identification of instrument used, and results of survey should be recorded.

P. FACILITY MONITORING PROGRAM

The ORSEP should describe the monitoring plan for a NORM decontamination or processing facility. The monitoring program should address the phases of the facility. The preoperational phase monitoring program should be designed to characterize the site as to existing radiation levels in the parameters of concern (e.g., soil, water and air). The operational monitoring program is a description of the monitoring (i.e., surveys, sampling, and analysis) during the operation phase of the facility to demonstrate and assure that the operations at the site are not resulting in releases off site in excess of permitted concentrations or resulting in exposures off site in excess of allowable limits, and monitors the levels of radiation and radionuclide concentrations on site for purposes of assessing occupational dose. The post operational program should describe the monitoring program to be employed to assess the facility after operations cease to demonstrate that the site is releasable to unrestricted use. These programs should, as a minimum, address the following:

1. Preoperational Site Monitoring Program.

This program should include the following:

- a. direct gamma radiation measurements - indicate sites, methodology, and frequency;
- b. radiological characteristics of soil, groundwater, surface waters, vegetation - indicate sampling sites, describe sampling and analytical methodology, frequency of sampling, and radionuclides analyzed for;

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. P. 1. (continued)

- c. air quality (on-site and off-site) - indicate areas where samples are collected, describe sampling and analytical methodology, frequency of sampling, and radionuclides analyzed for.

2. Operational Site Monitoring Program.

This program should include the following:

- a. direct gamma radiation measurements - indicate sites, methodology, and frequency;
- b. radiological characteristics of soil, groundwater, surface waters, vegetation (on-site and off-site) - indicate sampling sites, describe sampling and analytical methodology, frequency of sampling, and radionuclides analyzed for;
- c. air quality (on-site and off-site) - indicate areas where samples are collected, describe sampling and analytical methodology, frequency of sampling, and radionuclides analyzed for.

3. Postoperational Site Monitoring Program.

This program should include the following:

- a. direct gamma radiation measurements - indicate sites, methodology, and frequency;
- b. radiological characteristics of soil, groundwater, surface waters, vegetation - indicate sampling sites, describe sampling and analytical methodology, frequency of sampling, and radionuclides analyzed for;
- c. air quality (on-site and off-site) - indicate areas where samples are collected, describe sampling and analytical methodology, frequency of sampling, and radionuclides analyzed for.

**Q. RECORDS MANAGEMENT**

The ORSEP should specify the types of records that are to be maintained, identify the person responsible for maintenance of the records and identify where they will be stored or maintained for inspection. This section should address at least the following items regarding management of records:

1. Types of Records

- a. receipt [25 TAC §289.201(d)]
- b. transfer [25 TAC §289.201(d)]
- c. disposal [25 TAC §289.201(d)]
- d. leak test [25 TAC §289.201(g)(4) and §289.202(oo)]
- e. provisions of radiation protection program [25 TAC §289.202(mm)]
- f. audits of radiation protection program content and implementation [25 TAC §289.202(mm)]
- g. occupational radiation dose received during the current year for each individual monitored [25 TAC §289.202(j)(6) and (rr)]
- h. lifetime cumulative occupational radiation dose for each individual involved in a planned special exposure [25 TAC §289.202(k)]
- i. radiation surveys required by 25 TAC §289.202(p) [25 TAC §289.202(nn)(1)]
- j. calibrations required by 25 TAC §289.202(p) [25 TAC §289.202(nn)(1)]



**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

- III. Q. 1. (Types of Records -continued)
- k. surveys used to determine dose from external sources of radiation [25 TAC § 289.202(nn)(2)(A)]
  - l. measurements and calculations used to determine individual intakes of radioactive material used in the assessment of internal dose [25 TAC § 289.202(nn)(2)(B)]
  - m. air sampling, surveys and bioassays required pursuant to 25 TAC § 289.202(x)(1)(C)(i) and (ii) [25 TAC § 289.201(nn)(2)(C)]
  - n. measurements and calculations used to evaluate the release of radioactive effluents to the environment [25 TAC § 289.201(nn)(2)(D)]
  - o. planned special exposures describing (a) the exceptional circumstances requiring the use of a planned special exposure, (b) the name of the management official who authorized the planned special exposure and a copy of the signed authorization, (c) what actions were necessary, (d) why the actions were necessary, (e) what precautions were taken to assure that doses were maintained ALARA, (f) what individual collective doses were expected to result, and (g) the dose actually received in the planned special exposure [25 TAC § 289.202(qq)]
  - p. records sufficient to demonstrate compliance with the dose limits for individual members of the general public as specified in 25 TAC § 289.202(n) [25 TAC § 289.201(ss)(1)]
  - q. training
  - r. inventory
2. Person Responsible for Records Management
3. Location Where Records are Kept for DSHS Inspection

**R. ADMINISTRATION**

1. ALARA Policy

The ORSEP should contain a statement of the licensee's intent and commitment with respect to maintaining exposure to ionizing radiation as low as reasonable achievable (ALARA). This statement should be supported by citing the actions taken by the licensee to achieve the ALARA goal (e.g., informing the employees of the ALARA philosophy, employing a qualified RSO, delegation of sufficient authority to the RSO to implement and upgrade radiation safety procedures and stop unsafe work practices, clearly defining radiation protection responsibilities for each position in the licensee's organization, training of workers, issuance of work permits, and periodic audits of safety procedures and records, etc.)

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. R. (continued)

2. Records Review

This section should describe the records that are reviewed by the RSO and the licensee's management on a specified frequency. The procedures should specify the frequency at which the records are reviewed and denote, by initialing, that specific records were reviewed. As a minimum, the review should include the following records:

- a. Dose assessment records
  - (1) personnel dosimetry
  - (2) bioassay
- b. Survey records
- c. Air monitoring records
- d. Liquid monitoring records
- e. Radiation work permits
- f. Calibration

3. Audits

Audits should be included as a part of the licensee's quality assurance program. Audits should be conducted to assure that the various quality control aspects of the radiation safety program are being conducted and conducted as specified. The ORSEP should specify the audits that are conducted, the frequency of conducting the audits, and specify who conducts the audits. The audits should, as a minimum, include the following:

- a. Personnel surveys
- b. Air monitoring
- c. Liquid monitoring
- d. Soil monitoring
- e. Personnel monitoring
- f. Radiation areas
- g. Radiation postings and signs  
[25 TAC §289.203(b)(1) worker postings & §289.202(aa) caution sign postings]
- h. Receipt procedures
- i. Training and refresher training

4. Postings

The procedures should describe where and how the postings required by 25 TAC §289.203(b)(1) will be met.

5. Worker Instructions

The procedures should describe how the instructions to workers required by 25 TAC §289.203(c)(1) will be documented as having been done.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. R. (continued)

6. Training

- a. The ORSEP should identify the provider of training to the workers and the qualifications of the instructors.
- b. The ORSEP should describe the subjects covered in the training provided to the workers. The subjects should, as a minimum, include the following topics:
  - (1) types of radiation
  - (2) effects of radiation
  - (3) means of radiation detection
  - (4) means of protecting against radiation
  - (5) personnel monitoring
  - (6) respiratory protection (if used as a part of the radiation protection program)
  - (7) female worker instructions and declarations
- c. The ORSEP should describe the type of examination (oral or written) used to determine the effectiveness of the training provided to employees, and what level of performance on the examination is considered passing.
- d. Documentation of training
- e. Refresher training
  - (1) frequency
  - (2) subjects
  - (3) duration
  - (4) instructors

**S. TRANSFER PROCEDURES**

The ORSEP should identify the steps involved with transferring radioactive material to another person and the details required to accomplish the transfer.

1. Verification of Authorization to Receive

The applicant/licensee should specify which (or all) of the methods described in 25 TAC §289.252(cc)(1)-(5) will be used to obtain verification, and records specified by §289.201(d)(1)-(5).

2. Packaging

The applicant/licensee should describe the procedures for packaging material for transfer to another person. Those procedures should address the following items:

- a. Container
- b. Surveys
- c. Labeling
- d. Shipping papers

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. (continued)

T. EMERGENCY PROCEDURES

The ORSEP should specify the actions to be taken in the event of an accident. This section should attempt to identify or categorize in a general sense the type of accidents that can occur and then provide instructions on actions to be taken by users of the radioactive material in the event of such accidents. As an example, the ORSEP should address the following:

1. Spills

a. On-site

- (1) notifications
- (2) access restriction
- (3) area assessment
- (4) spill containment

b. Off-site

- (1) release from facility
  - (a) notifications
  - (b) access restriction
  - (c) area assessment
  - (d) spill containment
  
- (2) transportation accident
  - (a) notifications
  - (b) access restriction
  - (c) area assessment
  - (d) spill containment

2. Personnel Injury

- a. notifications

U. DECOMMISSIONING PROCEDURES

1. Mobil Operations

The procedures should describe the protocol for abandoning a job site on completion of decontamination activities. These procedures should address how the licensee will determine that the job site meets the radiation limits for release to unrestricted use, that all equipment items used in the licensee's decontamination activities meet the limits for release to unrestricted use, and that any fluids discharged or left behind meet the limits for unrestricted use. The procedures should, as a minimum, address the following items:

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. U. 1. (continued)

a. Site Release

(1) Release criteria

The applicant should specify the soil concentration limits that will be used to determine if a site can be released to unrestricted use. Title 25 of the TAC, §289.259(d)(1) provides for the use of either 5 picocuries per gram (pCi/g) of radium in soil or 30 pCi/g. The 30 pCi/g limit can be used if the applicant/licensee can demonstrate that the NORM contamination is due to oil and gas NORM waste (as defined at 16 TAC) or that the radon emanation rate (flux) will not exceed 20 picocuries per square meter per second (pCi/m<sup>2</sup>/sec). The only method currently recognized by the DSHS for determining radon flux is the procedure identified as Method 115 in Appendix B of Chapter 61 of Title 40 of the Federal Code of Regulations. Therefore, if an applicant/licensee proposes to use the 30 pCi/g limit for soil or material other than soil, that is not oil and gas NORM waste, then they should include in the ORSEP submitted with the application a description of the procedure cited in 40 CFR 61, Appendix B, Method 115.

(2) Contamination identification survey and documentation

The applicant should have procedures similar to those described in Sections IV.A and B of Regulatory Guide 5.10 (Guidelines for Conducting Close Out Surveys of Open Lands and Requesting Release for Unrestricted Use).

(3) Clean up procedure

(4) Post-clean up survey and documentation

b. Equipment Release

(1) Release criteria

The release criteria for equipment will depend on the type of equipment and the use intended for the equipment upon release. Equipment that is to be release for recycling, that is to be smelted and made into a new product, can be released under the criterion of 50 µR/hr [re: 25 TAC §289.259(d)(2)]. Equipment that is oil field tubulars or surface production equipment can also be released under the 50 µR/hr criterion [re: 25 TAC §289.259(d)(3)]. Any other equipment can be released only under the surface contamination limits specified at 25 TAC §289.259(w).

(2) Contamination identification survey and documentation

(3) Clean up procedure

(4) Post-clean up survey and documentation

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

III. U. 1. (continued)

c. Effluent Release

The procedures should describe the actions taken to ensure that effluents (e.g., fluids such as wash water) is either disposal of as radioactive material or if released, meets appropriate standards for release to unrestricted use. These procedures should, as a minimum, address the following topics:

- (1) Release criteria
- (2) Contamination identification survey and documentation
- (3) Clean up procedure
- (4) Post-clean up survey and documentation

2. Fixed Facility

Provide a decommissioning plan for the facility that addresses the following items:

The ORSEP should describe the protocol for abandoning decommissioning the facility upon completion of the facility's life as a site for decontamination of NORM contaminated materials. These procedures should address how the licensee will determine that the facility and surrounding areas meet the radiation limits for release to unrestricted use, that all equipment items used in the licensee's decontamination activities meet the limits for release to unrestricted use, That the soils or lands whereon the facility resides meets the limits for unrestricted use, and that any fluids discharged or left behind meet the limits for unrestricted use. The ORSEP should, as a minimum, address the following items:

- a. radiological surveys and other methods to assess radiological contamination of materials, equipment, and buildings;
- b. criteria and procedures for decontamination of materials, equipment and buildings;
- c. criteria for release of materials, equipment, and buildings for unrestricted use;
- d. disposal of uncontaminated materials, equipment, and buildings;
- e. disposal of contaminated materials, equipment, and buildings;
- f. protocols for soil surveys and sampling to assess radiological contamination, the statistical methods to be used, and the criteria for soil cleanup;
- g. post-cleanup surveys; and
- h. measurement methodology (survey instrumentation, analytical methods) and quality assurance.

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

IV. Financial Security/Assurance

If the applicant/licensee will take possession of NORM for decontamination at a customer's site or will receive NORM at the licensee's facility for decontamination or processing, financial security/assurance will be required. The financial security/assurance requirements are specified at 25 TAC §289.259(v) and §289.252(gg). If an applicant requests authorization to possess in excess of 10<sup>5</sup> the limits specified at 25 TAC §289.252(gg)(1), then a decommissioning funding plan must be submitted. The decommissioning funding plan will consist of a decommissioning plan as well as a method for providing financial security. If a decommissioning funding plan is required, please request a copy of the Branch Technical Position for the Preparation of a Decommissioning Plan Cost Estimate. Financial security/assurance may be in the form of a cash deposit, a surety bond, a certificate of deposit, an irrevocable letter of credit, a deposit of government securities, or other security acceptable to the DSHS. If financial security/assurance is required, the applicant should identify to the DSHS the type of surety that will be used. The DSHS has developed acceptable language for the various forms of surety that can be accepted. The applicant should obtain from the DSHS a copy of the language for the form of surety to be used before submitting the surety to the DSHS for acceptance.

V. Licensing Fee

An application for a license should be accompanied by the application fee. The application will not be processed until the fee has been received. The fee is non-refundable. However, if a license is issued the application fee is applied as the first years license fee.

The application fee is determined by the type of license for which application is being made and is good for the initial two-year following issuance of the license. The types of license and fee amount are prescribed in 25 TAC § 289.204(e)(8)(A) or (B). An additional surcharge of 5% of the total fee may be required for the Radiation and Perpetual Care Account as specified in rule. The Agency's accounting staff will be able to identify if fee is currently required. During license renewal, a Texas On-line application fee of \$20 is also required whether utilizing the On-line renewal process or not.

If the application is submitted by any method other than hand delivery, the fee payment should be in the form of a check or a money order made payable to the "Texas Department of State Health Services".

**Branch Technical Position**  
**NORM Processing/Decontamination (7/05)**

APPENDIX A

METHODS AND FREQUENCY FOR CONDUCTING RADIATION SURVEYS

I. Introduction

When contaminated material is handled, both radiation surveys and contamination surveys should be performed to prevent unnecessary radiation exposure to personnel and to prevent the spread of contamination throughout the site. Radiation surveys are performed using a radiation survey instrument, and contamination surveys are performed by taking wipe samples from surfaces likely to be contaminated in the facility.

II. Methods Of Surveys

Suggested methods for performing the two types of surveys are given below. Records of these surveys should be maintained for inspection by the DSHS and for reference to determine whether the radiation levels or the contamination levels remain constant or increase over a period of time.

A. Radiation Level Surveys

1. Instrument - A survey instrument capable of measuring radiation levels in microroentgens per hour (uR/hr) should be used.
2. Method - Equipment should be surveyed with the instrument's detector not less than one centimeter from the surface of the area being surveyed.
3. Records - The results should be recorded on a standard form showing the location, date, person performing survey, unique identification for instrument used, radiation levels, and corrective action taken, if any. A sketch of the area should be used to make an easily prepared and easily understood survey record.

B. Contamination Level Surveys

1. Instrument - Measurements should be made using a scintillation well counter, a proportional counter, or any other detector capable of detecting the radiations emitted by NORM and the appropriate energy ranges for those radiations. The instruments should provide results in counts per minute.
2. Method - A series of wipes using uncontaminated filter papers or swatches of cloth should be taken from those surfaces where contamination could exist (e.g., facilities where the decontamination process took place, etc.). The wipes should be numbered or labeled and their location indicated on the sketch record as previously described. Each wipe should be rubbed over a surface area of about 100 square centimeters to maintain a consistent means of determining the amount of removable contamination.



3. Records - The results should be recorded on a standard form showing the wipe identification number, the date, person performing the analysis, unique identification of instrument used, results, and calculations to convert to disintegrations per minute.

### III. Frequency Of Surveys

The frequency of surveys depends upon the amount and type of radioactive material used. Listed below are examples that may be useful in determining how often to perform surveys. The greater the workload, the more often the surveys should be performed.

- A. Low-Level Areas - Not less than once a month.
- B. Medium-Level Areas - Not less than once a week.
- C. High-Level Areas - Not less than once a day.

### IV. Acceptable Limits

#### A. Radiation Levels

1. Areas - In no unrestricted (uncontrolled) area should radiation levels exist such that a person could receive 100 mR in any one-year or 2 mR in any one hour. If such areas are found, measures should be taken to eliminate the excessive radiation levels. Additional shielding or relocation of radioactive material may be required. For restricted areas, the applicant should establish acceptable radiation levels that are as low as reasonably achievable.
2. Equipment from oil production areas and equipment in the recycling process - 50 uR/hr

#### B. Contamination Limits

1. Facilities and equipment should show no more than 1,000 dpm removable, as determined from a wipe, and no more than 5,000 dpm averaged and 15,000 dpm maximum for fixed contamination.

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## NORM Decontamination Application Review Guide

License Application No:   L0  

Log No.:                     

Item	Adequate Y / N	Comments/Questions
BRC Form 252-2 Used		
Signed and Dated		
BRC Form 252-1 Submitted		
Financial Qualifications/Assurance		
RSO Qualifications		
Training		
Experience		
<b>ORSEP</b>		
Organizational Structure		
RSO Duties & Responsibilities		
RSO Authorities		
RAM Users – Duties, Responsibilities & Authorities		
Users Training & Experience		
Restricted Area Designation		
Restricted Area Access Control		
Radiation Area Designation		
Personnel Dosimetry		
Occupational Dose Limits		
External Dose		
Internal Dose		
Air Sampling		
Bioassays		
Surveys		
Personnel		
Area		
Equipment		
Facilities		
Surface Contamination		
Background Determination		
Instrumentation		
Type		
Calibration Frequency		
Calibration Service		
Instructions on Use		
Scalers		
Public Dose Limits		
Radiation Levels		
Air Monitoring		
Liquid Monitoring		
Soil Monitoring		
Respiratory Protection		
Operational Procedures		
Equipment Decontamination		
Facility Decontamination		
Soil Remediation		
Fluid Decontamination		
NORM Processing		
Waste Management		
Radiation Work Permit		

Contamination Control		
Records Management		
Types of Records		
Where Kept		
Person Responsible		
Administration		
ALARA Policy		
Records Review		
Audits		
Postings		
Container Labeling		
Worker Instructions		
Training		
Transfer Procedures		
Emergency Procedures		
Spills		
Personnel Injury		
Decommissioning Procedures		
Site Release		
Equipment Release		
License Application Fee Paid		
Sample Chain of Custody		

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Reviewer name and date