

**2004  
RATIONALE FOR REVISIONS**

**PART N  
REGULATION AND LICENSING OF  
TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE  
MATERIAL (TENORM)**

Introduction

The following are reasons for changes made to the April 1999 version of Part N:

Specific Provisions

Sec. N.1 - Purpose.

Changes clarify the activities for which radiation standards or licensing criteria have been established by Part N.

Sec. N.2 - Scope.

N.2a. The minor editorial change is for clarification that some TENORM is excluded, such as the TENORM that is exempt.

N.2b. and N.2c. The order of these two sections was swapped. Because "Beneficial attribute" and "Beneficial to the product" had the same meaning, the first term was replaced by the second in the text. The "and/or its" words were deleted from N.2b. because the item being covered is covered well in N.2c. The words "neither the TENORM, nor" were deleted because Part N addresses radiation hazards.

N.2d. Here and elsewhere specific references to the Atomic Energy Act (AEA) definitions of source material and byproduct material were used because the NORM radionuclides for which NRC retains exclusive jurisdiction are defined by the terms used in SR-N's revised language rather than by radionuclide. Work is being done that may change the concentrations at which these materials are regulated by the NRC and Agreement States.

N.2e. The reference to location of transportation requirements has been moved here from N.4e. because the requirements are not exemptions.

Sec. N.3 - Definitions.

The term "Beneficial attribute" has been deleted because the identically defined term "Beneficial to the product" is now used throughout to be clearer.

The term "Conditional release" has been defined because it was used in N.7.

The term "Consumer" has been defined to clarify requirements in N.10, N.20, and N.22.

The term "Consumer or retail product" has been defined because it has been used in several sections including N.10, N.20, and N.22. The definition is a slight modification of the definition in the Consumer Product Safety Act (15 USC Section 2052).

The term "Critical group" has been defined as it is used in N.7b.

The terms "General environment" and "Institutional controls" are not used in the text so these terms have been deleted.

The definition for "Product" had a word that is not the generally accepted term of art for the affected industries so it was replaced with the generally accepted word -- "beneficiated."

The term "Residual radioactivity" has been defined as it is used in N.7. The definition was taken from 10 CFR 20.1003.

The definition of "Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)" including the pre-1978 tailings of waste produced by the extraction or concentration of uranium or thorium has been modified to match the language used in N.2d. See the comment for N.2d. above for the reason.

A footnote was added to address the EPA's concern regarding the definition of TENORM.

The definition of "Transfer" was revised for clarity.

#### Sec. N.4 - Exemptions.

N.4 formatting was revised.

N.4a. Minor editorial changes were made for clarification. The last sentence was moved to N.8e. because it is a prohibition rather than an exemption. Disposal is not the only issue here because dilution could be done to become or remain exempt. NOTE: SR-N also introduced a section, N.9, to address the prohibition. A footnote has been added to clarify that the concentration of TENORM may not be averaged over the weight of the contaminated article. The word "own" was deleted because ownership is addressed in Part C. The last sentence was clarified to indicate that consumer or retail products having greater than 5 pCi/g of radium are subject to specific licensing.

N.4b. Because the reference is to TENORM distributed in accordance with N.20a. and such TENORM is only regulated by Part N, "these regulations" has been changed to "this Part" for clarity.

N.4c. The word "fertilizer" was preceded by "phosphate or potash ore-based" to distinguish phosphate or potash fertilizers from organic-based fertilizers.

N.4d. The optional exemption for zircon, zirconia and zircon products was added after evaluation of information submitted demonstrated that the dose criteria specified in N.4f. would not be exceeded. The zircon exemption was added as a new N.4d.

N.4d. through N.4f. were relettered due to the insertion of the new N.4d.

N.4e. To be consistent the words have been spelled for the acronym CERCLA as was done for RCRA. The statutory references for the two federal statutes have been added as a user friendly item for persons desiring the information.

N.4e. The transportation provision has been moved to N.2e. because it is not an exemption. Transportation of TENORM is covered by the same regulations as all other radioactive material.

N.4f. The criterion upon which exemptions from Part N are to be based has been added.

N.4g. A section was added to address land spreading of water treatment plant and sewage treatment plant liquid or sludge.

A footnote was added for clarification in response to U.S. EPA's comments.

#### Sec. N.5 - Standards for Radiation Protection for Members of the Public.

The title has been changed for clarity because radiation protection for workers is addressed in N.6.

N.5a. This provision includes standards for radiation protection for TENORM that are consistent with Part D. N.5a. refers to controlling exposure to the general public from activities licensed or registered by the Agency. For clarity minor editorial changes were made to include words used in the referenced sections.

N.5b. For clarity the words were changed to correspond with the title of Part D.

N.5c. The dose from inhalation of radon and its short half-life decay products is excluded from the dose to members of the public, except when the dose is due to effluent releases from licensed operations from handling or processing TENORM. For licensed facilities that cause the release of radon from materials being processed the impact on the public is controlled by the effluent release criteria of Part D, and the dose from the released radon should be included in dose to workers.

N.5c. The standards for radiation protection exclude doses from indoor radon and its progeny. Radon, a radioactive gas, can accumulate to elevated levels inside buildings. Isotopes of radon are formed by the decay of uranium and thorium. There are many factors such as construction methods that make it nearly impossible to accurately predict the level of radon expected from a given concentration of uranium or thorium in soils or building materials. SR-N recommends that use, transfer or disposal of TENORM be done in such a manner to be consistent with EPA/HHS 1994 indoor radon guidance. This may be achieved by institutional controls or the adherence to building codes. As such, implementation of the Agency's radon program should provide adequate protection of the public from indoor radon.

Sections N.5b. and N.5c. have been revised to clarify that the TEDE dose from radon and its short half-life progeny for effluent emissions from licensed sites is included based on Part D, but that the indoor inhalation dose from diffusion of radon from subsurface residual radium is excluded from calculations of the TEDE dose.

N.5d.of 1999 has been deleted, due to revisions in N.5b. and N.5c.

Sec. N.6 - Protection of Workers During Operations.

Words have been changed for clarification.

Sec. N.7 - Unrestricted Use and Conditional Release.

The title has been changed to reflect changes in what is now covered by this section and the section has been rewritten. The section has been rephrased to state what can be done rather than what cannot. New subsections have been added to clarify criteria for transfer, unrestricted use and conditional release.

To be consistent with N.4 and for clarity "<sup>226</sup>Ra or <sup>228</sup>Ra" has been changed to "<sup>226</sup>Ra and <sup>228</sup>Ra". A provision was added to cover TENORM other than <sup>226</sup>Ra or <sup>228</sup>Ra and its associated progeny. The 25 millirem/y criterion for the average member of the critical group is added to apply when <sup>226</sup>Ra or <sup>228</sup>Ra is not present.

N.7b. A footnote was added, in response to U.S. EPA comments.

N.7e. A new footnote denoting the emphasis of CERCLA policies on permanent solutions is added to N.7e. A limit has been added for application to results from environmental pathways dose assessments to ensure the engineering design of sites, when remediation is performed, and the assumptions used in the dose assessment modeling meet the longevity requirements of Part D (equivalent to 10 CFR 20 and corresponding to the requirements of the EPA for radioactivity with similar characteristics).

N.7f. The screening criterion, which is for conditional release, has been rephrased to clearly state that such release is for metal recycle only. This eliminates the apparent contradiction with the concentration criterion. Also, SR-N is specifically stating a 50 microroentgen per hour screening level in an effort to encourage uniformity of this level nationwide. Specification in this manner eliminates arguments regarding what the true value of background was for each measurement.

Sec. N.8 - Disposal and Transfer of Waste for Disposal.

N.8a. Several words have been changed for purposes of clarity.

These options include, but are not limited to, disposal at sites licensed by the Nuclear Regulatory Commission or Agreement States and also provide the option for disposal of waste at sites that have been permitted for receipt and disposal of appropriate waste by other applicable regulatory agencies. Part N is not intended to foreclose the option of transferring TENORM waste to regulated waste disposal facilities, including RCRA-permitted solid waste disposal facilities. N.8a.iii. clarifies acceptance and disposal of TENORM waste is conditioned on the absence of express prohibition, e.g., by the disposal facility's operating permit, and must not be contrary to applicable federal and state law governing the type of TENORM waste to be disposed.

For example; WCS (Waste Control Specialists), in Texas, does not have a license for disposal of radioactive waste or TENORM, but under the Texas regulatory structure, it has permits for disposal of NORM exempt from the Texas NORM regulations (30 pCi/g of radium). Also, there are two sites in California with permits for disposal of geothermal NORM waste. The SR-N group does not wish the Part N rules to restrict these permitted options.

N.8a.iv. Provides the option for disposal in injection wells approved by applicable government authority, without Agency action.

N.8a.v. In N.8a.v. changes have been made to clarify that use of a disposal site is appropriately a function of the permitting agency for that disposal site not another Agency issuing the license to use the TENORM. This change eliminates potential conflicts with existing regulatory structure in some states. It also increases the options likely to be available to TENORM licensees.

N.8a.vi. In response to U.S.EPA comments, N.8a.iii. is reinstated in this section.

N.8b. This is the N.8d. of the 1999 Part N.

N.8c. This section was added to prohibit dilution for the purpose of making waste exempt, without regulatory approval. A footnote was added giving examples of approved uses.

#### Sec. N.9 - Prohibition.

This section has been added to clarify that dilution is not allowed to be used to avoid regulation by an Agency. This section applies to materials that are not waste, because waste is covered by a similar provision in N.8c. A footnote was added explaining that normal product processing is not considered purposeful dilution.

#### Sec. N.10 - General License.

N.10a. Words were added to clarify that a specific license and a general license are mutually exclusive for the same TENORM. A footnote was added concerning ownership.

N.10b. The words "consumer or retail" have been added to clarify that a general license is required for industrial products manufacturing but a specific license is required to manufacture consumer or retail products.

N.10c. Minor editing has been done for clarification.

N.10d. Minor editing has been done for clarification. A time limit for the notification has been added. A footnote was added indicating Agency options.

N.10e. The title was revised for clarity to include the item covered by the provisions that was not previously indicated in the title. The order of the subsections has been changed for clarity.

N.10e.i. Clarifications were made. A footnote was added for notification of local governments.

N.10e.ii. Minor editing has been performed to change to a clear positive requirement rather than a negative statement.

N.10e.iii. This section was formerly N.10e.iv.

N.10e.iv. . This provision has been rewritten to clarify that the prior approval must be in writing to transfer property and equipment in a manner other than the same person for the same purpose or there is an ownership/possession of property change. The criteria used to grant approval has been added. A record keeping provision has been added that conforms to decommissioning record keeping requirements. Another option has been added to the optional methods for documentation.

N.10f. Words were changed to allow more flexibility. A footnote was added to identify options for providing notification of recipients.

N.10g. A phrase has been added to clarify that radiation exposure concerns are the basis for an Agency to require a general licensee to apply for a license and become a specific licensee. This should be a rare event. An example of such would be some Florida facilities that have already been specifically licensed because of concerns for personnel exposures.

#### Sec. N.20 - Specific Licenses.

N.20 Editorial rephrasing has been done for clarity. We tried to eliminate some of the confusion caused by use of "unless", "except" and "not."

N.20a. The words "consumer or retail" have been added to clarify the type of manufacturing and distribution operations that require a specific license rather than a general license.

N.20b. Editorial rephrasing was done for clarity.

N.20c. Added storage and treatment to cover other waste management practices.

#### Sec. N.21 - Filing Application for Specific License.

N.21a. Words were added to require an application for a license to be in English.

N.21b. The word "expiration" was changed to "termination" to conform to regulatory practice. This change also has been made in other appropriate sections of the rule.

#### Sec. N.22 - Requirements for the Issuance of Specific Licenses.

A footnote has been added for clarity.

N.22a.v. The legally correct term has been used by changing "surety" to "assurance".

N.22a.vii. Because the land owner is or can be ultimately held liable for contamination existing on the property, this provision has been added. It may reduce potential liability for the licensing Agency.

N.22c. The words "consumer or retail" have been added to clarify the type of manufacturing and distribution operations that require a specific license rather than a general license. Defining "consumer or retail product" also indicated the need to delete "material or" where it was used with "product" for clarity.

N.22c.iii.(4) The word "radionuclides" replaced "TENORM" to clarify that solubility analysis will be for each form of each element.

N.22c.iii.(6) The word "material" has been replaced with "TENORM", because that is the material we are concerned with and want to keep isolated.

N.22c.iii.(14) The term "processing" seemed clearer than "production" before "production lots."

N.23. The words "consumer and retail" were added as adjectives for "products" for clarity to match new defined terms.

#### Sec. N.24 - Table of Doses.

N.24 The word "Organ" has been deleted because the doses are not all organ doses.

Sec.'s N.25 through N.40 These generic sections of licensing are found in Part C and basically applied to all kinds of licensees. An Agency may choose to reference appropriate sections of Part C rather than repeat them. The Agency should carefully review the recommended changes included in Part N before deciding to reference Part C provisions. The sections have been placed in Part N so that Part N can stand alone for most of the affected licensees.

N.26a.i., ii., iii. and iv. The word "specific" or "specifically" has been added for clarity.

N.26a.iv. N.5 has been added to the referenced sections to provide a comprehensive list of applicable sections.

N.26a.v. Editorial changes have been made for clarification and accuracy in reference to the definition of "entity".

N.26a.vi. and vii. These are updated requirements from N.32 (equivalent to NRC's License Termination Rulemaking).

N.26a.viii. The temporary jobsite provision from Part C has been modified to cover the lack of jurisdiction under the Atomic Energy Act of 1954, as amended.

#### Sec. N.27 - Expiration and Termination of Specific Licenses.

This section has been rewritten to more clearly indicate the distinction between expiration and termination of a license. It also more clearly indicates the licensees continuing responsibility for licensed material when a license has expired but has not been terminated by the Agency. Radiation monitoring reporting requirements are more clearly specified. Procedural requirements are more detailed for clarity.

Sec. N.31 - Modification and Revocation of Specific Licenses.

Minor editorial changes have been made for clarity.

Sec. N.32 - Record Keeping Requirements for Site Reclamation.

These are updated requirements from (equivalent to NRC's License Termination Rulemaking).

Sec. N.40 - Reciprocal Recognition of Specific Licenses.

The section has been revised to make it more user friendly and for clarity.

N.40b. This provision has been added to advise licensees who have been licensed under a less restrictive set of conditions that conditions or limitations can be imposed by the Agency with authority to grant the reciprocal recognition.

Sec. N.50 - Financial Surety Arrangements.

In the title and N.50a., the term "financial surety arrangements" has been revised to the technically correct term "financial assurance arrangements."

Matters for Future Consideration

1. TENORM Definition In letters dated April 2001 and May 3, 2002, the U.S. Environmental Protection Agency (EPA) recommended that the National Academy of Sciences (NAS) TENORM definition be adopted in Part N to address those circumstances where exposure risk to TENORM is increased without radionuclide concentration increasing. The NAS definition of TENORM is very broad, and could include trivial situations, such as plowing a field, or the use of granite in countertops. The SR-N Committee believes that the definition of TENORM proposed in this model rule will meet the needs of most States, as well as, address the major portions of the TENORM problems. The Committee agrees with EPA's comments that the definition will not address all situations, such as the potential TENORM problems associated with waste rock or drill cuttings. In those few situations, the individual state may wish to consider altering the model rule to address its specific TENORM problems. With the additional experience that the states will gain in the regulation of TENORM using the model rule and any additional TENORM studies that may be conducted, the definition of TENORM and EPA's comments should be reexamined during the next revision of Part N.
2. Release of Solid Materials (Clearance) and Conditional Release The NRC staff, as directed by the Commission, is currently proceeding with enhanced participatory rulemaking on the control of solid materials. The Conference of Radiation Control Program Directors, through a resolution, recommended that NRC move forward with the rulemaking process by developing national standards for the control of solid materials and that the technical bases developed by NRC include considerations of naturally-occurring and accelerator-produced

radioactive material and TENORM. The EPA and DOE are also currently working on developing standards for the release of solid materials. In addition to federal agencies, the National Council on Radiation Protection and Measurements (NCRP), is preparing a report with recommendations on alternatives for disposition and possible recycling of solid material. In this revision of Part N, the SR-N Committee only addressed the conditional release of metal for recycle of equipment contaminated with a maximum exposure level of 50 microrentgen per hour including background. However, with the additional information that should be forthcoming from these current studies by federal agencies and other organizations, the release of solid materials should be reexamined during the next revision of Part N.

3. Disposal of TENORM The EPA expressed concerns that the provisions in N.8a. addressing the disposal of TENORM were not adequate for the protection of groundwater. This concern was addressed by stating that SR-N believed that the 25 millirem per year all pathways criteria is protective of the environment with an adequate margin of safety. The SR-N committee believes that TENORM contamination of groundwater is very unlikely with the exception of uranium mining, rare earth metals extraction industries, or a few other metals mining and extraction industries where NORM is known to exist in significant concentrations (e.g., copper). These types of industries are currently subject to existing federal and state statues that address the protection of groundwater. However, this issue should be considered a matter for future consideration. EPA should identify for SR-N situations in which TENORM contamination of groundwater occurred that was not amenable to regulatory intervention under the existing environmental laws.
4. Table of Doses The Table of Doses and the dose terminology in N.22c.iii.(12) and N.23b. were revised to include the present terminology used in Part D and 10 CFR Part 20.
5. Concentration Limits Concentrations limits for other radionuclides should be developed for N.4 (Exemptions) and N.10b. (General License).
6. Regulatory Guidance A regulatory guide identifying the procedures for obtaining Agency approval as specified in N.10e.ii. for the transfer of material, equipment or real property not made in accordance with N.10e.i. should be developed.
7. Appendix A When NRC and the Agreement States adopt a dose based criteria for acceptable levels of surface contamination, Appendix A should be replaced using similar criteria. (e.g., ANSI/HPS N13.12-1999 *Surface and Volume Radioactivity Standards for Clearance*)
8. RSO Requirements Additional provisions to N.21 and N.22 should be considered to address RSO requirements and responsibilities consistent with anticipated changes to Part C.