

HSS Safety Directives – Final Crosswalk Report

Radiation Protection of the Public and the Environment - DOE Order 5400.5 & DOE O 458.1

REQUIREMENT NUMBER

RPPE-0001

DECISION: Delete

BASIS FOR DECISION: Deleted section to comply with the new Order format. Further, the schedule established for implementing the requirements of the Order -- DOE 5400.5, "Radiation Protection of the Public and the Environment," when first issued in 1990 is now out-of-date.

BEGINNING CITATION: 4.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: IMPLEMENTING PROCEDURES AND REQUIREMENTS. This Order becomes effective 5-8-90. Within 2 months from the date of issuance of the Order (2-8-90), the DOE Field Office Manager shall provide to the appropriate Program Office, with a copy to EH-1 for review and comment: a. a certification for those areas covered by the Order for which field elements are in compliance; and/or b. a request for exemption for areas not yet in compliance that includes a Plan for achieving compliance. Within 3 months of issuance, the appropriate Program Office will submit to EH-1 the certification and/or the request for exemption(s). The compliance plan accompanying the request for exemption shall include schedules of activities which will lead to compliance with the requirements of this Order.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0002

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement. It is not necessary to list the Secretary of Energy's authority and responsibilities in DOE O 458.1.

BEGINNING CITATION: 9.a.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: The Secretary. Many provisions in this Order permit and/or necessitate the exercise of discretion and/or judgment in carrying out the requirements of the Order. In those instances, the determination of whether, in the exercise of such discretion and/or judgment, the requirements of this Order were complied with rests initially with the relevant Department authority and, ultimately, with the Secretary. The Secretary retains the sole and final authority to determine what acts are necessary to comply with this Order. Further, the Secretary retains the authority to suspend any and all requirements under this Order whenever the Secretary deems it necessary. This authority may be delegated by the Secretary as appropriate.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0003**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement. The responsibilities of the Assistant Secretary for Environment, Safety and Health (EH-1) are now absorbed by DOE's Office of Health, Safety and Security (HSS).

BEGINNING CITATION: 9.b.(1)(a)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Assistant Secretary for Environment, Safety and Health (EH-1): Develop DOE public and environmental radiation protection policy and requirements; and

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0004**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement.

BEGINNING CITATION: 9.b.(1)(b)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Assistant Secretary for Environment, Safety and Health (EH-1): Approve, if warranted, specific exceptions to this Order, pursuant to provisions in DOE 5400.1 and DOE 5820.2A.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0005**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement.

BEGINNING CITATION: 9.b.(2)(a)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Program Secretarial Officers: Implement DOE public and environmental radiation protection policy and requirements in their respective programs; and

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REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0006**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement. Schedules for implementation of interim control strategies for the requirements of DOE 5400.5 when first issued in 1990 are now out-of-date, and are no longer necessary.

BEGINNING CITATION: 9.b.(2)(b)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Program Secretarial Officers: Implement, if warranted, interim control strategies proposed by field organizations pursuant to this Order and DOE 5820.2A.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0007**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement.

BEGINNING CITATION: 9.b.(3)(a)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Heads of Field Elements: Implement provisions of this Order for their respective activities;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0008**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement.

BEGINNING CITATION: 9.b.(3)(b)

ENDING CITATION: N/A

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Radiation Protection of the Public and the Environment - DOE Order 5400.5 & DOE O 458.1

REQUIREMENT DESCRIPTION: Heads of Field Elements: Maintain appropriate capabilities at each operating site for monitoring and assessing routine and unplanned releases of radioactive materials, with respect to the characteristics of radioactive material released and the release modes, consistent with the types of operations conducted;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0009**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement.

BEGINNING CITATION: 9.b.(3)(c)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Heads of Field Elements: Process specific requests for exceptions to this Order, pursuant to paragraph II.1a(4); and

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0010**

DECISION: Not a Requirement

BASIS FOR DECISION: This is a Responsibility statement.

BEGINNING CITATION: 9.b.(3)(d)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Heads of Field Elements: Temporarily suspend the requirements of this Order when doing so is in their judgment necessary to minimize damage to life or property or to protect public health or safety. Whenever this provision is invoked, such suspension and the reason therefore are to be reported to EH-1 at the earliest practicable time.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0011**

DECISION: Not a Requirement

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Radiation Protection of the Public and the Environment - DOE Order 5400.5 & DOE O 458.1

BASIS FOR DECISION: This is a statement of the responsibilities and authority of the Director of the Naval Nuclear Propulsion Program derived from P.L. 98-525 and E.O. 12344. The paragraph also contains an exemption from the provisions of DOE 5400.5 for the Naval Nuclear Propulsion Program. The Applicability section of DOE O 458.1 addresses the joint Navy/DOE Naval Nuclear Propulsion Program, consistent with DOE O 251.1C, paragraph 6.a(3).

BEGINNING CITATION: 9.b.(4)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Director, Naval Nuclear Propulsion Program: Executive Order 12344, statutorily prescribed by PL 98-525 (42 USC 7158 note) establishes the responsibilities and authority of the Director, Naval Nuclear Propulsion Program (who is also the Deputy Assistant Secretary for Naval Reactors within the Department) over all facilities and activities which comprise the Program, a joint Navy-DOE organization. The policy principle promoted by these executive and legislative actions is cited in the Executive Order as "... preserving the basic structure, policies, and practices developed for this Program in the past...". Accordingly, The Naval Nuclear Propulsion program is exempt from the provisions of this Order. The Director shall maintain an environmental protection program to ensure compliance with applicable environmental statues and regulations. The Director and EH-1 shall cooperatively develop information exchange and other mutually beneficial programs as appropriate, consistent with PL 98-525.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0012

DECISION: Delete

BASIS FOR DECISION: The requirement stating that for the purposes of the Order "the 80-km distance shall be measured from a point located centrally with respect to major facilities or DOE program activities" was contained within the DOE 5400.5 definition of the dose terms "Collective Dose Equivalent" and "Collective Effective Dose Equivalent." This requirement amplified the requirement in II.6.b to evaluate and document collective doses to the public within 80 km of the site as measured from a central point. Definitions pertaining to collective dose in DOE O 458.1 reflect current recommendations of the ICRP with regard to this dosimetric quantity.

BEGINNING CITATION: 10.d.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Collective Dose Equivalent and Collective Effective Dose Equivalent are the sums of the dose equivalents or effective dose equivalents of all individuals in an exposed population within an 80-km radius, for the purposes of this Order, and they are expressed in units of person-rem (or person-sievert). When the collective dose equivalent of interest is for a

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specific organ, the units would be organ-rem (or organ-sievert). For purposes of this Order, the 80-km distance shall be measured from a point located centrally with respect to major facilities or DOE program activities.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0013

DECISION: Not a Requirement

BASIS FOR DECISION: This paragraph of DOE 5400.5 explains how the term "release of property" was defined for purposes of the original Order, but did not contain a requirement. The term "Clearance of Property" is included in Attachment 2 (Definitions) of DOE O 458.1.

BEGINNING CITATION: 10.j.(Definitions)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Release of Property, as used in this Order, means the exercising of DOE's authority to release property from its control after confirming that residual radioactive material (over which DOE has authority) on the property has been determined to meet the guidelines for residual radioactive material in Chapter IV or any other applicable radiological requirements. There may be instances in which DOE or other authority will impose restrictions on the management and/or use of the property if the residual radioactive material guidelines of Chapter IV are not met or if other applicable Federal, State, or local requirements cause the imposition of such restrictions.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0014

DECISION: Delete

BASIS FOR DECISION: Since compliance with applicable environmental statutes, regulations and standards is longstanding DOE policy, the requirement to comply with legally applicable rules and regulations is not unique to this Order.

BEGINNING CITATION: I.2.b.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Other Sources of Regulations and Guidance. DOE is required to comply with legally applicable rules and regulations of other Federal, State, and local agencies, some of which have not adopted the ICRP system.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0015**

DECISION: Not a Requirement

BASIS FOR DECISION: This paragraph of DOE 5400.5 provides an introductory explanation of concepts and requirements regarding liquid effluents in Chapter II of DOE 5400.5 and emphasizes that both BAT and ALARA apply, but it does not establish any unique requirements. DOE O 458.1 addresses liquid releases, “best available technology” (BAT), and Derived Concentration Technical Standard (DCS) values in Paragraph 4.g entitled "Control and Management of Radionuclides from DOE Activities in Liquid Discharges."

BEGINNING CITATION: I.5.b.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Treatment of Liquid Radioactive Waste Streams. Standards for liquid effluent discharges are driven by the DOE ALARA policy and objective to minimize contamination in the environment to the extent practicable. The Order adopts the “best available technology” (BAT) as the appropriate level of treatment for liquid wastes containing radioactive material and provides that the BAT be phased in at the earliest practicable time. Technical and economic considerations are included in determining the BAT. Based on cost and benefit considerations, radioactive waste streams that contain radionuclide concentrations of not more than the derived concentration guide (DCG) reference values at the point of discharge to a surface waterway normally will not require treatment to further reduce the concentration. BAT treatment is provided to protect ground water and to prevent radionuclide buildup in soil.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0016**

DECISION: Not a Requirement

BASIS FOR DECISION: Paragraph I.7 of DOE 5400.5 provides an introductory explanation of requirements in Chapter II of DOE 5400.5 related to discharges to sanitary sewer systems, but does not establish any unique requirements. This paragraph also clarified that dose needed to be considered in addition to compliance with the source term and concentration limits in Chapter II of the DOE 5400.5. The Order, DOE O 458.1, includes requirements related to discharges to sanitary sewers in Paragraph 4.g, "Control and Management of Radionuclides from DOE Activities in Liquid Discharges."

BEGINNING CITATION: I.7.

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ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: DISCHARGES TO SANITARY SEWERAGE. The control of releases of liquid wastes to community sanitary sewer systems is designed to be generally consistent with requirements imposed by NRC on its licensees. As discussed in Chapter II, the “best available technology” (BAT) selection process is to be applied to the treatment of liquid wastes released to sanitary sewerage when concentrations of radionuclides would otherwise exceed five times the DCG reference values given in Chapter III. Operators should ensure that the total annual discharge of radioactive material to the sanitary sewer system will not cause exposures to members of the general public that will result in doses exceeding a small fraction of the basic annual dose limit.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0017

DECISION: Not a Requirement

BASIS FOR DECISION: The original paragraph provides an introductory explanation of concepts and requirements in Chapter II of DOE 5400.5, but does not establish any unique requirements. DOE O 458.1 contains requirements for demonstrating compliance in Paragraph 4.e, "Demonstrating Compliance with the Public Dose Limit."

BEGINNING CITATION: I.8.a.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Demonstration of Compliance. Demonstrations of compliance with requirements of this Order generally will be based upon calculations that make use of information obtained from monitoring and surveillance programs. The abilities to detect, quantify, and adequately respond to unplanned releases of radioactive material to the environment also rely on in-place effluent monitoring, monitoring of environmental transport and diffusion conditions, and assessment capabilities. This will enable DOE to develop useful data and to collect and analyze pertinent information on unplanned releases in a timely manner. It is the intent of DOE that the monitoring and surveillance programs for the DOE activities, facilities, and locations be of high quality. Although some differences result from specific site or specific activity conditions, uniformity in the methods and performance criteria used in obtaining the information is desirable.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0018

DECISION: Not a Requirement

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BASIS FOR DECISION: This paragraph of DOE 5400.5 provided an introduction to the monitoring and surveillance requirements contained in Chapter II of DOE 5400.5, and a reference to DOE/EH-0173T ("Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance"; January 1991), but does not establish any requirements. DOE O 458.1, includes specific requirements for environmental monitoring and surveillance programs under "Demonstrating Compliance with the Public Dose Limit" [See paragraph 4.e(9)].

BEGINNING CITATION: I.8.b.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Monitoring and Surveillance Requirements. To ensure that the effluent monitoring and environmental surveillance programs are of good quality at all DOE facilities and sites, certain requirements and recommendations are provided in DOE publication DOE/EH-0173T which deal with radiological effluent monitoring and environmental surveillance.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0019

DECISION: Not a Requirement

BASIS FOR DECISION: This paragraph provides an introductory explanation of the standard dose conversion factors or analytical methods to be used when conducting calculation of dose to the public under paragraph II.6.b of DOE 5400.5, but does not establish any unique requirements. DOE O 458.1 establishes requirements related to dose evaluation models and dose coefficients that may be used in demonstrating compliance with the public dose limit.

BEGINNING CITATION: I.10.a.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Standard Methods. Accordingly, this Order requires that calculations of dose to the public from exposures resulting from both routine and unplanned activities be performed using standard EPA or DOE dose conversion factors or analytical models prescribed in regulations applicable to DOE operations.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0020

DECISION: Not a Requirement

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BASIS FOR DECISION: The original paragraph of DOE 5400.5 did not contain a requirement, but rather provided detail on the EPA-approved computer models for dose calculations. Specific requirements related to dose evaluations, modeling, dose conversion factors, parametric considerations, etc. were contained in Chapter II of DOE 5400.5. The Order, DOE O 458.1, contains a requirement that doses to members of the public from airborne effluents must be evaluated with the CAP-88 model or another EPA-approved model or method to demonstrate compliance with applicable subparts of 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants."

BEGINNING CITATION: I.10.c.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: EPA Models. The use of AIRDOS/RADRISK, CAP-88, or AIRDOS-PC models is prescribed by EPA in 40 CFR Part 61, Subpart H, to evaluate potential doses from airborne releases. Thus, two evaluations of doses from airborne pathways could be required: one to satisfy 40 CFR Part 61 requirements and one for DOE purposes using contemporary dosimetry. [**Caution:** Unless modified, AIRDOS/RADRISK (also known as CAP-88 or AIRDOS-PC) is not suitable for calculating doses from accidents.]

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0021

DECISION: Not a Requirement

BASIS FOR DECISION: This paragraph of DOE 5400.5 did not contain a requirement, but instead provided an introduction to the requirements of Chapter II, Section 7-- "Reporting Requirements." DOE O 458.1 contains requirements for "Records, Retention and Reporting Requirements" in Paragraph 4.1.

BEGINNING CITATION: I.11.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: REPORTING. The Order addresses the notification of headquarters personnel when DOE activities might have caused, or might cause, a noncompliance with requirements of this Order. These requirements are in addition to the general requirements for reporting, specified in DOE 5484.1. "Federally permitted" designation of releases for purposes of EPA reporting requirements, are addressed in section II.7.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

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REQUIREMENT NUMBER **RPPE-0022**

DECISION: Not a Requirement

BASIS FOR DECISION: This paragraph presented background information on the public dose concepts and requirements addressed in Chapter II of DOE 5400.5, and provided background material on public dose limits promulgated by the Environmental Protection Agency. However, this paragraph did not establish any unique requirements.

BEGINNING CITATION: II.1.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: PUBLIC DOSE LIMITS. The primary public dose limits include consideration of all exposure modes from all DOE activities (including remedial actions). The primary dose limit is expressed as an effective dose equivalent, a term developed by the ICRP for their risk-based system, which requires the weighted summation of doses to various organs of the body. Additional public dose limits are established by EPA regulations for exposures to several selected sources or exposure modes (pathways or conditions). Public dose limits promulgated by EPA for selected exposure modes are sometimes expressed as dose equivalents, which do not include risk-based weighting or summation of doses to various organs, and sometimes expressed as effective dose equivalent. DOE must also comply with legally applicable requirements (e.g., 40 CFR Parts 61, 191, and 192 and 10 CFR Parts 60 and 72), including administrative and procedural requirements. Except for those provided in paragraph II.1a(4), administrative and procedural requirements of legally applicable regulations are not addressed in this Order. Such legally applicable regulations must be consulted for provisions not addressed in this Order.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0023**

DECISION: Modify

BASIS FOR DECISION: To improve clarity of intent concerning the public dose limit and to remove redundancy RPPE-0025 thru RPPE-00027 were merged with this requirement (RPPE-0023). The resulting requirement language was then modified for clarity and to establish consistency with ICRP recommendations (ICRP Publication 60).

BEGINNING CITATION: II.1.a.

ENDING CITATION: 4.b(1)-(2); 4.e(2)

REQUIREMENT DESCRIPTION: DOE Public Dose Limit--All Exposure Modes, All DOE Sources of Radiation. Except as provided by II.1a(4), the exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall

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not cause, in a year, an effective dose equivalent greater than 100 mrem (1 mSv). Dose evaluations should reflect realistic exposure conditions (see II.6b).

REVISED REQUIREMENT:

4b. Public Dose Limit.

- (1) DOE radiological activities, including remedial actions and activities using Technologically Enhanced Naturally Occurring Radioactive Material (TENORM), must be conducted so that exposure of members of the public to ionizing radiation will:
 - (a) Not cause a total effective dose (TED) exceeding 100 mrem (1mSv) in a year, an equivalent dose to the lens of the eye exceeding 1500 mrem (15 mSv) in a year, or an equivalent dose to the skin or extremities exceeding 5000 mrem (50 mSv) in a year, from all sources of ionizing radiation and exposure pathways that could contribute significantly to the total dose excepting:
 - 1 Dose from radon and its decay products in air [Radon is regulated separately e.g., under Paragraphs 4.f. and 4.h.(1)(d) in this Order and under Title 40 Code of Federal Regulations (CFR) Part 61, Subparts Q and T];
 - 2 Dose received by patients from medical sources of radiation, and by volunteers in medical research programs;
 - 3 Dose from background radiation;
 - 4 Dose from occupational exposure under NRC or Agreement State license or to general employees regulated under 10 CFR Part 835, and
 - (b) Comply with ALARA requirements in paragraph 4.d. of this Order.
- (2) The public dose limit applies to members of the public located off DOE sites and on DOE sites outside of controlled areas, and to those exposed to residual radioactive material subsequent to any remedial action or clearance of property.

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4.e. Demonstrating Compliance with the Public Dose Limit.

- (2) The estimated individual dose to the MEI or representative person that is representative of the persons or group likely to receive the most dose and is based on pathway and exposure parameters that are not likely to underestimate or substantially overestimate the dose, and, the collective dose (population dose) that is a realistic as practicable estimate of the sum of the doses to all members of the actual exposed population.

BASIS FOR REQUIREMENT: The basis for the requirement in DOE 5400.5 was DOE policy (now incorporated in DOE P 441.1) to establish requirements for radiation protection consistent with Federal guidance and considering national and international radiation protection standards and recommendations. DOE 5400.5 required that DOE facilities comply with a dose limit for all sources and pathways (except radon) of 100 mrem in a year. The 100 mrem/year all sources/all pathways limit of ICRP Publication No. 26 is consistent with national (NCRP Report No.116, "Limitation of Exposure to Ionizing Radiation," 1993) and international (ICRP Publication 60, "Recommendations of the International Commission on Radiological Protection," 1991) recommendations, and with 10 CFR Part 20. The exclusion represents sources of radiation which are regulated separately (radon, occupational exposure), or for which the requirements for protection of the public and the environment were not intended or not appropriate (background, medical, volunteers in medical research).

REQUIREMENT NUMBER

RPPE-0024

DECISION: Not a Requirement

BASIS FOR DECISION: This paragraph of DOE 5400.5 is not a requirement. The purpose of the paragraph was to clarify that the dose limit includes both internal and external components. NCRP recommends that the limit for public exposure should be expressed as an effective dose of 1 mSv in a single year. Note that DOE O 458.1 contains a definition of the term "Total Effective Dose."

BEGINNING CITATION: II.1.a.(1)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Dose Components. The limit of 100 mrem (1 MSv) effective dose equivalent in a year specified in paragraph II.1a is the sum of the effective dose equivalent (or deep dose equivalent, if dosimeter data are used) from exposures to radiation sources external to the body during the year plus the committed effective dose equivalent from radionuclides taken into the body during the year.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

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REQUIREMENT NUMBER **RPPE-0025**

DECISION: Merge MERGE WITH: RPPE-0023

BASIS FOR DECISION: The concept in the first sentence of the original DOE 5400.5 requirement is addressed under Public Dose Limit (paragraph 4.b(1)(a) in DOE O 458.1). This requirement has been merged into RPPE-0023 to reduce extra verbiage. The second sentence was deleted because it is not a requirement and only served to cross reference a particular section of the original DOE 5400.5 that discussed requirements and methods for performing evaluations.

BEGINNING CITATION: II.1.a.(2)

ENDING CITATION: 4.b(1)(a)

REQUIREMENT DESCRIPTION: Exposure Modes. Other than for sources specifically excepted, doses to members of the public from all exposure modes that could contribute significantly to the total dose shall be considered for evaluation. Requirements and methods for performing the evaluations are discussed in paragraph II.6.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0026**

DECISION: Merge MERGE WITH: RPPE-0023

BASIS FOR DECISION: The major intent of the first and second sentences of the original requirement in DOE 5400.5 is now reflected in paragraph 4.b(1) under "Public Dose Limit" in DOE O 458.1 [See RPPE-0023].

The third sentence of this paragraph of DOE 5400.5 cross-references other parts of the original DOE 5400.5 that address limits for radon and its decay products in air; it has been deleted because it is not a requirement.

The last sentence contains a requirement to report DOE-related effective dose equivalent contributions of 10 mrem (0.10mSv) or more in a year and cross references the Reporting Requirements section (II.7) of DOE 5400.5. In DOE O 458.1 paragraph 4.1, "Records, Retention and Reporting Requirements" contains reporting requirements.

BEGINNING CITATION: II.1.a.(3)

ENDING CITATION: 4.b(1) and 4.1(5)

REQUIREMENT DESCRIPTION: Application. The public dose limits in paragraph II.1.a apply to doses from exposures to radiation sources from routine activities, including remedial actions and naturally occurring radionuclides released by DOE processes and operations. The dose limits also apply to the doses to individuals who are exposed to radiation or contamination by radionuclides at

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properties subsequent to remedial action and release of the property. Limits for radon and its decay products in air are provided in terms of Working Levels and concentrations in air and are addressed independently (Chapter IV and Figure III-1). In addition, DOE operators are required to report DOE-related effective dose equivalent contributions of 10 mrem (0.10 mSv) or more in a year (see paragraph II.7).

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0027

DECISION: Merge MERGE WITH: RPPE-0023 and RPPE-0085

BASIS FOR DECISION: The primary basis for changes to this paragraph of DOE 5400.5 was to improve the overall organization of the topics addressed in DOE O 458.1, and to minimize redundant language. The value that would initiate a site to consider other non-DOE sources when determining dose to the public was changed to 25 mrem, as recommended in NCRP Report 116. This part of the requirement was merged into RPPE-0085 (See paragraph 4.e(1)(c) of DOE O 458.1) to consolidate language for demonstrating compliance with the public dose limit.

Language related to the exceptions referred to in the first part of the first sentence is addressed in Paragraph 4.b, "Public Dose Limit," of DOE O 458.1 (See RPPE-0023). For improved organizational structure, the topic of doses from non-DOE sources of exposure was merged into the "Demonstrating Compliance with the Public Dose Limit" requirements (See paragraph 4.e(1)(c) of DOE O 458.1; See RPPE-0085). The last sentence in the original DOE 5400.5 provision required notification of EH-1 and the appropriate Program Offices if the 100 mrem in a year dose limit cannot be achieved. Reporting requirements are now contained in paragraph 4.l(5) of Paragraph 4.1, "Records, Retention and Reporting Requirements" of DOE O 458.1 (See RPPE-0100).

BEGINNING CITATION: II.1.a.(3)(a)

ENDING CITATION: 4.b(1); 4.e(1)(c); and 4.l(5)

REQUIREMENT DESCRIPTION: Doses from Sources Other than DOE Man-Made or Enhanced Natural Radionuclides. Except for medical sources, consumer products, residual fallout from past nuclear accidents and weapons tests, and naturally occurring radiation sources, DOE operators shall make a reasonable effort to be aware of the existence of other than DOE man-made sources of radiation which, combined with the DOE sources, might present a potential for exceeding contributions of 10 mrem (0.1 mSv) effective dose equivalent in a year. Reasonable efforts shall be made to limit dose to members of the public, from multiple sources of radiation, to 100-mrem (1 mSv) effective dose equivalent, or less, in a year. EH-1 and the appropriate Headquarters Program Offices shall be notified if the 100-mrem in a year dose limit cannot be achieved.

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REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0028**

DECISION: Merge MERGE WITH: RPPE-0023

BASIS FOR DECISION: To identify explicitly activities to which the public dose limit does not apply. The exemption from accident conditions (as opposed to emergency conditions) was not considered appropriate because such an approach could be construed as suggesting that there is no penalty for those actions that resulted in the accident. Therefore, the reference to accident conditions has been deleted. The last two sentences in this paragraph of DOE 5400.5 were deleted because they are not requirements, but rather provide cross-references to requirements that existed in other DOE directives at the time DOE 5400.5 was issued.

BEGINNING CITATION: II.1.a.(3)(b)

ENDING CITATION: 4.b(1)(a)

REQUIREMENT DESCRIPTION: Doses Not Included in Evaluations. The public dose limits do not apply to doses from medical exposures, consumer products, and generally do not apply to doses from naturally occurring radiation sources or from exposures due to accident conditions, where controls of exposures cannot be maintained. The policy and requirements relating to protective actions following the uncontrolled release of radionuclides are set forth in the DOE 5500 series of directives. Requirements for planning to prevent or mitigate accidents and their effects are presented in DOE 5480.5 and DOE 5480.6.

REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0029**

DECISION: Delete

BASIS FOR DECISION: DOE sites are no longer involved in underground nuclear weapons tests.

BEGINNING CITATION: II.1.a.(3)(c)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Doses from Underground Nuclear Weapons Tests. The unanticipated release of radioactive material due to venting or seepage from underground nuclear weapons is considered to be an accident. However, the release of radioactive material that results from planned sampling or reentry following an underground nuclear weapons test is not an accidental condition, and shall be controlled in accordance with this standard.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0030

DECISION: Modify

BASIS FOR DECISION: The DOE 5400.5 requirements of paragraphs II.1.a.(4), II.1.a.(4)(a) and II.1.a.(4)(b) (See RPPE-0030, RPPE-0031 and RPPE-0032) are addressed in "Temporary Dose Limits," Paragraph 4.c of DOE O 458.1. Language has been modified to streamline and update requirements related to special circumstances where the potential public dose limit could exceed 100 mrem in a year, and to reflect DOE organizational changes. The DOE organizations with authority for requesting a temporary public dose limit that is higher than 100 mrem in a year, the necessary information that must accompany such a request, and the approving DOE organization are identified in DOE O 458.1. Dose terminology has been modified for consistency with 10 CFR Part 835.

BEGINNING CITATION: II.1.a.(4)

ENDING CITATION: 4.c(1)

REQUIREMENT DESCRIPTION: Exceptions. Unusual circumstances could affect a DOE activity in such a manner that the potential public dose could exceed an effective dose equivalent of 100 mrem (1 mSv) in a year.

REVISED REQUIREMENT:

4.c. Temporary Dose Limits.

(1) Special circumstances could affect a DOE radiological activity in such a manner that the potential dose to a member of the public could exceed a TED of 100 mrem (1 mSv) in a year.

BASIS FOR REQUIREMENT: As stated directly in the text of paragraph II.1.a(4)(a) of DOE 5400.5 (See RPPE-0031), "the temporary higher dose limit derives from ICRP recommendations (ICRP Publication 45)." ICRP Publication 45, 1985, "Quantitative Bases for Developing a Unified Index of Harm", referenced ICRP Publication 26, in which the 5 mSv limit was endorsed under strict conditions only; however the Commission, in ICRP Publication 45, presented its view at that time which was that it was permissible to use the 5 mSv dose limit in some years provided that the average annual effective dose equivalent averaged over a lifetime does not exceed the 1 mSv per year principal limit. The requirements in DOE O 458.1 are consistent with ICRP Publication 60, page 45,

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paragraph 192, which discusses an exposure in one year above 1 mSv as long as the average dose over five years does not exceed 1 mSv. (See RPPE-0040).

REQUIREMENT NUMBER **RPPE-0031**

DECISION: Modify

BASIS FOR DECISION: The first sentence of the DOE 5400.5 paragraph "Temporary Increases of Dose Limit" has been combined with the DOE 5400.5 paragraph "Justification for Increase of Public Dose Limit" to streamline language and to reflect current DOE organizational structure. The second sentence of this DOE 5400.5 paragraph is not a requirement, but rather it identifies the technical basis for the temporary higher dose limit (ICRP Publication 45). The third sentence has been modified in DOE O 458.1, referring to "exposure pathways" instead of "sources" and cross referencing to a paragraph of the Public Dose Limit requirements.

BEGINNING CITATION: II.1.a.(4)(a)

ENDING CITATION: 4.c(2), (3), and (4)

REQUIREMENT DESCRIPTION: Temporary Increases of Dose Limit. If avoidance of the higher exposures is impracticable, the Manager of the DOE Field Office, in coordination with their Program Office, may request from EH-1 specific authorization for a temporary public dose limit higher than 100 mrem (1 mSv), but not to exceed 500 mrem (5 mSv), for the year. The temporary higher dose limit derives from ICRP recommendations (ICRP Publication 45) for a principal stochastic dose limit of 100 mrem (1 mSv) effective dose equivalent in a year for exposures to the public, and a subsidiary dose limit of 500 mrem (5 mSv) effective dose equivalent in a year, for some years, if the dose averaged over a lifetime does not exceed the principal limit of 100 mrem (1 mSv) effective dose equivalent per year. The specific sources excepted in paragraph II.1a(3)(b) are also excepted for II.1a(4)(a).

REVISED REQUIREMENT:

4.c. Temporary Dose Limits.

- (2) The Field Element Manager¹ may request specific authorization for a temporary public dose limit higher than 100 mrem (1 mSv) in a year from a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer. This request must include documentation that justifies the need for the increase, the alternatives considered, and the application of the ALARA process.

¹ Includes operation office, site office, field office, area office, project office and service center.

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- (3) A Cognizant Secretarial Officer must limit approval of such requests to no more than 500 mrem (5 mSv) TED, provided that the average TED over any 5 contiguous years does not exceed 100 mrem per year.
- (4) The specific exposure pathways excepted in paragraphs 4.b.(1)(a)~~1-4~~ are also excepted for temporary dose limits.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Consistency with ICRP recommendations (ICRP Publications 45 and 60) and Federal regulations (10 CFR Part 20).

REQUIREMENT NUMBER **RPPE-0032**

DECISION: Merge MERGE WITH: RPPE-0031

BASIS FOR DECISION: The first sentence of the DOE 5400.5 paragraph "Temporary Increases of Dose Limit" has been combined with the DOE 5400.5 paragraph "Justification for Increase of Public Dose Limit" to streamline language and to reflect current DOE organizational structure.

BEGINNING CITATION: II.1.a.(4)(b)

ENDING CITATION: 4.c(2)

REQUIREMENT DESCRIPTION: Justification for Increase of Public Dose Limit. A request to EH-1 for a dose limit higher than 100 mrem (1 mSv) shall be accompanied by documentation that discusses the need for the increase, the alternatives considered, and the application of the ALARA process. EH-1 may approve such a request, or a lesser increase in the public dose limit, as appropriate.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: The original requirement in DOE 5400.5 was derived from recommendations in ICRP Publication 45.

REQUIREMENT NUMBER **RPPE-0033**

DECISION: Modify

BASIS FOR DECISION: Modified to consolidate and clarify requirements related to airborne radioactive effluents. DOE must comply with all applicable statutes and implementing regulations, including the Clean Air Act and 40 CFR 61, Subparts H, Q and T, as applicable.

BEGINNING CITATION: II.1.b.

ENDING CITATION: 4.f

REQUIREMENT DESCRIPTION: Airborne Emissions Only, All DOE Sources of Radionuclides. To the extent required by the Clean Air Act, the exposure of members of the public to radioactive materials released to the atmosphere as a consequence of routine DOE activities shall not cause members of the public to receive, in a year, an effective dose equivalent greater than 10 mrem (0.1

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mSv). Exposures to, and releases of, radon-220, radon-222, and their respective decay products are subject to DOE limits (See Figure III-3 and paragraphs IV.4b and IV.6).

REVISED REQUIREMENT:

4.f. Airborne Radioactive Effluents. Radiological activities must be conducted in a manner such that the release of radioactive material to the atmosphere will:

- (1) Be evaluated using the ALARA process established in paragraph 4.d. of this Order;
- (2) Not cause radon-222 flux rates to exceed $20 \text{ pCi (0.7 Bq) m}^{-2} \text{ sec}^{-1}$ averaged over the surface area overlaying waste, including the covering or other confinement structures, wherever radium-226 wastes are accepted for storage or disposal (See 40 CFR Part 61, Subparts Q and T);
- (3) Meet compliance agreements under 40 CFR Part 61, Subparts H, Q, and T;
- (4) Not cause the radon-220 and radon-222 decay product concentration, including background, to exceed 0.03 WL in buildings that are being released from DOE control. Further, a reasonable effort must be made to meet a 0.02WL generic guideline for annual average radon-220 and radon-222 decay product concentration, including background, in such buildings; and
- (5) Not exceed 3 pCi/L annual average radon-220 and radon-222 concentration, not including background, at the site boundary if DOE activities release radon-220 and radon-222 or their decay products.

BASIS FOR REQUIREMENT: For certain DOE facilities not subject to UMTRCA, 40 CFR Part 61, Subpart Q -- "National Emission Standards for Radon Emissions from Department of Energy Facilities" regulates radon-222 emission while 40 CFR 61, Subpart H -- "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities" regulates radionuclide emission other than radon-222 and radon-220. 40 CFR Part 61, Subpart T -- "National Emission Standards for Radon Emissions from the Disposal of Uranium Mill Tailings" applies to both commercial tailings piles and those sites remediated by DOE under Title I of UMTRA.

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REQUIREMENT NUMBER **RPPE-0034**

DECISION: Modify

BASIS FOR DECISION: Applicable model requirements are contained in 40 CFR Part 61, Subpart H. Not specifying a number of other specific EPA codes in DOE O 458.1 assures that the Order will not need to be changed if, in the future, EPA modifies its approved procedures and computer models for calculating dose.

BEGINNING CITATION: II.1.b.(2)

ENDING CITATION: 4.e(7) and (8)

REQUIREMENT DESCRIPTION: AIRDOS/RADRISK Codes. To demonstrate compliance analytically with air emissions for the Clean Air Act Standards, doses to the individuals shall be evaluated using the version of AIRDOS/RADRISK known as CAP-88 or, when available and approved, AIRDOS-PC. Other computer codes or models, such as “Comply Code,” which are specifically approved in accordance with 40 CFR Part 61, may also be used.

REVISED REQUIREMENT:

4.e. Demonstrating Compliance with the Public Dose Limit.

- (7) DOE-approved dose coefficients must be used to evaluate doses resulting from DOE radiological activities. Use of alternative dose coefficients must be approved by the Chief Health, Safety and Security Officer or by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- (8) Doses to members of the public from airborne effluents must be evaluated with the CAP-88 model or another EPA-approved model or method to demonstrate compliance with applicable subparts of 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*.

BASIS FOR REQUIREMENT: Airborne emissions of radioactive materials from DOE-controlled facilities are subject to 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), Subparts H, Q and T, as applicable, and must follow EPA-approved procedures and computer models for calculating dose.

REQUIREMENT NUMBER **RPPE-0035**

DECISION: Modify

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BASIS FOR DECISION: The phrase "All exposure mode" is unnecessary as the requirement states "from direct radiation or radioactive material released." The phrase "To the extent required by 40 CFR Part 191" is unnecessary as the requirement is consistent with the extent required by 40 CFR Part 191. The numerical dose limits for spent fuel, HLW and TRU waste management and storage from 40 CFR Part 191 have been deleted consistent with direction to avoid repetition of requirements contained in other regulations.

BEGINNING CITATION: II.1.c.

ENDING CITATION: 4.h(1)(b)

REQUIREMENT DESCRIPTION: All Exposure Modes, Sources from Management and Storage of Spent Nuclear Fuel, High-Level, and Transuranic Wastes at Disposal Facilities. To the extent required by 40 CFR Part 191, the exposure of members of the public to direct radiation or radioactive material released from DOE management and storage activities at a disposal facility for spent nuclear material or for high-level or transuranic radioactive wastes that are not regulated by the NRC shall not cause members of the public to receive, in a year, a dose equivalent greater than 25 mrem (0.25 mSv) to the whole body or a committed dose equivalent greater than 75 mrem (0.75 mSv) to any organ.

REVISED REQUIREMENT:

4.h. Radioactive Waste and Spent Nuclear Fuel.

(1) Management, Storage and Disposal of Radioactive Waste.

- (b) DOE management of spent nuclear fuel, and high-level and transuranic wastes at a disposal facility which is not regulated by the NRC must comply with the requirements of this Order and 40 CFR Part 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-level and Transuranic Radioactive Wastes.*

BASIS FOR REQUIREMENT: To harmonize compliance with external standards that use older dosimetry with DOE's effective dose-based requirements from ICRP Publication 60. (40 CFR Part 191, "Environmental Radiation Protection Standards for Management of and Disposal of Spent Nuclear Fuel").

REQUIREMENT NUMBER

RPPE-0036

DECISION: Modify

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BASIS FOR DECISION: The first 3 sentences of the original paragraph of DOE 5400.5 do not contain any requirements, but rather explain the basis for the requirements contained in paragraph II.1.c, identify the requirements of 40 CFR 191, Subpart B as beyond the scope of DOE 5400.5, and restate the applicability of the public dose limits.

BEGINNING CITATION: II.1.c.(1)

ENDING CITATION: 4.h(1)(b)

REQUIREMENT DESCRIPTION: 40 CFR Part 191. The dose limits as outlined in paragraph II.1.c, are established by Section 191.03(b) of EPA regulation 40 CFR Part 191, Subpart A, “Environmental Standards for Management and Storage.” The implementation of the requirements of Subpart B, “Environmental Standards for Disposal,” is beyond the scope of this Order. DOE waste management and storage activities at facilities other than disposal facilities are subject to the dose limits outlined in paragraph II.1.c. The Waste Isolation Pilot Plant, for purposes of this Order, is considered to be a disposal facility subject to this Order and 40 CFR Part 191. Other requirements and guidelines for the management and storage of spent nuclear fuel and high-level and transuranic waste at DOE facilities that are not licensed by the NRC are given in DOE 5820.2A.

REVISED REQUIREMENT:

4.h. Radioactive Waste and Spent Nuclear Fuel

(1) Management, Storage and Disposal of Radioactive Waste.

(b) DOE management of spent nuclear fuel, and high-level and transuranic wastes at a disposal facility which is not regulated by the NRC must comply with the requirements of this Order and 40 CFR Part 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-level and Transuranic Radioactive Wastes*.

BASIS FOR REQUIREMENT: WIPP compliance with DOE O 458.1 and 40 CFR Part 191 is necessary to protect the public and the environment per the Nuclear Waste Policy Act of 1982, the Atomic Energy Act of 1954, as amended, and the WIPP Land Withdrawal Act.

REQUIREMENT NUMBER

RPPE-0037

DECISION: Delete

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BASIS FOR DECISION: The original paragraph of DOE 5400.5 stated a longstanding Department of Energy policy to comply with applicable environmental statutes, regulations and standards and represents how DOE conducts its operations; it did not contain any unique requirements that are not addressed by other DOE directives.

BEGINNING CITATION: II.1.c.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Regulatory Requirements. DOE facilities and operations, in some instances, are subject to the regulatory requirements of the NRC and the EPA, e.g., 10 CFR Parts 60 and 72 and 40 CFR Parts 61, 191, and 192. It is Departmental policy that DOE facilities and operations will comply fully with the requirements of those and other applicable regulatory requirements. In addition, these same DOE facilities and operations shall comply with all applicable requirements in this Order unless they are duplicative or conflict with any of the other Federal regulatory requirements. The resolution of issues concerning duplicative or conflicting requirements will be conducted pursuant to the issue coordination provisions of DOE 5400.2A.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0038

DECISION: Modify

BASIS FOR DECISION: To clarify the applicability of the drinking water requirements and to ensure that DOE facilities continue to protect drinking water systems.

BEGINNING CITATION: II.1.d.

ENDING CITATION: 4.i(1)

REQUIREMENT DESCRIPTION: Drinking Water Pathway Only, All DOE Sources of Radionuclides. It is the policy of DOE to provide a level of protection for persons consuming water from a public drinking water supply operated by the DOE, either directly or through a DOE contractor, that is equivalent to that provided to the public by the public community drinking water standards of 40 CFR Part 141. These systems shall not cause persons consuming the water to receive an effective dose equivalent greater than 4 mrem (0.04 mSv) in a year. Combined radium-226 and radium-228 shall not exceed and gross alpha activity (including radium-226 but excluding radon and uranium) shall not exceed $1.5 \times 10^{-8} \mu\text{Ci/ml}$.

REVISED REQUIREMENT:

4.i. Protection of Drinking Water and Ground Water.

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(1) DOE sites must provide a level of radiation protection for persons consuming water from a drinking water system operated by DOE, directly or through a DOE contractor, which is equivalent to that provided to members of the public by the community drinking water standards of 40 CFR Part 141, *National Primary Drinking Water Regulations* (that is, not exceed the radionuclide maximum contaminant levels (MCLs)).

BASIS FOR REQUIREMENT: DOE-owned or contractor-operated drinking water systems for a DOE activity or facility may be exempt from provisions of 40 CFR Part 141. However, as stated in paragraph II.1.d of DOE 5400.5, it is DOE's policy that DOE drinking water systems that are not subject to EPA regulation of drinking water systems must still be subject by DOE to equivalent requirements.

REQUIREMENT NUMBER

RPPE-0039

DECISION: Modify

BASIS FOR DECISION: For improved organization the modified requirement is now contained in DOE O 458.1 under Paragraph 4.g, "Control and Management of Radionuclides from DOE Activities in Liquid Discharges." Language has been edited for consistency with the format of Paragraph 4.g.

BEGINNING CITATION: II.1.d.(3)

ENDING CITATION: 4.g(7)

REQUIREMENT DESCRIPTION: Impact on Other Systems. The liquid effluents from DOE activities shall not cause private or public drinking water systems downstream of the facility discharge to exceed the drinking water radiological limits in 40 CFR Part 141.

REVISED REQUIREMENT:

4.g(7) Conduct radiological activities to ensure that radionuclides from DOE activities contained in liquid effluents do not cause private or public drinking water systems to exceed the drinking water maximum contamination limits in 40 CFR Part 141, *National Primary Drinking Water Regulations*.

BASIS FOR REQUIREMENT: The purpose of this requirement is to ensure that the National Primary Drinking Water Regulations are not exceeded at any public or private drinking water system as a result of DOE activities involving the management of DOE-added radiological constituents.

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REQUIREMENT NUMBER RPPE-0040

DECISION: Modify

BASIS FOR DECISION: To improve organizational structure and to consolidate and update requirements into a single "ALARA Requirements" section of DOE O 458.1.

BEGINNING CITATION: II.2.

ENDING CITATION: 4.d(1)-(3)

REQUIREMENT DESCRIPTION: THE ALARA PROCESS. Field Elements shall develop a program and shall require contractors to implement the ALARA Process for all DOE activities and facilities that cause public doses.

REVISED REQUIREMENT:

4.d. As Low As Reasonably Achievable (ALARA) Requirements.

- (1) A documented ALARA process must be implemented to optimize control and management of radiological activities so that doses to members of the public (both individual and collective) and releases to the environment are kept as low as reasonably achievable. The process must be applied to the design or modification of facilities and conduct of activities that expose the public or the environment to radiation or radioactive material.
- (2) The ALARA process must: consider DOE sources, modes of exposure, and all pathways which potentially could result in the release of radioactive materials into the environment, or exposure to the public; use a graded approach; and to the extent practical and when appropriate, be coordinated with the 10 CFR Part 835 ALARA process.
- (3) The ALARA process must be applied to all routine radiological activities. Though not applicable to non-routine radiological events (for example, accidental, unplanned, or inadvertent releases or exposures), the ALARA process is applicable during recovery and remediation activities associated with a non-routine event.

BASIS FOR REQUIREMENT: The ALARA principle has been a fundamental principle of radiation protection programs in the United States for several decades, and has long been a goal of radiation protection programs of the Department of Energy (and its predecessor agencies) and its contractor organizations. The ALARA principle is consistent with ICRP recommendations. The ICRP, in its Publication 26 published in 1977, recommended that ALARA be a formal procedure as part of a system of radiation protection consisting of three parts: 1) Justification; 2) Optimization (i.e., ALARA); and 3) Dose Limits. This three-part system was

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subsequently endorsed in later ICRP recommendations (ICRP Publication 60). The National Council on Radiation Protection and Measurements (NCRP) made similar recommendation in NCRP Report No. 91, "Recommendations and Limits for Exposure to Ionizing Radiation," published in 1987 and in NCRP Report No. 116, "Limitation of Exposure to Ionizing Radiation," published in 1993. The ICRP system of dose limitations has been adopted almost universally and DOE has implemented the recommendations in its Orders such as DOE 5400.5 and regulations such as 10 CFR Part 835. ICRP Publication 37, "Cost-Benefit Analysis in the Optimization of Radiation Protection", pages 1 and 2, paragraphs 7 and 8 discuss some of the aspects of the ALARA process and pages 11 through 18 discuss various items to be considered in a cost-benefit analysis to achieve Optimization.

REQUIREMENT NUMBER RPPE-0041

DECISION: Delete

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, "The ALARA Process." DOE 5400.5 Chapter II, paragraph II.2.a, entitled "Considerations," listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum, in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman's March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Considerations. ALARA requires judgment with respect to what is reasonably achievable. Factors that relate to societal, technological, economic, and other public policy considerations shall be evaluated to the extent practicable in making such judgments. Factors to be considered, at a minimum, shall include:

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0042

DECISION: Delete

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, "The ALARA Process." DOE 5400.5 Chapter II, paragraph II.2.a, entitled "Considerations," listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum,

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in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(1)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: The maximum dose to members of the public;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0043

DECISION: Delete

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, “The ALARA Process.” DOE 5400.5 Chapter II, paragraph II.2.a, entitled “Considerations,” listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum, in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: The collective dose to the population;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0044

DECISION: Delete

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, “The ALARA Process.” DOE 5400.5 Chapter II, paragraph II.2.a, entitled “Considerations,” listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum,

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in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(3)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Alternative processes, such as alternative treatments of discharge streams, operating methods, or controls;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0045

DECISION: Delete

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, “The ALARA Process.” DOE 5400.5 Chapter II, paragraph II.2.a, entitled “Considerations,” listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum, in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(4)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Doses for each process alternative;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0046

DECISION: Delete

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BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, “The ALARA Process.” DOE 5400.5 Chapter II, paragraph II.2.a, entitled “Considerations,” listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum, in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(5)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Costs for each of the technological alternatives;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0047

DECISION: Delete

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, “The ALARA Process.” DOE 5400.5 Chapter II, paragraph II.2.a, entitled “Considerations,” listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum, in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(6)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Examination of the changes in-cost among alternatives;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0048

DECISION: Delete

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Radiation Protection of the Public and the Environment - DOE Order 5400.5 & DOE O 458.1

BASIS FOR DECISION: DOE 5400.5 set forth requirements related to the ALARA process in Chapter II, Section 2, “The ALARA Process.” DOE 5400.5 Chapter II, paragraph II.2.a, entitled “Considerations,” listed general categories of factors (i.e., societal, technological, economic and public policy) to evaluate to the extent practicable, and specified factors to be considered, at a minimum, in making ALARA judgments. In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, such as reviewing opportunities to streamline requirements, DOE O 458.1 addresses the essential ALARA requirements. Specific detailed requirements related to the ALARA process are not included, but overarching, higher level ALARA requirements have been retained in DOE O 458.1.

BEGINNING CITATION: II.2.a.(7)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Changes in societal impact associated with process alternatives, e.g., differential doses from various pathways.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0049

DECISION: Delete

BASIS FOR DECISION: The original DOE 5400.5 paragraph (Ch. II.2.b) contains recommendations and background information on how a cost-benefit evaluation could be performed. This material may be more appropriately addressed in guidance or a technical standard. The basis for the original DOE 5400.5 requirement may be found in ICRP Publication 26, 1977, "Recommendations of the International Commission on Radiological Protection", pages 14-15. Also, ICRP Publication 37, "Cost-Benefit Analysis in the Optimization of Radiation Protection", pages 11 through 18, Section on “The Use of Cost-Benefit Analysis.”

BEGINNING CITATION: II.2.b.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Evaluations. A quantitative cost-benefit analysis (e.g., optimization) could be performed, given the results of the considerations noted in paragraph II.2a, above. However, the parameters needed to evaluate the cost-benefit analyses are difficult to quantify, and evaluations themselves can be expensive. Furthermore, the evaluations include many additional assumptions, judgments, and limitations that are often difficult to reflect as uncertainties in the analyses. Therefore, except for meeting requirements of the National Environmental Policy Act, qualitative analyses are acceptable, in most instances, for ALARA judgments, especially where potential doses are well below the dose limit. The bases for such judgments should be documented. More detailed analyses should be considered if the decisions might result in doses that approach the limit.

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REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0050**

DECISION: Modify

BASIS FOR DECISION: To clarify, streamline and update the provisions of the Order related to control and management of radioactive materials in liquid discharges and phaseout of soil columns.

BEGINNING CITATION: II.3.

ENDING CITATION: 4.g

REQUIREMENT DESCRIPTION: MANAGEMENT AND CONTROL OF RADIOACTIVE MATERIALS IN LIQUID DISCHARGES AND PHASEOUT OF SOIL COLUMNS. In addition to the requirement to limit dose to members of the public (onsite or offsite) in accordance with the standards established in paragraphs II.1a and II.1d, further controls are imposed on liquid releases to protect resources such as land, surface water, ground water, and the related ecosystems from undue contamination. DCGs are not release limits, but rather are screening values for considering BAT for these discharges and for making dose estimates. The following requirements apply at the point of discharge from the conduit to the environment.

REVISED REQUIREMENT:

4.g. Control and Management of Radionuclides from DOE Activities in Liquid Discharges. Operators of DOE facilities discharging or releasing liquids containing radionuclides from DOE activities must:

- (1) Characterize planned and unplanned releases of liquids containing radionuclides from DOE activities, consistent with the potential for on- and off-site impacts, and provide an assessment of radiological consequences as necessary to demonstrate compliance with the requirements of this Order.
- (2) Comply with the ALARA process requirements in paragraph 4.d. of this Order.
- (3) Conduct activities to ensure that liquid releases containing radionuclides from DOE activities are managed in a manner that protects ground water resources now and in the future, based on use and value considerations.

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- (4) Conduct activities to ensure that liquid discharges containing radionuclides from DOE activities do not exceed an annual average (at the point of discharge) of either of the following:
 - (a) 5 pCi (0.2 Bq) per gram above background of settleable solids for alpha-emitting radionuclides.
 - (b) 50 pCi (2 Bq) per gram above background of settleable solids for beta-emitting radionuclides.
- (5) Except for tritium and sanitary sewers, apply Best Available Technology (BAT) if at the point of discharge:
 - (a) The annual average concentration of a given radionuclide is greater than the DOE-approved *Derived Concentration Technical Standard*, DOE-STD-1196-2011, (DCS) value for water, or for multiple radionuclides, the composite DCS must be the sum of the fractional DCS values derived from DOE-approved DCS values,
 - (b) The discharge contributes greater than 10 mrem (0.1 mSv) annual TED to members of the public, or
 - (c) The collective dose from all DOE sources is greater than 100 person-rem (1 person-Sv) and the liquid discharge contributes 50 percent or more of this collective dose.
- (6) Control releases of tritium in a manner that has been established by application of the ALARA process.
- (7) Conduct radiological activities to ensure that radionuclides from DOE activities contained in liquid effluents do not cause private or public drinking water systems to exceed the drinking water maximum contamination limits in 40 CFR Part 141, *National Primary Drinking Water Regulations*.
- (8) Control discharges into sanitary sewers in accordance with the following requirements:
 - (a) Except for excreta from patients and medical research volunteers treated with radioactive material, discharges of liquids containing radionuclides from DOE activities into non-Federally owned sanitary sewers are prohibited unless:
 - 1 The material is readily soluble (or readily dispersed biological materials) in water;
 - 2 Such discharges comply with ALARA process requirements;

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- 3 BAT is applied to discharges of liquid releases containing radionuclides from DOE activities if the average monthly concentration level at the point of discharge into the sanitary sewer is greater than five times the DOE-approved DCS values for ingestion except for tritium which is addressed under paragraph 4.g.(6);
- 4 Releases do not result in an annual discharge (above background) into sanitary sewers in excess of 5 Ci (185 GBq) of tritium; 1 Ci (37 GBq) carbon-14 or 1 Ci (37 GBq) of all other radionuclides combined;
- 5 DOE operations are conducted to minimize long-term buildup of radionuclides in the sewage treatment plants that may create handling and disposal issues or interfere with plant operations;
- 6 Operators of sewage treatment plants are informed of DOE practices and processes to radiologically control and clear discharges, and are notified of unusual discharges to sanitary sewers;
- 7 The DOE Field Element Manager provides a report that describes and summarizes such discharges to sanitary sewers to appropriate local officials at least annually; and
- 8 Existing agreements, contracts, statements of understanding or other formal arrangements with other agencies concerning the discharge of liquids containing radionuclides from DOE activities to sanitary sewers are not violated.

(b) DOE facilities discharging liquids containing radionuclides from DOE activities into sanitary sewer systems owned by the Federal government are not subject to the requirements in paragraph 4.g.(8)(a) of this Order if:

- 1 The system provides treatment in accordance with the environmental radiological protection program and
- 2 Sludge from the system is disposed of in accordance with this Order and applicable Federal, State, and municipal regulations.

(9) Prohibit the use of soil columns.

(10) Manage the disposition of non-process water potentially containing radionuclides from DOE activities to protect soil and ground water and prevent the creation of future cleanup sites.

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- (11) Ensure that storm water runoff containing radionuclides from DOE activities is considered, as appropriate, as a pathway of exposure that has the potential for on- and off-site impacts. Using a graded approach, the receiving ecosystem including, but not limited to, wetlands, floodplains, streams, ponds, basins and lakes must be monitored to evaluate human or ecological impacts when warranted based on site specific risk.

BASIS FOR REQUIREMENT: In addition to the requirement to limit dose to members of the public (onsite or offsite) to the primary standards established under DOE 5400.5, DOE determined that it needed to impose additional controls on the release of liquid wastes to reduce the potential for contamination of natural resources such as land, ground water and surface water, and ecosystems. Recommendations for such additional controls were made from both within and outside of DOE. For example, a U.S. General Accounting Office (GAO) report entitled "Nuclear Energy: Environmental Issues at DOE's Nuclear Defense Facilities" (GAO/RCED-86-192) recommended that DOE establish a ground water and soil protection strategy that would include a policy on the extent ground water and soil can be contaminated and specific guidelines to protect resources in the vicinity of DOE facilities. In response to this recommendation DOE 5400.5 required DOE facilities to establish Best Available Technology (BAT) as the level of treatment of liquid waste streams prior to release as liquid effluents and to phase out the use of soil columns which retain suspended or dissolved radionuclides from radioactive liquid waste streams.

Injection of a treated liquid waste containing tritium into an aquifer or a well is not addressed by the requirements in paragraph II.3.b(2) of DOE 5400.5. Paragraph II.3.e(2) - "Tritium Control" was included in DOE 5400.5 to specifically address such an action. Under DOE 5400.5, the use of ground water to control access to tritium while it has time to decay is a viable and permitted control practice for liquid waste containing tritium. DOE 5400.5 provided this exception to the liquid waste control requirements of Section 3, which address discharges of liquid waste to surface water, aquifers and soil columns, and sanitary sewerage. The exception in paragraph II. 3.e(2) of DOE 5400.5 primarily requires that the ALARA process be used to reduce, as much as practicable, the levels of tritium in the process that generated the liquid waste, and to rely on containment or confinement (e.g., in ground water) to afford the time needed for sufficient radioactive decay of the tritium isotope, given tritium's relatively short half-life (12.3 years). Decay in transit in the aquifer is identified in paragraph II.3.e(2) of DOE 5400.5 as a practicable disposal alternative for such treated liquid wastes. This practice allows consideration of the relatively short half-life of tritium and the flow rate of the ground water to ensure that tritium has decayed to levels that will not result in unacceptable exposures should the water ever be used or become accessible to the public. (See Raymond F. Pelletier memorandum to Distribution dated April 28, 1995, on "Interpretation of Tritium Control Exception of DOE 5400.5, Radiation Protection of the Public and the Environment").

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REQUIREMENT NUMBER

RPPE-0051

DECISION: Modify

BASIS FOR DECISION: Consolidation and clarification of BAT requirements, as well as improved clarity related to tritium.

BEGINNING CITATION: II.3.a.(1)

ENDING CITATION: 4.g(5) and 4.g(6)

REQUIREMENT DESCRIPTION: Discharge at Greater Than DCG Level. For liquid wastes containing radionuclides from DOE activities which are discharged to surface water, the best available technology (BAT) is the prescribed level of treatment if the surface waters otherwise would contain, at the point of discharge and prior to dilution, radioactive material at annual average concentrations greater than the DCG values in liquids given in Chapter III. The BAT selection process shall be implemented in accordance with II.3a(1)(a) and (b), below. Although there is no known practicable method for removing tritium from liquid waste streams, facilities and operations are to be designed and operated so that tritium sources and releases are considered in the ALARA process.

REVISED REQUIREMENT:

4.g(5) Except for tritium and sanitary sewers, apply Best Available Technology (BAT) if at the point of discharge:

- (a) The annual average concentration of a given radionuclide is greater than the DOE-approved *Derived Concentration Technical Standard*, DOE-STD-1196-2011, (DCS) value for water, or for multiple radionuclides, the composite DCS must be the sum of the fractional DCS values derived from DOE-approved DCS values,
- (b) The discharge contributes greater than 10 mrem (0.1 mSv) annual TED to members of the public, or
- (c) The collective dose from all DOE sources is greater than 100 person-rem (1 person-Sv) and the liquid discharge contributes 50 percent or more of this collective dose.

4.g(6): Control releases of tritium in a manner that has been established by application of the ALARA process.

BASIS FOR REQUIREMENT: Section II.3.a of DOE 5400.5 provided for the protection of surface waters from DOE liquid discharges containing radioactive material. This section was intended to control releases in a manner consistent with Section 301(b) of the Clean Water Act. EPA's regulation 40 CFR Part 125 -- "Criteria and Standards for the National Pollutant Discharge Elimination System" requires use of BAT for National Pollutant Discharge Elimination System (NPDES) Permits to control

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discharges of non-radioactive pollutants to surface waters. DOE determined that it was appropriate to have an equivalent requirement of the application of BAT to the discharge of radioactive pollutants into public waters. Therefore, DOE incorporated BAT to provide a consistent level of protection.

Unlike most other contaminants, there is no known practical method for removing tritium as tritiated water from a waste stream where it is mixed with large quantities of water. However, the dose limits and the ALARA process apply to exposures to tritium, just as they do to all other radionuclides.

REQUIREMENT NUMBER

RPPE-0052

DECISION: Delete

BASIS FOR DECISION: Editorial decision. The requirement was deleted but the following definition is in Attachment 2 to DOE O 458.1 to identify technical and economic considerations to be included in determining the best available technology (BAT): “BAT Selection Process — The evaluation of candidate alternative technologies in order to select the BAT after considering: technology; economics; the age of equipment and facilities involved; the process employed; the engineering aspects of the application of various types of control techniques; process changes; other environmental impacts (including energy requirements); safety considerations; and policy considerations.”

BEGINNING CITATION: II.3.a.(1)(a)

ENDING CITATION: Attachment 2- Definitions

REQUIREMENT DESCRIPTION: BAT Selection. Selection of the best available technology for a specific application will be made from among candidate alternative treatment technologies which are identified by an evaluation process that includes factors related to technology, economics, and public policy considerations. Factors that are to be considered in selecting BAT, at a minimum, shall include:

1. the age of equipment and facilities involved;
2. the process employed;
3. the engineering aspects of the application of various types of control techniques;
4. process changes;
5. the cost of achieving such effluent reduction;
6. non-water quality environmental impact (including energy requirements);

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7. safety considerations; and
8. public policy considerations.

BAT analyses are difficult to express quantitatively because the factors do not have a common denominator. However, consideration of the factors will permit qualitative evaluations which will support judgments.

REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0053**

DECISION: Delete

BASIS FOR DECISION: The purpose of the original paragraph of DOE 5400.5 was to establish an internal DOE management mechanism to develop a schedule for assessing or achieving compliance with the requirements of the Order when first issued in 1990. The schedule is now out-of-date.

BEGINNING CITATION: II.3.a.(1)(b)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Plan and Schedule for Implementation. A plan and schedule to install waste treatment systems in existing facilities, if justified by a BAT analysis, shall be developed within 6 months of the issuance date of this Order, to permit compliance with paragraph II.3a(1) at the earliest practicable time. The plan shall include an ALARA section on tritium, where applicable. General design criteria are presented in DOE 6430.1A.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0054**

DECISION: Delete

BASIS FOR DECISION: The purpose of the original requirement was to establish an internal DOE management mechanism for the BAT selection process. DOE will still make the decision on whether to allow exceeding the DCG. DOE O 5820.2(a) has been replaced by DOE O 435.1, which does not address BAT.

BEGINNING CITATION: II.3.a.(1)(c)

ENDING CITATION: N/A

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REQUIREMENT DESCRIPTION: Approval. The plan shall be submitted for approval to the responsible DOE Field Office Manager and updated annually, consistent with the provisions of DOE 5820.2A for preparing and updating Waste Management Plans.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0055

DECISION: Merge MERGE WITH: RPPE-0051

BASIS FOR DECISION: Consolidation and clarification of BAT provisions.

BEGINNING CITATION: II.3.a.(2)

ENDING CITATION: 4.g(5)

REQUIREMENT DESCRIPTION: Discharge at Less Than DCG Level. Implementation of the BAT process for liquid radioactive wastes is not required where radionuclides are already at a low level, i.e., the annual average concentration is less than DCG level. In that case, the cost consideration component of BAT analysis precludes the need for additional treatment, since any additional treatment would be unjustifiable on a cost-benefit basis. Therefore, additional treatment will not be required for waste streams that contain radionuclide concentrations of not more than the DCG values in Chapter III at the point of discharge to a surface waterway. However, the ALARA provisions are applicable.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0056

DECISION: Merge MERGE WITH: RPPE-0051

BASIS FOR DECISION: Consolidation and clarification of BAT and DCG provisions.

BEGINNING CITATION: II.3.a.(3)

ENDING CITATION: 4.g(5)(a)

REQUIREMENT DESCRIPTION: Multiple Radionuclides. For purposes of II.3a(1), above, the DCG for liquid waste streams containing more than one type of radionuclide shall be the sum of the fractional DCG values.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

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REQUIREMENT NUMBER

RPPE-0057

DECISION: Modify

BASIS FOR DECISION: This requirement is necessary to prevent build up of radiological contamination in sediments. The language has been edited to improve clarity, to remove explanatory material from the front of the paragraph, and to be consistent with the formatting of DOE O 458.1.

BEGINNING CITATION: II.3.a.(4)

ENDING CITATION: 4.g(4)

REQUIREMENT DESCRIPTION: Sedimentation. To prevent the buildup of radionuclide concentrations in sediments, liquid process waste streams containing radioactive material in the form of settleable solids may be released to natural waterways if the concentration of radioactive material in the solids present in the waste stream does not exceed 5 pCi (0.2 Bq) per gram above background level, of settleable solids for alpha-emitting radionuclides or 50 pCi (2 Bq) per gram above background level, of settleable solids for beta-gamma-emitting radionuclides.

REVISED REQUIREMENT:

4.g(4): Conduct activities to ensure that liquid discharges containing radionuclides from DOE activities do not exceed an annual average (at the point of discharge) of either of the following:

- (a) 5 pCi (0.2 Bq) per gram above background of settleable solids for alpha-emitting radionuclides.
- (b) 50 pCi (2 Bq) per gram above background of settleable solids for beta-emitting radionuclides.

BASIS FOR REQUIREMENT: Accumulation of radioactive materials in sediments can result in exposure of humans through ingestion of aquatic species, through resuspension in drinking water supplies, or as an external radiation source (for example, irradiating people engaged in fishing or wading). Limits for settleable solids were established to prevent or minimize the risk of radionuclide buildup in sediments.

REQUIREMENT NUMBER

RPPE-0058

DECISION: Modify

BASIS FOR DECISION: Consistency with DOE Technical Standard: "A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota" (DOE-STD-1153-2002).

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BEGINNING CITATION: II.3.a.(5)

ENDING CITATION: 4.j

REQUIREMENT DESCRIPTION: Interim Dose Limit for Native Aquatic Animal Organisms. To protect native animal aquatic organisms, the absorbed dose to these organisms shall not exceed 1 rad per day from exposure to the radioactive material in liquid wastes discharged to natural waterways. DOE publication DOE/EH-0173T provides guidance on monitoring and calculating dose for aquatic organisms.

REVISED REQUIREMENT:

4.j. Protection of Biota.

- (1) Radiological activities that have the potential to impact the environment must be conducted in a manner that protects populations of aquatic animals, terrestrial plants, and terrestrial animals in local ecosystems from adverse effects due to radiation and radioactive material released from DOE operations.
- (2) When actions taken to protect humans from radiation and radioactive materials are not adequate to protect biota then evaluations must be done to demonstrate compliance with paragraph 4.j.(1) of this Order in one or more of the following ways:
 - (a) Use DOE-STD-1153-2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*.
 - (b) Use an alternative approach to demonstrate that the dose rates to representative biota populations do not exceed the dose rate criteria in DOE-STD-1153-2002, Table 2.2.
 - (c) Use an ecological risk assessment to demonstrate that radiation and radioactive material released from DOE operations will not adversely affect populations within the ecosystem.

BASIS FOR REQUIREMENT: The original DOE 5400.5 requirement was based on draft NCRP recommendations which were developed at DOE's request, and published as NCRP Report No. 109, "Effects of Ionizing Radiation on Aquatic Organisms" (1991).

REQUIREMENT NUMBER

RPPE-0059

DECISION: Delete

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BASIS FOR DECISION: This requirement is redundant since the overall requirement for discharge in Paragraph 4.g does not exclude new facilities.

BEGINNING CITATION: II.3.a.(6)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: New Facilities. New facilities shall be designed and constructed to meet the discharge requirements shown in paragraph II.3a.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0060

DECISION: Modify

BASIS FOR DECISION: Soil columns are no longer used by DOE as a means of liquid discharge disposal.

BEGINNING CITATION: II.3.b.(1)

ENDING CITATION: 4.g(9) & (10)

REQUIREMENT DESCRIPTION: Phasing Out the Use of Soil Columns. The use of soil columns (i.e., trenches, cribs, ponds, and drain fields) to retain, by sorption or ion exchange, suspended or dissolved radionuclides from liquid waste streams shall be discontinued at the earliest practicable time in favor of an acceptable alternative disposal means. DOE activities that currently discharge liquids containing radioactive materials not first treated by BAT to soil columns, shall develop, within 6 months of the issuance date of this Order, a plan and schedule for implementing alternate acceptable disposal at the earliest practicable time. The BAT selection process shall be applied to those liquid waste streams that will continue to be discharged to soil columns for indefinite periods and which contain process-derived radionuclides. The plan shall be submitted for approval to the respective DOE Field Office Manager and updated annually, consistent with the provisions of DOE 5820.2A for preparing and updating Waste Management Plans.

REVISED REQUIREMENT:

4.g (9) Prohibit the use of soil columns.

4.g (10) Manage the disposition of non-process water potentially containing radionuclides from DOE activities to protect soil and ground water and prevent the creation of future cleanup sites.

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BASIS FOR REQUIREMENT: To enhance protection of ground water, to minimize the buildup of radionuclides in soil, and to incorporate lessons learned from cleanup costs associated with the use of soil columns. To protect ground water contaminated by soil columns from further degradation and to prevent the spread of contamination through the soil column to minimize future cleanups.

REQUIREMENT NUMBER

RPPE-0061

DECISION: Merge MERGE WITH: RPPE-0060

BASIS FOR DECISION: Soil columns are no longer used by DOE as a means of liquid discharge disposal.

BEGINNING CITATION: II.3.b.(2)

ENDING CITATION: 4.g(9)

REQUIREMENT DESCRIPTION: Prohibition of New or Increased Discharge Quantities and New Soil Columns. Except as permitted by the provisions in paragraph II.3e(1), new or increased discharges of radionuclides in liquid waste to active soil columns and virgin soil columns shall be prohibited after the effective date of this Order.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0062

DECISION: Merge MERGE WITH: RPPE-0060

BASIS FOR DECISION: Soil columns are no longer used by DOE as a means of liquid discharge disposal.

BEGINNING CITATION: II.3.c.(1)

ENDING CITATION: 4.g(9)

REQUIREMENT DESCRIPTION: Management of Soil Columns, Natural Drainage Systems, and Ground Water at Inactive Sites Previously Contaminated with Radioactive Material. (1) Inactive Receptors. Contaminated soil columns, drainage systems, and ground water to which contaminated liquid discharges have been discontinued shall be managed or decontaminated pursuant to the procedures and requirements of DOE 5480.4 and in the 5400 series.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0063

DECISION: Modify

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BASIS FOR DECISION: To prevent the spread of radionuclides from DOE activities in liquid discharges to soil and water and to clarify the applicability of the requirements.

BEGINNING CITATION: II.3.c.(2)

ENDING CITATION: 4.g(9) and (10)

REQUIREMENT DESCRIPTION: Discharge of Other Liquids. Liquid discharges, even though uncontaminated, are prohibited in inactive release areas to prevent the further spread of radionuclides previously deposited.

REVISED REQUIREMENT:

4.g (9) Prohibit the use of soil columns.

4.g (10) Manage the disposition of non-process water potentially containing radionuclides from DOE activities to protect soil and ground water and prevent the creation of future cleanup sites.

BASIS FOR REQUIREMENT: DOE management practice.

REQUIREMENT NUMBER

RPPE-0064

DECISION: Modify

BASIS FOR DECISION: Consolidate requirements and streamline language regarding control and management of radionuclides from DOE activities in liquid discharges to sanitary sewers in paragraph 4.g(8) of DOE O 458.1.

BEGINNING CITATION: II.3.d.

ENDING CITATION: 4.g(8)(a)3

REQUIREMENT DESCRIPTION: Discharges of Liquid Waste to Sanitary Sewerage. The BAT selection process shall be implemented if liquid wastes discharged from DOE activities into sanitary sewerage contain radionuclides at concentrations, averaged monthly, would otherwise be greater than five times the DCG values for liquids given in Chapter III at the point of discharge. That is, the BAT selection process shall be implemented if the total of the fractions of the average concentrations for each radionuclide to its respective DCG value would otherwise exceed 5.

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REVISED REQUIREMENT:

4.g(8)(a)3 BAT is applied to discharges of liquid releases containing radionuclides from DOE activities if the average monthly concentration level at the point of discharge into the sanitary sewer is greater than five times the DOE-approved DCS values for ingestion except for tritium which is addressed under paragraph 4.g.(6);

BASIS FOR REQUIREMENT: The basis for the requirement in DOE 5400.5 was DOE's decision to be generally compatible with requirements regarding the control of releases of liquid wastes to sanitary sewer systems imposed by NRC on its licensees under 10 CFR Part 20. (See also June 17, 1992, memorandum from Raymond F. Pelletier to Distribution, "Guidance regarding water protection element of DOE 5400.5").

REQUIREMENT NUMBER

RPPE-0065

DECISION: Modify

BASIS FOR DECISION: Consolidate requirements and streamline language regarding discharges of liquids containing DOE-added radiological constituents to sanitary sewers in paragraph 4.g(8) of DOE O 458.1. Clarify requirement regarding coordination with public sewer operators.

BEGINNING CITATION: II.3.d.(1)

ENDING CITATION: 4.g(8)(a)6

REQUIREMENT DESCRIPTION: Discharges to public sewers should be coordinated with the operators of the waste water treatment works.

REVISED REQUIREMENT:

4.g(8)(a)6 Operators of sewage treatment plants are informed of DOE practices and processes to radiologically control and clear discharges, and are notified of unusual discharges to sanitary sewers;

BASIS FOR REQUIREMENT: DOE management practice.

REQUIREMENT NUMBER

RPPE-0066

DECISION: Modify

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BASIS FOR DECISION: The need to conduct operations in such a way as to minimize the potential build-up of radioactivity outside of the DOE system.

BEGINNING CITATION: II.3.d.(2)

ENDING CITATION: 4.g(8)(a)5

REQUIREMENT DESCRIPTION: Concentrations shall be controlled so that long-term buildup of radionuclides in solids will not present a handling and disposal problem at sewage disposal plants.

REVISED REQUIREMENT:

4.g(8)(a)5 DOE operations are conducted to minimize long-term buildup of radionuclides in the sewage treatment plants that may create handling and disposal issues or interfere with plant operations;

BASIS FOR REQUIREMENT: DOE management practice.

REQUIREMENT NUMBER

RPPE-0067

DECISION: Modify

BASIS FOR DECISION: The environmental radiological protection program or applicable Federal regulations would assure that the site is meeting the requirements.

BEGINNING CITATION: II.3.d.(3)

ENDING CITATION: 4.g(8)(b)

REQUIREMENT DESCRIPTION: Liquid wastes containing concentrations or quantities of radioactive materials that, when averaged monthly, are greater than those specified in paragraph II.3d may be discharged into a chemical or sanitary sewerage system (e.g., systems with drain fields excepted) if the system is owned by the Federal Government. However, ALARA process considerations are required. Such a sewerage system will provide liquid waste treatment prior to discharge to surface waters in accordance with the requirements of paragraph II.3a(1).

REVISED REQUIREMENT:

4.g(8)(b) DOE facilities discharging liquids containing radionuclides from DOE activities into sanitary sewer systems owned by the Federal government are not subject to the requirements in paragraph 4.g.(8)(a) of this Order if:

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- 1 The system provides treatment in accordance with the environmental radiological protection program and
- 2 Sludge from the system is disposed of in accordance with this Order and applicable Federal, State, and municipal regulations.

BASIS FOR REQUIREMENT: DOE management practice.

REQUIREMENT NUMBER **RPPE-0068**

DECISION: Delete

BASIS FOR DECISION: The provision of DOE 5400.5 contained a "should" not a "shall" statement.

BEGINNING CITATION: II.3.d.(4)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Operators should ensure that the total annual discharge of radioactive material to the sanitary sewer system will not cause exposures to members of the general public that will result in doses exceeding a small fraction of the basic annual dose limit.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A.

REQUIREMENT NUMBER **RPPE-0069**

DECISION: Delete

BASIS FOR DECISION: The purpose of the original paragraph in DOE 5400.5 was to establish an internal DOE management mechanism to provide a flexible schedule for achieving compliance with the requirements of DOE 5400.5 when it was first issued in 1990. The mechanism is no longer applicable.

BEGINNING CITATION: II.3.e.(1)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Exceptions for Liquid Waste Control Requirements: Interim Control Strategies. DOE Field Office Managers responsible for DOE activities that cannot comply, when this Order is issued, with requirements shown in paragraph II.3, shall develop an interim control strategy with adequate documentation identifying the alternatives considered and evaluation thereof. Such interim control strategies shall be adopted and implemented under the provisions of DOE 5820.2A, Chapter III, paragraph 3a(2), within 6 months of the issuance of this Order, and shall be reevaluated every 2 years thereafter.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0070**

DECISION: Merge MERGE WITH: RPPE-0050

BASIS FOR DECISION: Liquid waste containing tritium is a special case. Since no practical technology is available to remove tritium from water decay should be considered.

BEGINNING CITATION: II.3.e.(2)

ENDING CITATION: 4.g(6)

REQUIREMENT DESCRIPTION: Exceptions for Liquid Waste Control Requirements: Tritium Control. There is no practicable technology available for removing tritium from dilute liquid waste streams. Therefore, process alternatives that reduce the amount of tritium entering the liquid waste streams shall be identified and evaluated in accordance with the DOE ALARA policy. Tritium decay in transit in confined ground water may be an acceptable alternative to direct release to the atmosphere or to surface waters. A description and summary of the alternatives considered in the control of tritium releases shall be incorporated into the site Waste Management Plan required by DOE 5820.2A.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0071**

DECISION: Not a Requirement

BASIS FOR DECISION: Section II.4 of DOE 5400.5 is not a requirement, but rather it cross references other DOE Orders that contained requirements pertaining to low-level radioactive waste. Low-level radioactive waste is managed in accordance with DOE O 435.1 and DOE G 435.1-1, Chapter IV.

BEGINNING CITATION: II.4.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: MANAGEMENT OF LOW-LEVEL RADIOACTIVE SOLID WASTE. The requirements for the management of low-level wastes are presented in DOE 5400.1 and DOE 5820.2A. Design, operational, and monitoring requirements for disposal of solid low-level waste containing no constituents regulated by The Resource Conservation and Recovery Act (RCRA) are addressed in DOE 5820.2A.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0072

DECISION: Modify

BASIS FOR DECISION: Modified to provide greater specificity and clarify the requirements related to clearance of DOE real property that potentially contains residual radioactive material.

BEGINNING CITATION: II.5.a.

ENDING CITATION: 4.k

REQUIREMENT DESCRIPTION: Release of Real Property. Release of real property (land and structures) shall be in accordance with the guidelines and requirements for residual radioactive material presented in Chapter IV. These guidelines and requirements apply to both DOE-owned facilities and to private properties that are being prepared by DOE for release. Real properties owned by DOE that are being sold to the public are subject to the requirements of Section 120(h) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended, concerning hazardous substances, and to any other applicable Federal, State, and local requirements. The requirements of 40 CFR Part 192 are applicable to properties remediated by DOE under Title I of the Uranium Mill Tailings Radiation Control Act (UMTRA).

REVISED REQUIREMENT:

- 4.k Release and Clearance of Property. Release or clearance of property with the potential to contain residual radioactive material must be conducted in accordance with the requirements in paragraph 4.k. of this Order.²
- (1) Property control and clearance processes must be developed and implemented in accordance with the dose limits in paragraph 4.b. under any plausible use of the property and the ALARA process requirements in paragraph 4.d. of this Order must be met before property is cleared.

² In addition to paragraph 4.k of this Order, the following may have applicable requirements regarding clearance of property: 41 CFR Chapter 109, *Department of Energy Property Management Regulations*; 10 CFR Part 770, *Transfer of Real Property at Defense Nuclear Facilities for Economic Development*; DOE O 430.1B Chg 1, *Real Property Asset Management*; and DOE O 580.1 Chg 1, *Department of Energy Personal Property Management Program*.

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- (2) Dose Constraints. Unless alternative dose constraints are approved by issuance of a directive or memorandum by the Chief Health, Safety and Security Officer or for NNSA, the Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer, the following dose constraints for DOE residual radioactive material must be applied to each specific clearance of property for any actual or likely future use of the property:
 - (a) Real property – a TED of 25 mrem (0.25 mSv) above background in any calendar year;
 - (b) Personal property - a TED of 1 mrem (0.01 mSv) above background in any calendar year.
- (3) Residual Radioactive Material. Property potentially containing residual radioactive material must not be cleared from DOE control unless either:
 - (a) The property is demonstrated not to contain residual radioactive material based on process and historical knowledge, radiological monitoring or surveys, or a combination of these; or
 - (b) The property is evaluated and appropriately monitored or surveyed to determine:
 - 1 The types and quantities of residual radioactive material within the property;
 - 2 The quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material present on and under any coating);
 - 3 That for property with potentially contaminated surfaces that are difficult to access for radiological monitoring or surveys, an evaluation of residual radioactive material on such surfaces is performed which is:
 - a Based on process and historical knowledge meeting the requirements of paragraph 4.k.(5) of this Order and monitoring and or surveys, to the extent feasible and

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- 4 Explicitly state any restrictions or conditions on future use of the property necessary to ensure the basic dose limit and applicable dose constraint are not exceeded;
 - 5 Include written notification of applicable Federal, State, or local regulatory agencies, or Tribal governments;
 - 6 Be approved in accordance with paragraph 4.k.(6)(d); and
 - 7 In addition to paragraphs 4.k.(6)(b)1-6, for clearance of personal property only:
 - a Be based on expected annual quantity of property to be cleared or
 - b Be based on expected total amount of property cleared over the life of the project for specific remedial action or decontamination and decommissioning projects and
 - c Prior to clearance of metals, the Field Element Manager must determine that there is no practical internal DOE opportunity for reuse or recycle of the material or equipment.
- (c) Applications for DOE approval of Authorized Limits must contain the following:
- 1 A description of the property.
 - 2 Specific limits proposed for each radionuclide or group of radionuclides and/or external radiation exposure, surrogate metrics, or conditions used to limit radionuclides.
 - 3 Potential collective dose to the exposed population and the potential dose to a member of the public most likely to receive the highest dose for both: actual or likely future use, and plausible future use of the property.
 - 4 ALARA assessments conducted under paragraph 4.d. of this Order for the proposed clearance action to include, at a minimum, the effects of:

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- a Implementing the proposed Authorized Limits;
 - b Implementing alternative levels of residual radioactive material instead of the proposed Authorized Limits;
 - c Not implementing the proposed Authorized Limits, i.e., not proceeding with the proposed clearance action.
-
- 5 A description of the procedures and radiological monitoring or surveys to be used to demonstrate compliance with proposed limits.
 - 6 Identification of any restrictions or conditions on the future use of the property upon which the proposed limits are based, and the means by which the restrictions or conditions will be implemented and maintained.
 - 7 Evidence of notification of applicable Federal, State or local regulatory agencies or Tribal governments.
 - 8 An estimated date for when the property will be cleared and an estimate of when the property will be released from DOE control.³
- (d) DOE Approval of Authorized Limits. All Authorized Limits must be approved in writing. The use of pre-approved Authorized Limits are approved by the Field Element Manager under paragraph 4.k.(6)(f). Otherwise:

³ This information is needed to support the DOE expectation stated at 72 FR 31904, 31906 (10 CFR Part 835, June 8, 2007) that the material, equipment, or real property to which the 10 CFR Part 835.1(b)(6) exclusion is applied will be released from DOE control according to a specified time interval.

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- 1 Authorized Limits for real property require Field Element Manager approval in consultation with the Cognizant Secretarial Officer.
- 2 The Field Element Manager approves Authorized Limits for personal property (including any restrictions or conditions on future use of the personal property) under the following conditions:
 - a Clearance of the property must not cause a TED to a member of the public in excess of 1 mrem (0.01 mSv) in any year or a public collective dose of more than 10 person-rem (0.1 person-Sv) in any year due to residual radioactive material for any actual or likely future use of the property;
 - b Documentation supporting the Authorized Limits is provided to the responsible Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer at least 45 working days prior to the intended implementation date of the Authorized Limits; and
 - c The Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer does not notify the Field Element Manager within 30 working days of receipt of application that the documentation is incomplete or that the Authorized Limits are not acceptable.

Otherwise; Authorized Limits for personal property must be approved by the Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.

- 3 Authorized Limits for property that has not been released from DOE control must meet the criteria in paragraphs 4.k.(6)(a) through (d) of this Order and be approved by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer if such property is to be excluded from the provisions of 10 CFR Part 835.

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- (e) Revision of Authorized Limits. If established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property, further clearance for that specific type or portion of property must not proceed without revised Authorized Limits.
 - 1 An application for revised Authorized Limits must be submitted in accordance with the requirements in paragraphs 4.k.(6)(a) through (d) of this Order.
 - 2 Approval of revised Authorized Limits must be provided in accordance with the requirements in paragraph 4.k.(6)(d) of this Order.
 - 3 In addition to the requirements of applicable paragraphs of 4.k.(6) of this Order, requests for approval of revised Authorized Limits must include a justification for the need for the revised Authorized Limits. Justifications for revised Authorized Limits must be based upon one of the following:
 - a Complying with existing Authorized Limits would pose a clear and present risk of injury to general employees or members of the public; or
 - b Complying with existing Authorized Limits would produce environmental harm (e.g., destruction of artifacts, ecological damage, loss of cultural assets) that is clearly excessive compared to the potential health benefits to persons exposed to affected properties; or
 - c Complying with existing Authorized Limits is unreasonably costly relative to long-term benefits and where the residual radioactive material does not pose a clear present or future potential of exceeding the public dose limit of paragraph 4.b.(1) of this Order; or
 - d Portions of the project or activity for which the scenarios or assumptions used to establish the existing Authorized Limits are overly conservative, or where more appropriate scenarios or assumptions indicate that other limits are applicable or appropriate for protection of the public and the environment; or

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- (a) DOE elements responsible for radiological clearance of property must ensure that final radiological monitoring or surveys are conducted and that documentation is prepared that shows that the clearance meets applicable DOE Authorized Limits, or other applicable requirements including associated restrictions or institutional controls (See DOE P 454.1).
- (b) DOE Field Element Managers responsible for oversight of clearance processes must implement oversight duties to verify that the contractor assurance program is ensuring that the applicable radiological clearance requirements have been met. DOE must determine the type and scope of oversight activities necessary to independently verify compliance. Such oversight must use a graded approach commensurate with the Department's requirements to implement DOE oversight functions (See DOE O 226.1A).
 - 1 The graded approach to the independent verification activities must be commensurate with the scope, complexity, and risk associated with the clearance action. The oversight must, at a minimum, ensure procedures, instruments, data and analyses, and documentation used for the clearance are adequate to comply with the requirements of this Order.
 - 2 Oversight for personal property releases will be graded at the discretion of DOE to include formal assessments, if necessary, but at a minimum must include operational awareness of radiological monitoring and survey instrumentation, radiological survey procedures, recordkeeping, methodologies, and techniques used for the clearance of such property to ensure their adequacy. If deemed appropriate by the Field Element Manager, such as in cases of high technical complexity or poor historical performance, a more formal independent verification process (e.g., peer review, third party support in review of clearance processes or independent audit or sampling) may be instituted.
 - 3 The independent verification activities required for the clearance of all real property must, at a minimum, include review of the radiological characterization report or data, but, as appropriate, may include independent surveys or sample analysis to verify compliance. If the real property is to be transferred to the public, or managed by another agency/entity other than DOE or a new facility constructed, an independent verification plan will be prepared and independent verification surveys and sample analysis will be conducted to verify compliance, unless determined to be unneeded by DOE because, for example, the transferred property will be under a license.

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- 4 Independent verification must be performed by DOE personnel not directly involved in the specific clearance action or by a contractor who is independent of the contractor conducting clearance activities. The personnel performing independent verification activities must:

 - a Report directly to DOE,
 - b Have sufficient authority and freedom to report unresolved issues to the Field Element Manager, and
 - c Be qualified or have sufficient knowledge and experience to oversee radiological clearance activities.

- (10) Public Notification of Clearance of Property.

 - (a) Field Element Managers must, as appropriate, incorporate information on site clearance policies and protocols, process knowledge decisions, approved Authorized Limits, any approved revised Authorized Limits, use of pre-approved Authorized Limits, and property control and clearance programs into effective site public notification and communications programs.
 - (b) Information on approved Authorized Limits, any approved revised Authorized Limits, use of pre-approved Authorized Limits, results of radiological monitoring and surveys of cleared property with type and quantity of property cleared, and independent verification results must be summarized in the Annual Site Environmental Report.
 - (c) The responsible field element must make documentation on clearance of property available to the public and to the property owner or recipient as appropriate.

- (11) Final Clearance Documentation. Clearance of property must be documented. The contents of the documentation or the mechanism for documenting information may be tailored to the need, situation, and type of property being cleared. For ongoing, routine clearances, e.g., clearance of personal property from controlled areas, such documentation may be

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based on the general process(es) rather than each specific clearance. In general, the documentation must describe the clearance process(es) and the property being cleared.

- (a) The documentation must serve to demonstrate requirements have been met, show criteria used for clearance, identify the property's destination or disposition, as appropriate, and provide additional confidence to DOE and assurance to other interested parties that the public and the environment are being protected. The documentation must indicate any Authorized Limits, including any revised or pre-approved Authorized Limits used for the clearance, and include information and data supporting the clearance of property such as radiological certification and independent verification results and summarize the annual quantities cleared.
- (b) Field Element Managers or their designees must ensure in the preparation and maintenance of documentation that property being sold or otherwise cleared from DOE radiological control:
 - 1 Meets all DOE radiological protection requirements,
 - 2 Is not required to be controlled for national security reasons, and
 - 3 Meets DOE property control requirements.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended; Section 120(h) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended; and consistency with 10 CFR Part 20 -- "Standards for Protection Against Radiation," Subpart E, ("Radiological Criteria for License Termination") and 40 CFR Part 192.

REQUIREMENT NUMBER

RPPE-0073

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE personal property that potentially contains residual radioactive material.

BEGINNING CITATION: II.5.b.

ENDING CITATION: 4.k(3)(a)-(b); 4.k(8)(b)

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REQUIREMENT DESCRIPTION: Release of Personal Property. Personal property, which potentially could be contaminated, may be released for unrestricted use if the results of a survey with appropriate instruments indicate that the property is less than the contamination limits presented in Figure IV-1.

REVISED REQUIREMENT:

- 4.k(3) Residual Radioactive Material. Property potentially containing residual radioactive material must not be cleared from DOE control unless either:
- (a) The property is demonstrated not to contain residual radioactive material based on process and historical knowledge, radiological monitoring or surveys, or a combination of these; or
 - (b) The property is evaluated and appropriately monitored or surveyed to determine:
 - 1 The types and quantities of residual radioactive material within the property;
 - 2 The quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material present on and under any coating);
 - 3 That for property with potentially contaminated surfaces that are difficult to access for radiological monitoring or surveys, an evaluation of residual radioactive material on such surfaces is performed which is:
 - a Based on process and historical knowledge meeting the requirements of paragraph 4.k.(5) of this Order and monitoring and or surveys, to the extent feasible and
 - b Sufficient to demonstrate that applicable specific or pre-approved DOE Authorized Limits will not be exceeded; and
 - 4 That any residual radioactive material within or on the property is in compliance with applicable specific or pre-approved DOE Authorized Limits.

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- 4.k(8)(b) Instrumentation used for radiological monitoring or surveys must be capable of detecting and quantifying residual radioactive material consistent with the applicable Authorized Limits, and be:
- 1 Periodically maintained and calibrated on an established frequency;
 - 2 Appropriate for the type(s), levels, and energies of the radiation(s) encountered; and
 - 3 Appropriate for existing environmental conditions and routinely tested for operability.

BASIS FOR REQUIREMENT: The health and safety sections of the Atomic Energy Act of 1954, as amended; and consistency with 10 CFR Part 20 requirements.

REQUIREMENT NUMBER

RPPE-0074

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material.

BEGINNING CITATION: II.5.c.(1)

ENDING CITATION: 4.k(6)(f)

REQUIREMENT DESCRIPTION: Surface Contamination Levels. Prior to being released, property shall be surveyed to determine whether both removable and total surface contamination (Including contamination present on and under any coating) are in compliance with the levels given in Figure IV-1 and that the contamination has been subjected to the ALARA process.

REVISED REQUIREMENT:

4.k(6)(f): Pre-Approved Authorized Limits.

- 1 The following values have been pre-approved by DOE for use as Authorized Limits, and may be used as specified below instead of developing and approving specific Authorized Limits.
 - a For radium-226 and radium-228 in soil - 5 pCi/gram (0.2 Bq/gram) in excess of background levels, averaged over 100 m², in the first 15 cm depth of the surface layer of soil; and 15 pCi/gram (0.56 Bq/gram) in excess of

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background levels, averaged over any subsequent 15 cm subsurface layer of soil plus an ALARA assessment. If both thorium-230 and radium-226 or both thorium-232 and radium-228 are present and not in secular equilibrium, the appropriate pre-approved limit must be applied to the radionuclide with the higher concentration.

b Previously approved guidelines and limits (such as the surface activity guidelines) may continue to be applied and used as Pre-Approved Authorized Limits until they are replaced or revised by Pre-Approved Authorized Limits issued under this Order.

2 Other Pre-Approved Authorized Limits must be approved by the Chief Health, Safety and Security Officer or the responsible Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.

a The approvals may be made through a DOE memorandum but must be included in a DOE directive issued under DOE O 251.1C or a Technical Standard under DOE O 252.1, *Technical Standards Program*, dated 11-19-99, within eighteen months of issuance.

b Pre-Approved Authorized Limits must provide reasonable expectation that their implementation will comply with the requirements in paragraphs 4.k.(1) and 4.k.(2) of this Order.

c The scope of applicability (e.g., property, activities, or radionuclides) and conditions of, or restrictions on, their use must be documented.

3 Pre-Approved Authorized Limits may be used for any radiological activity instead of developing specific Authorized Limits if their use is documented in the environmental radiological protection program and the specific application of the Authorized Limits is approved by the responsible Field Element Manager.

BASIS FOR REQUIREMENT: The health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with national (ANSI) and international (IAEA) standards.

REQUIREMENT NUMBER

RPPE-0075

DECISION: Modify

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BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material.

BEGINNING CITATION: II.5.c.(2)

ENDING CITATION: 4.k(3)

REQUIREMENT DESCRIPTION: Potential for Contamination. Property shall be considered to be potentially contaminated if it has been used or stored in radiation areas that could contain unconfined radioactive material or that are exposed to beams of particles capable of causing activation (neutrons, protons, etc.).

REVISED REQUIREMENT:

- (3) Residual Radioactive Material. Property potentially containing residual radioactive material must not be cleared from DOE control unless either:
 - (a) The property is demonstrated not to contain residual radioactive material based on process and historical knowledge, radiological monitoring or surveys, or a combination of these; or
 - (b) The property is evaluated and appropriately monitored or surveyed to determine:
 - 1 The types and quantities of residual radioactive material within the property;
 - 2 The quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material present on and under any coating);
 - 3 That for property with potentially contaminated surfaces that are difficult to access for radiological monitoring or surveys, an evaluation of residual radioactive material on such surfaces is performed which is:
 - a Based on process and historical knowledge meeting the requirements of paragraph 4.k.(5) of this Order and monitoring and or surveys, to the extent feasible and

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- b Sufficient to demonstrate that applicable specific or pre-approved DOE Authorized Limits will not be exceeded; and
- 4 That any residual radioactive material within or on the property is in compliance with applicable specific or pre-approved DOE Authorized Limits.

BASIS FOR REQUIREMENT: The health and safety sections of the Atomic Energy Act of 1954, as amended. To ensure that property is not cleared as "clean" without adequate confirmation that it either met limits or was free of contamination. If it cannot be shown either by process knowledge or survey that property is "clean", the property needs to be considered to be "potentially contaminated".

REQUIREMENT NUMBER

RPPE-0076

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material.

BEGINNING CITATION: II.5.c.(3)

ENDING CITATION: 4.k(8)

REQUIREMENT DESCRIPTION: Surveys. Surfaces of potentially contaminated property shall be surveyed using instruments and techniques appropriate for detecting the limits stated in Figure IV-1.

REVISED REQUIREMENT:

4.k(8): Radiological Monitoring or Surveys.

- (a) All radiological monitoring or surveys performed in support of clearance of property must:

- 1 Use methodologies sufficient to meet measurement objectives such as those in the *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, the *Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME)* or other methodologies approved by DOE;

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- 2 Meet Measurement Quality Objectives;
 - 3 Use DOE-approved sampling and analysis techniques, if applicable; and
 - 4 Include an evaluation of non-uniformly distributed residual radioactive material, if applicable.
- (b) Instrumentation used for radiological monitoring or surveys must be capable of detecting and quantifying residual radioactive material consistent with the applicable Authorized Limits, and be:
- 1 Periodically maintained and calibrated on an established frequency;
 - 2 Appropriate for the type(s), levels, and energies of the radiation(s) encountered; and
 - 3 Appropriate for existing environmental conditions and routinely tested for operability.

BASIS FOR REQUIREMENT: To establish performance-based criteria for acceptable radiological surveys, and to provide confidence in the results of the surveys.

REQUIREMENT NUMBER

RPPE-0077

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify requirements for clearance of property with potentially contaminated surfaces which are difficult to access.

BEGINNING CITATION: II.5.c.(4)

ENDING CITATION: 4.k(3)(b)3

REQUIREMENT DESCRIPTION: Inaccessible Areas. Where potentially contaminated surfaces are not accessible for measurement (as in some pipes, drains, and ductwork), such property may be released after case-by-case evaluation and documentation based on both the history of its use and available measurements demonstrate that the unsurveyable surfaces are likely to be within the limits given in Figure IV-1.

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REVISED REQUIREMENT:

- 4.k(3)(b)3 That for property with potentially contaminated surfaces that are difficult to access for radiological monitoring or surveys, an evaluation of residual radioactive material on such surfaces is performed which is:
- a Based on process and historical knowledge meeting the requirements of paragraph 4.k.(5) of this Order and monitoring and or surveys, to the extent feasible and
 - b Sufficient to demonstrate that applicable specific or pre-approved DOE Authorized Limits will not be exceeded;

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. To establish a process to review, make a determination and document a decision to clear property that cannot be fully surveyed/measured.

REQUIREMENT NUMBER

RPPE-0078

DECISION: Modify

BASIS FOR DECISION: Recognition of the importance of documentation. DOE O 458.1 contains specific requirements for Final Clearance Documentation in addition to records requirements contained in Paragraph 4.1, "Records, Retention and Reporting Requirements". Records will be managed in accordance with DOE O 243.1, "Records Management Program."

BEGINNING CITATION: II.5.c.(5)(a)

ENDING CITATION: 4.k(11)

REQUIREMENT DESCRIPTION: Records. The records of released property shall include: A description or identification of the property;

REVISED REQUIREMENT:

4.k(11) Final Clearance Documentation. Clearance of property must be documented. The contents of the documentation or the mechanism for documenting information may be tailored to the need, situation, and type of property being cleared. For ongoing, routine clearances, e.g., clearance of personal property from controlled areas, such documentation may be based on the general process(es) rather than each specific clearance. In general, the documentation must describe the clearance process(es) and the property being cleared.

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- (a) The documentation must serve to demonstrate requirements have been met, show criteria used for clearance, identify the property’s destination or disposition, as appropriate, and provide additional confidence to DOE and assurance to other interested parties that the public and the environment are being protected. The documentation must indicate any Authorized Limits, including any revised or pre-approved Authorized Limits used for the clearance, and include information and data supporting the clearance of property such as radiological certification and independent verification results and summarize the annual quantities cleared.
- (b) Field Element Managers or their designees must ensure in the preparation and maintenance of documentation that property being sold or otherwise cleared from DOE radiological control:
 - 1 Meets all DOE radiological protection requirements,
 - 2 Is not required to be controlled for national security reasons, and
 - 3 Meets DOE property control requirements.

BASIS FOR REQUIREMENT: Provide necessary specificity for compliance with DOE's records' requirements. Lessons learned from reviews of past releases highlight the need for adequate documentation.

REQUIREMENT NUMBER **RPPE-0079**

DECISION: Delete

BASIS FOR DECISION: In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, specific detailed requirements related to records were not included in DOE O 458.1 which addresses essential records requirements. However, overarching, higher level requirements related to monitoring and surveillance and documentation for clearance of property can be found in DOE O 458.1 in paragraphs 4.k(8) “Radiological Monitoring or Surveys,” 4.k(9) “Documentation and Verification,” 4.k(10) “Public Notification of Clearance of Property,” and 4.k(11) “Final Clearance Documentation.” Additionally, paragraph 4.l, “Records, Retention and Reporting Requirements” identifies required records for clearance of property in paragraphs 4.l(2)(j), (k), and (l).

BEGINNING CITATION: II.5.c.(5)(b)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Records. The records of released property shall include: The date of the last radiation survey;

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REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0080**

DECISION: Delete

BASIS FOR DECISION: In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, specific detailed requirements related to records were not included in DOE O 458.1 which addresses essential records requirements. However, overarching, higher level requirements related to monitoring and surveillance and documentation for clearance of property can be found in DOE O 458.1 in paragraphs 4.k(8) “Radiological Monitoring or Surveys,” 4.k(9) “Documentation and Verification,” 4.k(10) “Public Notification of Clearance of Property,” and 4.k(11) “Final Clearance Documentation.” Additionally, paragraph 4.l, “Records, Retention and Reporting Requirements” identifies required records for clearance of property in paragraphs 4.l(2)(j), (k), and (l).

BEGINNING CITATION: II.5.c.(5)(c)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Records. The records of released property shall include: The identity of the organization and the individual who performed the monitoring operation;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0081**

DECISION: Delete

BASIS FOR DECISION: In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, specific detailed requirements related to records were not included in DOE O 458.1 which addresses essential records requirements. However, overarching, higher level requirements related to monitoring and surveillance and documentation for clearance of property can be found in DOE O 458.1 in paragraphs 4.k(8) “Radiological Monitoring or Surveys,” 4.k(9) “Documentation and Verification,” 4.k(10) “Public Notification of Clearance of Property,” and 4.k(11) “Final Clearance Documentation.” Additionally, paragraph 4.l, “Records, Retention and Reporting Requirements” identifies required records for clearance of property in paragraphs 4.l(2)(j), (k), and (l).

BEGINNING CITATION: II.5.c.(5)(d)

ENDING CITATION: N/A

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REQUIREMENT DESCRIPTION: Records. The records of released property shall include: The type and identification number of monitoring instruments;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0082

DECISION: Delete

BASIS FOR DECISION: In support of the safety and security reform plan presented in Deputy Secretary Poneman’s March 16, 2010, memorandum, specific detailed requirements related to records were not included in DOE O 458.1 which addresses essential records requirements. However, overarching, higher level requirements related to monitoring and surveillance and documentation for clearance of property can be found in DOE O 458.1 in paragraphs 4.k(8) “Radiological Monitoring or Surveys,” 4.k(9) “Documentation and Verification,” 4.k(10) “Public Notification of Clearance of Property,” and 4.k(11) “Final Clearance Documentation.” Additionally, paragraph 4.l, “Records, Retention and Reporting Requirements” identifies required records for clearance of property in paragraphs 4.l(2)(j), (k), and (l).

BEGINNING CITATION: II.5.c.(5)(e)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Records. The records of released property shall include: The results of the monitoring operation; and

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0083

DECISION: Merge

MERGE WITH: RPPE-0078

BASIS FOR DECISION: Good management practice. It is important to identify the property’s destination or disposition, as appropriate

BEGINNING CITATION: II.5.c.(5)(f)

ENDING CITATION: 4.k.(11)(a)

REQUIREMENT DESCRIPTION: Records. The records of released property shall include: The identity of the recipient of the released material.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0084

DECISION: Modify

BASIS FOR DECISION: While there are no generic volumetric authorized limits, sites can propose limits. This practice is similar to the case-by-case practice used by NRC and its Agreement State programs.

BEGINNING CITATION: II.5.c.(6)

ENDING CITATION: 4.k(6)(b)3

REQUIREMENT DESCRIPTION: Volume Contamination. No guidance is currently available for release of material that has been contaminated in depth, such as activated material or smelted contaminated metals (e.g., radioactivity per unit volume or per unit mass). Such materials may be released if criteria and survey techniques are approved by EH-1.

REVISED REQUIREMENT:

4.k(6)(b) Authorized Limits must:

- 3 Be expressed in terms of concentration of radioactivity per unit surface area (e.g., dpm per 100 cm²), radioactivity per unit mass (e.g., pCi per gram) or volume (e.g., pCi per ml), total radioactivity, or DOE controls and restrictions, if applicable;

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with the process used by NRC.

REQUIREMENT NUMBER

RPPE-0085

DECISION: Modify

BASIS FOR DECISION: Update demonstration of compliance with current Orders, guidance and field scenarios.

BEGINNING CITATION: II.6.

ENDING CITATION: 4.e(1)-(10)

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REQUIREMENT DESCRIPTION: DEMONSTRATION OF COMPLIANCE WITH THE DOSE LIMITS. Compliance with the dose limits of this Order shall be demonstrated by documentation of an appropriate combination of measurements and calculations to evaluate potential doses and the results of the evaluations.

REVISED REQUIREMENT:

4.e. Demonstrating Compliance with the Public Dose Limit.

- (1) Dose evaluations to demonstrate compliance with the public dose limit in paragraph 4.b.(1) of this Order and to assess collective dose must include the following:
 - (a) The TED to members of the public from exposure to radiation, airborne effluents, and liquid effluents, of DOE origin.
 - 1 Compliance may be demonstrated by calculating dose to the representative person or to the maximally exposed individual (MEI).
 - 2 Determination of the representative person or the MEI must include members of the public both on DOE sites outside of controlled areas and off DOE sites.
 - 3 If it is suspected that any of the dose limits specified in paragraph 4.b.(1)(a) of this Order may be exceeded or the estimated TED for members of the public exceeds 25 mrem (0.25 mSv) in a year, then dose to the lens of the eye, skin and extremities must be evaluated.
 - (b) Analytical models that consider likely exposure pathways, such as:
 - 1 Direct external radiation from sources located on-site;
 - 2 External radiation from airborne radioactive material;
 - 3 External radiation from radioactive material deposited on surfaces off-site;
 - 4 Internal radiation from inhaled airborne radioactive material;

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- 5 Internal radiation from radioactive material ingested with water, and with food from terrestrial crops or animal products (e.g., meat, eggs, milk);
 - 6 Internal radiation from radioactive material ingested with aquatic food products such as fish, shellfish, crustaceans (e.g., crayfish, shrimp, crab, lobsters), and aquatic plants and algae;
 - 7 External or internal radiation due to residual radioactive material on, or in, cleared real property; and
 - 8 Any other pathway unique to the DOE site or activity.
- (c) The dose to members of the public from DOE-related exposure sources only, if the projected DOE-related dose to the representative person or MEI is 25 mrem (0.25mSv) in a year or less. If the DOE-related dose is greater than 25 mrem in a year, the dose to members of the public must include both major non-DOE sources of exposure (excluding dose from radon and its decay products in air, background radiation dose, occupational doses and doses due to medical exposures) and dose from DOE-related sources.
- (d) Collective dose for members of the public resulting from radiation emitted and radioactive materials released from DOE radiological activities only (not including radon and its decay products). Collective dose for members of the public must be representative of the total dose and of adequate quality for supported comparisons, trending or decisions. Consistent with the graded approach, collective dose estimates may be truncated by distance (e.g., 50 miles) or individual dose level (e.g., 10 microrem) when integration of doses beyond such thresholds does not significantly affect data quality objectives. Where it is of concern, collective dose for members of the public resulting from radon and its decay products released by DOE radiological activities needs to be calculated separately from other radionuclides.
- (2) The estimated individual dose to the MEI or representative person that is representative of the persons or group likely to receive the most dose and is based on pathway and exposure parameters that are not likely to underestimate or substantially overestimate the dose, and, the collective dose (population dose) that is a realistic as practicable estimate of the sum of the doses to all members of the actual exposed population.

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- (3) Site-specific information on radiation source dispersion patterns, location and demography of members of the public in the vicinity of DOE radiological activities, land use, food supplies, and exposure pathway information must be updated, as necessary, to document significant changes that could affect dose evaluations.
- (4) Values of assumed default or site-specific parameters used in calculations must be identified and included with the documentation of the calculations.
- (5) Direct measurements must be made, to the extent practicable, to obtain information characterizing source terms, exposures, exposure modes, and other information needed in evaluating dose.
- (6) Dose evaluation models that are codified or approved for use by DOE must be used. Alternative dose evaluation models, including those used by other regulatory agencies, national organizations or international organizations, must be approved for use by the Chief Health, Safety and Security Officer, or by the DOE Field Element Manager with the concurrence of a Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer, or for NNSA sites by the NNSA Field Element Manager with the concurrence of the NNSA Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- (7) DOE-approved dose coefficients must be used to evaluate doses resulting from DOE radiological activities. Use of alternative dose coefficients must be approved by the Chief Health, Safety and Security Officer or by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- (8) Doses to members of the public from airborne effluents must be evaluated with the CAP-88 model or another EPA-approved model or method to demonstrate compliance with applicable subparts of 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*.
- (9) Environmental monitoring must be conducted to characterize routine and non-routine releases of radioactive material from radiological activities, estimate the dispersal pattern in the environs, characterize the pathway(s) of exposure to members of the public and estimate the doses to individuals and populations in the vicinity of the site or operation commensurate with the nature of the DOE radiological activities and the risk to the public and the environment. Radiological monitoring must be integrated with the general environmental and effluent monitoring. Environmental monitoring must include, but is not limited to:

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- (a) Effluent Monitoring
 - (b) Environmental Surveillance
 - (c) Meteorological Monitoring. Meteorological monitoring must be commensurate with the level of site radiological activities, the site topographical characteristics, and the distance to critical receptors. The scope must be sufficient to characterize atmospheric dispersion and model the dose to members of the public over distances commensurate with the magnitude of potential source terms and possible pathways to the atmosphere.
 - (d) Pre-operational Monitoring. Prior to the startup of a new site, facility or process with the potential to expose the public or environment to radiation or radioactive material, it is necessary to ensure that adequate knowledge exists to understand: 1) radiological background; 2) pertinent environmental and ecological parameters; and 3) potential pathways for human exposures or ecological/natural resource impacts either from existing data or documents (for example, NEPA evaluations or existing monitoring and surveillance programs, etc.) or from the conduct of a pre-operational study initiated at least one year prior to startup of a new operation.
- (10) Site-specific environmental monitoring criteria must be established to ensure that representative measurements of quantities and concentrations of radiological contaminants are conducted and that the effects from DOE radiological activities on members of the public and the environment are monitored sufficiently to demonstrate compliance with this Order

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Increase public confidence in DOE public dose assessments by performing comprehensive assessments using established methodologies. Since the publication of DOE 5400.5 in 1990 the members of the public scenario changed for many sites. Some sites now have members of the public located onsite. To eliminate any gaps in reporting and to allow sites to still demonstrate a benchmark of compliance to their offsite stakeholders, "members of the public" onsite have been distinguished from "members of the public" offsite. ICRP Publication 60 (sect. 5.51(186), page 44) states: "the dose constraint should be applied to the mean dose of the critical group from the source for which the protection is being optimised;" NCRP Report 116 (sect. 15, page 47) states: "...whenever the potential exists for exposure of an individual member of the public to exceed 25% of the annual effective dose limit as a result of irradiation attributable to a single site, the site operator should ensure that the annual exposure of the MEI, from all man-made exposure (...except medical...), does not exceed 1 mSv on a continuous basis..."; 40 CFR 61.94 (a):"Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, business or office."

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REQUIREMENT NUMBER **RPPE-0086**

DECISION: Not a Requirement

BASIS FOR DECISION: The original DOE 5400.5 paragraph did not contain any unique requirements, but referenced other documents which did contain requirements. Since an environmental monitoring program is necessary for a site to characterize releases, to estimate dispersal patterns, to characterize pathways of exposure and to estimate doses, DOE O 458.1 contains requirements for environmental monitoring and surveillance requirements in paragraph 4.e(9).

BEGINNING CITATION: II.6.a.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Monitoring and Surveillance. General requirements for routine effluent monitoring are part of the environmental monitoring plan prescribed in DOE 5400.1. Specific requirements for radiological effluent monitoring and environmental surveillance and their schedule of implementation are prescribed in DOE publication DOE/EH-0173T which deals with radiological effluent monitoring and environmental surveillance. The monitoring requirements are applicable to all DOE and DOE contractor operations that are subject to the standards and requirements of this Order.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0087**

DECISION: Modify

BASIS FOR DECISION: DOE O 231.1 Environmental Safety and Health Reporting, and DOE M 231.1-1, Chapter I.

Collective Dose- Consistency with 10 CFR 50, Appendix I, and NCRP Report No. 121, "Principles and Application of Collective Dose", November 30, 1995 and ICRP Publication 60, "1990 Recommendations of the International Commission on Radiological Protection", page 9, paragraph 34.

BEGINNING CITATION: II.6.b.

ENDING CITATION: 4.e.(1)(d)

REQUIREMENT DESCRIPTION: Dose Evaluations. Doses to members of the public in the vicinity of DOE activities shall be evaluated and documented to demonstrate compliance with the dose limits of this Order and to assess exposures of the public from unplanned events. Collective doses to the public within 80 km of the site shall also be evaluated and documented at least annually.

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REVISED REQUIREMENT:

4.e Demonstrating Compliance with the Public Dose Limit.

- (1)(d) Collective dose for members of the public resulting from radiation emitted and radioactive materials released from DOE radiological activities only (not including radon and its decay products). Collective dose for members of the public must be representative of the total dose and of adequate quality for supported comparisons, trending or decisions. Consistent with the graded approach, collective dose estimates may be truncated by distance (e.g., 50 miles) or individual dose level (e.g., 10 microrem) when integration of doses beyond such thresholds does not significantly affect data quality objectives. Where it is of concern, collective dose for members of the public resulting from radon and its decay products released by DOE radiological activities needs to be calculated separately from other radionuclides.

BASIS FOR REQUIREMENT: The health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with national (NCRP Report Nos. 116 and 121) and international (ICRP) recommendations.

REQUIREMENT NUMBER

RPPE-0088

DECISION: Modify

BASIS FOR DECISION: To remove reference to older and outdated computer codes and to clarify ambiguities that could be associated with the phrase "other authorities".

BEGINNING CITATION: II.6.b.(1)

ENDING CITATION: 4.e.(1)(b); 4.e(2)-(8)

REQUIREMENT DESCRIPTION: Modeling. Analytical models used for dose evaluations shall be appropriate for characteristics of emissions (e.g., gas, liquid, or particle; depositing or non-depositing; buoyant or non-buoyant); mode of release (e.g., stack or vent; crib or pond; surface water or sewer; continuous or intermittent); environmental transport medium (e.g., air or water); and exposure pathway (e.g., inhalation; ingestion of food, water, or milk; direct radiation). Information on dispersion (transport and diffusion) in the environment, demography, land use (including the location and number of dairy and slaughter animals), food supplies, and exposure pathways used in the dose calculations shall be appropriate to evaluate actual and potential doses in the environs of DOE facilities. Such information shall be updated as necessary to document significant changes that could affect dose evaluations. Dose evaluation models that are codified, approved, or accepted by regulatory or other authorities shall be used where appropriate, such as the AIRDOS/RADRISK codes for demonstrating compliance with 40 CFR Part 61, Subpart H.

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REVISED REQUIREMENT:

4.e(1)(b): Analytical models that consider likely exposure pathways, such as:

- 1 Direct external radiation from sources located on-site;
- 2 External radiation from airborne radioactive material;
- 3 External radiation from radioactive material deposited on surfaces off-site;
- 4 Internal radiation from inhaled airborne radioactive material;
- 5 Internal radiation from radioactive material ingested with water, and with food from terrestrial crops or animal products (e.g., meat, eggs, milk);
- 6 Internal radiation from radioactive material ingested with aquatic food products such as fish, shellfish, crustaceans (e.g., crayfish, shrimp, crab, lobsters), and aquatic plants and algae;
- 7 External or internal radiation due to residual radioactive material on, or in, cleared real property; and
- 8 Any other pathway unique to the DOE site or activity

4.e(2)-(8):

- (2) The estimated individual dose to the MEI or representative person that is representative of the persons or group likely to receive the most dose and is based on pathway and exposure parameters that are not likely to underestimate or substantially overestimate the dose, and, the collective dose (population dose) that is a realistic as practicable estimate of the sum of the doses to all members of the actual exposed population.
- (3) Site-specific information on radiation source dispersion patterns, location and demography of members of the public in the vicinity of DOE radiological activities, land use, food supplies, and exposure pathway information must be updated, as necessary, to document significant changes that could affect dose evaluations.

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- (4) Values of assumed default or site-specific parameters used in calculations must be identified and included with the documentation of the calculations.
- (5) Direct measurements must be made, to the extent practicable, to obtain information characterizing source terms, exposures, exposure modes, and other information needed in evaluating dose.
- (6) Dose evaluation models that are codified or approved for use by DOE must be used. Alternative dose evaluation models, including those used by other regulatory agencies, national organizations or international organizations, must be approved for use by the Chief Health, Safety and Security Officer, or by the DOE Field Element Manager with the concurrence of a Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer, or for NNSA sites by the NNSA Field Element Manager with the concurrence of the NNSA Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- (7) DOE-approved dose coefficients must be used to evaluate doses resulting from DOE radiological activities. Use of alternative dose coefficients must be approved by the Chief Health, Safety and Security Officer or by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- (8) Doses to members of the public from airborne effluents must be evaluated with the CAP-88 model or another EPA-approved model or method to demonstrate compliance with applicable subparts of 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended, and 40 CFR Part 61, Subpart H, Section 61.93 -- "Emission monitoring and test procedures."

REQUIREMENT NUMBER

RPPE-0089

DECISION: Modify

BASIS FOR DECISION: Clarify and simplify language regarding DOE-approved methods of calculation for estimation of public dose.

BEGINNING CITATION: II.6.b.(2)

ENDING CITATION: 4.e.(7) and (8)

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REQUIREMENT DESCRIPTION: Dose Conversion Factors. Except as provided in paragraph II.6b(2)(d), tables of approved dose conversion factors in paragraphs II.6b(2)(a), (b), and (c), below, shall be used to evaluate doses unless otherwise legally required, e.g., use of AIRDOS/RADRISK codes pursuant to 40 CFR Part 61, Subpart H.

REVISED REQUIREMENT:

- 4.e (7) DOE-approved dose coefficients must be used to evaluate doses resulting from DOE radiological activities. Use of alternative dose coefficients must be approved by the Chief Health, Safety and Security Officer or by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- 4.e (8) Doses to members of the public from airborne effluents must be evaluated with the CAP-88 model or another EPA-approved model or method to demonstrate compliance with applicable subparts of 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*.

BASIS FOR REQUIREMENT: Federal Guidance Reports and dose conversion factors serve as compliance tools and standard practices and assure consistent calculations across the DOE complex.

REQUIREMENT NUMBER **RPPE-0090**

DECISION: Merge MERGE WITH: RPPE-0089

BASIS FOR DECISION: Clarify and simplify language regarding DOE-approved methods of calculation for estimation of public dose.

BEGINNING CITATION: II.6.b.(2)(a)

ENDING CITATION: 4.e.(7) and (8)

REQUIREMENT DESCRIPTION: Committed Dose Conversion Factors. Radionuclides taken into the body, generally by exposure modes whereby the radionuclide is ingested or inhaled, will continue to irradiate the body as long as they exist and are retained by the body. The dose delivered to a body over the lifetime of the individual from a single committed dose conversion factors shall be used, as appropriate, and are presented in EPA-520/1-88-020, Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," and in DOE/EH-0071, "Internal Dose Conversion Factors for Calculation of Dose to the Public." These conversion factors are based upon the ICRP reference man model, and the committed dose is the dose integrated over an interval of 50 years.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0091**

DECISION: Merge MERGE WITH: RPPE-0089

BASIS FOR DECISION: Clarify and simplify language regarding DOE-approved methods of calculation for estimation of public dose.

BEGINNING CITATION: II.6.b.(2)(b)

ENDING CITATION: 4.e.(7) and (8)

REQUIREMENT DESCRIPTION: External Dose Conversion Factors. The doses from exposure to external radiation from radionuclide concentrations in air and in water that result from submersion or from exposure to contaminated plane surfaces shall be estimated, as appropriate, using the external dose conversion factors presented in EPA-520/1-88-020, Federal Guidance Report No. 11, “Limiting Values of Radionuclides Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion” and in DOE/EH-0070, “External Dose-Rate Conversion Factors for Calculation of Dose to the Public.”

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0092**

DECISION: Delete

BASIS FOR DECISION: Derived Concentration Guides (DCGs) are not requirements. HSS currently plans to issue a Derived Concentration Technical Standard (DCS) in support of DOE O 458.1.

BEGINNING CITATION: II.6.b.(2)(c)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Derived Concentration Guides (DCG). DCG values are presented as reference values in Chapter III for each of three exposure modes: inhalation of air containing the radionuclide; submersion in a semi-infinite cloud of air containing the radionuclide; and ingestion of water containing the radionuclide. The DCG tables may be used to evaluate only the three exposure modes upon which they are based.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

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REQUIREMENT NUMBER **RPPE-0093**

DECISION: Modify

BASIS FOR DECISION: DOE O 458.1 provides flexibility for the use of other methodologies in other paragraphs. Also, references to EH-1 are out-of-date.

BEGINNING CITATION: II.6.b.(2)(d)

ENDING CITATION: 4.e(6)

REQUIREMENT DESCRIPTION: Other Methods and Alternatives. Methods and alternatives other than those discussed above and as prescribed in applicable regulations shall be submitted to EH-1 for approval. EH-1 may approve the alternative method, if appropriate.

REVISED REQUIREMENT:

4.e(6) Dose evaluation models that are codified or approved for use by DOE must be used. Alternative dose evaluation models, including those used by other regulatory agencies, national organizations or international organizations, must be approved for use by the Chief Health, Safety and Security Officer, or by the DOE Field Element Manager with the concurrence of a Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer, or for NNSA sites by the NNSA Field Element Manager with the concurrence of the NNSA Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.

BASIS FOR REQUIREMENT: To provide an appropriate amount of flexibility to use other approved methods, while assuring consistent calculation of and reporting of public dose across DOE sites.

REQUIREMENT NUMBER **RPPE-0094**

DECISION: Modify

BASIS FOR DECISION: The dose limits for members of the public are expressed as Total Effective Dose (TED). This quantity/parameter was chosen for consistency with 10 CFR 835 and ICRP Publication 60. The definition of TED establishes the manner in which a dose will be determined. (e.g., inclusion of internal and external dose and the time period over which internal dose is calculated).

BEGINNING CITATION: II.6.b.(3)(a)

ENDING CITATION: 4.b(1)(a)

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REQUIREMENT DESCRIPTION: Parametric Considerations. Dose limits for members of the general public, from routine operation of a DOE activity, shall be expressed as a dose received by the individuals during the year (if, for example, the exposure is external to the body) or the committed dose received by the individual over a period of 50 years from radionuclides taken into the body during the year. The limits should not be interpreted as dose rates per se, especially not in the sense of instantaneous dose rates.

REVISED REQUIREMENT:

4.b Public Dose Limit

- (1) DOE radiological activities, including remedial actions and activities using Technologically Enhanced Naturally Occurring Radioactive Material (TENORM), must be conducted so that exposure of members of the public to ionizing radiation will:
 - (a) Not cause a total effective dose (TED) exceeding 100 mrem (1mSv) in a year, an equivalent dose to the lens of the eye exceeding 1500 mrem (15 mSv) in a year, or an equivalent dose to the skin or extremities exceeding 5000 mrem (50 mSv) in a year, from all sources of ionizing radiation and exposure pathways that could contribute significantly to the total dose excepting:
 - 1 Dose from radon and its decay products in air [Radon is regulated separately e.g., under Paragraphs 4.f. and 4.h.(1)(d) in this Order and under Title 40 Code of Federal Regulations (CFR) Part 61, Subparts Q and T];
 - 2 Dose received by patients from medical sources of radiation, and by volunteers in medical research programs;
 - 3 Dose from background radiation;
 - 4 Dose from occupational exposure under NRC or Agreement State license or to general employees regulated under 10 CFR Part 835, and

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with national (NCRP Report No. 116) and international (IAEA) recommendations.

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REQUIREMENT NUMBER

RPPE-0095

DECISION: Modify

BASIS FOR DECISION: Provide clarity.

BEGINNING CITATION: II.6.b.(3)(b)

ENDING CITATION: 4.e(1)(a) and 4.e(2)

REQUIREMENT DESCRIPTION: Doses calculated should be as realistic as practicable. Consequently, the individuals subject to the greatest exposure shall be identified, to the extent practicable, so that the highest dose might be determined.

REVISED REQUIREMENT: 4.e(1)(a)

- (1) Dose evaluations to demonstrate compliance with the public dose limit in paragraph 4.b.(1) of this Order and to assess collective dose must include the following:
 - (a) The TED to members of the public from exposure to radiation, airborne effluents, and liquid effluents, of DOE origin.
 - 1 Compliance may be demonstrated by calculating dose to the representative person or to the maximally exposed individual (MEI).
 - 2 Determination of the representative person or the MEI must include members of the public both on DOE sites outside of controlled areas and off DOE sites.
 - 3 If it is suspected that any of the dose limits specified in paragraph 4.b.(1)(a) of this Order may be exceeded or the estimated TED for members of the public exceeds 25 mrem (0.25 mSv) in a year, then dose to the lens of the eye, skin and extremities must be evaluated.
- 4.e(2): The estimated individual dose to the MEI or representative person that is representative of the persons or group likely to receive the most dose and is based on pathway and exposure parameters that are not likely to underestimate or substantially overestimate the dose, and, the collective dose (population dose) that is a realistic as practicable estimate of the sum of the doses to all members of the actual exposed population.

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BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Dose estimates must be realistic in order to assist DOE Cognizant Secretarial Officers gauge the safety of their operations.

REQUIREMENT NUMBER **RPPE-0096**

DECISION: Modify

BASIS FOR DECISION: Provide clarity

BEGINNING CITATION: II.6.b.(3)(c)

ENDING CITATION: 4.e.(1)(a)-(c); 4.e(3)

REQUIREMENT DESCRIPTION: Dose limits apply to actual or committed doses to real individuals. Consequently, all factors germane to dose determination should be applied. Alternatively, if available data are not sufficient to evaluate these factors or if they are too costly to determine, the assumed parametric values shall be sufficiently conservative so that it is unlikely that individuals would actually receive a dose that would exceed the dose calculated using the values assumed.

REVISED REQUIREMENT:

4.e. Demonstrating Compliance with the Public Dose Limit.

- (1) Dose evaluations to demonstrate compliance with the public dose limit in paragraph 4.b.(1) of this Order and to assess collective dose must include the following:
 - (a) The TED to members of the public from exposure to radiation, airborne effluents, and liquid effluents, of DOE origin.
 - 1 Compliance may be demonstrated by calculating dose to the representative person or to the maximally exposed individual (MEI).
 - 2 Determination of the representative person or the MEI must include members of the public both on DOE sites outside of controlled areas and off DOE sites.
 - 3 If it is suspected that any of the dose limits specified in paragraph 4.b.(1)(a) of this Order may be exceeded or the estimated TED for members of the public exceeds 25 mrem (0.25 mSv) in a year, then dose to the lens of the eye, skin and extremities must be evaluated.

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- (b) Analytical models that consider likely exposure pathways, such as:
 - 1 Direct external radiation from sources located on-site;
 - 2 External radiation from airborne radioactive material;
 - 3 External radiation from radioactive material deposited on surfaces off-site;
 - 4 Internal radiation from inhaled airborne radioactive material;
 - 5 Internal radiation from radioactive material ingested with water, and with food from terrestrial crops or animal products (e.g., meat, eggs, milk);
 - 6 Internal radiation from radioactive material ingested with aquatic food products such as fish, shellfish, crustaceans (e.g., crayfish, shrimp, crab, lobsters), and aquatic plants and algae;
 - 7 External or internal radiation due to residual radioactive material on, or in, cleared real property; and
 - 8 Any other pathway unique to the DOE site or activity.
- (c) The dose to members of the public from DOE-related exposure sources only, if the projected DOE-related dose to the representative person or MEI is 25 mrem (0.25mSv) in a year or less. If the DOE-related dose is greater than 25 mrem in a year, the dose to members of the public must include both major non-DOE sources of exposure (excluding dose from radon and its decay products in air, background radiation dose, occupational doses and doses due to medical exposures) and dose from DOE-related sources

4.e(3): Site-specific information on radiation source dispersion patterns, location and demography of members of the public in the vicinity of DOE radiological activities, land use, food supplies, and exposure pathway information must be updated, as necessary, to document significant changes that could affect dose evaluations.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Provide public confidence in DOE public dose assessments by performing comprehensive assessments using established methodologies. DOE

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Cognizant Secretarial Officers are responsible for the safety of their operations. Assuming good default values or using site-specific values when demonstrating compliance supports this effort. Values used to demonstrate compliance must be well-documented.

REQUIREMENT NUMBER **RPPE-0097**

DECISION: Modify

BASIS FOR DECISION: Provide clarity

BEGINNING CITATION: II.6.b.(3)(d)

ENDING CITATION: 4.e(4)

REQUIREMENT DESCRIPTION: Parametric values used in performing dose calculations shall be recorded.

REVISED REQUIREMENT:

4.e(4): Values of assumed default or site-specific parameters used in calculations must be identified and included with the documentation of the calculations.

BASIS FOR REQUIREMENT: Values used to demonstrate compliance must be well-documented.

REQUIREMENT NUMBER **RPPE-0098**

DECISION: Not a Requirement

BASIS FOR DECISION: The original DOE 5400.5 paragraph is not a requirement, but rather, a description of choice of resources to estimate collective dose.

BEGINNING CITATION: II.6.b.(3)(e)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Collective public dose in the environs of a site with multiple emission points may be estimated using the assumption that all emissions occur from a single point centrally located on the site. Guidance on combining emission points is provided in EPA-450/477-001, “Guidelines for Air Quality Maintenance Planning and Analysis,” Vol. 10, Revised: Procedures for Evaluating Air Quality Impact of New Stationary Sources.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0099**

DECISION: Merge MERGE WITH: RPPE-0085

BASIS FOR DECISION: Streamline and clarify language related to demonstrating compliance with public dose limit.

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BEGINNING CITATION: II.6.b.(3)(f)

ENDING CITATION: 4.e

REQUIREMENT DESCRIPTION: The assumption of a single point of emission, as discussed in II.6b(3)(e), may be used to calculate public dose for the maximally exposed individuals if the emission points are close to one another relative to the distance to the site boundary. Otherwise, the public dose to the maximally exposed individuals should be determined taking into consideration the actual locations of emissions on the site with respect to the offsite locations.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0100

DECISION: Modify

BASIS FOR DECISION: DOE management practice decision.

BEGINNING CITATION: II.7.

ENDING CITATION: 4.1.(5)

REQUIREMENT DESCRIPTION: REPORTING REQUIREMENTS. In addition to the reporting requirements of DOE 5400.1 and DOE 5484.1, the responsible DOE Field Office Manager shall notify, in a timely manner, the relevant Program Office(s) and the Deputy Assistant Secretary for Environment (EH-20) of actual or potential exposures of members of the public that could result in either an effective dose equivalent from DOE sources exceeding 10 mrem (0.1 mSv) in a year; or exceeding any limit or not meeting any other requirement specified in this Order or any other legally applicable limits, or a combined dose equal to or greater than 100 mrem (1 mSv) effective dose equivalent in a year due to DOE and other man-made sources of radiation (medical, consumer products, and natural sources excepted). For purposes of determining compliance with the reporting requirements of 40 CFR Parts 302 and 355, releases of source, by-product, and special nuclear material that occur from DOE activities are considered to be “Federally permitted” releases if they do not exceed the limits specified in this Order and the operations and releases are in compliance with DOE policies, and guidelines, and requirements specified in DOE Orders, including DOE 5820.2A.

REVISED REQUIREMENT:

4.1.(5) Reporting.

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- (a) Reporting requirements for this Order are contained in DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*, dated 8-19-03, and DOE M 231.1-1A Chg 2, *Environment, Safety and Health Reporting Manual*, dated 6-12-07.
- (b) The responsible Field Element Manager must notify a Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer within 30 calendar days when it has been identified that any requirement in this Order that is not required to be reported under paragraph 4.1.(5)(a) has not been met.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended; DOE M 231.1-1A Chg 2, "Environment, Safety and Health Reporting Manual", and DOE M 231.1-2, "Occurrence Reporting and Processing of Operations Information."

REQUIREMENT NUMBER

RPPE-0101

DECISION: Modify

BASIS FOR DECISION: Need to recognize the importance of records. Text of this DOE 5400.5 requirement generally retained with minor editing in DOE O 458.1. Deleted reference to paragraph II.6 of DOE 5400.5.

BEGINNING CITATION: II.8.a.

ENDING CITATION: 4.1(1)-(4)

REQUIREMENT DESCRIPTION: RECORDS. Content. Records developed shall include information and data necessary to identify and characterize releases of radioactive material to the environment, their fate in the environment, and their probable impact on radiation doses to the public. Basic information used assess compliance with the requirements of this Order pursuant to paragraph II.6, and the results of such assessments, shall be incorporated as part of the record.

REVISED REQUIREMENT:

4.1. Records, Retention and Reporting Requirements.

- (1) Records must be maintained to document compliance with the requirements of this Order.
- (2) Required records include the following:

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- (a) Information and data necessary to identify and characterize releases of radioactive material to the environment, their fate in the environment, and their probable impact on radiation dose to members of the public, and any impacts on ecological systems.
- (b) Documentation of individual and collective dose to members of the public due to radiological activities. This includes documentation of site-specific information on radiation source dispersion patterns, location and demography of members of the public in the vicinity of the radiological activity and assumed default values or site-specific parameters used in calculations.
- (c) Requests for specific authorization for temporary public dose limits, and subsequent approvals and other related actions.
- (d) Identification of radiological activities subject to environmental radiological protection program requirements, and descriptions of the measures to be used in implementing these requirements.
- (e) Documentation of actions taken to implement the ALARA process identified in paragraph 4.d. of this Order.
- (f) Documentation of actions taken to demonstrate compliance with the public dose limit [See paragraph 4.e.(1) of this Order].
- (g) Documentation of actions taken to implement the BAT selection process in regulating liquid discharges, including documentation of analyses and factors considered to be important, including alternative processes, for the BAT selection process.
- (h) Effluent monitoring and environmental surveillance information and data, including:
 - 1 Results of effluent monitoring for determining sources of radiation and radioactive material that provide direct exposure to members of the public and releases of radioactive material in liquid or airborne effluent;
 - 2 Results of surveys for radiation and radioactive material in the environment;

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- 3 Results of surveys, measurements, and calculations used to determine the dose to members of the public and ecological receptors from external and internal radiation sources;
 - 4 Meteorological data used in assessing dose; and
 - 5 Results of pre-operational monitoring.
- (i) Documentation related to the long-term management of radioactive waste and residual radioactive material.
 - (j) Final documentation for clearance of property containing residual radioactive material.
 - (k) Documentation of:
 - 1 Approved Authorized Limits for routine clearance of property for unrestricted or restricted use and the scenarios evaluated in selecting the limits,
 - 2 Approved revised Authorized Limits for clearance of property, and
 - 3 Written notification of applicable Federal, State or local regulatory agencies or Tribal governments (See paragraph 4.k.(6) (c) 7 of this Order).
 - (l) Annual summaries related to clearance of property.
- (3) Records required by this Order must be maintained by, or transferred to, DOE upon cessation of a DOE radiological activity at a site.
 - (4) Records must be retained until final disposition is authorized by DOE in accordance with DOE O 243.1, *Records Management Program*, dated 2-3-06.

BASIS FOR REQUIREMENT: To state DOE expectation of what types of information needed to be incorporated as part of the record.

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REQUIREMENT NUMBER **RPPE-0102**

DECISION: Modify

BASIS FOR DECISION: Records management. Records retention needs are addressed in DOE O 458.1 under "Records, Retention and Reporting Requirements."

BEGINNING CITATION: II.8.b.

ENDING CITATION: 4.1(4)

REQUIREMENT DESCRIPTION: Retention. Information and data developed pursuant to this Order shall be retained consistent with the requirements of DOE 1324.2A and other legally applicable requirements.

REVISED REQUIREMENT:

4.1(4) Records must be retained until final disposition is authorized by DOE in accordance with DOE O 243.1, *Records Management Program*, dated 2-3-06.

BASIS FOR REQUIREMENT: To emphasize good records management

REQUIREMENT NUMBER **RPPE-0103**

DECISION: Modify

BASIS FOR DECISION: Consistency with 10 CFR Part 835.

BEGINNING CITATION: II.9.

ENDING CITATION: 4.1(6)

REQUIREMENT DESCRIPTION: UNITS. All reports, notifications, and records developed pursuant to DOE Order requirements shall present data in the units used in the applicable regulation or DOE Order.

REVISED REQUIREMENT:

4.1(6) Units. Unless otherwise specified, the quantities used in the reports and records required by this Order must be clearly indicated in special units of curie, rad, roentgen, or rem, including multiples and subdivisions of these units, or other conventional units, such as dpm, dpm/100 cm², or mass units. The SI units, and becquerel (Bq), gray (GY), and sievert (Sv) may be provided parenthetically for reference with scientific standards.

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BASIS FOR REQUIREMENT: To ensure consistency across the DOE complex.

REQUIREMENT NUMBER

RPPE-0104

DECISION: Move

BASIS FOR DECISION: This section in DOE 5400.5 provided a tool and a reference for DOE use, but contained no requirements. HSS currently plans to issue a Derived Concentration Technical Standard (DCS) in support of DOE O 458.1.

BEGINNING CITATION: III.1.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: PURPOSE. The Derived Concentration Guide (DCG) values listed in this chapter are provided as reference values for conducting radiological environmental protection programs at operational DOE facilities and sites. Derived Air Concentrations (DAC) guides for controlling occupational intake of radionuclides through inhalation are listed in DOE 5480.11.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0105

DECISION: Move

BASIS FOR DECISION: This section in DOE 5400.5 provided a tool and a reference for DOE use, but contained no requirements. HSS currently plans to issue a Derived Concentration Technical Standard (DCS) in support of DOE O 458.1.

BEGINNING CITATION: III.2.c.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Application to Mixtures of Radionuclides. The DCG values are given for individual radionuclides. For known mixtures of radionuclides, the sum of the ratios of the observed concentration of each radionuclide to its corresponding DCG must not exceed 1.0.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0106

DECISION: Not a Requirement

BASIS FOR DECISION: This section in DOE 5400.5 provided a tool and a reference for DOE use, but contained no requirements. HSS currently plans to issue a Derived Concentration Technical Standard (DCS) in support of DOE O 458.1.

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BEGINNING CITATION: III.3.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: LIMITATIONS. The values given in Figures III-1 and III-3 account for only three exposure pathways (ingested water or inhaled air or air immersion) and do not include other potentially significant pathways. When more complex environmental pathways are involved, a more complete pathway analysis is required for calculating public radiation doses resulting from the operation of DOE facilities.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0107

DECISION: Delete

BASIS FOR DECISION: FUSRAP is no longer a DOE program. Congress transferred FUSRAP to the U.S. Army Corps of Engineers in the 1998 Energy and Water Appropriations Act.

BEGINNING CITATION: IV.2.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: IMPLEMENTATION. DOE elements shall develop plans and protocols for the implementation of this guidance. FUSRAP sites shall be identified, characterized, and designated, as such, for remedial action and certified for release.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0108

DECISION: Delete

BASIS FOR DECISION: This is not a requirement; it is a description.

BEGINNING CITATION: IV.2.b.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Basic Dose Limit. The basic dose limit for doses resulting from exposures to residual radioactive material is a prescribed standard from which limits for quantities that can be monitored and controlled are derived; it is specified in terms of the effective dose equivalent as defined in this Order. The basic dose limits are used for deriving guidelines for residual concentrations of radionuclides in soil. Guidelines for residual concentrations of thorium and radium in soil, concentrations of airborne radon decay products, allowable indoor external gamma radiation levels, and residual surface contamination concentrations

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are based on existing radiological protection standards (40 CFR Part 192; NRC Regulatory Guide 1.86 and subsequent NRC guidance on residual radioactive material). Derived guidelines or limits based on the basic dose limits for those quantities are used only when the guidelines provided in the existing standards are shown to be inappropriate.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0109

DECISION: Not a Requirement

BASIS FOR DECISION: The original provision in IV.2.d of DOE 5400.5 is a definition, not a requirement. The term "Authorized Limits" is included in Attachment 2 (Definitions) of DOE O 458.1.

BEGINNING CITATION: IV.2.d.

ENDING CITATION: Attachment 2 - Definitions

REQUIREMENT DESCRIPTION: Authorized Limit. An authorized limit is a level of residual radioactive material that shall not be exceeded if the remedial action is to be considered completed and the property is to be released without restrictions on use due to residual radioactive material.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0110

DECISION: Modify

BASIS FOR DECISION: Needed to estimate dose to receptors and magnitude of cleared source term.

BEGINNING CITATION: IV.2.d.(1)(a)

ENDING CITATION: 4.k(6)(c)2

REQUIREMENT DESCRIPTION: The authorized limits for a property will include: Limits for each radionuclide or group of radionuclides, as appropriate, associated with residual radioactive material in soil or in surface contamination of structures and equipment.

REVISED REQUIREMENT:

4.k(6)(c) Applications for DOE approval of Authorized Limits must contain the following:

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- 2 Specific limits proposed for each radionuclide or group of radionuclides and/or external radiation exposure, surrogate metrics, or conditions used to limit radionuclides.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with national standard (ANSI).

REQUIREMENT NUMBER **RPPE-0111**

DECISION: Delete

BASIS FOR DECISION: It is no longer necessary to include this specific requirement because ALARA plus the complete exposure pathway analysis required in paragraph 4.k(6)(b)2 of DOE O 458.1 includes external dose from gamma radiation as well as internal dose from either inhaled air or ingested water.

BEGINNING CITATION: IV.2.d.(1)(b)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Limits for each radionuclide or group of radionuclides, as appropriate, in air or water; and

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0112**

DECISION: Delete

BASIS FOR DECISION: It is no longer necessary to include this specific requirement because ALARA plus the complete exposure pathway analysis required in paragraph 4.k(6)(b)2 of DOE O 458.1 includes external dose from gamma radiation as well as internal dose from either inhaled air or ingested water.

BEGINNING CITATION: IV.2.d.(1)(c)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Where appropriate, a limit on external gamma radiation resulting from the residual material.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A.

REQUIREMENT NUMBER **RPPE-0113**

DECISION: Not a Requirement

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BASIS FOR DECISION: The original paragraph of DOE 5400.5 is not a requirement, but contains information on how values for authorized limits may be established.

BEGINNING CITATION: IV.2.d.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Under normal circumstances expected at most properties, authorized limits for residual radioactive material are set equal to, or below guideline values. Exceptional conditions for which authorized limits might differ from guideline values are specified in paragraphs IV-5 and IV-7.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0114

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material.

BEGINNING CITATION: IV.2.d.(3)

ENDING CITATION: 4.k(3)

REQUIREMENT DESCRIPTION: A property may be released without restrictions if residual radioactive material does not exceed the authorized limits or approved supplemental limits, as defined in paragraph IV.7a, at the time remedial action is completed. DOE actions in regard to restrictions and controls on use of the property shall be governed by provisions in paragraph IV. 7b. The applicable controls and restrictions are specified in paragraph IV.6 and IV.7.c.

REVISED REQUIREMENT:

4.k(3) Residual Radioactive Material. Property potentially containing residual radioactive material must not be cleared from DOE control unless either:

- (a) The property is demonstrated not to contain residual radioactive material based on process and historical knowledge, radiological monitoring or surveys, or a combination of these; or
- (b) The property is evaluated and appropriately monitored or surveyed to determine:

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- 1 The types and quantities of residual radioactive material within the property;
- 2 The quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material present on and under any coating);
- 3 That for property with potentially contaminated surfaces that are difficult to access for radiological monitoring or surveys, an evaluation of residual radioactive material on such surfaces is performed which is:
 - a Based on process and historical knowledge meeting the requirements of paragraph 4.k.(5) of this Order and monitoring and or surveys, to the extent feasible and
 - b Sufficient to demonstrate that applicable specific or pre-approved DOE Authorized Limits will not be exceeded; and
- 4 That any residual radioactive material within or on the property is in compliance with applicable specific or pre-approved DOE Authorized Limits.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended.

REQUIREMENT NUMBER

RPPE-0115

DECISION: Modify

BASIS FOR DECISION: ALARA requirements are applicable to clearance of property.

BEGINNING CITATION: IV.2.e.

ENDING CITATION: 4.k(1)

REQUIREMENT DESCRIPTION: ALARA Applications. The monitoring, cleanup, and control of residual radioactive material are subject to the ALARA policy of this Order. Applications of ALARA policy shall be documented and filed as a permanent record.

REVISED REQUIREMENT:

- 4.k(1) Property control and clearance processes must be developed and implemented in accordance with the dose limits in paragraph 4.b. under any plausible use of the property and the ALARA process requirements in paragraph 4.d. of this Order must be met before property is cleared.

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BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Need to apply the ALARA process to clearance activities.

REQUIREMENT NUMBER

RPPE-0116

DECISION: Merge MERGE WITH: RPPE-0023

BASIS FOR DECISION: Consolidate with public dose limit for all exposure pathways and sources.

BEGINNING CITATION: IV.3.a.

ENDING CITATION: 4.b(1)(a)

REQUIREMENT DESCRIPTION: Defining and Determining Dose Limits. The basic public dose limits for exposure to residual radioactive material, in addition to natural occurring "background" exposures, are 100 mrem (1 mSv) effective dose equivalent in a year, as specified in paragraph II.1a.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0117

DECISION: Modify

BASIS FOR DECISION: Paragraph 4.c of DOE O 458.1 entitled "Temporary Dose Limits," addresses the original requirements of DOE 5400.5 for: "Exceptions" (DOE 5400.5, Ch. II.1.a(4)); "Temporary Increases of Dose Limits" (DOE 5400.5, Ch. II.1.a(4)(a)); and "Justification for Increase of Public Dose Limit" (DOE 5400.5, Ch. II.1.a(4)(b)).

BEGINNING CITATION: IV.3.b.

ENDING CITATION: 4.c(1)-(4)

REQUIREMENT DESCRIPTION: Unusual Circumstances. If, under unusual circumstances, it is impracticable to meet the basic limit based on realistic exposure scenarios, the respective project and/or program office may, pursuant to paragraph II.1a(4), request from EH-1 for a specific authorization for a temporary dose limit higher than 100 mrem (1 mSv), but not greater than 500 mrem (5mSv), in a year. Such unusual circumstances may include temporary conditions at a properly scheduled for remedial action or following the remedial action. The ALARA process shall apply to the selection of temporary dose limits.

REVISED REQUIREMENT:

4.c Temporary Dose Limits.

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- (1) Special circumstances could affect a DOE radiological activity in such a manner that the potential dose to a member of the public could exceed a TED of 100 mrem (1 mSv) in a year.
- (2) The Field Element Manager¹ may request specific authorization for a temporary public dose limit higher than 100 mrem (1 mSv) in a year from a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer. This request must include documentation that justifies the need for the increase, the alternatives considered, and the application of the ALARA process.
- (3) A Cognizant Secretarial Officer must limit approval of such requests to no more than 500 mrem (5 mSv) TED, provided that the average TED over any 5 contiguous years does not exceed 100 mrem per year.
- (4) The specific exposure pathways excepted in paragraphs 4.b.(1)(a)1-4 are also excepted for temporary dose limits.

BASIS FOR REQUIREMENT: As stated directly in the text of paragraph II.1.a(4)(a) of DOE 5400.5 (See RPPE-0031), "the temporary higher dose limit derives from ICRP recommendations (ICRP Publication 45)." ICRP Publication 45, 1985, "Quantitative Bases for Developing a Unified Index of Harm", referenced ICRP Publication 26, in which the 5 mSv limit was endorsed under strict conditions only; however the Commission, in ICRP Publication 45, presented its view at that time which was that it was permissible to use the 5 mSv dose limit in some years provided that the average annual effective dose equivalent averaged over a lifetime does not exceed the 1 mSv per year principal limit. The requirements in DOE O 458.1 are consistent with ICRP Publication 60, page 45, paragraph 192, which discusses an exposure in one year above 1 mSv as long as the average dose over five years does not exceed 1 mSv. (See RPPE-0040).

REQUIREMENT NUMBER

RPPE-0118

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material. Newer radiological survey approaches use different averaging areas than 100 square meters.

BEGINNING CITATION: IV.4.a.

¹ Includes operation office, site office, field office, area office, project office and service center.

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ENDING CITATION: 4.k(6); and 4.k(8)(a)4

REQUIREMENT DESCRIPTION: Residual Radionuclides in Soil. Generic guidelines for thorium and radium are specified below. Guidelines for residual concentrations of other radionuclides shall be derived from the basic dose limits by means of an environmental pathway analysis using specific property data where available. Procedures for these derivations are given in DOE/CH-8901. Residual concentrations of radioactive material in soil are defined as those in excess of background concentrations averaged over an area of 100 m².

REVISED REQUIREMENT:

4.k(6) Authorized Limits.

- (a) Authorized Limits must be established and approved for the clearance of any property with residual radioactive material to provide reasonable assurance that the requirements of paragraphs 4.k.(1) and 4.k.(2) are met. Authorized Limits may be applied to property for which process knowledge cannot establish the absence of residual radioactive material but in which no residual radioactive material can be detected.
- (b) Authorized Limits must:
 - 1 Be developed in accordance with the ALARA requirements in paragraph 4.d. of this Order;
 - 2 Be based on the applicable dose constraint, supported by a complete exposure pathway analysis using appropriate methodologies, techniques, parameters and models (such as the RESRAD family of codes) that meet DOE quality assurance requirements under DOE O 414.1C, *Quality Assurance*, dated 6-17-05;
 - 3 Be expressed in terms of concentration of radioactivity per unit surface area (e.g., dpm per 100 cm²), radioactivity per unit mass (e.g., pCi per gram) or volume (e.g., pCi per ml), total radioactivity, or DOE controls and restrictions, if applicable;
 - 4 Explicitly state any restrictions or conditions on future use of the property necessary to ensure the basic dose limit and applicable dose constraint are not exceeded;
 - 5 Include written notification of applicable Federal, State, or local regulatory agencies, or Tribal governments;

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- 6 Be approved in accordance with paragraph 4.k.(6)(d); and
 - 7 In addition to paragraphs 4.k.(6)(b)1-6, for clearance of personal property only:
 - a Be based on expected annual quantity of property to be cleared or
 - b Be based on expected total amount of property cleared over the life of the project for specific remedial action or decontamination and decommissioning projects and
 - c Prior to clearance of metals, the Field Element Manager must determine that there is no practical internal DOE opportunity for reuse or recycle of the material or equipment.
- (c) Applications for DOE approval of Authorized Limits must contain the following:
- 1 A description of the property.
 - 2 Specific limits proposed for each radionuclide or group of radionuclides and/or external radiation exposure, surrogate metrics, or conditions used to limit radionuclides.
 - 3 Potential collective dose to the exposed population and the potential dose to a member of the public most likely to receive the highest dose for both: actual or likely future use, and plausible future use of the property.
 - 4 ALARA assessments conducted under paragraph 4.d. of this Order for the proposed clearance action to include, at a minimum, the effects of:
 - a Implementing the proposed Authorized Limits;
 - b Implementing alternative levels of residual radioactive material instead of the proposed Authorized Limits;
 - c Not implementing the proposed Authorized Limits, i.e., not proceeding with the proposed clearance action.

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- 5 A description of the procedures and radiological monitoring or surveys to be used to demonstrate compliance with proposed limits.
 - 6 Identification of any restrictions or conditions on the future use of the property upon which the proposed limits are based, and the means by which the restrictions or conditions will be implemented and maintained.
 - 7 Evidence of notification of applicable Federal, State or local regulatory agencies or Tribal governments.
 - 8 An estimated date for when the property will be cleared and an estimate of when the property will be released from DOE control.³
- (d) DOE Approval of Authorized Limits. All Authorized Limits must be approved in writing. The use of pre-approved Authorized Limits are approved by the Field Element Manager under paragraph 4.k.(6)(f). Otherwise:
- 1 Authorized Limits for real property require Field Element Manager approval in consultation with the Cognizant Secretarial Officer.
 - 2 The Field Element Manager approves Authorized Limits for personal property (including any restrictions or conditions on future use of the personal property) under the following conditions:
 - a Clearance of the property must not cause a TED to a member of the public in excess of 1 mrem (0.01 mSv) in any year or a public collective dose of more than 10 person-rem (0.1 person-Sv) in any year due to residual radioactive material for any actual or likely future use of the property;
 - b Documentation supporting the Authorized Limits is provided to the responsible Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer at least 45 working days prior to the intended implementation date of the Authorized Limits; and

³ This information is needed to support the DOE expectation stated at 72 FR 31904, 31906 (10 CFR Part 835, June 8, 2007) that the material, equipment, or real property to which the 10 CFR Part 835.1(b)(6) exclusion is applied will be released from DOE control according to a specified time interval.

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c The Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer does not notify the Field Element Manager within 30 working days of receipt of application that the documentation is incomplete or that the Authorized Limits are not acceptable.

Otherwise; Authorized Limits for personal property must be approved by the Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.

3 Authorized Limits for property that has not been released from DOE control must meet the criteria in paragraphs 4.k.(6)(a) through (d) of this Order and be approved by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer if such property is to be excluded from the provisions of 10 CFR Part 835.

(e) Revision of Authorized Limits. If established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property, further clearance for that specific type or portion of property must not proceed without revised Authorized Limits.

1 An application for revised Authorized Limits must be submitted in accordance with the requirements in paragraphs 4.k.(6)(a) through (d) of this Order.

2 Approval of revised Authorized Limits must be provided in accordance with the requirements in paragraph 4.k.(6)(d) of this Order.

3 In addition to the requirements of applicable paragraphs of 4.k.(6) of this Order, requests for approval of revised Authorized Limits must include a justification for the need for the revised Authorized Limits. Justifications for revised Authorized Limits must be based upon one of the following:

a Complying with existing Authorized Limits would pose a clear and present risk of injury to general employees or members of the public; or

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- b Complying with existing Authorized Limits would produce environmental harm (e.g., destruction of artifacts, ecological damage, loss of cultural assets) that is clearly excessive compared to the potential health benefits to persons exposed to affected properties; or
 - c Complying with existing Authorized Limits is unreasonably costly relative to long-term benefits and where the residual radioactive material does not pose a clear present or future potential of exceeding the public dose limit of paragraph 4.b.(1) of this Order; or
 - d Portions of the project or activity for which the scenarios or assumptions used to establish the existing Authorized Limits are overly conservative, or where more appropriate scenarios or assumptions indicate that other limits are applicable or appropriate for protection of the public and the environment; or
 - e New information which indicates the existing Authorized Limits are not sufficient to meet the protective requirements of this Order.
- (f) Pre-Approved Authorized Limits.
 - 1 The following values have been pre-approved by DOE for use as Authorized Limits, and may be used as specified below instead of developing and approving specific Authorized Limits.
 - a For radium-226 and radium-228 in soil - 5 pCi/gram (0.2 Bq/gram) in excess of background levels, averaged over 100 m², in the first 15 cm depth of the surface layer of soil; and 15 pCi/gram (0.56 Bq/gram) in excess of background levels, averaged over any subsequent 15 cm subsurface layer of soil plus an ALARA assessment. If both thorium-230 and radium-226 or both thorium-232 and radium-228 are present and not in secular equilibrium, the appropriate pre-approved limit must be applied to the radionuclide with the higher concentration.
 - b Previously approved guidelines and limits (such as the surface activity guidelines) may continue to be applied and used as Pre-Approved Authorized Limits until they are replaced or revised by Pre-Approved Authorized Limits issued under this Order.

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- 2 Other Pre-Approved Authorized Limits must be approved by the Chief Health, Safety and Security Officer or the responsible Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- a The approvals may be made through a DOE memorandum but must be included in a DOE directive issued under DOE O 251.1C or a Technical Standard under DOE O 252.1, *Technical Standards Program*, dated 11-19-99, within eighteen months of issuance.
- b Pre-Approved Authorized Limits must provide reasonable expectation that their implementation will comply with the requirements in paragraphs 4.k.(1) and 4.k.(2) of this Order.
- c The scope of applicability (e.g., property, activities, or radionuclides) and conditions of, or restrictions on, their use must be documented.
- 3 Pre-Approved Authorized Limits may be used for any radiological activity instead of developing specific Authorized Limits if their use is documented in the environmental radiological protection program and the specific application of the Authorized Limits is approved by the responsible Field Element Manager.
- (g) Documentation of Approved Authorized Limits. Approved Authorized Limits and approved revised Authorized Limits and supporting documentation must be made available to the public.

4.k(8)(a)4: Include an evaluation of non-uniformly distributed residual radioactive material, if applicable.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Consistency with 40 CFR Part 192 for radium and thorium; implementation of basic dose limit. Consistency with national (ANSI) and international (IAEA) standards. Flexibility in implementing "averaging" methodology.

REQUIREMENT NUMBER

RPPE-0119

DECISION: Modify

BASIS FOR DECISION: To improve wording and provide greater flexibility. Consistency with other guidance such as NUREG-1757, Consolidated Decommissioning Guidance, Appendix Page B-1, Section B.2 and Appendix O, page O-31, Section O.3.4.4. RESRAD and RESRAD-BUILD are mentioned in NUREG-1757 as being most suited for dealing with hot spots.

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BEGINNING CITATION: IV.4.a.(1)

ENDING CITATION: 4.k(8)(a)4

REQUIREMENT DESCRIPTION: Hot Spots. If the average concentration in any surface or below-surface area less than or equal to 25 m², exceeds the limit or guideline by a factor of (100/A), [where A is the area (in square meters) of the region in which concentrations are elevated], limits for “hot-spots” shall also be developed and applied. Procedures for calculating these hot-spot limits, which depend on the extent of the elevated local concentrations, are given in DOE/CH-8901. In addition, reasonable efforts shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

REVISED REQUIREMENT:

4.k(8)(a)4: Include an evaluation of non-uniformly distributed residual radioactive material, if applicable.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Recognition that items may not be uniformly contaminated. Meeting the public dose limit.

REQUIREMENT NUMBER

RPPE-0120

DECISION: Modify

BASIS FOR DECISION: To identify levels that represent the maximum concentrations permitted in soils for properties being cleared from DOE control and to specify the clearance criteria for Thorium and its decay products.

BEGINNING CITATION: IV.4.a.(2)(a)

ENDING CITATION: 4.k.(6)(f)1

REQUIREMENT DESCRIPTION: Generic Guidelines. The generic guidelines for residual concentrations of Ra-226, Ra228, Th-230, and Th-232 are:

5 pCi/g, averaged over the first 15 cm of soil below the surface; and

REVISED REQUIREMENT:

4.k.(6)(f): Pre-Approved Authorized Limits.

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- 1 The following values have been pre-approved by DOE for use as Authorized Limits, and may be used as specified below instead of developing and approving specific Authorized Limits.
 - a For radium-226 and radium-228 in soil - 5 pCi/gram (0.2 Bq/gram) in excess of background levels, averaged over 100 m², in the first 15 cm depth of the surface layer of soil; and 15 pCi/gram (0.56 Bq/gram) in excess of background levels, averaged over any subsequent 15 cm subsurface layer of soil plus an ALARA assessment. If both thorium-230 and radium-226 or both thorium-232 and radium-228 are present and not in secular equilibrium, the appropriate pre-approved limit must be applied to the radionuclide with the higher concentration.
 - b Previously approved guidelines and limits (such as the surface activity guidelines) may continue to be applied and used as Pre-Approved Authorized Limits until they are replaced or revised by Pre-Approved Authorized Limits issued under this Order.

BASIS FOR REQUIREMENT: The bases for this requirement are UMTRA and 40 CFR Part 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings." Section 192.12 -- "Standards" mentions that the concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than— (1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and (2) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface. Ra-228 limits are mentioned elsewhere in 40 CFR Part 192. According to DOE G 441.1-XX (p.21) "the Department has evaluated the EPA standard and finds the limits generally acceptable for most situations. However; this standard was derived for 40 CFR 192 ("Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings") actions specifically; DOE requires that ALARA be implemented when these standards are applied."

REQUIREMENT NUMBER

RPPE-0121

DECISION: Merge

MERGE WITH: RPPE-0120

BASIS FOR DECISION: To identify levels that represent the maximum concentrations permitted in soils for properties being cleared from DOE control and to specify the clearance criteria for Thorium and its decay products.

BEGINNING CITATION: IV.4.a.(2)(b)

ENDING CITATION: 4.k.(6)(f)1

REQUIREMENT DESCRIPTION: 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0122

DECISION: Modify

BASIS FOR DECISION: Improved clarification.

BEGINNING CITATION: IV.4.a.(3)

ENDING CITATION: 4.k(6)(b)2 and 4.k(6)(f)1

REQUIREMENT DESCRIPTION: Ingrowth and Mixtures. These guidelines take into account ingrowth of Ra-226 from Th-230 and of Ra-228 from Th-232, and assume secular equilibrium. If both Th-230 and Ra-226 or both Th-232 and Ra-228 are present and not in secular equilibrium, the appropriate guideline is applied as a limit for the radionuclide with the higher concentration. If other mixtures of radionuclide occur, the concentrations of individual radionuclides shall be reduced so that either the dose for the mixtures will not exceed the basic dose limit or the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1. Explicit formulas for calculating residual concentration guidelines for mixtures are given in DOE/CH-8901.

REVISED REQUIREMENT:

4.k(6)(b): Authorized Limits must:

- 2 Be based on the applicable dose constraint, supported by a complete exposure pathway analysis using appropriate methodologies, techniques, parameters and models (such as the RESRAD family of codes) that meet DOE quality assurance requirements under DOE O 414.1C, *Quality Assurance*, dated 6-17-05.

4.k(6)(f)1: Pre-Approved Authorized Limits.

- 1 The following values have been pre-approved by DOE for use as Authorized Limits, and may be used as specified below instead of developing and approving specific Authorized Limits:
 - a For radium-226 and radium-228 in soil - 5 pCi/gram (0.2 Bq/gram) in excess of background levels, averaged over 100 m², in the first 15 cm depth of the surface layer of soil; and 15 pCi/gram (0.56 Bq/gram) in excess of background levels, averaged over any subsequent 15 cm subsurface layer of soil plus an ALARA assessment. If

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both thorium-230 and radium-226 or both thorium-232 and radium-228 are present and not in secular equilibrium, the appropriate pre-approved limit must be applied to the radionuclide with the higher concentration.

- b Previously approved guidelines and limits (such as the surface activity guidelines) may continue to be applied and used as Pre-Approved Authorized Limits until they are replaced or revised by Pre-Approved Authorized Limits issued under this Order.

BASIS FOR REQUIREMENT: Ingrowth and mixtures need to be taken into account when selecting authorized limits for clearance of property.

REQUIREMENT NUMBER

RPPE-0123

DECISION: Modify

BASIS FOR DECISION: Consistency with 40 CFR Part 192 requirements and EPA radon guidance.

BEGINNING CITATION: IV.4.b.

ENDING CITATION: 4.f(2)

REQUIREMENT DESCRIPTION: Airborne Radon Decay Products. Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that are intended for release without restriction; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR Part 192) is: In any occupied or habitable building, the objective of remedial action shall be, and a reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. [A working level (WL) is any combination of short lived radon decay products in 1 L of air that will result in the ultimate emission of 1.3 x MeV of potential alpha energy.] In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions by DOE are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive material is not the source of the radon concentration.

REVISED REQUIREMENT:

4.f. Airborne Radioactive Effluents. Radiological activities must be conducted in a manner such that the release of radioactive material to the atmosphere will:

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- (2) Not cause radon-222 flux rates to exceed $20 \text{ pCi (0.7 Bq) m}^{-2} \text{ sec}^{-1}$ averaged over the surface area overlaying waste, including the covering or other confinement structures, wherever radium-226 wastes are accepted for storage or disposal (See 40 CFR Part 61, Subparts Q and T);

BASIS FOR REQUIREMENT: The basis for this requirement is 40 CFR 192.12(b)(1), and EPA and State radon guidance, as well as AEA health and safety sections.

REQUIREMENT NUMBER **RPPE-0124**

DECISION: Delete

BASIS FOR DECISION: Basic dose limit supercedes this and is more stringent.

BEGINNING CITATION: IV.4.c.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: External Gamma Radiation. The average level of gamma radiation inside a building or habitable structure on a site to be released without restrictions shall not exceed the background level by more than 20 micro-R/h and shall comply with the basic dose limit when an “appropriate-use” scenario is considered. This requirement shall not necessarily apply to structures scheduled for demolition or to buried foundations. External gamma radiation levels on open lands shall also comply with the basic limit and the ALARA process, considering appropriate-use scenarios for the area.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0125**

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material.

BEGINNING CITATION: IV.4.d.

ENDING CITATION: 4.k(6)(f)

REQUIREMENT DESCRIPTION: Surface Contamination. The generic surface contamination guidelines provided in Figure IV-1 are applicable to existing structures and equipment. These guidelines are generally consistent with standards of the NRC (NRC 1982) and functionally equivalent to Section 4, “Decontamination for Release for Unrestricted Use,” of Regulatory Guide 1.86, but apply to nonreactor facilities. These limits apply to both interior equipment and building components that are potentially salvageable or

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recoverable scrap. If a building is demolished, the guidelines in paragraph IV.6a are applicable to the resulting contamination in the ground.

REVISED REQUIREMENT:

4.k(6)(f) Pre-Approved Authorized Limits.

- 1 The following values have been pre-approved by DOE for use as Authorized Limits, and may be used as specified below instead of developing and approving specific Authorized Limits.
 - a For radium-226 and radium-228 in soil - 5 pCi/gram (0.2 Bq/gram) in excess of background levels, averaged over 100 m², in the first 15 cm depth of the surface layer of soil; and 15 pCi/gram (0.56 Bq/gram) in excess of background levels, averaged over any subsequent 15 cm subsurface layer of soil plus an ALARA assessment. If both thorium-230 and radium-226 or both thorium-232 and radium-228 are present and not in secular equilibrium, the appropriate pre-approved limit must be applied to the radionuclide with the higher concentration.
 - b Previously approved guidelines and limits (such as the surface activity guidelines) may continue to be applied and used as Pre-Approved Authorized Limits until they are replaced or revised by Pre-Approved Authorized Limits issued under this Order.
- 2 Other Pre-Approved Authorized Limits must be approved by the Chief Health, Safety and Security Officer or the responsible Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
 - a The approvals may be made through a DOE memorandum but must be included in a DOE directive issued under DOE O 251.1C or a Technical Standard under DOE O 252.1, *Technical Standards Program*, dated 11-19-99, within eighteen months of issuance.
 - b Pre-Approved Authorized Limits must provide reasonable expectation that their implementation will comply with the requirements in paragraphs 4.k.(1) and 4.k.(2) of this Order.

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- c The scope of applicability (e.g., property, activities, or radionuclides) and conditions of, or restrictions on, their use must be documented.
- 3 Pre-Approved Authorized Limits may be used for any radiological activity instead of developing specific Authorized Limits if their use is documented in the environmental radiological protection program and the specific application of the Authorized Limits is approved by the responsible Field Element Manager.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with national (ANSI) and international (IAEA) standards.

REQUIREMENT NUMBER

RPPE-0126

DECISION: Delete

BASIS FOR DECISION: This is not a unique requirement.

BEGINNING CITATION: IV.4.e.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Residual Radionuclides in Air and Water. Residual concentrations of radionuclides in air and water shall be controlled to the required levels shown in paragraph II.1a and as required by other applicable Federal and/or State laws.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0127

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material. Current HSS plans call for Figure IV-1 of DOE 5400.5 to be updated and moved into DOE guidance or technical standard for increased flexibility of use.

BEGINNING CITATION: IV.5.a.

ENDING CITATION: 4.k(6)(a)-(g)

REQUIREMENT DESCRIPTION: Establishment of Authorized Limits. The authorized limits for each property shall be set equal to the generic or derived guidelines unless it can be established, on the basis of specific property data (including health, safety, practical, programmatic and socioeconomic considerations), that the guidelines are not appropriate for use at the specific property. The authorized limits shall be established to (1) provide that, at a minimum, the basic dose limits of in paragraph IV.3, will not be

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exceeded under the “worst case” or “plausible-use” scenarios, consistent with the procedures and guidance provided in DOE/CH-8901, or (2) be consistent with applicable generic guidelines. The authorized limits shall be consistent with limits and guidelines established by other applicable Federal and State laws. The authorized limits are developed through the project offices in the field and are approved by the Headquarters Program Office.

Figure IV-1 Surface Contamination Guidelines

[NOTE: the following are footnotes to Figure IV-1]

1As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

2Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

3Measurements of average contamination should not be averaged over an area of more than 1m². For objects of less surface area, the average should be derived for each such object.

4The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

5The maximum contamination level applies to an area of not more than 100 cm².

6The amount of removable material per 100 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

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⁷This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

REVISED REQUIREMENT:

4.k(6) Authorized Limits.

- (a) Authorized Limits must be established and approved for the clearance of any property with residual radioactive material to provide reasonable assurance that the requirements of paragraphs 4.k.(1) and 4.k.(2) are met. Authorized Limits may be applied to property for which process knowledge cannot establish the absence of residual radioactive material but in which no residual radioactive material can be detected.
- (b) Authorized Limits must:
 - 1 Be developed in accordance with the ALARA requirements in paragraph 4.d. of this Order;
 - 2 Be based on the applicable dose constraint, supported by a complete exposure pathway analysis using appropriate methodologies, techniques, parameters and models (such as the RESRAD family of codes) that meet DOE quality assurance requirements under DOE O 414.1C, *Quality Assurance*, dated 6-17-05;
 - 3 Be expressed in terms of concentration of radioactivity per unit surface area (e.g., dpm per 100 cm²), radioactivity per unit mass (e.g., pCi per gram) or volume (e.g., pCi per ml), total radioactivity, or DOE controls and restrictions, if applicable;
 - 4 Explicitly state any restrictions or conditions on future use of the property necessary to ensure the basic dose limit and applicable dose constraint are not exceeded;
 - 5 Include written notification of applicable Federal, State, or local regulatory agencies, or Tribal governments;
 - 6 Be approved in accordance with paragraph 4.k.(6)(d); and
 - 7 In addition to paragraphs 4.k.(6)(b)1-6, for clearance of personal property only:

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- a Be based on expected annual quantity of property to be cleared or
 - b Be based on expected total amount of property cleared over the life of the project for specific remedial action or decontamination and decommissioning projects and
 - c Prior to clearance of metals, the Field Element Manager must determine that there is no practical internal DOE opportunity for reuse or recycle of the material or equipment.
- (c) Applications for DOE approval of Authorized Limits must contain the following:
 - 1 A description of the property.
 - 2 Specific limits proposed for each radionuclide or group of radionuclides and/or external radiation exposure, surrogate metrics, or conditions used to limit radionuclides.
 - 3 Potential collective dose to the exposed population and the potential dose to a member of the public most likely to receive the highest dose for both: actual or likely future use, and plausible future use of the property.
 - 4 ALARA assessments conducted under paragraph 4.d. of this Order for the proposed clearance action to include, at a minimum, the effects of:
 - a Implementing the proposed Authorized Limits;
 - b Implementing alternative levels of residual radioactive material instead of the proposed Authorized Limits;
 - c Not implementing the proposed Authorized Limits, i.e., not proceeding with the proposed clearance action.
 - 5 A description of the procedures and radiological monitoring or surveys to be used to demonstrate compliance with proposed limits.

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- 6 Identification of any restrictions or conditions on the future use of the property upon which the proposed limits are based, and the means by which the restrictions or conditions will be implemented and maintained.
 - 7 Evidence of notification of applicable Federal, State or local regulatory agencies or Tribal governments.
 - 8 An estimated date for when the property will be cleared and an estimate of when the property will be released from DOE control.³
- (d) DOE Approval of Authorized Limits. All Authorized Limits must be approved in writing. The use of pre-approved Authorized Limits are approved by the Field Element Manager under paragraph 4.k.(6)(f). Otherwise:
- 1 Authorized Limits for real property require Field Element Manager approval in consultation with the Cognizant Secretarial Officer.
 - 2 The Field Element Manager approves Authorized Limits for personal property (including any restrictions or conditions on future use of the personal property) under the following conditions:
 - a Clearance of the property must not cause a TED to a member of the public in excess of 1 mrem (0.01 mSv) in any year or a public collective dose of more than 10 person-rem (0.1 person-Sv) in any year due to residual radioactive material for any actual or likely future use of the property;
 - b Documentation supporting the Authorized Limits is provided to the responsible Cognizant Secretarial Officer and the Chief Health, Safety and Security Officer at least 45 working days prior to the intended implementation date of the Authorized Limits; and

³ This information is needed to support the DOE expectation stated at 72 FR 31904, 31906 (10 CFR Part 835, June 8, 2007) that the material, equipment, or real property to which the 10 CFR Part 835.1(b)(6) exclusion is applied will be released from DOE control according to a specified time interval.

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c The Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer does not notify the Field Element Manager within 30 working days of receipt of application that the documentation is incomplete or that the Authorized Limits are not acceptable.

Otherwise; Authorized Limits for personal property must be approved by the Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.

3 Authorized Limits for property that has not been released from DOE control must meet the criteria in paragraphs 4.k.(6)(a) through (d) of this Order and be approved by a Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer if such property is to be excluded from the provisions of 10 CFR Part 835.

(e) Revision of Authorized Limits. If established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property, further clearance for that specific type or portion of property must not proceed without revised Authorized Limits.

1 An application for revised Authorized Limits must be submitted in accordance with the requirements in paragraphs 4.k.(6)(a) through (d) of this Order.

2 Approval of revised Authorized Limits must be provided in accordance with the requirements in paragraph 4.k.(6)(d) of this Order.

3 In addition to the requirements of applicable paragraphs of 4.k.(6) of this Order, requests for approval of revised Authorized Limits must include a justification for the need for the revised Authorized Limits. Justifications for revised Authorized Limits must be based upon one of the following:

a Complying with existing Authorized Limits would pose a clear and present risk of injury to general employees or members of the public; or

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- b Complying with existing Authorized Limits would produce environmental harm (e.g., destruction of artifacts, ecological damage, loss of cultural assets) that is clearly excessive compared to the potential health benefits to persons exposed to affected properties; or
 - c Complying with existing Authorized Limits is unreasonably costly relative to long-term benefits and where the residual radioactive material does not pose a clear present or future potential of exceeding the public dose limit of paragraph 4.b.(1) of this Order; or
 - d Portions of the project or activity for which the scenarios or assumptions used to establish the existing Authorized Limits are overly conservative, or where more appropriate scenarios or assumptions indicate that other limits are applicable or appropriate for protection of the public and the environment; or
 - e New information which indicates the existing Authorized Limits are not sufficient to meet the protective requirements of this Order.
- (f) Pre-Approved Authorized Limits.
 - 1 The following values have been pre-approved by DOE for use as Authorized Limits, and may be used as specified below instead of developing and approving specific Authorized Limits.
 - a For radium-226 and radium-228 in soil - 5 pCi/gram (0.2 Bq/gram) in excess of background levels, averaged over 100 m², in the first 15 cm depth of the surface layer of soil; and 15 pCi/gram (0.56 Bq/gram) in excess of background levels, averaged over any subsequent 15 cm subsurface layer of soil plus an ALARA assessment. If both thorium-230 and radium-226 or both thorium-232 and radium-228 are present and not in secular equilibrium, the appropriate pre-approved limit must be applied to the radionuclide with the higher concentration.
 - b Previously approved guidelines and limits (such as the surface activity guidelines) may continue to be applied and used as Pre-Approved Authorized Limits until they are replaced or revised by Pre-Approved Authorized Limits issued under this Order.

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- 2 Other Pre-Approved Authorized Limits must be approved by the Chief Health, Safety and Security Officer or the responsible Cognizant Secretarial Officer in consultation with the Chief Health, Safety and Security Officer.
- a The approvals may be made through a DOE memorandum but must be included in a DOE directive issued under DOE O 251.1C or a Technical Standard under DOE O 252.1, *Technical Standards Program*, dated 11-19-99, within eighteen months of issuance.
- b Pre-Approved Authorized Limits must provide reasonable expectation that their implementation will comply with the requirements in paragraphs 4.k.(1) and 4.k.(2) of this Order.
- c The scope of applicability (e.g., property, activities, or radionuclides) and conditions of, or restrictions on, their use must be documented.
- 3 Pre-Approved Authorized Limits may be used for any radiological activity instead of developing specific Authorized Limits if their use is documented in the environmental radiological protection program and the specific application of the Authorized Limits is approved by the responsible Field Element Manager.
- (g) Documentation of Approved Authorized Limits. Approved Authorized Limits and approved revised Authorized Limits and supporting documentation must be made available to the public.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Consistency with national (ANSI) and international (IAEA) standards. November 17, 1995, memorandum from Raymond F. Pelletier to Distribution on "Application of DOE 5400.5 Requirements for Release and Control of Property Containing Residual Radioactive Material."

REQUIREMENT NUMBER

RPPE-0128

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material. The original requirement in DOE 5400.5 was oriented towards the FUSRAP, which is no longer a DOE program. Rewritten to cover all appropriate programs.

BEGINNING CITATION: IV.5.b.

ENDING CITATION: 4.k(3)

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REQUIREMENT DESCRIPTION: Application of Authorized Limits. Remedial action shall not be considered complete until the residual radioactive material levels comply with the authorized limits, except as authorized pursuant to paragraph IV.7 for special situations where the supplemental limits and exceptions should be considered and it is demonstrated that it is not appropriate to decontaminate the area to the authorized limit or guideline value.

REVISED REQUIREMENT:

4.k(3) Residual Radioactive Material. Property potentially containing residual radioactive material must not be cleared from DOE control unless either:

- (a) The property is demonstrated not to contain residual radioactive material based on process and historical knowledge, radiological monitoring or surveys, or a combination of these; or
- (b) The property is evaluated and appropriately monitored or surveyed to determine:
 - 1 The types and quantities of residual radioactive material within the property;
 - 2 The quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material present on and under any coating);
 - 3 That for property with potentially contaminated surfaces that are difficult to access for radiological monitoring or surveys, an evaluation of residual radioactive material on such surfaces is performed which is:
 - a Based on process and historical knowledge meeting the requirements of paragraph 4.k.(5) of this Order and monitoring and or surveys, to the extent feasible and
 - b Sufficient to demonstrate that applicable specific or pre-approved DOE Authorized Limits will not be exceeded; and
 - 4 That any residual radioactive material within or on the property is in compliance with applicable specific or pre-approved DOE Authorized Limits.

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BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended.

REQUIREMENT NUMBER **RPPE-0129**

DECISION: Delete

BASIS FOR DECISION: The requirements formerly contained in Chapter II of DOE 5400.5 are applicable to the management of all radioactive material. Specific citation for residual radioactive materials above the guidelines is not necessary.

BEGINNING CITATION: IV.6.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: CONTROL OF RESIDUAL RADIOACTIVE MATERIAL. Residual radioactive material above the guidelines shall be managed in accordance with Chapter II and the following requirements.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0130**

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Operational and Control Requirements. The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0131**

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.(1)

ENDING CITATION: N/A

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REQUIREMENT DESCRIPTION: DOE 5000.3B, Occurrence Reporting and Processing of Operations Information

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0132

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: DOE 5440.1E, National Environmental Policy Act Compliance Program

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0133

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.(3)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: DOE 5480.4, Environmental Protection, Safety, and Health Protection Standards

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0134

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.(4)

ENDING CITATION: N/A

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REQUIREMENT DESCRIPTION: DOE 5482.1B, Environmental, Safety, and Health Appraisal Program

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0135**

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.(5)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: DOE 5483.1A, Occupational Safety and Health Program for DOE Employees at Government-Owned, Contractor-Operated Facilities

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0136**

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

BEGINNING CITATION: IV.6.a.(6)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: DOE 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0137**

DECISION: Delete

BASIS FOR DECISION: The relevant requirements in these Orders or their successor directives are applicable without being referenced and do not merit special citation here.

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BEGINNING CITATION: IV.6.a.(7)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: DOE 5820.2A, Radioactive Waste Management.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0138

DECISION: Delete

BASIS FOR DECISION: The original requirement of DOE 5400.5 was based upon DOE management decision to ensure that plausible use scenarios that may occur for land released with residual radioactive material will be a small fraction of the dose limits in a 50 year time frame and at a minimum for 25 years. DOE no longer has interim storage facilities for 11.e.(2) waste.

BEGINNING CITATION: IV.6.b.(1)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 50 years with a minimum life of at least 25 years.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0139

DECISION: Delete

BASIS FOR DECISION: DOE no longer has interim storage facilities for 11.e.(2) wastes.

BEGINNING CITATION: IV.6.b.(2)(a)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Controls shall be designed such that Rn-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels, will not exceed: 100 pCi/L at any given point;

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0140

DECISION: Delete

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BASIS FOR DECISION: DOE no longer has interim storage facilities for 11.e.(2) wastes.

BEGINNING CITATION: IV.6.b.(2)(b)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: An annual average concentration of 30 pCi/L over the facility site; and

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0141

DECISION: Delete

BASIS FOR DECISION: DOE no longer has interim storage facilities for 11.e.(2) wastes.

BEGINNING CITATION: IV.6.b.(2)(c)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: An annual average concentration of 3 pCi/L at or above any location outside the facility site.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0142

DECISION: Modify

BASIS FOR DECISION: Although the original requirement of DOE 5400.5 applied to interim storage, it also applies generally.

Modified to clarify language regarding airborne radioactive effluents.

BEGINNING CITATION: IV.6.b.(2)(d)

ENDING CITATION: 4.h(1)(d)1b and 4.f(2)

REQUIREMENT DESCRIPTION: Flux rates from the storage of radon producing wastes shall not exceed 20 pCi/sq.m-sec., as required by 40 CFR Part 61.

REVISED REQUIREMENT:

4.h(1)(d)1b: Provide reasonable assurance that releases of radon-222 to the atmosphere will not: (1) exceed an average release rate of 20 picocuries per square meter per second or (2) increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than one-half picocurie per liter.

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4.f(2): Not cause radon-222 flux rates to exceed 20 pCi (0.7 Bq) m⁻² sec⁻¹ averaged over the surface area overlaying waste, including the covering or other confinement structures, wherever radium-226 wastes are accepted for storage or disposal (See 40 CFR Part 61, Subparts Q and T);

BASIS FOR REQUIREMENT: 40 CFR Part 61, Subpart Q, National Emission Standards for Radon Emissions from Department of Energy Facilities; Consistency with 40 CFR Part 192.02 Standards.

REQUIREMENT NUMBER

RPPE-0143

DECISION: Delete

BASIS FOR DECISION: The original requirement applied to interim storage of waste. It is not necessary to state longstanding DOE policy to comply with legally applicable standards. Paragraphs 4.g(3) and 4.g(10) of DOE 458.1 address ground water.

BEGINNING CITATION: IV.6.b.(3)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Controls shall be designed such that concentrations of radionuclides in the groundwater and quantities of residual radioactive material will not exceed applicable Federal or State standards.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0144

DECISION: Delete

BASIS FOR DECISION: DOE no longer has "interim" storage facilities for 11.e.(2) wastes.

BEGINNING CITATION: IV.6.b.(4)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Access to a property and use of onsite material contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR Part 192. These control features should be designed to provide, to the extent reasonable, an effective life of at least 25 years.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0145

DECISION: Not a Requirement

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BASIS FOR DECISION: Not a requirement. The original language of DOE 5400.5 recommended management practices.

BEGINNING CITATION: IV.6.c.(1)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Interim Management. A property may be maintained under an interim management arrangement when the residual radioactive material exceeds guideline values if the residual radioactive material is in inaccessible locations and would be unreasonably costly to remove, provided that administrative controls are established by the responsible authority (Federal, State, or local) to protect members of the public and that such controls are approved by the appropriate Program Secretarial Officer.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0146

DECISION: Delete

BASIS FOR DECISION: The original provision of DOE 5400.5 provided examples of types of administrative controls.

Administrative controls for interim management are no longer necessary.

BEGINNING CITATION: IV.6.c.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: The administrative controls include but are not limited to periodic monitoring as appropriate; appropriate shielding; physical barriers to prevent access; and appropriate radiological safety measures during maintenance, renovation, demolition, or other activities that might disturb the residual radioactive material or cause it to migrate.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0147

DECISION: Not a Requirement

BASIS FOR DECISION: The original provision of DOE 5400.5 is a "should" statement. It is duplicative of other property management responsibilities.

BEGINNING CITATION: IV.6.c.(3)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: The owner of the property should be responsible for implementing the administrative controls and the cognizant Federal, State, or local authorities should be responsible for enforcing them.

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REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0148

DECISION: Modify

BASIS FOR DECISION: Changed to affect materials not otherwise regulated by other authorities.

BEGINNING CITATION: IV.6.d.(1)(a)

ENDING CITATION: 4.h(1)(d)

REQUIREMENT DESCRIPTION: Long-Term Management. Uranium, Thorium, and Their Decay Products. Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 1,000 years with a minimum life of at least 200 years.

REVISED REQUIREMENT:

4.h(1)(d) Management, storage and disposal of 11e.(2) byproduct material, as defined in Section 11e.(2) of the AEA and other wastes containing uranium and thorium and their decay products which are not subject to the requirements of 40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, are not at facilities licensed by the NRC, or are not disposed of at DOE low-level waste disposal facilities, must be in accordance with the requirements of paragraph 4.h.(1) of this Order and DOE-approved plans.

- 1 Disposal facilities for uranium and thorium wastes must be designed to:
 - a Remain effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years and
 - b Provide reasonable assurance that releases of radon-222 to the atmosphere will not: (1) exceed an average release rate of 20 picocuries per square meter per second or (2) increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than one-half picocurie per liter.

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- 2 For wastes containing significant concentrations of radium and thorium, special considerations must be given to measures to prevent inadvertent human intrusion.
- 3 Before any potentially biodegradable contaminated wastes are placed in a disposal facility, such wastes must be conditioned so that the generation and escape of biogenic gases will not cause the emission or dose limits in paragraph 4.h.(1) of this Order to be exceeded and that bio-degradation within the facility will not result in premature structural failure.
- 4 All plans for the management and disposal of these wastes must provide for institutional controls and long-term stewardship of the disposal facility necessary to ensure continued performance.

BASIS FOR REQUIREMENT: Change reflects technical requirements from 40 CFR Part 192.

REQUIREMENT NUMBER

RPPE-0149

DECISION: Modify

BASIS FOR DECISION: Clarify language regarding the control of radioactive waste.

BEGINNING CITATION: IV.6.d.(1)(b)

ENDING CITATION: 4.h(1)(d)1

REQUIREMENT DESCRIPTION: Control and stabilization features shall be designed to limit Rn-222 emanation to the atmosphere from the wastes to less than an annual average release rate of 20 pCi/m² /s and prevent increases in the annual average Rn-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L. Field verification of emanation rates shall be in accordance with the requirements of 40 CFR Part 61.

REVISED REQUIREMENT:

4.h(1)(d)1: Disposal facilities for uranium and thorium wastes must be designed to:

- a Remain effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years and

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- b Provide reasonable assurance that releases of radon-222 to the atmosphere will not: (1) exceed an average release rate of 20 picocuries per square meter per second or (2) increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than one-half picocurie per liter.

BASIS FOR REQUIREMENT: DOE established a maximum annual average radon concentration for offsite locations of 0.5 pCi/L to ensure that potential doses to the public were as low as reasonably achievable in cases where people reside or work in the vicinity of a DOE facility. 40 CFR Part 61 and consistent with DOE M 435.1-1 IV P.(1) Performance Objectives.

REQUIREMENT NUMBER **RPPE-0150**

DECISION: Modify

BASIS FOR DECISION: Consistent with DOE M 435.1-1 G.(d).4 which does not apply to 11.e.(2) wastes.

BEGINNING CITATION: IV.6.d.(1)(c)

ENDING CITATION: 4.h(1)(d)3

REQUIREMENT DESCRIPTION: Before any potentially biodegradable contaminated wastes are placed in a long-term management facility, such wastes shall be properly conditioned so that the generation and escape of biogenic gases will not cause the requirement in paragraph IV.6d(1)(b) to be exceeded and that biodegradation within the facility will not result in premature structural failure in violation of the requirements in paragraph IV.6d(1)(a).

REVISED REQUIREMENT:

- 4.h(1)(d)3: Before any potentially biodegradable contaminated wastes are placed in a disposal facility, such wastes must be conditioned so that the generation and escape of biogenic gases will not cause the emission or dose limits in paragraph 4.h.(1) of this Order to be exceeded and that bio-degradation within the facility will not result in premature structural failure.

BASIS FOR REQUIREMENT: To provide protection in DOE O 458.1 similar to that provided for other wastes by DOE O 435.1.

REQUIREMENT NUMBER **RPPE-0151**

DECISION: Delete

BASIS FOR DECISION: It is not necessary to state longstanding DOE policy to comply with legally applicable standards in DOE O 458.1. Paragraphs 4.g(3) and 4.(g)(10) of DOE O 458.1 address ground water.

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BEGINNING CITATION: IV.6.d.(1)(d)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Ground water shall be protected in accordance with legally applicable Federal and State standards.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0152

DECISION: Modify

BASIS FOR DECISION: Control of property pursuant to 40 CFR Part 192 and AEA requirements and clarify language regarding the control of radioactive waste.

BEGINNING CITATION: IV.6.d.(1)(e)

ENDING CITATION: 4.h(1)

REQUIREMENT DESCRIPTION: Access to a property and use of onsite material contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR Part 192. These controls should be designed to be effective to the extent reasonable.

REVISED REQUIREMENT:

4.h:

(1) Management, Storage and Disposal of Radioactive Waste.

- (a) Radiological activities must be conducted in a manner such that radiation exposure to members of the public from management and storage of radioactive waste complies with ALARA process requirements and does not result in a TED greater than 25 mrem (0.25 mSv) in a year from all exposure pathways and radiation sources associated with the waste, except for transportation and radon and its decay products.
- (b) DOE management of spent nuclear fuel, and high-level and transuranic wastes at a disposal facility which is not regulated by the NRC must comply with the requirements of this Order and 40 CFR Part 191, *Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-level and Transuranic Radioactive Wastes*.

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- (c) Management, storage and disposal of low-level radioactive waste must be conducted in a manner such that exposure to members of the public to radiation from radioactive waste complies with ALARA process requirements, and does not exceed a TED of 25 mrem (0.25 mSv) in a year from all exposure pathways and radiation sources associated with the waste, except for transportation and radon and its decay products.
- (d) Management, storage and disposal of 11e.(2) byproduct material, as defined in Section 11e.(2) of the AEA and other wastes containing uranium and thorium and their decay products which are not subject to the requirements of 40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, are not at facilities licensed by the NRC, or are not disposed of at DOE low-level waste disposal facilities, must be in accordance with the requirements of paragraph 4.h.(1) of this Order and DOE-approved plans.
 - 1 Disposal facilities for uranium and thorium wastes must be designed to:
 - a Remain effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years and
 - b Provide reasonable assurance that releases of radon-222 to the atmosphere will not: (1) exceed an average release rate of 20 picocuries per square meter per second or (2) increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than one-half picocurie per liter.
 - 2 For wastes containing significant concentrations of radium and thorium, special considerations must be given to measures to prevent inadvertent human intrusion.
 - 3 Before any potentially biodegradable contaminated wastes are placed in a disposal facility, such wastes must be conditioned so that the generation and escape of biogenic gases will not cause the emission or dose limits in paragraph 4.h.(1) of this Order to be exceeded and that bio-degradation within the facility will not result in premature structural failure.
 - 4 All plans for the management and disposal of these wastes must provide for institutional controls and long-term stewardship of the disposal facility necessary to ensure continued performance.

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- (e) AEA Section 11e.(3) and 11e.(4) Byproduct Material. Discrete sources of radium-226, accelerator produced radioactive material, or naturally-occurring radioactive material (NORM) that pose a threat similar to discrete sources of radium-226, which are defined as Section 11e.(3) or 11e.(4) byproduct material in the AEA, must be managed as high-level waste, low-level waste or 11e.(2) material as appropriate under DOE AEA authorities and in compliance with the requirements of this Order and DOE O 435.1 Chg 1.

BASIS FOR REQUIREMENT: Consistent with administrative and physical controls in 40 CFR Part 192; and DOE M 435.1-1 IV.P.2.(h).

REQUIREMENT NUMBER **RPPE-0153**

DECISION: Merge MERGE WITH: RPPE-0152

BASIS FOR DECISION: To consolidate requirements into one place and eliminate duplication. Requirements have also been updated to reflect that DOE 5820.2A has been superseded by DOE O 435.1.

BEGINNING CITATION: IV.6.d.(2)

ENDING CITATION: 4.h(1)

REQUIREMENT DESCRIPTION: Other Radionuclides. Long-term management of other radionuclides shall be in accordance with Chapters II, III, and IV of DOE 5820.2A, as applicable.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0154**

DECISION: Modify

BASIS FOR DECISION: To provide greater specificity and to clarify the requirements related to clearance of DOE property that potentially contains residual radioactive material. DOE O 458.1 establishes requirements for revisions to authorized limits in situations where established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property.

BEGINNING CITATION: IV.7.

ENDING CITATION: 4.k(6)(e)

REQUIREMENT DESCRIPTION: SUPPLEMENTAL LIMITS AND EXCEPTIONS. If special specific circumstances indicate that the guidelines or authorized limits established for a given property are not appropriate for any portion of that property, then the DOE-Field Office Manager may request, through the Program Office, that supplemental limits or an exception be applied. The responsible

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DOE Field Office Manager shall document the decision that the subject guidelines or authorized limits are not appropriate and that the alternative action selected will provide adequate protection, giving due consideration to health and safety, the environment, costs, and public policy considerations. The DOE Field Office Manager shall obtain approval for specific supplemental limits or exceptions from Headquarters as specified in paragraph IV.5, and shall provide to the Headquarters Program Office those materials required by Headquarters for the justification as specified in this paragraph and in the FUSRAP and SFMP protocols and subsequent guidance documents. The DOE Field Office Manager shall also be responsible for coordination with the State and local government regarding the limits or exceptions and associated restrictions as appropriate. In the case of exceptions, the DOE Field Office Manager shall be responsible for coordinating with the State and/or local governments to ensure the adequacy of restrictions or conditions of release and that mechanisms are in place for their enforcement.

REVISED REQUIREMENT:

- 4.k(6)(e) Revision of Authorized Limits. If established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property, further clearance for that specific type or portion of property must not proceed without revised Authorized Limits.
- 1 An application for revised Authorized Limits must be submitted in accordance with the requirements in paragraphs 4.k.(6)(a) through (d) of this Order.
 - 2 Approval of revised Authorized Limits must be provided in accordance with the requirements in paragraph 4.k.(6)(d) of this Order.
 - 3 In addition to the requirements of applicable paragraphs of 4.k.(6) of this Order, requests for approval of revised Authorized Limits must include a justification for the need for the revised Authorized Limits. Justifications for revised Authorized Limits must be based upon one of the following:
 - a Complying with existing Authorized Limits would pose a clear and present risk of injury to general employees or members of the public; or

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- b Complying with existing Authorized Limits would produce environmental harm (e.g., destruction of artifacts, ecological damage, loss of cultural assets) that is clearly excessive compared to the potential health benefits to persons exposed to affected properties; or
- c Complying with existing Authorized Limits is unreasonably costly relative to long-term benefits and where the residual radioactive material does not pose a clear present or future potential of exceeding the public dose limit of paragraph 4.b.(1) of this Order; or
- d Portions of the project or activity for which the scenarios or assumptions used to establish the existing Authorized Limits are overly conservative, or where more appropriate scenarios or assumptions indicate that other limits are applicable or appropriate for protection of the public and the environment; or
- e New information which indicates the existing Authorized Limits are not sufficient to meet the protective requirements of this Order.

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended. Good radiation management practice and ALARA process dictate that a reasonable clearance level for property be selected.

REQUIREMENT NUMBER

RPPE-0155

DECISION: Merge MERGE WITH: RPPE-0154

BASIS FOR DECISION: DOE O 458.1 establishes requirements for revisions to authorized limits in situations where established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property.

BEGINNING CITATION: IV.7.a.

ENDING CITATION: 4.k(6)(e)

REQUIREMENT DESCRIPTION: Supplemental Limits. Any supplemental limits shall achieve the basic dose limits set forth in Chapter II of this Order for both current and potential unrestricted uses of a property. Supplemental limits may be applied to any portion of a property if, on the basis of a specific property analysis, it is demonstrated that:

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

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REQUIREMENT NUMBER

RPPE-0156

DECISION: Merge MERGE WITH: RPPE-0154

BASIS FOR DECISION: DOE O 458.1 establishes requirements for revisions to authorized limits in situations where established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property. The ALARA process and good management practices permit a different clearance level for the property.

BEGINNING CITATION: IV.7.a.(1)

ENDING CITATION: 4.k(6)(e)

REQUIREMENT DESCRIPTION: Certain aspects of the property were not considered in the development of the established authorized limits for that property; and

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0157

DECISION: Merge MERGE WITH: RPPE-0154

BASIS FOR DECISION: DOE O 458.1 includes requirements for revised authorized limits for situations where established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property.

BEGINNING CITATION: IV.7.a.(2)

ENDING CITATION: 4.k(6)(e)

REQUIREMENT DESCRIPTION: As a result of these certain aspects, the established limits either do not provide adequate protection or are unnecessarily restrictive and costly.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0158

DECISION: Merge MERGE WITH: RPPE-0154

BASIS FOR DECISION: DOE O 458.1 establishes requirements for revisions to authorized limits in situations where established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property.

BEGINNING CITATION: IV.7.b.

ENDING CITATION: 4.k(6)(e)

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REQUIREMENT DESCRIPTION: Exceptions to the authorized limits defined for a property may be applied to any portion of the property when it is established that the authorized limits cannot reasonably be achieved and that restrictions on use of the property are necessary. It shall be demonstrated that the exception is justified and that the restrictions will protect members of the public within the basic dose limits of this Order and will comply with the requirements for control of residual radioactive material as set forth in paragraph IV.6.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0159

DECISION: Merge MERGE WITH: RPPE-0154

BASIS FOR DECISION: DOE O 458.1 establishes requirements for revisions to authorized limits in situations where established Authorized Limits are found to be not protective, appropriate or practical to apply for a specific type or portion of property.

BEGINNING CITATION: IV.7.c.

ENDING CITATION: 4.k(6)(e)

REQUIREMENT DESCRIPTION: Justification for Supplemental Limits and Exceptions. The need for supplemental limits and exceptions shall be documented by the DOE Field Office on a case-by-case basis using specific property data. Every reasonable effort should be made to minimize the use of supplemental limits and exceptions.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER RPPE-0160

DECISION: Not a Requirement

BASIS FOR DECISION: As noted in the text of DOE 5400.5 in Chapter IV, paragraphs 7.c (1) - (5) provide examples of specific situations that warrant DOE use of supplemental standards and exceptions.

BEGINNING CITATION: IV.7.c.(1)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Examples of specific situations that warrant DOE use of supplemental standards and exceptions are:

(1) Where remedial action would pose a clear and present risk of injury to workers or members of the public, notwithstanding reasonable measures to avoid or reduce risk.

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REVISED REQUIREMENT: N/A
BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0161**

DECISION: Not a Requirement

BASIS FOR DECISION: As noted in the text of DOE 5400.5, Chapter IV, paragraphs 7.c (1) - (5) provide examples of specific situations that warrant DOE use of supplemental standards and exceptions.

BEGINNING CITATION: IV.7.c.(2)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Examples of specific situations that warrant DOE use of supplemental standards and exceptions are:

(2) Where remedial action, even after all reasonable mitigative measures have been taken, would produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near affected properties, now or in the future. A clear excess of environmental harm is harm that is long-term, manifest, and grossly disproportionate to health benefits that may reasonably be anticipated.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER **RPPE-0162**

DECISION: Not a Requirement

BASIS FOR DECISION: As noted in the text of DOE 5400.5, Chapter IV, paragraphs 7.c (1) - (5) provide examples of specific situations that warrant DOE use of supplemental standards and exceptions.

BEGINNING CITATION: IV.7.c.(3)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Examples of specific situations that warrant DOE use of supplemental standards and exceptions are:

(3) Where it is determined that the scenarios or assumptions used to establish the authorized limits do not apply to the property or portion of the property identified, or where more appropriate scenarios or assumptions indicate that other limits are applicable or appropriate for protection of the public and the environment.

REVISED REQUIREMENT: N/A

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BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0163

DECISION: Not a Requirement

BASIS FOR DECISION: As noted in the text of DOE 5400.5, Chapter IV, paragraphs 7.c (1) - (5) provide examples of specific situations that warrant DOE use of supplemental standards and exceptions.

BEGINNING CITATION: IV.7.c.(4)

ENDING CITATION: N/A

REQUIREMENT DESCRIPTION: Examples of specific situations that warrant DOE use of supplemental standards and exceptions are:

(4) Where the cost of remedial action for contaminated soil is unreasonably high relative to long-term benefits and where the residual material does not pose a clear present or future risk after taking necessary control measure. The likelihood that buildings will be erected or that people will spend long periods of time at such a property should be considered in evaluating this risk. Remedial action will generally not be necessary where only minor quantities of residual radioactive material are involved or where residual radioactive material occurs in an inaccessible location at which specific property factors limit its hazard and from which it is difficult or costly to remove. Examples include residual radioactive material under hard-surfaced public roads and sidewalks, around public sewer lines, or in fence-post foundations. A specific property analysis shall be provided to establish that the residual radioactive material would not cause an individual to receive a radiation dose in excess of the basic dose limits stated in paragraph IV.3, and a statement specifying the level of residual radioactive material shall be provided to the appropriate State and/or local agencies for appropriate action, e.g., for inclusion in local land records.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0164

DECISION: Not a Requirement

BASIS FOR DECISION: As noted in the text of DOE 5400.5, Chapter IV, paragraphs 7.c (1) - (5) provide examples of specific situations that warrant DOE use of supplemental standards and exceptions.

BEGINNING CITATION: IV.7.c.(5)

ENDING CITATION: N/A

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REQUIREMENT DESCRIPTION: Examples of specific situations that warrant DOE use of supplemental standards and exceptions are:

(5) Where there is no feasible remedial action.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: N/A

REQUIREMENT NUMBER

RPPE-0165

DECISION: New

BASIS FOR DECISION: Ensure a comparable "regulatory" implementation structure and importance for radiation protection of the public and the environment as that afforded occupational workers via 10 CFR Part 835. The ERPP is comparable to the RPP required under 10 CFR Part 835.

BEGINNING CITATION: N/A

ENDING CITATION: 4.a

REQUIREMENT DESCRIPTION:

4.a Environmental Radiological Protection Program.

(1) DOE must ensure that:

- (a) DOE or DOE contractors operating sites or implementing projects, involving radiological activities that can affect the public or environment, establish and maintain a program that complies with applicable requirements of this Order.
- (b) The program, which is the composite of plans, procedures, protocols and other documents describing the methods used to achieve compliance, must be tailored to the hazard or risk and particular radiological activities being conducted at the site and relevant requirements of this Order.
- (c) For any determination that a requirement of this Order is not relevant, the basis for that determination is appropriate to the hazard and adequately documented.

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- (2) DOE must document directions to the contractor necessary to correct any potential inadequacies or inappropriate determinations of relevancy.
- (3) DOE must ensure that long-term stewardship and institutional controls for protection of the public and environment determined necessary to meet the requirements of this Order are adequately documented and implemented as long as is necessary.

REVISED REQUIREMENT: N/A

BASIS FOR REQUIREMENT: Health and safety sections of the Atomic Energy Act of 1954, as amended, and consistency with 10 CFR Part 835. DOE management decision to ensure consistency in application of environmental programs throughout the DOE complex.
