Department of Energy
Washington, DC 20585

December 18, 2009

Mr. Michael Kluse
Laboratory Director
Pacific Northwest National Laboratory
P.O. Box 999
Richland, Washington 99352

Dear Mr. Kluse:

This letter responds to Pacific Northwest National Laboratory's (PNNL) September 8, 2009, request for an exemption from provisions contained in title 10, Code of Federal Regulations, part 835 (10 C.F.R. 835), appendix D, "Surface Contamination Values." The purpose of the exemption request is to permit PNNL to use revised values when identifying the need for posting of contamination and high contamination areas in accordance with section 835.603 (e) and (f) 1101 and 1102 and identifying the need for surface contamination monitoring and control. The revised values are for hard-to-detect radionuclides. The Office of Science and the Department of Energy's Richland Operations Office concur with the request.

The Office of Worker Safety and Health Policy, within the Office of Health, Safety and Security, conducted a technical review (enclosure 1) of the exemption request. Based on review of the information provided, I am granting PNNL an exemption, with two conditions, from the applicable provisions of 10 C.F.R. 835.

The technical review provides additional information concerning the Exemption Decision (enclosure 2).

Sincerely,

Glenn S. Podonsky
Chief Health, Safety and Security Officer
Office of Health, Safety and Security

Enclosures

cc w/enclosures:
See attached list.

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Enclosure 1

Technical Review

Pacific Northwest National Laboratory
Title 10, Code of Federal Regulations, Part 835
Exemption Request

On September 8, 2009, Pacific Northwest National Laboratory (PNNL) submitted a request for relief from certain requirements contained in title 10, Code of Federal Regulations, part 835 (10 C.F.R. 835), "Occupational Radiation Protection," as they pertain to values used for identifying the need for posting of contamination and high contamination areas for hard-to-detect radionuclides.

As discussed below, relief from the provision of 10 C.F.R. 835 is justified. The Department of Energy's (DOE) Office of Worker Safety and Health Policy recommends granting the requested exemption to 10 C.F.R. 835 requirements, with conditions, as specifically discussed in this technical review.

Discussion of Exemption Request

General

In particular, PNNL requested an exemption from the requirement contained in 10 C.F.R. 835, appendix D, to use the values in the appendix for identifying the need for posting of contamination and high contamination areas and identifying the need for surface contamination monitoring and control. PNNL proposed alternate values for hard-to-detect radionuclides.

Requirement from which Exemption is Sought

Appendix D to Part 835--SURFACE CONTAMINATION VALUES

The data presented in appendix D are to be used in identifying and posting contamination and high contamination areas in accordance with section 835.603(e) and (f) and identifying the need for surface contamination monitoring and control in accordance with section 835.1101 and 1102.

Table 1. 10 C.F.R. 835 Surface Contamination Values[1] in dpm/100 cm^2

Radionuclide	Removable [2,4]	Total (Fixed + Removable)[2,3]
U-nat, U-235, U-238, and associated decay products	1,000[7]	5,000[7]
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1,000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[5]	1,000	5,000
Tritium and STCs [6]	10,000	See Footnote 6

[1] The values in this appendix, with the exception noted in footnote 6 below, apply to radioactive contamination deposited on, but not incorporated into the interior or matrix of, the contaminated item. Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides apply independently.

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

[3] The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm^2 is less than three times the value specified. For purposes of averaging, any square meter of surface shall be considered to be above the surface contamination value if: (1) from measurements of a representative number of sections it is determined that the average contamination level exceeds the applicable value; or (2) it is determined that the sum of the activity of all isolated spots or particles in any 100 cm^2 area exceeds three times the applicable value.

[4] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. (Note: The use of dry material may not be appropriate for tritium.) When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area shall be based on the actual area and the entire surface shall be wiped. It is not necessary to use swiping 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.

[5] This 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.

[6] Tritium contamination may diffuse into the volume or matrix of materials. Evaluation of surface contamination shall consider the extent to which such contamination may migrate to the surface in order to ensure the surface contamination value provided in this appendix is not exceeded. Once this contamination migrates to the surface, it may be removable, not fixed; therefore, a "Total" value does not apply. In certain cases, a "Total" value of 10,000 dpm/100 cm^2 may be applicable either to metals of the types from which insoluble special tritium compounds are formed, that have been exposed to tritium, or to bulk materials to which insoluble special tritium compound particles are fixed to a surface.

[7] These limits apply only to the alpha emitters within the respective decay series.

Results of Analysis

Discussion

In its September 8, 2009, exemption request, PNNL states that the exemption is required to support the environmental cleanup and decommissioning of its facilities. The DOE Chief, Health, Safety and Security Officer granted identical exemptions to three major contractors at the Hanford Site: Fluor Hanford (FH), CH2MHill Plateau Remediation Company (CHPRC), and Washington Closure Hanford (WCH). They claim that the exemption is needed to allow for consistency among the Hanford Site contractors' radiological control programs. PNNL provides laboratory equipment and contamination evaluation for the other sites.

The proposed surface contamination values would result in individual doses less than 1 mrem in a year and a 30-year collective dose of less than 10 person-rem. The provisions of 10 C.F.R. 835 do not apply to the uncontrolled release of materials and equipment. The radiological criteria in DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE O 5400.5), establishes the limits for uncontrolled release of materials and equipment. PNNL submitted an authorized limit request, "Request for Authorized Limits for Select Radionuclides," to the DOE Richland Operations Office. On September 24, 2009, the request was approved by DOE. Granting the PNNL 10 C.F.R. 835 exemption request would make PNNL's 10 C.F.R. 835 surface contamination values consistent with its DOE O 5400.5 authorized limit.

PNNL proposes to revise 10 C.F.R. 835, appendix D, to make it consistent with its DOE O 5400.5 authorized limit, by inserting an additional row (bolded below).

Table 2. PNNL Proposed Surface Contamination Values[1] in dpm/100 cm^2

Radionuclide	Removable [2,4]	Total (Fixed + Removable)[2,3]
U-nat, U-235, U-238, and associated decay products	1,000[7]	5,000[7]
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1,000
C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, Eu-155	**10,000**	**50,000**
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[5]	1,000	5,000
Tritium and STCs [6]	10,000	See Footnote 6

PNNL's exemption request states that the exemption request meets several of the special circumstances for granting exemptions to DOE's nuclear safety rules specified in 10 C.F.R. 820, "Procedural Rules for DOE Nuclear Activities." Specifically, PNNL states that the application of the criteria would result in resource impacts, which are not justified by the safety improvements. In support of this statement PNNL noted that the proposed surface contamination values would result in individual doses to workers or any member of the public of less than 1 mrem per year. Implementation of the existing surface contamination values requires significant modification to field survey techniques, which would result in substantial increases in labor costs. PNNL estimates that use of the proposed surface contamination values would result in a cost savings and/or cost avoidance of approximately $561,200 per year.

The requested surface contamination values are more conservative (i.e., lower) than the derived screening limits and primary dose criterion established in American National Standard "Surface and Volume Radioactivity Standards for Clearance" (ANSI/HPS N13.12-1999). Table 1 of ANSI/HPS N13.12 lists a surface contamination value of 600,000 dpm/100 cm^2 for the following hard-to-detect radionuclides specified in the PNNL exemption request; C-14, Fe-55, Ni-63, and Tc-99. The following radionuclides: Ni-59, Se-79, Pd-107, and Eu-155, which are specified in the PNNL exemption request, are not listed in Table 1 of ANSI/HPS N13.12. A footnote to Table 1 of ANSI/HPS N13.12 refers the user to use effective dose factors from National Council on Radiation Protection and Measurements Report No 123, "Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground" (NCRP Report 123), in determining an appropriate surface contamination value. The exemption request states that PNNL determined that Ni-59, Se-79, Pd-107, and Eu-155 should be grouped with radionuclides having a surface contamination value of 600,000 dpm/100 cm^2. FH, CHPRC, and WCH had made the same determination in their exemption requests.

In reviewing the FH, CHPRC, and WCH exemption requests, the Office of Worker Safety and Health Policy agreed that the exemption request grouping of radionuclides was consistent with ANSI/HPS N13.12.

The values requested in the PNNL exemption request (10,000 dpm/100 cm^2 removable and 50,000 dpm/100 cm^2 total) are approximately 10 to 50 times lower than those in Table 1 of ANSI/HPS N13.12. The primary dose criterion in ANSI/HPS N13.12 is to limit the dose to an average member of a critical group to 1.0 mrem/yr. By comparison DOE's occupational exposure limit for general employees is 5000 mrem/yr.

As previously stated, 10 C.F.R. 820.62(d)(2) provides for granting exemptions if application of the requirements in the particular circumstances would not serve, or is not necessary, to achieve its underlying purpose or would result in resource impacts, which are not justified by the safety improvements. The Office of Worker Safety and Health Policy agreed with PNNL's assertion that it met the criterion in 10 C.F.R. 820.62(d)(2) for the following reasons: (1) PNNL has already been granted an authorized limit consistent with the values specified in the exemption request; (2) the magnitude of the projected occupational doses associated with granting the exemption; (3) FH, CHPRC, and WCH has already been granted the same exemption as that requested by PNNL and (4) the cost savings and/or cost avoidance of approximately $561,200 per year.

Concurrence

Relief from the requirement in 10 C.F.R. 835, appendix D, should be provided with two conditions. This decision recognizes the fact that the application of the requirements in the particular circumstances would not serve, or is not necessary, to achieve its underlying purpose or would result in resource impacts, which are not justified by the safety improvements.

Conclusion

The above exemption meets the criteria for granting an exemption under 10 C.F.R. 820.62, with conditions:

1. Granting this exemption would be authorized by law.

2. This exemption would not present an undue risk to public health and safety, the environment, or facility workers.

3. The exemption would be consistent with the safe operation of a DOE nuclear facility.

4. In granting this exemption pursuant to 10 C.F.R. 820.62(d)(2), DOE recognizes that special circumstances exist that justify exemption because application of the requirements in the particular circumstances would not serve, or is not necessary, to achieve its underlying purpose or would result in resource impacts that are not justified by the safety improvements.

Conditions

Based on the above, the Office of Worker Safety and Health Policy concurs with the request for exemption with the conditions that:

1. PNNL use the surface contamination values shown in table 1 of the Exemption Decision in place of those in 10 C.F.R. 835, appendix D, in all provisions and definitions of 10 C.F.R. 835 where appendix D is cited.

2. PNNL updates its radiation protection program to reflect the revised surface contamination values for C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, and Eu-155 as shown in Table 2 of this technical review.

Enclosure 2

EXEMPTION DECISION

Pursuant to title 10, Code of Federal Regulations, section 820.61 (10 C.F.R. 820.61), the Chief Health, Safety and Security Officer is authorized to exercise authority on behalf of the Department of Energy (DOE) with respect to requests for exemptions from nuclear safety rules relating to radiological protection of workers, the public, and the environment.

On September 8, 2009, Pacific Northwest National Laboratory (PNNL) requested exemption from certain DOE regulations contained in 10 C.F.R. 835, "Occupational Radiation Protection," as they pertain to surface contamination values.

In particular, PNNL requested an exemption from requirements contained in 10 C.F.R. 835.602(e), (f), 835.1101, and 835.1102 as they relate to the application of the surface contamination values found in appendix D of the regulation, and to allow use of alternate quantities for identifying the need for posting of contamination and high contamination areas and identifying the need for surface contamination monitoring and control. The alternate quantities are for hard-to-detect radionuclides.

Under the terms set forth in 10 C.F.R. 820.61, I am granted the review and approval authority for exemption requests made with respect to 10 C.F.R. 835 provisions relating to radiological protection of workers, the public, and the environment. Based on a review of the supporting documentation, I find that the request set forth above has been justified for relief. Specifically, I find that the exemption criteria of 10 C.F.R. 820.62 have been met. The requested exemption is not prohibited by law; will not present an undue risk to the public health and safety, the environment, or facility workers; and is consistent with the safe operation of a DOE nuclear facility. In addition, I have determined that the exemption meets the special circumstances described in the technical review prepared by the Office of Worker Safety and Health Policy, which constitute a sufficient basis upon which to grant this exemption with two conditions.

On the basis of the foregoing, I hereby approve PNNL's request for exemption from 10 C.F.R. appendix D, with two conditions:

Conditions:

1. PNNL shall use the surface contamination values shown in Table 1 of this Exemption Decision in place of those in 10 C.F.R. 835, appendix D, in all provisions and definitions of 10 C.F.R. 835 where appendix D is cited.

2. PNNL shall update its radiation protection program to reflect the revised surface contamination values for C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, and Eu-155 as shown in the following table.

Pursuant to 10 C.F.R. 820.66, PNNL has 15 days from the date of the filing of this decision to file a Request to Review with this office. The Request to Review shall state, specifically, the respects in which the exemption determination is claimed to be erroneous, the grounds of the request, and the relief requested. If no Request to Review is submitted, the Exemption Decision becomes a Final Order 15 days after it is filed.

12/16/01
Date

Glenn S. Podonsky
Chief Health, Safety and Security Officer
Office of Health, Safety and Security

Table 1. Pacific Northwest National Laboratory. Revised Surface Contamination Values[1] in dpm/100 cm^2

Radionuclide	Removable [2,4]	Total (Fixed + Removable)[2,3]
U-nat, U-235, U-238, and associated decay products	1,000[7]	5,000[7]
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1,000
C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, Eu-155	**10,000**	**50,000**
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[5]	1,000	5,000
Tritium and STCs [6]	10,000	See Footnote 6

[1] The values in this appendix, with the exception noted in footnote 6 below, apply to radioactive contamination deposited on, but not incorporated into the interior or matrix of, the contaminated item. Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides apply independently.

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

[3] The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm^2 is less than three times the value specified. For purposes of averaging, any square meter of surface shall be considered to be above the surface contamination value if: (1) from measurements of a representative number of sections it is determined that the average contamination level exceeds the applicable value; or (2) it is determined that the sum of the activity of all isolated spots or particles in any 100 cm^2 area exceeds three times the applicable value.

[4] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. (Note - The use of dry material may not be appropriate for tritium.) When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area shall be based on the actual area and the entire surface shall be wiped. It is not necessary to use swiping 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.

[5] This 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.

[6] Tritium contamination may diffuse into the volume or matrix of materials. Evaluation of surface contamination shall consider the extent to which such contamination may migrate to the surface in order to ensure the surface contamination value provided in this appendix is not exceeded. Once this contamination migrates to the surface, it may be removable, not fixed; therefore, a "Total" value does not apply. In certain cases, a "Total" value of 10,000 dpm/100 cm^2 may be applicable either to metals of the types from which insoluble special tritium compounds are formed, that have been exposed to tritium, or to bulk materials to which insoluble special tritium compound particles are fixed to a surface.

[7] These limits apply only to the alpha emitters within the respective decay series.