



Department of Energy
Washington, DC 20585

September 26, 2008

Mr. S. L. Feaster
Manager, Contracts
Washington Closure Hanford
2620 Fermi Avenue
Richland, Washington 99354

Dear Mr. Feaster:

Thank you for your May 6, 2008, request for an exemption from provisions contained in title 10, Code of Federal Regulations, part 835 (10 C.F.R. 835), "Occupational Radiation Protection." The purpose of the exemption request is to permit Washington Closure Hanford (WCH) to use revised values for identifying the need for posting of contamination and high contamination areas and identifying the need for surface contamination monitoring and control. The revised values are for hard-to-detect radionuclides. The Office of Environmental Management (EM) and the Department of Energy's (DOE) Richland Operations Office (RL) 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 that was provided, we are granting WCH an exemption, with two conditions, from the applicable provisions of 10 C.F.R. part 835.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn S. Podonsky".

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

Enclosures

cc w/enclosures:
Radiological Control
Coordinating Committee
Price Anderson Amendments
Act Coordinator - RL
James Rispoli, EM-1
David Hill, GC-1
Docketing Clerk, HS-40

Technical Review

**Washington Closure Hanford
Title 10, Code of Federal Regulations, Part 835
Exemption Request**

On May 6, 2008, Washington Closure Hanford (WCH) 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 the 10 C.F.R. 835 requirements, with conditions, as specifically discussed in this technical review.

Discussion of Exemption Request

General

In particular, WCH 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. WCH 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 § 835.603(e) and (f) and identifying the need for surface contamination monitoring and control in accordance with § 835.1101 and 1102.

Table 1. 10 C.F.R. 835 Surface Contamination Values¹ in dpm/100 cm²

Radionuclide	Removable ^{2,4}	Total (Fixed + Removable) ^{2,3}
U-nat, U-235, U-238, and associated decay products	⁷ 1,000	⁷ 5,000
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 cm² 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 cm² area exceeds three times the applicable value.

⁴ The amount of removable radioactive material per 100 cm² 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 cm² 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 cm² 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 May, 6, 2008, exemption request, WCH states that the exemption is required to support the decommissioning of Hanford facilities. 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 to workers or members of the public. 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. On August 22, 2006, WCH submitted an authorized limit request, "Request for Authorized Limit of Hard-to-Detect Radionuclides – Categories, Percentages, and Estimated Cost of Materials Released from Radiological Controls," to the DOE Richland Operations Office (RL). On May 14, 2007, the request was subsequently approved by DOE. In its 10 C.F.R. 835 exemption requests, WCH notes that granting the 10 C.F.R. 835 exemption request would make its 10 C.F.R. 835 surface contamination values consistent with its DOE O 5400.5 authorized limit.

WCH 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. WCH Proposed Surface Contamination Values¹ in dpm/100 cm²

Radionuclide	Removable ^{2,4}	Total (Fixed + Removable) ^{2,3}
U-nat, U-235, U-238, and associated decay products	⁷ 1,000	⁷ 5,000
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.

WCH'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, WCH 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, WCH 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. WCH estimates that use of the proposed surface contamination values would result in a cost savings and/or cost avoidance of approximately \$980,000 per year.

The extended time requirements for conducting surveys to meet existing surface contamination values would also result in extended exposure to other radionuclides of significant dose consequence, such as Co-60.

The exemption request also notes that the proposed surface contamination values are consistent with 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 cm² for the following hard-to-detect radionuclides specified in the WCH exemption request; C-14, Fe-55, Ni-63, and Tc-99. Ni-59, Se-79, Pd-107, and Eu-155, which are specified in the WCH 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 the National Council on Radiation Protection and Measurements Report Number 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 WCH 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 cm².

The Office of Worker Safety and Health Policy staff evaluated the effective dose factors from NCRP Report 123 for all the radionuclides having an ANSI/HPS N13.12 surface contamination value of 600,000 dpm/100 cm² and for Ni-59, Se-79, Pd-107, and Eu-155 to determine if they would typically be grouped together.

The following table summarizes a comparison of effective dose factors from ANSI/HPS N13.12 and those specified in the WCH exemption request.

Table 3. NCRP Report 123 Effective Dose Factors

Radionuclide	Inhalation Dose Sv/Bq	Ingestion Dose Sv/Bq	Included in WCH Exemption Request	ANSI/HPS N13.12 Surface Contamination Value dpm/100 cm ²
H-3	1.7E-11	1.7E-11	no	600,000
P-32	4.2E-9	2.5E-9	no	600,000
S-35	6.8E-10	2.8E-10	no	600,000
Ca-45	1.8E-9	8.6E-10	no	600,000
Cr-51	9.4E-11	4.5E-11	no	600,000
Sr-89	1.2E-8	3.6E-9	no	600,000
In-111	2.3E-10	3.7E-10	no	600,000
I-125	1.1E-8	1.7E-8	no	600,000
Pm-147	1.0E-8	4.0E-10	no	600,000
C-14	5.6E-10	5.6E-10	yes	600,000
Fe-55	6.3E-10	1.5E-10	yes	600,000
Ni-63	1.7E-9	1.9E-10	yes	600,000
Tc-99	2.4E-9	6.6E-10	yes	600,000
Ni-59	7.2E-10	6.5E-11	yes	Not Specified
Se-79	1.9E-9	1.6E-9	yes	Not Specified
Pd-107	3.5E-9	5.8E-11	yes	Not Specified
Eu-155	7.6E-9	5E-10	yes	Not Specified

Table 4. Comparison of Effective Dose Factors

Radionuclides	Average Inhalation Dose (+/- σ) Sv/Bq	Average Ingestion Dose (+/- σ) Sv/Bq
Those included in ANSI/HPS N13.12	3.5 (+/- 4.4) E-9	2.0 (+/- 0.4) E-9
Those not included in ANSI/HPS N13.12	3.4 (+/- 3.0) E-9	5.6 (+/- .7) E-10

As shown in Table 3, the inhalation effective dose factors for those radionuclides listed in ANSI/HPS N13.12 range from 1.7E-11 to 1.2E-8. Ni-59, Se-79, Pd-107, and Eu-155 all have inhalation effective dose factors within this range. Comparably, the ingestion effective dose factors for those radionuclides listed in ANSI/HPS N13.12 range from 1.7E-11 to 1.7E-8. Again, the four radionuclides specified in the WCH exemption request and not listed in Table 1 of ANSI/HPS N13.12 all have inhalation effective dose factors within this range. Table 4 summarizes the average effective dose factors (and their standard deviations) for both those listed in Table 1 of ANSI/HPS N13.12 and those not listed. For the inhalation pathway, the average effective dose factors were essentially identical; and for the ingestion pathway, the average effective dose factor was approximately a factor of four lower for those radionuclides not listed in Table 1 of ANSI/HPS N13.12. The grouping of radionuclides with lower effective dose factors with those with higher effective dose factors would be conservative or protective of the worker; i.e., it would tend to overestimate radiation doses.

From the above comparison, the Office of Worker Safety and Health Policy concluded that the exemption request grouping of radionuclides was consistent with ANSI/HPS N13.12.

The values requested in the WCH exemption request (10,000 dpm/100 cm² removable and 50,000 dpm/100 cm² 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.

The 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 WCH's assertion that it met the criterion in 10 C.F.R. 820.62(d)(2) for the following reasons: (1) WCH 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; and (3) the cost savings and/or cost avoidance of approximately \$980,000 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; and
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. WCH uses the surface contamination values shown in Table 2 of this technical review 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. WCH 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.

EXEMPTION DECISION

Pursuant to title 10, Code of Federal Regulations, Sec. 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 May 6, 2008, Washington Closure Hanford (WCH), the prime contractor for the Hanford River Corridor Closure Contract (RCCC), 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, WCH requested an exemption from requirements contained in 10 C.F.R. §§ 835.603(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. Specifically, 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.

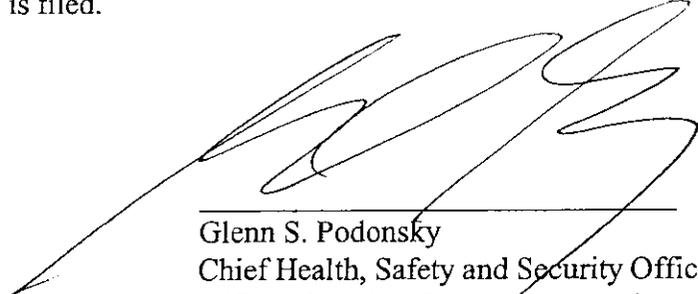
On the basis of the foregoing, I hereby approve WCH's request for exemption from 10 C.F.R. 835, appendix D, with two conditions:

Conditions:

1. WCH 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. WCH 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 Table 1 of this Exemption Decision.

Pursuant to 10 CFR 820.66, WCH has 15 days from the date of the filing of this decision to file a Request to Review with the Secretary of Energy. 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, pursuant to 10 C.F.R. § 835.20.67, the Exemption Decision becomes a Final Order 15 days after it is filed.

9-26
Date



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

Table 1. WCH Revised Surface Contamination Values¹ in dpm/100 cm²

Radionuclide	Removable ^{2,4}	Total (Fixed + Removable) ^{2,3}
U-nat, U-235, U-238, and associated decay products	⁷ 1,000	⁷ 5,000
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 cm² 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 cm² area exceeds three times the applicable value.

⁴ The amount of removable radioactive material per 100 cm² 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 cm² 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 cm² 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.