Department of Energy
Washington, DC 20585

January 9, 2013

Mr. Cameron Andersen
Director
Environment, Health, Safety and Security
Pacific Northwest National Laboratory
902 Battelle Boulevard
P.O. Box 999, MSIN K9-16
Richland, Washington 99352

Dear Mr. Andersen:

This letter responds to your August 16, 2012, request for exemption for relief from specified requirements contained in title 10, Code of Federal Regulations, part 835 (10 C.F.R. 835), *Occupational Radiation Protection*, as they pertain to total and removable surface contamination values for Plutonium-241.

On November 27, 2012, the Office of Science forwarded your request to the Office of Health, Safety and Security (HSS) recommending approval.

The Office of Worker Safety and Health Policy conducted a technical review (enclosure 1) of the exemption request. Based on review of the information that was provided, I am granting Pacific Northwest National Laboratory an exemption, with conditions, from the applicable provisions of 10 C.F.R. 835.

The technical review provides additional information concerning the Exemption Decision (enclosure 2). Please contact Mr. Peter O'Connell, HSS Office of Worker Safety and Health Policy, at 301-903-5641 with any questions concerning this exemption.

Sincerely,

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

Enclosures

cc w/enclosures:
See attached list.

Courtesy Copy Distribution List for Granting Pacific Northwest National Laboratory the Enclosed Exemption, with a Condition, from Applicable Provisions of Title 10, Code of Federal Regulations, Part 835

Radiological Control Coordinating Committee
Price Anderson Amendments Act Coordinator – Pacific Northwest National Laboratory
William F. Brinkman, Office of Science (SC)
Joseph A. McBrearty, Office of Field Operations, SC
Roger E. Snyder, Pacific Northwest Site Office
Docketing Clerk, DOE/Office of Health, Safety and Security

Enclosure 1

Technical Review

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

On August 16, 2012, Pacific Northwest National Laboratory (PNNL) submitted a request for relief from specified requirements contained in title 10, Code of Federal Regulations, part 835 (10 C.F.R. 835), *Occupational Radiation Protection*, as they pertain to total and removable surface contamination values for Plutonium-241 (^{241}Pu).

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

Discussion of Exemption Request

General

In particular, PNNL requests a permanent exemption from certain requirements contained in 10 C.F.R. 835 pertaining to total and removable surface contamination values for ^{241}Pu.

Applicable Requirements

§ 835.2 Definitions.

(a) As used in this part:

Contamination area means any area, accessible to individuals, where removable surface contamination levels exceed or are likely to exceed the removable surface contamination values specified in appendix D of this part, but do not exceed 100 times those values.

High contamination area means any area, accessible to individuals, where removable surface contamination levels exceed or are likely to exceed 100 times the removable surface contamination values specified in appendix D of this part.

Subpart L - Radioactive Contamination Control

§ 835.1101 Control of material and equipment.

(a) Except as provided in paragraphs (b) and (c) of this section, material and equipment in contamination areas, high contamination areas, and airborne radioactivity areas shall not be released to a controlled area if:

(1) Removable surface contamination levels on accessible surfaces exceed the removable surface contamination values specified in appendix D of this part; or
(2) Prior use suggests that the removable surface contamination levels on inaccessible surfaces are likely to exceed the removable surface contamination values specified in appendix D of this part.

(b) Material and equipment exceeding the removable surface contamination values specified in appendix D of this part may be conditionally released for movement onsite from one radiological area for immediate placement in another radiological area only if appropriate monitoring is performed and appropriate controls for the movement are established and exercised.

(c) Material and equipment with fixed contamination levels that exceed the total surface contamination values specified in appendix D of this part may be released for use in controlled areas outside of radiological areas only under the following conditions:

(1) Removable surface contamination levels are below the removable surface contamination values specified in appendix D of this part; and
(2) The material or equipment is routinely monitored and clearly marked or labeled to alert personnel of the contaminated status.

§ 835.1102 Control of areas.

(a) Appropriate controls shall be maintained and verified that prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions.

(b) Any area in which contamination levels exceed the values specified in appendix D of this part shall be controlled in a manner commensurate with the physical and chemical characteristics of the contaminant, the radionuclides present, and the fixed and removable surface contamination levels.

(c) Areas accessible to individuals where the measured total surface contamination levels exceed, but the removable surface contamination levels are less than, corresponding surface contamination values specified in appendix D of this part, shall be controlled as follows when located outside of radiological areas:

(1) The area shall be routinely monitored to ensure the removable surface contamination level remains below the removable surface contamination values specified in appendix D of this part; and

(2) The area shall be conspicuously marked to warn individuals of the contaminated status.

(d) Individuals exiting contamination, high contamination, or airborne radioactivity areas shall be monitored, as appropriate, for the presence of surface contamination.

(e) Protective clothing shall be required for entry to areas in which removable contamination exists at levels exceeding the removable surface contamination values specified in appendix D of this part.

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.

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	[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 1square 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

PNNL requests exemption from part of 10 C.F.R. 835, appendix D, to allow use of beta-gamma emitter surface contamination values for ^{241}Pu, by inserting an additional footnote to its 10 C.F.R. 835 Radiation Protection Program:

Transuranics[9], Ra-226, Ra-228, Th-230,
Th-228, Pa-231, Ac-227, I-125, I-129

[9] Transuranics as used in this row apply to transuranic radionuclides excluding ^{241}Pu. ^{241}Pu shall be evaluated using the beta-gamma emitters limits.

> Note: PNNL's radiation protection program already includes a footnote 8 related to an Exemption Decision allowing use of different values for hard to detect nuclides.

PNNL's exemption request states that the exemption request would be authorized by law, would not present an undue risk to public health and safety, the environment, or facility workers, and would be consistent with the safe operation of a DOE nuclear facility. The exemption request also provides justification supporting these assertions, including that any increase in personnel dose would be far less than 1 mrem/year. This value is consistent with DOE Orders and national and international consensus standards, such as DOE Order 458.1, *Radiation Protection of the Public and the Environment,* American National Standards Institute N13.12, Surface *and Volume Radioactivity Standards for Clearance,* and International Atomic Energy Agency guidance documents.

PNNL's exemption request states that it meets one of the special circumstances for granting exemptions to DOE's nuclear safety rules specified in title 10, Code of Federal Regulations, part 820, *Procedural Rules for DOE Nuclear Activities* (10 C.F.R. 820). Specifically, PNNL states that the application of the criteria is not necessary to achieve the requirement's purpose and

would result in resource impacts, which are not justified by the safety improvements. In support of this statement, PNNL noted that ^{241}Pu is a hard to detect radionuclide and is undetectable with typical field instruments at the transuranic residual surface contamination limits specified in 10 C.F.R. 835, appendix D, and monitoring at the current values would "significantly increase the cost of operations and delay work activities."

PNNL's evaluation of the economic impact of applying the transuranic surface contamination values for ^{241}Pu without relief would result in costs of approximately $1.2 million with no benefit from the associated cost.

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 458.1 establish the limits for uncontrolled release of materials and equipment. In order to gain practical economic relief from use of the transuranic surface contamination values for ^{241}Pu, relief from the applicable requirements in DOE Order 458.1 is necessary. Accordingly, PNNL submitted an authorized limit request, *Request for Authorized Limits for Select Radionuclides,* to the DOE Pacific Northwest Site Office (PNSO) on July 18, 2012, requesting to use the same values as requested in the 10 C.F.R. 835 exemption request.

On September 27, 2012, PNSO, with the concurrence of the Director, Office of Science, forwarded the authorized limit request to the Chief Health, Safety and Security Officer (HS-1) recommending approval. The authorized limit request is currently being evaluated.

Accordingly, the Office of Worker Safety and Health Policy recommends that the 10 C.F.R. 835 Exemption Decision includes a condition that the exemption decision is to be concurrent with a DOE-approved authorized limit using the same values for ^{241}Pu.

Concurrence

Permanent relief from the specified requirements in 10 C.F.R. 835, with conditions, should be provided.

Conclusion

The above exemption meets the criteria for granting a permanent exemption under 10 C.F.R. 820.62:

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 §820.62(d)(2), DOE recognizes that special circumstances exist that justify permanent 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.

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

PNNL should update its radiation protection program to reflect the following changes:

1. The term "transuranics," as used in the PNNL radiation protection program, means any radionuclide with an atomic number greater than 92, excluding ^{241}Pu. For all 10 C.F.R. part 835 provisions related to appendix D, ^{241}Pu shall be evaluated using the beta-gamma emitters limits.

2. This Exemption Decision is contingent on PNNL receiving a DOE Authorized Limit for ^{241}Pu consistent with the 10 C.F.R. 835, appendix D, values for beta-gamma emitters.

PNNL may revise its radiation protection program to add a footnote to the "transuranic row" of appendix D: "Transuranics as used in this row apply to transuranic radionuclides excluding ^{241}Pu. ^{241}Pu shall be evaluated using the beta-gamma emitters limits."

The Exemption Decision applies to release of material and equipment to a controlled area. Release of material and equipment outside of a controlled area is beyond the scope of the Exemption Decision.

The Office of Worker Safety and Health Policy also recommends that the Exemption Decision state that, based on this and subsequent evaluation, DOE reserves the right to modify the conditions of this Exemption Decision.

Enclosure 2

EXEMPTION DECISION

Pursuant to title 10, Code of Federal Regulations, part 820.61 (10 C.F.R. 820.61), the Chief Health, Safety and Security Officer is authorized to exercise authority on behalf of the U.S. 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.

Under the terms set forth in 10 C.F.R. 820.61, on August 16, 2012, Pacific Northwest National Laboratory (PNNL) submitted a request for relief from specified requirements contained in title 10, Code of Federal Regulations, part 835 (10 C.F.R. 835), *Occupational Radiation Protection*, as they pertain to total and removable surface contamination values for Plutonium-241 (^{241}Pu).

Under the terms set forth in 10 C.F.R. 820.61, I am granting the review and approval authority for exemption requests made with respect to 10 C.F.R. 835. 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. Also, 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. 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 a condition.

On the basis of the foregoing, I hereby issue the permanent Exemption Decision for PNNL from the 10 C.F.R. 835 provision listed with the following conditions.

Conditions:

1. PNNL shall update its radiation protection program to reflect the changes in the following provision:

   § 835.2 Definitions.

   (a) As used by the PNNL radiation protection program:

   Transuranics, as used in this Exemption Decision, means any radionuclide with an atomic number greater than 92, excluding ^{241}Pu. For all 10 C.F.R. 835 provisions related to appendix D, ^{241}Pu shall be evaluated using the beta-gamma emitters limits.

2. This Exemption Decision is contingent on PNNL receiving a DOE Authorized Limit for ^{241}Pu consistent with the 10 C.F.R. 835, appendix D, values for beta-gamma emitters.

PNNL may revise its radiation protection program to add a footnote to the "transuranic row" of appendix D: "Transuranics as used in this row apply to transuranic radionuclides excluding ^{241}Pu. ^{241}Pu shall be evaluated using the beta-gamma emitters limits."

This Exemption Decision applies to release of material and equipment to a controlled area. Release of material and equipment outside of a controlled area is beyond the scope of this Exemption Decision.

As always, based on this and subsequent evaluations, DOE reserves the right to modify the conditions of this Exemption Decision upon notice to PNNL. As such, DOE reserves the right to perform periodic inspections of activities covered by the scope of this Exemption Decision.

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 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, the Exemption Decision becomes a Final Order 15 days after it is filed.

1/9/13
Date

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