GENERAL ATOMICS

38/67- 4706
December 18, 2015

Marlayna G. Vaaler, Project Manager
Reactor Decommissioning Branch
Division of Decommissioning, Uranium Recovery, and Waste Programs
Office of Nuclear Material Safety and Safeguards

Docket Nos: 050-00089 and 050-00163 (R-38 and R-67, respectively)

Subject: Request for Approval of Release Criteria for General Atomics TRIGA Reactor Facility

Dear Ms. Vaaler,

As you are aware, General Atomics (GA) has been conducting activities in furtherance of the decontamination and decommissioning its TRIGA® Reactor Facility where GA's Mark I and Mark F non-power research reactors, R-38 and R-67 respectively, are located on GA's site.

GA is now in the process of obtaining information about the extent and level of activation in the structural concrete comprising the biological shield, reactor pool and fuel storage canals associated with its reactors. In addition, GA is also acquiring information with regard to whether the soil beyond (outside) the biological shield has been activated and/or contaminated; and, if so, to what extent and to what levels.

In planning for the final stages of decommissioning, it is important to know what levels of residual activity (for each individual nuclide of interest) are acceptable to the U.S. Nuclear Regulatory Commission (NRC) for release of GA's TRIGA® Reactor Facility (including the associated land area) to unrestricted use. Those levels (i.e., release criteria) are the primary factors in determining the volume of concrete that will need to be removed from the reactor structure and the amount of contaminated or activated soil that may need to be excavated. That information will, in turn, drive the scope of the decontamination efforts, including the extent of building demolition required, the volume of low-level waste that must be packaged and shipped off-site for disposal, numerous and various other associated D&D costs, and the schedule for completing the decommissioning of GA's TRIGA® Reactor Facility.

Historically, GA has obtained the release of its facilities and land areas to unrestricted use based upon meeting clear release criteria provided in NRC-approved decommissioning plans. Examples include GA's Hot Cell Decommissioning Plan (Ref. 1) and the General Atomics' Site Decommissioning Plan (Ref 2). Both of these plans contain tables with soil and concrete rubble release criteria (in pCi/g) for specific individual radionuclides of interest. In particular, see the Attachment to this letter which was taken from Section 6.2.1 "Release Criteria" of Section 6.2 "Soil Sampling Plan" of Reference 2.

With only one exception, the above NRC-approved plans and the consistent set of release criteria contained therein (e.g., Attachment) have been the basis for the release to unrestricted use of every building (~35) and all land areas comprising GA's original site (~415 acres). The only exception being GA's TRIGA® Reactor Facility (and associated licensed land area) located in the middle of its site.

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Unfortunately, GA's NRC-approved TRIGA® Reactor Facility Decommissioning Plan (July 1999) does not contain a table of isotope specific release criteria applicable to activated concrete in the reactor pit configuration or to activated or contaminated soil (for example the soil behind the biological shield). Rather the criteria are expressed as acceptable surface contamination levels (floors and walls) and exposure rates in uR/hr at one meter above the surface.

Consequently, GA is hereby requesting that the isotope specific release criteria (e.g., in pCi/gm) previously approved by the NRC for the release of facilities and land areas comprising GA's site (e.g., those criteria contained in Reference 2) be approved for use in obtaining the release of its TRIGA® Reactor Facility (including land areas within the TRIGA licensed boundary); e.g., by incorporating those criteria by reference into GA's TRIGA Reactor Facility Decommissioning Plan.

If you have questions or desire additional information regarding this request, please contact me at keith.asmussen@ga.com or (858) 455-2823, or Paul Pater at paul.pater@ga.com or (858) 455-2758.

Very truly yours,

Keith E. Asmussen

Keith E. Asmussen, Ph.D., Director
Licensing, Safety and Nuclear Compliance

References: 1) "General Atomics Hot Cell Facility Decommissionng Plan," dated November 1995; Approved by NRC on May 1, 1996 ; additional supplemental information dated November 20 and 30, and December 18, 1995 approved by NRC letter dated January 29, 1997.

2) "General Atomics' Site Decommissioning Plan," September 1996, revised December 1996, Revised April 1997 and Revised January 1998. Approved by NRC per SNM-696 License Amendment No. 45 dated April 29, 1998

Attachment: Table 6-2 "Soil and Concrete/Asphalt Rubble Release Criteria" taken from General Atomics' Site Decommissioning Plan (Taken from Section 6 of Ref. 2 of this letter)

Table 6-2—Soil and Concrete/Asphalt Rubble Release Criteria[1]

Isotope	Release Criteria Based upon External Exposure Limitations (pCi/g)	Release Criteria Based upon Internal Exposure Limitations (pCi/g)
^{60}Co	8[2]	
^{134}Cs	10	
^{137}Cs	15[2]	
^{152}Eu	11	
^{154}Eu	10	
^{155}Eu	635	
^{94}Nb	7.5	
^{125}Sb	37	
^{90}Sr		1800[2]
^{238}Pu		26[4]
^{239}Pu		27[4]
^{240}Pu		27[4]
^{241}Pu		4326[4]
^{242}Pu		28[4]
^{244}Pu		28[4]
^{241}Am		25[4]
Natural Uranium		10[3]
Depleted Uranium		35[3]
Enriched Uranium (^{234}U & ^{235}U)[5]		30[3]
Thorium (^{232}Th & ^{228}Th)		10[3]

[1] The release criteria shown in this table without annotation by footnotes 2, 3, or 4 were calculated by the licensee using RESRAD version 5.18 adhering to the same assumptions that were provided in the correspondence listed in note 2, below. This corresponds to conservative calculation of the homogenous concentration of an isotope in the soil that by itself would give approximately 10 μR/hr external exposure rate above background for the maximum year of exposure. It is the licensee's intent to apply criteria from this table to concrete, asphalt, or similar construction media materials that have been ground to a coarse rubble. These criteria were approved by the NRC for the Hot Cell Decommissioning project by letter dated May 1, 1996, Robert C. Pierson to K. E. Asmussen.

[2] These release criteria are based upon past precedent through NRC and State of California approved release limits for the GA site. See Correspondence K. E. Asmussen to W. T. Crow, dated October 1, 1985, correspondence identification 696-8023, Subject: "Docket 70-734: Plan for Obtaining Release of Certain Areas to Unrestricted Use."

[3] These release criteria are based upon past precedent established by NRC through NRC Policy Issue SECY-81-576, dated October 5, 1981, Subject: "Disposal or on-site storage of residual thorium or uranium (either as natural ores or without daughters present) from past operations."

[4] Numbers were established using the most limiting of lung dose (20 mrem/yr) or bone dose (60 mrem/yr) using Dose Conversion Factors from NUREG/CR-0150, Volume 2, with an alpha quality factor of 20, where applicable, lung mass of 580 grams, and AMAD of 1.0.

[5] For enriched uranium, GA shall determine the U-234:U-235 ratio by uranium isotopic analysis and then use gamma spectroscopy results of U-235 to demonstrate compliance with the release criteria for enriched uranium.