

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

Response to U. S. Nuclear Regulatory Commission Demand for Information

(A) Explain how you ensure compliance with the NRC requirements applying to the possession, transfer, and disposal of tritium exit signs you have acquired. Identify and provide contact information for the individual you have appointed who is responsible for ensuring day-to-day compliance with these requirements.

The National Aeronautics and Space Administration (NASA) consists of 13 geographically separate centers and facilities across the United States, and Headquarters located in Washington, DC. The NASA Office of the Chief Health and Medical Officer (OCHMO), Occupational Health division establishes and promulgates radiological health policy for individual site implementation via NASA Procedural Requirements (NPR) 1800.1B, *NASA Occupational Health Program Procedures*. The intent of the Radiological Health requirements is to exercise centralized control over the procurement, use, storage, transportation, and disposition of ionizing and nonionizing radiation sources in order to limit the exposure of personnel, facilities, and the environment to levels of radiation that are As Low As Reasonably Achievable (ALARA). The goals of the program are to protect the health of the public, astronauts and pilots, NASA workforce and high value property and equipment so that NASA's mission may be effectively met; and to administer a program that is in compliance with all applicable Federal, state, and local regulations.

Each NASA site establishes its own site-specific radiological health procedures in accordance NPR 1800.1B requirements and has appointed individuals, typically a Radiation Safety Officer (RSO), who ensures day-to-day compliance with radiological health requirements. Many of the designated individuals are NASA contractors and listed in Table 1.

Table 1.

NASA Site	Location	Responsible Individual	Phone
Ames Research Center	Mountain View, CA 94035	P. Muldoon	(650) 604-3979
Dryden Flight Research Center	Edwards, CA 93523	J. Piatt	(661) 276-7576
Jet Propulsion Laboratory	Pasadena, CA 91109	R. King	(818) 354-5811
White Sands Test Facility	Las Cruces, NM 88012	D. Waggett	(281) 483-7084
Johnson Space Center	Houston, TX 77058	D. Waggett	(281) 483-7084
Michoud Assembly Facility	New Orleans, LA 70189	F. Duncan	(504) 257-2539
Stennis Space Center	Stennis Space Center, MS 39529	J. Lindsey	(228) 688-2557
Marshall Space Flight Center	Huntsville, AL 35812	P. Brown	(256) 544-2390
Kennedy Space Center	Kennedy Space Center, FL 32899	R. Scott	(321) 867-6958
Langley Research Center	Hampton, VA 23681	K. Merritt	(757) 864-3210
Headquarters	Washington, DC 20546	C. Zieschang	(202) 358-2600
Wallops Flight Facility	Chincoteague, VA 23337	D. Simpson	(301) 286-0280
Goddard Space Flight Center	Greenbelt, MD 20771	D. Simpson	(301) 286-0280
Glenn Research Center	Cleveland, OH 44135	C. Blasio	(216) 433-6520

Mr. Guy Camomilli is the NASA Senior Environmental Health Officer overseeing radiological health issues at the agency-level. He serves as the Agency Radiation Safety Officer and functions as the liaison between the individual sites and the OCHMO for all radiological issues. His contact information is:

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

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The purpose of NPR 1800.1B radiological health requirements pertains to controlling occupational radiation exposures. The direct acquisition, receipt, possession, use, and transfer of generally licensed devices such as tritium exit signs has been primarily beyond the scope of that document, except for those activities that would be related to responding to a damaged tritium exit sign incident. Tritium exit signs are managed at individual sites according to individual site-level procedures. Pre-approval by the site RSO or Radiation Safety Committee is the usual practice for purchases of radioactive material at NASA centers and facilities; however, not all sites have required that approval for tritium exit signs in the past. As a result, tritium exit signs may have been procured, installed, and removed by NASA contractors without the knowledge of the site health physics staff. NPR 1800.1 is under revision and will specifically include control of generally licensed devices including tritium exit signs.

(B) State the number of tritium exit signs you currently possess and the number of signs that, according to your records, should be in your possession.

According to our best information, NASA sites possess 3,206 tritium exit signs. Current NASA records indicate that 3, 216 tritium signs should be in possession. Table 2 lists the individual inventory results at NASA sites and Headquarters.

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

Table 2.

NASA Site	Site Abbrev.	Currently Possessed	Should be Possessed	Discrepancy	Notes
Ames Research Center	ARC	136	136	0	(1)
Dryden Flight Research Center	DFRC	53	53	0	(2)
Jet Propulsion Laboratory	JPL	179	179	0	(3)
White Sands Test Facility	WSTF	0	0	0	
Johnson Space Center	JSC	61	61	0	(4)
Michoud Assembly Facility	MAF	190	200	10	(5)
Stennis Space Center	SSC	0	0	0	
Marshall Space Flight Center	MSFC	1661	1661	0	(6)
Kennedy Space Center	KSC	0	0	0	
Langley Research Center	LaRC	0	0	0	
Headquarters	HQ	0	0	0	(7)
Wallops Flight Facility	WFF	1	1	0	(8)
Goddard Space Flight Center	GSFC	0	0	0	(9)
Glenn Research Center	GRC	925	925	0	(10)
	Total	3206	3216	10	

Explanation:

- (1) Records are based on inventory and process originated in 2001.
- (2) Records are based on inventory originated in May 2008.
- (3) No previous inventory records could be located. Includes JPL facilities at Goldstone and Table Mountain.
- (4) No prior baseline record. Inventory was determined in January 2009.
- (5) Based on inspection conducted with annotated blue prints in February 2009.
- (6) Based on inventory verification completed April 30, 2009.
- (7) Based on statements by Property Manager of leased Headquarters building.
- (8) Located in NASA-8 Beech Aircraft pull handle on escape door.
- (9) Includes Goddard Space Flight Center facilities at the White Sands Test Facility.
- (10) Includes Glenn Research Center's Plum Brook Station in Sandusky, OH.

(C) Explain the reasons for any discrepancy between the number of tritium exit signs you currently possess and the number of signs that should be in your possession.

NASA is a very large, diverse, and historic organization. Many of its facilities originated with its predecessor federal entity the National Advisory Committee for Aeronautics and there are literally over a thousand buildings at NASA's 13 sites and Headquarters with operations and facilities maintenance contracts distributed over a large number of independent companies and organizations. Over time these contracts were held by dozens of different contractors and accurate accounting for the installation, removal, and transfer of tritium exit signs was not maintained in a centralized system. Consequently, pre-existing inventory records for tritium exit signs could not be obtained at many of the NASA sites.

At the request of Mr. Camomilli, Ms. Angela McIntosh of the Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, provided by email on February 6, 2009 a spreadsheet file identifying 695 tritium exit signs that the NRC attributes to NASA sites. The NRC spreadsheet file is difficult to reconcile with available NASA site records. Discrepancies with the NRC data are included as applicable.

Ames Research Center (ARC), Mountain View, CA

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

An inventory verification was performed at ARC to account for all tritium exit signs. There are no discrepancies with site or NRC records. The six tritium exit signs attributed to NASA on the NRC spreadsheet at Moffett Field and Mountain View, CA are possessed by the ARC site.

Dryden Flight Research Center (DFRC), Edwards, CA

A current inventory was performed at DFRC and identified 53 tritium exit signs. There is no baseline inventory data for comparison. DFRC staff have not been able to find any construction drawings or purchase requests associated with these signs. Because the site has no records of the purchase of tritium exit signs, it is impossible to know whether there is any discrepancy. No discrepancy with site records is believed to exist. Physical verification of the ten tritium exit signs attributed to NASA on the NRC spreadsheet at Edwards AFB, CA is planned.

Jet Propulsion Laboratory (JPL), Pasadena, CA

A current inventory performed at JPL identified 179 tritium exit signs. There are no site records of previous inventories for tritium exit signs. Consequently the number that should be possessed is unknown. No previous records exist; consequently no discrepancies can be verified. No discrepancy with site records is believed to exist. All 179 tritium exit signs are located at the JPL facility in Pasadena, CA; none are located at the Table Mountain, CA or Barstow, CA facilities. The NRC spreadsheet does not attribute any tritium exit signs to NASA at the JPL sites in Pasadena, Table Mountain, and Barstow, CA.

White Sands Test Facility (WSTF), Las Cruces, NM

JSC reported no tritium exit signs at its WSTF site. No discrepancy with site records is believed to exist. The NRC spreadsheet does not attribute any tritium exit signs to NASA at the WSTF site.

Johnson Space Center (JSC), Houston, TX

A current inventory performed at JSC identified 61 tritium exit signs. No discrepancy with site records is believed to exist. The NRC spreadsheet attributes 126 tritium exit signs to NASA at the JSC, Houston, TX site. Site records document 181 tritium exit signs as returned to the manufacturer, including at least 47 signs from the of the NRC spreadsheet. The discrepancy is believed to be due to illegible and inaccurate records. The remaining 79 signs are believed to have been returned to manufacturer also.

Michoud Assembly Facility (MAF), New Orleans, LA

An inventory verification was performed at MAF and identified 190 tritium exit signs. MAF site records indicate 200 should be possessed by the site. This discrepancy is attributed to damage suffered to some buildings at this site during Hurricane Katrina in August 2005. The NRC spreadsheet does not attribute any tritium exit signs to NASA at the MAF site in New Orleans, Louisiana.

Stennis Space Center (SSC), MS

Current inventory records at the SSC site identify no tritium exit signs. No discrepancy with site records is believed to exist. The NRC spreadsheet does not attribute any tritium exit signs to NASA at the Stennis Space Center, MS site.

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

Marshall Space Flight Center (MSFC), Huntsville, AL

Current inventory records at the MSFC site identify 1,661 tritium exit signs. Serial numbers could not be obtained for 69 of the 1,661 signs. The NRC spreadsheet attributes 168 tritium exit signs to NASA at the Huntsville, AL site, 43 with the serial listed as "DLGB". As DLGB is obviously not a serial number it is impossible to check these against the MSFC inventory. It is possible that some of the DLGB signs are on the MSFC inventory. MSFC has verified by serial number, possession of 37 of the 168 signs that are on the NRC inventory. Historically, all expired signs were returned to manufacturers for proper disposal.

Kennedy Space Center (KSC), FL

Current inventory records at the KSC site indicate no tritium exit signs. No discrepancy with site records is believed to exist. The NRC spreadsheet does not attribute any tritium exit signs to NASA at the Kennedy Space Center, FL site.

Langley Research Center (LaRC), Hampton, VA

Records indicate no tritium exit signs are possessed at the LaRC site. No discrepancy with site records is believed to exist. The NRC spreadsheet attributes 3 tritium exit signs to NASA at the LaRC site in Hampton, VA and another 6 signs to NASA at the zip code (23665) for Langley Air Force Base located in Hampton, VA. Site procedures have prohibited the use of tritium exit signs at the LaRC site; therefore the discrepancy with NRC records cannot be explained.

Headquarters, Washington (HQ), DC

A current inventory performed at HQ identified no tritium exit signs. No discrepancy with site records is believed to exist. The NRC spreadsheet does not attribute any tritium exit signs to NASA at Headquarters in Washington, DC.

Wallops Flight Facility (WFF), Chincoteague, VA

A current inventory performed at WFF identified only 1 tritium exit sign, installed in the pull handle of on the escape door of an aircraft. No discrepancy with site records is believed to exist. The NRC spreadsheet attributes 11 tritium exit signs to NASA at the WFF, Chincoteague, VA site. These signs are believed to have been returned to the manufacturer or disposed of a radioactive waste in accordance with NRC License number 19-05748-02.

Goddard Space Flight Center (GSFC), Greenbelt, MD

The inventory performed at GSFC in February 2009 identified 2 tritium exit signs which were subsequently transferred and reported to the NRC in March 2009. No discrepancy with site records is believed to exist. The NRC spreadsheet attributes 3 tritium exit signs to NASA at the GSFC, Greenbelt, MD site. One of the signs transferred in March is listed on the NRC spreadsheet. The remaining two signs are believed to have been returned to the manufacturer or disposed of a radioactive waste in accordance with NRC License number 19-05748-02.

Glenn Research Center (GRC), Cleveland, OH

A current inventory performed at GRC identified 925 tritium exit signs. No discrepancy with site records is believed to exist. The NRC spreadsheet attributes 36 tritium exit signs to NASA at the Plum Brook Station (PBS), in Sandusky, OH. This is consistent with NASA records for PBS.

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

The NRC spreadsheet attributes 364 tritium exit signs to NASA at the Cleveland, OH site. NASA records indicate 889 signs at the Cleveland site.

(D) Describe any actions you have taken, or plan to take, to locate tritium exit signs that should be, but are not, in your possession.

Ames Research Center, Mountain View, CA

None. All tritium exit signs that should be in possession are in possession. No further actions are needed.

Dryden Flight Research Center, Edwards, CA

Since no pre-existing records (e.g., construction drawings or purchase requests associated with these signs) could be located, a physical inventory was completed and the locations of all (53) tritium exit signs on site was documented to form a new baseline inventory. All tritium exit signs will be replaced with non-radioactive alternative. As tritium exit signs are removed and replaced their serial numbers will be checked against the signs listed on the NRC-provided spreadsheet.

Jet Propulsion Laboratory, Pasadena, CA

No pre-existing records could be located. A physical inventory was completed and the locations of all (177) tritium exit signs on site was documented to form a new baseline inventory. No discrepancy with site records is believed to exist. All tritium exit signs that should be in possession are believed to be in possession. No further actions are needed.

White Sands Test Facility, Las Cruces, NM

None. JSC reported no tritium exit signs at its WSTF site. No discrepancy with site records is believed to exist. No further actions are needed.

Johnson Space Center, Houston, TX

An inventory verification was performed. All tritium exit signs that should be in possession are believed to be in possession. No further actions are needed.

Michoud Assembly Facility, New Orleans, LA

A physical inventory verification was completed using facility drawings. Tritium signs lost during Hurricane Katrina and in the cleanup afterwards are irrecoverable. No further actions are planned. In accordance with instructions contained in the NRC Demand for Information EA-09-001, dated January 16, 2009, further reporting beyond this reply to the NRC DFI is not required.

Stennis Space Center, MS

None. SSC reported no tritium exit signs. No discrepancy with site records is believed to exist. No further actions are needed.

Marshall Space Flight Center, Huntsville, AL

A comprehensive physical inventory verification was completed April 30, 2009. No discrepancy with site records is believed to exist. No further actions are needed.

NASA RESPONSE TO TRITIUM EXIT SIGN INVENTORY

Kennedy Space Center, FL

None. No discrepancy with site records is believed to exist. No further actions are needed.

Langley Research Center, Hampton, VA

Records indicate no tritium exit signs are possessed at the LaRC site. Verification was made by interviews with the site Fire Chief, the emergency lighting technicians, the aircraft operations branch, and a former RSO who worked at the site for 12 years. No discrepancy with site records is believed to exist. No further efforts are planned.

Headquarters, Washington, DC

None. HQ reported no tritium exit signs. No further actions are needed.

Wallops Flight Facility, Chincoteague, VA

An inventory verification was performed. All tritium exit signs that should be in possession are believed to be in possession. No further actions are needed.

Goddard Space Flight Center, Greenbelt, MD

An inventory verification was performed. All tritium exit signs that should be in possession are believed to be in possession. Those signs were subsequently transferred and reported to the NRC. No further actions are needed.

Glenn Research Center, Cleveland, OH

An inventory verification was performed. All tritium exit signs that should be in possession are believed to be in possession. No further actions are needed.

(E) Describe any actions you have taken, or plan to take, to prevent future losses of tritium exit signs.

NASA recognized the need for increased surveillance of tritium exit signs as early as March 2008. An Environmental Health Bulletin which included the regulatory requirements along with additional NASA requirements was developed and distributed agency-wide. The latest effort was initiated following the NRC Demand for Information issued January 16, 2009. The inventory information presented here will serve as a baseline against which future inventory efforts will be compared. In addition, more specific requirements for controlling generally licensed devices have been incorporated into a revision to NPR 1800.1B which is currently undergoing agency-wide review in the Online Directives Information System. It is anticipated that the revised document and new requirements will be in force on or before October 1, 2009.