DOE F 1325.8
(3/02)

United States Government **Department of Energy**

Thomas Jefferson Site Office

memorandum

DATE: February 18, 2016

REPLY TO ATTN OF: SC-TJSO:Arango

SUBJECT: **SUPPLEMENT ANALYSIS (SA) OF THE PROPOSED USE OF A TRITIUM TARGET AT THE THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY**

TO: Patricia Hunt, TJSO NEPA Document Manager

A supplement analysis (SA) was prepared for the proposed use of the tritium target in an upcoming experiment at the Thomas Jefferson National Accelerator Facility (TJNAF). After a review of the SA, the recommendation of the Oak Ridge Operations National Environmental Policy Act (NEPA) Compliance Officer, and legal review by the Oak Ridge Office of Chief Counsel, I have determined that the proposed action does not constitute a significant change relevant to environmental concerns pursuant to 10 CFR 1021.314; therefore no additional review under NEPA is required.

Please ensure that this SA is made available to the public and that a Public Notice of Availability is published in the local newspaper. The analysis must also be attached to DOE/EA-1534 as part of the NEPA record for this project.

Please direct any questions on the ORO NEPA process to Mr. James Elmore, ORO and TJSO NEPA Compliance Officer at (865-576-0938).

Please also serve as the point of contact for any specific questions related to this Supplement Analysis.

Michael A Lepp Sr.

For Joseph Arango, Manager
Thomas Jefferson Site Office

Attachment:
Supplement Analysis

cc w/attachment:
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February 16, 2016
DOE/EA-1534/SA1

SUPPLEMENT ANALYSIS

PROPOSED USE OF A TRITIUM GAS TARGET
AT THE
THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY
NEWPORT NEWS, VIRGINIA

FEBRUARY 2016

U.S. DEPARTMENT OF ENERGY

ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
CEBAF	Continuous Electron Beam Accelerator Facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Ci	Curies
DOE	U. S. Department of Energy
EA	Environmental Assessment
FONSI	Finding of No Significant Impact
FSAD	Facility Safety Assessment Document
GeV	Giga electron volts (billion electron volts)
HTO	Tritium oxide; tritiated water
NEPA	National Environmental Policy Act
NRC	National Response Center
RQ	Reportable Quantity
SA	Supplement Analysis
SRS	Savannah River Site

INTRODUCTION

National Environmental Policy Act (NEPA) documents associated with the original construction of the Thomas Jefferson National Accelerator Facility (Jefferson Lab) Continuous Electron Beam Accelerator Facility (CEBAF) in Newport News Virginia include: U. S. Department of Energy (DOE)/ Environmental Assessment (EA)-0257, completed in 1987; with subsequent changes (DOE/EA-1204, in 1997; and DOE/EA-1384, in 2002). These addressed issues associated with sending an electron beam to targets in the Experimental Halls. All EAs resulted in Findings of No Significant Impact.

On February 7, 2007, the U. S. Department of Energy (DOE) issued a Finding of No Significant Impact (FONSI) based on DOE/EA-1534 for proposed construction and upgrade projects at the Jefferson Lab. These projects were associated with Jefferson Lab's 2005 Ten-Year Site Plan. In DOE/EA-1534, impacts evaluated were for the increase in energy of the electron beam from a maximum of 8 Giga-electron Volts (GeV) to 16 GeV. There was no specific discussion of the targets used by Physics in the Experimental Halls.

Based on the analysis reported in DOE/EA-1534, DOE determined that the proposed action was not a major federal action and would not significantly alter the quality of the human environment within the context of the NEPA of 1969. Therefore, no Environmental Impact Statement was required.

In accordance with DOE NEPA regulation 10 Code of Federal Regulations (CFR) 1021.314, this Supplement Analysis (SA) is to determine whether the proposed action: use of a tritium gas target in Hall A; is within the scope of the previous EAs, or whether it merits additional scrutiny under NEPA.

PROPOSED ACTION

Actions involve installing a target in Hall A filled with less than 1080 Ci of tritium gas. This quantity of tritium is well below the threshold of 1.6E+00 grams (or 1.6E+04 Ci) that would make Jefferson Lab a Category 3 facility (per DOE-STD-1027-92). The Lab therefore will not require changes in its Emergency Management System (per DOE Order 151.1C and DOE Standard DOE-STD-1027-92, Change 1).

The subject experiment is currently slated for an 8-month run period spanning fall 2016 to spring 2017. The design of the target and target containment chamber ("scattering chamber") has been widely reviewed by experts from within the DOE complex with respect to tritium handling during the course of the target's safety review, a subset of Jefferson Lab's Experimental Readiness Review (ERR) process. The experimental apparatus is designed to provide at least three levels of containment/confinement of the tritium gas during all phases

including shipping, receiving, installation, operation and removal of the target. The tritium gas will be provided by the DOE's Savannah River Site (SRS), who will fill the target and ship it under Department of Transportation regulations and DOE requirements.

Using the ERR process, which is in place for all experiments conducted at the facility, all safety controls were approved.

Controls in place can be summarized as follows:

- Use of SRS knowledge and experience;
- Over 15 years of operational experience in the design, commissioning and use of targets;
- A target designed to remain intact under pressure;
- A scattering chamber also designed to avoid accidental rupture;
- A Handling Hut, which will surround the target assembly during installation;
- A dedicated exhaust pump and ductwork.

The controls demonstrate a defense in depth that more than adequately mitigates the associated risk.

ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

No environmental effects are expected to result from the proposed action. However, in the unlikely event of the release of more than 100 Ci of tritium to the environment over a 24-hour period, Reportable Quantity notification under CERCLA § 103 would be required. There are other materials present at the lab in quantities sufficient to also require this notification if released so this process has been in place for some time.

Designers of the experiment indicate that any loss of tritium would essentially be instantaneous; however, in the event of a release, the RQ Notification would be made to the National Response Center (NRC) (800-424-8802). While the NRC notification would satisfy the regulatory requirement, Jefferson Lab would also notify interested local and state agencies. The list that contains the RQ for tritium is located in 40 CFR 302.4, Appendix B.

The ***Radiological Impacts*** of the proposed action fall within the bounds of the radiological impacts previously evaluated in DOE/EA-1534, as summarized below:

> The annual DOE dose limit for radiation exposure to members of the general public is 100 mrem. DOE and Jefferson Lab have adopted a "good neighbor" policy under which radiation exposure of the affected population near Jefferson Lab be maintained far below the regulatory limit. This is practiced site-wide as our As Low As Reasonably

Achievable (ALARA) policy. A design goal of 10% of the dose limit at the site boundary (10 mrem) has been established and modeling has shown that even if all controls fail a total release would likely not exceed this dose.

Prior to the start of any experiment at Jefferson Lab, the Radiation Control Department (RadCon) conducts a radiation safety analysis and, based on the energy, power, and nature of the target, estimates the radiation that may be measurable at the property line. This Radiation Budgeting, which is verified by empirical measurements taken continuously at Radiation Boundary Monitors, has proven to be a reliable tool to predict and limit public exposure. This tool will be applied to this and other experiments, as is done routinely.

There are no significant environmental effects associated with this activity, which is consistent with the analysis in DOE/EA-1534 (FONSI, beginning on p. 2 of 5). Table 1 provides a summary of the impacts examined.

Table 1. Summary of Environmental Effects

Potential Impact	***Conclusion, DOE/EA-1534***	***Relevance to Proposed Action***
Socioeconomics	Minimal impacts to the local population, services, economy, and social justice.	No socioeconomic impacts would be caused by the proposed action.
Cultural Resources	No adverse impacts to archaeological or historic resources.	No impact on cultural resources.
Geology	Proposed activities should not affect site geology or soils.	No impact on site geology.
Land Use	No land use impacts will occur.	No impact on land use.
Transportation and Traffic	No significant impacts will occur.	The transportation of the tritium-filled target is the responsibility of SRS, and is within the scope of their normal activities.
Noise	Temporary increases in noise will not affect human hearing.	No impact on environmental noise levels.
Floodplain, Wetlands	No flood plain on site; the one designated wetland will not be affected.	No impact to wetlands.
Endangered Species	No adverse impacts to protected species or habitats would be expected.	No impact on endangered or protected species or habitats.

Potential Impact	***Conclusion, DOE/EA-1534***	***Relevance to Proposed Action***
Groundwater Withdrawal	There will be no impact on the flow quantity of the groundwater dewatering operation at the experimental halls.	The proposed activity will not affect groundwater levels.
Water Quality	Any impacts would occur during construction activities and would be mitigated.	There will be no construction associated with the proposed action and no water quality impacts of any kind.
Air Quality	No anticipated air emission concerns.	Jefferson Lab's established "radiation budget" method of evaluating proposed experiments, as described in the EA and Facility Safety Assessment Document (FSAD), demonstrates the negligible impacts on air quality.
Waste Generation	Only temporary increase due to construction.	No waste generation is anticipated.
Pollution Prevention	Pollution prevention considerations will be fully integrated in the proposed action.	Measures to contain the tritium within the target and/or scattering chamber constitute pollution prevention measures.
Resource Usage	Increased demand for power, water, and cryogens has been anticipated and planned for.	No impact on resources.
Health and Safety Impacts (including radiological)	Neither occupational nor public dose should increase from proposed actions.	Established dose limits and goals will be recognized. Neither occupational nor public dose should increase from proposed actions.
Accidental Release	None analyzed.	Modeling has shown that even in the event of an accidental release the dose would not likely exceed 10% of the dose limit at the site.

Potential Impact	*Conclusion, DOE/EA-1534*	*Relevance to Proposed Action*
Cumulative Impacts	Minimal temporary and long term cumulative impacts on the environment or public health and safety.	No significant cumulative impacts are expected.

CONCLUSIONS

Based upon this available information, the proposed project is determined to be covered under existing NEPA analyses and documentation. Additional NEPA documentation is therefore not required.

Prepared by: Patricia Hunt 2/17/16

Patricia Hunt, NEPA Document Control Manager — Date

Reviewed by: [signature] 2/17/2016

Colin Colverson , Attorney-Advisor,Oak Ridge Office of Chief Council — Date

Reviewed by: James Z. Elmore 2/17/2016

James Elmore, NEPA Compliance Officer — Date

Approved by: Michael A Lyons Sr. 2/22/16

FOR Joseph Arango, Manager, Thomas Jefferson Site Office — Date