LA-UR-21-31397

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Subject: Supplemental Information Regarding the Application for Remediation of the Flanged Tritium Waste Containers at Los Alamos National Laboratory

Dear Mr. Garcia:

This letter is in response to the October 18, 2021 letter from David Gray, Acting Regional Administrator, to Mr. Theodore Wyka, Manager of the National Nuclear Security Administration's Los Alamos Field Office (NA-LA). That letter requested additional information regarding the Application for remediation of the Flanged Tritium Waste Containers (FTWCs) at Los Alamos National Laboratory (LANL) Technical Area 54, Area G. Several topics were raised in Mr. Gray's letter, as summarized below.

A. Region 6 is requesting updated information that reflects changes to the material submitted in support of the Application, as well as revisions to the plans and specifications associated with the venting project;
B. LANL should identify and describe safety procedures that will be implemented to ensure emissions of radionuclides remain below the 10 mrem/year standard;
C. Region 6 encourages continued tribal coordination and government-to-government consultation regarding this project with local communities;
D. Region 6 encourages DOE offer consultation to all tribal governments within a 30-mile radius of the Lab.

Detailed responses on each area are provided in subsequent sections of this letter.

A. Summary of changes to Application.

The letter from EPA Region 6 on October 18, 2021 requested information on changes to information submitted in support of the Application. To recap, LANL has submitted two documents detailing the FTWC remediation project. Full reference information is included at the end of this letter.

- The Application for Pre-Construction Approval, submitted in May 2019 (the "Application"); and
- The Notification of Scope Change, submitted in March 2020 (the "Notification").

Approval of the documents by Region 6 came with specific conditions regarding process changes that would require LANL to notify Region 6. **No such changes to the processes described in these documents have taken place**.

In response to EPA's request, we are providing more information on certain operating details submitted in the documents listed above. While these updates do not significantly affect the overall remediation process or increase emissions or off-site dose consequence, they are identified below to provide full transparency. The additional details provided here (and in Section B, below) are provided to expand awareness of the process and protective measures that have been established for the project.

A1. Schedule. The 2019 Application discussed operations commencing in June 2019. The operation was delayed several times for a variety of reasons, both internal to LANL as well as larger issues such as the COVID-19 pandemic. Delays in the operational readiness process within LANL have affected the project schedule and pushed back the start of FTWC remediation operations. The list of actions that are required to be completed prior to an operation of this type is extensive, and these actions are necessary to ensure the safety of the planned activities.

A2. Emissions management plan. An emissions management plan is typically developed for LANL sources which have the likelihood of significant emissions (greater than 1 millirem/year). The 2019 Application transmittal letter stated that no formal management plan would be developed. As delays to the project ensued, an emissions management plan was written by compliance operations staff and approved by LANL management. This plan provides detailed information and transparency on how emissions will be controlled. It was included in the 2020 Notification to Region 6. Specific steps from the plan are discussed extensively in section B of this letter.

A3. Storage issues. The 2019 Application stated that continued tritium storage in the FTWCs could pose an unsafe condition. The undisturbed containers are safe in their present condition, but the remediation of the FTWCs is necessary to move the containers for long-term waste disposal. Indefinite storage of these containers does not fulfill regulatory requirements for waste disposal.

A4. Sequence of operations. The 2019 Application discussed venting one FTWC, and then moving it to LANL's main tritium processing facility (the Weapons Engineering Tritium Facility, WETF) before the next FTWC was vented. This sequence was changed in the 2020 Notification, reflecting current plans to vent all four FTWCs (one at a time) before any of the drums are moved out of TA-54 Building 1028. This process change reduces the risk of a possible uncontrolled release during FTWC handling, by ensuring all FTWCs within Building 1028 are vented and rendered safe for handling prior to moving any container.

A5. Incremental venting process. The 2019 Application mentioned the venting of the FTWCs without further detail. As described in the 2020 Notification, once the venting rig is attached to the FTWC, venting will take place in small increments of 10 pounds per square inch (psi). After each 10 psi drop, operations will pause for at least one hour to allow the FTWC contents to come

to equilibrium at the new pressure. This hour-long pause was not described in either of the documents listed above, but plays a role in the emissions tracking described in section B of this letter. This process also reduces the chance of an uncontrolled release due to a rapid pressure change within the FTWC during venting.

A6. FTWC evacuation. The 2020 Notification mentioned in the body of the letter that after venting is complete, each FTWC would be evacuated to a slight negative pressure. This evacuation step was inadvertently omitted from the numbered operational steps in the Notification. The evacuation to below ambient atmospheric pressure is important, as it serves as an indicator whether pressure is building up within the FTWC. Monitoring the negative pressure on the vented FTWCs will enable us to assess whether follow-up venting may be needed.

A7. Emissions control system selection and description. The 2019 Application referred to using either a molecular sieve or a "getter bed" to extract tritium from the air stream. These two technologies both use surface adsorption to remove airborne moisture, including tritium. The FTWC project has determined that a molecular sieve is the preferred choice to capture airborne tritium in water vapor phase (HTO). The 2019 Application went on to state that this type of control system is not "recognized" in 40 CFR 61, Appendix D. This statement has caused confusion to stakeholders. The statement simply meant that molecular sieves or getter beds are not included in the list of examples of common controls systems in Appendix D, and therefore a default emissions reduction factor is not provided in that regulation. The result of this approach creates increased conservatism for human health exposure calculations. However, molecular sieve and getter bed systems are widely used to effectively reduce airborne tritium emissions in the nuclear industry, including at the LANL tritium facility. No credit for these systems was taken in controlled emissions calculations in the 2019 Application because they were not listed in Appendix D, but the systems will provide a significant reduction to actual emissions of tritium vapor. The molecular sieve system is one of multiple components providing defense in depth in controlling emission from the FTWC project.

A8. Building 1028 ventilation. The 2019 Application discussed equipping the FTWC storage building, TA-54 Building 1028, with an exhaust duct and stack exhaust system. This was to be the demonstration of "construction" to meet one requirement of Region 6's approval of the 2019 Application. In October 2019, LANL sent a request for concurrence to Region 6 asserting that the fabrication and testing of the ventilation system met the definition of construction for this project under EPA's regulations. Region 6 concurred with this approach in November 2019. The 2020 Notification clarified that the stack, blower, and ventilation duct would be located outside Building 1028 and a flexible duct would be extended into the building through the open door to provide ambient air exhaust during venting operations. Similarly, for ventilation locations outside of Building 1028, the same stack and blower system will be used with flexible ducting extending to the desired venting location.

A9. Ventilation system testing. The 2019 Application discussed the need to test the ventilation system to meet design requirements of ANSI N13.1-1999. This testing was successfully completed in the summer of 2019. Results were sent to EPA Region 6 as an attachment to the letter requesting concurrence of the status of construction in October 2019 described above; full reference information for this concurrence request is included at the end of this letter.

A10. Ventilation system components. The 2019 Application contains a sketch of the ventilation system, showing a rigid duct near the blower and stack, followed by flexible ducting extending to the FTWC venting location inside Building 1028. The basis for this is unchanged; the rigid duct

represents the system that has been tested to meet ANSI standard criteria as described above. The headspace gas vented from the FTWC will discharge directly into this rigid section. Further upstream, however, the duct will be a mixture of rigid components (usually bends) and flexible sections as needed to provide effective exhaust flow in multiple configurations to support different operating scenarios (e.g., venting within Building 1028, venting in the parking lot outside of Building 1028, or venting on the transportation truck). The mix of upstream components will not affect the emission monitoring systems, and all commissioning testing performed on the duct remains valid for all operational scenarios.

A11. Tritium inventory decay. The delay in the start of operations means that the total FTWC tritium inventory has reduced slightly due to natural radioactive decay. The total tritium inventory in January 2022 will be about 99,000 curies, down from the 114,683 curies projected in the 2019 Application. This results in a corresponding reduction in potential airborne tritium emissions and subsequent off-site dose from the operation. Overall, about 5% of the tritium inventory will decay in one year. However, the decay of tritium will increase pressure within the headspace of each FTWC. This pressure increase complicates the worker safety issues and adds to the overall difficulty of the FTWC remediation project. Venting is being conducted to enable the safe handling and transport of the FTWCs for waste disposal. Therefore, it is prudent to perform the FTWC remediation operations as soon as possible.

B. Description of safety procedures to control airborne emissions.

There are several levels of controls that will be used to ensure airborne emissions of tritium will not exceed the 10 millirem per year standard to the maximally exposed individual (MEI) member of the public. These can be categorized as operational controls and administrative controls, and are explained in more detail below. The administrative controls are also described in the FTWC emissions management plan. Note these controls are unchanged from the 2020 Notification; details below are simply to provide more clarity to stakeholders. Collectively, the controls provide defense in depth to ensure that the 10 millirem per year limit will not be exceeded.

B1. Operational controls.

a. One FTWC processed at a time. By only performing venting activities on one FTWC at a time, the entire tritium inventory within Building 1028 is never available for emission. The inventory of a single FTWC is not enough to approach the 10 millirem limit, even in the case of an uncontrolled release. Processing a single FTWC at a time also allows the project to evaluate total cumulative emissions in real-time.

b. Incremental venting. By only performing venting actions on a FTWC in 10 psi increments followed by a 1-hour equilibration period, there is no possibility of an uncontrolled release of tritium due to a rapid pressure change. This process makes it very straightforward to quantify the emissions and evaluate total releases with respect to established limits (see section B2 below regarding limits) by providing time to perform the calculations and evaluations.

c. Use of molecular sieve control system. The FTWC vent line is equipped with a molecular sieve system, virtually identical to the emissions control system used at the LANL tritium facility. This system has proven very effective at removing tritium vapor (HTO) from the exhaust air stream. After passing through the molecular sieve, the filtered headspace gas is discharged directly into the rigid exhaust duct prior to the sampling location within the

stack. This ensures that any tritium remaining in the air stream after passing through the molecular sieve is measured before release to the environment.

d. Dual emissions monitoring on the exhaust system. The exhaust stack will be equipped with a tritium retrospective sampler ("bubbler") to provide the EPA record sample as well as an ion chamber system to provide real-time tracking of emissions. The two systems provide redundancy; either can be used to quantify emissions if the other should fail. Spares of all instruments are maintained at LANL.

e. Ambient air measurements at work site. Radiological control technicians will monitor the air within Building 1028 to evaluate worker exposure. This also provides defense-in-depth, ensuring that there is no release of tritium from the FTWCs that could bypass the emissions monitoring system. All releases will be pulled through the monitored exhaust stack via the flexible duct described above.

f. Downwind environmental surveillance measurements. Besides the stack emissions measurements required for compliance with the Radionuclide NESHAP, additional air and soil sampling will be conducted at select downwind sample locations. This sampling will be used to help validate plume modeling calculations and also to advance scientific knowledge of tritium behavior in the environment. LANL is collaborating with EPA subject matter experts on specifics of these environmental surveillance activities.

B2. Administrative controls.

a. Dose limit of 8 millirem. A hard limit of 8 millirem has been allocated to this operation. If that level of off-site dose is reached, venting activities will cease. This 8 millirem administrative limit was chosen to ensure the total MEI dose from all LANL operations (FTWCs combined with routine facility operations throughout the Laboratory) will not exceed the EPA's 10 millirem per year limit.

b. Pause points at 3 and 6 millirem. Administrative pause points have been established at 3 millirem and 6 millirem. These administrative controls are included to provide opportunities to evaluate progress and communicate with LANL management. If total emissions reach 3 millirem, operations will temporarily pause for field evaluation of the process. Environmental compliance staff will consult with operations personnel to assess the cumulative progress and ensure all operational controls are in place and functional. After this evaluation, operations may continue. If total emissions reach 6 millirem, operations will pause again and staff will consult with LANL management to determine if operations can safely continue while still meeting environmental compliance requirements. Approval for continued operation must be received from both the Associate Laboratory Director for Weapons Engineering and the Associate Laboratory Director for ESHQSS (Environment, Safety, Health, Quality, Safety, and Security). Note these pause points are established by Triad for internal tracking and are not regulatory compliance thresholds.

c. Emissions tracking. LANL will use the EPA's plume & dose modeling software (CAP-88) and worst-case wind conditions to convert the dose limits and pause points above (in millirem) into corresponding levels of emissions, representing curies of tritium that can be released from the project on a given day. Emissions will be tracked in real time and compared with these thresholds. If thresholds are met, appropriate actions are taken as described in steps 'a' and 'b' of this section.

d. Daily calculations of actual emissions and dose. At the end of each work day, samples will be changed out at the stack and sent for analysis to determine the tritium emissions of record for the day. These emissions will be modeled with actual wind conditions for that day using CAP-88 to determine the actual dose to the maximally exposed individual from that day's operation. The total dose from each day's operation will be summed to determine the total FTWC cumulative dose to date. Reporting of these daily emissions is discussed in item "h" below.

e. Recalculation of limit and pause points. Using the FTWC cumulative dose, new thresholds are established by subtracting the cumulative dose from the 8 millirem limit and the 3 and 6 millirem pause points. For example, if the FTWC cumulative dose after two days of operation is 2.5 millirem to the maximally exposed individual, the new daily thresholds for the next day of operation will be:

- Dose limit: 8 mrem total – 2.5 millirem cumulative dose = 5.5 millirem.
- Pause for Approval: 6 mrem total – 2.5 millirem cumulative dose = 3.5 millirem.
- Pause for Evaluation: 3 millirem total – 2.5 millirem dose = 0.5 millirem.

f. Recalculation of emissions thresholds. After new dose thresholds are determined, LANL will again use worst-case wind conditions and CAP-88 to develop the corresponding stack emissions thresholds for the next day's operation.

g. Repeating cycle. Steps 'c' through 'f' of this section are repeated each day using the newly determined emissions thresholds. When the project is complete, the sum of daily emissions and dose will represent the reporting values for EPA compliance for the FTWC project. The flow chart on pages 21 and 22 of the attached emissions management plan is a visual representation of the steps described above.

h. Reporting to stakeholders. Operations are currently scheduled to take place primarily on weekends. Any time there is a pause between scheduled venting operations of more than 3 working days, LANL will generate an interim status report to track operations to date, air emissions, and off-site doses at the maximally exposed individual location and at selected other locations of interest. These interim status reports will be sent to EPA Region 6 and copied to the LANL Electronic Public Reading Room.

i. Additional reports. A detailed report at the end of the FTWC venting operation will be generated to document air emissions and doses from the project, drawing data from each interim status report generated over the duration of the project. Also, a summary of this detailed report will be included in the annual Radionuclide NESHAP compliance report sent to EPA Region 6 each June and the Annual Site Environmental Report published each September.

C. Continued tribal coordination, and
D. Consultation with all tribes within 30 miles of LANL.

Initially, NNSA did not engage in tribal consultations on the FTWC project based on our assessment of existing NEPA coverage, the self-imposed emission limits, and the safeguards and mitigation efforts designed into the project. Later, however, based on feedback received from nearby Pueblo Nations requesting more information on this project, NNSA agreed that tribal engagement was warranted and organized numerous briefings and meetings to solicit tribal nation input prior to venting.

The following is a list of engagements (starting with the most recent) where NNSA provided information on the FTWC project, solicited feedback, and offered to answer any questions. While some of the engagements were not organized specifically for tribal audiences, tribal nations had an opportunity to ask questions and provide feedback during each of the events.

Summary of Tribal Engagements		
Audience	Date	Description
Pueblo of San Felipe, Department of Natural Resources (San Felipe Pueblo Governor was unable to attend last minute)	December 9, 2021	NNSA visited San Felipe Pueblo Department of Natural Resource staff to discuss any NNSA related concerns, including the FTWC project. The meeting was beneficial and will be followed by continuing communications and outreach.
Eight Northern Indian Pueblo Council (ENIPC)*	September 21, 2021	NNSA provided a project overview briefing and answer questions at the virtual ENIPC September Monthly Meeting.
Environmental Protection Agency Region 6, Regional Tribal Operations Committee (EPA Region 6 RTOC)	September 14, 2021	NNSA provided a status report on the FTWC project and answered questions at the EPA Region 6 RTOC virtual monthly meeting, which includes federally recognized tribes located in New Mexico, Oklahoma, Louisiana, and Texas.
Accords Technical Exchange Meeting (ATEM)**	September 8, 2021	NNSA provided update on project status to the Accords environmental staff. The virtual ATEM meeting was hosted by NNSA and EM.
All Pueblo Council of Governors (APCG)***	August 26, 2021	NNSA provided a project overview briefing and answered questions at the virtual APCG August Monthly Meeting, which gathers all 20 Pueblo Governors.
Email Notification to Pueblo Governors and staff	December 15, 2020	Sent email notification that provided update on the status of FTWC project to nearby Pueblo Governors and staff.
EPA Region 6 Intertribal Resource Advisory Committee (IRAC)	November 19, 2020	NNSA update on project status and answered questions at the virtual IRAC Annual Meeting.

Summary of Tribal Engagements		
Audience	Date	Description
Virtual Public Meeting No. 2	November 5, 2020	NNSA provided the same presentation from the Oct. 20 meeting. Questions submitted to Virtual Public Meeting No. 1 were answered and included in the newly launched FTWCs website. The meeting had 84 parties who logged or called in.
Virtual Public Meeting No. 1	October 20, 2020	NNSA provided a project overview presentation and committed to answer questions on a FTWCs website under development. The meeting had 128 parties who logged or called in.
EPA Region 6 RTOC	October 6, 2020	NNSA provided a status report on the FTWC project and answered questions at the EPA Region 6 RTOC virtual monthly meeting.
All Pueblo Council of Governors (APCG)	September 24, 2020	NNSA provided a briefing to all Pueblo Governors and answered questions at the virtual APCG September Monthly Meeting.
Pueblo de San Ildefonso Governor Martinez	September 16, 2020	NNSA provided a status update briefing (virtual) to San Ildefonso Pueblo Governor Martinez and answered questions.
EPA Region 6 RTOC	September 1, 2020	NNSA provided a status report on the FTWC project and answered questions at the virtual EPA Region 6 RTOC monthly meeting.
Pueblo de San Ildefonso Governor Martinez	July 28, 2020	NNSA provided a direct briefing (virtual) to San Ildefonso Pueblo Governor Martinez and answered questions.
Pueblo of Santa Clara Governor	July 21, 2020	NNSA provided a direct briefing (virtual) to Santa Clara Pueblo Governor Chavarria and answered questions.
EPA Region 6 RTOC	April 4, 2020	NNSA provided a presentation on the EPRR for the Air Quality permit at the virtual EPA Region 6 RTOC virtual monthly meeting.

Summary of Tribal Engagements		
Audience	Date	Description
Pueblo de San Ildefonso Governor Martinez	March 25, 2020	NNSA provided a direct briefing (virtual) to San Ildefonso Pueblo Governor Martinez and answered questions.

*** Eight Northern Indian Pueblo Council (ENIPC) Members include:** Pueblo of Nambé, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of San Ildefonso, Pueblo of Santa Clara, Ohkay Owingeh, Pueblo of Tesuque, Pueblo of Taos

**** Accord Pueblos include:** Pueblo of Cochiti, Pueblo of Jemez, Pueblo of Santa Clara, Pueblo of San Ildefonso

***** All Pueblo Council of Governors (APCG) includes**: Pueblo of Acoma, Pueblo of Cochiti, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Nambe, Ohkay Owingeh, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of Sandia, Pueblo of San Felipe, Pueblo of San Ildefonso, Pueblo of Santa Ana, Pueblo of Santa Clara, Pueblo of Santo Domingo, Pueblo of Taos, Pueblo of Tesuque, Pueblo of Ysleta Del Sur, Pueblo of Zia, and Pueblo of Zuni.

Going forward, NNSA will provide updates on the project status prior to the FTWC venting to nearby pueblos (within the 30-mile radius, as requested by the EPA) and other community stakeholders. NNSA will notify the four Accord Pueblos and other nearby pueblos, directly and through the All Pueblo Council of Governors and Eight Northern Indian Pueblos points of contacts, of the exact venting date, once the date is confirmed and all formal readiness processes are complete and the permit from the New Mexico Environment Department is received. Depending on when the venting date is confirmed, NNSA will offer briefings to the nearby Pueblo governments, as best feasible, to provide any updates and answer questions, prior to the venting.

NNSA values our trust responsibility and government-to-government relationships with the pueblo governments and all federally recognized tribal nations. NNSA will continue to seek opportunities to expand current relations and to ensure open and transparent communications about the projects happening at LANL.

E. Closing.

A summary of outreach activities was provided to the New Mexico Environment Department in June 2021, and this document is available at the LANL Electronic Public Reading Room at the following web address: http://permalink.lanl.gov/object/tr?what=info:lanl-repo/eprr/ESHID-603641.

More information on the FTWC project and answers to stakeholder questions is on the LANL public web site at: https://www.lanl.gov/environment/flanged-tritium-waste-containers.shtml.

If you have questions or comments, please contact David Fuehne of LANL's Environmental Compliance Programs Group, or Adrienne Nash of NA-LA. Mr. Fuehne can be reached by email at davef@lanl.gov or

by phone at 505-699-5619; Ms. Nash can be reached by email at adrienne.nash@nnsa.doe.gov or by phone at 505-665-5026.

Sincerely,

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Jennifer Payne
Division Leader
Environmental Protection and Compliance
Triad National Security, LLC

Sincerely,

JUAN SANCHEZ Digitally signed by JUAN SANCHEZ Date: 2022.01.27 16:19:37 -07'00'

Darlene S. Rodriguez
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National Nuclear Security Administration
U.S. Department of Energy

Attachment(s): Attachment 1 EPC-CP-QP-0148, Emissions Management Plan for the FTWC Venting Project.

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References:

1. LA-UR-18-26283 rev.2, "Application for Pre-Construction Approval under 40 CFR 61 Subparts A and H for Venting of Flanged Tritium Waste Containers (FTWCs) at TA-54." Transmitted to EPA Region 6 as part of letter EPC-DO-19-137, May 17, 2019. EPA approval received May 22, 2019. Hyperlink: https://permalink.lanl.gov/object/tr?what=info:lanl-repo/eprr/ESHID-603412

2. LA-UR-20-2214, "Notification of Operational Scope Change for the FTWC Venting Project at Los Alamos National Laboratory (LANL)." Transmitted to EPA Region 6 as part of letter EPC-DO-20-068, March 05, 2020. EPA approval received August 10, 2020. Hyperlink: https://permalink.lanl.gov/object/tr?what=info:lanl-repo/eprr/ESHID-603581

3. LA-UR-19-30778, "Request for Determination on the Status of Construction for the FTWC Venting Project at LANL TA-54." Transmitted to EPA Region 6 as part of letter EPC-DO-19-388, October 28, 2019. Includes ventilation system design, construction, and testing details. EPA concurrence received November 7, 2019.

4. FTWC Information Web Site
https://www.lanl.gov/environment/flanged-tritium-waste-containers.shtml

Attachment 1

EPC-CP-QP-0148,
Emissions Management Plan for the FTWC Venting Project

EPC-DO: 22-030

LA-UR-21-31397, rev. 1

Date: 1/28/22

EPC-CP-QP-0148	Revision: **0**	Los Alamos NATIONAL LABORATORY EST.1943
Effective Date: 02/12/2020	Next Review Date: 02/12/2023	

Environment, Safety, Health, Quality, Safeguards, and Security Directorate

Environment Protection and Compliance – Compliance Programs Group

Quality Procedure

Emissions Management Plan for the FTWC Venting Project

Hazard Grading: ☒ Low ☐ Moderate ☐ High/Complex

Usage Level: ☐ Reference ☐ UET ☒ Mixed: UET Sections: Attachments 3-4

Status: ☒ New ☐ Major Revision ☐ Minor Revision

☐ Review w/No Changes ☐ Other: _____

Safety Basis: ☐ N/A ☒ USQ ☐ USI Number: _____

Document Author/Subject Matter Expert:

Name:	Organization:	Signature:	Date:
David Fuehne, RAEM Team Leader	EPC-CP	Signature on File	2-10-2020

Derivative Classifier: ☒ **Unclassified or** ☐ _____

Name:	Organization:	Signature:	Date:
Marjorie Stockton	EPC-CP	Signature on File	2-10-2020

Approval Signatures:

EPC Reviewer:	Organization:	Signature:	Date:
Jeff Whicker, Dose Assessment Program	EPC-ES	Signature on File	2-10-2020
EPC-CP RLM:	Organization:	Signature:	Date:
Michael Saladen, Deputy Group Leader	EPC-CP	Signature on File	2-12-2020

REVISION HISTORY

Document Number and Revision *[Include revision number, beginning with Revision 0]*	**Effective Date** *[Document Control Coordinator inserts effective date]*	**Description of Changes** *[List specific changes made since the previous revision]*
EPC-CP-QP-0148 Rev. 0	02/12/2020	New Document for use in FTWC venting operations. Defines milestones and approvals required for operations.

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1.0 INTRODUCTION

This Environmental Protection and Compliance Division - Environmental Compliance Programs group (EPC-CP) Quality Procedure (QP) describes activities performed by members of the Radioactive Air Emissions Management (RAEM) team that are required to support the venting of Flanged Tritium Waste Containers (FTWCs). The FTWCs are tritium storage containers that need to be vented to reduce potential hazardous conditions within the containers. A full description of the FTWC venting process is contained in the LA-UR-18-26283, R2, *Application for Pre-Construction Approval under 40 CFR 61 Subpart A and H for Venting of Flanged Tritium Waste Containers (FTWCs) at TA-54*, sent to the Environmental Protection Agency (EPA) Region 6 in May 2019.

The RAEM team is responsible for the compliance of Los Alamos National Laboratory (LANL) in regards to regulations put forth in 40 CFR 61, Subpart H, the Radionuclide NESHAP (National Emission Standard for Hazardous Air Pollutants). The overall compliance program is described in EPC-CP-PIP-0101, *Rad-NESHAP Compliance Program - Program Implementation Plan* (PIP). Under the PIP, sources with the likelihood to exceed an off-site dose of 1 millirem to the maximally exposed individual (MEI) member of the public require an Emissions Management Plan, this document.

1.1 Purpose

This QP will document the emissions limits and calculation methodology for the FTWC project. Concurrence from affected LANL and Department of Energy (DOE) management is obtained by the signature page in Attachment 1. Following this document will ensure LANL does not exceed the 10 millirem per year emissions standard established by the EPA.

This QP also provides consideration of the all-pathway dose limits put forth in DOE Order 458.1, *Radiation Protection of the Public and the Environment*. This limit is 100 millirem per year, but is calculated to any public receptor rather than the Radionuclide NESHAP requirement that a receptor be a “residence, school, business, or office.” The higher limit in DOE O 458.1 is offset by the closer possible receptor distances. DOE O 458.1 also charges DOE facilities with keeping public radiation doses As Low As Reasonably Achievable (ALARA), and conducting ALARA reviews for planned operations. LANL’s compliance with DOE O 458.1 is managed by the Dose Assessment program within the Environmental Stewardship Group (EPC-ES). While this QP does not fully detail environmental ALARA or dose calculations under DOE O 458.1, it does document where in the process these calculations are performed by EPC-ES personnel.

1.2 Scope

This QP documents initial dose calculations and interim limits established for the FTWC venting project. It also provides methods for updating these limits based on actual emissions and actual meteorology. As dose milestones are reached, different actions are required.

1.3 Applicability

Initial dose calculations are provided for up-front planning purposes, using conservative or bounding assumptions. After each individual FTWC venting operation, the dose limits can be recalculated and the limits adjusted based on actual emissions and actual meteorological data encountered during venting operations.

1.4 Authority

Compliance with 40 CFR 61 Subpart H is the responsibility of the RAEM team within EPC-CP. Methods used by RAEM team personnel are established in Subpart H and referenced guidance. Approval for operations are authorized by LANL management and DOE/National Nuclear Security Agency (NNSA) personnel.

Compliance with DOE O 458.1 is the responsibility of the Environmental Health Physics program in EPC-ES, the Environmental Stewardship Group.

2.0 PRECAUTIONS AND LIMITATIONS

The work described in this procedure is office work and has a **LOW hazard** rating. This assessment has been performed by the RAEM team leader and is consistent with LANL procedure P300, *Integrated Work Management*. Note that the actual venting activity is performed under an Integrated Work Document (IWD), number EPC-CP-106-FTWC, *Flanged Tritium Waste Container (FTWC) Venting Setup, Sampling, and Takedown.* That IWD will reference this Emissions Management Plan in places, but the actions specifically described in this document are low hazard.

2.1 Precautions

Actions specified within this procedure, unless proceeded with “should” or “may,” are to be considered mandatory (i.e., “shall”, “will”, “must.”)

2.2 Limitations

Dose limits and levels apply only to the NESHAP reporting year(s) in which FTWCs are vented. Procedure ENV-ES-QP-610, *Radioactive Air Emissions Management Plan for LANSCE* will be updated prior to the 2020 run cycle and incorporate changes from this document as needed.

3.0 PREREQUISITE ACTIONS

Different portions of this document are implemented at different points in the FTWC venting process. Preliminary analyses are performed using bounding case scenario conditions, while follow-up assessments during the course of venting operations use actual conditions encountered during the venting operations.

In addition to training to this procedure, familiarity with the following documents is also required prior to performing this procedure:

- Procedure EPC-ES-TP-501, *Dose Assessment Using CAP88* is required to perform dose calculations and develop mrem/Ci factors; subsequent analysis using pre-generated factors does not require training to EPC-ES-TP-501.
- Emissions calculation methods in procedure EPC-CP-QP-0112, *Tritium Stack Emission Calculation and Reporting.*
- Procedure ENV-ES-QP-610, *Radioactive Air Emissions Management Plan for LANSCE* is required to ensure consistency with dose limit allocations throughout the Laboratory. This document is currently in the process of being updated; see references.

3.1 Planning and Coordination

Establishing Dose and Emissions Limits. Radionuclide NESHAP emissions standards are based on off-site dose consequence rather than emissions of specific quantities of radionuclides. As such, general dose limits (in millirem) are established for the FTWC venting project, and are translated into emissions limits (in curies) as described in Section 4 of this document.

NOTE: limits in this document supersede those in ENV-ES-QP-610 for the calendar year(s) in which the FTWC venting project takes place.

3.1.1 EPA Dose Limit – Air Pathway

Airborne radionuclide emissions under 40 CFR 61 Subpart H are limited to levels which result in 10 millirem in any year to the maximally exposed member of the public. "Any year" has been defined as any time period of 12 consecutive months. Note that emissions and doses are reported to EPA by calendar year, but a significant dose incurred in one calendar year can affect LANL operations in the next calendar year.

3.1.2 LANL Ongoing Facility Operations

In recent years, the worst-case off-site doses for different LANL facilities are shown in Table 1. The total for all sites if the worst-case doses all occurred in a single year to a single Maximally Exposed Individual (MEI) is about 1 millirem per year.

The DOE O 458.1 all-pathway dose over the past several years trends closely to the Radionuclide NESHAP MEI dose.

Table 1. Maximum Doses from LANL Facilities Since 2009*	
LANL Source	**Annual Dose, 10-Year Max**
LANSCE Facility	0.27 millirem
Airnet (all diffuse sources)	0.49 millirem
Minor Sources (potential)	0.25 millirem (potential dose)
Tritium Facility	0.03 millirem
TA-48 Hot Cell	0.01 millirem
Balance; sum of remaining sources	0.01 millirem
Total; all-sources max dose	1.06 millirem
EPA dose limit to Maximally Exposed Individual	10 millirem per year
*Dose values are calculated to individual facility Maximally Exposed Individual; Airnet doses exclude the MDA-B cleanup year of 2011.	

3.1.3 FTWC Emissions & Dose Limit

To allow for variation in meteorology and fluctuations in LANL operations, the administrative annual limit for FTWC emissions is **8 millirem** to any Radionuclide NESHAP receptor. When off-site doses meet this level, no further venting operations will occur for 12 consecutive months.

The overall emissions limit (in curies) is set to correspond to this dose limit. Daily curie emissions limits can change as dose is accumulated, as described later in this document.

The environmental ALARA administrative limit under DOE O 458.1 criteria is set at 90 millirem. Curie limits and hold points established for Radionuclide NESHAP compliance will be shared with EPC-ES Dose Assessment personnel for evaluation relative to this DOE O 458.1 all-pathway administrative limit.

3.1.4 Interim Hold Points

Two interim action hold points are established.

1. "Pause for evaluation." When the calculated off-site dose reaches **3 millirem**, work will temporarily pause to evaluate progress on venting operations; anticipated remaining releases; efficiency of emissions controls; adequacy of operational controls. Evaluators will consist of the venting operation Person-In-Charge (PIC) and the EPC-CP RAEM Team Leader or their designees.
2. "Pause for approval." When the calculated off-site dose reaches **6 millirem**, work will pause again. Stakeholders listed in Attachment 1 will be notified of the measured dose to date and best estimate of remaining dose. Work will only commence after verbal approval is received from Associate Laboratory Director for ESHQSS and Associate Laboratory Director for Weapons, or their designees.

3.1.5 Dose Assessment Parameters.

As inputs into the CAP88v4 program, the following parameters in Table 2 will be used for calculating dose conversion factors. Environmental ALARA calculations will use similar parameters as needed.

Table 2. CAP88 Input Parameters

Parameter	Value
Stack diameter	0.25 meter = 10 inches
Stack height	2 meters
Exit velocity	Bounding cases: 13.75 m/s (large blower) or 7.01 m/s (small blower); or Actual measured flow rate per ENV-ES-QP-127; or Estimated exhaust flow using real-time meter per LA-UR-19-32748.
Distance to receptor	2195 m ESE (for Area G releases); 740 m SSW (for WETF releases); Actual distance once specific exhaust location is known. ALARA calculations assume 500 m NNE to San Ildefonso boundary for Area G venting.
Wind file	Dec 1, 2018 daylight wind (bounding case) for planning Area G ventilation limits (wind file DF120118.WND); Jan 2, 2019 daylight wind (bounding case) for planning WETF venting operations (wind file 6DF10219.WND); or Actual wind conditions provided by EPC-CP meteorologist for actual dose calculations.
Radionuclide	1 Ci of H-3, form of tritiated water, type "V" (vapor), size 0.
Other Meteorological parameters: Precipitation, Temperature, Lid Height, Humidity	Per EPC-ES-TP-501. Lid height should be selected for actual month of venting operations; other parameters use annual averages described in procedure EPC-ES-TP-501.
Agricultural settings	"Local" food sources; New Mexico state defaults for other agricultural parameters.

3.2 Performance Documents

To perform this procedure, information from the following documents are needed:

- Emissions report from RADAIR database or equivalent calculation to document total tritium emissions from each FTWC venting operation, as described in EPC-CP-QP-0112, *Tritium Stack Emission Calculation and Reporting*.

- Knowledge of methods described in procedures EPC-ES-TP-501, *Dose Assessment Using CAP88*, and EPC-ES-TP-511, *Calculating mrem per Curie factors*.
- Knowledge of flow determination methods in ENV-ES-QP-0127, *Determination of Stack Gas Velocity and Flow Rate in Exhaust Stacks, Ducts, and Vents* and document LA-UR-19-32748, *Protocol for Determining Actual Flow Rate in FTWC Duct Systems*.

3.3 Special Tools, Equipment, Parts, and Supplies

For flow measurements:

- Equipment as described in ENV-ES-QP-0127, or
- Sierra Instruments 620s Insertion Thermal Mass Flow Meter; use this instrument in conjunction with methods described in document LA-UR-19-32748, *Protocol for Determining Actual Flow Rate in FTWC Duct Systems* to determine exhaust flow rate and subsequent air emissions.

For tritium emissions measurements:

- A tritium bubbler, operated in accordance with EPC-CP-TP-0106, *Collecting Tritium Stack Bubbler Samples*, and emissions calculated per EPC-CP-QP-0112, *Tritium Stack Emission Calculation and Reporting*.
- Real-time tritium meter(s), operated in accordance with the instrument manual(s) and with guidance from Radiation Protection Services (RP-SVS). Real-time emissions can be calculated based on these real-time readings. One or more instruments may be used to properly measure the range of expected emissions.

3.3.1 Special Tools

None.

3.3.2 Measuring and Test Equipment

RAEM team members ensure the following equipment is calibrated and available for the FTWC venting operations. Calibration documentation should be available upon request.

Description	Range	Accuracy	Calibration Category
Sierra 620s Flow Meter	300-3056 std cfm	+/- 75 std feet/min	Annual (LANL S&CL)
OS1700 Bubbler	n/a	n/a	Semi-Annual (RP-SVS)
Overhoff Triathalon 311	0-20,000 microCi/m^3	n/a	Annual (RP-SVS)
femto-TECH U24 high-range tritium monitor	0-20,000 milliCi/m^3	n/a	3yr (RP-SVS)

4.0 PROCESS DESCRIPTION

The following steps make up the FTWC venting process. Several steps can be repeated throughout the process as needed to determine dose impacts at various locations. Attachment 2 is a process flow chart which illustrates the order that these processes are performed or repeated.

For all steps: actions are to be performed and documented by the assigned RAEM team member or affiliate (e.g., EPC-ES Dose Assessment team member or WETF engineer) trained in the referenced RAEM procedure or methods.

Verification checks for all calculations are to be performed by a different RAEM team member or trained affiliate. Most referenced procedures have peer review built into the process. Ad hoc calculations that are not part of an independent procedure require complete independent review.

4.1 Establishing Initial Curie Emissions Limits

For the Area G FTWC venting operations and planning purposes, the worst-case wind file from 2018 was used. This represents wind during daylight hours of Dec 1, 2018, when the wind blew steadily from Area G towards the White Rock town site. This file, provided by EPC-CP meteorologists, is called DF120118.wnd.

[1] Run CAP88 v4 using wind file DF120118.wnd and other parameters as described in Section 3.1.5 for Area G. The resulting dose conversion factor should be 2.66E-4 millirem per curie of H-3 emitted. This dose conversion factor is used for up-front planning ***and*** for dose conversions when planning future FTWC venting at Area G.

[2] To determine the emissions limit, divide the off-site dose limit in Section 3.1.3 by the CAP88 dose conversion factor: 8 mrem / (2.66E-4 mrem/Ci) = **30,000 curies** (rounded). This is the initial "hard stop" emissions limit for the project.

[3] To determine the "Pause for approval" hold point in Section 3.1.4b, divide that dose value by the CAP88 dose conversion factor: 6 mrem / (2.66E-4 mrem/Ci) = **22,500 Ci** (rounded). This is the "Pause for approval" hold point described in 3.1.4b.

[4] To determine the "Pause for evaluation" hold point in Section 3.1.4a, divide that dose value by the CAP88 dose conversion factor: 3 mrem / (2.66E-4 mrem/Ci) = **11,300 Ci** (rounded). This is the "Pause for evaluation" hold point described in 3.1.4a.

[5] Note that actual doses will be calculated at the end of each operational day, using actual meteorology, flow, and curies emitted. This is described in Sections 4.4-4.7.

4.2 Define New Emissions Limit & Hold Points for Upcoming Venting Operations

Prior to each day of venting operations, curie emissions limits must be established and documented which correspond to dose limits from 3.1.3, 3.1.4a, and 3.1.4b. These curie limits will ensure that off-site doses to the MEI will not exceed EPA regulations. Attachment 3 shall be used to document the calculation process for these emissions limits and hold points.

Note that if venting operations have occurred at multiple locations (e.g., Area G and WETF), the process will have to be duplicated for each potential Radionuclide NESHAP MEI. The most conservative (lowest) emissions limits resulting from analysis at different MEI locations will be used for the daily emissions limits.

[1] Determine the integrated off-site MEI dose to date from FTWC venting operations. If this is the first day of FTWC venting, the integrated FTWC dose will start at zero. If this evaluation is done between venting of specific FTWCs, sum the doses from each day of operation together to determine the integrated FTWC dose.

Integrated FTWC dose = IFD = sum(DailyDose).

[2] Determine the planning Dose Conversion Factor (DCF_p) used for the MEI location in question. For Area G operations, this is the 2.66E-4 mrem/Ci calculated in Section 4.1 Step 1 above. Other MEI locations will have different values.

[3] Limit on dose and emissions.

[a] The new dose limit for daily operations is equal to this integrated MEI dose, subtracted from 8 millirem.

DoseLimit = 8 – IFD.

[b] The new curie limit corresponding to this dose limit is equal to the DoseLimit in Step 3a, divided by the planning Dose Conversion Factor for the MEI in question.

CurieLimit = DoseLimit / DCF_p

[4] Upper hold point – "Pause for Approval"

[a] The new dose hold point for "Pause for Approval" is the integrated FTWC dose subtracted from 6 millirem.

PauseForApprovalDose = 6 – IFD.

[b] The new curie hold point for "Pause for Approval" is the PauseForApprovalDose in Step 4a, divided by the Planning Dose Conversion Factor.

PauseForApproval_Ci = PauseForApprovalDose / DCF_p

[5] Lower hold point – "Pause for Evaluation."

[a] The new dose hold point for "Pause for Evaluation" is the integrated FTWC dose subtracted from 3 millirem.

PauseForEvaluationDose = 3 – IFD.

[b] The new curie hold point for "Pause for Evaluation" is the PauseForEvaluationDose in Step 5a, divided by the Planning Dose Conversion Factor.

PauseForEvaluation_Ci = PauseForEvaluationDose / DCF_p

[6] If venting operations have taken place in multiple locations, repeat the Steps 1-5 in this section for each MEI location. The most conservative (lowest) values for each hold point and limit value will be used for upcoming FTWC venting.

[7] Document and communicate the proposed curie limit and hold points to EPC-ES Dose Assessment personnel for evaluation of their adequacy for ALARA and public dose calculations under DOE O 458.1. Resolve any issues and determine a final set of values for use in upcoming FTWC venting operations. Document these limits.

[8] Prior to each day's FTWC venting operations, communicate the new dose and curie values for each interim hold point and the overall limit to the PIC and to other interested stakeholders upon request.

4.3 Calculate Air Emissions

Air emissions are tracked in real time using the Triathalon or femto-TECH instrument and formally measured (for EPA compliance purposes) using an Ortec OS1700 bubbler. Bubbler data will typically only be generated at the end of each individual FTWC container venting, usually at the end of each day of operation.

[1] The Triathalon and femto-TECH instruments will display tritium air concentration.

[2] Use flow information from the Sierra 620s velocity meter, duct diameter, and time interval to convert air concentration to determine integrated curies. Attachment 4 or similar form (e.g., field notebook or spreadsheet) can be used.

[3] Periodically (e.g., every 15 minutes), determine the integrated emissions reading with each incremental venting to determine total curies emitted.

[4] If emissions hold points or limits from Section 4.1 or 4.2 are met or exceeded based on real-time instrument readings, pause or stop work accordingly and take the steps described in Section 3.1. Document all communications via email to WFO-DO.

[5] At the end of each FTWC venting (or other logical extended break in operations), exchange bubbler samples according to procedure EPC-CP-TP-0106.

[6] Process and submit bubbler samples to the Health Physics Analytical Laboratory (HPAL) for analysis per procedure EPC-CP-TP-0106. Request accelerated analysis.

[7] If HPAL analysis of bubbler samples cannot be completed before the next scheduled venting operation, use the emissions calculated by the Triathalon or femto-TECH for subsequent analysis. Proceed to section 4.4, returning to this section as HPAL data becomes available.

[8] Using the HPAL electronic data deliverable or equivalent report, calculate emissions using the RADAIR database or hand-calculations per procedure EPC-CP-QP-0112. This calculation should use the actual flow rate as measured or estimated per LA-UR-19-32748.

NOTE: These calculated emissions as measured by the bubbler will be the emissions of record for further use in this procedure. The measured bubbler emissions will supersede emissions calculated by the real-time instruments. Real-time data will only be used if there is a quality problem with the bubbler data.

4.4 Calculate Dose from Venting Operations

Curie emissions calculated in Section 4.3 are converted into off-site dose using the EPA's CAP88 v4 software. LANL procedures for using CAP88 are EPC-ES-TP-501 and EPC-ES-TP-511.

[1] From the EPC-CP meteorology program, request a meteorological file representing the actual wind conditions during the FTWC venting activities for which dose is being calculated. For example, if operations were confined to daylight hours on a specific day, the wind file should reflect that time frame to most accurately calculate dose.

[2] Generate the CAP88 v4 wind file for the specific dates of venting operation.

[a] If the specific wind file is not able to be generated in time to perform these analyses, use the most appropriate wind file for the activity, e.g., a file representing average wind data for the month in question from the appropriate weather tower.

[3] Using CAP88 v4, the new wind file, and the actual exhaust flow rate, calculate off-site dose to the Radionuclide NESHAP MEI from the current day's FTWC venting.

[4] If venting has taken place at multiple sites (e.g., both Area G and the Weapons Engineering Tritium Facility, WETF), repeat the steps in this section for each site's MEI location.

[5] Communicate the results of these calculations to EPC-ES Dose Assessment personnel via email. Include CAP88 v4 output for verification.

4.5 Determine Total FTWC Dose to Date

[1] Add the dose calculated in Section 4.4 to the previous Integrated FTWC Dose from Section 4.2. This new sum represents the year-to-date dose from FTWC venting operations.

[2] Repeat Step 1 for any other MEI locations evaluated. The highest (most conservative) dose is used for reporting and tracking to the limits established in Section 3.1.

[3] Report the dose from Step 2 to the FTWC venting operations PIC and to other interested stakeholders upon request. Document via email to WFO-DO.

4.6 Repeat Processes

If more FTWC venting operations will be performed, this entire process will be repeated until all venting operations are complete.

If venting activities take place at multiple locations, the entire process must be repeated for each potential MEI location.

[1] Using the integrated dose from Section 4.5, calculate new dose limits and air emissions limits according to Section 4.2.

[2] Measure emissions according to Section 4.3.

[3] Calculate off-site dose to MEI location(s) according to Section 4.4.

[4] Determine integrated FTWC dose at the MEI location(s) according to Section 4.5.

[5] Repeat this process for each day of operation or at intervals determined by the RAEM team leader and FTWC venting PIC.

4.7 Responses to Exceeding Established Limits or Hold Points

Meeting or exceeding the dose limits or hold points from Section 3.1 will trigger certain responses.

[1] If the "Pause for Evaluation" hold point (3 millirem) is exceeded, all venting operations will temporarily cease.

[a] The RAEM team leader and FTWC venting PIC (or their designees) will consult and evaluate the operation. This evaluation includes:

- The overall progress of the FTWC venting process & number of FTWC drums remaining to be vented.
- The level of emissions from each FTWC, relative to the total tritium inventory of each FTWC.
- The efficiency of emissions controls systems at reducing tritium emissions.
- The anticipated level of emissions projected for the remainder of the FTWC project.
- Any other factors which may affect the venting and emissions.

[b] Take any actions deemed necessary in Step 1.a.

[c] Document the pause, evaluation, and any actions in an email to WFO-DO.

[2] If the "Pause for Approval" hold point (6 millirem) is exceeded, notification is made to parties listed in Attachment 1.

[a] Report the dose to date and updated projections of future dose to the Attachment 1 signatories to provide the best information regarding the project's likely emissions and off-site dose consequence.

[b] Prior to resuming operations, verbal approval to continue shall be obtained from the Associate Laboratory Director for ESHQSS and Associate Laboratory Director for Weapons, or their designees.

[c] Document all notifications and approvals received via email to the WFO Division Leader (WFO-DO).

[3] If the Emissions Limit is exceeded, it means the project has approached or exceeded a dose of 8 millirem to the MEI from the FTWC project. No further venting can take place until an updated dose assessment is performed. Pause work and perform the verification steps below.

[a] Determine emissions and integrated dose in accordance with sections 4.3, 4.4, and 4.5.

[b] If the actual dose is 8 millirem or more, FTWC venting operations must cease for the year.

[c] If the actual dose is less than 8 millirem, limited operations can resume, with the goal of keeping total FTWC dose less than 8 millirem for the year. Verbal approval to continue must be received from the Associate Laboratory Director for ESHQSS and Associate Laboratory Director for Weapons, or their designees.

[d] Document in an email to WFO-DO all analyses, including pause work actions, subsequent dose calculations, and decisions to proceed or not.

4.8 Annual Dose Reporting

The FTWC emissions will be included in the LANL Radionuclide Air Emissions Report, submitted to EPA Region 6 in June of each year. MEI locations in this section refer to Radionuclide NESHAP MEIs.

[1] When generating the annual EPA report, compare the dose(s) measured at the MEI(s) from FTWC venting operations to other potential MEI locations from other LANL sites.

[2] Use processes in ENV-ES-QP-507, *Preparation of the Annual Rad-NESHAP Report* to determine the LANL-wide MEI location for the year.

[3] If a FTWC dose needs to be calculated to different MEI locations, use the meteorological files generated in Section 4.4 to determine doses from individual FTWC venting operations at the new MEI location(s).

[4] Sum the doses from individual FTWC venting operations to determine the FTWC project dose for the year, as calculated to each MEI location.

[5] Repeat this section for all potential MEI locations.

5.0 TRAINING

The training method for this procedure is **self-study** training and is documented in accordance with ADESH-TPP-301, *ADESH Training Program Plan.* Annual retraining is required and will be by self-study ("reading") of this procedure. All training must be assigned and tracked using the institutional training records management system, UTrain.

Training is required to procedures referenced in individual work steps above.

- EPC-ES-TP-501, Dose Assessment Using CAP88
- EPC-ES-TP-511, Calculating mrem per Curie Factors.
- ENV-ES-QP-127, Determination of Stack Gas Velocity and Flow Rate in Exhaust Stacks, Ducts, and Vents (pending update; new number EPC-CP-TP-0127)
- EPC-CP-TP-0106, Collecting Tritium Stack Bubbler Samples
- EPC-CP-QP-0112, Tritium Stack Emission Calculation and Reporting
- ENV-ES-QP-610, Radioactive Air Emissions Management Plan for LANSCE (pending update; new number EPC-CP-QP-0610)
- ENV-ES-QP-507, Preparation of the Annual Rad-NESHAP Report (pending update; new number EPC-CP-QP-0507)

6.0 RECORDS

EPC-CP is the Office of Record for this document and must be maintained in accordance with PD1020, *Document Control and Records Management* and ADESH-AP-006, *Records Management Plan*. Records generated by this document will be submitted to the RAEM records center.

Below are records generated as a result of implementing this procedure. Records generated are identified by title and type.

Record Title	QA Record	Non-QA Record
CAP88 Dose Calculations	☒	☐
Documentation of notifications and verbal approvals to continue operations (via email to WFO Division Leader).	☒	☐
Attachment 3 Daily Emissions Limits Calculations Worksheet (or equivalent) for each day of operations	☒	☐
Attachment 4 Emissions Tracking Worksheet (or equivalent) for each day of operations	☒	☐
Briefing materials and supporting documents	☐	☒

7.0 DEFINITIONS AND ACRONYMS

7.1 Definitions

See LANL Definition of Terms.

Limit – Level of emissions or dose that is not to be exceeded.

Hold point – Level of emissions or dose that triggers an action.

7.2 Acronyms

See LANL Acronyms Database.

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
Ci	Curies, unit of radioactivity; a quantity of radioactive material
DCF	Dose Conversion Factor, millirem off-site per curie emitted, generated by CAP88
DCF_p	Planning Dose Conversion Factor, maximum for potential scenarios
DOE	Department of Energy
EPA	Environmental Protection Agency
EPC	Environmental Protection and Compliance Division
EPC-CP	Environmental Compliance Programs Group
EPC-ES	Environmental Stewardship Group
FOD	Facility Operations Director
FTWC	Flanged Tritium Waste Container
HPAL	Health Physics Analytical Laboratory, part of RP-SVS
IWD	Integrated Work Document
LANL or the Laboratory	Los Alamos National Laboratory
MEI	Maximally Exposed Individual member of the public
PIC	Person In Charge
PIP	Project Implementation Plan
POC	Point Of Contact
QP	Quality Procedure
Rad-NESHAP or RN	National Emissions Standards for Hazardous Air Pollutants, Radionuclides. Codified in Title 40, Code of Federal Regulations, Part 61, Subpart H
RAEM	Radioactive Air Emissions Management team
RP-SVS	Radiation Protection Services Group
TA	Technical Area
WETF	Weapons Engineering Tritium Facility, TA-16-205.

8.0 REFERENCES

LA-UR-18-26283, R2, Application for Pre-Construction Approval under 50 CFR 61 Subpart A and H for Venting of Flanged Tritium Waste Containers (FTWCs) at TA-54

40 CFR 61, Subpart H, *National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities*

DOE Order 458.1, *Radiation Protection of the Public and the Environment*

P300, *Integrated Work Management*

LA-UR-19-32748, *Protocol for Determining Actual Flow Rate in FTWC Duct Systems*

EPC-ES-TP-501, *Dose Assessment Using CAP88*

EPC-ES-TP-511, *Calculating mrem per Curie factors*

ENV-ES-QP-127, *Determination of Stack Gas Velocity and Flow Rate in Exhaust Stacks, Ducts, and Vents* (pending update; new number EPC-CP-TP-0127)

EPC-CP-QP-0106, *Collecting Tritium Stack Bubbler Samples*

EPC-CP-QP-0112, *Tritium Stack Emission Calculation and Reporting*

ENV-ES-QP-610, *Radioactive Air Emissions Management Plan for LANSCE* (pending update; new number EPC-CP-QP-0610)

ENV-ES-QP-507, *Preparation of the Annual Rad-NESHAP Report* (pending update; new number EPC-CP-QP-0507)

EPC-CP-106-FTWC, *Flanged Tritium Waste Container (FTWC) Venting Setup, Sampling, and Takedown*

PD1020, *Document Control and Records Management*

ADESH-TPP-301, *ADESH Training Program Plan*

ADESH-AP-006, *Records Management*

LANL Definition of Terms

LANL Acronyms Database

9.0 APPENDICES

None.

10.0 ATTACHMENTS

Attachment 1: Endorsement of Milestones, Actions, and Methods

Attachment 2: Process Flow Chart

Attachment 3: Daily Emissions Calculation Worksheet

Attachment 4: Emissions Tracking Worksheet

Attachment 1: Endorsement of Milestones, Actions, and Methods

Authorization is required to continue FTWC venting operations when accumulated MEI doses exceed 6 millirem. This authorization is required to ensure that LANL stakeholders are aware of the off-site dose and potential ramifications on other LANL operations.

If the 6 millirem hold point is met or exceeded, notification by telephone or email will be made to all parties below. A verbal briefing shall be made to ALDESHQSS and ALDW (or their designees); verbal approval from these two parties constitutes authorization to continue venting operations. These notifications and authorizations shall be documented in an email to the WFO Division Director.

Current FTWC Dose: _____ millirem to (MEI location): _____

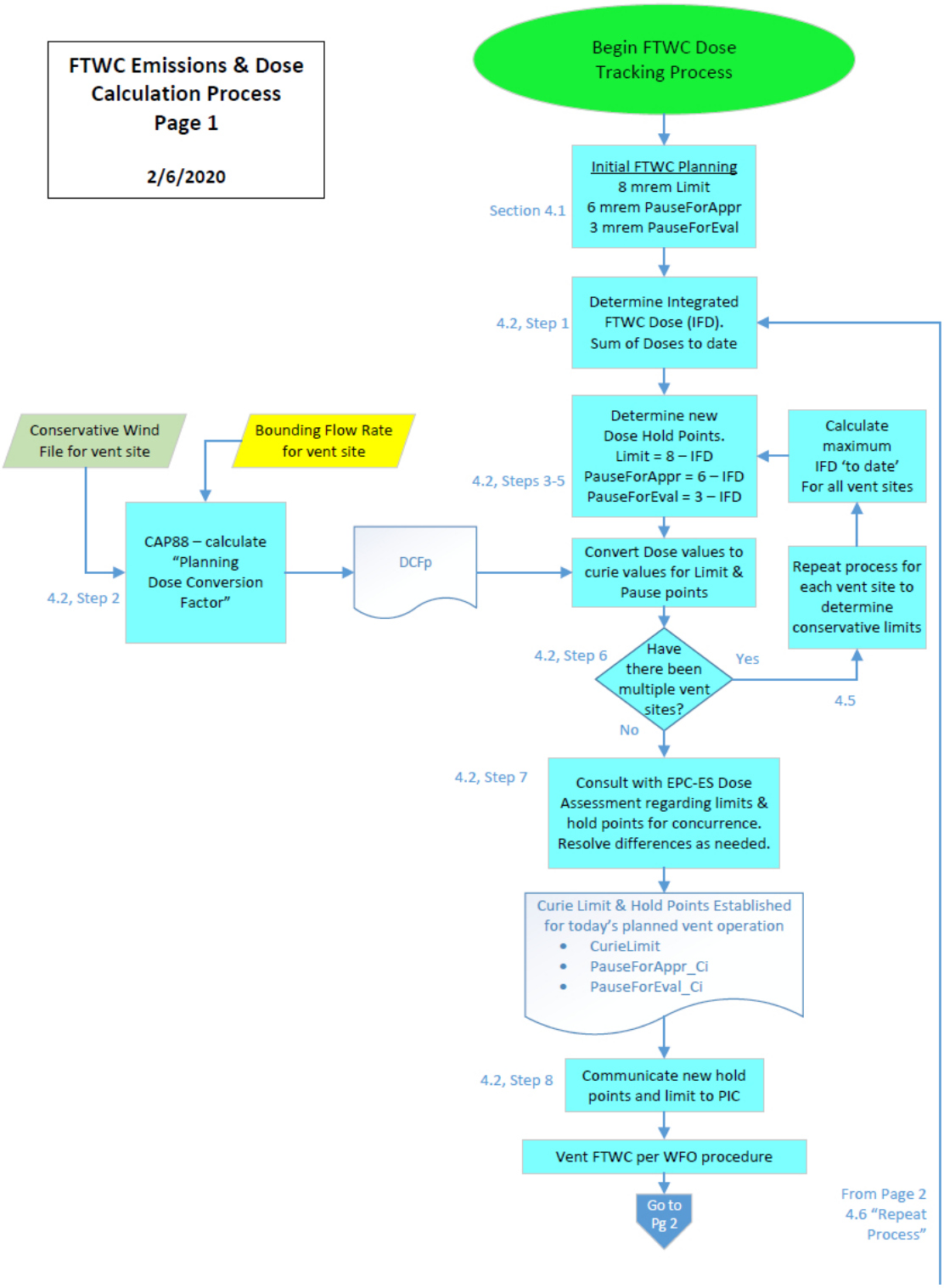
Projected Dose upon completion of venting: _____millirem.

Table 3. Endorsement of Milestones and Planned Actions

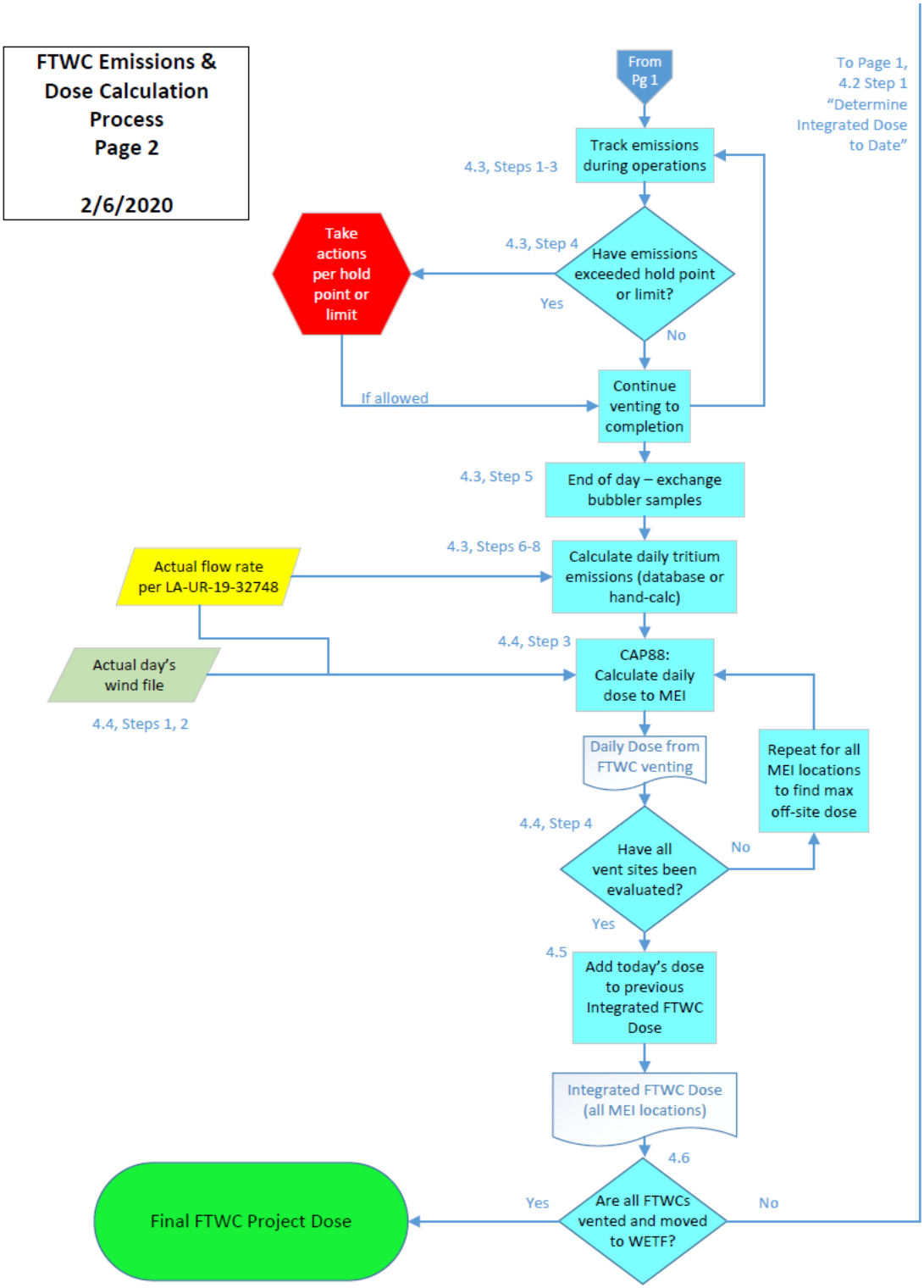
Role	Signature	Date
EPC-CP Group Leader	*Signature on file* Taunia Van Valkenburg	12 Feb 2020
EPC Division Leader	*Signature on file* Jennifer Payne	13 Feb 2020
Associate Laboratory Director, ESHQSS	*Signature on file* Michael Hazen	13 Feb 2020
FTWC Venting Person-in-Charge	*Signature on file* Don Hyatt	18 Feb 2020
WFO Division Director	*Signature on file* Brian Watkins	18 Feb 2020
Associate Laboratory Director, Weapons	*Signature on file* Derrick Montoya	18 Feb 2020
Engineering Services	*Signature on file* Derek Gordon	18 Feb 2020
Briefing for NA-LA personnel		18 Feb 2020
Briefing for EM-LA personnel		13 Feb 2020
Briefing for N3B personnel		13 Feb 2020

Attachment 2: Process Flow Chart

Visio file location: \\dcstorage.lanl.gov\ENV\CP\RAEM\RAD-NESHAPS\FTWC\Venting Procedure Docs



Attachment 2: Process Flow Chart, continued



Attachment 3: Daily Emissions Calculation Worksheet

This worksheet provides an example of information required to determine daily emissions hold points and limits.

FTWC Venting Process # _____ Start date & time: _____

FTWC WCATS ID: _____ End date & time: _____

Venting Location: _____

Integrated FTWC Dose (IFD) from previous ventings: IFD = _____ mrem *Enter 0 if first vent operation*

Calculating Today's Limit & Hold points:

CAP88 Planning Dose Conversion Factor = DCF_p = _____ mrem/Ci

DoseLimit: 8 mrem - _____mrem (IFD) = _____ mrem

Corresponding CurieLimit = DoseLimit / DCF_p = _____ / _____ = _____Ci

PauseForApprovalDose: 6 mrem - _____mrem (IFD) = _____ mrem

PauseForApproval_Ci = PauseForApprDose / DCF_p = _____ / _____ = _____Ci

PauseForEvaluationDose: 3 mrem - _____mrem (IFD) = _____ mrem

PauseForEvaluation_Ci = PauseForEvalDose / DCF_p = _____ / _____ = _____Ci

Concurrence on limits from EPC-ES Dose Assessment: (date/time/initials): _____

These levels communicated to the FTWC Venting PIC (date/time/initials): _____

Current Venting Operation Data:

GPS Coordinates of stack: _____ Latitude, _____ Longitude

Stack exhaust flow rate: _____ acfm.

Basis for flow rate determination: _____

Calculations by: _____ Date: _____
Printed Name / Signature / Z#

Verified by: _____ Date: _____
Printed Name / Signature / Z#

Attachment 4: Emissions Tracking Worksheet

This worksheet provides an example of ways to track FTWC stack emissions during venting ops.

FTWC Venting Process # _____ Start date & time: _____

This process: Log Sheet _____ of _____ End date & time: _____

Venting Location: _____

Stack Flow rate = _____ actual ft^3/min * 0.028317 m^3/ft^3 = _____ m^3/min

*Emitted Activity (Ci) = Concentration (uCi/m^3) * Δt (min) * Flow (m^3/min) * 1E6 (Ci/uCi)*

Time of Reading	Concentration microCi/m^3	Time Interval Δt; min	Flow (*above*) m^3/min	Emitted Activity microCi	Emitted Activity curies

Calculations by: _____ Date: _____
Printed Name / Signature / Z#

Verified by: _____ Date: _____
Printed Name / Signature / Z#