Outdoor HEPA Vacuum Operations

Tank Farm Plant Operating Procedure

Effluent Treatment Facility

USQ Not Required – ETF is a < Hazard Category 3 Radiological Facility

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
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<tr>
<td>A-3</td>
<td>07/23/2018</td>
<td>ETF Formatting</td>
<td>Updated records section, updated Print/Sign/Date in data sheets, and updated RadCon statement in Section 3.</td>
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<tr>
<td>A-2</td>
<td>10/23/2017</td>
<td>Periodic Review Change</td>
<td>Updated data sheet 1 to include print sign date changes. Updated step 3.3.8, 3.3.4, and 4.2.1. Removed first time use banner.</td>
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<tr>
<td>A-1</td>
<td>11/29/2016</td>
<td>Record requirements changed</td>
<td>Inconsequential change to update record section.</td>
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<tr>
<td>A-0</td>
<td>11/02/2015</td>
<td>Converting to WRPS Format</td>
<td>New Procedure, Supersedes ETF-PRO-OP-51510 (POP-40-001)</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for the requirements for use of HEPA-filtered vacuums used outdoors at ETF, in accordance with the site-wide Hanford Site Air Operating Permit 00-05-006, Emission Unit ID #455. Completion of the data sheets is not required for use of the HEPA filter vacuum inside the 2025-E building because the building has permitted HEPA filters on its exhaust.

The air operating permit allows use of HEPA-filtered vacuums outside for reduction of removable/smearable contamination and for reduction of fixed contamination in association with shrouded tools for sanding, stripping, etc.

1.2 Scope

The following HEPA vacuum models are allowed by the air operating permit:
- Euroclean UZ-878A (wet/dry)
- Euroclean UZ-930S (dry)
- Nilfisk GS-83 (dry)
- Tiger Vac, Model B-8 (wet/dry).

The following activities are not covered by this procedure:
- Vacuuming soil or vegetation that is not in the form of a dust layer on a hard surface.
- Using the HEPA-filtered vacuum to ventilate an air space of glove bag during work activities that have the potential to release contamination.
- Using the HEPA-filtered vacuum to replace an existing exhaust unit covered by another emission unit in the air operating permit.

This procedure does not cover disposal of wastes generated by use of the HEPA vacuum. For information on waste handling, refer to the work documentation, Waste Planning Checklist (SWITS-generated), or consult Waste Technical Services.
2.0 INFORMATION

2.1 Terms and Definitions
- APQ - Annual Possession Quantities
- EFR - Environmental Field Representative
- SWITS - Solid Waste Information and Tracking System.

2.2 General Information
2.2.1 Error! Reference source not found. is to be completed by all personnel who initial and/or sign this procedure.
2.2.2 HEPA vacuums should be kept locked when not in use.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Equipment Safety
3.1.1 Keep the power cord away from oil and heat to avoid damage to cord insulation.
3.1.2 Inspect power cord, hose wands, fittings, and attachments for damage before use.

3.2 Radiation and Contamination Control
3.2.1 When this procedure is worked in radiological areas, an approved radiological work permit (RWP) is required. If radiological conditions or work performed falls outside the scope of the RWP, all work activities must be discontinued until a new or revised RWP has been issued in accordance with TFC-ESHQ-RP_RWP-C-03.

3.3 Environmental Compliance
3.3.1 Do not vacuum contaminated soil using HEPA vacuum without EFR approval.
3.3.2 If a new HEPA vacuum is to be used outside, ETF management must notify the Washington State Department of Health at least seven days prior to aerosol testing. Management will coordinate testing of new equipment with notifications to the Department of Health. A new HEPA vacuum must be approved by the Washington State Department of Health prior to use.
3.3 Environmental Compliance (Cont.)

3.3.3 An aerosol test must have been performed on the vacuum within a year prior to use to ensure the integrity of the HEPA filtration is maintained. Aerosol testing is also required prior to use if any tamper-indicating seal is broken or tampered with. (Air Operating Permit, Emission Unit ID #455)

3.3.4 Vacuums are not to be used for areas or materials with removable contamination levels that exceed 100,000 dpm/100 cm² beta-gamma or 2,000 dpm/100 cm² alpha. These levels define the limits of a contamination area; therefore, the vacuums cannot be used in unfiltered high contamination areas. An exception to these limits is restricted to spot surface contamination areas found during outdoor radiological field surveys and to clean up localized radiologically contaminated materials (e.g., dust, dirt, bird droppings, animal feces, insects, spider webs, tumbleweed fragments, etc.). These types of materials could have beta-gamma contamination levels exceeding 1,000,000 dpm/100 cm², but are very localized (e.g., a few square meters, rather than hundreds of square meters) and could occur in contamination area, buffer areas, and clean zones. This exception does not apply to areas normally posted as high contamination areas. (Air Operating Permit, Emission Unit ID# 455)

3.3.5 To ensure APQ is not exceeded, Engineering must estimate the cumulative curies amounts prior to use. The combined APQ for all facilities in the 200 East Area is limited to 4.57E-03 Ci alpha (as Pu-239) and 2.30E-01 Ci beta-gamma (as Sr-90) per year. (Air Operating Permit, Emission Unit ID #455)

3.3.6 The vacuum exhaust port is to be surveyed before and after each use to verify filter integrity. (Air Operating Permit, Emission Unit ID #455)

3.3.6.1 Survey is recorded daily on Data Sheet 1.

3.3.6.2 If vacuum exhaust port smears are positive, remove vacuum from service and notify management. (Air Operating Permit, Emission Unit ID# 455)

3.3.7 The size of the areas cleaned with the vacuum and the surface contamination or sample results for the areas will be recorded daily on Data Sheet 1.
3.3 Environmental Compliance (Cont.)

3.3.8 Engineering must estimate the potential curies released during the proposed activity and determine that the cumulative curies for the year (i.e., the estimated APQ) do not exceed the 90% limit for listed in item 3.3.5. The curies vacuumed can be calculated using sample results or by entering the estimated or measured surface contamination levels and surface area into the formulas in Data Sheet 2. Curies from previous activities can be obtained from the Air Operating Permit Reporting Coordinator. (Air Operating Permit, Emission Unit ID #455)

3.3.9 The EFR will transmit copies of completed data sheets to the WRPS Air Operating Permit Reporting Coordinator for quarterly submittal to the Washington State Department of Health. (Air Operating Permit, Emission Unit ID #455)

3.3.10 In the event of a spill/leak/release, notify the SOM/FWS and respond per ETF-ERP-85B-003, Emergency Spill or Release at ETF.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- HEPA vacuum (Euroclean UZ 878A, Euroclean UZ-930S, Nilfisk GS-83, Tiger Vac, model B-8)
- Tape
- Plastic bags
- Ground-Fault Circuit Interrupter (GFCI).

4.2 Field Preparations

4.2.1 ENSURE HPT has confirmed removable contamination levels are less than 100,000 dpm/100 cm² beta gamma or 2,000 dpm/100 cm² alpha except for localized spots of removable contamination as allowed by item 3.3.4.

4.2.2 ENSURE Engineering has estimated the potential curies released during the proposed activity and determined that the cumulative curies for the year (i.e., the estimated APQ) do not exceed the 90% limit for each facility listed in item 3.3.5.

4.2.3 CHECK vacuum HEPA filter integrity for the following:

- Aerosol test
- Sticker attached
- Tested within last twelve months
- Tamper indicating seal(s) on the HEPA canister lid joint is intact.

4.2.4 CHECK that hoses are not damaged and are properly connected. There are no dents or punctures that could cause a leak in the vacuum or the hoses.

4.2.5 INSPECT the following for damage before use:

- Power cord
- Hose wands
- Fittings
- Attachments.
5.0 PROEDURE

5.1 Prepare for Vacuuming Operations

5.1.1 (NCO) ENTER the following information on Data Sheet 1:

- Location
- Vacuum make/model
- Date
- Purpose of operation/work package number
- Source constituents
- Type of waste.

5.1.2 REQUEST management sign/date Data Sheet 1 indicating prerequisites are complete.

5.1.3 REQUEST HPT perform pre-operations contamination surveys of contaminated surface to be vacuumed and exhaust port.

5.1.4 IF vacuum exhaust port smears are positive, PERFORM the following:

5.1.4.1 REMOVE vacuum from service.

5.1.4.2 NOTIFY SOM, Radiological Control Manager, and EFR.

5.1.5 DOCUMENT survey results on Data Sheet 1.

5.2 Perform Vacuuming Operations

5.2.1 STAGE vacuum cleaner near work area.

5.2.2 POSITION air exhaust port so the exhaust will not cause turbulence that could result in a spread of contamination.

5.2.3 TURN ON vacuum.

5.2.4 VACUUM area to be cleaned.

5.2.5 IF hose clogs while vacuuming, FEEL along the hose intake for blockage AND

MASSAGE OR TWIST hose at blockage to free obstruction.
5.2 Perform Vacuuming Operations (Cont.)

5.2.6 IF vacuum cleaner becomes full, CONTACT Radiological Control for assistance in changing out bag.

5.2.7 WHEN vacuuming operation is complete, TURN OFF vacuum.

5.3 Complete Daily Vacuuming Operations

5.3.1 REQUEST HPT perform post-operation removable contamination survey of the exhaust port.

5.3.2 DOCUMENT survey results on Data Sheet 1.

5.3.3 IF vacuum exhaust port smears are positive, PERFORM the following:

5.3.3.1 REMOVE vacuum from service.

5.3.3.2 NOTIFY SOM, Radiological Control Manager, and EFR.

5.3.4 WHEN vacuum drum unit is not in use, COVER ends of vacuum attachments, using plastic bags or tape.

5.3.5 ENTER information on area that was vacuumed daily into Data Sheet 1.

5.3.6 REQUEST Engineering calculate potential curies released using Data Sheet 2.

5.3.7 DOCUMENT results on Data Sheet 1.

5.3.8 REQUEST EFR perform post review and sign Data Sheet 1.

5.3.9 REPEAT steps 5.2.1 to 5.3.8 for each day of vacuuming.

5.4 Final Conditions

5.4.1 FORWARD copies of Data Sheet 1 to the ERF for submittal to the WRPS Air Operating Permit Reporting Coordinator.
5.5 Records

5.5.1 **PERFORM** the following for records identified within this procedure.

5.5.1.1 **RECORD** the number of times the record was generated in applicable column

OR

**PLACE** a check mark (✓) in the N/A column.

5.5.1.2 **SUBMIT** the package for verification of completed records.

<table>
<thead>
<tr>
<th>Records Submittal Checklist</th>
<th>Number of times completed</th>
<th>N/A (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Sheets</td>
<td></td>
<td></td>
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<tr>
<td>Data Sheet 1 – HEPA Filtered Vacuum Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Sheet 2 – Calculations for HEPA Vacuuming</td>
<td></td>
<td></td>
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<tr>
<td><strong>FWS/OE/Shift Manager SEND</strong> the completed records to the Central Shift Office for records retention.</td>
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________________________/________________________/______________
Signature                        Print (First and Last)      Date
FWS/OE/Shift Manager

The record custodian identified in the company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
### Data Sheet 1 – HEPA Filtered Vacuum Operations

#### Pre-Job Activities

<table>
<thead>
<tr>
<th>Job Location:</th>
<th>Vacuum Make/Model No:</th>
<th>Procedure/Work Package No:</th>
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<tbody>
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</table>

**Description of Activity:**

**Source Constituent (Sr-90, Tc-99, Pu-239, etc.) if known:**   **Type of Waste (dust, sand, concrete):**

**Procedure prerequisites are complete and vacuum is acceptable for use.**

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<thead>
<tr>
<th>Signature</th>
<th>Print (First &amp; Last)</th>
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**Shift Manager /OE**

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#### Pre-Job Radiological Control Surveys

**Max. surface contamination encountered or sample results (dpm/100 cm²)**

<table>
<thead>
<tr>
<th>Alpha:</th>
<th>Beta/Gamma:</th>
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</table>

**Survey #:**

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**Pre-job exhaust port smears (dpm/100 cm²)**

<table>
<thead>
<tr>
<th>Alpha:</th>
<th>Beta/Gamma:</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

<table>
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**Survey #:**

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#### Vacuum Operations

**Start Date/Time:**   **Finish Date/Time:**   **Area Clean (m²):**

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<thead>
<tr>
<th>Signature</th>
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<th>Date</th>
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**Operator**

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### Post-Job Radiological Control Surveys

<table>
<thead>
<tr>
<th>Post-job exhaust port smears (dpm/100 cm²)</th>
<th>Alpha:</th>
<th>Beta/Gamma:</th>
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</table>

### Environmental Post Review

<table>
<thead>
<tr>
<th>Allowed unabated emissions as Pu 239/240 (alpha) or as Sr-90 (beta gamma), curies/year</th>
<th>200 East Area</th>
<th>Alpha</th>
<th>Beta/Gamma</th>
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<tbody>
<tr>
<td></td>
<td>0.00457</td>
<td>0.23</td>
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</table>

| Estimated unabated emissions from activity, curies |                          |       |           |
| Previous total unabated emissions, year-to-date, curies/year |                          |       |           |
| New total unabated emissions, year-to-date, curies/year |                          |       |           |
| % of allowed unabated emissions. If greater than 90%, notify EFR. |                          |       |           |

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<tr>
<th>Signature</th>
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<tr>
<td>Environmental Post Review</td>
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</table>
Data Sheet 2 – Calculations for HEPA Vacuuming

Curies = \frac{\text{Surface area vacuumed (m}^2\text{) x highest contamination (dpm/100 cm}^2\text{)/100}}{(\text{Conversion factors: } 1E-04 \text{ m}^2/\text{cm}^2 \times 2.22E+12 \text{ dpm/1 Ci})}

= \text{SA Vacuumed (m}^2\text{) x max contamination (dpm/100 cm}^2\text{) x 4.5E-11 (Ci x cm}^2/\text{m}^2 \times \text{dpm).}

\begin{align*}
&{239}\text{Pu} = \frac{\text{Surface area (m}^2\text{) x highest contamination reading (dpm alpha/100 cm}^2\text{) x 4.5E-11 =}}{\text{potential curies released (alpha)}} \\
&{90}\text{Sr} = \frac{\text{Surface area (m}^2\text{) x highest contamination reading (dpm beta-gamma/100 cm}^2\text{) x 4.5E-11 =}}{\text{potential curies released (beta-gamma)}}
\end{align*}

EXAMPLE:
A proposed job involves vacuuming a hard surface in a contamination area of 500 m². The highest smear found was 1000 dpm/100 m² alpha contamination, and 50,000 dpm/1000 cm² beta-gamma contamination.

\begin{align*}
&{239}\text{Pu} = 500 \text{m}^2 \times 1000 \text{ (dpm/100 cm}^2\text{) x 4.5E-11 \text{ Ci x cm}^2/\text{m}^2 \times \text{dpm} = 2.3E-5 \text{ Ci}} \\
&{90}\text{Sr} = 500 \text{m}^2 \times 50,000 \text{ (dpm/100 cm}^2\text{) x 4.5E-11 \text{ Ci x cm}^2/\text{m}^2 \times \text{dpm} = 1.1E-3 \text{ Ci}}
\end{align*}

Calculations performed by:

\begin{center}
\underline{\text{Signature}} / \underline{\text{Print (First & Last)}} / \underline{\text{Date}}
\end{center}

Calculations* checked by:

\begin{center}
\underline{\text{Signature}} / \underline{\text{Print (First & Last)}} / \underline{\text{Date}}
\end{center}

*Calculations performed by the procedure are considered computations per TFC-ENG-DESIGN-C-10, Engineering Calculations.