Umatilla Chemical Agent Disposal Facility

ATTACHMENT 7

REQUIREMENTS FOR OPERATION OF THE MERCURY MONITORING SYSTEM

All federal Title 40 CFR citations are citations to the Title 40 CFR adopted as Oregon rule by OAR 340-100-0002 and as altered by OAR Chapter 340, Divisions 100-106, 109, 111, 113, 120, 124, and 142. See the preface introduction for further explanation.

ATTACHMENT 7

Requirements for Operation of the Mercury Monitoring System

A. General Description

During the HD campaign, the mercury monitoring system (VEN-MERC-001) shall continuously sample and monitor the total vapor phase mass concentration of mercury (Hg) (elemental and oxidized forms) in the MPF exhaust gas. It is located after the MPF PFS and before the common stack. It is comprised of the monitor units listed below and in Table 1.

A.1. The VEN-MERC-001A and VEN-MERC-001B CEMS provide the initial Hg detection and are the monitor of record during normal operations. They are redundant, and only one at a time must be online when being used to monitor for initial Hg detection. At least one must be online, operational, and monitoring except during the HD trial burn.

A.2. VEN-MERC-001C (Ohio Lumex monitor) is operated as a confirmational Hg monitor. It provides a means to confirm or refute the CEMS results.

A.3 VEN-MERC-001D is a historical Hg monitor, but may also be used to confirm or refute the CEMS or VEN-MERC-001C results and must be online during HD treatment operations. It may also be used to provide Hg detection when the VEN-MERC-001A, VEN-MERC-001B, and VEN-MERC-001C are not operational. VEN-MERC-001D must be online, functional, and sampling for Hg during the HD campaign.

B. Conversion of Mercury Concentrations

B.1. The measured mercury concentration at the stack shall be converted from grams per second to µg/dscm corrected to 7% oxygen using the following calculation.

$$\mathrm{Hg_c} = \mathrm{Hg_m} \times \frac{60\ \mathrm{sec/min}}{5{,}325\ \mathrm{dscf/min}} \times \frac{35.31\ \mathrm{dscf}}{\mathrm{dscm}} \times \frac{1{,}000{,}000\ \mu\mathrm{g}}{\mathrm{g}} \times \frac{14}{21 - 7.38}$$

Where: $\mathrm{Hg_c}$ = corrected concentration of mercury

$\mathrm{Hg_m}$ = measured concentration of mercury grams per second

5,325 = maximum measured flow rate during MPF surrogate trial burn (STB)

7.38 = average measured O_2 concentration in the stack gas during MPF STB

C. Operating Requirements

C.1. The mercury monitoring system shall be operated, maintained, and calibrated in accordance with Table 1 and Table 2 of this attachment.

C.2. The Permittees shall notify the Department no later than the next business day if VEN-MERC-001A and VEN-MERC-001B are inoperable, out-of-control (as defined in Table 2), or otherwise unable to accurately monitor for Hg. Notification is not required if either VEN-MERC-001A or VEN-MERC-001B is inoperable and the other CEMS is taken offline for routine calibration and maintenance.

a. If VEN-MERC-001C is being used as the monitor of record during the VEN-MERC-001A/B inoperability period, a VEN-MERC-001C tube shall be pulled and analyzed at least every four hours.

b. If VEN-MERC-001D is being used as the monitor of record during the VEN-MERC-001A/B inoperability period, a VEN-MERC-001D tube shall be pulled and sent offsite for analysis at least every four hours.

C.3. The Permittees shall notify the Department if VEN-MERC-001C becomes inoperable, out-of-control (as defined in Table 2), or otherwise unable to accurately monitor for Hg.

a. If VEN-MERC-001D is being used as the monitor of record during the VEN-MERC-001C inoperability period, the VEN-MERC-001D tubes shall be pulled and sent offsite for analysis at least every four hours.

C.4. At a minimum VEN-MERC-001D shall be operational and collecting samples for Hg monitoring purposes prior to feeding waste to the MPF. VEN-MERC-001A or VEN-MERC-001B must be monitoring during the HD campaign except during the HD trial burn .

C.5. If mercury (Hg) is detected at or above 15 micrograms per dry standard cubic meter ($\geq$15 µg/dscm) corrected to 7% oxygen, it shall be reported to the Department within 12 hours of detection.

C.6. When $\geq$15 µg/dscm corrected to 7% oxygen mercury is detected by the:

a. VEN-MERC-001A or -001B (CEMS), a VEN-MERC-001C tube shall be immediately pulled and analyzed.

b. VEN-MERC-001C (Ohio Lumex), a VEN-MERC-001D (historical) tube shall be immediately pulled and sent off-site for analysis.

C.7. Only one CEMS or the Ohio Lumex may be taken offline at a time for routine maintenance or calibration during HD campaign treatment operations.

D. Metal Parts Furnace Pollution Abatement System Carbon Filter System Carbon Change-Out Requirements

D.1. If the Hg CEMS results of ≥15 µg/dscm corrected to 7% oxygen are confirmed by VEN-MERC-001C or VEN-MERC-001D analysis or if the VEN-MERC-001C results of ≥15 µg/dscm corrected to 7% oxygen are confirmed by VEN-MERC-001D analysis, the affected PFS will be taken offline.

D.2. The affected PFS shall not be used in conjunction with any UMCDF treatment operations until the SIC is replaced in the affected PFS.

E. Metal Parts Furnace Waste Feed Limitations

At a minimum VEN-MERC-001D shall be operational and monitoring for Hg during the HD campaign and prior to feeding waste to the MPF. VEN-MERC-001A or VEN-MERC-001B must be monitoring during the HD campaign except during the HD trial burn .

F. Inspection Requirements

The mercury monitoring system shall be inspected in accordance with the requirements of the Inspection Schedule (Permit Attachment 3).

G. Recordkeeping Requirements

The following shall be documented in the daily operating record for the Hg monitoring system:

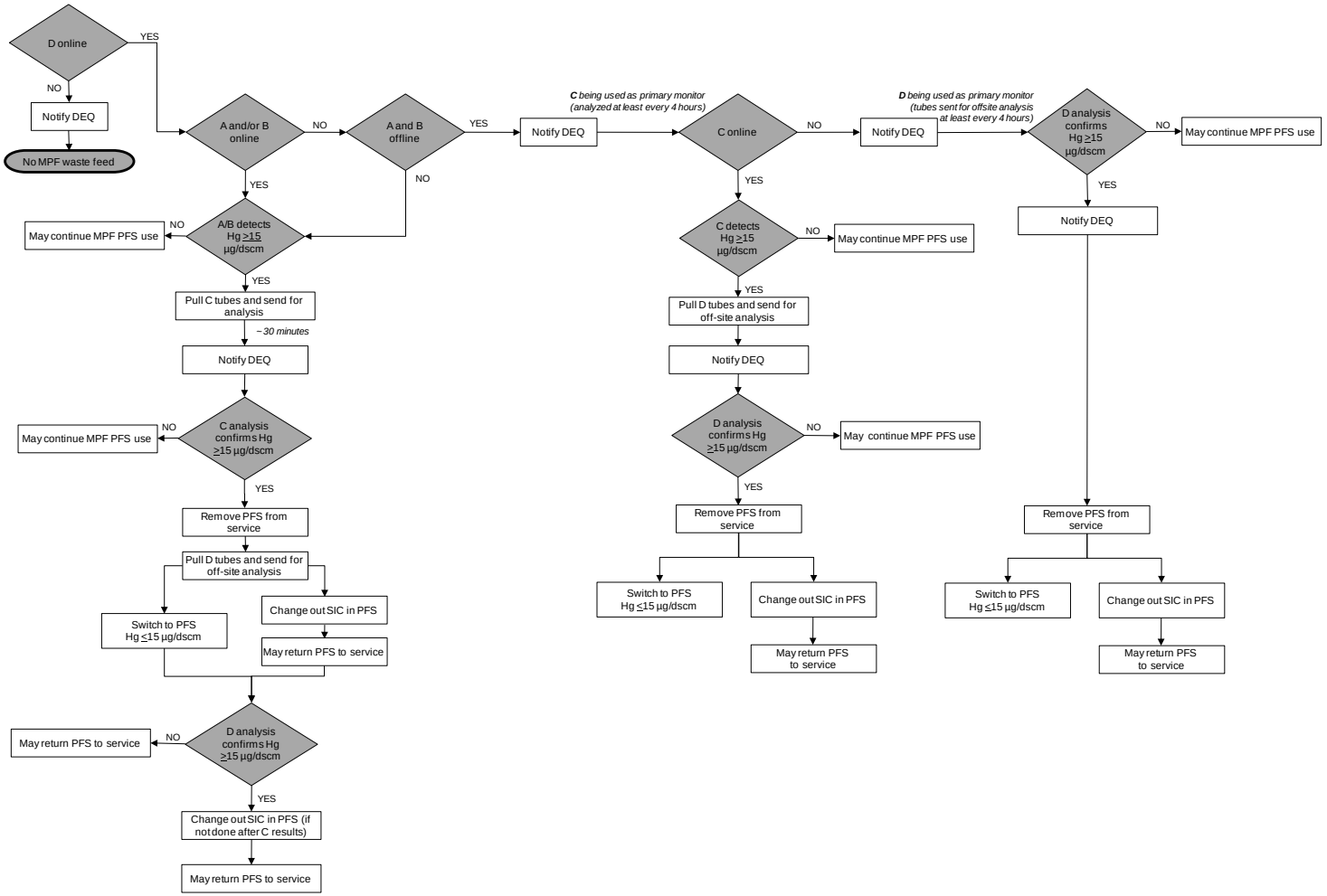
G.1. VEN-MERC-001A, VEN-MERC-001B, VEN-MERC-001C, and VEN-MERC-001D flow check and calibration results, quality assurance test results, operational status, and maintenance performed.

G.2. VEN-MERC-001A, VEN-MERC-001B, VEN-MERC-001C, and VEN-MERC-001D monitoring results.

H. Summary

Operation of the mercury monitoring system is depicted in Figure 1.

Figure 1. Mercury Monitoring System Decision Logic



A = VEN-MERC-001A (Hg CEMS – Primary, near-real-time monitoring)
B = VEN-MERC-001B (Hg CEMS – Primary, near-real-time monitoring)
C = VEN-MERC-001C (Hg sorbent bed (tube) monitor – secondary/confirmation monitoring, on-site analysis)
D = VEN-MERC-001D (Hg sorbent bed (tube) monitor – historical/confirmation monitoring, off-site analysis)

TABLE 1 MERCURY MONITORING SYSTEM INSTRUMENT AND PROCESS PARAMETERS

Tag Number	Type of Monitor	Normal Monitoring Function	Sampling and Analysis Frequency	Calibrated Instrument Range	RATA Method
VEN-MERC-001A	CEMS	Initial detection/ near-real-time analysis	90-second cycle, 5-minute averaging time	≤ 5% of the span value	EPA Method 29 or 30B
VEN-MERC-001B					
VEN-MERC-001C	Paired sorbent bed tubes with tube analyzer for on-site analysis	Confirmation	≤ 12-hours (confirmation operation) ≤ 4 hours (initial detection operation)		
VEN-MERC-001D	Paired sorbent bed tubes for off-site analysis	Historical	Normal Function: Sample: 24 hours Analysis: 1 tube every 10 days Initial Detection Operation: ≤ 4 hours	N/A (off-site analysis)	

CEMS = Continuous emission monitoring system
N/A = not applicable

TABLE 2 ONGOING QA TEST REQUIREMENTS FOR THE MERCURY MONITORING SYSTEMS

QA Test	Frequency	Procedure	Criteria[a]
Calibration Error Test	Daily	Challenge entire system with zero and mid- or high-level gas values of elemental or oxidized Hg	≤ 5% of the span value or ≤ 1.0 µg/scm absolute difference if span value is 10 µg/scm
Calibration Drift	Daily	Challenge entire system with zero and upscale elemental Hg gas once per day at two concentration values	≤ 5% of the span value
System Integrity	Weekly	Challenge entire measurement system with one oxidized Hg reference gas.	
System Integrity	Quarterly	Challenge entire measurement system with three reference gas values of elemental and oxidized Hg	
RATA and Bias	Annual	Compare mercury monitoring system results with results from an approved reference method for a minimum of nine (9) test runs.	≤ 20% of the mean RM value or ≤ 1.0 µg/scm absolute difference if the mean RM ≤ 5 µg/scm

[a] If criteria not met, identify and correct the problem before proceeding.

A. Criteria for Excessive CD. If either the zero (or low-level) or high-level CD result exceeds twice the applicable drift specification in the applicable PS in appendix B for five, consecutive, daily periods, the CEMS is out-of-control. If either the zero (or low-level) or high-level CD result exceeds four times the applicable drift specification in the PS in Appendix B during any CD check, the CEMS is out-of-control. If the CEMS is out-of-control, take necessary corrective action. Following corrective action, repeat the CD checks.
   1. Out-Of-Control Period Definition. The beginning of the out-of-control period is the time corresponding to the completion of the fifth, consecutive, daily CD check with a CD in excess of two times the allowable limit, or the time corresponding to the completion of the daily CD check preceding the daily CD check that results in a CD in excess of four times the allowable limit. The end of the out-of-control period is the time corresponding to the completion of the CD check following corrective action that results in the CDs at both the zero (or low-level) and high-level measurement points being within the corresponding allowable CD limit (i.e., either two times or four times the allowable limit in the applicable PS in Appendix B).

B. Excessive Audit Inaccuracy. If the RA, using the RATA, GA, or RAA exceeds the criteria in Section 5.2.3, the Hg monitor is out-of-control. If the Hg monitor is out-of-control, take necessary corrective action to eliminate the problem. Following corrective action, the source owner or operator must audit the monitor with a RATA, GA, or RAA to determine if the monitor is operating within the specifications. A RATA must always be used following an out-of-control period resulting from a RATA. The audit following corrective action does not require analysis of performance audit samples. If audit results show the monitor to be out-of-control, the monitor operator shall report both the audit showing the monitor to be out-of-control and the results of the audit following corrective action showing the monitor to be operating within specifications.
   1. Out-Of-Control Period Definition. The beginning of the out-of-control period is the time corresponding to the completion of the sampling for the RATA, RAA, or GA. The end of the out-of-control period is the time corresponding to the completion of the sampling of the subsequent successful audit.
   2. Criteria for Excessive Audit Inaccuracy. Unless specified otherwise in the applicable subpart, the criteria for excessive inaccuracy are:
      a. For the RATA, the allowable RA in the applicable PS in Appendix B.
      b. For the GA, ±15 percent of the average audit value or ±5 ppm, whichever is greater.
      c. For the RAA, ±15 percent of the three run average or ±7.5 percent of the applicable standard, whichever is greater.

C. Criteria for Acceptable QC Procedure. Repeated excessive inaccuracies (i.e., out-of-control conditions resulting from the quarterly audits) indicates the QC procedures are inadequate or that the Hg monitor is incapable of providing quality data. Therefore, whenever excessive inaccuracies occur for two consecutive quarters, the source owner or operator must revise the QC procedures or modify or replace the Hg monitor.