

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division	NUMBER IH75530
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INDUSTRIAL HYGIENE GROUP Standard Operating Procedure: Field Procedure	DATE 02/12/07
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SUBJECT: INSTRUMENT OPERATION: JEROME 431-X MERCURY VAPOR ANALYZER	

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1.0 Purpose/Scope

This procedure provides a standardized method for operation for the Jerome 431-X Gold Film Mercury Analyzer to be used as an area monitor. It should be used in conjunction with the IH procedure IH75180: *Atmospheric Testing Using Direct Reading Instruments*. [Personnel exposure monitoring for mercury is to be done using *IH75140 Atmospheric Testing with Integrated Sampling with Sorbents/ Filters/ Impingers: Media & Pump Sampling*.]

The Jerome 431-X Gold Film Mercury Analyzer provides a method for easy and accurate analysis of elemental mercury vapor in the workplace environment and for determining the location of mercury spills with a range of 0.001 to 0.999 milligrams per cubic meter of mercury (mg/m³ Hg).

2.0 Responsibilities

- 2.1 **Program Administration:** This procedure is administered through the SHSD Industrial Hygiene Group. Members of the SHSD Industrial Hygiene Group are required to follow this procedure. Use of the Jerome 431-X Gold Film Mercury Analyzer is to be performed only by persons who have demonstrated the competence to satisfactorily use the meter as

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evidenced by experience and training to the satisfaction of their supervision. Personnel that perform exposure monitoring with this instrument are responsible to follow all steps in this procedure. The data collected using this meter must have an appropriate evaluation of the hazard and risk by a skilled Industrial Hygiene professional.

- 2.2 Other BNL organizations that provide BNL with field monitoring or other hazard assessment services are required to follow this SOP or an equivalent document that ensures an equal or superior method of assessment documentation and recordkeeping.
- 2.3 **Industrial Hygiene Professional:** The *Industrial Hygiene Professional* of SHSD and other BNL organizations are to be qualified to conduct or supervise industrial hygiene hazard assessments and personal exposure monitoring using this procedure. These *IH Professionals* are responsible for:
- Interpreting, reporting, and documenting personal exposure monitoring in accordance with the requirements of this procedure, other appropriate SOPs, and generally accepted professional standards and practices.
 - Ensuring a quality report is prepared that documents the exposure, evaluates the relevance to exposure standards, and recommends protective and corrective actions.
 - Ensuring the final report is provided in a timely manner to all appropriate parties.
 - Ensuring that the appropriate data is correctly and completely entered into the BNL IH exposure monitoring database (i.e. *Compliance Suite*[®]).
 - Ensuring that original records of sampling and analysis enter the SHSD *Record Custodian* filing system.
- 2.4 **Industrial Hygiene Technician (Sampler):** The industrial hygiene technician is to be qualified to conduct industrial hygiene personal exposure monitoring under the direction of an *IH Professional*. The sampler is responsible for collecting personal exposure monitoring samples in accordance with the guidance of the *IH Professional* and the requirements of all SOP's pertinent to the particular monitoring requirements (i.e. Chain of custody, equipment check in/out, equipment operation, recordkeeping, etc.).
- 2.5 **Compliance Suite[®] data entry:** The management of the person conducting the sampling is responsible for entering complete and correct data into the BNL IH exposure monitoring database (i.e. *Compliance Suite*). This task may be assigned to one or more individuals who act as the data entry person for an organization, however, it remains the

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responsibility of the line management of the *Sampler* to ensure this task is fulfilled within 21 calendar days of the end of the sampling event.

3.0 Definitions

None.

4.0 Prerequisites

4.1 **Training prior to using this procedure:**

- 4.1.1 Demonstration of proper operation of the procedure to the satisfaction of the SHSD IH Program Manager. See Section 7 for qualification requirements.
- 4.1.2 Other appropriate training for the area to be entered (check with ESH coordinator or FS Representative for the facility).

4.2 **Area Access:**

- 4.2.1 Contact the appropriate Facility Support Representative or Technician to obtain approval to enter radiological areas.
- 4.2.2 Verify with the appropriate Facility Support Representative or Technician if a Work Permit or Radiological Work Permit is needed or is in effect. If so, review and sign the permit.
- 4.2.3 Use appropriate PPE for area.

5.0 Precautions

5.1 **Hazard Determination:**

- 5.1.1 The operation of this meter does not cause exposure to any chemical, physical, or radiological hazards. The meter design does not cause significant ergonomic concerns in routine use. The meter does not generate Hazardous Waste.
- 5.1.2 By its very nature as a mercury analyzer, this meter may be used in areas where elemental mercury is known or suspected to be present. Inhalation of mercury can have significant neurological health hazards including:
 - Acute inhalation of high airborne levels
 - Chronic (exposure over a long period- weeks to months) of low airborne

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levels.

The meter readings must be observed continuously when entering areas of potential mercury vapor exposure and the user should leave the area if readings approach the OSHA Ceiling or ACGIH TLV levels. If the Jerome 431-X is to be used for measurements of mercury processes where exposure may vary significantly over time or the length of exposure will be several hours, employee exposure monitoring may be required using a sorbent tube or badge. The evaluation of exposure monitoring needs should be made by a cognizant ESH professional.

- 5.1.3 There may be significant chemical or radiological hazards in areas where this meter is used. These hazards must receive a hazard evaluation by a cognizant ESH professional.

5.2 Personal Protective Equipment

- 5.2.1 **Hand:** Contact with liquid elemental mercury must be prevented. Use of this meter in areas of known or suspected mercury contamination requires the use of disposable gloves. Exam-style, splash gloves are acceptable. Acceptable elastomers are: Nitrile, Neoprene, PVC, Butyl, Natural Rubber, Viton, and PEVAL (SilverShield®).

5.2.2 **Body:**

- 5.2.2.1 If contact of the body with mercury contaminated surfaces is anticipated, a disposable suit should be used. Acceptable CPC materials include: Tyvek®, KleenGuard®, and cotton. Disposable garments must be discarded as mercury waste if contact with contamination has occurred.
- 5.2.2.2 If contact with potentially contaminated surfaces is not expected, body covering are optional. However, if personal clothing items become contaminated, they must be surrendered for BNL cleaning or disposal.

5.2.3 **Foot:**

- 5.2.3.1 If contact of the feet is anticipated with liquid mercury contamination, disposable shoe coverings, boots or booties should be used. Acceptable CPC material include: Tyvek®, KleenGuard®, and rubber.
- 5.2.3.2 If contact with potentially contaminated surfaces is not expected, shoe covering are optional. However, if personal shoes become contaminated, they must be surrendered for BNL cleaning or disposal.

- 5.2.4 **Respiratory:** If mercury levels are expected to exceed the ACGIH TLV of

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0.025 mg/m³ TWA-8 or OSHA of 0.1 mg/m³ TWA-8, respirators are required. A half face or full face APR or PAPR respirator with Mercury cartridge or an air line respirator may be used up to assigned protection factor listed in the BNL's Respiratory Protection Selection and Issuance SOPS.

5.2.5 **Eye:** Safety Glasses with side shields are required.

5.3 Instrument protection:

5.3.1 The Jerome 431-X is intended for elemental mercury vapor use only. DO NOT allow the probe or the instrument's intake to come in contact with liquids, dust or other foreign material.

5.3.2 Do not allow mercury contamination to stay on film overnight. Regenerate the sensor at the end of use. See Step 6.

5.4 **Job Risk Assessment:** Consult the *Job Risk Assessment* for [SHSD-JRA-05: Exposure Monitoring](#) at the SHSD OHSAS 18001/OSH Web page for the hazards and controls of this SOP.

6.0 Procedure

6.1 Equipment:

- Meter Body
- Sample Probe- aluminum, 0.25" O.D.
- Optional: remote sampling tubing- (not supplied with meter). Up to 25 feet of Teflon® tubing (0/25"O.D.) may be inserted into the probe fitting. Tygon® tubing may absorb mercury vapor and should not be used. Perform the Zero and Operational Check of the meter with the tubing in-line to determine the time delay in meter reading due to the transit of the sample vapor in the tubing.

6.2 Operation of the Jerome 431-X

6.2.1 **Set-up:** Place the metal Probe into the probe fitting attached to the front of the meter.

6.2.2 **Power On:** Plug the instrument into an AC power outlet. Press the power *ON* button: The digital meter displays **000**. *Disregard the digital meter's initial momentary reading.*

6.2.3 Recharge or replace the battery pack if the LO BAT indicator remains ON.

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The Jerome 431-X operates a minimum of 6 hours on a fully charged battery. A complete battery recharge takes 14 hours.

6.2.4 **Initial Warm Up:** Allow the instrument's electronics to stabilize by allowing 1 minute for the unit to warm up.

6.2.5 **Sensor Regeneration:** Regenerate the sensor (clear the sensors of any accumulated mercury) by following these steps. Plug the instrument into an AC power outlet. Press *REGEN* button. The instrument will begin a 10 minute regeneration cycle, indicated by *.H.H.H* flashing on the display. **Do not interrupt this cycle.**

For maximum accuracy, wait 30 minutes after the sensor regeneration cycle to rezero the unit. For emergency response, such as for spill cleanup, the unit can be rezeroed immediately after sensor regeneration.

6.2.6 **Zero:** Adjust the sensor by pressing the *ZERO* button and turning the zero adjust screw located under the handle. Adjust until the display reads 0.
Do not adjust the ZERO after the instrument has measured mercury and before the next regeneration.

6.2.7 **Bump Check:** Verifying that the Jerome 431-X is operating properly by sampling the headspace of a vial of mercury and observing the response. Do not use the meter if the instrument fails to detect mercury. Perform the bump test at least once each day of use.

6.2.8 **Operation Note(s):**

- ❖ *If the sensor is completely saturated, the digital meter displays .8.8.8 instead of a value. No further operation is possible until a sensor regeneration is performed.*
- ❖ *The gold film sensors in the analyzer do not respond to the following compounds: Hydrocarbons; CO, CO₂, and SO₂; and Water Vapor (water vapor on the gold film can cause irreparable harm to the sensor and must be avoided)*
- ❖ *The acidic gas filter, contained in the internal filter system, removes the following compounds that cause the gold filter to respond: Chlorine; NO₂; Hydrogen Sulfide; Most mercaptans (organic sulfur compounds or "thiols").*

6.2.9 **Operating in the SAMPLE Mode:**

- Press the *SAMPLE* button to start taking the sample.
- At the end of the 12 second sample cycle, read the digital meter. The

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number shown on the digital meter is the mercury concentration in mg/m^3 .
This value remains on the display until the next sample is taken.

6.2 Turning off the meter:

6.3.1 **Do not allow mercury contamination to stay on film overnight.**
Regenerate the sensor at the end of use.

6.3.2 Turn off the instrument by pressing the power *OFF* button. The instrument should always be turned off when not in use.

6.4 Documenting Sampling Results

6.4.1. Record readings on a BNL [Direct Reading Sampling Instrument](#) Form.

6.4.2. Plan and conduct hazard assessments and exposure monitoring using the procedure outlined in [IH 60500 Planning, Sampling, & Reporting Personnel Exposure Monitoring Results](#) for:

- Exposure Assessment Sampling Strategy,
- Initial Notification of Employee Monitoring Results, and
- Preparation of a formal report on the exposure monitoring or hazard assessment.

6.4.3. Return meter and original copy of the sampling form to the SHSD IH Laboratory. The file code for sample data is **IH75**.

6.4.4. Send a copy of the hazard evaluation report written on the sampling to the IH Laboratory, OMS, and employee(s) monitored, and the employee's supervision.

7.0 Implementation and Training

Prior to using this procedure, the user:

7.1 Demonstrates proper operation of this instrument to the satisfaction of the SHSD IH Program Manager.

7.2 Completes other appropriate training for the area to be entered (check with ESH coordinator or FS representative for the facility).

7.3 Completes OT&Q Training and a medical surveillance required for any PPE used on

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the job or for other hazards encountered in the work area.

- 7.4 Completes qualification on this procedure on at least a 3 year basis, providing the professional uses the equipment several times per year.
- 7.5 Personnel are to document their training using the Attachment 9.6 with its *Job Performance Measure- Completion Certificate*.

8.0 References

- 8.1 Jerome 431-X Mercury Vapor Analyzer OPERATION MANUAL

9.0 Attachments

- 9.1 Instrument Operations: Meter Display Readings
- 9.2 Material Safety Data Sheet for Mercury
- 9.3 Theory of Operation
- 9.4 Photo of the meter
- 9.5 Short Operating Instructions for the Jerome 431-X
- 9.6 Job Performance Measure- Completion Certificate

10.0 Documentation

Document Review Tracking Sheet		
PREPARED BY: <i>(Signature and date on file)</i> C. Kramer Author Date 01/26/01	REVIEWED BY: <i>(Signature and date on file)</i> R. Selvey SHSD IH Group Leader Date 02/06/01	APPROVED BY: <i>(Signature and date on file)</i> R. Selvey SHSD IH Group Leader Date 02/07/01
RCD Facility Support Procedure Committee Review 04/10/10		RCD Approved By / Date: <i>(Signature and date on file)</i> N. Foster 04/12/01 Procedure Committee Review
Filing Code: IH52QR.01	DQAR Date	Effective Date: 02/09/01

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Periodic Review Record		
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input checked="" type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above Section/page and Description of change: Renumbered IH-FP-105 to IH75530. Update text to refer to new numbering system.		
<i>Robert Selvey 03/09/01 (Signature on file)</i> SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above Section/page and Description of change: Revised to include RCD Facility Support Procedure Committee Review comments.		
<i>Robert Selvey 04/11/01 (Signature on file)</i> SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input checked="" type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above Section/page and Description of change: Revised to include Section 7 Implementation and Training. Text added to Section 2, 4,5, 6, and 7. JRA added to Section 5.		
<i>Robert Selvey 03/30/05 (Signature on file)</i> SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input checked="" type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above Section/page and Description of change: Corrected error in PEL in 5.2.4. Changed Step title in 6.2.8.1 for clarity. Removed the embedded JRA and linked to the actual JRA in OHSAS128001 web page. Changes 7.1 to indicate unified qualification criteria. Added a new JPM as Attachment 9.6.		
<i>Robert Selvey 02/01/06 (Signature on file)</i> SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above Section/page and Description of change: Corrected error in PEL in 5.2.4. Corrected to OSHA Exposure Limit as a TWA-8. Minor clarification of wording in 5.1.2 Revised Section 6 to streamline the instruction and remove non-essential notes. Removed the "Survey Mode" section. Limited scope in Section 1 to area surveys only.		
<i>J. Peters 11/14/06 (Signature on file)</i> SME Reviewer/Date:	<i>R. Selvey 02/12/07 (Signature on file)</i> Reviewer/Date:	Reviewer/Date:

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Attachment 9.1
INSTRUMENT OPERATIONS
Meter Display Readings

3 INSTRUMENT OPERATION

3.1 DIGITAL METER DISPLAY CODES

METER DISPLAY	EXPLANATION
000	Ready to sample
.000	Lack of mercury reading
00.0	Lack of mercury reading, display in nanograms (see page 17)
.8.8.8	Perform sensor regeneration (refer to page 6)
.H.H.H	Sensor regeneration in progress (.H.H.H flashes)
.L.L.L	Perform re-zero (refer to page 6)
.P.P.P	Power cord required or low line power, <100 VAC (or 200 VAC)(see page 17, Changing the Fuse, if .P.P.P remains on after the cord is connected.)
.H.L.P	High line power, greater than 130 VAC (or 260 VAC)
.LO BAT	Recharge batteries (refer to page 10)
.E.E.E	Same as LO BAT, automatically shuts off
.HL	High level, sample exceeded maximum sample limit (.999)
DURING SAMPLING	
.-	0-25% sensor saturation
.--	25-50% sensor saturation
---	50-75% sensor saturation
----	75-100% sensor saturation
DURING SAMPLING USING THE SURVEY MODE	
-	Survey sampling (minus sign flashes continuously)
WHEN ZERO IS DEPRESSED	Adjust to 0 <u>only</u> after sensor regeneration. It is normal for the display to read H after sampling has started.
0	Zero, ready to sample
H	High, turn Zero pot counterclockwise
L	Low, turn Zero pot clockwise

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Attachment 9.2

Material Safety Data Sheet For Mercury from the Jerome Instrument Manual

MATERIAL SAFETY DATA SHEET

Date of Issue 04/95

10.2 MERCURY

ARIZONA INSTRUMENT CORPORATION
4114 East Wood Street
Phoenix, AZ 85040
INFORMATION HOTLINE (800) 235-3360

Product Identification:

CHEMICAL NAME: Mercury metal
TRADE NAME & SYNONYMS: Quick Silver
CHEMICAL FAMILY: Metals
FORMULA: Hg
FORMULA WEIGHT: 200.59

Section 1 - Physical Data

ODOR: Odorless
SPECIFIC GRAVITY (H₂O = 1): 13.54
VAPOR PRESSURE AT 20°C (mmHg): 0.0012
BOILING POINT, 760 mm Hg (°C): 356.9
MELTING POINT (°C): -38.9

Section 2 - Fire and Explosion Data

FIRE HAZARD: Nonflammable
UNUSUAL HAZARDS: Extremely toxic vapors upon exposure to high temperatures.

Section 3 - Reactivity Data

STABILITY: Stable at room temperature
INCOMPATIBILITIES AND REACTIVITIES:
Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper, nitric acid

Section 4 - Leak/Spill Disposal Information

PRODUCT CLEAN-UP: Recover with suction cup equipped with a capillary tube.
DISPOSAL METHOD: Perform in compliance with all current local, state and federal regulations.

Section 5 - Health Hazard Information

EXPOSURE LIMIT
0.05mg/m³ (NIOSH/TWA)
0.100mg/m³ Ceiling (OSHA)

EXPOSURE/HEALTH EFFECTS: Coughing, bronchitis, pneumonia, tremor, insomnia, irritability, headache, fatigue, weakness, stomatitis, weight loss, GI disorder

SKIN & EYES: Can irritate skin and eyes

FIRST AID:

SKIN: Wash with water, get medical assistance.
EYES: Wash with water, get medical assistance.
INHALATION: Remove to fresh air, get medical assistance.
INGESTION: Get medical assistance.

Section 6 - Special Protection Information

Ventilation must be sufficient to meet TLV. Wear rubber gloves and eye protection.

Section 7 - Special Handling and Storing Precautions

Do NOT heat mercury unless appropriate safety precautions for highly toxic vapors have been taken. Store in sealed container.

Section 8 - Hazardous Ingredients

Mercury and Mercury vapor

The information and recommendations set forth herein are presented in good faith and believed to be correct as of the date hereof. Arizona Instrument Corporation, however, makes no representations as to the completeness or accuracy thereof and information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Arizona Instrument Corporation be responsible for damages of any nature whatsoever resulting from the use of or reliance upon this information.

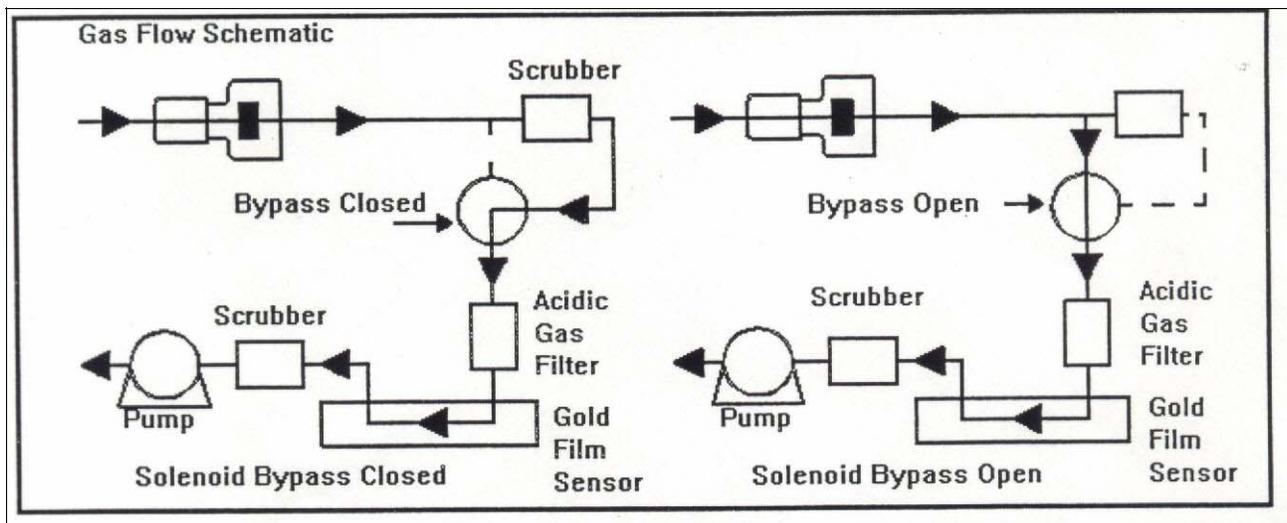
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Attachment 9.3 Theory of Operation

Activating the sample mode of the Jerome 431-X Gold Film Mercury Analyzer starts an internal pump which draws air through a scrubber filter and into the flow system. After 2 seconds, the sample solenoid bypass opens, closing off the scrubber filter from the flow system. The sample air passes through a filter (removing any acidic gases which interfere with the sensor's response to mercury) and is drawn over the gold film sensor. The sensor adsorbs and alters the electrical resistance in response to the mercury vapor. Nine seconds after starting, the sample solenoid bypass closes and the remainder of the sample is drawn through the scrubber filter and the flow system. The measured concentration is then displayed on the digital meter in milligrams per cubic meter (mg/m^3) of mercury.

Mercury is unique in its ability to alter the resistance of gold film. The Jerome 431-X sensor consists of two thin fold films, a reference and a sensor, configured in a Wheatstone Bridge circuit, which detects very small changes in electrical resistance. The reference film is sealed and not exposed to mercury. The sensor film is exposed to mercury resulting in resistance changes, which are measured by the circuit. A microprocessor computes the concentration of mercury vapor and displays the results.

During the sample cycle, bars on the digital meter represent the percentage of sensor saturation. Approximately sixty-five samples containing $0.1 \text{ mg}/\text{m}^3 \text{ Hg}$ may be taken before the sensor reaches saturation. After absorbing approximately 500 nanograms of mercury, the sensor becomes saturated and needs to be cleaned. This is accomplished by a manually activated 10 minute heat cycle, or sensor regeneration, which burns the mercury from the sensor. This mercury is absorbed on internal filters to prevent any external contamination. The solenoid bypass closes during the sensor regeneration cycle, causing the air to pass through the scrubber filter, providing clean air for the regeneration process. The flow system's scrubber prevents contamination to the atmosphere from the desorbed mercury.



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Attachment 9.4
Photo of the Meter



Probe

ZERO

REGENERATION

ON

OFF

SAMPLE

Display Function
Descriptions

Switch Function
Descriptions

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Attachment 9.5 Short Operating Instructions for the Jerome 431-X

	Step	User Action	Meter Display
1	Power ON	Plug into AC power. Press the power <i>ON</i> . Allow 1 minute for the unit to warm up.	000
2	Sensor Regeneration	Press <i>REGEN</i> . (10 minute regeneration cycle)	.H.H.H flashes
3	Zero	Press <i>ZERO</i> and adjust screw under the handle until the display reads "0".	0
4	Bump Check	Sample the headspace of a vial of mercury and observing the response	Should read a positive number
5	Single Sample Mode	Press and hold the <i>SAMPLE</i> . When finished, release the <i>SAMPLE</i> . (For maximum accuracy, wait 30 minutes after the sensor regeneration cycle to rezero the unit).	At the end of 12 seconds, the mercury concentration is shown in mg/m ³ .
6	Survey Mode	Hold the <i>SAMPLE</i> until the sensor status indicator bar(s) "_" begins flashing. Press the <i>ZERO</i> , then release the <i>SAMPLE</i> . (Meter samples every 3 seconds automatically. The accuracy of the instrument is reduced to +/- 20% @ .100 mg/m ³ .)	"-" flashes
7	Power OFF	Press <i>REGEN</i> . Regenerate the sensor at the end of use. Then turn off the instrument by pressing <i>OFF</i> .	.H.H.H flashes

Safety and Safety & Health Services Division

HP-IHP-75530

**Jerome 431-X Mercury Vapor Analyzer
Job Performance Measure (JPM) Qualification Certificate**

Candidate's Name	BNL#	Date of Qualification
		Expires (3 years)

Topic	Criteria	Qualification Status		
		Not Qualified	Corrected	Satisfactory
Personal Protective Equipment	Understands the need to be aware of the potential surface contamination and airborne levels of contaminants and knows how to determine the need for PPE and how to obtain the correct PPE for the hazard.			
Sampling Equipment	Shows where equipment needed for the procedure is located and how to properly sign it out.			
Sampling Protocol	Understands the exposure monitoring logic necessary to appropriately select sampling locations to accurately measure worker, public and environmental exposure potential.			
Meter Operation	Demonstrates pre-operational checks			
	turning on and off,			
	warm-up			
	zeroing			
	bump checking the meter.			
	taking reading and interpreting if valid			
Operating Modes	regeneration and the reason for this action			
	Explains the difference in the <i>Sample</i> and <i>Survey</i> modes and when each is used.			
Record forms	Shows how to correctly and completely fill all forms associated with this SOP.			
Analysis of data	Shows how to perform (or who to request to perform) the data analysis on the sampling data to access potential exposure to the sampler, worker, public and environment.			

I accept the responsibility for performing this task as demonstrated within this JPM and the corresponding SOP.

Candidate Signature:	Date:

I certify the candidate has satisfactorily performed each of the above listed steps and is capable of performing the task unsupervised.

Evaluator Signature:	Date: