One Team. One Culture.

Administrative Procedure

PRC-PRO-SH-409

Industrial Hygiene Monitoring, Reporting and Records Management

Revision 4, Change 3

Published: 01/29/2019
Effective: 01/29/2019

Program: Occupational Safety and Industrial Hygiene
Topic: Occupational Safety and Industrial Health

Technical Authority: Williams, Cynthia
Functional Manager: Robinson, Roby

Use Type: Administrative

- Solid Waste Operations Complex :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- Canister Storage Building/Interim Storage Area :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- Central Plateau Surveillance and Maintenance :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- Waste Encapsulation Storage Facility :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- 100 K Facility :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- Plutonium Finishing Plant :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- Transportation :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie
- 324 Facility :
  Categorical Exclusion: GCX-2 (Editorial Changes)
  Screener: Kraemer, Laurie

JHA: Administrative
Periodic Review Due Date:09/28/2022
Publication Correction:11/04/2019
Rev. 4, Chg. 3

Change Summary

Description of Change

Align language regarding sample location documentation requirements, in 4 places, for consistency and completeness

TABLE OF CONTENTS

1.0 INTRODUCTION ... 3
1.1 Purpose ... 3
1.2 Scope ... 3
1.3 Applicability ... 4
1.4 Implementation ... 4
2.0 RESPONSIBILITIES ... 4
2.1 Project Industrial Hygienist (PIH) ... 4
2.2 Industrial Hygiene (IH) Program Manager ... 4
2.3 Surveyor or Assessor (IH or IHT) ... 5
2.4 SWIHD Administrator ... 5
3.0 PROCESS ... 6
3.1 General Requirements for IH Exposure Monitoring/Sampling Records ... 6
3.1.1 Use of SWIHD ... 7
3.1.2 Record Configuration Management ... 9
3.2 Documenting IH Surveys ... 9
3.2.1 Use of IH Sample Plans ... 9
3.2.2 Collecting Exposure Monitoring Data ... 10
3.2.3 Revising Exposure Monitoring Records in SWIHD ... 11
3.2.4 SWIHD and Laboratory Data Flags ... 12
3.2.5 Cancelling a SWIHD Survey ... 13
3.3 Chemical Agent Surveys ... 15
3.3.1 Air Sampling Surveys ... 15
3.3.2 Direct Reading Instrument (DRI) Monitoring Surveys for Chemical Hazards ... 19
3.3.3 Surface/Bulk Sampling Surveys ... 20
3.4 Physical Agent Surveys ... 21
3.4.1 Heat Stress Monitoring Surveys ... 21
3.4.2 Noise Surveys ... 24
3.5 Other Agent Surveys ... 27
3.5.1 Ergonomic Surveys ... 27
3.5.2 Generic Survey Tab ... 28
3.6 Beryllium Facility Assessment ... 28
3.7 Requests for Exposure Monitoring Data ... 29
4.0 FORMS ... 30
4.1 Other Forms ... 30
5.0 RECORD IDENTIFICATION ... 30
6.0 SOURCES ... 31
6.1 Requirements ... 31
6.2 References ... 31
6.3 Developmental References ... 32

List of Tables

Table 1. SWIHD Status and Actions 8
Table B-1. Working (Business) Days for Employee Notification of Results 37

List of Appendixes

Appendix A - Glossary 33
Appendix B - DOE & OSHA-Driven Time Requirements 37
Appendix C - Method for Estimating Hearing Protector Attenuation 38

1.0 INTRODUCTION

1.1 Purpose

This procedure establishes the CH2M HILL Plateau Remediation Company (CHPRC) Industrial Hygiene (IH) sampling and monitoring program for chemical, ergonomic, biological, and physical agents (except for ionizing radiation; addressed with Radiation Protection procedures). Requirements for monitoring and reporting of chemical, ergonomic, biological and physical agent hazards in CHPRC activities are implemented with this procedure, which describes requirements for planning, documenting, reporting, and managing IH records using the Site Wide Industrial Hygiene Database (SWIHD) and/or other supporting hard-copy data collection forms.

This procedure addresses Occupational Safety and Health Administration (OSHA) requirements identified in *Occupational Safety and Health Standards* (1910), *Safety and Health Regulations for Construction* (1926), and under substance-specific standards, *Noise,* and Subpart Z, *Toxic and Hazardous Substances,* and is an implementing mechanism for PRC-MP-MS-003, *Integrated Safety Management System/Environmental Management System Description (ISMSD).* The following requirements are addressed in this procedure:

- Use of OSHA Permissible Exposure Limits (PEL) or the American Conference of Governmental Industrial Hygienists (ACGIH®) Threshold Limit Values (TLV®), whichever is more stringent;
- Initial and periodic exposure evaluation;
- Employee notification of exposure monitoring results;
- Exposure monitoring recordkeeping;
- Access to exposure monitoring information for medical surveillance;
- Employee access to exposure monitoring information, including OSHA standards;
- Observation of monitoring and access to exposure monitoring records for the employee and/or the employee's representative.

1.2 Scope

This procedure applies to evaluation and monitoring of chemical, ergonomic, biological, and physical agent hazards in CHPRC activities and work areas, including but not limited to dusts, mists, fumes, vapors, mold, light, heat, and noise. It provides guidance for Occupational Safety and Industrial Hygiene (OS&IH) staff who conduct IH sampling and monitoring, and report results.

This procedure does not apply to medical monitoring results forwarded by the Occupational Medical Provider to the employee via the employee's manager; nor does it apply to ionizing radiation exposure and recordkeeping (refer to Radiation Protection procedures); nor to Confined Space Entry (refer to PRC-MP-SH-54314, *Confined Space Management Plan*).

1.3 Applicability

This procedure is applicable to all CHPRC operations and activities where there is a potential for employee exposure to chemical, ergonomic, biological, or physical agent hazards. It describes required monitoring and sampling activities to assess actual or potential hazards and the characterization of work place exposures using personal, direct reading, area, bulk, and wipe samples. This includes the reporting, retention, and retrieval of data using SWIHD.

CHPRC subcontractors who perform their own monitoring may collect samples using their personnel and equipment. Subcontractors may collect monitoring information on their own hard-copy or electronic forms, provided they contain the same information as on the corresponding approved CHPRC form (e.g., IH Personal Sampling Data, IH Noise Survey, CHPRC WBGT Monitoring Data, etc.). Subcontractor exposure monitoring/sampling data must be retained in SWIHD. The CHPRC Industrial Hygienist providing subcontractor oversight may enter a SWIHD survey under the *Generic* tab, and attach subcontractor data electronically.

1.4 Implementation

This procedure is effective upon publication.

2.0 RESPONSIBILITIES

Roles in this procedure are identified to align with SWIHD roles for ease of SWIHD use:

- The Project Industrial Hygienist (PIH) in this procedure fulfills the role of the PIH in SWIHD (Note: the role is identified as *Industrial Hygienist* in the *Ergonomics* tab or the *Assessor* in the *Beryllium* tab).
- The Industrial Hygienist (IH) or IH Technician in this procedure fulfills the role of Surveyor/Peer Reviewer in SWIHD (note: the role is identified as *Assessor* in the *Ergonomics* tab or the *Reviewer* in the *Beryllium* tab).

2.1 Project Industrial Hygienist (PIH)

- Verify IH surveys and SWIHD documentation are performed consistent with the planning, data collection, and reporting process described in this procedure.
- Review and evaluate laboratory data with respect to employee exposure and identify when additional controls or actions are warranted.
- Verify employee notification of exposure monitoring results are made within required timelines and that SWIHD survey closure actions are completed.

2.2 Industrial Hygiene (IH) Program Manager

- Establish, maintain, and manage CHPRC's interface with SWIHD.
- Provide oversight and review of SWIHD records.

2.3 Surveyor or Assessor (IH or IHT)

- Perform and document IH surveys under the guidance of the PIH consistent with the process described in this procedure.
- Verify SWIHD data fields are populated with information that describes the work activity and controls, including notation of engineering controls, administrative controls, personal protective equipment (PPE), and employees whose exposure is represented.
- Attach supplemental documents to provide an accurate representation of exposure monitoring activities to the SWIHD survey, such as photos, maps, and drawings.

2.4 SWIHD Administrator

- Upload analytical data into SWIHD surveys and attach laboratory reports.
- Upload IH exposure assessments, IH work permits, and IH sample plans (and document revisions) into SWIHD.
- Maintain and manage the records storage, handling, and access control of the submitted active and in-process records.

3.0 PROCESS

3.1 General Requirements for IH Exposure Monitoring/Sampling Records

IH monitoring and sampling documentation, which consists of notes on field-use forms, drawings, diagrams, calculations, photos, and other graphic material deemed pertinent, shall be retained as record material during sampling activities. Exposure monitoring documentation must be legible, complete, accurate, dated, labeled with the SWIHD survey identification number, and attached to the SWIHD survey.

All IH monitoring data and information from sampling events prior to use of SWIHD shall be maintained in hard-copy form. All OS&IH staff shall turn over any such data to IH Programs for records disposition determination.

While data is being collected for an IH survey, hard-copy field-use sample collection forms or the printed SWIHD field log, with supporting documents (e.g., photos, diagrams, maps), serve as record material. After data is entered into SWIHD and the survey is processed to *COMPLETE* status, the SWIHD survey is recorded in the Integrated Document Management System (IDMS) as the record material, in accordance with PRC-PRO-IRM-10588, *Records Management Processes*.

1. Field-use forms are not considered records after the survey has been completed and sent to IDMS, and may be destroyed in a manner that protects personal information in accordance with PRC-PRO-IRM-184, *Information Protection and Clearance,* (e.g., deposited in a *Controlled-Use Information* shred bin).

2. Changes to CHPRC field-use forms associated with this procedure must be coordinated through OS&IH Programs to assure compliance with requirements for managed forms, established by PRC-PRO-IRM-112, *Forms Control*.

3. If SWIHD fields or structure are modified administratively, such as to enhance collection, uniform reporting, and/or facilitate statistical analysis, it is not considered changing a record.

4. If data is modified in a SWIHD survey such that it would alter the meaning of a record, then a revision to the SWIHD record in IDMS must be made in accordance with Section 3.2.3.

Equipment and standards used to collect IH monitoring/sampling data are required to be within calibration tolerance and expiration dates, in accordance with PRC-STD-SH-54164, *Management of Industrial Hygiene Instruments*. When equipment fails to function within established parameters for pre- and post-use functional tests, the PIH will evaluate and document impacts that deviation may have on the validity of the data, using the *Comments* <u>or</u> *Out of Tolerance* sections of the SWIHD survey.

IH surveys are to be completed in a timely manner, e.g., no more than 15 working days after receipt of final sample results for media samples, or 15 working days after a survey where direct measurements are taken. When time requirements are not met, comments are to be entered into SWIHD explaining the reason for the delay.

- Extensions to SWIHD time requirements for record completion are to be reported to the Project OS&IH Manager and the IH Program Manager, with notification to the SWIHD Administrator.
- Notification of exposure monitoring results are still required to be provided to employees within the required time frame.

3.1.1 Use of SWIHD

Planning, documenting, reporting, and managing IH survey records using SWIHD requires the following:

1. Receive user access and operation briefing from IH Programs, documented in 600242, *Site Wide Industrial Hygiene Database Briefing.*

NOTE: *When entering data into SWIHD, the "**Save**" button must be activated for each data entry screen, or information will not be saved.*

2. Perform field work and document monitoring and sampling information using field-use forms, instrument data logs, or the printed SWIHD Field Log, and attach supplemental documentation to the SWIHD survey.
   - SWIHD sequentially generates survey numbers and assigns unique sample identification numbers.
   - Enter information into all SWIHD fields associated with the type of survey being conducted, including the engineering and administrative controls, and PPE used.
   - When conducting representative sampling, record the names of all workers whose exposure is represented by the sample being collected.
3. Process exposure monitoring/sampling survey data collected through SWIHD's *OPEN*, *READY*, *REVIEW*, and *COMPLETE* phases, as shown in Table 1, "SWIHD Survey Status and Actions."
   - After the survey has been entered as *COMPLETE*, a survey record is sent to IDMS and personal exposure monitoring notifications are sent to their respective email addresses, with a copy to the Site Occupational Medical Contractor.

Table 1. SWIHD Status and Actions

SWIHD Status	Survey Type	Required SWIHD Actions	Comments
OPEN	All	Surveyor to: Enter initial survey information; instrument pre/post function check information. Attach reports, data, pictures, sample plans, etc. Beryllium Assessor to: Enter initial or revision data and attach reports, data, pictures, sample plans.	Survey is viewable to the Surveyor on their home screen, and viewable to the IH in the specific SWIHD tab. Beryllium Facility Assessment is viewable only to the Beryllium Assessor on their home screen.
READY	All (except Beryllium)	IH to: Verify completeness and accuracy of survey data. If analytical data has been uploaded, verify Time-Weighted Average (TWA) results (for *Personal Noise*, *Air* Surveys). Generate and attach Personal Notification Letter (for *Personal Noise* Surveys).	Survey is on the IH's "Home Screen" for P(IH) to review. Analytical data (for Air, Surface, Bulk Surveys) may be pending analysis **or** results may be available and uploaded. (**NOTE:** As available, data can be uploaded and viewed on the IH's Home Screen, in yellow highlight); Personal Notification letter button is available in SWIHD for *Personal Noise.*
REVIEW	Air, Surface, Bulk ONLY	SWIHD Administrator to: Upload lab data and attach analytical data report, including Chain of Custody. IH to: Verify completeness and accuracy of survey data; AND For Personal Air Surveys: 1) Calculate and report time-weighted average (TWA) results; 2) Generate and attach Personal Notification letter(s), including, as applicable, letters to employees whose exposure is represented.	Analytical data is received and uploaded into SWIHD; Personal Notification letter button is available in SWIHD for *Personal Air*.
IN REVIEW	Beryllium ONLY	Beryllium Reviewer to: Verify completeness and accuracy of survey data.	**NOTE**: There are no comments for this action.
COMPLETE	All	Survey is submitted to IDMS for long-term storage.	Survey is recorded in IDMS; Personal Notification letters are sent to individuals.

3.1.2 Record Configuration Management

3.1.2.1 Pen and Ink Changes

Handwritten modifications to record material, such as on hard-copy field-use forms or the printed SWIHD field log prior to its entry into SWIHD, are made using a single line through the wording to be modified. The modification is then legibly written in place of the text that was lined through. The modifier shall initial and date the change.

3.1.2.2 Revisions

IH Sample plans, IH Exposure Assessments, Beryllium Facility Assessments, and other IH report documents are managed using version control, in accordance with PRC-PRO-IRM-8310, *Document Control Processes*. As the document is revised, it is identified as R1, R2, etc. The original version, as well as revisions, are retained as record material.

3.2 Documenting IH Surveys

3.2.1 Use of IH Sample Plans

An IH monitoring/sampling plan is utilized as reference instruction for data collection surveys and as a means to record characterization or sampling strategies, in accordance with PRC-PRO-SH-17916, *Industrial Hygiene Exposure Assessments*, or for beryllium, in accordance with DOE-0342-002*, Hanford Site Assessment and Characterization/Verification of Buildings Procedure,* or DOE-0342-004*, Hanford Site Assessment and Characterization/ Verification of Structures and Conex Boxes Procedure*.

In general, IH sampling should be representative of the exposure potential for the identified exposure group, or IH monitoring should represent a source or general concentration in an area.

Actionee	***Step***	***Action***
(P)IH	1.	IDENTIFY the IH Sample Plan, IH Exposure Assessment, or IH Work Permit to be used for sampling guidance, <u>OR</u> DEVELOP an IH Sample Plan for the activities, in accordance with PRC-PRO-SH-17916 or DOE-0342 (for beryllium). a. VERIFY the IH Sample Plan or IH Exposure Assessment is available in the SWIHD dropdown menu. 1) <u>IF</u> the IH Sample Plan or IH Exposure Assessment is not available in the SWIHD dropdown menu, <u>THEN</u> PROVIDE a copy to the SWIHD Administrator for upload into SWIHD.

3.2.2 Collecting Exposure Monitoring Data

Actionee	*Step*	*Action*
Surveyor or Assessor	1.	FOLLOW direction on the IH Sample Plan or IH Exposure Assessment AND SELECT the title and number of the plan used in SWIHD. a. PRINT the SWIHD field log for the survey. OR b. DOCUMENT the IH Sample Plan or IH Exposure Assessment title and number on field-use form(s), instrument data log, or notes used to collect and document IH sample data. 1) GENERATE a temporary Survey ID number that uniquely identifies the sampling event on hard copy forms. 2) GENERATE a unique sample number for each sample (including blank samples) that includes the survey number, followed by a dash, followed by a unique three-digit number.
	2.	COLLECT sampling and/or monitoring information using the SWIHD field log and/or hard copy field-use sample data collection forms. a. PROTECT personal information collected during sampling as “Official Use Only” (“OUO”) in accordance with PRC-PRO-IRM-184. b. TRANSCRIBE survey information into SWIHD AND ATTACH electronic copies of hard copy sample data form, and other information used to document sample activities (e.g., SWIHD field log, instrument data log, maps, drawings, photos), as applicable.
NOTE		*For RUSH samples, refer to PRC-PRO-SH-54243, Industrial Hygiene Sample Management, for detailed information. RUSH samples require advance consideration to ensure timely shipping and analysis.*
		c. GENERATE the SWIHD Chain-of-Custody (COC) form AND COORDINATE with the Lab Liaison for Sample Management to identify critical information, such as analytical time requirements for agent stabilization and/or special requirements for shipping and handling, in accordance with PRC-PRO-SH-54243. 1) PRINT AND SIGN the COC AND SUBMIT the COC with samples identified for laboratory analysis to IH Sample Management in accordance with PRC-PRO-SH-54243.
SWIHD Administrator	3.	After analytical results are received, UPLOAD laboratory results into SWIHD AND ATTACH the lab report and completed COC.

Actionee	*Step*	*Action*
(P)IH	4.	REVIEW SWIHD survey information in *REVIEW* or *READY* status AND VERIFY required sampling and analytical information is entered and/or attached to the SWIHD survey. a. IF the SWIHD survey has missing or incomplete information, THEN CONTACT the surveyor or laboratory point-of-contact to gather complete information and make comments as needed to provide an accurate record of sampling and monitoring activities.
	5.	PROCESS the SWIHD survey through the *COMPLETE* status to generate an IDMS record.

3.2.3 Revising Exposure Monitoring Records in SWIHD

Actionee	*Step*	*Action*
(P)IH	1.	IF exposure monitoring information is inadvertently omitted or requires updating, or additional information needs to be provided for clarity in a SWIHD survey that has been processed through the *COMPLETE* status and sent to IDMS, THEN PROVIDE additional comments and/or correcting information in an electronic document to the SWIHD Administrator. a. IDENTIFY the SWIHD survey number to be appended.
SWIHD Administrator	2.	APPEND the SWIHD survey by attaching the electronic document to the IDMS survey record.
(P)IH	3.	IF the SWIHD exposure monitoring record requires revision to allow the database to accurately display exposure monitoring information, (e.g., such as when the IH fails to accurately validate survey data before it is marked as *COMPLETE)*, THEN REQUEST the SWIHD Administrator *UNCOMPLETE* the SWIHD survey. a. NOTE the reason(s) why the survey needs to be uncompleted.
SWIHD Administrator	4.	REVIEW the request AND UNCOMPLETE SWIHD survey(s) that require revisions to exposure monitoring data.
(P)IH	5.	MAKE corrections to exposure monitoring data in SWIHD. a. IF the SWIHD survey includes a record of personal exposure monitoring, THEN REVISE the Personal Notification letter AND MARK it as a “Correcting Copy,” before identifying the survey as *COMPLETE.*

3.2.4 SWIHD and Laboratory Data Flags

Actionee	*Step*	*Action*
P(IH)	1.	USE SWIHD data flags to identify data that do not meet data quality requirements and need special consideration, such as: • The pre/post pump flow rate or instrument function check exceeds 10%, • Instrument malfunction or failure in the field, • Incorrect sample method or media used, • Overloaded air samples (e.g., loose particulate are seen in the air sample cassette after sample collection), • Post-use flow or function check cannot be achieved (e.g., the battery failed or lost charge, equipment is not released from a radiological area, equipment is lost or damaged).
NOTE:	*SWIHD uses the following data flags: Suspect, Void, Invalid, Out of Tolerance*	
	2.	USE the *Suspect* flag (*Lab Results* tab) when <u>sample data quality requirements are not met</u> or there are questionable or problematic circumstances or conditions (e.g., insufficient volume for the method or for analytical sensitivity above an exposure limit, pre/post use flow rate exceeds 10%), <u>AND</u> MAKE COMMENTS about the discrepancy. a. These data may be used with a thorough understanding of their limitation.
P(IH)/ Surveyor or Assessor	3.	USE the *Void* flag (*Pump* tab) when there are <u>sampling errors</u> (e.g., using the incorrect sample media or method, sample media detaches from the sample train, sample volume is uncertain, broken sample tube/media, samples appear overloaded in the field, or the media is contaminated) <u>AND</u> MAKE COMMENTS about the discrepancy.
P(IH)	4.	USE the *Invalid* (*Lab Results* tab) flag primarily when there are laboratory issues such that <u>sample results cannot be used to draw a conclusion</u> (e.g., sample is lost/damaged in shipment, sample media is overloaded, sample cannot be analyzed, or there is another non-sampling issue that render the results unusable) <u>AND</u> MAKE COMMENTS about the discrepancy.

Actionee	*Step*	*Action*
P(IH)	5.	USE the *Out of Tolerance* flag (*DRI* tab has the *Out of Tolerance* tab) when instrument pre/post function tests exceed 10%, and review the data associated with that survey, a. MAKE COMMENTS about the "*Out of Tolerance*" in the *Out of Tolerance* tab. b. CONSULT PRC-STD-SH-54164, *Management of Industrial Hygiene Instruments*, for additional information, as needed.
	6.	WHEN there are questions or concerns with sample data and the use of SWIHD data flags THEN CONSULT with and follow the direction of the IH Program Manager.
SWIHD Administrator	7.	MAKE CHANGES in SWIHD data flags at the direction of the IH Program Manager.
P(IH)	8.	REVIEW the lab report for laboratory flags, shown in Table 2, "Laboratory Flags," and determine if the flags have an adverse impact on data quality that requires consideration in exposure evaluation.

Table 2. Laboratory Flags

Flag	Meaning
"D"	Dilution (NOTE: Dilution always raises the Reporting Limit for the analyte)
"E"	Exceeded calibration limit (NOTE: used primarily for Volatile Organic Compounds)
"U"	Non-Detect

3.2.5 Cancelling a SWIHD Survey

Actionee	*Step*	*Action*
(P)IH	1.	DETERMINE when a survey is not needed and should be cancelled, such as the activity was delayed or cancelled, or a duplicate survey was created.
	2.	IF survey is in *READY* status, THEN SET back to the *OPEN* status. a. CANCEL the survey in *OPEN* status. 1) PROVIDE a comment on the valid reason for cancelling the survey, AND INITIAL AND DATE the comment.

Actionee	*Step*	*Action*
	3.	IF survey is in *REVIEWED* status, THEN CONTACT the SWIHD Administrator AND REQUEST the survey is placed in *OPEN* status.
SWIHD Administrator	4.	SET survey to *OPEN* status for the P(IH).
(P)IH	5.	CANCEL the survey in *OPEN* status.
		a. PROVIDE a comment on the valid reason for cancelling the survey, AND INITIAL AND DATE the comment.

3.3 Chemical Agent Surveys

3.3.1 Air Sampling Surveys

For information on field use and calibration of equipment, refer to PRC-STD-SH-54164, *Management of Industrial Hygiene Instruments*.

NOTE: *Radiological Control must be contacted when sampling in radiological areas to establish the clearance process for IH air samples.*

The IH Program Manager must be contacted before sampling for an agent that is not identified on current laboratory contracts.

Actionee	Step	Action
Surveyor	1.	ASSEMBLE the sample train AND VERIFY: a. The air sampling equipment calibration dates are current. b. The equipment functions within tolerance (e.g., three consecutive flow-rate measurements within +/- 5%). c. IF equipment is out-of-date or is not functioning appropriately, THEN USE other equipment that functions within tolerance and is not out-of-date.
	2.	COLLECT air samples and blank samples in accordance with the sample method or criteria identified in the IH Sample Plan, IH Exposure Assessment, or IH Work Permit, using hard-copy field-use forms (e.g., Site Form A-6003-857, *IH Personal Sampling Data*; Site Form A-6003-862, *IH Sampling Pump Functional Test Data*) or a printed SWIHD field log. • USE SWIHD-generated sample numbers. a. IF collecting an *Area Sample,* THEN CONSIDER the source location(s), boundaries, and/or the ventilation pattern when placing air sampling pump(s), such as: • In an area with limited obstructions to minimize interference with air flow; • At approximate breathing zone height, where air is mixing; • Close to a source or area of concern to measure the highest concentration of an agent; • At a project or property boundary.

Actionee	Step	Action

NOTE: *Personal sampling directly measures employee exposure and is used to demonstrate compliance with regulatory and health-based standards. Personal sampling is conducted on the employee who performs the work activity. Results of personal sampling may be used to represent results of similarly exposed employees (those who perform the same work activity, in the same location, at the same time, and having the same training and qualification).*

Full-shift or 8-hour Time-Weighted Average (8-hr TWA) samples represent the daily exposure to an agent and accounts for variation in exposure throughout the day. Short Term Exposure Limit (STEL) samples are collected over 15-minute intervals (or Excursion Limit samples are collected over 30 minutes), to represent the "worst case" and/or Ceiling condition(s) for work having variable exposure potentials.

Surveyor

b. IF collecting a *Personal Air Sample* (e.g., in the breathing zone), THEN DISCUSS sampling with the worker(s) and their supervisor, to include the:

- Purpose of sampling;
- Agent being sampled for;
- Name(s) of those sampled and name(s) of those whose exposure is represented;
- Position of the media on the lapel or collar;
- Contact information in case of problems with equipment or if the planned work activity changes;
- Disposition of sampling equipment at lunch time or breaks;
- Questions workers may have about sampling activities and sample results.

3. CONDUCT post-sampling instrument flow checks AND VERIFY pre-and post-flow rates are within plus or minus (±) 10 percent (%), using the following formula (L is the larger; S the smaller of the pre- and post-flow rates):

$$\%difference = \frac{L-S}{S} * 100\%$$

Actionee	*Step*	*Action*
Surveyor/ (P)IH		a. IF the difference between average pre/post flow rates is less than or equal to 10%, THEN USE the sample results quantitatively. b. IF the difference between average pre/post flow rate is greater than 10%, THEN FLAG the result(s) as “Suspect” in SWIHD AND QUALIFY the data using the *Lab Result* tab. 1) CHANGE the flow rate in SWIHD AND USE the lower flow rates, instead of the average, when determining sample volume. 2) MAKE comments in SWIHD about the discrepancy in pre/post flow rates AND the difference in the sample volume using the lower flow rate versus the average flow rate. 3) REPORT the sample volume in SWIHD and as applicable, to the laboratory using the lower flow rate.
Surveyor	4.	TRANSCRIBE sampling data from field-use forms into SWIHD under the *Air* tab AND ATTACH supporting data and information.
	5.	PRINT the Chain of Custody (COC) from SWIHD. • DO NOT MODIFY the sample numbers on the COC. • WRITE IN the Control Account Charge Number (CACN) and Code of Accounts (COA) on the COC.
	6.	RETAIN a signed copy of the COC when the samples are relinquished to the IH Sample Management Point of Contact (POC).
	7.	CHANGE survey status from *OPEN* to *READY*.
(P)IH	8.	REVIEW survey information for accuracy and completeness AND CHANGE survey status from *READY* to *REVIEW*. a. IF there are unanswered questions or other issues, THEN CONTACT the OS&IH Surveyor for additional information.
SWIHD Administrator	9.	UPLOAD analytical sample results into SWIHD AND ATTACH Final Lab Report (which includes the COC) to the SWIHD survey.

Actionee	*Step*	*Action*
(P)IH and/or IH Program Manager and/or IH Lab Liaison	10.	REVIEW analytical sample results AND: a. PERFORM blank corrections as needed for measurable results (e.g., for asbestos) in the SWIHD *Exposure Summary* tab OR note in comments if results are not blank corrected. b. DETERMINE the TWA exposure for *Personal Air Samples* AND COMPARE to the agent occupational exposure limit (OEL). • When applicable, such as when a sample result is above an OEL, DETERMINE the effective exposure for measurable results, by dividing the TWA result by the protection factor afforded by respiratory protection. c. IDENTIFY exposure-related comments for the Notification Letter in the *Exposure Summary* tab. d. REPORT high or unusual sample results to the IH Program Manager and/or the IH Lab Liaison. 1) DETERMINE follow-up activities, such as requesting sample re-analysis or collecting additional samples AND TAKE necessary actions.
IH Program Manager and/or OS&IH Manager	11.	IF effective exposures are measured above an OEL, THEN DETERMINE if an occurrence report is required, in accordance with PRC-PRO-EM-060, *Reporting Occurrences and Processing Operations Information*. a. COORDINATE discussion on occurrence reporting through the IH Program Manager.
(P)IH	12.	As applicable, PREPARE Personal Notification letters for those sampled and for those whose exposure is represented. a. CONSULT Appendix B – "DOE & OSHA-Driven Time Requirements," to determine the required time for reporting of compliance sample results AND MEET reporting time requirements. 1) IF reporting time requirements cannot be met, THEN INFORM the IH Program Manager so that follow-up actions may be taken.
	13.	ATTACH letter(s) and any additional record material to the survey.
	14.	CHANGE survey status from *REVIEW* to *COMPLETE*.

3.3.2 Direct Reading Instrument (DRI) Monitoring Surveys for Chemical Hazards

For information on field use and calibration of equipment, refer to PRC-STD-SH-54164, *Management of Industrial Hygiene Instruments*.

NOTE: *Radiological Control must be contacted when sampling in radiological areas to establish the clearance process for IH instruments.*

Actionee	*Step*	*Action*
Surveyor	1.	VERIFY instrument calibration or detector tube expiration dates are current and that the equipment functions within tolerance. • IF equipment is out-of-date or is not functioning appropriately, THEN USE other equipment that functions within tolerance and is not out-of-date.
	2.	FOLLOW the manufacturer's instructions to obtain an accurate measurement when using a direct reading instrument and/or when using detector tubes.
	3.	MONITOR the work area in accordance with the IH Sample Plan, IH Work Permit or IH Exposure Assessment, using hard-copy field-use forms (e.g., Site Form A-6003-861, *IH DRI Functional Test Data;* Site Form A-6004-731, *Industrial Hygiene Direct Reading Instrument Survey*), instrument data log or a SWIHD field log. a. RECORD instrument readings and times on the SWIHD field log or on a field-use form OR USE the instrument's data log function. b. DOCUMENT the sampling location(s) using a written description, map, photograph, or diagram AND/OR as applicable, DOWNLOAD the instrument data log.
Surveyor/ (P)IH	4.	CONDUCT post-sampling instrument function checks AND DETERMINE if the data collected is acceptable. a. IF instrument pre/post function checks are within tolerance, THEN CONSIDER the data as valid. b. IF the instrument pre/post function checks are not within tolerance, and/or the equipment did not function as expected during the survey, THEN DETERMINE with the PIH how survey data should be qualified in the "Comments" AND IDENTIFY the instrument in the *Out of Tolerance* tab (under the *DRI* tab).

Actionee	*Step*	*Action*
Surveyor	5.	TRANSCRIBE field data into SWIHD under the *DRI* tab AND ATTACH electronic copies of supporting data and information.
	6.	CHANGE survey status from *OPEN* to *READY*.
(P)IH	7.	REVIEW the survey for accuracy and completeness AND CHANGE survey status from *READY* to *COMPLETE*.

3.3.3 Surface/Bulk Sampling Surveys

NOTE: *Radiological Control must be contacted when sampling in radiological areas to establish the clearance process for IH bulk or wipe samples.*

The IH Program Manager must be contacted before sampling for an agent that is not identified on current laboratory contracts.

Although both surface and bulk samples may be collected concurrently, they require separate SWIHD surveys. Surface wipe samples are entered under SWIHD's Surface tab; Bulk samples are entered under SWIHD's Bulk tab.

Actionee	*Step*	*Action*
Surveyor	1.	COLLECT bulk or surface wipe samples, and blank samples if required, in accordance with the sample method identified in the IH Sample Plan, IH Work Permit or IH Exposure Assessment, using hard-copy field-use forms (e.g., Site Form A-6004-078, *Industrial Hygiene Surface Sampling Field Log)* or a downloaded SWIHD field log. a. USE SWIHD-generated sample numbers. b. DOCUMENT sample location(s) using a written description, map, photograph, or diagram. c. As needed, TAKE PHOTOGRAPHS (both in the near and far field).

NOTE: *Asbestos sampling can ONLY be performed by an Asbestos Hazard Emergency Response Act (AHERA)-trained Inspector having a current qualification.*

	2.	TRANSCRIBE sampling data from field-use forms or the SWIHD field log, into SWIHD under the *Surface* and/or *Bulk* tabs, as applicable AND ATTACH supporting photographs, data and information.
	3.	PRINT the COC for each type of survey from the database. • DO NOT MODIFY the sample numbers on the COC. • WRITE IN the CACN and COA on the COC.

Actionee	*Step*	*Action*
	4.	RETAIN a signed copy of the COC(s) when the samples are relinquished to the IH Sample Management POC.
Surveyor	5.	CHANGE survey status from *OPEN* to *READY*.
(P)IH	6.	REVIEW survey information for accuracy and completeness AND CHANGE survey status from *READY* to *REVIEW*.
SWIHD Administrator	7.	UPLOAD analytical sample results into SWIHD as they are received AND ATTACH Final Lab Report (which includes the COC) to the SWIHD survey.
(P)IH and/or IH Manager	8.	REVIEW analytical sample results. • DETERMINE if follow-up sampling and/or if re-analysis of a sample is required AND MAKE necessary comments on the survey.
	9.	CHANGE survey status from *REVIEW* to *COMPLETE*.

3.4 Physical Agent Surveys

3.4.1 Heat Stress Monitoring Surveys

Heat stress monitoring performed by CHPRC does not measure personal heat exposure. Heat exposure is determined by measuring core body temperature with a rectal thermometer, a measurement not performed by OS&IH.

Environmental screening measurements such as the Wet-Bulb Globe Temperature (WBGT) and/or an individual's physiological measurements (e.g., heart rate), are collected using direct reading instruments for purposes of determining appropriate work-rest cycles for the activities being performed, in accordance with PRC-PRO-SH-121, *Heat Stress Control*. Screening measurements are not individually reported via exposure letters.

There are several SWIHD tabs where heat stress monitoring data is entered:

- WBGT data is entered under the *Heat* tab;
- Physiological Monitoring data is entered under the *PM* tab;
- Subcontractor WBGT or Physiological Monitoring data, when collected by the subcontractor, is entered in the *Generic* tab by the PIH.

3.4.1.1 WBGT Surveys

Actionee	*Step*	*Action*
OS&IH Surveyor	1.	VERIFY the instrument calibration dates are current and that the equipment functions within tolerance. • IF equipment is out-of-date or is not functioning appropriately, THEN USE other equipment that functions within tolerance and is not out-of-date.
NOTE: *WBGT data must be representative of the area where work is performed. WBGT Data from the nearest Hanford Meteorological Station may only be used to monitor outdoor work located away from heat sinks such as concrete buildings/structures, reflective surfaces, and asphalt.*		
	2.	FOLLOW the manufacturer's instructions when using instruments to obtain accurate and appropriate measurements.
Surveyor	3.	MONITOR the work area in accordance with the IH Sample Plan, IH Work Permit, IH Exposure Assessment, or Heat Stress Evaluation, using hard-copy field-use forms (Site Form A-6004-691, *CHPRC WBGT Monitoring Data*), an instrument data log or a printed SWIHD field log. a. RECORD instrument readings and times on the SWIHD field log or on a field-use form, and/or on the instrument's data log. b. DOCUMENT the sampling location(s) using a written description, map, diagram, or photograph. 1) As applicable, DOWNLOAD the instrument data log.
	4.	TRANSCRIBE the subset of the data deemed representative into SWIHD under the *Heat* tab, AND ATTACH any supporting data to the survey.
	5.	CHANGE survey status from *OPEN* to *READY*.
(P)IH	6.	REVIEW the survey for accuracy and completeness AND CHANGE the survey status from *READY* to *COMPLETE.*

3.4.1.2 Physiological Monitoring Surveys

Actionee	*Step*	*Action*
Surveyor	1.	As applicable, VERIFY the instrument calibration dates are current and that the equipment functions within tolerance. • IF equipment is out-of-date or is not functioning appropriately, THEN USE other equipment that functions within tolerance and is not out-of-date
	2.	FOLLOW the manufacturer's instructions when using instruments to obtain accurate and appropriate measurements.
	3.	MONITOR the physiological functioning of workers (e.g., heart rate, temperature) in accordance with the IH Sample Plan, IH Work Permit, IH Exposure Assessment or Heat Stress Evaluation, using hard-copy field-use forms (Site Form A-6007-287, *CHPRC Physiological Monitoring*), an instrument data log or a printed SWIHD field log. a. RECORD instrument readings and times on the SWIHD field log or on a field-use form, or if using a continuous monitoring system, collect data electronically. b. DOCUMENT worker location(s) using a written description, map, diagram or photograph, and/or by using the continuous monitoring data log. c. As applicable, DOWNLOAD the instrument data log. d. Mark physiological monitoring data as "OUO." 1) ATTACH Physiological monitoring to a SWIHD survey data under the *PM* tab.
	4.	CHANGE survey status from *OPEN* to *READY*.
(P)IH	5.	REVIEW the survey for accuracy and completeness AND CHANGE the survey status from *READY* to *COMPLETE.*

3.4.2 Noise Surveys

Actionee	*Step*	*Action*
Surveyor	1.	VERIFY the instrument's calibration dates are current, that the equipment functions within tolerance. • IF equipment is out-of-date or is not functioning appropriately, THEN USE other equipment that functions within tolerance and is not out-of-date.
	2.	FOLLOW the manufacturer's instructions to obtain accurate measurements when using direct reading instruments for noise.

NOTE: *Because of the potential for measurement bias with some dosimeters, it is recommended that evaluation of Peak Noise exposure is made using a Type 1 or 2 sound level meter.*

3. MONITOR the work area in accordance with the IH Sample Plan, IH Work Permit or IH Exposure Assessment, using hard-copy field-use forms (e.g., Site Form A-6004-735, *Industrial Hygiene Noise Dosimetry Survey*; Site Form A-6004-736, *Industrial Hygiene Noise Survey*), an instrument data log or a SWIHD field log.

   a. RECORD instrument readings and times on the SWIHD field log or on a field-use form.

   b. As applicable, DOCUMENT the sampling location(s) using a written description, map, diagram, or photograph.

   c. IF collecting a Personal Sample (e.g., noise dosimetry), THEN DISCUSS sampling with the worker(s) and their supervisor, to include the:

      - Purpose of sampling;
      - Name(s) of those sampled and name(s) of those whose exposure is represented;
      - Position of the media on the shoulder or collar;
      - Proximity of personal noise sources such as hand-held radios;
      - Contact information in case of problems with equipment or if the planned work activity changes;
      - Disposition of sampling equipment at lunch time or breaks (e.g., instrument set to pause);
      - Questions workers may have about sampling activities and sample results.

Actionee	*Step*	*Action*
Surveyor		d. WHEN collecting a Personal Sample, THEN ADDRESS the following in SWIHD comments: 1) Any potential exposure bias on one ear (e.g., driving with the window open results in greater left ear exposure, or wearing a radio-communicator on the same side as the dosimeter); 2) Exposure to chemical ototoxins (e.g., solvents and metals listed in the ACGIH Threshold Limit Value booklet) concurrent with noise exposure.
	4.	CONDUCT post-sampling instrument function checks in accordance with manufacturer's instructions AND DETERMINE if the data collected is acceptable. a. IF instrument pre- and post-use function checks are within a 0.5 decibel (dB) tolerance, THEN CONSIDER the data as valid. b. IF the instrument pre- and post-use function checks are not within tolerance, and/or the equipment did not function as expected during the survey, THEN DETERMINE with the PIH if survey data should be invalidated and/or qualified in the *Exposure Summary* tab, or using the Instrument *Out of Tolerance* tab.
	5.	TRANSCRIBE the data into SWIHD under the *Noise* tab AND ATTACH supporting data and information to the survey.
	6.	CHANGE survey status from *OPEN* to *READY.*

Actionee	*Step*	*Action*
(P)IH	7.	REVIEW noise survey and/or dosimetry results AND: a. DETERMINE the TWA, and/or other applicable exposure measurements (e.g., Peak, Impact) for *Personal Samples* AND COMPARE to the agent occupational exposure limit (OEL). • DETERMINE the corrected value for personal noise exposures to allow for the noise reduction afforded by use of hearing protection, in accordance with Appendix C. • IDENTIFY exposure-related comments for the Notification Letter in the *Exposure Summary* tab. b. Immediately REPORT all corrected noise exposures that exceed an OEL to the OS&IH manager and/or IH Program Manager, for determination of occurrence reporting and other follow-up measures. c. As applicable, DETERMINE AND CONDUCT necessary follow-up actions.
	8.	As applicable, PREPARE Personal Notification letters showing corrected results for those sampled and for those whose exposure is represented. a. VERIFY Personal Notification letters are distributed within the specified OSHA-required time limits, presented in Appendix B.
	9.	REVIEW the survey for accuracy and completeness AND CHANGE the survey status from *READY* to *COMPLETE.*
IH Program Manager and/or OS&IH Manager	10.	IF corrected noise exposures are measured above an OEL, THEN DETERMINE if an occurrence report is required, in accordance with PRC-PRO-EM-060, AND INITIATE occurrence reporting as needed.

3.5 Other Agent Surveys

3.5.1 Ergonomic Surveys

Actionee	*Step*	*Action*
Assessor	1.	CONDUCT Office or Field Ergonomic Assessment in accordance with PRC-PRO-SH-40463, *Ergonomics*, and document using a hard-copy field-use form (Site Form A-6006-185, *CHPRC Office Ergonomic Evaluation*) or other approved means of documentation (e.g. use of ergonomic assessment tools).
	2.	TRANSCRIBE data into SWIHD under the *Ergonomics* tab in either the *Office* or *Field* sections within the *Ergonomics* tab <u>AND</u> ATTACH field-use forms and supporting data/information. a. PROCESS the survey to *READY status.*
Industrial Hygienist/ Ergonomics TA	3.	REVIEW survey information for accuracy and completeness <u>AND</u> CHANGE survey status from *READY* to *REVIEW*.
	4.	REVIEW survey information <u>AND</u> as needed, CONTACT the OS&IH Surveyor and/or the individual assessed, to verify requests for ergonomic equipment.
	5.	MAKE requests for <u>office</u> ergonomic equipment fulfillment to CHPRC Facilities, <u>or</u> to the Responsible Manager/Project OS&IH Manager for <u>field</u> ergonomics, <u>AND</u> PROCESS survey from *REVIEW* to *COMPLETE*.
Assessor	6.	FOLLOW UP <u>AND</u> ASSIST individuals with furniture/equipment adjustments as needed to reduce their ergonomic stressors.

3.5.2 Generic Survey Tab

The *Generic* tab is a repository for miscellaneous sampling data and information, such as illumination measurements, vibration measurements, activities involving potential exposure to biological agents (e.g., mold), subcontractor-collected physiological and environmental monitoring data for heat stress evaluation, and/or subcontractor exposure monitoring data.

Actionee	*Step*	*Action*
Surveyor	1.	CONDUCT evaluation in accordance with applicable requirements <u>AND</u> DOCUMENT using a hard-copy field-use form or other appropriate documentation under the *Generic* tab.
	2.	TRANSCRIBE data into SWIHD <u>AND</u> ATTACH field-use forms and supporting data/information. a. PROCESS the survey to *READY* status.
P(IH)	3.	REVIEW survey information for accuracy and completeness <u>AND</u> CHANGE survey status from *READY* to *REVIEW*.
	4.	PROCESS the survey from *REVIEW* to *COMPLETE.*

3.6 Beryllium Facility Assessment

The process for conducting and documenting Beryllium Facility Assessments using SWIHD is described in this section.

Actionee	*Step*	*Action*
Beryllium Assessor	1.	INITIATE a new or revision Beryllium Facility Assessment in accordance with the appropriate implementing procedure (DOE-0342-002 or DOE-0342-004).
	2.	TRANSCRIBE field data into SWIHD under the *Beryllium* tab <u>AND</u> ATTACH supporting data and information.
	3.	CHANGE survey status from *OPEN* to *IN REVIEW.*
	4.	REVIEW the Beryllium Facility Assessment for accuracy and completeness <u>AND</u> CHANGE survey state from *IN REVIEW* to *COMPLETE*.

3.7 Requests for Exposure Monitoring Data

When an employee, or designated representative, requests access to an exposure monitoring record, and/or to their exposure screening data, the CHPRC OS&IH shall ensure that the information is provided in a reasonable time, place, and manner. The CHPRC OS&IH may require additional information to locate or identify the records being requested (e.g., dates and locations where the employee worked during the time period of interest, or the agent monitored for, etc.). Site Form A-6006-800, *Request for Personal Industrial Hygiene Exposure Records*, is used to document the transfer of requested information.

Actionee	***Step***	***Action***
OS&IH	1.	RESPOND to requests for exposure monitoring data with the individual(s) monitored and/or their representative(s), AND DETERMINE the time, location, and type of sample data being requested, to help locate the data in SWIHD.
	2.	IF the information requested cannot be obtained within 15 working days, THEN NOTIFY the requestor of the reason for the delay and the anticipated date when the data will be made available.
(P)IH	3.	CONTACT the requestor when the data is available AND COORDINATE delivery of information. a. EXPLAIN exposure monitoring results in terms of TWA exposure(s), the OEL, and the PPE worn. b. ADDRESS questions regarding the data, as applicable.
	4.	OBTAIN the requestor signature on the *Request for Personal Industrial Hygiene Exposure Records* (Site Form A-6006-800), acknowledging receipt of the information. • The individual or their representative may sign attesting to delivery of the information.
	5.	SUBMIT signed and completed *Request for Personal Industrial Hygiene Exposure Records* to the Information and Records Management (IRM) Service Provider, MSIN: A5-05.

4.0 FORMS

IH Sampling Pump Functional Test Data, A-6003-862
IH Personal Sampling Data, A-6003-857
IH DRI Functional Test Data, A-6003-861
Industrial Hygiene Direct Reading Instrument Survey, A-6004-731
Industrial Hygiene Surface Sampling Field Log, A-6004-078
CHPRC WBGT Monitoring Data, A-6004-691
CHPRC Physiological Monitoring, A-6007-287
Industrial Hygiene Noise Dosimetry Survey, A-6004-735
Industrial Hygiene Noise Survey, A-6004-736
CHPRC Office Ergonomic Evaluation, A-6006-185

4.1 Other Forms

Request for Personal Industrial Hygiene Exposure Records, A-6006-800

5.0 RECORD IDENTIFICATION

Records are required to be managed in accordance with PRC-PRO-IRM-10588, *Records Management Processes*.

Records Capture Table

Name of Record	Submittal Responsibility	Retention Responsibility
CHPRC Request for Personal IH Exposure Records	(P)IH for CHPRC Project Initiating Monitoring	IRM Service Provider
Beryllium Facility Assessments	(P)IH for CHPRC Project Initiating Monitoring	IRM Service Provider
SWIHD Exposure Monitoring, Records, Laboratory Analysis Reports (including signed Chain of Custody), and Personal Notification letters which include but are not limited to: Air Sampling, Beryllium, DRI, Surface, Bulk, Heat, Physiological Monitoring, Noise, Ergonomic and Generic	(P)IH for CHPRC Project Initiating Monitoring	IRM Service Provider

6.0 SOURCES

6.1 Requirements

10 CFR 850, *Chronic Beryllium Disease Prevention Program*

10 CFR 851, *Worker Safety and Health Program*

29 CFR 1910, *Occupational Safety and Health Standards*, and Subpart Z, *Toxic and Hazardous Substances*

29 CFR 1910.1020, *Access to Employee Exposure and Medical Records*

29 CFR 1926, *Safety and Health Regulations for Construction*, and Subpart Z, *Toxic and Hazardous Substances*

American Conference of Governmental Industrial Hygienists (ACGIH) *Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices*, 2005, ACGIH Worldwide Signature Publications, Cincinnati, OH

DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*

DOE O 471.3, Identifying and Protecting Official Use Only Information

6.2 References

DOE-0342-002, *Hanford Site Assessment and Characterization/Verification of Buildings Procedure*

DOE-0342-004, *Hanford Site Assessment and Characterization/Verification of Structures and Conex Boxes Procedure*

PRC-MP-MS-003, *Integrated Safety Management System/Environmental Management System Description (ISMSD)*

PRC-PRO-EM-060, *Reporting Occurrences and Processing Operations Information*

PRC-PRO-IRM-112, *Forms Control*

PRC-PRO-IRM-184, *Information Protection and Clearance*

PRC-PRO-IRM-8310, *Document Control Processes*

PRC-PRO-IRM-10588, *Records Management Processes*

PRC-PRO-SH-121, *Heat Stress Control*

PRC-PRO-SH-17916, *Industrial Hygiene Exposure Assessments*

PRC-PRO-SH-40463, *Ergonomics*

PRC-STD-SH-54164, *Management of Industrial Hygiene Instruments*

PRC-PRO-SH-54243, *Industrial Hygiene Sample Management*

PRC-MP-SH-54314, *Confined Space Management Plan*

6.3 Developmental References

Manual of Analytical Methods, 5th edition, 2015, Centers for Disease Control and Prevention-National Institute of Occupational Safety and Health (NIOSH)

OSHA Technical Manual TED 01-00-015, Section II, Chapter 1. Personal Sampling for Air Contaminants, 2014, U.S. Department of Labor, Occupational Safety & Health Administration, Washington, DC

OSHA Technical Manual TED 01-00-015, Section III, Chapter 4. Heat Stress, 2015, U.S. Department of Labor, Occupational Safety & Health Administration, Washington, DC

OSHA Technical Manual TED 01-00-015, Section III, Chapter 5. Noise, 2013, U.S. Department of Labor, Occupational Safety & Health Administration, Washington, DC

Appendix A - Glossary

Term	*Definition*
Action Level (AL)	A percentage of the OEL, usually 50%, assigned to some chemical and physical agents. The AL triggers required actions to limit employee exposure, such as medical surveillance, exposure monitoring, and training.
Administrative Control	Administrative controls alter the way work is done, including timing, training, signage, policies, operating procedures, and other practices designed to reduce the duration, frequency, and severity of exposure to hazards.
A-Weighting	A measurement scale that approximates the “loudness” of tones relative to a 40-dB sound pressure level, 1,000-Hz reference tone, said to best fit the frequency response of the human ear.
Breathing Zone	The area within a 10-inch radius of the nose/mouth where air is drawn into the lungs. This zone is the area sampled during personal air sampling to determine exposure to an airborne agent.
Calibration	The process of adjusting an instrument to meet the manufacturer’s specifications by establishing a relationship between an agent in a calibration standard(s) and the detection/measurements of the agent made by an instrument. The range of the agent in the calibration standard brackets the range of measured agent levels made by an instrument.
Chain-of-Custody (COC)	The chronological documentation of a paper trail showing the collection of a sample, custody, control, transfer, analysis, and disposition, documented by name and signature at each step. The COC verifies sample security from sample collection through sample analysis.
Data Flag	Sample data which needs a qualifier as it did not pass all documented, required quality control tests, such as post-calibration NOT within 10% of pre-calibration, or equipment fault/failure.
Decibel (dB)	Decibel: the logarithmic unit of measurement used to express the ratio of two values of power or intensity. One value is a standard reference value and the other expresses a measured level relative to the reference level.
Decibel, A-Scale (dBA)	Decibel level on the A-weighted scale are an expression of the relative loudness of sounds in air as perceived by the human ear.
Dose	Dose is the amount of exposure to a physical agent (sound) over a specified period of time. Use of hearing protection mitigates sound dose according to the noise reduction rating (NRR).
Engineering Control	Engineering controls are designs or modifications to equipment, plants, processes, or systems that reduce the risk of worker exposure to a hazard by preventing the release of contaminants into the workplace.
Impact or Impulse Noise	Impact noise is created by the impact of one surface on another and is of a short duration; impulsive noise is typically an air noise that has a short duration, such as the shooting of a firearm or the explosion of a firework. Exposure to impulsive or impact noise should not exceed a 140-dB peak sound pressure level (SPL). Impulsive or impact noises are considered to be much more harmful to hearing than continuous noises.

Appendix A - (Cont.)

Term	*Definition*
"Invalid" Data Flag	The *Invalid* flag is used primarily when there are laboratory issues such that sample results cannot be used to draw a conclusion (e.g., sample is lost/damaged in shipment, sample media is overloaded, sample cannot be analyzed, or there is another non-sampling issue that render the results unusable).
Laboratory-Generated Data Flags	"D" indicates a dilution was performed to analyze the sample, which always raises the laboratory reporting limit for the analyte; "E" indicates the calibration limit was exceeded, typically used for Volatile Organic Compounds (VOCs); "U" indicates an analyte was not-detected, typically in an analysis with multiple analytes such as a full metal scan.
Managed Forms	Forms originated on the Hanford Site in conventional or electronic format that: 1. Cross divisional or departmental lines, within or across contractor organization/agency; and/or 2. Are required by state or federal law, DOE Order, company policy or procedure, or are defined in a controlled manual; and/or 3. Are required for audit traceability or otherwise becomes an official document of record when completed.
Monitoring	The process of evaluating a physical or chemical agent level using a direct reading instrument and comparing the results to acceptable values; OSHA identifies monitoring as the process of evaluating workplace exposures.
Noise Criterion Level	The continuous, equivalent 8-hour A-weighted sound level (as dBA) that constitutes 100% of an allowable noise exposure (dose). For OSHA it is 90 dB, averaged over 8 hours on the A-scale of a standard dosimeter set on slow response. (For ACGIH it is 85 dBA, 8-hr TWA.)
Noise Dosimetry	A personal noise measurement made by a specialized sound level meter that approximates noise exposure by integrating sound level measurements collected over increments of time, then averaged. A dosimeter is worn on the shoulder (or collar) near the employee's ear.
Noise Exchange Rate	The increase or decrease in decibels corresponding to twice (or half) the noise dose; e.g., if the exchange rate is 5 dB, 90 dB produces twice the noise dose that 85 dB produces (assuming that duration is constant). The OSHA exchange rate is 5 dB. The ACGIH exchange rate is 3dB. 88 dB produces twice the noise dose that 85 dB produces (assuming constant duration). ACGIH provides a more conservative exchange rate and this standard is used at CHPRC.
Occupational Exposure Limit (OEL)	A health-based upper limit on the acceptable concentration of a hazardous substance to protect workers from adverse health effects. OELs are typically expressed as 8-hour time-weighted averages (8-hr TWA) but are also expressed as 15-minute TWAs, also known as short-term exposure limits (STEL), and as Ceiling limits. At CHPRC, OELs are the lowest value obtained by comparing the OSHA PEL to the ACGIH TLV® per 10 CFR 851.23(a)(9).
OEL-TWA **OEL-STEL** **OEL-EL** **OEL-C**	OELs are typically expressed as: • OEL-TWAs as an 8-hour time-weighted average exposure limit; • OEL-STEL as a15-minute short-term exposure limit; • OEL-EL (for asbestos) as a 30-minute excursion limit; • OEL-C as an instantaneous ceiling exposure limit.

Appendix A - (Cont.)

Term	*Definition*
Ototoxicity	The property of being toxic to the cochlea or auditory nerve. Exposure to certain chemicals may also result in hearing loss. In settings where there may be exposures to noise and to some organic vapors (toluene, ethylbenzene, xylene, hexane, carbon disulfide, styrene, trichloroethylene) and/or exposure to carbon monoxide, lead, mercury, and manganese, periodic audiograms are advised and should be carefully reviewed.
"Out of Tolerance" Data Flag	The *Out of Tolerance* flag is used when direct reading instrument pre/post function tests exceed 10%.
Peak Noise	The highest instantaneous sound pressure level (SPL) that a microphone detects within the measuring period. Unlike the max level, the peak is detected independently of the slow or fast response for which the unit is set. Peak circuitry on noise dosimeters is very sensitive. Brushing the microphone over a shirt collar or accidentally bumping it can cause a false high reading. Because of this sensitivity, peak noise measurements collected in support of CHPRC activities shall be made using a Type I or II sound level meter. OSHA and ACGIH recommend that NO exposures of an unprotected ear be permitted in excess of a C-weighted peak sound pressure level of 140 dB.
Permissible Exposure Limit (PEL)	A legal limit for exposure of an employee to a chemical/physical agent, established by OSHA. A PEL is generally given as a concentration over an 8-hour time-weighted average (TWA) or short-term exposure limit (STEL) over 15 or 30 minutes, that cannot be exceeded unless mitigations such as respiratory protection (or hearing protection) are utilized to reduce the exposure to within a concentration that is below the PEL and/or STEL.
Personal Air/Noise Sample	An air/noise sample collected in an employee's breathing/hearing zone as a measure of personal exposure to an airborne chemical/physical agent. Personal samples are typically collected with a small pump/integrating sound level meter worn on the belt attached to a sample media/microphone worn on the lapel/shoulder for the duration of the work shift, or throughout the entire work activity being monitored, for comparison with health-based OELs.
Personal Protective Equipment (PPE)	Equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses, such as protective clothing, gloves, helmets, goggles, respirators, and other equipment designed to protect the body from injury.
Professional Judgment	The process of forming an opinion or evaluation by the application and appropriate use of specialized knowledge gained from extensive academic preparation through formal education, observation, experimentation, inference, and analogy, which is also characterized by conformance with technical and ethical standards within a discipline.
Representative Sampling	A representative sample is a small quantity of something that accurately reflects the larger entity, such as when a small number of people accurately reflect the members of an entire population. Some OSHA regulations require representative sampling for an agent, meaning that all members of the exposure group present during the operation are identified and tied to a sample result or set of sample results collected on one or more members of the exposure group.

Appendix A - (Cont.)

Term	*Definition*
Sampling	The process of collecting air or sound samples from the work environment to quantitatively evaluate the agent level. This may involve sampling an individual (personal) or sampling an area.
Safety Data Sheet (SDS)	Safety Data Sheet and/or the predecessor Material Safety Data Sheet contain standardized information from the manufacturer listing the chemical components and their amounts in the product, health hazards, required PPE and spill protection requirements, etc.
"Suspect" Data Flag	The *Suspect* flag is used to identify sample(s) where data quality requirements are not met or there are questionable or problematic circumstances or conditions (e.g., insufficient volume for the method or analytical sensitivity, pre/post use flow rate exceeds 10%).
Threshold Limit Value (TLV®)	Threshold limit values (TLV) refer to airborne concentrations of chemical and physical agents and represent conditions under which it is believed that *nearly all* workers may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects. TLVs are developed to protect workers who are normal, healthy adults. TLVs for chemical agents are expressed as TLV-TWA, TLV-STEL, or TLV-C.; TLVs for physical agents are expressed as TLV-TWA.
Time-Weighted Average (TWA)	1) The average measured exposure during a given working period, generally expressed as an 8-hour TWA (within a 40-hour work week), but may be adjusted (e.g., using the Brief and Scala model) to account for longer shifts, such as a 10-hour TWA (within a 40-hour work week). 2) The concentration of a sample where the amount of the contaminant measured is averaged over the time the sample was obtained, or the time the exposure represents.
"Void" Data Flag	The *Void* flag is used to identify sampling errors (e.g., using the incorrect sample media or method, sample media detaches from the sample train, sample volume is unknown, broken sample tube/media, overloaded sample is identified in the field, or the media is contaminated).

Appendix B - DOE & OSHA-Driven Time Requirements

Information in Table B-1, "Working (Business) Days for Employee Notification of Results," is provided to assist the (P)IH in determining employee notification time requirements. The clock for employee notification starts when analytical sample results are received by CHPRC.

Refer to the applicable standards for actual requirements since regulatory information is dated material. The values are for both OSHA General Industry and OSHA Construction Standards unless noted otherwise.

Table B-1. Working (Business) Days for Employee Notification of Results

Agent, Regulation	1910, General Industry	1926, Construction
13 carcinogens 1910.1003; 1926.1103	No Time Requirement	No Time Requirement
1,2-dibromo-3-chloropropane; 1910.1044; 1926.1144	15	15
1,3-Butadiene; 1910.1051	15	N/A
Acrylonitrile; 1910.1045: 1926.1145	15	15
Asbestos; 1910.1001; 1926.1101	15	5
Benzene; 1910.1028; 1926.1128	15	15
Beryllium, 10 CFR 850.24	10	N/A
Cadmium; 1910.1027; 1926.1127	15	5
Coke oven emissions; 1910.1029; 1926.1129	15	15
Ethylene oxide; 1910.1047;1926.1147	15	15
Formaldehyde; 1910.1048; 1926.1148	15	15
Hexavalent Chromium; 1910.1026; 1926.1126	15	5
Inorganic Arsenic; 1910.1018; 1926.1118	15	15
Lead; 1910.1025;1926.62	15	5
Methylene chloride; 1910.1052; 1926.1152	15	15
Methylene dianiline; 1910.1050	15	N/A
Noise; 1910.95*; 1926.52	No Time Requirement Specified	No Time Requirement Specified
Vinyl Chloride; 1910.1017;1926.1117	No Time Requirement Specified	No Time Requirement Specified

Appendix C - Method for Estimating Hearing Protector Attenuation

If the employee is wearing hearing protection during noise monitoring, a reduction is allowed when reporting their TWA exposure, as follows:

1. For **single hearing protection** (either muffs or plugs):
   a. Record the Noise Reduction Rating (NRR) as reported by the manufacturer.
   b. Subtract the (NRR -7 dB) from TWA noise data.

   Estimated Exposure (dBA) = TWA (dBA) – (NRR - 7)

   Example: TWA=100 (dBA), muff NRR = 22 dB
   Estimated Exposure = 100 – (22-7) = 85 dBA TWA

2. For **double hearing protection** (ear muffs and plugs used together):
   a. Record the NRR as reported by the manufacturer for each hearing protection device.
   b. Chose the hearing protection device with the higher NRR rating (called NRRh).
   c. Subtract the (NRRh – 7 dB) for the plugs AND subtract 5 dB for the second hearing protection device, as shown below:

   Estimated Exposure (dBA) = TWA (dBA) – [(NRRh- 7) + 5]

   Example: TWA=106 dBA, plug NRR=33, and muff NRR=22 dB
   Estimated Exposure = 106 – [(33 - 7) + 5] = 106 - 31= 75 dBA TWA