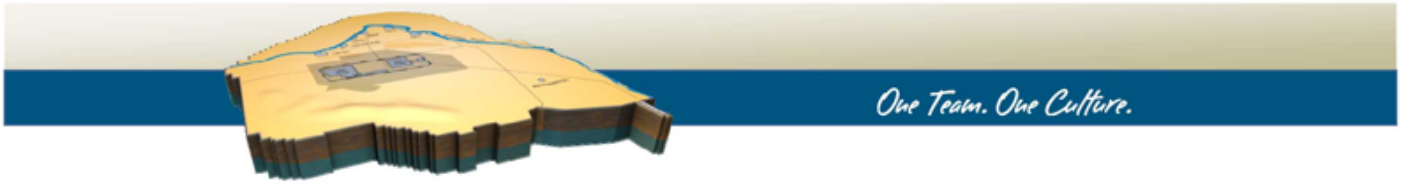

Administrative Procedure

PRC-PRO-SH-17916

Industrial Hygiene Exposure Assessments

Revision 3, Change 0

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CHANGE SUMMARY

Description of Change

None

Industrial Hygiene Exposure Assessments

Published Date: 03/21/14 Effective Date: 03/21/14

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1.0 INTRODUCTION

1.1 Purpose

This procedure provides instructions to industrial hygienists (IH) and other Occupational Safety and Industrial Health (OS&IH) professionals for conducting Industrial Hygiene Exposure Assessments (IHEAs).

1.2 Scope

IHEAs are used to collect necessary information relative to a facility, a project, or a task, to adequately identify and characterize existing or potential hazardous agents. Once hazardous agents are identified and characterized, the information is used to determine employee risk, to prioritize sampling, to determine regulatory compliance, and to make recommendations regarding hazard control measures or hazard abatement.

The results of this procedure will provide information to support and facilitate the work management process as described in PRC-PRO-WKM-12115, *Work Management*.

1.3 Applicability

This procedure is applicable to CH2M HILL Plateau Remediation Company (CHPRC) Team employees in operations and activities where worker exposure to chemical, physical, and biological hazards at levels of occupational significance exists. It applies to operations covered under Department of Energy 10 CFR 851. This process is a tool for the OS&IH professional, providing a mechanism for consistent characterization of industrial hygiene hazards and documenting these evaluations.

This procedure is not intended to address radiological hazards, confined space evaluations, or blood borne pathogens.

This procedure generally does not apply to hazard assessments for the following:

- Ergonomic hazard assessment in office facilities (see PRC-PRO-SH-40463, *Ergonomics*, for information on the identification and control of ergonomic hazards);
- Beryllium activities covered by DOE-0342-001, *Hanford Site Beryllium Work Permit (BWP) and Hazard Assessment Procedure*; and
- Ventilation system evaluation or design.

1.4 Implementation

This procedure is effective on the date published. Existing IHEAs can continue to be utilized, but should be updated to meet the requirements of this procedure during their next update.

2.0 RESPONSIBILITIES

All responsibilities associated with this procedure are identified in the process steps.

3.0 PROCESS

This procedure does not require a specific format for documenting an IHEA. An IHEA may be a standalone document; a Health and Safety Plan (HASP); a Detailed Safety Analysis (DSA); part of a Job Hazard Analysis (JHA); part of an Automated Job Hazard Analysis (AJHA); part of a Job Safety Analysis (JSA); or part of any other hazard analysis document.

IHEA documentation is required whenever exposures to chemical, physical, and biological hazards exist at levels of occupational significance (see Appendix B, *Exposure Assessment Decision Logic*). An IHEA contains the following eight elements. The order in which these elements are presented in an IHEA is not important, but each element must be considered and documented. These elements are listed below and detailed in Section 3.1.1:

- Describe the work or tasks performed (step 3.1.1.7)
- Identify the potentially exposed workers (step 3.1.1.8)
- Identify and describe the potential sources of hazardous agents (step 3.1.1.9)
- Evaluate the controls used to prevent or minimize exposure (step 3.1.1.10)
- Assess the level(s) of exposure (step 3.1.1.11)
- Include a conclusion, with rationale, whether the identified agent(s), their use(s), and the potential exposures they cause pose a hazard to workers (i.e. generate a positive or negative exposure assessment (step 3.1.1.12)
- Recommend additional controls for hazardous agents where necessary (step 3.1.1.13)
- Recommend the scope and frequency of further exposure monitoring (step 3.1.1.14)

3.1 Performing the Exposure Assessments

3.1.1 Initial (Baseline) Industrial Hygiene Exposure Assessment

The initial IHEA is often referred to as the “Baseline”. It is used for comparative purposes for all future assessments.

Actionee	*Step*	*Action*
CHPRC OS&IH professional	1.	DETERMINE whether conducting an EA is necessary using the guidance in the decision logic diagram in Appendix B, AND DOCUMENT decision logic if *no* EA is required.
	2.	GATHER all information necessary to perform initial EA. This should include any pertinent monitoring/sampling data that is available..
	3.	As part of the initial information gathering process, REVIEW appropriate existing historical employee exposure monitoring data.
	4.	CONDUCT employee/line management interviews.

Actionee	Step	Action
	5.	REVIEW work plans, Material Safety Data Sheets (MSDSs), Safety Data Sheets (SDS), product specifications, waste inventories, other relevant hazard analyses, facility drawings, list of process chemicals, airflow distribution pathways, and other pertinent documents.
	6.	Wherever possible, CONDUCT walkthroughs with line management and/or affected personnel to gain a full understanding of the worksite, work practices, procedures, hazard sources, and hazard controls.
	7.	DESCRIBE the work or tasks performed clearly and succinctly.
	8.	IDENTIFY all Similar Exposure Groups (SEGs) associated with specific operations/tasks.
	9.	DEVELOP an industrial hygiene hazard inventory of chemical, physical, and/or biological hazards noted during the initial walkthrough noting the operation/activity/task that produces the hazard.
	10.	DESCRIBE in-place engineering and administrative control practices that impact employee exposure levels.
	11.	ASSESS AND DOCUMENT overall exposure for each SEG for each agent identified using relevant qualitative or historical sampling data if available. Appendix C provides a tool that may be used to assess the relative risk of a hazard and to prioritize controls.
	12.	DEVELOP a rationale for determining whether the industrial hygiene hazard(s) associated with activities/tasks present an exposure hazard to the worker(s).
	13.	RECOMMEND any additional control measures for the industrial hygiene hazards identified where necessary.
	14.	DETERMINE the necessity and frequency of follow-up sampling/monitoring.
	15.	COMPLETE AND DOCUMENT the IHEA ensuring that the eight elements listed in section 3.0 are considered and documented.

3.1.2 Periodic Reassessments

Initial (baseline) IHEAs should be reviewed and updated periodically based on the risk and variability of the operation and/or task. Factors to consider include facility and process changes, structural renovations, ventilation system modifications, changes in workplace environmental conditions, and employee reports of symptoms or work related illnesses or occupational diseases.

In determining the frequency of periodic reassessments, a graded approach should be used based on the risk posed by the hazard, the variability of the operation, the frequency and duration with which the task is performed, and the type of control measures implemented.

Actionee	*Step*	*Action*
CHPRC OS&IH Professional	1.	ESTABLISH a written schedule for review/revision of the IHEAs sufficient to assure that hazards have not changed and are adequately identified/assessed and exposure profiles are up-to-date.

A suggested schedule for review/updating of IHEAs is as follows:

- Industrial areas (general industry areas, craft shops) – annually or more frequently, if serious health hazards are present
- Frequently changing worksites (construction sites, hazardous waste sites) – as often as necessary to characterize current worker exposures
- Whenever there is a change in process operations, work practices, change in presence of chemical, physical or biological agents or when changes in personnel could affect exposure profiles
- Unoccupied vacant facilities that are entered only for surveillance and maintenance purposes. – at least once a year
- Low hazard areas (office areas, non-hazardous facilities) – at least every three years
- Unoccupied areas – when hazards not previously identified for the affected SEGs are present
- In response to employee concerns or reported occurrences, injuries or illnesses
- As monitoring/sampling data is obtained
- As engineering/administrative/PPE controls are upgraded or downgraded

2. PERFORM IHEA reassessment following the guidance in 3.1.1.1

3.1.3 Technical Evaluations

A Technical Evaluation (TE) is a mechanism for documenting an IHEA or as a tool to document information to be used as a part of an IHEA. Industrial Hygiene technical decisions, positions taken, and interpretations may also be documented as a TE.

A TE can be a standalone document or be a part of a larger exposure assessment.

Actionee	*Step*	*Action*
IH Records Specialist	1.	MAINTAIN TE numbers.
IH	2.	PREPARE the TE using the *Industrial Hygiene Technical Evaluation Form*, A-6006-552.
	3.	COMMUNICATE the number and subject to the IH Records Specialist.
		The following elements are typically considered and may be documented in a TE: • Summary of the technical issue • Summary of the requirements (e.g., regulatory, procedural, contractual) • Decision description • Basis for the decision (including any assumptions) • Bounding conditions of the decisions

4.0 FORMS

CHPRC Industrial Hygiene Technical Evaluation Form, A-6006-552

5.0 RECORD IDENTIFICATION

All records are generated, processed, and maintained in accordance with PRC-PRO-IRM-10588, *Records Management Processes*.

Records Capture Table

Name of Document	Submittal Responsibility	Retention Responsibility
Documented written schedule for review/revision of IHEAs	CHPRC OS&IH manager(s)	CHPRC OS&IH manager(s)
Written IHEA report	CHPRC OS&IH professional performing the Industrial Hygiene Exposure Assessments	CHPRC OS&IH manager(s)
Technical Evaluation	TE Preparer	CHPRC OS&IH Manager(s)

6.0 SOURCES

6.1 Requirements

10 CFR, Part 851, *Worker Safety and Health Program*
29 CFR 1910, *Occupational Safety and Health Standards*
29 CFR 1926, *Safety and Health Regulations for Construction*
DOE-0342, *Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP)*
PRC-MP-SH-32219, *10 CFR 851 CHPRC Worker Safety and Health Program Description*

6.2 References

DOE-0342-001*, Hanford Site Beryllium Work Permit (BWP) and Hazard Assessment Procedure or the Hanford Site CBDPP*
PRC-PRO-IRM-10588, *Records Management Processes*
PRC-PRO-SH-40463, *Ergonomics*

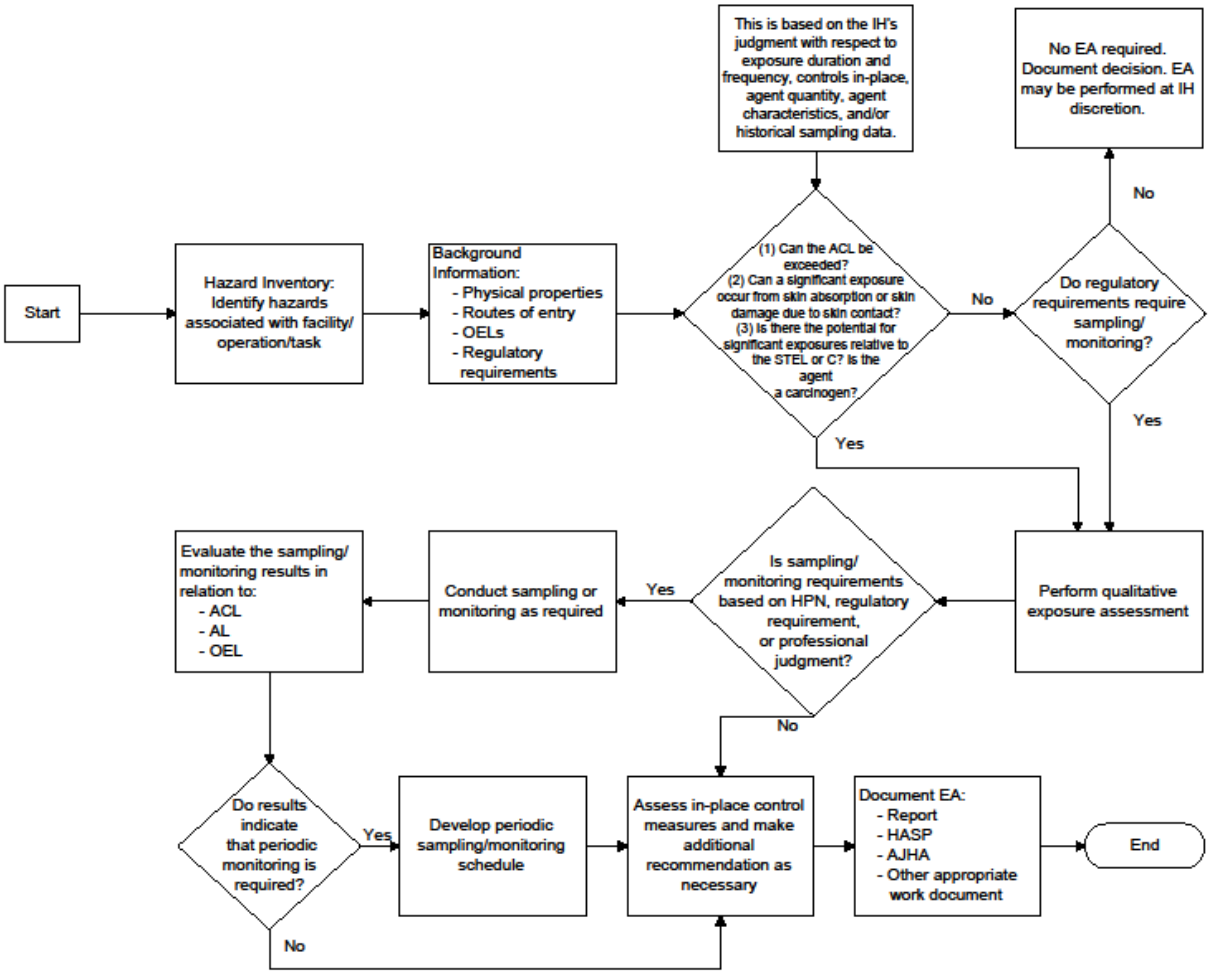
7.0 APPENDIXES

Appendix A - Glossary
Appendix B - Exposure Assessment Decision Logic
Appendix C - Hazard Priority Number
Appendix D - Exposure Assessment Elements Guidance
Appendix E - Example EXPOSURE ASSESSMENT REPORT FORMAT

Appendix A - Glossary

Term	Definition
Administrative Control Level (ACL)	The hazard level below which additional assessment may not be necessary. CHPRC uses 10% of the OEL for the ACL. The ACL is to be used as a decision point for determining the need for additional information to assess the exposure profile.
Action Level (AL)	The exposure level to a hazard that require some precautionary measure to protect the worker from over exposure to the hazard. The AL is typically 50% of the OEL. Some individual OSHA standards establish specific AL values.
Baseline Exposure Assessment	The first EA of each facility/operation/task is usually considered its baseline and is used for comparison with the results of future evaluations and exposure monitoring.
Exposure Assessment	The collection and analysis of data relating to occupational hazards exposure for a task or operation, including; magnitude, frequency, variability, duration, and route of exposure. This data is used to develop an exposure profile for the SEG for the purpose of risk management and health surveillance.
Occupational Exposure Limit (OEL)	A generic term used to represent a limit of exposure based on concentration or intensity and duration. This includes those referenced in 10 CFR 851 or it may be those referenced by other organizations where none exist under 10 CFR 851 if deemed appropriate.
Hazard Priority Number (HPN)	The HPN is a qualitative assessment method used for consistent evaluation of exposure risk and the establishment of sampling priorities. It also allows for consistent characterization and documentation of chemical and physical hazards.
Similar exposure group *(SEG)*	A group of employees whose exposures to chemical substances or physical hazards have been determined to be similar enough that monitoring the exposures of randomly selected workers in the group provides data useful for predicting the exposures or exposure profiles of the remaining workers. A SEG is also defined as a group of individuals who perform the same jobs or tasks and who have similar exposures to an individual hazardous agent.
Technical Evaluation (TE)	An evaluation of Industrial Hygiene hazards performed with limited sampling or no sampling and using a format outside of the normal IHEA process. This may be done using calculations or by using a tracer to identify potential exposures or other analytical techniques. A TE must be done using the process established in Section 3.2 of this procedure and using the Form A-6006-552.

Appendix B - Exposure Assessment Decision Logic



Appendix C - Hazard Priority Number

How to use the Model for Calculating Hazard Priority Number (HPN)

Using the definitions for each category, assign a numerical value (1 to 4) to each criterion. It is critical to evaluate each criterion solely on the definition. Then use the formula below to calculate the risk assessment priority number.

HPN Worksheet

Facility/Project:	**Operation:**				
Task Description:			**Date:**		
Hazard:			**OEL:**		
Exposure Time					
Exposure Frequency		X	1.5	=	
Exposure Duration		X	1.5	=	
Exposure Potential					
Eng. Controls & Env. Conditions		X	1.0	=	
Agent Characteristics & Route of Entry		X	1.0	=	
Quantity/Concentration/Intensity		X	1.0	=	
Major Health Effects					
Major Health Effects		X	3.0	=	
HPN				=	
Industrial Hygienist:			**Date:**		
Peer Review:			**Date:**		

Hazard Priority Number Direction

HPN	Recommendation
≥28	Sampling is required before or during next job performance or as soon as feasible
≥18<27	Sampling should be conducted when the opportunity permits to verify exposures
<18	Sampling not required

Appendix C - Hazard Priority Number (Cont.)

Industrial Hygiene has used this information to assign a Hazard Priority Number (HPN) for each hazardous agent. The HPN is a measure of the relative risk of a hazard and is used by the Industrial Hygienist to prioritize hazards. Those hazards with a high HPN will require more stringent mitigative controls than those with a moderate HPN. Those with a lower HPN may not require any mitigative controls.

HAZARD PRIORITY GUIDELINES

Exposure Frequency	Exposure Duration
(4) >100 work shifts/year	(4) >4 hours/shift
(3) 26-100 work shifts/year	(3) 1-4 hours/shift
(2) 5-25 work shifts/year	(2) <1 hour/shift
(1) < 5 work shifts/year	(1) < 1 minute
Exposure Potential (Engineering Controls/Environmental Conditions)	**Exposure Potential (Characteristics of Agent/Route of Entry)**
(4) significant potential for exposure	(4) significant potential for exposure
(3) moderate potential for exposure	(3) moderate potential for exposure
(2) little potential for exposure	(2) little potential for exposure
(1) no potential for exposure	(1) no potential for exposure
Quantity/Concentration/Intensity	**Major Health Effects**
(4) significant	(4) life threatening, or irreversible injury
(3) moderate	(3) severe reversible injury/illness
(2) little	(2) moderate, reversible injury/illness
(1) insignificant	(1) <moderate, reversible injury illness

Appendix C - Hazard Priority Number (Cont.)

Exposure Potential (Engineering Controls/Environmental Conditions)

(4) Significant potential for exposure – for example, any one or more of the following conditions: pouring chemicals, open vat, breaking lines, direct contact, high temperatures, high heat, high humidity, no shielding, no barriers.

(3) Moderate potential for exposure – for example, any one or more of the following conditions: heating chemical with limited ventilation, some controls available/used, temperature greater than standard, limited shielding, limited barriers.

(2) Little potential for exposure – for example, any one or more of the following conditions: exposure not likely under normal conditions, exposure if a spill or accident, agents not completely contained but well controlled, working with chemicals in a laboratory hood, standard temperatures.

(1) No potential for exposure – for example, any one or more of the following conditions: hazard completely isolated or contained, fail-safe mechanisms, no release anticipated.

Exposure Potential (Characteristics of Agent/Route of Entry)

(4) Significant potential for exposure – for example, any one or more of the following conditions; inhaled soluble chemicals that may pass from the lung to other organs by way of the circulatory system or the lymph system (i.e. lead), insoluble materials (i.e. asbestos, beryllium, silica, coal dust) that may remain in the lung causing irritation, inflammation, fibrosis, sensitization or malignancy, vapor pressure >100 mm Hg at standard temperatures (of an inhalation hazard), significant skin absorption properties and direct contact, friable and an inhalation hazard, physical agent anticipated to be, or measured to be with an area monitor or direct-reading instrument, present at levels that are > the OEL(this includes whichever of the 8-hr TWA, excursions, STEL, or ceiling values are applicable).

(3) Moderate potential for exposure – for example, any one or more of the following conditions: some dust/vapor/gas can be generated (of an inhalation hazard), vapor pressure 10-99 mm Hg at standard temperature (of an inhalation hazard), physical agent anticipated to be, or measured to be with an area monitor or direct-reading instrument, present at levels that are > action level < OEL, potential infections resulting from penetration or injection of infectious material into the bloodstream (i.e tetanus)

(2) Little potential for exposure – for example, any one or more of the following conditions: vapor pressure 0.1-9 mm Hg at standard temperatures (for an inhalation hazard), physical agent anticipated to be, or measured to be with an area monitor or direct-reading instrument, present at levels that are < the action level >administrative control level.

(1) No potential for exposure – for example, any one or more of the following conditions: vapor pressure < 0.1 mm Hg at standard temperatures (for an inhalation hazard), nonfriable condition for an inhalation hazard, physical agent anticipate to be, or measured to be with an area monitor or direct-reading instrument, present at levels that are < the administrative control level.

Appendix C - Hazard Priority Number (Cont.)

Quantity/Concentration/Intensity

(4) Significant – for example, any one or more of the following conditions: > 1 gallon of actual material (i.e., 1 gallon of 100% concentrated material, 2 gallons of 50% concentrated material, etc.), noise > 85 dBA, temperature > 100 F or < 20 F; > 3.6 kg of material, any substance with an LC-50 of < 100 ppm.

(3) Moderate – for example, any one or more of the following conditions: > liter - < 1 gallon of actual material, noise 83 – 85 dBA, temperature 90 – 99 F or 20 - 32 F; > 900 g - < 3.6 kg of material, any substance with an LC-50 of < 1000 ppm.

(2) Little – for example, any one or more of the following conditions: 10 - < 1000 ml of actual material, noise 80 – 82 dBA, temperature 80 – 89 F or 33 – 50 F; . 9 g - < 900 g of material.

(1) Insignificant – for example, any one or more of the following conditions: < 10 ml of actual material, noise < 80 dBA, temperature 51 – 79 F; < 9g of material.

Major Health Effects

(4) Life threatening or irreversible injury/illness – for example, any one or more of the following characteristics: carcinogens, chemical or simple asphyxiants and other substances where acute or chronic exposure likely to result in a fatality, blindness, permanent hearing loss, lung, organ, blood or tissue damaging including hepatotoxins, nephrotoxins and reproductive effects. .

(3) Severe, reversible injury/illness – for example, any one or more of the following characteristics: severe irritation, severe burns, sensitization, anesthetics, depression of the central nervous system, exposure to organo-phosphate and organo-chlorine pesticides.

(2) Moderate, reversible injury/illness – for example, any one or more of the following conditions: moderate irritation, 1st degree burn,

(1) <Moderate, reversible injury/illness – short term skin discoloration, headache, mild irritation, nausea.

Appendix D - Exposure Assessment Elements Guidance

The information collected relating to the eight EA elements will be used in the development of the rationale for determining the exposure profile for a specific operation/task. Therefore it is important that the detail for each element be of such rigor as to withstand evaluation by the professional community.

Describe the work or tasks performed.

Provide sufficient detail so that the reader of the document has an understanding of the operation/task being evaluated. This should include:

- How the task is being performed as it relates to exposure potential
- Environmental condition that may affect exposure
- Duration of exposure (constant, intermittent, single)
- Quantity of agent associated with the task.

Identify the potentially exposed workers.

SEGs are those workers having the same general exposure profile to the hazard being assessed. Workers may be members of more than one SEG, depending on the complexity of the task (s) being evaluated. For Initial assessments, the common practice is to select those workers with the greatest exposure potential as representative of the SEG. Although this is a conservative approach and aids in the determination of regulatory compliance, it may not be representative of all workers in the SEG and modification of the assessment may be required to accurately describe the exposure profile for all workers. It is not uncommon for a specific operation or task to contain multiple SEGs.

Identify and describe the potential sources of hazards.

Identify and list all hazards (chemical, physical, biological) that may present an exposure hazard for the operation/task being assessed. This should include commercial products used during the work activity. The identification should be more than just the product name or MSDS/SDS number. A detail list of all constituents used and concentrations should be included in this section. This is important in assessing potential chemical interactions as part of the exposure assessment.

Document the source of the exposure as well as the exposure risk associated with the hazard for the operation or task. The quantity and concentration of the agent can often be useful in estimating the exposure potential.

For chemical agents the following physical properties are helpful in determining exposure and physical hazard potential:

- Vapor Pressure
- Flash point
- Lower Explosive Limit
- Boiling point
- Odor threshold
- Specific Gravity
- pH
- Relevant OELs
- Air dilution volume flow rate (for concentration prediction)

Evaluate the in-place controls used to prevent or minimize exposure.

Document all control measures used at the time of the assessment to control or reduce worker exposures. This should include all administrative, engineering, and personal protective equipment use and their effectiveness. ***Recommend interim hazard control measures to management where the initial assessment indicates significant enough exposure to warrant immediate control measures to mitigate the hazard.***

For operations using engineering controls, collect information on ventilation rates to use in modeling atmospheric agent concentration for the work activity. Engineering Controls and required work practices should be within the framework of applicable OSHA and EPA regulations and consensus based standards.

Where personal protective equipment is used to control worker exposure to a hazard, document the protection factor afforded by the protective device being used.

Assess the levels of exposure.

An integral part of any exposure assessment is estimating or quantifying the exposure profile for each SEG exposed to an identified hazard. Initial exposure assessments often rely on qualitative information to estimate the SEG's exposure profile until qualitative data become available. When estimating exposures, the quality of the information used has an impact on the certainty of the assigned exposure. To deal with this uncertainty, one method is to establish exposure ranges based on worst-case assumptions. This typically overestimates the exposure, but provides a conservative approach to assigning exposures to the SEG. Typical ranges used to estimate SEG exposures are shown below.

Exposure Potential
< ACL
>ACL<AL
>AL<OEL
>OEL

The method presented in Appendix C is a qualitative approach to assessing exposure hazard in lieu of quantitative data. This method relies on assessing frequency and duration of exposure; environmental conditions; route of entry; quantity or intensity of exposure; and health effects of the hazard. Using this method provides the industrial hygienist with a consistent approach to assessing worker risk to each hazard evaluated and the need for additional sampling/monitoring data as well as mitigative efforts. As with any qualitative exposure assessment, professional judgment is critical to the method used.

Include a conclusion, with rationale, whether the identified agent(s), their use(s), and the potential exposures they cause pose a hazard to workers (i.e. generate a positive or negative exposure assessment.

The information gathered for the exposure assessment should be used to draw conclusions about the exposure profile for each SEG. Initial EAs where there is limited or no quantitative exposure data, need to include a strong rationale for assigning exposures to the SEG. The rationale should address the route of entry, rate of uptake and other elements of intensity of exposure, frequency/duration of exposure, controls used to minimize or reduce exposures, and the use of personal protective equipment. Others factors to consider are environmental conditions (i.e. heat, cold, wind, atmospheric pressure) and individual susceptibility (i.e. health, age, gender, previous exposure, allergies).

Where quantitative data is available for the EA, statistical tools should be used to support the rationale in the conclusions. The use of statistical tools to characterize the exposure profile will provide the industrial hygienist a technically sound basis for determining the acceptability or unacceptability of a SEG/task exposure profile. To accurately characterize the SEG/task exposure profile, a thorough understanding of the exposures attributed to the SEG/task should include a measure of central tendency (geometric mean) and its variability (Geometric Standard Deviation). It can be assumed that most industrial hygiene exposure profiles have a lognormal distribution unless there is evidence to the contrary.

Metrics such as the 95^{th} percentile or the exceedance fraction are useful in describing the exposure profiles potential to exceed the specific exposure limit or action point. When calculating any statistical metric it is critical to include all data, including those values reported as less than limit of detection (LOD). The IH should take care when using statistical tools on highly censored (<LOD) data sets.

Recommend additional controls for hazardous agents where necessary.

When the EA indicates that the controls in place at the time of the assessment do not provide adequate protection to the worker to minimize occupational illness or injury, recommendations for additional controls should be made. If the data gathered during the EA indicates the workers are at significant risk of exposure (>AL) immediate action should be undertaken to contact line management to implement additional control measures.

Recommend the scope and frequency of further exposure monitoring.

The conclusion drawn from the EA may indicate additional sampling/monitoring is needed to adequately assess the exposure profile for the SEG. When additional sampling/monitoring is recommended; a sampling/monitoring schedule should be developed. The data collected as part of the sampling/monitoring effort should be used to verify or refine the exposure profile. The data should also be used to update the EA as necessary.

Appendix E - Example EXPOSURE ASSESSMENT REPORT FORMAT

Executive Summary: Describe the purpose of the exposure assessment, date, location, number of samples collected or measurements taken, general observations, conclusions, and major recommendations.

Introduction should include purpose. The reason for performing the assessment must be stated clearly, e.g., baseline, reassessment, employee concern, or negative exposure.

Methodology should include exposure assessment strategy: The report should make reference to the exposure assessment strategy/sampling plan and specify the assessment goal (qualitative vs. quantitative).

Environmental agents: For each environmental agent, an evaluated assessment should be conducted evaluating the risk to the worker. The assessment should address, but is not limited to: frequency, duration, environmental conditions, nature of the agent, intensity of the agent and major health effects. The report should discuss OEL's used in the assessment.

Exposure assessment data: Should include dates of the assessment, name of industrial hygienist performing assessment, SEG/task, task/activity, and controls in place.

Monitoring/Sampling data: Monitoring data should include, sample dates, SEG/task, measured exposure levels normalized to the integration period of the OEL (8 hour, 15 minute) and use of relevant PPE.

Conclusions: Interpretive remarks should be provided. All assumptions and models should be identified or referenced. The report should conclude whether exposures were judged acceptable or unacceptable, or whether more data are needed to resolve the assessment. A diagnostic exposure assessment report should provide observations and conclusion about the sources of exposure and the effectiveness of controls.

Recommendations: As appropriate, specific recommendations should be provided (e.g. engineering controls, process changes, work practice controls, PPE). A re-evaluation frequency may be recommended.