

Approved  
**ORNL WORK PLAN**  
 Operations, Maintenance and Services  
 Work Plan Name / Rev: CB-WP00001 / 0  
 Expiration Date: 2/18/2026



WORK SCOPE/DESCRIPTION				
Requester (Name/Badge/Division):	Barger, Craig / 03090916 / X089			
Location of work (Bldg/Rm/Other):	4500S / S143 /			
Work Plan Title:	Installation, Hood Flow Monitors			
Description of Service/Work Needed:	Install Monitors in West hood EF-97, West IE9254, East Hood EF-96 and East Hood IE 9252.			
Charge Number, if required:				
Work Plan Grade/Worktype:	3 / 0			
Author (Name/Badge):	Barger, Craig / 03090916			
File Attachments:	<b>Badge</b>	<b>Name</b>	<b>Attachment Desc</b>	<b>File Name</b>
	03090916	Barger, Craig	QEA for Hood Monitor installation	Hood flow Monitor Installation 17FEB2021.pdf
INSTRUCTIONS				
Prerequisites/Precautions:				
Known Hazards:				
*The hoods have transite panels / ACM. *The hoods have been detected as being radiation contaminated. *Ladder Usage, Elevated Work				
<ul style="list-style-type: none"> <li>- A pre-job briefing must be attended and the safety review sign-in sheet signed by each worker prior to starting this work.</li> <li>- Workers must contact someone with radiological protection and get approval before performing any work on any hood.</li> <li>- Ladder inspection required prior to each use.</li> <li>- Workers will wet wipe the surface inside the hood to be drilled prior to drilling</li> <li>- Worker must verify that the hood is in working condition before performing work.</li> </ul>				

- When the hood has two sashes, the opposite one being used should remain closed while work is being performed.
- The sash where the work is being performed should only be opened enough to perform the drilling safely.

**Directions:**

- Perform only the tasks described by the work order

**Post Work Testing:**

- Validate installed monitors operate as designed
- Validate there are no sources of air in leakage that could impede the accuracy/performance of the monitors.

**Closeout:**

- Ensure work area is clean and free of hazards or safety concerns prior to leaving work site.
- Move used material to designated disposal area.
- Return work package to Supervisor and provide feedback for future use.

**JOB HAZARD EVALUATION**

HAZARDS	PERMITS / CONTROLS
Asbestos/Man-Made Mineral Fibers: Transite Panels, Drilling Required	<ul style="list-style-type: none"> <li>  Asbestos hazard controls applied:           <ul style="list-style-type: none"> <li>  Wet methods</li> <li>  HEPA Vacuum</li> <li>  Prompt Cleanup</li> <li>  Medical Monitoring</li> <li>  Authorization by the Asbestos Program Manager (APM)</li> </ul> </li> <li>  PPE &amp; Access - Safety glasses</li> <li>  Approved HEPA Vacuum Cleaner</li> </ul>
Radiological Work	<ul style="list-style-type: none"> <li>  <a href="#">Radiological Work Permit</a> (Enter RWP no.)</li> </ul>
Elevated Work: Ladders will be required for access.	<ul style="list-style-type: none"> <li>  <a href="#">Inspecting Ladders</a> Guide [Step &amp; Fixed]: Inspect ladder condition prior to each use.</li> </ul>
Noise: Entering high noise areas or creating high noise due to tasks performed use appropriate hearing protectors to reduce noise levels below 85 dBA.	<ul style="list-style-type: none"> <li>  <a href="#">Exposure Assessment</a>: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM)</li> <li>  Hearing protection (plugs or muffs): <a href="#">Selecting Hearing Protection</a></li> </ul>
Chemical/Rec ID 1	<ul style="list-style-type: none"> <li>  <a href="#">Exposure Assessment</a>: Enter or attach justification to classify exposure scenario as low risk, qualitative exposure assessment (QEA), or requirement to conduct quantitative exposure monitoring (QEM)</li> </ul>

**DOCUMENTATION REVIEW AUTHORIZATION**  
(Approvals are certification of hazards assessment)

Reviewer/Approver Roles	Signature	Date
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Accountable Management (Service Provider, Line, Equipment Owner, or Facility Management)	Hudey, Bryce D	2/18/2021
IS/IH	Thomasson, Kris	2/18/2021
Radiation Protection	Stayman, Chris	2/18/2021
System Engineer, Accountable Equipment Owner, or Facility Engineer	West, Michael S	2/18/2021
Task Leader	Roberts, Michael	2/18/2021
Work Package Concurrence		
Facility Manager		
Operations Supervisor		
Facility Manager Approval To Start Work		
Facility Manager		
Work Start Authorization		
Task Leader		
Work Acknowledged Complete		
Task Leader		
Worker Feedback:		

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## PRE-JOB SAFETY REVIEW GUIDE

ID: 55847

**Scope of Work:** Review work package/plan to ensure all participants understand the work activity.

**Hazards:** Review the hazards identified in Job Hazard Evaluation (JHE) / work plan (IOP).

- ↳ Since the work package / plan was written: 1) Have conditions changed? 2) Are there new hazards? Refer to Field Notes and Focus Areas.

**Hazard Controls / Permits:** Review:

- ↳ Written permits for the work activity.
- ↳ Precautions, step warnings, Hold Points ...
- ↳ Personal Protective Equipment (PPE)
- ↳ Work instructions for information - e.g., steps where hazards are introduced.
- ↳ ORNL subject area requirements - e.g., non-permit hazard controls.

**Performing Work:**

- ↳ Discuss group/individual responsibilities for safe & effective work.
- ↳ Follow work instructions & safety procedures.
- ↳ Availability/location of materials, tools, etc.
- ↳ Any previous experiences / lessons learned?
- ↳ Response if work cannot be performed as planned.
- ↳ What is the worst thing that could happen?
- ↳ Are there Potential error traps with the job? → →
- ↳ Take a minute before: work start & leaving work area.
- ↳ Work Hand-off / Turnover - workers & Task Leader

→ **Potential Error Traps:**

- ↳ Time pressures
- ↳ Distractive environment
- ↳ High workload
- ↳ First time evolution
- ↳ First day back
- ↳ Vague guidance
- ↳ Over confidence
- ↳ Imprecise communications
- ↳ Work stress

**Abnormal Situation Response:**

- ↳ Stop Work: Observe an unsafe act, activity or condition that creates an imminent danger.
- ↳ Emergency Response: Discuss egress paths or other responses if problems are encountered.

**Field Notes and Focus Areas:** (Use this area as a work space to record notes related to new hazards identified in the field or changed conditions. Record feedback in work package/plan information systems.)

*By signing below, I am indicating that I have been briefed on the potential hazards associated with completing this job.*

Signature / Badge	Date	Signature / Badge	Date

## Qualitative Exposure Assessment – Multiple Hazard Form

### Project Information

- No QEA is required based upon a review of the type(s) of hazard(s) associated with the activity/task  
 QEA could not be conducted at the time the RSS/Work Plan was reviewed/approved due to inadequate information provided by the PI, Work Planner/Package author or some or all agent(s)/hazard(s). List the agent(s) for which a QEA could not be conducted:  All Agents (see below) or  Specific Agent(s) that could not be assessed: . Discuss controls incorporated into *Work Control* to assure EA is conducted in the future:

**Process/Job/Task:**  
<sub>(SEG/SET Name)</sub> FMD/sheetmetal/ drilling

**Work Description:** sheet metal worker will be drilling through asbestos to install a hood flow monitor in a fume hood

<b>Facility #:</b> 4500S		<b>Room/Lab/Shop #:</b> 4500S/S143
<b>Organization:</b> FMD/Central Complex		<b>RSS/Work Plan #:</b> WO#: 4140262 WP#: CB-WP0001

### Agents and Control Information

	<b>Process/Job/Task</b>	<b>Agent</b>	<b>Quantity or Magnitude</b>	<b><sup>1</sup>Potential Routes of Entry</b>	<b>Primary Exposure Forms</b>	<b>Frequency of Exposure</b>	<b>Duration of exposure per exposure Event</b>	<b><sup>2</sup>Engineering and Administrative Controls</b>	<b>*OEL</b>	<b>Health Severity Rating 1-4</b>	<b>Exposure Rating 1-4</b>	<b>Certainty Rating 1 - 3</b>	<b><sup>3</sup>QEA Rating 1-24</b>	<b><sup>4</sup>Exposure Decision</b>
1	FMD/sheet metal/drilling	asbestos	unknown	NH	Particulate	Variable	< 1/2 hour	GV, T, P, W	1f/cc	4	3	1	7	Acceptable (2 - 7)
2	FMDsheet metal /drilling	Formula 409 RECID 9271 Monoethanolamine	1 gallon	NH, S	Liquid	Variable	1/2 - 2 hours	W,T, L/P, P	3 PPM TWA	3	3	1	6	Acceptable (2 - 7)
3	FMD/sheet metal/ drilling	noise	>85DB(A)<105D	B(A)	Other	Variable	< 1/2 hour	T,P,MS	85DB(A)	4	3	1	7	Uncertain (8-15)
4														
5														
6														

1. **Routes of entry codes:** Inh – Inhalation, P – Penetration, Ing – Ingestion, S – Splash; A – Absorption; 2. **Engineering Control codes:** GB – Glovebox, GV – General Ventilation, Hood – Other LEV Hood, I/E – Isolate or Enclose Hazard, LH – Lab Hood S – Shielding, W – Wet Methods; **Administrative Control Codes:** T – Training, L/P – Labeling or Postings, P – Written procedure/plan; LT – Limited Stay Time; W/R – Modified Work/Rest Cycle, BEI – Biological Monitoring, MS – Medical Surveillance;

3. **QEA Rating** = (Health Severity Rating + Exposure Rating) X Certainty Rating; 4. **Exposure Decision:** Acceptable (2-7), Uncertain (8-15), Unacceptable (16-24)

\* Optional field

### Exposure Decision and Follow-up

Acceptable Exposure (LOW RISK)				Uncertain and Unacceptable Exposures			
Was Agent Hazard Acceptable (Low Risk)?	If yes, describe justification for classification as acceptable			Follow-up Priority	Follow-up Schedule	Is Quantitative Monitoring Required?	Recommendations/Comments
1 YES	workers must use an approved shrouded drill attachment tool connected to an approved nil-fisk HEPA vac while drilling through the hood. workers will also have on a tyvek sleeve, double layer of nitrile gloves,safety glasses with side shields, and a single layer of herculeite on the floor where the worker will be standing to perform the work..			Low	_____	NO	the floor and any equipment needs to be covered with herculeite.
2 YES	The Monoethanolamine comprises <1.5% of the product and it is in solution. It will be diluted before use.			Low	_____	NO	
3 NO	Single layer hearing protection with a minimum NRR of 27 will be worn during high noise operations. This will reduce exposure to well below the PEL.Hearing protection will be required while operating power equipment.			Low	_____	NO	
4							
5							
6							

### Additional Comments

**Qualified H&S Professional:** Kris Thomasson

**Date:** 02/17/2021

# Qualitative Exposure Assessment – Multiple Hazard Form

## QEA Rating Tables

**Table 1: Health Severity Rating**

Rating		Criteria
HSR		Effects from Over Exposure
1	<b>Negligible</b>	<p>Negligible or <b>reversible</b> effects of little concern</p> <p>Note: This applies to chemical agents classified as a *Relatively Harmless Hazard.</p>
2	<b>Minor</b>	<p>Minor or reversible health concern</p> <p>Note: This applies to chemical agents classified as a *Slight Health Hazard. Examples for using this rating for physical agents include: heat fatigue, discomfort from repetitive stress tasks, minor skin burn not requiring medical treatment, etc.</p>
3	<b>Medium</b>	<p>Medium to severe, reversible health concern.</p> <p>Note: This applies to chemical agents classified as a *Moderate Health Hazard. Examples for using this rating for physical agents includes temporary threshold shift in hearing, heat exhaustion, reversible repetitive stress disorders requiring medical intervention, temporary or transient sight impairment, minor skin burns (UV or IR) requiring medical treatment, etc.</p>
4	<b>Major</b>	<p>Major or irreversible health concern. Includes unknown health effects</p> <p>Note: This applies to chemical agents classified as a *High Health Hazard or *Extreme Health Hazard. Examples for using this rating for physical agents include: standard threshold shift in hearing, heat stroke, permanent peripheral nerve or tendon damage, ruptured disc, permanent (total or partial) loss of sight, formation of cataracts, neurological effects, sterility, etc.</p>

\*See the [Hodge and Sterner toxicity classification scale](#)

**Table 2: Exposure Rating\*\***

Rating		Criteria
1	<b>Negligible/Remote</b>	<ul style="list-style-type: none"> <li>• Little to no exceedance of 10% of the OEL (i.e., 95th percentile exposure estimate is virtually always less than 10% of the OEL)</li> <li>• No signs or symptoms of exposure</li> <li>• There is sufficient quantitative exposure data to judge exposure</li> <li>• Very little skin contact with Agent is expected</li> <li>• Engineering and administrative controls are in place and functioning</li> <li>• Only diluted chemicals are used in the process</li> <li>• Very low intensity of energy source</li> <li>• Short exposure duration</li> <li>• The phase of the chemical does not allow for route of exposure</li> </ul>
2	<b>Low/Occasional</b>	<ul style="list-style-type: none"> <li>• Exposure &gt;5% exceedance of 10% of the OEL (i.e., 95th percentile exposure estimate lies between 10% of the OEL and 50% of the OEL)</li> <li>• No specific signs or symptoms of exposure</li> <li>• Qualitative monitoring indicates insignificant levels of hazard</li> <li>• Only incidental skin contact with Agent</li> <li>• There is exposure potential</li> <li>• Engineering and administrative controls are available but effectiveness is questionable</li> </ul>
3	<b>Medium/Probable</b>	<ul style="list-style-type: none"> <li>• Exposure &gt;5% exceedance of 50% of the OEL (i.e., 95th percentile exposure estimate lies between 50% the OEL and the OEL)</li> <li>• Air concentrations may exceed established action levels</li> <li>• Routine skin contact with chemical is expected</li> </ul>
4	<b>High/Likely</b>	<ul style="list-style-type: none"> <li>• Exposure &gt;5% exceedance of the OEL (i.e., 95th percentile exposure estimate &gt; OEL)</li> <li>• Signs and symptoms are evident</li> <li>• High generation of airborne particles or vapors</li> </ul>

\*\* Use of personal protective equipment (including respirators) shall not be taken into account when determining the exposure rating.

## Qualitative Exposure Assessment – Multiple Hazard Form

**Table 3: Certainty Rating**

Rating		Criteria
1	Certain	The environmental agent's exposure profile and health effects are well-understood. The industrial hygienist has high confidence in the acceptability judgment.
2	Uncertain	There is enough information to make a judgment, but further information gathering is warranted to verify the exposure assessment.
3	Highly Uncertain	The acceptability judgment was made in the absence of significant information on the exposure profile and/or health effects.

### Qualitative Exposure Rating

**QEA Rating = (Health Severity Rating + Exposure Rating) X Certainty Rating**