

1.0 INTRODUCTION

The purpose of this document is to provide a systematic approach to hazard identification, assessment, and mitigation for completing a job site risk assessment, or a Job Hazard Analysis (JHA) at NB Power. A risk evaluation requires many considerations for mitigation that are both reasonable and practicable. This is best achieved when utilizing the Hierarchy of Controls. A risk assessment will be completed when:

- High-risk Safety Work is performed that is not covered by a document or risk analysis that clearly identifies all hazards and mitigating controls.
- A newly introduced work process or hazard exists that requires documented analysis of risk and controls.
- The Workgroup Supervisor or Health & Safety deem it necessary.

2.0 SCOPE

This document is intended for all persons planning and conducting high risk safety work, or a newly introduced work process involving high risk to workers/public at NB Power including work that is performed through contract services or work that is not included in the local work planning process.

Although the criterion to compete a JHA is the same for contract personnel as for NB Power personnel, contractors may use their own risk analysis and process for completing a JHA provided the form and process meets the intent of a Job Hazard Analysis equivalent to or better than this Standard.

3.0 REFERENCES

NB Occupational Health and Safety Act	Duties of the Employer, Supervisor, Contracting Employer, and Employee.
NB OHS General Regulation 91-191	
CSA Z1002-12	Occupational Health and Safety - Hazard Identification and Elimination and Risk Assessment and Control
HSEE-03-07	Human Performance Tools
HSEE-03-19	Contractor Safety Management
HSEE-03-41	Tailboard Conference (Pre-Job Briefing, PJB)
SDP-01368-A057	Point Lepreau Nuclear Generating Station Departmental Procedure Completing a Job Hazard Analysis
HSEE-03-51	Line of Fire
Hard Hat	Link to JHA's

4.0 TERMS AND DEFINITIONS

Analysis	An analysis is the examination of something in detail in order to understand it better or draw conclusions from it.
Approve/Approval	In the context of this Standard, the term approve or approval means that the responsible person(s) for the job has taken all reasonable measures to control the safety hazards associated with the job.

	Approving the JHA means that accountability is understood, and due diligence has been completed in the development of the JHA.
Consequence	A consequence is the outcome of a hazardous event.
Document	Document in the context of this Standard refers to any approved Safe Work Method, Procedure, Code of Practice, existing Job Hazard Analysis, etc.
High Risk Safety Work	High Risk Safety Work is any work that has the potential to cause a major injury /illness (LTA) or one or more fatalities, and which has a medium to high likelihood of occurring without controls in place as defined in Appendix A.
Hazard	A hazard is anything that can cause harm to life, health, property or the environment (examples: toxic chemicals, moving machinery parts, high-voltage electricity, working at heights, temperature extremes, slippery work surfaces, etc.).
Hierarchy of Controls	The hierarchy of controls is the prioritized approach for hazard mitigation, in order of the most effective to least effective, being: <ul style="list-style-type: none"> • Elimination (remove the hazard) • Substitution (replace with non-hazardous material or equipment) • Engineering Controls. (create a physical barrier around the hazard such as limiting access or exposure to a hazard, reducing energy, or providing an alternate means of interacting with a hazard) • Administrative Controls (procedures, training, technology, lights, audible alarms, and warning signs) • Personal Protective Equipment PPE (equipment to be worn or held by a worker for protection).
Inherent Risk	A magnitude of risk before any controls have been implemented.
Job Hazard Analysis	A Job Hazard Analysis (JHA) is a systematic approach to preparing for a job by listing the steps of the job, identifying the potential hazards, and then removing the hazards or putting defenses in place to mitigate the hazards using the Hierarchy of Controls.
Likelihood	The chance of something happening
Line of Fire	The line of fire is the path an object under tension, pressure, suspension, or any other energy will travel should something fail or go wrong.
Local Safety Representatives	Generation Work Methods, Training, Safety Coordinators, T&D Safety Champions, Nuclear Health and Safety Advisors; etc.
Probability	The extent to which an event is likely to occur
Residual Risk	The magnitude of risk that remains, after all controls have been implemented.
Risk Severity	The combination of the likelihood of the occurrence of an event and the severity of that event
Risk Evaluation	Risk evaluation is the process of comparing an estimated risk



	against given risk criteria to determine the significance of a risk (see Appendix C).
Subject Matter Expert	A person or professional who has extensive knowledge and experience in a particular field or task. Who may need to be consulted on the risk analysis specific to the job being performed. An example of this would be a System Engineer for a particular plant system or function.

5.0 **ROLES AND RESPONSIBILITIES**

Terminology for specific roles may differ in each business unit of the Corporation, such as Generation and Transmission. The roles have been defined, and each sector may hold a different title than described below. For major discrepancies, contact Total Health and Safety

5.1 **Total Health & Safety**

- support, as required, to determine when a JHA is necessary.
- when required, provide input and feedback on risk evaluation to ensure all reasonable measures have been taken to ensure the health and safety of all workers/members of the public.
- support when required, if the job has not achieved a moderate or low residual risk indicator, review and provide input on the work process. Determine if alternative options are available.

5.2 **Local Safety Representative**

- support the Planner/Assessor/ Supervisor//Project/Job Lead or Contractor to determine when a JHA is required during the hazard identification and risk evaluation process as needed.
- review the JHA in collaboration with the Workgroup Supervisor/Job Lead and provide feedback as required.
- when deemed necessary, perform a walk down of the job site with the supervisor responsible for the work.

5.3 **Planner/Assessor/Detailer/Engineering (where applicable)**

- assess the scope of work to determine if it meets the criteria of High-Risk Safety Work as identified in Appendix A
- determine if a document exists for the work that can address and/or document all hazards and controls (e.g., working at heights, critical lift, etc.) then a JHA is not required.
- determine if a JHA already exists for the work, if no document exists request that the Workgroup Supervisor complete a JHA

5.4 **Project/Job Lead/ Foreman etc. (where applicable)**

- Ensure the JHA has been developed and completed.
 - ensure that the JHA has been reviewed with all employees assigned to the work
 - ensure the JHA is followed.
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5.5 Subject Matter Expert

- support the risk analysis by providing expertise in specialized area of function. As an example: Engineering input may be required to thoroughly evaluate the risk associated with a system or process/task when complete list of hazards is unknown by the developer of the JHA, or specialized high-risk activities such as diving.

5.6 Workgroup Supervisor

- support the Planner/Assessor, where applicable, to determine if the scope of work meets the criteria of High-risk Safety Work (see Appendix A and/or Appendix B for guidance)
- review and ensure no additional hazards are present for existing documents or JHA's,
- ensure the document or JHA has appropriate reviews
- approve the JHA when satisfied all hazards and controls have been addressed to the appropriate level, using the Hierarchy of Controls
- ensure the signed JHA has been scanned and sent to local safety representatives

5.7 Workers/Contractors

- support the process for developing the JHA
- provide input and feedback on the analysis to ensure no additional hazards are present without mitigation controls
- participate and sign the JHA once understood and ready for work

5.8 JHSC

Their responsibility during the monthly workplace inspections are to:

- identify and record potential and actual hazards associated with buildings, equipment, environment, processes and practices
- identify any hazards which require immediate attention, whether they are substandard conditions or substandard acts
- ensure that existing hazard controls are functioning adequately; and
- where needed, recommend corrective action

6.0 STANDARD

A Job Hazard Analysis is a documented, systematic approach to hazard identification, assessment, and mitigation. This tool is typically developed during the Planning stage of work and can be several weeks prior to the job starting, or in some circumstances, on short notice. However, to ensure the proper amount of rigor and analysis have gone into the job, considerations for early planning should always be implemented.

It is important to note that all work being completed at NB Power must document a risk assessment to understand all hazards and controls applicable to the job and to ensure the health and safety of all workers. A Job Hazard Analysis is one method of documenting a risk assessment. For routine work or low risk jobs, a Tailboard Conference/ Pre-Job Briefing may be all that is required, if an existing safe work practice does not exist. Utilize Section 6.1 to make this determination.



For urgent or reactive unplanned work, it is still necessary to assess the risk and identify appropriate controls prior to execution. At no time will NB Power put the health and safety of workers or contractors at risk in lieu of having a documented risk assessment for the work. Should you require support, contact your Supervisor and/or local safety representative.

6.1 Identify the Need for a Job Hazard Analysis

This section describes the process for identifying the need for a Job Hazard Analysis (JHA). Please see Appendix A and B for further guidance and decision making.

Step	Action	
Planner/Assessor or Supervisor where no Planner/Assessor s involved		
1.	Review the Work Order or Project details.	
2.	Determine if the work to be performed is classified as High Risk Safety; refer to Appendix A, Identification of High-Risk Work. Proceed as follows:	
	If the work...	Then...
	does not meet the criteria for High Risk Safety Work	use appropriate safe work procedures and tailboard conference/pre-job brief requirements. No JHA is required.
	meets the criteria for High Risk Safety Work	proceed to Step 3.
3.	Determine if a document exists (other than a JHA) for the work that includes identification of all potential hazards and controls to be implemented, <i>example</i> : Confined/Enclosed Space Entry procedures with scope of work, critical lift procedures, Fall Protection/ working at heights, etc. Proceed as follows:	
	If a document...	Then...
	exists	<ul style="list-style-type: none"> review the assigned work details. If possible, perform a job site visit, otherwise; review/familiarize with existing documents, pictures, video footage, etc. of the job site/location to determine if additional high-risk hazards exist that are not covered in the document. proceed to Step 4.
	does not exist	Proceed to step 5
4.	Proceed as follows:	
	If...	Then...
	No additional high risk hazards exist	no JHA is required. Use appropriate safe work procedures and tailboard conference/pre-job brief requirements.
	Additional high risk hazards exist and document/Safe Work Practice can be edited	<ul style="list-style-type: none"> edit document follow appropriate safe work procedures and tailboard conference/pre-job brief requirements

		• no JHA required.
	Additional high risk hazards exist however document cannot be edited	JHA required to document hazards and controls that do not exist in the existing document/safe work procedure. Proceed to Step 5.
5.	Determine if a JHA already exists:	
	If a...	Then...
	JHA already exists	the JHA must undergo a review for applicability to the job, including a site visit (where possible) and must be updated with new date and approval prior to use.
	JHA does not exist	proceed to <i>Section 6.2</i> .

6.2 Prepare the Job Hazard Analysis

This section describes the process for preparing a Job Hazard Analysis JHA

Step	Action
Workgroup Supervisor/Project/Job Lead or Contractor	
1.	Initiate form <i>0554 Job Hazard Analysis</i> or Contractor/Site Specific JHA Form. Note: If using an existing JHA, determine if the hazards and controls listed are still appropriate and add additional hazards and controls as deemed necessary. If satisfactory, proceed to Section 6.3. Otherwise, proceed to Step 2
2.	Consult with the appropriate Subject Matter Experts, Health & Safety or individuals involved in performing the work to supply the detail, as required.
3.	Break the job down into basic steps (example 6-8), providing a brief description of what work is to be done. Avoid: <ul style="list-style-type: none"> • making the breakdown so detailed that there is an unnecessarily large number of steps. • making the breakdown so general that important steps are missed.
4.	Clearly list all the potential hazards for each step of the job. Use lessons learned if available, from jobs already completed that relates or is similar to the task to be performed to assist with identifying hazards.
5.	Once the hazards are identified, determine the appropriate controls to eliminate or mitigate the hazards using the Hierarchy of Controls. Always consider the Line of Fire when identifying and assessing risks. The line of fire is the path an object under tension, pressure, suspension, or any other energy will travel should something fail or go wrong. Body positioning and restrictions to the job location based on the line of fire hazards can increase the controls necessary to ensure the health and safety of the workers during job execution. Never make assumptions about the risks, evaluate and consult with subject matter experts if you are uncertain.
6.	Document your analysis on the Job Hazard Analysis form #0554 (or review submitted form from Contractor), sign and date the form in the Prepared By field.

6.3 Review and Approve the Job Hazard Analysis

This section describes the process for the review and approval of a Job Hazard Analysis (JHA).

All JHA documents shall be submitted for review in an appropriate timeframe to ensure adequate time for review and consultation. Typically, this is performed during the planning stage of work and can be several weeks prior to the job starting, or in some circumstances, on short notice review, as required. However, to ensure the proper amount of rigor and analysis have gone into the job, considerations for early planning should always be implemented.

Step	Action
Workgroup Supervisor/Project/Job Lead or Contractor	
1.	Review the JHA and other relevant information (<i>example</i> : SDS) in the package to ensure all job steps have been properly identified, hazards have been identified, and controls are adequate to mitigate any potential hazards.
2.	Subject matter experts may be used as reviewers. (<i>example</i> : Engineering, Management, etc)
Local Safety Representatives	
3.	May review the JHA and other relevant information(<i>example</i> : SDS) in the package to ensure all job steps have been properly identified, hazards have been identified, and controls are adequate to mitigate any potential hazards.
4.	If changes are required, return any change requests to the Workgroup Supervisor/ Project/Job Lead or Contractor.
5.	Once the document has been returned with appropriate changes, review, sign and date the form and forward to the Workgroup Supervisor/Project/Job Lead or Contractor.
Workgroup Supervisor/Project/Job Lead or Contractor	
6.	Approve and send (record keeping) the JHA to your local safety representative

6.4 Amendments and Field Revisions to JHA

At times, due to working conditions or discovery work, it may be necessary to make changes to the existing Job Hazard Analysis in the field or shortly before the execution of work. Any revision necessary requires the workplace supervisor’s approval.

Once all revisions have been made, it is imperative to review with the entire crew for their knowledge and understanding as well. A sign off of the document (verbal if necessary due to logistics) is required again when any new information has been added or omitted from the JHA.

6.5 Lifecycle of Job Hazard Analysis

A Job Hazard Analysis is to be used for specific jobs and projects. However, if there is an absence of a safe work practice/procedure, a JHA can be reused for a job that meets all the same requirements laid out in the plan. However, the JHA must be reviewed for applicability to the job and must go through the same review and approval process as when it was created.

Regardless of the age of the JHA, the details must be reviewed to ensure they meet the latest regulations, policies, industry best practices etc. and have all the appropriate hazards and controls identified.

See note in Appendix B.

6.6 NB Power's Hazard Inventory

NB Power maintains a master Hazard Inventory. This is a living document as it is updated as new hazards are identified or when controls are improved on. The following can lead to updates to the master list:

- Incidents, workplace inspections and audits which outlines hazards not previously identified
- Field observations identifying hazards not previously captured
- New or changing equipment/processes adopted by the company
- Task / project specific JHAs capturing hazards not previously captured.

The master Hazard Inventory can be used as a tool when developing work methods or task specific JHAs.

7.0 TRAINING

HAZ001 – Hazard Identification, Mitigation and Control

8.0 APPENDIX

Appendix A: Identification of High-Risk Safety Work

Appendix B: Decision Tree

Appendix C: Job Hazard Analysis Form 554



Director of
Total Health & Safety



Revision #	Date	Revision Summary	Author	Reviewed By	Approved By
1	2021/01/27	<p>Correction of minor grammatical and formatting errors.</p> <p>Update to 5.1 & 5.2 to include the responsibility to support all stakeholders in ensuring legislative compliance, if required.</p> <p>Included values from Table 2 in Table 1, Risk Matrix for ease of use.</p> <p>Revised formatting of Risk Matrix table legends</p>	Erin Price	Melinda Mallery	Robin Condon
2	2021/08/27	<p>Revised based on feedback from training sessions, including formatting</p> <p>Updated Scope to remove Contractor JHA form needing NBP approval.</p> <p>Updated Section 5.0 to include context around different terminology for titles and roles throughout the corporation.</p> <p>Added paragraph to Section 6.0 regarding urgent or reactive unplanned work</p> <p>Added Sections 6.4 and 6.5 as per comments</p>	Sarah Riche	Hercules Georgiadis	Robin Condon

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Completing a Job Hazard Analysis (JHA)**

03	2023-06-12	Section 6.6 NB Power's Hazard Identification & Risk Assessment Changed title NB Power Health and Safety Representative / Department (local) to Local Safety Representatives	H. Georgiadis	H&S Team R. Cook M. Parks	R. Roy
04	2024-04-02	Removal of Risk Ratings Evaluation on JHA form	N. Legere	H&S Team	R. Roy

Appendix A: Identification of High-Risk Safety Work

Jobs that have documented procedures and standards to support the systematic approach to identifying hazards and controls *may not* require a Job Hazard Analysis. However, in some cases where new processes are introduced, a change to the document is required (specific to hazard identification and control), or a newly introduced hazard is present without supporting documentation of controls for implementation, a JHA may be required to support existing work processes. The list below is not a conclusive list of high-risk work, however, can be utilized to support the development or decision towards creating a JHA. Locally documented procedures and safe work methods can be used to support the decision of creating a JHA. However, based on a review of the procedure, a gap analysis may be required to supplement the hazard identification and controls, outside of the existing work practice. See Appendix B for addition guidance on making this decision.

Hazard Type	Issues	High Energy	Documents to support Job
Air Quality/Hazardous Chemicals	<ul style="list-style-type: none"> • When air quality has the potential to be immediately dangerous to life or health: <ul style="list-style-type: none"> ○ Oxygen (less than 19.5% – greater than 23%). ○ Combustible gases are present above 50% of the LEL. ○ Chemical substances or airborne concentrations above 50% of NIOSH IDLH values. ○ Chemical exposures in a confined space where the airborne concentrations are not known. • Where there is the potential for exposure to asbestos or lead. • Where there is the potential for exposure to chemical substances above 50% of the TLV. • Where there is the potential for exposure to biohazardous materials (molds, sewage, animal 	 	HSEE-03-17 Confined Space Entry

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	feces, etc.).		
Confined Spaces	<ul style="list-style-type: none"> Air quality. Electric shock. Restricted entry and/or exits. Enclosed or partially enclosed. 		HSEE-03-17 Confined Space Entry
Critical Lifts	<ul style="list-style-type: none"> Coordination. Lift drop zones. Barricading. 		HSEE-03-12 Rigging and Lifting Operations
Temperature Extremes	<ul style="list-style-type: none"> When working in an environment where there is a significant potential for Heat Stress or Cold Stress. Cold – Great Danger category (Corporate Safety Manual). Heat – Hi-Risk Category (Corporate Safety Manual). Work in extreme weather conditions. 		Corporate Safety Manual
Working at Heights	<ul style="list-style-type: none"> Working at heights or near an unguarded edge where the use of fall protection is required. Working from a powered mobile work platform. 		HSEE-03-16 Fall Protection
Rope Work	<p>All rope activities where personnel will be suspended by rope including:</p> <ul style="list-style-type: none"> Rope Access Work positioning Training 		

Electrical Work	<ul style="list-style-type: none"> When working near or on live electrical equipment or apparatus 		HSEE-03-25 Minimum Approach Distances.
Diving	<ul style="list-style-type: none"> For all diving operations. 		HSEE-03-22 Diving and Underwater Operations
Excavations	<ul style="list-style-type: none"> Asphyxiation. Air quality. Buried services. 		
High Pressure	<ul style="list-style-type: none"> Pneumatic pressure >15psi. Hydraulics under mechanical pressure. Any liquid under a pressure and at a temperature that is such that the liquid will change to a gas or vapor when the pressure is reduced to atmospheric pressure. 		Boiler and Pressure Vessel Code, NB Reg 84-174
Open Water	<ul style="list-style-type: none"> All work on or near open water where there is a risk of drowning. 		HSSE-03-28 Water Operations

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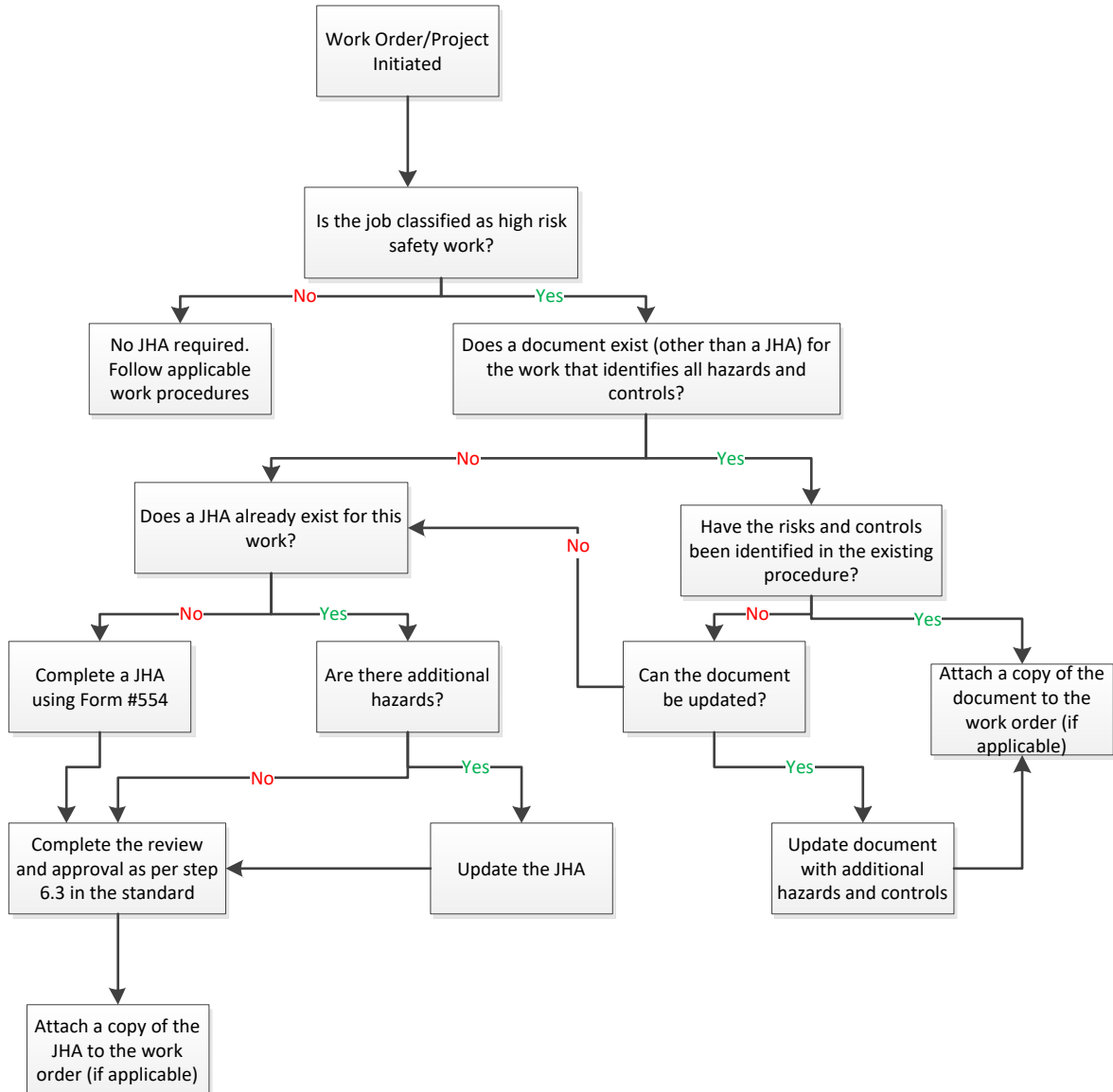
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Rotating equipment	All work near unguarded rotating equipment.		
Line of Fire	Evaluate the path an object under tension, pressure, suspension or any other energy will travel should something fail or go wrong		HSEE-03-51 Line of Fire
New or Unknown Hazards	When introducing new processes, chemicals or equipment that has never been used before or is substantially different from what has been in use.		HSEE-03-01 Hazard Identification, Assessment, and Mitigation for Completing a Job Hazard Analysis

Appendix B: Decision Tree

Identifying Jobs that Require a Job Hazard Analysis



Note: All existing JHAs that are being used must undergo a review for applicability to the job and must be updated with new date and approval prior to use. Consider hosting a meeting with all stakeholders during the development of the document. This should be a cross-functional activity.

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Appendix B: Job Hazard Analysis Form



Job Hazard Assessment

Form 0554E
2024-05

JHA Prepared by		Date (yyyy-mm-dd)	
Supervisor for Job		Date (yyyy-mm-dd)	
Job Location		Work Order # (if avail)	

Job Description

INSTRUCTIONS

- 1 Identify each step of the job
- 2 Identify the hazards and associated energies with each step
- 3 Identify the mitigating actions (controls) to be implemented to address each hazard.
- 4 Identify the person / group responsible



Example of identifying steps of the job, hazards and associated energies and mitigating controls to address each hazard.

Job Step	Hazards	High Energy	Mitigating Actions (Direct or Indirect Controls)	Person/Group Responsible
working from an elevated platform	Falling objects risk	Gravity: Suspended Load	install tarp to cover openings, use tool tethers to prevent dropping	Mechanical Maintainers
working from an elevated platform	Working from heights	Gravity: Fall from Elevation	fall protection system	Mechanical Maintainers

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Job Hazard Assessment

Form 0554E
2024-05

Job Step	Hazards	High Energy	Mitigating Actions (Direct or Indirect Controls)	Person/Group Responsible

CREW SIGN OFF (by signing this JHA, I understand the hazards and controls)				

REVIEWER(S) - (optional)			APPROVER(S) - Lead, Foremen, Supervisor, etc.		
Name	Signature	Date	Name	Signature	Date