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Brunel Energy, Inc.

Risk Assessment (Identification of Hazard)

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1. Purpose

- 1.1. Brunel Energy, Inc., hereinafter referred to as, “the Company,” has established a program to meet OSHA recommended Practices for Hazard Identification and Assessment.

2. Applicability

- 2.1. This policy applies to employees, subcontractors and/or visitor(s) of the Company. For the purposes of this policy, an employee shall be considered on the job whenever he/she is:
 - 2.1.1. On or in, any Company or client property, including parking areas; or
 - 2.1.2. On Company time even if off Company premises (including paid lunch, rest periods and periods of being on call).
- 2.2. As a condition of employment, Company employees are required to abide by additional governmental or customer policies and requirements that may be imposed at a worksite in addition to the requirements of these policies and procedures. Nothing set forth in this policy constitutes, construes, or interprets in any way as a contract of employment.

3. Definitions

- 3.1. **‘As Low as Reasonably Practicable’ (ALARP)** is a concept that is related to balancing the assumed risks of exposure against the benefit of performing the work. Management balances the cost of control measures in terms of time, inconvenience, and money against the Risk Level being considered. The goal of the ALARP process is to identify, from among several candidate alternative protection systems, the system that would result in minimal overall cost and provide maximum risk reduction benefit.
- 3.2. A **Hazard** is a condition with the potential to cause harm, ill health or injury, damage to property, plant, products, reputation, shareholder value, and the environment, production losses or increased liabilities.
- 3.3. **Likelihood** is a measure of frequency of an undesired event occurring. It is derived from a combination of frequency of the activity, level of exposure, and the probability of the sequence of events leading to the undesired event. The likelihood of an undesired event occurring shall take into account the existing passive and active safeguards of the system.
- 3.4. **Risk** is a measure of the product of likelihood of occurrence of an undesired event and the potential severity of the consequences that may arise.
 - 3.4.1. Risk in the Company Task Risk Assessment is measured using a 3x3 risk matrix with risk scores of 1 (lowest risk) through 9 (highest risk). Risk scores are translated into risk levels ranging from negligible to acceptable, tolerable, and intolerable. These levels provide an indication of what actions need to be taken to proceed.

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- 3.4.2. Risk in the Company Risk Assessment is measured using a 5x5 risk matrix. Risk scores are translated into varying risk levels dependent upon the type of risk being evaluated. These levels provide an indication of what actions need to be taken to proceed and are measured as high, medium, and low risk.
- 3.4.3. Risk in the Company Personal Task Risk Assessment is measured using a 5x5 risk matrix. Risk scores are translated into varying risk levels from “minor health impact or injury” through “multiple fatalities”. These levels provide an indication of what actions need to be taken to proceed and are measured as high, medium, and low risk.
- 3.5. **Risk Level** is a qualitative measure of risk as plotted on the risk matrix and identified by colored zones, each with different decision-making requirements.
- 3.6. **Risk Management** is the set of ongoing management and engineering activities of a business that ensure that risks are effectively identified, understood, and minimized to an achievable or tolerable level.
- 3.7. **Risk Matrix** is a two-dimensional 5x5 matrix used to determine the risk level of an unwanted event or scenario by plotting likelihood on the X-axis (horizontal) and severity on the Y-axis (vertical).
- 3.8. **Severity** is the degree of health and safety, financial, environmental, and quality consequences arising from an undesired event with planned prevention and mitigation measures in place. It is the maximum credible worst-case level of harm expected from the incident. The severity of an undesired consequence shall take into account the existing passive safeguards of the system.

4. Responsibilities

- 4.1. Manager(s):
 - 4.1.1. Shall be responsible for ensuring the policy is fully implemented in their areas of control and to consult with employees as part of undertaking the hazard identification, risk assessment and control process.
- 4.2. HSE Supervisors(s):
 - 4.2.1. Shall be responsible for supporting management in ensuring the policy is implemented and to consult with employees as part of undertaking the hazard identification, risk assessment and control process.
- 4.3. Employee(s):
 - 4.3.1. Shall be responsible to participate in the risk identification process and policy which includes providing effective constructive information and feedback to aid the risk management process.
- 4.4. Subcontractor(s):

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- 4.4.1. Shall be responsible to participate in the risk identification process, which includes providing effective constructive information and feedback to aid the risk management process.

5. General Requirements

- 5.1. Manage risks/identifying risks to employees' health and safety, through assessing, identifying, and addressing risks through engineering controls.
- 5.2. Collect, organize, and review information with workers to determine what hazards may be present and which workers may be exposed to. Information available in the workplace may include equipment and machinery operating manuals, Safety Data Sheets (SDS) inspection reports records of previous injuries and illnesses incident investigations report results of job safety analyses (JSA).
- 5.3. Conduct regular inspections of all operations, equipment, work areas and facilities for safety hazards.
- 5.4. Identify health hazards including chemical hazards, physical hazards, biological hazards, and ergonomic risk factors by conducting qualitative exposure assessments and reviewing employee medical records.
- 5.5. Workplace incidents including injuries, illnesses, near misses, and stop work interventions should be investigated to identify the root cause in order to prevent future occurrences.

6. Procedure

- 6.1. The Risk Assessment is the Company's formal process for identifying potential risks/hazards. The process may be informal or formal. The formal process, Job Safety Analysis (JSA) (Appendix 9.2) shall be conducted before work begins to identify and assess hazards and where a task could result in a Recordable Incident, or worse, if adequate control measures are not put in place. Informal risk assessment includes any form of job planning where risk(s) may be assessed but are not formally documented.
- 6.2. A Risk Matrix is provided as a tool to assist both processes, informal and formal. The Matrix can be used by individuals to assist in the formal (JSA) process or as an individual stand-alone record of informal risk assessment for any task which does not require a JSA or for use by an individual in the conduct of a task for which a JSA has been prepared. In either case, the use of the Risk Matrix is encouraged.
- 6.3. Where Risk Matrix are available then the worksite supervisors (Manager / Superintendent), shall be responsible for ensuring that the Matrix are easily available at any time to members of the workforce, encouraging their use and for collecting, reviewing, and retaining completed JSA for discussion at Safety Meetings, reviewing with worksite management and audit purposes.
- 6.4. Job Safety Analysis (JSA)

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- 6.4.1. It is the responsibility of the supervisors and work supervisors to ensure JSA's are prepared as required. While the actual writing of the instructions may be delegated to others judged competent to write them, the responsibility to ensure that they are written and are of high quality remains with the worksite and work supervisors.
- 6.4.2. A JSA shall be prepared for a job if:
 - 6.4.2.1. Task review identifies exposure to any hazard(s) which are considered to warrant a Risk Assessment Matrix value of C2 (possible Recordable Incident) or greater.
 - 6.4.2.2. Past accident or incident history demonstrated uncontrolled exposures can result in an accident.
 - 6.4.2.3. It is unusual or non-routine.
 - 6.4.2.4. It is new or uses tools or equipment.
 - 6.4.2.5. It is part of simultaneous operations, either within the scope of operations or including other external work that can impact the operations.
 - 6.4.2.6. Any other reason supervisors, work supervisors or crews deem appropriate.
- 6.4.3. Hazards classified as "Red Zone" potential are deemed to be "unacceptable risks" if left unmanaged and shall be seriously considered for elimination altogether. Classifications in the "Yellow Zone" are considered to have "tolerable risk" potential and require management to risk levels that are as low as reasonably practicable (ALARP). Hazards that can realistically be assessed as "Green Zone" are relatively low in the danger they represent and can be managed by day-to-day application of normal precautions and existing controls.
- 6.4.4. Risk Reduction Measures are then identified and repeating the assessment process will demonstrate how the risk reduction measures have reduced the risk rating and whether the risk is acceptable. If the residual risk remains unacceptable then either further risk reduction resources shall be identified, or the task cannot proceed.
- 6.4.5. Any unusual physical or operational factors, existing or expected during the job that may cause a departure from or change to the sequence of tasks, hazards or risk reduction measures as stated on the JSA shall be listed on the JSA along with the measures to be taken in recognition of these points.
- 6.4.6. If a JSA is to be written for a lengthy, complicated, or multi-faceted task, or one involving more than one crew or work group. Consideration shall be given to the preparation of standard operating practice (SOP), for parts of the task. In such a case, care must be taken to co-ordinate the development of JSA and SOP.
- 6.4.7. It is the responsibility of all departments to develop JSAs for tasks meeting the criteria defined in (b).

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- 6.4.8. All JSAs and associated SOPs shall be discussed at pre-Job and pre-task meetings and copies of relevant JSAs shall be kept at work locations (field location, workshops, etc.) for ease of referral.
- 6.4.9. It is the responsibility of the supervisors to review existing JSAs on a continual basis, and when recommended by input from personnel, shall ensure any revisions, as necessary. These supervisors also have the responsibility to amend JSAs as required to improve or increase the safety of each task.
- 6.4.10. Maintenance and control of the Risk Matrix shall be as per the Safety Manual.

6.5. Risk Assessment Matrix

Potential Severity Index	People	Assets	Environment	Corporate Image	Increasing Probability of Occurrence				
					A	B	C	D	E
					Never heard of in the oil industry	Heard of before in the oil industry	Has occurred before in our company	Happens more than 2/yr in our company	Happens more than 3/yr at a SES location
1	Minor health impact or injury -FA-	Slight damage	Slight impact	Slight impact (annoyance to resident)	LOW RISK				
2	Serious health impact or injury -MTO or RWC-	Minor damage	Minor impact	Limited impact (local media)					
3	Major health impact or injury -LT or PPD	Significant localized damage	Significant localized impact	Considerable impact (regional coverage)		MEDIUM RISK			
4	Single fatality or PTD	Major equipment damage	Major long term impact	National impact					
5	Multiple fatalities	Total-loss Write-off	Catastrophic impact	International exposure and impact			HIGH RISK		

Definitions:

- EQD - Equipment Damage
- ENV - Environmental Incident
- FA - First Aid
- FTL - Fatality
- LT - Lost Time
- MTO - Medical Treatment Only
- PPD - Permanent Partial Disability
- PTD - Permanent Total Disability
- RWC - Restricted Work Case

6.6. Hazard Assessment

- 6.6.1. A hazard at the workplace is any condition having the potential to cause injury, illness, or a loss. A hazard assessment shall be conducted and documented prior to any new worksite activity. For normal operations, a listing of tasks that may have significant risk to people, environment, or equipment should be maintained along with the Job Safety Analysis and Control Process. The purpose of a hazard assessment is to identify the hazards.
- 6.6.2. A hazard assessment shall be completed and documented for each of the worksite's risk sensitive tasks.
- 6.6.3. All potential hazards shall be systematically prioritized, with those of imminent danger to workers being rectified prior to work commencing.

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6.6.4. Re-assessments are required:

- 6.6.4.1. At intervals that prevent the development of unsafe and unhealthy working conditions.
- 6.6.4.2. When a new work process is introduced.
- 6.6.4.3. Before any construction commences at a new location.
- 6.6.4.4. When a work process or operation changes.
- 6.6.4.5. When new workers arrive at the site and are not familiar with the scheduled work activity.
- 6.6.4.6. Note: Use the Hazard Assessment and Control Process with the simple Hazard Risk Matrix to assist in the worksite Hazard Assessment. Follow the step-by-step process to identify and manage the hazards associated with each risk sensitive task.

6.7. Hazard Identification

6.7.1. There are seven main categories for which certain types of hazards may occur. They are:

- 6.7.1.1. Hazardous Atmospheres
- 6.7.1.2. Energy Sources
- 6.7.1.3. Access/Egress Hazards
- 6.7.1.4. Environmental Hazards
- 6.7.1.5. Electrical Hazards
- 6.7.1.6. Cranes & Hoisting
- 6.7.1.7. Personal Risk & PPE

6.7.2. Hazard recognition and control involves:

- 6.7.2.1. Determining what hazards are present in the workplace.
- 6.7.2.2. Assessing the level of risk for the hazards identified; implementing strategies to eliminate or reduce the risk involved.
- 6.7.2.3. Following up to ensure the control strategies chosen are effectively implemented.
- 6.7.2.4. All personnel shall understand how to identify potential hazards associated with the work site. Hazards can exist in many forms, they can be visible or hidden, and they may also be a condition or an action.
- 6.7.2.5. Recognition and control of hazards ensure corrective actions shall be completed in a timely manner, before an incident occurs.

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6.7.2.6. Employees and subcontractors shall be actively involved in the hazard identification process and hazards shall be reviewed with all personnel concerned.

6.7.2.7. Employees shall be trained in the hazard identification process including the use and care of proper PPE.

6.8. Hazard Control

6.8.1. The best way to mitigate an identified hazard is to remove it from the process or site. Quite often this action is not feasible and control measures shall be implemented. These measures may include isolating the hazard, and/or the use of personal protective equipment (PPE) to limit the risk of personal injury.

6.8.2. Hazard Identification Checklist (Appendix 9.1):

6.8.2.1. Check off the hazards specific to the tasks carried out at this location.

6.8.2.2. List the hazards and the recommended controls to reduce risk.

6.8.2.3. Hazards shall be eliminated, isolated, or minimized.

6.8.3. Elimination By:

6.8.3.1. Engineering solutions such as removing a hazardous job, tool, process, machine, or substance.

6.8.3.2. Substitution or replacing one substance or process with another that would not pose a potential hazard.

6.8.3.3. Redesign hazards can be “engineered out” through redesign of work site, work process, and jobs.

6.8.4. Isolation By:

6.8.4.1. Hazards can often be isolated through containment or enclosure.

6.8.4.2. Automation: Some processes can be automated or mechanized.

6.8.4.3. Barriers: Some hazards can be blocked or barricaded. The further the barrier keeps the hazard away from the workers, the more effective it is.

6.8.4.4. Absorption: engineering controls that would absorb the hazard such as baffles that block or absorb noise.

6.8.4.5. Dilution: Some hazards can be diluted or dissipated.

6.8.5. Minimized By:

6.8.5.1. Planning and communication.

6.8.5.2. Codes of Practice, Standard Operating Procedures, and associated Safe Work Programs and Guidelines.

6.8.5.3. Work Permits.

6.8.5.4. Work/rest schedules limit exposure to the hazard.

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- 6.8.5.5. Limiting hours of work.
- 6.8.5.6. Scheduling hazardous work during times when exposure to workers is minimized.
- 6.8.5.7. Monitors and alarms.
- 6.8.5.8. Training
- 6.8.5.9. Safety Meetings
- 6.8.5.10. Posters and Bulletins
- 6.8.5.11. Note: Personal Protective equipment (PPE) shall always be used as a last resort in controlling hazards. PPE is less effective as a control as it does not eliminate the hazard. The PPE shall be properly maintained and worn by workers.
- 6.8.6. All reported hazards shall be immediately assessed and controlled. A worker will be assigned to correct the hazard and a target date will be given for completion.
- 6.8.7. Utilize the company "Observation / Hazard Identification" or contractors Hazard ID Cards as applicable.
- 6.8.8. A hazard report shall include the following:
 - 6.8.8.1. Date reported
 - 6.8.8.2. Location
 - 6.8.8.3. Description of the hazard
 - 6.8.8.4. The risk it presents
 - 6.8.8.5. Control measures needed
 - 6.8.8.6. Interim actions taken if any
 - 6.8.8.7. The signature of who reported the hazard

7. Training

- 7.1. Employees shall be trained to identify risks, assess risks, incorporate hazard control and to report risks to their supervisors and managers.

8. Recordkeeping

- 8.1. Hazard Identification checklists and Job Safety Analysis shall be kept and maintained.

9. Appendix

- 9.1. Appendix 9.1 – Hazard Identification Checklist.
- 9.2. Appendix 9.2 – Job Safety Analysis.

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10. Reference

- 10.1. OSHA recommended practices for hazard identification and assessment.

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Brunel Energy, Inc. Hazard ID Checklist

Hazardous Atmospheres	Energy Sources	Electrical hazards	Personal Risk & PPE
<input type="checkbox"/> Carbon Dioxide	<input type="checkbox"/> Electrical	<input type="checkbox"/> Condition of tools & cords	<input type="checkbox"/> Contact with moving parts
<input type="checkbox"/> Carbon Monoxide	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Defective power equipment	<input type="checkbox"/> Defective hand tools
<input type="checkbox"/> Explosive gas	<input type="checkbox"/> Mechanical	<input type="checkbox"/> GFI Breakers	<input type="checkbox"/> Entanglement
<input type="checkbox"/> Flash fire hazard	<input type="checkbox"/> Other	<input type="checkbox"/> Lighting levels too low	<input type="checkbox"/> Equipment backing
<input type="checkbox"/> Flammable substances	<input type="checkbox"/> Pneumatic	<input type="checkbox"/> Overhead lines	<input type="checkbox"/> Equipment operation
<input type="checkbox"/> H ₂ S / toxic gases	<input type="checkbox"/> Rotation	<input type="checkbox"/> Powered mobile equipment	<input type="checkbox"/> Fall protection
<input type="checkbox"/> Inhalation	<input type="checkbox"/> Stored Energy	<input type="checkbox"/> Underground services	<input type="checkbox"/> Fire fighting
<input type="checkbox"/> Oxygen deficient atmosphere	<input type="checkbox"/> Thermal	<input type="checkbox"/> Working on or near energized equipment	<input type="checkbox"/> Fueling equipment
<input type="checkbox"/> Ignition source within 25m of hydrocarbon substance	<input type="checkbox"/> Chemical	<input type="checkbox"/>	<input type="checkbox"/> Guarding
<input type="checkbox"/> Sludge residue	<input type="checkbox"/> Gravity	<input type="checkbox"/>	<input type="checkbox"/> Lack of safe work procedures
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Landowner relations
Access/Egress Hazards	Cranes and Hoisting	Environmental Hazards	<input type="checkbox"/> Leg protection
<input type="checkbox"/> Access/egress	<input type="checkbox"/> Aerial devices	<input type="checkbox"/> Airborne particles	<input type="checkbox"/> NORM
<input type="checkbox"/> Confined space	<input type="checkbox"/> Compressed gas cylinders	<input type="checkbox"/> BTEX	<input type="checkbox"/> Operating ATVs
<input type="checkbox"/> Ladders	<input type="checkbox"/> Cranes/hoisting equipment	<input type="checkbox"/> Flying debris/dust	<input type="checkbox"/> Pinch points/crushing
<input type="checkbox"/> Rigging/ropes/slings/cables	<input type="checkbox"/> Manual lifting	<input type="checkbox"/> High/low temperature	<input type="checkbox"/> Radiation
<input type="checkbox"/> Scaffolds	<input type="checkbox"/> Mechanical lifting	<input type="checkbox"/> Hot fluids	<input type="checkbox"/> Slips/trips/falls
<input type="checkbox"/> Trapped by	<input type="checkbox"/> Overhead work	<input type="checkbox"/> housekeeping	<input type="checkbox"/> Traffic
<input type="checkbox"/> Trench/excavation	<input type="checkbox"/>	<input type="checkbox"/> Noise levels	<input type="checkbox"/> Violence
<input type="checkbox"/> Working at heights (>3m)	<input type="checkbox"/>	<input type="checkbox"/> Pits/ponds	<input type="checkbox"/> Working alone
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Vibrations	<input type="checkbox"/> Working near water
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Weather	<input type="checkbox"/>

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Permits Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Confined space permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Ground disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Hot work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Lockout/tagout log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Safe work permit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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APPENDIX 9.2 Job Safety Analysis – Page 2 of 2

*I understand & will adhere to the steps, hazards & controls as described in this JSA. I understand that performing steps out of sequence may pose hazards that have not been evaluated, nor authorized. I will contact my supervisor prior to continuing work, if the scope of work changes or new hazards are introduced.
I understand I have the authority and responsibility to stop work I believe to be unsafe.*

<u>Worker Name (please print)</u>	<u>Signature</u>	<u>Date</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

I have reviewed the steps, hazards & controls described in this JSA with all workers listed above and authorize them to perform the work. Workers are qualified (i.e. licensed or certified, as appropriate, & in full compliance with Company training requirements) to perform this activity.

_____	_____	_____
Supervisor	Signature	Date

I have communicated area hazards with the supervisor or listed worker(s) for this activity and have coordinated the described activity with affected occupants. The above listed workers are released to perform described scope of work in the following area(s): _____

_____	_____	_____
Area or Building Manager	Signature	Date