Job Safety and Environmental Analysis (JSEA)
Sequoia Marine Solutions
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Personal Protective Equipment (PPE)

- Non-slip footwear
- Insulating gloves (Electrical equipment)
- Waterproof work gloves
- Safety glasses
- Life vest

Transportation & Arrival Operations				
Task Description	Task Hazard	Risk Control	Task Personnel	Sign Off
Transporting ROV equipment	Back injury, foot injury, and hand injury	Use team lifting procedures and secure equipment in transport cases	Deck management	
Unloading equipment	Back injury, foot injury, hand injury, and slips	Ensure using proper lifting techniques, wear gloves, and wear non slip shoes	Deck management	
Power supply	Back injury, foot injury, and hand injury	Ensure proper lifting techniques	Pilot/Co-pilot	
Control center	Back injury, foot injury, hand injury, and tripping	Ensure proper lifting techniques and having proper cable management	Pilot/Co-pilot	
Tether cable management	Tripping	Ensure that tether is wrapped up nicely	Deck management	

Transportation & Arrival Operations				
Attire	Hypothermia	Ensure when working in cold conditions to have proper clothing to keep warm	Entire team	

Electrical & Power Operations				
Task Description	Task Hazard	Risk Control	Task Personnel	Sign Off
Connecting power supply	Electrical shock, reverse polarity	Verify polarity before energizing the system	Deck management	
Tether inspection	Loss of communications or power	Inspect tether to make sure there are no cuts or tears	Deck management	
Camera check	No visuals can cause damage to ROV	Run a test to ensure cameras are functioning before going into water	Pilot/Co-pilot	
Emergency power shutdown	Delayed shutdown response	Ensure functionality of power shutdown is working properly	Pilot/Co-pilot	

Mechanical Operations				
Task Description	Task Hazard	Risk Control	Task Personnel	Sign Off
Thruster operation	Electrocution, injury to fingers	Inspect wires of thrusters for wear and tear, ensure guards are not broken, and power is off when inspecting the thruster	Pilot/Co-pilot	
Manipulator operation	Electrocution, pinched fingers	Ensure power is completely off when inspecting the manipulator or making repairs	Pilot/Co-pilot	
Check bolts/Pressure valve	Leakages	Protects the ROV from water leakages and keep structural integrity	Pilot/Co-pilot	

Water Operations				
Task Description	Task Hazard	Risk Control	Task Personnel	Sign Off
Launching ROV	Back injury, slipping, and drowning	Lift with legs, wear non slip shoes, and have life vest on	Deck management	
Tether handling	Tripping and damage to tether	Assign dedicated tether manager	Deck management	
Operating near water	Falling into the water	Ensure to wear non slip shoes and life vest	Deck management	
ROV recovery	Back injury, slipping, and drowning	Lift with legs, wear non slip shoes, and have life vest on	Deck management	
Clear communication	Miscommunication causes delays on mission, damage to equipment, or injury to team members	Establish clear roles, ensure to have call outs, communication between ROV operators and deck crew	Entire team	
Adding and removing manipulator attachments	Pinch injury to hand	Have clear communication with pilot and co-pilot of when to open/close manipulator	Deck management	

End of Operations Procedure				
Task Description	Task Hazard	Risk Control	Task Personnel	Sign Off
Powering down system	Improper shutdown causing damage to equipment	Use circuit breaker actuator to turn off power, wait a few seconds then switch off power entry	Deck management	
Disconnect tether from power supply	Electrical shock, tripping hazard, and cable damage	Ensure to wear insulating gloves and wrap up tether	Deck management	
Disconnect main power system	Electrical shock, tripping hazard, and cable damage	Ensure to wear insulating gloves and wrap up power cable	Deck management	
Dry ROV	Water slippage and water entering chassis	Use towels to dry off ROV	Deck management	
Clean worksite/pool deck	Slipping hazard, tripping hazard	Wrap up tether, collect tools, pick up retrieved items	Entire team	
Inventory all equipment	Tripping hazard	Checklist of equipment	Deck management	

Sequoia Marine Solutions Stop Work Authority

Sequoia Marine Solutions is committed to maintaining a safe working environment during all phases of the ROV construction, testing, transportation, and competition operations. Any team member has the authority and responsibility to immediately stop operations if an unsafe condition, hazardous action, or equipment malfunction concern is identified.

Operations will be suspended until:

- Hazard has been identified
- Risk has been evaluated

- Corrective action has been implemented
- Safety Lead approves continuation of operations once corrective action has been taken

Sequoia Marine Solutions prioritizes:

1. Personal safety
2. Equipment protection
3. Mission success