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| TDI HAZID Template | | | | | **Hazard Classification** | |  | **Hazard Classification After Additional Mitigation Measures** | |
| **ITEM#** | **ELEMENT** | **POTENTIAL HAZARDS / INCIDENTS** | **EFFECTS/ THREATS/ RISKS** | **CONTROLS IN PLACE** | **CONSQ** | **PROB** | **FURTHER MITIGATION** | **CONSQ** | **PROB** |
|  |  |  |  |  |  |  |  |  |  |
|  | **Planning** |  |  |  |  |  |  |  |  |
| 1 | Project Planning | Inadequate planning | Poor safety control, job quality, and efficiency | Project planning mtgs, Project HSE Plan, PEP, ERP, Bridging Document, SIMOPS Plan in place | 3 | D |  | 3 | D |
| 2 | Training/Familiarity | Lack of familiarity with work scope | unsafe acts, loss of quality, errors | Start up meeting, Training Matrix on CM for crew & staff positions, SSE program, Safety Mgmt System, HSE System | 3 | D |  | 3 | D |
| 3 | Journey Management | Lack of suitable transportation means, inadequate or inaccurate planning and communications, travelling when dark. | Exposure to unsafe conditions and extortive locals. Missed connections and project delay. Car crash, collision with wildlife. Kidnapping/physical harm. | Driving policy in HSE System. | 3 | D |  | 3 | D |
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|  | **SIMOPS/On-site Assets** | |  |  |  |  |  |  |  |
| 4 | SIMOPS | Conflict caused by lack of or insufficient SIMOPS coordination & cooperation between vessels | Loss, vessel or deployed gear damage, platform damage. Poor quality & efficiency | SIMOPS Plan as needed, including cross-informing by Party Chiefs & maintaining communication in work area | 4 | D |  | 4 | D |
| 5 | Emergency Response | inability to MEDEVAC after accident/injury/illness, inadequate environmental response/mitigation to incident. | Potential for more serious or exacerbated injuries/illness, loss/damage of vessel/equipment, environmental release worsened | ERP, emergency drills, Project HSE Plan including the performance of desk-top drill in transit | 3 | D |  | 3 | D |
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|  | **General Control Methods** | |  |  |  |  |  |  |  |
| 6 | Manning | Improperly licensed crew, untrained/inexperienced crew, insufficient crew causing incident/accident | Unsafe operations, collision, loss, injury | USCG Safe Manning Letter in place, Crewing qualifications on CM. Review of CV and crew list, review of manning requirements for job, experienced helmsmen. Training matrix in place. | 2 | D |  | 2 | D |
| 7 | Permits to Work | Inadequate work controls causing incident/accident/equipment damage/loss. | Loss, injury, mistakes, unsafe acts, lost time, financial loss, damage/loss of equipment | Process Checklists, JSAs, Off-Process PTWs, Toolbox Meetings, Stop-work policy, mgmt team meetings, continual mgmt team evaluation of weather | 2 | D |  | 2 | D |
| 8 | Transit Navigation | Loss of GPS signal, loss of nav equipment function, inadequate charts causing incident/accident | Running aground, collisions, entering restricted areas | Backup bridge GPS system. Charts, Pubs, and Voyage Plans in place. NTMs incorporated weekly. | 2 | E |  | 2 | E |
| 9 | Site Navigation | Imprecise coordinates, wrong geodetics, obsolete/wrong/no calibrations, imprecise tool offsets, loss of GPS signal, loss of nav equipment function causing | Striking seabed infrastructure causing damage or leakage. sample/measure at wrong location, loss of quality/efficiency | Pre-start validation of Client's geodetic settings in nav system, vessel offsets, calibrations, coordinates. Backup GPS system. | 2 | E |  | 2 | E |
| 10 | Station Holding Ability | Vessel unable to maintain position within specifications, sea state building, causing incident/accident/loss | Equipment damage, injury, reputation, financial loss, poor quality | Stop Work authority in place. Matrix of Permitted Operations (MOPO) in place. Experienced helmsmen, navigator, Party Chief. | 4 | C |  | 4 | C |
| 11 | Lifting Gear Use | Unsafe operations in sea conditions, swinging gear, runaway gear, untrained staff, failure of winch, a-frame, crane, other gear, during lift, causing incident/accident/damage. | Injury, loss, equipment damage, project delay | All lifting equipment SWL inspected and certified, process checklists, field-tested processes, personnel qualified & certified for position, properly designed systems, weather stand-down threshold/decision, procedure in place for disposal of gear taken out of service. | 2 | D |  | 2 | D |
| 12 | Slips, Trips, & Falls | Unsafe walking and working surfaces due to sea conditions. Poor housekeeping, rushing, fatigue, heat/body stress, causing injury | Injury | On-board hospital, PPE per matrix, ERP, experienced crew & staff, non-slip surfaces, awareness training, visual warnings, safety signage, fall-protection gear, observation cards, Safety HSE Awareness topic, cross-dept audits | 3 | C |  | 3 | C |
| 13 | Exposure to Elements | Sun and high temperature exposure causing illness, injury | heat stroke, sunburn, heat exhaustion, dehydration | Heat Stress training program in place. Proper clothing, water, sun screen, covered work area, reinforcement in Daily Safety mtg. | 4 | C |  | 4 | C |
| 14 | Vessel Visitor Mgmt | Unapproved visitor gaining access to vessel causing incident. | Visitor injury, safety violations, security compromised. Theft/loss. Introduction of computer viruses. | Gangway watch/sign-in with ID check. Vessel security plan. Escort policy, Orientation/safety briefing & pamphlet, restricted zones posted, visitor PPE issued. Secure dock. | 3 | D |  | 3 | D |
| Expected visitor not oriented/escorted causing incident. |
| 15 | Drugs & Alcohol | Worker having impaired ability/judgement on the job, causing incident/accident/loss. | injury, safety violations, equipment damage, project delay | Pre-employment tests, clear policy statement. Policy reviewed at kickoff meeting. For-cause and post-incident testing. Private call at kickoff mtg for personal meds by HSE officer. | 3 | D |  | 3 | D |
| 16 | Third-Party Interference | Third party interferes with vessel or deployed gear. | equipment damage, injury, interruption, detainment, project delay, reputation, project goals not met | ISPS plan in place. ERP in place, NGO policy in place. | 4 | E |  | 4 | E |
| 17 | Computer Malware | No virus protection, untested equipment renders job-essential computer inoperable or inefficient. Hard drive erasure. | Loss of information, inefficient or inaccurate site-navigation, loss of email comms with shore. | Virus protection on all project computers on-board. Policies in place: (1) Client file transfer by wireless network only. (2) No games on any project computer. (3) No exe files allowed to be installed on any project computers. (4) Restricted access to Internet. Regularly updated VirusDefs and scans. Backup hard drives and other redundancy in place. | 4 | D |  | 4 | D |
| 18 | Management of Change | Not properly using MOC process. Inadequate training/focus on MOC process, causes imprudent or ill-considered process change. | Imprudent action introduces greater operational safety risk, decreased quality/accuracy of result, and/or reduced efficiency of operation. | MOC process in place. Post MOC communication plan to crew/staff in place. Re-enforcement at kickoff meeting and daily safety meetings. On-board Mgmt team reviews change process regularly. Mature, well defined processes and gear design reduces need for process change. | 2 | D |  | 2 | D |
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|  | **Marine Procedures** | |  |  |  |  |  |  |  |
| 19 | Abandon Ship | Uncontrolled fire, sinking | Injury, damage, loss, reputation, financial loss, loss of life, environmental damage | Training, emergency drills, procedures in place, certified personnel and equipment, life rafts, inspections, safety meetings | 2 | E |  | 2 | E |
| 20 | Fire | Improper response to fire exacerbating problem | Injury, damage, loss, reputation, financial loss, loss of life | Training, emergency drills, procedures in place, certified personnel and equipment, fixed fire fighting systems, SCBAs, inspections, safety meetings, EEBDs in place, smoke hoods in every stateroom, smoke alarms in every room, emergency flashlights in every stateroom | 2 | E |  | 2 | E |
| 21 | Main Engine Failure | Complete blackout (propulsion) lack of engineer competence poor maintenance exacerbating problem | Loss, collision, reputation, project delays, | Planned Maintenance System (PMS), trained personnel and equipment. Training, 2 engines/screws, anchor for shallow water, communication | 4 | C |  | 4 | C |
| 22 | Loss of Steering | Uncontrolled vessel movement | Loss, collision, grounding, project delay, inability to respond to other hazards | 2 engines & bow thruster used for steering. Drop anchor. Loss of Steering drills. PMS in place. | 2 | D |  | 2 | D |
| 23 | Loss of Electrical | Loss of electrical by flooding, fire, malfunction exacerbating problem | Loss, collision, grounding, project delay, inability to respond to other hazards | 2 generators plus emergency generator tied to emergency fire pump. Emergency generator drills/test. PMS in place. starting instructions & flashlight posted at emergency generator | 2 | E |  | 2 | E |
| 24 | Man Overboard | Sea state, traffic, visibility, not following procedures, PPE/equipment failure, causing MOB | Injury, loss of life, reputation, project delay | Retrieval training, drills, retrieval procedures, inspections, update manifest daily, life saving appliances, SAS training, FRC on board, PPE per matrix, Working at Heights training | 2 | E |  | 2 | E |
| 25 | At-Sea Transfers | MOB, sea-state related injury hazards. | Injury, loss of life, collision, damage, project delay | boat-to-boat procedure in place, PPE per matrix, SAS training | 2 | D | . | 4 | E |
| 26 | Severe Weather | Imprudent judgement to continue work causes incident/accident/loss. | Personnel injury, equipment damage/loss, unsafe acts, possible MOB | Planning, Procedures, certified personnel, weather updates, hatch management protocols, MOPO in place.(pitch/roll/deck wash monitoring) | 3 | D |  | 3 | D |
| 27 | Hydrocarbon Spill | Release of hydrocarbons to the environment, causing environmental incident. | Environmental damage, fire, reputation, injury, fines, cleanup expense. | Training, drills, field-tested gear & procedures, spill catchments, audits, certified personnel and equipment, Planned Maintenance System, NTVRP, SOPEP clean up kit w/PPE, bunkering procedures. Vessel General Permit weekly inspection process. Spill containment for drums & coring hydraulic hoses. Spare hydraulic line kits. | 3 | D |  | 3 | D |
| 28 | Sewage Disposal/ Treatment | Inadequate treatment/handling capacity of sewage prior to disposal causing MARPOL violation/incident. | Environmental damage, reputation, fines, cleanup expense | MARPOL-compliance procedures in place. Use of holding tanks & discharge per MARPOL. | 3 | D |  | 3 | D |
| 29 | Disturbance of Marine Life | Inadequate considerations for marine life during operations, by vessel or deployed gear, disrupting marine life | Injury/fatality to marine life, especially mammals. Environmental damage, reputation, fines | Avoid deploying equipment in protected communities. | 4 | E |  | 4 | E |
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|  | **Over-the-Side Tool Preparation** | |  |  |  |  |  |  |  |
| 30 | Tool Mobilization | Improper mobilization of gear causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | Load tests, JSA reviews, oversight, pre-lift tool box meetings, well documented/practiced processes | 2 | D |  | 2 | D |
| 31 | Lifting gear accidents, poor communications, close quarters | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear | good deck communications, pre-inspection of gear, pre-lift meetings, inventory checklists, PPE per matrix | 2 | D |  | 2 | D |
| 32 | Hydraulic leak causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear, environmental incident | pre-tested gear, hydraulics contained, Planned Maintenance System, SOPEP clean up kit ready, SOPEP drills | 2 | D |  | 2 | D |
| 33 | Tool Changout | Improper changeout of gear causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | JSA reviews, changeout procedure, well documented/practiced procedures, PMS in place. | 2 | D |  | 2 | D |
| 34 | Lifting at sea, swinging gear, poor communications, wet deck inherent, causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear | good deck communications (radio), daily inspection of gear, daily safety meeting, MOPO in place, stop work authority for all, tool box meetings | 2 | D |  | 2 | D |
| 35 | Hydraulic leak causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear, environmental incident | pre-tested gear, hydraulics contained, PMS in place, SOPEP clean up kit ready, SOPEP drills | 2 | D |  | 2 | D |
| 36 | Tool Demobilization | Improper demobilization of gear causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | JSA reviews, oversight, pre-lift tool box meetings | 2 | D |  | 2 | D |
| 37 | Lifting gear accidents, poor communications, close quarters | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear | good deck communications, pre-inspection of gear, pre-lift meetings, PPE per matrix | 2 | D |  | 2 | D |
| 38 | Hydraulic leak causing incident | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear, environmental incident | pre-tested gear, hydraulics contained, Planned Maintenance System, SOPEP clean up kit ready, SOPEP drills | 2 | D |  | 2 | D |
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|  | **Over-the-Side Tool Operations** | |  |  |  |  |  |  |  |
| 39 | Rigging | Improper rigging of gear | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | Load tests in place, load test new terminations, JSA review, rigging checklist, daily safety meetings, mature & proven process, lifting register, tool box meetings, position-training, PPE per matrix, rigging certification, oversight | 2 | D |  | 2 | D |
| 40 | Deployment | Improper deployment of gear | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | Load tests, JSA reviews, deployment checklist, trained deckmen/winchmen, well-defined work process. | 2 | D |  | 2 | D |
| 41 | Staff standing in on deployment/retrieval platform | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | Deployment/retrieval platform configured to protect “platform” men and keep from falling overboard, fall protection, PPE per matrix | 2 | D |  | 2 | D |
| 42 | Lifting at sea, swinging gear, poor communications, wet deck inherent | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear | good deck communications (wireless), daily inspection of gear, daily safety meeting, MOPO conditions (stop work authority for all), tool box meetings | 2 | D |  | 2 | D |
| 43 | Hydraulic leak | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear, environmental incident | pre-tested gear, hydraulics contained, Planned Maintenance System, SOPEP clean up kit ready, SOPEP drills | 2 | D |  | 2 | D |
| 44 | Fatigue | injury, damage, loss, poor efficiency, poor quality & errors, unsafe conditions, runaway gear | Single watch/day, contingency plan for unplanned event, bridge/mgmt team approval for deployment, training, PPE per matrix | 2 | D |  | 2 | D |
| 45 | Retrieval | Improper retrieval of gear | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | Load tests, JSA reviews, deployment checklist, trained deckmen/winchmen | 2 | D |  | 2 | D |
| 46 | Staff standing in on deployment/retrieval platform | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | Deployment/retrieval platform configured to protect “platform” men and keep from falling overboard, fall protection, PPE per matrix | 2 | D |  | 2 | D |
| 47 | Lifting at sea, swinging gear, poor communications, wet deck inherent | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear | good deck communications (radio), daily inspection of gear, daily safety meeting, MOPO conditions (stop work authority for all), tool box meetings | 2 | D |  | 2 | D |
| 48 | Hydraulic leak | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, runaway gear, environmental incident | pre-tested gear, hydraulics contained, Planned Maintenance System, SOPEP clean up kit ready, SOPEP drills | 2 | D |  | 2 | D |
| 49 | Fatigue | injury, damage, loss, poor efficiency, poor quality & errors, unsafe conditions, runaway gear | Single watch, contingency plan for unplanned event, training, PPE per matrix | 2 | D |  | 2 | D |
| 50 | Sample Processing | Improper processing of samples | injury, damage, loss, poor efficiency, poor quality, unsafe conditions | JSA reviews, procedures in place, trained techs, calibrated equipment, proper PPE per matrix | 4 | D |  | 4 | D |
| 51 | Manual lifting at sea, poor communications, wet deck inherent | injury, damage, loss, poor efficiency, poor quality, unsafe conditions, PPE per matrix sample | good deck communications, daily inspection of gear, daily safety meeting, MOPO conditions (stop work authority for all), tool box meetings, proper PPE per matrix | 4 | D |  | 4 | D |
| 52 | H2S (Deck/Outdoors) | Illness, respiratory irritation, unconsciousness | Vigilant core inspection for gas expansion pockets and smell of H2S gases, outdoor processing, proper sealing of cores, training & substantial experience. | 4 | E |  | 4 | D |
| 53 | H2S (Lab/Indoors) | Illness, respiratory irritation, unconsciousness | Proper sealing of core sections. Sufficient air circulation, training | 4 | D |  | 4 | D |
| 54 | Fatigue | injury, damage, loss, poor efficiency, poor quality & errors, unsafe conditions | Single watch/day, contingency plan for unplanned event, training, PPE per matrix | 4 | D |  | 4 | D |
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|  | **Other** |  |  |  |  |  |  |  |  |
| 55 | Confined Space Entry | Inadequate ventilation | Oxygen deficiency, asphyxiation | Ensure Permit-To-Work System is in place & being used correctly, Suitable Breathing Apparatus: Air tank certification, Properly maintained equipment, Ensure certified and controlled gas meters are in place for testing of any atmosphere | 2 | D |  | 2 | D |
| 56 | Entering Confined Spaces for Repairs & Maintenance Purposes | Personal injury , Long term illness, medivac situation | Ensure Pre-Planning & Adequate ventilation for confined space early, Only trained crewmembers to enter confined spaces, JSA's in place where applicable, Availability and correct use of PPE, Adequate communications with person on the inside. no confined space entry for this project | 2 | D |  | 2 | D |
| 57 | Proximity of ignition sources | Toxic/flammable environment | Ensure Lock-out / Tag-out System is in place & being used correctly | 2 | D |  | 2 | D |
| 58 | Electrical Systems | Faulty Electrical Wiring / Equipment | Fire, Electrocution | Specified electrical standards, Lock-out / Tag-out Procedures in place & trained personnel, Use only circuit breakers that trip automatically. Do not work on live equipment. | 3 | D |  | 3 | D |
| 59 | Overloading | Fire, Electrocution | Adequate electrical distribution designed, Residual / ground/earth leakage breakers | 3 | D |  | 3 | D |
| 60 | Loss of Electrical Power | Burns/bodily injury, equipment damage/loss | Approved electrical wiring & fittings, Adequate contingency plan, Restricted areas defined and marked | 3 | D |  | 3 | D |
| 61 | Inadequate Capacity | Poor distribution of electrical power | Only qualified personnel to work on electrical system, Permanent experienced electrician | 3 | D |  | 3 | D |
| 62 | Damage of high voltage cables on back deck | Equipment damage | Properly maintained circuit diagram, Add 220V/60Hz topic to vessel Induction Tour, Use only water/weatherproof fittings, Inspections and maintenance of high voltage cable and connectors | 3 | D |  | 3 | D |
| 63 | Hand & Power Tools | Improper usage of tools | Injury | Proper training on use of tools in place | 3 | C |  | 3 | C |
| 64 | Defective tools (electrical or mechanical defects) | Equipment damage, electrical shock from power tool | Lock-out / Tag-out for faulty tools and equipment, Procedures, Work Instructions, JSA's as appropriate, inspection/maintenance procedure in place | 3 | C |  | 3 | C |
| 65 | Using wrong tool for job | Equipment damage, injury | Adequate supply of tools to perform tasks - right tool for the job, well defined/developed work processes | 3 | C |  | 3 | C |
| 66 | Failure to wear appropriate PPE | Injury | Appropriate PPE per matrix, Cross-audits | 3 | C |  | 3 | C |
| 67 | Failure to follow safety guidelines for tool usage | Injury | Regular tool inspections | 3 | C |  | 3 | C |
| 68 | Debris in eye from grinder, chipper | Injury, exacerbated injury | Eyewash stations, proper PPE per matrix | 3 | C |  | 3 | C |
| 69 | Galley/Mess | Fire | Injury/Illness, financial impact | galley equipment maintained in good repair | 3 | D |  | 3 | D |
| 70 | Improperly stored food causes illness | Delay to schedule, illness | good pest control, good food storage, food handlers have certs & medical evaluations, galley kept clean, good hygiene of food handlers, freezer/reefer temp monitors | 3 | D |  | 3 | D |
| 71 | Improperly prepared food causes illness | Delay to schedule, illness | food handlers have certs & medical evaluations, galley kept clean, good hygiene of food handlers, Galley personnel to wear correct attire – including hair restraints, color-coded chopping blocks, galley standing orders | 3 | D |  | 3 | D |
| 72 | Cuts, lacerations, burns | Personal Injury | Cut-proof gloves while preparing food, Long sleeves / oven mitts when working over hot surfaces | 3 | D |  | 3 | D |
|  | **Environmental** |  |  |  |  |  |  |  |  |
| 73 | Hazardous Materials / Chemicals | ·     Explosion | ·     Air / sea pollution | ·    All chemicals to be properly identified, inventoried, and stored. | 2 | D |  | 2 | D |
| ·     Fire | ·     Contamination of vessel or equipment | ·    Crew to be trained in HAZCOM, MSDS, and lab/chemical safety. |
| ·     Toxic fume release | ·     Loss or damage to vessel or crew by fire or explosion | ·    Work management for chemical handling. |
| ·     Chemicals are: | ·     Injury or illness to workers exposed | ·    Spill response kit(s) are available and regular safety / spill drills are conducted. |
| - spilled |  | ·    Adequate and suitable waste disposal program. |
| - absorbed |  | ·    Applicable MSDS are available. |
| - inhaled |  | ·    Survey vessel only carries standard chemical products in limited volumes. |
| - ingested |  | ·    Chemical spills will be reported per regulatory and internal requirements. |
| 74 | Fuel / Oil Spills | ·   Overflow while transferring lube oils | ·     Shipboard only spill | ·    Vessel will hold an International Oil Pollution Prevention Certificate (IOPP) and has an Oil Pollution Emergency Plan as appropriate. | 2 | C |  | 2 | C |
| ·   Broken lines / hoses / fittings | ·     Over-side spill in port | ·   Bunkering procedures for at port as required by regulation. |
| ·   Bilge overflow | ·     Over-side spill at sea | ·   Planned maintenance for associated equipment. |
|  | ·     Fuel / oil fire | ·   Adequate and suitable waste disposal program. |
|  |  | ·   Fuel / oil spills will be reported per regulatory and internal requirements. |
|  |  | ·   Secondary containment around hydraulic hoses and equipment, as applicable. |
| 75 | Survey Activity (Including Sound Sources) Impacts Marine Mammals or Protected Species | ·   Individuals are exposed to survey activity that potentially causes a behavioral response that is biologically significant | A: Results in disruption of feeding activities | Take guidance from BSEE / BOEM NTL 2012-JOINT-G02 MMO requirements. | 4 | D |  | 4 | D |
| B: Results in disruption of mating activities | When in transit, turn the survey vessel away if marine mammals or protected species are observed in a critical activity within 500 m of the survey vessel. |
| C: Results in disruption of migrating activities | ·    Geophysical source energy is not expected to cause a response that is biologically significant. |
| D: Undesirable publicity and regulatory action | ·     Geophysical equipment will only be used for its planned / intended purpose during this survey. |
| 76 | Sound from Survey Activity Injures Marine Mammals or Protected Species | ·   Individuals are exposed to marine sound sources at sufficient energy levels to potentially cause injury (stranding) | ·     Activity results in one or more incidents | ·Take guidance from BSEE / BOEM NTL 2012-JOINT-G02 MMO requirements. | 4 | D |  | 4 | D |
| ·     Project delays or deferral | ·    When in transit, turn the survey vessel away if marine mammals or protected species are observed in a critical activity within 500 m of the survey vessel. |
| ·     Undesirable publicity | ·    Geophysical source energy is not expected to cause a response that is biologically significant. |
| ·     Regulatory Action by local government or NGOs | ·    Geophysical equipment will only be used for its planned / intended purpose during this survey. |
| 77 | Vessel Strike | ·   Survey vessel strikes marine mammal or protected species causing injury | ·     Injury to animal | ·    Take guidance from BSEE / BOEM NTL 2012-JOINT-G02 MMO requirements. | 3 | E |  | 3 | E |
| ·     Project delays or deferral | ·    When in transit, turn survey vessel away if marine mammals or protected species are observed in a critical activity within 500 m of survey vessel. |
| ·     Undesirable publicity | ·    Follow vessel strike avoidance guidelines as outlined in BSEE / BOEM NTL 2012-JOINT-G01 |
| ·     Potential civil and criminal action by local government or NGO |  |
|  |  |
| 78 | Entanglement | ·     Marine mammal or protected species becomes entangled in equip. | ·     Injured animal | ·    Take guidance from BSEE / BOEM NTL 2012-JOINT-G02 MMO requirements | 3 | E |  |  |  |
| ·     Adverse publicity |
| 79 | Community Action | ·     Community or activists interference, confronting contractor / vessel in an attempt to stop field program | ·     Project delays or deferral | ·    Affiliate PA group will be informed of survey activities in advance and prepare as appropriate given scope, location, and duration. | 2 | C |  | 2 | C |
| ·     Undesirable publicity | ·    Short duration project. |
|  |  |
| 80 | Introduction of Foreign / Invasive Species | ·     Foreign species are introduced to the survey area | ·     Adverse impact on marine ecology | ·    Comply with USCG NVIC 07-04 (Change 1) for antifouling and in-water hull cleaning and maintenance. | 2 | C |  | 2 | C |
| ·     Potential regulatory action | ·    Where applicable, vessel to have a Ballast Water Management Plan compliant with local regulations, flag state regulations, and international conventions. |
| 81 | Impact with Subsea Equipment | ·     Equipment may strike pipelines or other subsea infrastructure | ·     Loss of equipment | ·    Review of known assets (e.g., pipeline maps). | 2 | C |  | 2 | C |
| ·     Project delays or deferral | ·    Contingency plan as per Emergency Response Plan in place and tested. |
| ·     Undesirable publicity |  |
| ·     Regulator or NGO action |  |
| 82 | Waste Disposal | ·     Waste onboard survey vessel is released in an inappropriate manner | ·     Contractor improperly releases waste at sea | ·    Where applicable, vessel will comply with MARPOL regulations. | 2 | C |  | 2 | C |
| ·     Contractor inadvertently spills waste at sea | ·    Disposal of waste per Waste Management Plan. |
| ·     Regulatory action | ·   Additional guidance from regs (e.g. NTL 2012-BSEE-G01 in regards to waste management at sea) |
| 83 | Air Emissions | ·     Survey vessel produces an excessive amount of air emissions | ·     Survey operations result in air pollution | ·    Confirm contractor has performed regular maintenance on the vessel engines, generators, etc. in accordance with the manufacturers’ requirements. | 2 | C |  | 2 | C |
|  | ·    Vessel crew will report any observed air emission upsets and will take any necessary corrective actions immediately. |
|  | ·    Where applicable, vessel will have an International Air Pollution Prevention (IAPP) certificate. |
| 84 | Socioeconomic Impact | ·     Disruption of commercial / recreational fishing and other marine support activities | ·     Loss of income / jobs | ·     Activity not in shipping lanes. | 2 | C |  | 2 | C |
| ·     Impacts on cultural resources | ·     Obstruction to right of way or safe passage | ·      Trained and qualified vessel Captain and crew. |
|  | ·     Regulator or NGO action | mapped locations of potential archaeological debris; geotechnical survey has been planned to avoid those locations. |
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| 85 | Sensitive/Rare Communities (e.g. Chemosynthetic Communities) | ·     Survey activities may impact potential sensitive communities on the seafloor | ·     Regulator or NGO action | Historical/current surveys of the study area; mapped locations of these potential sensitive communities; plan survey to avoid those locations. | 2 | C |  | 2 | C |
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|  | **Regional** |  |  |  |  |  |  |  |  |
| 86 | Piracy |  |  |  | 2 | B |  | 3 | E |
| ·     Transit to and survey work may be within pirate prone area of the world. | Financial loss attributable to ransom demands and temporary loss of income from captive resources | Flag State approved Vessel Security Plan and Anti Piracy annex. Defensive, surveillance, and alerting/reporting procedures and hardware. |
| Damage and loss of equipment thru acts of violence against the ship. | Extensive and intensive training and drills; physical defenses (hardening) of the vessel |
|  | Loss of productivity due to suspension of work for extra drills, response to attacks, resources spent on lookouts/surveillance and reaction/response | Real time, ongoing security threat assessments available to the vessel in the field. |
| Serious personal injury or loss of life from armed attack or capture by pirates |  |