

Drilling Safety

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Approved by:



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date



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6/26/08
date

Drilling Safety

1.0 Introduction

In this document, Contractor refers to the Remedial Action Contractor and/or Technical Assistance Contractor (TAC) as appropriate, regarding drilling activities performed in support of Moab UMTRA Project operations. The Occupational Safety and Health Administration (OSHA) Standards do not define drilling health and safety requirements specifically therefore, the following guidelines are offered in order to provide direction on the safety for drilling operations conducted by the Contractor. When these drilling health and safety requirements are incorporated by reference in a project planning document or subcontract, the requirements apply for drilling operations conducted under the authority of the Contractor.

2.0 Policy

The Contractor considers the prevention of illness, injury, and accidents in the work place to have greater importance than any other facet of the work. Safety will always take precedence over expediency or shortcuts, and every attempt will be made to reduce the possibility of injury, illness, or unwanted/unplanned occurrences in the performance of drilling operations.

All drilling tasks and related work assigned under a subcontract or purchase order issued by the Contractor shall be conducted in accordance with the OSHA, DOE, and other applicable Federal, State, Indian Reservation, County, and City Regulations, and this document. Oversight may be performed by the Contractor at any time during the course of the contracted work.

All personnel, including the contractor, subcontractors, lower tier subcontractors, consultants, and service personnel, who perform any task in relation to the drilling efforts or are visitors to the drilling site(s) must adhere to the provisions of this document.

Any other activities that are needed to accomplish project objectives while the field team is deployed to the various sites will be coordinated with project management and the Health and Safety staff and assessed through the DOE Integrated Safety Management System.

2.0 Responsibilities and Authorities

2.1 General

The safety of all personnel takes priority over all other aspects of the drilling project. Contractor personnel have the authority to suspend all drilling operations when an unsafe practice or condition is observed. Drilling will not proceed until the unsafe practice or condition is corrected. The subcontractor shall not be compensated for efforts required to correct any unsafe act or unsafe condition created by the subcontractor's actions. All personnel, including Contractor, subcontractor, and site visitors shall participate in a daily safety briefing. Daily safety briefings should be conducted by the subcontractor, with input from the Contractor if necessary. Documentation of the on-site safety briefing shall be initiated by the Contractor for the project records. All visitors will be escorted while in the vicinity of drilling operations.

2.2 Contractor Personnel

The Line Supervisor is responsible for the implementation of these requirements for all drilling projects.

The Project Manager or line supervisor is responsible for assigning a qualified individual to each drilling activity. The assigned individual must be cognizant of the required tasks and knowledgeable of drilling techniques and the requirements of this document. The Line Supervisor is responsible for the day-to-day field operations and compliance with these requirements. The Line Supervisor shall fully coordinate the field drilling activities with the Health and Safety staff to assure that all drilling tasks are performed in a safe manner. Should any variance from standard drilling procedures or project Statement of Work provisions be required to complete the drilling tasks, the line supervisor shall obtain concurrence from either the project manager, project drilling coordinator, or Health and Safety representative prior to implementation.

The SSS is responsible for providing health and safety oversight for drilling activities. It shall be the responsibility of all field personnel working on a drilling project to promote safety at all times in the performance of their assigned tasks. All field personnel shall be made aware of suspected site-specific hazards and associated controls. In addition, it is the responsibility of all field personnel to report any real or suspected unsafe situation, act, or questionable practice immediately to the PDC or line supervisor.

2.3 Subcontractor and Subcontractor Personnel

The subcontractor shall immediately (within one-half hour) notify the Contractor of any job related accident, injury, or near-miss situation. Any equipment and/or work site involved in an accident shall be secured and shall remain secured until the Project Manager has given permission to resume work.

The subcontractor shall conduct an investigation for all OSHA recordable injuries/illnesses, using guidelines provided by the Contractor. The Contractor shall provide a representative to assist the subcontractor with the investigation, if requested. Investigations shall be completed within 10 working days of the event.

The subcontractor must comply with all site-specific health and safety planning documents and permits.

Before work begins contractor personnel will perform an inspection of equipment to be used to ensure compliance with applicable requirements. Inspection for drill rigs will be documented on an "Equipment Safety Inspection Checklist for Small Auger, Rotary, and Core Rigs" form, a copy of which is attached. Other motor vehicles and material handling equipment will be inspected in accordance with the provisions of 29 CFR 1926.600-602. A "Beginning of Shift Motor Vehicle and Material Handling Equipment Inspection Form" (GJO2013e), or equivalent may be used to document the required inspections.

2.4 Drill Rig (Driller) Operator

It is understood that the subcontractor competent person is the Drill Rig Operator unless the subcontractor designates a different person in writing prior to the start of work.

The drill rig operator shall:

- Have and exercise the authority to enforce safety at all times.
- Ensure that all drill rig workers have received the site-specific briefing and have signed the “Statement of Understanding” in Appendix A. All personnel are required to read and indicate an understanding of the provisions of these requirements.
- Enforce the use of proper personal protective equipment (PPE) and take appropriate corrective action when proper PPE is not being used or being used improperly by subcontractor personnel.
- Ensure proper maintenance of tools and equipment and general housekeeping on and around the drill rig.
- Ensure that equipment inspections are conducted in accordance with the requirements listed in Section 3.
- Ensure that all crew members associated with the drilling operation are aware of the location and operation of all emergency shut-down devices.
- Monitor all gauges and warning lights and ensure that control levers are functioning properly while the rig is operating.
- Observe the performance of drill rig workers, and ensure compliance with safety requirements.
- Verify that there are two U.L. listed, 2A:40BC Dry Chemical fire extinguishers at the rig at all times.
- Verify that there is a fully stocked first aid kit at the rig at all times.

3.0 Guidelines

3.1 Personal Protective Equipment

The minimum requirements for PPE are:

Clothing Safety—Clothing must be close fitting and without loose ends, straps, draw strings or belts, or otherwise unfastened parts that might catch on rotating or moving components of the drill rig.

Head Protection—Approved safety hats (hard hats) will be worn properly at all times by everyone working or visiting within the perimeter of the drill site. The perimeter is defined as the distance equal to the height of the mast. Head protection shall meet the requirements of ANSI Z89.1, Class B (most current), and be nonconductive.

Foot Protection—Safety shoes or boots shall be worn by all drilling personnel and all visitors working within the posted perimeter of the drill site. Foot protection shall meet the requirements of ANSI Z41, Class 75 (most current).

Eye Protection—All drilling personnel and visitors to the immediate drill site area are required to wear approved safety glasses or goggles while the drill rig is in operation or other drilling functions are being performed. All eye and face protection shall meet ANSI Z87.1 (most current).

Hand Protection—All drilling personnel shall wear gloves for protection against cuts and abrasion which could occur while handling wire rope or cable and from contact with sharp edges and burrs on drill rods, drill pipe, and other drilling or sampling tools.

Hearing Protection—All drill crew personnel, site workers, and drill site visitors shall wear noise reducing ear protection when noise level exceeds 85 dBA. Hearing protection will be prescribed by the contractor.

Other Protective Equipment—For some drilling operations, environmental conditions may dictate that other protective equipment be used. When drilling is performed in chemical or radiological contamination areas, special protective equipment and clothing will be used as required by the site-specific health and safety controls established.

3.2 Housekeeping On and Around the Drill Rig

The minimum requirements for housekeeping on and around the drill rig are:

- Storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig is prohibited within the project site or area.
- Drill pipe, drill rods, casing, augers, and similar drilling tools shall be properly stacked and secured on racks or sills to prevent spreading, rolling, or sliding.
- Penetration or other driving hammers shall be placed at a safe location on the ground or secured on the rig to prevent movement when not in use.
- Work areas, platforms, walkways, scaffolding, and other access ways shall be kept free of materials, debris, obstructions, and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous. Walking/working surfaces greater than six feet above a lower level shall be provided with a fall protection system.
- All hand controls, control linkages, and warning and operation lights and lenses shall be kept free of excess oil, grease, ice, or other foreign material that may interfere with safe operation.
- Transportation and storage of flammable liquids shall be in accordance with OSHA, state, and local regulations. Any engine to be refueled shall be shut off and sufficiently cooled before the refueling operation begins and the dispensing and receiving containers shall be electrically bonded.
- Engine exhaust spark arresters are required in areas of fire danger such as grasslands, wooded areas, or when specified in the site-specific health and safety planning documents.
- Storage tanks, including fuel, water (potable and nonpotable), hydraulic oil, etc., shall be labeled and/or placarded to identify contents.
- All oily rags, and other such materials used for maintenance shall be stored in a fire-resistant metal container until properly disposed.

3.3 Equipment Maintenance Safety

The minimum requirements for maintenance safety are:

- Emergency safety (kill) switches shall be checked daily to ensure they are functioning properly.
- Shut down the drill rig and/or auxiliary equipment engine(s) to make repairs or adjustments or to lubricate fittings. (Except adjustments that can only be made with the engine(s) running. In such case, a qualified operator shall remain at the shutdown control station during the maintenance.) Take precautions to prevent accidental starting of an engine during maintenance by removing the ignition key or ignition control(s).
- Block the rig carrier wheels and/or lower the leveling jacks, and set parking brakes before working under a drill rig.

- When possible and appropriate, release all pressure on the hydraulic systems, the drilling fluid circulation system, and the air pressure systems of the drill rig prior to performing maintenance or repairs.
- Welding or cutting on or near a fuel tank is prohibited.
- Replace all caps, filler plugs, protective guards or panels, high pressure hose clamps, and safety chains or cables that have been removed for maintenance before returning the drill rig to service.
- Personnel shall remain clear of all rotating equipment to the maximum extent possible.
- All exposed drive shafts, drive chains and sprockets, drive belts, and similar power transmitting components shall have guards installed if they are exposed to contact by employees.
- All exposed exhaust pipe(s) and/or systems shall be guarded or insulated adequately to protect personnel from burns and prevent fire hazard.
- All high pressure air/water hoses, swivels, and mud line connections shall be secured with safety chains or clamped to prevent whipping in the event of a break or failure.
- Pipelines, tanks, and other storage facilities (for fuel, oil, gas, mud, foamers, etc.) shall be inspected frequently and kept from leaking. Any spills or leaks will be cleaned up immediately.

3.4 Safe Use of Hand Tools

The minimum requirements for safe use of hand tools are:

- When a hand tool becomes damaged, the tool shall either be repaired before further usage or removed from service.
- Hand tools shall be used only for the express purpose for which they were designed.
- Keep all tools cleaned and stored in an orderly, safe manner when not in use.
- Never use pipe wrenches as a substitute for a drill rod holding device.
- Replace pipe wrench hook and heel jaws when they become visibly worn.
- When breaking tool joints manually on a hard surface or on a drilling platform, position hands so that fingers will not be injured between the wrench handle and the hard surface or the platform, should the wrench slip or the joint suddenly release.

3.5 Preparing the Work Site

Prior to drilling, adequate site cleaning and leveling shall be performed to accommodate the drill rig, ancillary equipment, and supplies. Drilling shall not commence until tree limbs, vegetation, unstable ground (caving, slides, loose boulders), or other site obstructions, which may cause unsafe tool handling or potential fire hazards, have been controlled.

3.6 Start Up

The minimum requirements for safety during start up are:

- All drill rig personnel and visitors shall be instructed to stand clear of the drill rig or auxiliary equipment immediately prior to and during starting of an engine.
- Make sure all gear boxes are in neutral, all drawworks clutches and hoist levers are disengaged or in the neutral position, all hydraulic levers are in the correct nonactuating positions, and the cathead rope is not on the cathead spool before starting a drill rig engine.

3.7 Safety During Drilling Operations

The minimum requirements for safety during drilling operations are:

- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must be first leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig shall be re-leveled immediately if settling occurs after the initial set-up.
- Before raising or lowering the mast (derrick), the area shall be inspected for potential safety hazards. All unnecessary drill rig personnel and visitors shall be cleared from the areas immediately to the rear, front, and the sides of the mast. Once the mast is raised into position, the mast or derrick locks will be secured. The rig shall not be operated unless mast locks are functional and are locked. Prior to lowering, mast hydraulic system(s) will be checked.
- No personnel, other than the assigned rig crew, shall be allowed on or under an operating rig deck for any reason. No Contractor personnel shall attempt to make any type of inspection of the subcontractor's equipment unless a subcontractor's representative is present during the inspection.
- Before raising the mast (derrick), always check for overhead wires and obstructions. An observer shall be posted at a strategic location to ensure adequate clearance is maintained. See Section 8. "Overhead and Underground Utilities."
- The drill rig shall not be moved from hole to hole with the mast (derrick) in the raised position.
- The operator of a drill rig shall operate a drill rig only from the driller's control station. The operator shall remain within 15 feet of the operating controls at all times when the rig is in operation.
- If it is necessary to drill within an enclosed area, make certain that exhaust gases are conducted out of the area and sufficient ventilation is provided.
- When using a mast or derrick ladder, face the ladder and grasp either the side rails or the rungs with both hands while ascending or descending. The three-point of contact system (2 hands and 1 foot or 2 feet and 1 hand) shall be used when climbing. Always make sure that shoe soles are clean and dry before attempting climbing or descending the mast.
- Anyone working on a derrick board, platform, or mast shall be provided with fall protection in accordance with 29 CFR 1926, subpart M.
- When working on a mast or derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoisting line, traveling block, or other moving hoisting equipment. Rack only one pipe stand at a time. Always stay clear of moving hoisting line, traveling block, elevators, or hoisting plugs.
- Loose tools and similar items shall not be left on the derrick platform or on structural members of the derrick.
- All unattended boreholes must be adequately covered or otherwise protected to prevent people or animals from stepping or falling into the hole.
- Platforms, steps, handholds, and guardrails shall be provided on the equipment to assure safe access and footing. The platform and decks shall be coated with a nonskid surface.
- Personnel shall employ good ergonomic lifting techniques when lifting heavy objects, such as keeping the back straight, keeping weight close to the body, getting help when necessary and using mechanical assist when possible.
- Personnel shall not ride the hoisting line, catline, traveling block, the traveling block hook, the elevators, or suspended equipment as a means of ascending or descending to or from the derrick.

- All rig steps, ladders, stairways, platforms, and walkways shall be free of mud, snow, ice, tools, and other materials that may cause slipping or tripping.

3.8 Overhead and Underground Utilities

Overhead and underground utilities shall be located, noted, and emphasized on all boring location plans. No borehole will be drilled where it can reasonably be anticipated that utilities exist until the exact location to be drilled is surveyed by a qualified utility line locator.

The minimum requirements for overhead and underground utilities are:

- When overhead electrical power lines exist at or near a drilling site or project, personnel shall consider all wires to be energized and dangerous.
- Visually inspect the drill site for sagging power lines before entering the site. Do not lift power lines to gain entrance or exit. Call the responsible utility and ask them to lift or raise the lines or de-energize (turn-off) the power.
- An observer or “spotter” shall be posted at a sufficient distance from the rig to adequately monitor for safe clearance during the raising and lowering of the rig mast when operating in the vicinity of overhead power lines or other overhead obstructions.
- Before raising the drill rig mast (derrick) in the vicinity of power lines, walk completely around the drill rig. Determine what the minimum distance from any point on the drill rig to the nearest power line will be when the mast is raised and/or lowered. Do not raise the mast or operate the drill rig if this distance is less than the following:

NOTE: UNDER NO CIRCUMSTANCES WILL THE FOLLOWING MINIMUM POWER LINE CLEARANCE REQUIREMENTS BE VIOLATED UNLESS THE LINES ARE DE-ENERGIZED, GROUNDED, AND TAGGED OUT BY THE RESPONSIBLE UTILITY COMPANY OR THEIR DESIGNEE.

When operating near high voltage power lines:

Table 3–1. Clearance Requirements for Operations

Normal Voltage (phase-to-phase)	Minimum Required Clearance
50 kV and less	10 ft (3.05 m)
Over 50 kV, not over 200 kV	15 ft (4.60 m)
Over 200 kV, not over 350 kV	20 ft (6.10 m)
Over 350 kV, not over 500 kV	25 ft (7.62 m)
Over 500 kV, not over 750 kV	35 ft (10.67 m)
Over 750 kV, not over 1000 kV	45 ft (13.72 m)

While in transit with no load and boom or mast lowered:

Table 3-2. Clearance Requirements for Transit

Normal Voltage (phase-to-phase)	Minimum Required Clearance
50 kV and less	4 ft (1.22 m)
Over 50, not over 345 kV	10 ft (3.05 m)
Over 345, not over 750 kV	16 ft (4.87 m)
Over 750, not over 1000 kV	20 ft (6.10 m)

3.9 Electrical Safety

The minimum requirements for electrical safety are:

- Portable electric tools (except for battery-powered tools) shall be double insulated or three-wire-to plug case-grounded. Low-voltage tools shall be powered from an isolating transformer supplying no more than 50 volts.
- Any person using portable electric tools shall inspect them before each use for external defects and evidence of possible internal damage.
- Plugs and receptacles shall mate properly and provide proper grounding continuity. Adapters with pigtailed and adapters that interrupt grounding continuity shall not be used.
- The outdoor use of portable electric tools shall require ground-fault circuit interrupter (GFCI) protection, even if plugged directly into a permanent electrical system.
- GFCI protection shall be provided for single-phase circuits supplying grounded electrical tools. Portable GFCIs shall be used in circumstances where permanent GFCI protection is not provided.
- The user shall test portable GFCIs daily before use by pressing the test button as specified by the GFCI manufacturer.
- All extension cords shall be designed for hard or extra-hard usage in accordance with the *National Electrical Code*, Article 400, Table 400-4. Examples are Types S, ST, SO, STO, SJ, SJO, SJT, and SJTO.
- Cords and connectors shall be protected from wet or damp locations when possible, traffic of all kinds, excessive heat, chemicals, and other agents that might cause failure.
- Flexible electric cords connected to equipment shall not be used to raise or lower equipment. Flexible cords shall not be stapled, hung over nails, or otherwise hung in a manner that could damage the outer jacket or insulation.
- Before use, the person using any extension cord shall inspect it visually for external defects and evidence of internal damage. Defective cords shall not be used.
- All electrical wiring and devices shall be installed in accordance with the *National Electrical Code*.
- Only qualified electricians will perform repairs on electrical lines or install electrical devices.
- All lights positioned above the working areas shall be enclosed in cages or similar enclosures to prevent loose or detached lamps or vapor-tight enclosures from falling on workers. All light bulbs shall be heavy-duty, outdoor, and non-shattering type. Illumination of all working surfaces shall be a minimum of 5 foot candles and 10 foot candles on the drilling platform.
- Poles used to hold wiring and lights shall not be used for any other purpose.

3.10 Safe Use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

Any required hoisting operations which are not performed with the drill rig equipment, (e.g., crane operations) shall be conducted in accordance with the “Hoisting and Rigging” safety procedure.

The minimum requirements for safe use of wire line hoists, wire rope, and hoisting hardware are:

- All wire ropes and fittings shall be visually inspected in accordance with the manufacturer’s recommendations and applicable OSHA regulations during use and thoroughly inspected at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper reeving, jamming, crushing, bird caging, kinking, core protrusion, or damage to lifting hardware. Any discrepancies that create a hazard to employees shall be corrected before operations continue.
- Inspect at the start of each shift all rotating cable attachments, for example, safety hooks, deadman anchors, and hoisting apparatus, for freedom of movement and correct any deficiencies.
- All manufactured cable-end fittings and connections shall be installed according to the manufacturer’s instructions and loaded according to the manufacturer’s specifications. This includes cable clamps and thimbles. Cable ends should be seized.
- All water swivels and hoisting plugs shall be checked for possible frozen bearings and shall be properly lubricated before use.
- Wire rope size shall be properly matched to sheave groove size.
- Avoid shock loading of wire rope. Apply loads smoothly and steadily.
- Protect wire rope from sharp corners or edges. Avoid pile-up or uneven spooling of wire rope when possible.
- Replace faulty guides and rollers.
- Replace damaged safety latches on safety hooks.
- Know and do not exceed the rated capacity of hooks, rings, links, swivels, hoisting plugs, elevators, shackles, and other lifting aids. Never exceed the manufacturer’s rated load capacity for any reason.
- Do not guide wire rope on hoist drums with hands or feet.
- Keep hands and other extremities away from hoists, wire rope, hoisting hooks, sheaves, and pinch points as slack is being taken up and when the load is being hoisted.
- Following the installation of new wire rope, lift a light load first to allow the wire rope to adjust.
- Never leave a load suspended when the hoist is unattended.
- Never hoist the load over personnel.

3.11 Safe Use of Catheads and Rope Hoists

The minimum requirements for safe use of catheads and rope hoists are:

- Never use frozen catline ropes. Keep ropes protected from adverse weather.
- Keep the cathead spool clean and free of rust, oil, and grease.
- Check the cathead periodically, with the engine not running, for rope wear grooves.
- Never wrap the rope from the cathead (or any other rope, wire rope, or cable on the drill rig) around a hand, wrist, arm, foot, ankle, leg, or any other part of the body.

- Do not use a rope that is any longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operators' legs.
- Do not use more rope wraps than are required to hoist a load or than can be safely released.
- Do not leave a cathead unattended with the rope wrapped on the cathead spool when the cathead power is engaged.
- Position all hoist lines to prevent contact with the operating cathead rope.
- The cathead operator must be able to operate the cathead standing on a level surface with firm footing and without distraction or disturbance.

3.12 Safe Use of Augers

If the manufacturer's operating instructions are not available, the following minimal general procedures and safe practices shall be used when starting a boring with continuous flight or hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low RPM.
- Apply sufficient downward pressure prior to rotation to seat the auger head below the ground surface.
- Observe the auger head while slowly engaging the clutch or rotation control. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply down pressure. Keep one hand on the clutch or the rotation control at all times until the auger has penetrated one foot or more below ground surface.
- If the auger head slides out of alignment, disengage the clutch or hydraulic rotation control and repeat the hole starting process.
- The use of mismatched auger sections should be avoided. Different brands and different weights shall NOT be used in the same auger flight.
- Only tight-fitting pins designed for the auger shall be used. Some pins lose their temper after very little use and the spring or clip section fails to hold the pin securely.
- An auger guide shall be used to start drilling through hard ground or pavement.
- Use only the manufacturers recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with hands, feet, wrenches, or any tools during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of an auger section in the ground or other hard surfaces such as the drill rig platform.
- Never place feet under the auger section that is being hoisted.
- When rotating augers, stay clear of the auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason. A minimum of 18 inches clearance shall be maintained between personnel, clothing, footwear, and other personal apparel and the rotating augers, kellys, heads, drillrod or other rotating components of the drill rig.
- Use a long-handled shovel to move auger cuttings away from the hole, ensuring that the shovel blade does not come in contact with the rotating auger. Never use hands or feet to move cuttings away from the auger while auger is rotating.
- Never attempt to remove cuttings from rotating augers. Augers should be cleaned only when the auger driver is in neutral and rotation of the augers has ceased.

- Auger speed shall be only that speed necessary for penetration and cuttings removal. High speed auger rotation shall not be used for penetration or cuttings removal unless approved by the on-site PDC or line supervisor. In such case, all unnecessary personnel will be removed from the rig operating area.
- Free standing augers shall be secured to prevent accidental falling.

3.13 Safety During Rotary and Core Drilling Operations

The minimum requirements for safety during rotary and core drilling operations are:

- Water swivels, and hoisting plugs shall be lubricated and checked for frozen bearings before use. A swivel guide cable and anchor chain shall be used to prevent swivel hose whip in case of swivel failure.
- Pressure relief valves shall be installed and operable on all circulation systems and the discharge located to prevent personal injuries. Protective covers shall be installed on shear-type relief valves.
- Direct-reading pressure gauges shall be installed on all air drilling fluid delivery lines. Gauges shall be operable at all times and must represent the true pressure of the medium being transported in the line(s). This shall include all ancillary equipment, for example, grout mixers, auxiliary circulation pumps, and other such equipment.
- Drill rod chuck jaws shall be checked periodically and replaced when necessary.
- A string of drill rods shall NOT be braked, during lowering into the hole, by the chuck jaws. A catline or hoisting cable and plug should be used for braking prior to tightening of the chuck. Failure to follow this procedure will result in steel slivers on the rods, possible hand injuries, and loss of the rods down the hole.
- Drill rods or drill pipe shall not be held or lowered into the hole with pipe wrenches. Use slips, clamps, spiders, or other suitable holding devices.
- In the event of a plugged bit or other circulation (fluid or air) blockage, the pressure in the piping and hose(s) between the pump, or air compressor, and the obstruction shall be relieved or bled down before breaking the first tool joint. Line pressure shall be relieved prior to breaking any tool joint connection.
- When drill rods or drill pipe are hoisted from the borehole, they shall be cleaned for safe handling with a rubber pipe wiper or other suitable apparatus. Do not use hands to clean or strip drilling fluids from downhole tools as they are being hoisted.
- If work must progress over a portable drilling mud pit, do not attempt to stand on narrow sides or cross members. The mud pit shall be equipped with rough surfaced, fitted cover panels of adequate strength to support the combined weight of drill rig personnel and where required shall be equipped with guard rails.
- Drill rods and drill pipe shall not be lifted and leaned unsecured against the mast. A suitable method shall be provided for securing the upper ends of the drill rod or drill pipe sections for safe vertical storage or they must be laid down. Only personnel necessary to perform hoisting or tripping operations shall be on the rig during these operations.
- Remain well clear of moving rotary tables, kellys, drill rods, pull-down chains, drive lines, drive chains, and other rotating components at all times.
- When air rotary or air coring operations are in progress, all discharges, for example dust, cuttings, and fluids shall be contained. All shrouds, curtains, diverter head(s), cyclone separator(s), bloopie line(s), and other necessary containment equipment will be used at all times. Any variance from these requirements must be approved in writing by the Contractor before implementation.

- All rig air-delivery systems used in environmental drilling applications will be equipped with oil-separating, 10 micron in-line filter(s) to remove oil that might be discharged into the air stream by the compressor(s). These filters shall be inspected daily and serviced as applicable.

3.14 Movement of Drilling Equipment and/or Components

The minimum requirements for safety during movement of drilling equipment and/or components are:

- Prior to moving drill equipment, a thorough inspection shall be made to ensure that the mast, drill rods, tools, and other supplies and equipment are secured to prevent displacement while in transit. Applicable traffic laws shall be observed in moving drill equipment over public roads. A check shall be made of steering mechanism, brakes, lights, load limits, and proper flagging or lighting of load extensions.
- Before off-road movement of a drill rig, visually survey the route of travel, inspecting the proposed route for unstable road beds and bridges, depressions, stumps, gullies, ruts, and similar obstacles which might impede safe movement of the equipment.
- Use caution when traveling on slopes. Conservatively evaluate side hill capability of drill rigs, as the arbitrary addition of drilling tools may raise the center of gravity. When possible, travel directly uphill or downhill.

3.15 Hazardous Materials and Waste

The minimum requirements for hazardous materials and waste are:

- The subcontractor shall provide material safety data sheets (MSDSs) for all hazardous chemicals used in the drilling operation(s) as per 29 CFR 1910.1200.
- Personnel must be trained in accordance with 29 CFR 1910.1200 for handling any such hazardous chemicals as well as any site-specific requirements pertinent to the particular task being undertaken.
- Chemicals shall be properly labeled, placarded, and stored.
- Any waste generated by drilling operations shall be handled as per site-specific project requirements.
- All cuttings, dust, fluids, and other waste generated by drilling activities must be contained and disposed of per site-specific project requirements.
- All spills and leaks, including but not limited to oils, fuels, grease, motor coolants, drilling additives, or other potentially hazardous wastes will be cleaned up immediately and properly disposed. The cause of such spills or leaks shall be determined and appropriate corrective action taken before drilling is resumed. Such events will be reported by the subcontractor to the Contractor.

Appendix A

Statement of Understanding

Drilling Health and Safety Requirements

STATEMENT OF UNDERSTANDING

I, the undersigned have read and understand the *Drilling Safety*

Name (please print) Signature Date

 Position

1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____
10	_____
11	_____
12	_____
13	_____
14	_____
15	_____
16	_____
17	_____
18	_____
19	_____
20	_____

Appendix B

Equipment Safety Inspection Checklist for Small Auger, Rotary, and Core Rigs

Equipment Safety Inspection Checklist for Small Auger, Rotary, and Core Rigs

Contractor: Rig Type: Rig Number: Date: ___/___/___

Safety Inspector: Project:

(Y) If OK (-) Not Applicable (X) If Correction Required

I. Rig Carrier

Overall Appearance Oil Leaks Fuel Fire Extinguishers (2) Back-up Alarm Exhaust System Wheel Chocks Outrigger Jacks Fuel Tank Placard(s) Portable fuel containers Other: _____

II. Mast

Crown Block Hinge Pins Lock Pins/Devices Lights/Wiring Safety Climbing Device Safety Belts/Harness Racking Board Ladders Guy Wires/Fasteners Deadman Anchors Standpipe Swivel Hose Safety Chains/Clamps Mast Rams/Cylinders Other: _____ Other: _____

III. Rig Engine(s)

Fuels Tank(s) Exhaust System Electrical System Belt/Drive Line Guards Emergency Shut-down System(s) Heat Shields Fluid Leaks Gauges Clutches Other: _____

Comments:

VIII. Hoisting Equipment

Hoisting Plug(s)
 Lifting Iron(s)
 Elevators
 Weight Indicator
 Safety Hook(s)
 Spider(s)
 Slips
 Foot Clamps
 Other : _____
 Other : _____
 Other : _____

IX. Downhole Equipment

Drill pipe Drill collars Core Rod Core Barrel(s) Augers Samplers Other : _____

X. Safety Equipment

Placards/Warning Signs Applicable OSHA Postings First Aid Kit(s) Applicable Regulation Posting Emergency Medical Posting(s) Emergency Procedures Other : _____

XI. Personal Protective Equipment

Hard Hats Safety Glasses Safety Boots/Shoes Other : _____

XII. Other Items