

**Attachment F20-1
Integrated Work Document (IWD) – Form 2100A**

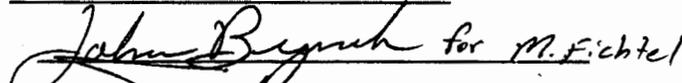
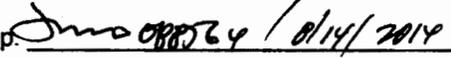
IWD#: <u>CrEX Sonic Core Hole Drill.</u> Revision#: <u>1</u>		Activity/Task Title:		
Company Name / Subcontract # Yellow Jacket Drilling / 293629		IWDs for Core Hole Drilling using the SONIC and Dual Rotary Drilling Methods		
TA:	Building:	Room:	Additional Location Description: Mortandad Canyon	
Activity Description/Overview Core Hole Drilling using the SONIC and Dual Rotary Drilling Methods				
Work Tasks/Steps Identify sequence of work steps/tasks.	Hazards, Concerns, and Potential Accidents or Incidents Identify both activity and work-area hazards for each task/step.	Controls, Preventive Measures, and Bounding Conditions Specify preventive measures, controls for each hazard (e.g., lockout/tagout points, specific PPE, TIDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ES&H/S&S hazards and associated controls.				
The SUBCONTRACTOR line manager approves work based upon confidence that this IWD has been properly prepared, that the work will be performed within ES&H/S&S requirements, and will be performed in accordance with this IWD.				
 Signature		Z# <u>253818</u>	Date: <u>8/12/14</u>	
Name of Primary PIC <u>Vernon R. Christensen</u>			Reviewed by SUBCONTRACTOR ES&H Representative	
Signature of STR 				
Signature of LANL ES&H Rep. 			Signature	
Signature of FOD Rep.  <u>08/14/2014</u>			Z# <u>295718</u>	Date: <u>8/12/14</u>
Signature of LANL ESO (if required)				



TABLE OF CONTENTS

Integrated Work Document (IWD) Part 1

General Information	Page 1 – 6
Mobilization/Demobilization	Page 7
Setting Up Drill Rig & Ancillary Equip.	Page 7 – 10
SONIC and/or Rotary Drilling	Page 10 – 13
Well Construction & Setting Surface Casing	Page 14
Downhole Logging	Page 14 - 15
Well Development, Aquifer Testing & Groundwater Well Sampling	Page 15 – 17
Waste Management	Page 18
Maintenance & Refueling	Page 19 – 21
Decontamination	Page 21 – 22

Integrated Work Document (IWD) Part 1, Activity Specific Information Continuation Page

IWD#: Chromium Core Holes

Revision #: 1

Work Tasks/Steps Identify work steps/tasks in sequence when such sequencing contributes to safety, security, and/or environmental protection.	Hazards, Concerns, and Potential Accidents/Incidents Identify both activity and work-area hazards for each task/step.	Controls, Preventive Measures, and Bounding Conditions Specify preventive measures, controls for each hazard [e.g., lockout/tagout points, specific PPE, Tamper Indicating Device TIDs), alarms, safes, recycle, waste minimization]	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Work planning and field preparedness and communication check	Working outside the authorized scope of work	Planned work activity FOR EACH DAY shall be clearly communicated to personnel at the Daily Tailgate Briefing. Personnel shall not perform activities whose hazards and controls have not been addressed at the Daily Tailgate Briefing. All work must be scheduled on the Plan of the Day (POD) and Plan of the Week (POTW) Follow all other postings. Contact the TA-64 Operations Center for weather alerts and when emergency situations arise. The PIC or designee shall check in at the Operations Center prior to and after entrance to the site.		
Evaluation of General Outdoor/Field Conditions -- All areas	Unknown personnel entering work areas / Potential disturbances / distractions, and poor site housekeeping	Watch for and assume unknown personnel and vehicles will inadvertently enter the work area. Perform daily housekeeping inspection checklist of worksite. Perform daily ES&H inspection at worksite Promptly initiate action to correct all identified hazards, deficiencies, or compliance issues Maintain inspection forms on site.	ES&H Plan, "General Requirements	none
Operation of motor vehicles - General	Vehicular traffic hazards	Use caution and watch for oncoming traffic when working on or adjacent to roadways or in parking areas. Wear a reflective safety vest when working in traffic areas or around heavy equipment. Use spotters during backing and other intricate maneuvers (per PIC/ES&H assessment) in heavy trafficked areas.	"Zero Accident Performance Objectives."	Pre-job briefing Spotter training or equivalent
Operation of motor vehicles - Driving	Mishap related to motor vehicle use	Inspect vehicle daily. Do not use vehicles or bring onsite with obvious problems on the project. Do not transport a passenger unless he/she is in a seat. Wear seatbelts in vehicles that are equipped with them. Abide by posted speed limits. Determine the safest route to the site prior to mobilization. Use a spotter when backing-up, if rear view is obscured. Immediately notify STR if an accident occurs	Motor Vehicle Safety Program	Valid and current driver license for the type of vehicle driven. PPE training

<p>Operation of motor vehicles - Driving</p>	<p>Driving safely on remote roads</p>	<p>Personnel shall drive slowly and get approval to proceed down Mortandad road and use caution while driving on single-lane roads, especially around blind corners. As much as possible, stay on maintained roads. Use caution when transitioning from a paved section of road to dirt. If driving on wet sections of dirt roads, ensure the road can support the vehicle's weight before driving over wet or muddy sections. Ensure weekly vehicle inspections are being performed before operating the vehicle. Operators must possess a valid state driver's license. Do not attempt to drive over impediments in the road, such as downed trees. Do not attempt to use a winch to move a vehicle.</p>	<p>Motor Vehicles and Powered Industrial Equipment Motor Vehicle Safety Program</p>	<p>Motor Vehicle Safety Program Operators must possess a valid state driver's license</p>
<p>Evaluation of Daily Field Conditions -Wildland Fire Danger</p>	<p>Wildland Fire</p>	<p>At least one 10-lb ABC fire extinguisher shall be readily accessible near fuel-fired equipment. Only trained personnel shall be allowed to use fire extinguishers. Comply with LANL alerts, fire danger estimates, and Wildland Fire HCP. Contact TA-64 Ops Center for current fire conditions. Spark arrestors shall be in undamaged condition and installed on portable, gasoline-powered equipment. Do not park vehicles with under-vehicle catalytic converters in tall grass or weeds. Brief the fire danger status daily at the safety Pre-job briefing.</p>	<p>ES&H Plan, "Fire Protection and Prevention" LANL Alerts, Fire Danger Estimates, and Fire Matrix. ES&H Plan, "Emergency Preparedness Requirements"</p>	<p>LANL fire extinguisher training or equivalent Pre-job briefing</p>
<p>Evaluation of Daily Field Conditions -Flash Flood</p>	<p>Potential for injury from flash flooding</p>	<p>Arrange work around inclement weather, so that project personnel are not working in canyon bottoms when heavy thunderstorms could develop and cause flash flooding. Project teams shall carry a radio that communicates with the TA-64 Operations Center. When project teams receive a message for potential flooding or heavy thunderstorms, field teams shall immediately stop work and exit the canyon (if applicable).</p>	<p>ES&H Plan, "Inclement Weather"</p>	<p>Pre-job briefing</p>
<p>Evaluation of Work area to determine if wildlife and other biological hazards exist</p>	<p>Encounters with Wildlife and/or biological hazards</p>	<p>Personnel shall avoid animals (dead or alive). Notify STR for removal of dead animals. If wildlife is encountered, remain calm, and slowly back away without turning your back or running. Stop if the animal advances. Resume backing away once the animal stops. Look for and avoid rodent droppings and nests. If droppings or nests must be disturbed to complete work, notify STR for removal and disinfecting. Avoid creating dust in areas where rodent nests or droppings are observed. If exposure to potentially infected rodents is suspected, affected personnel should get medical attention as soon as possible. Watch for snakes and spiders especially in grassy areas and well heads. If found, avoid contact and notify others in the area. Do not disturb bee/wasp nests. It is recommended that project personnel notify the ES&H professional, ES&H representative, and PIC if they are allergic to bees/wasps. Become familiar with the various types of hazardous vegetation and avoid contact. Use full-length clothing and cover exposed skin. If skin contact with poison plants occurs, immediately wash the affected area with lukewarm water and mild soap detergent and notify the ES&H professional, ES&H representative, or PIC. Do not rub or scratch the affected area as this will spread the contamination.</p>	<p>ES&H Plan, "Biological Safety"</p>	<p>Pre-job briefing</p>

<p>Field work including general lifting, bending, and moving of materials</p>	<p>Musculoskeletal injury due to heavy lifting</p> <p>Hand injuries</p> <p>Pinch points</p>	<p>Before moving or carrying a heavy or bulky object to another location, check the routes to ensure that obstructions and/or slip and trip hazards are removed. Choose an alternate route if clearance is not adequate. Evaluate the load location, task repetition, and load weight to determine if the material can be lifted safely.</p> <p>Inspect materials for slivers, jagged or sharp edges, and burrs, and rough or slippery surfaces before handling.</p> <p>Use a handling aid, such as a hand truck or cart, a hand tool, or a jack, to lift and/or move heavy objects, if possible.</p> <p>Use proper lifting technique to safely lift the load:</p> <ul style="list-style-type: none"> • Place feet close to load and lift mostly by straightening the legs, keeping the load close to the body. • Get a good grip on the load. • Do not twist the back or bend sideways. • Do not lift or lower awkwardly. • Do not lift with the arms extended. • Get mechanical help or help from another person if the load is too heavy. • Wear gloves, hand leathers, or other hand protectors to prevent hand injuries. • Wear protective footwear, such as steel-toed shoes where foot injury could occur. <p>Use all tools for their intended purpose.</p>	<p>ES&H Plan, "General Requirements"</p>	<p>General PPE training</p>
<p>Evaluation of General Outdoor/Field Conditions</p> <p>-Sudden illness of sampling team member</p>	<p>Sudden severe illness (heart attack, seizure, etc.); injury</p>	<p>Use the buddy system. No one is permitted to work alone in the field.</p> <p>At least one person on-site shall training in first-aid/CPR.</p> <p>Call for emergency services (911) as appropriate</p> <p>Make sure that personnel requiring medical TREATMENT for a serious condition are sent directly to an emergency room, not to LANL Occupational Medicine.</p> <p>Have First aid kit with bloodborne pathogen kit onsite.</p> <p>Preserve the scene of an accident.</p> <p>Verbally notify STR.</p>		
<p>Evaluation of General Outdoor/Field Activities</p> <p>- PPE</p>	<p>Eye, foot, hand, and head injuries</p>	<p>Standard PPE for site personnel includes:</p> <p>Safety-toed work boots or shoes.</p> <p>Safety glasses – Z87 compliant.</p> <p>Full-length pants and shirt with sleeves at least 3' in length</p> <p>Reflective safety vests when working near roadways and heavy equipment</p> <p>Work gloves, as necessary.</p> <p>Nitrile or other appropriate gloves for sample collection.</p>		
<p>Evaluation of Daily Site Conditions</p> <p>-High Winds</p>	<p>Injury due to high winds and/or airborne debris</p>	<p>If sustained wind exceeds 25 mph or wind gusts exceed 30 mph, personnel shall suspend activities and shelter in a safe location until winds subside.</p> <p>All personnel shall wear safety glasses.</p>		
<p>Evaluation of Daily Site Conditions</p> <p>-Summer Weather Conditions</p>	<p>Heat stress/stroke and sunburn</p>	<p>A complete briefing on heat stress shall be conducted by a qualified person.</p> <p>Implement work/rest periods for all affected personnel.</p> <p>During heat stress conditions, personnel shall hydrate continuously.</p> <p>Consider using sunscreen on exposed skin.</p> <p>Notify the ES&H representative, or PIC immediately if personnel show symptoms of heat stress</p>		

<p>Evaluation of Daily Site Conditions -Lighting</p>	<p>Lightning hazards</p>	<p>Comply with the AMS Lightning Recommendations including the "30-30 Rule": if the time between the flash and the boom of a lightning strike is 30 seconds or less, stop work and take shelter in the field vehicle or other designated safe area. Do not resume work until 30 minutes after the last lightning/thunder. Keep out of open areas, never shelter under or near tall objects, and stay away from metal objects such as fences</p>		
<p>Mobilization of material and portable equipment using a trailer.</p>	<p>Towing trailer to site</p>	<p>Ensure that the brake, taillights, and trailer brakes are functioning properly before moving the vehicle. Connect the trailer safety chains to the vehicle. Ensure that the towing vehicle and associated equipment have the rated capacity to handle the trailer. Use a spotter when backing-up, if rear view is obscured. Use a spotter when backing or staging trailer to work location Block trailer and lower tongue jack to prevent movement</p>	<p>ES&H Plan Motor Vehicle Safety Program.</p>	<p>Valid and current driver license for the type of vehicle driven.</p>
<p>Setting up generator / light systems and operation around rig.</p>	<p>Integrated trailer-mounted generator / lighting system</p>	<p>Use containment to catch small leaks of fuel or fluids from generator. Follow manufacturer's recommendations. Generator must have UL listing. Routine maintenance on equipment will be provided by on-site personnel. Non-routine maintenance will be performed by qualified electrician only. Ground the generator per manufacturer's specifications</p>		
<p>Setting up generator / light systems and operation around rig</p>	<p>Lights "blind" drivers</p>	<p>Set up lights in a manner that they do not shine onto roads in a way that interferes with vehicular traffic.</p>	<p>ES&H Plan, Health and Safety General Duty.</p>	<p>Pre-job Briefing.</p>
<p>Setting up generator / light systems and operation around rig</p>	<p>Inadequate illumination of work area and accessory structures</p>	<p>Set up at least two light systems around the drill rig location, so that they minimize shadows in the work area.</p> <ul style="list-style-type: none"> • Verify that the following minimum illumination levels are attained by taking foot-candle power reading 18 inches above the walking and working surfaces: • An average of five (5) foot-candles power on the whole of the derrick floor, with no less than three (3) foot-candles power at any point; and <ul style="list-style-type: none"> • A minimum of three (3) foot-candles power at all other walking and working surfaces. • Weather and other circumstances such as the need to perform fine work may warrant higher lighting values. • Run the lighting system from about 30 minutes before dusk and until 30 minutes after dawn. • Provide additional illumination or post and tape-off work areas where the required lighting levels are not attained. • Move chemical toilets closer to illuminated work area if necessary. • Take flashlights to toilet, if necessary. 	<p>ES&H Plan, ES&H Plan, "Industrial Hygiene." OSHA 29 CFR 1926.65 (m) Table D-65-1</p>	<p>Pre-job Briefing.</p>

Working at night under lights	Power outage (impaired visibility)	Flashlights will be kept in trailer, vehicles and other critical locations in case of power outage. Use flashlights to get around site, as necessary during power outage. Shutdown the rig and ancillary equipment. Restore lighting before resuming drilling and other site operations. If unable to restore lighting then leave the site until daylight.	ES&H Plan "Emergency Preparedness Requirements"	Pre-job-Briefing.
Operations of Forklift at the drill pad	Accident or injury due to equipment failure or operator error	Inspect upon arrival, departure, and before the first use of the day. Be familiar with operation and function of all controls and instruments before using the vehicle. Operator must be trained and licensed for the equipment he/she will be operating. Ensure forklift has sufficient capacity to handle the determined load weights. Evaluate work area hazards, obstacles, and clearances before starting work. Operate the forklift in a manner that avoids the following hazards: <ul style="list-style-type: none"> • falling loads caused by overloading; • unbalanced loading, or • other improper loading, i.e., free rigging a load,; • obstructions to the free passage of the load or to the operator's view in the direction of travel; platforms, curbs, or other surfaces, which could cause the vehicle to veer or fall; • poor maintenance; • driving the vehicle at excessive speed • using equipment for a purpose for which it was neither intended nor designed. Perform and document pre-operational inspection before each shift during which the vehicle is used.	ES&H Plan, Motor Vehicles and Powered Industrial Trucks 29CFR 1926.600 and .602	Certification by employer that operator has current training per 29 CFR 1910.178(L), Operator Training.
Operation of Heavy Equipment - General	Heavy equipment failure resulting injury	Inspect heavy equipment (drill rig, generators, air compressors, support trucks) upon arrival to the site, daily prior to start of work, and the start of each shift. Be observant as to your location with respect to heavy equipment. Maintain equipment inspection forms on site. Use a spotter if backing-up and rear visibility is limited.	ES&H Plan,, Motor Vehicles and Powered Industrial Equipment Manufacturer's Specification. 29 CFR 1926.601 Motor Vehicles. 29 CFR 1926.602 Material Handling Equipment	PPE Training or equivalent.

<p>Operation of Heavy Equipment - Trenching</p>	<p>Cave in, soil type, vehicle and equipment entering excavation, spoil pile, asphyxiation, access/egress</p>	<p>Slope excavation, use shielding or shoring to stabilize. Assessment of proper protective system by competent person. Barricades, "stop" logs, grade soil away from excavation, fencing. Place spoil pile more than 2 feet from edge of excavation. Ensure testing of space by competent person; emergency recovery plan in place and ready to be implemented, if needed. Proper design, positioning and use of structural ramps and ladders.</p>	<p>Dig in accordance with excavation permit.</p>	<p>Excavations and Trenching 7074</p>
<p>Overhead hazards -Electrical -General</p>	<p>Electrocution due to contact with overhead lines. Head injury due to overhead hazards</p>	<p>Persons shall not be located under suspended loads (operators shall not move suspended loads above people). Site personnel shall perform a 2-minute drill prior to the commencement of lifting operations that represent a potential overhead hazard, ensuring that all persons are aware of the potential hazards and position themselves at a safe location during overhead transfer operations Secure overhead objects. Prior to raising mast, inspect to ensure there are no loose tools or parts, which could fall. Observe the drill mast for overhead obstructions or potential falling objects from mast. Wear hardhat to protect head from falling objects (ANSI Z89.1-1986) in areas where overhead hazards are present. Pay attention to hazards such as trees and/or large limbs that may fall into work area. Pay attention to hazards such as overhead power lines. Maintain minimum safe distances from all high voltage lines. Ensure that the equipment or any part thereof does not have the capability to come within the following distances from the energized lines: Minimum distances for operation of equipment near high voltage power lines (2300 meters altitude):</p> <ul style="list-style-type: none"> • 11 feet from lines of 50 kV or less • 17 feet from lines of 51 kV to 200 kV • 23 feet from lines of 201 kV to 350 kV • 28 feet from lines of 351 kV to 500 kV • 39 feet from lines of 501 kV to 750 kV • 51 feet from lines of 751 kV to 1000 kV <p>Minimum distances for equipment in transit with no load and the boom and-or mast lowered (2300 meters altitude):</p> <ul style="list-style-type: none"> • 5 feet from lines of 0 kV to 50 kV or less • 13 feet from lines of 51 kV to 345 kV • 18 feet from lines of 346 kV to 750 kV • 23 feet from lines of 751 kV to 1000 kV <p>Notify STR and then LANL Operations of overhead hazards so that proper warning signs/flags can be emplaced.</p>	<p>Section 1.8, "Zero Accident Performance Objectives." ES&H Plan, PPE.</p>	<p>PPE training or equivalent. Pre-job briefing.</p>

MOBILIZATION/DEMobilIZATION

This step includes activities related to the moving persons, equipment and supplies to the site and caching them onsite and getting electric power to the trailer.

Site set-up, material handling and storage	Unstable stacks of materials	<p>Bagged materials shall be cross-keyed and shall not be more than 10 bags high.</p> <p>Drill rods, core barrels, casing, and pipe shall be stacked and blocked to prevent spreading and rolling.</p> <p>Avoid staging materials in close proximity to work activities where they may be knocked over or fall on personnel.</p>	ES&H Plan,	Pre-job Brief
Site set-up, offloading & loading of materials	injury due to unsecured loads	<p>Assure the delivery driver has the appropriate PPE or does not exit from the truck cab unless donning the PPE, i.e., hard hat and safety shoes.</p> <p>Use spotters to help direct the operator while driving equipment off the trailer.</p> <p>Remove all unauthorized/unnecessary personnel from the off-loading area.</p> <p>Personnel shall wear leather gloves (or similar material) to protect against potential pinch points.</p> <p>Notify STR and Complete New Equipment Declaration forms.</p> <p>Use only appropriate vehicles in transportation across any distance other than directly on drill pad (i.e. pick-up or flat bed service trucks) in movement and support operations.</p>	ES&H Plan Motor Vehicles and Powered Industrial Equipment	Pre-job brief PPE training
Site set-up of job trailer	Electrocution due to improper connection of trailer to power grid or generator	<p>Have a licensed electrician install electric meter and connect trailer to power grid or generator. Notify STR of all electrical for possible ESO approved or inspection.</p> <p>Ensure trailer is blocked & level.</p> <p>Attach stairs / platform with guardrails</p>	ES&H Plan	Licensed electrician per LANS procedure P101-13

SETTING UP THE DRILL RIG AND ANCILLARY EQUIPMENT

Setting up the Drill Rig and Ancillary Equipment

Setting up the SONIC drill rig and/or the Dual Rotary Drill Rig and ancillary equipment - Unloading materials	Unstable stacks of materials and piping	<p>Pipe shall be cribbed, stacked and blocked to prevent spreading and rolling.</p> <p>Avoid staging materials in close proximity to work activities where they may be knocked over or fall on personnel.</p>	ES&H Plan	Pre-job Briefing
--	---	---	-----------	------------------

<p>Setting up the SONIC drill rig and/or the Dual Rotary Drill Rig and ancillary equipment.</p> <p>-Position rig , support truck, and ancillary trailers,</p> <p>-Level the rig and support truck set any cribbing necessary.</p> <p>-Set outriggers.</p>	<p>Improper rig setup</p>	<p>Maintain the minimum distances provided in the General ES&H Plan during equipment operation.</p> <p>Level the equipment</p> <p>Set brakes, block wheels, set cribbing, and outriggers</p> <p>Use outrigger pads as necessary in soft soil.</p> <p>Do not set outriggers directly over any underground utility line.</p>	<p>ES&H Plan</p> <p>Minimum distances for operation of equipment near high voltage power lines</p>	<p>Pre-job briefing.</p>
<p>Setting up the SONIC drill rig and/or the Dual Rotary Drill Rig, support truck, and ancillary equipment.</p> <p>-Position rig, support truck, and ancillary trailers</p>	<p>Improper rig setup</p>	<p>Excavate / dig in accordance with excavation permit.</p> <p>Schedule Utility Locate through UMAP.</p> <p>Do not collect, dig, drill, power auger, or excavate directly over underground utilities.</p> <p>Do not place outriggers directly over underground utilities and maintain the designated distances noted in the General Field Work section for mobilization and erection of the rig and any other heavy equipment.</p>	<p>Excavations & Trenching</p>	<p>LANL Excavation/Soil Disturbance (self study) training Course:31419 for everyone involved in excavation</p>
<p>Setting up the SONIC drill rig and/or the Dual Rotary Drill Rig, support truck, and ancillary equipment.</p> <p>-Cut plastic and wood for secondary containments and construct; place containments under rigs and major stationary equipment</p>	<p>Misuse of portable power tools and hand tools</p>	<p>Personnel shall wear leather or equivalent work gloves.</p> <p>Knife blades shall be retracted or sheathed when not in use.</p> <p>Cut away from body.</p> <p>Wear a leather apron or other protective clothing when it is not possible to cut away from your body.</p> <p>Inspect all tools prior to use.</p>	<p>ES&H Plan Tools and Equipment</p>	<p>PPE training.</p>
<p>Set up generators and air compressor system</p> <p>-Air system</p>	<p>Injury to duecompressed air tools, and hose whip</p>	<p>Inspect all hoses, fittings, valves, safety valves & regulators before the first use of the day & periodically throughout their use.</p> <p>Inspect compressed air tools before the first use of the day and periodically throughout their use.</p> <p>Assume compressors will start automatically and without warning.</p> <p>Do not expose body parts to compressed air, do not walk over, stand on, or straddle hoses. A positive means shall connect the hoses to tools.</p> <p>Couple hosing into place and use whip checks to secure hose connections. Hoses shall not be used for hoisting or lowering tools, and ensures those systems, i.e., cable guards, are fully engaged/extended down the length of the hose lines.</p>	<p>Compressor manufacturer's specification.</p> <p>Tool manufacturer's specification.</p>	<p>Pre-job briefing.</p>

		Hoses exceeding ½-inch in diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.		
Set up generators and air compressor system - Dust suppression	Inhalation hazards due to uncontrolled dust	Inspect system before mobilizing. Securely connect hose between drilling air exhaust to cyclone inlet and use whip checks at hose connections. Inspect existing connections between cyclone exhaust and filter housing inlet, also between filter housing outlet and air mover. Attach blow down capture bags/containers to filter housing and cyclone. Personnel shall wear leather gloves (or similar material) to protect against potential pinch point hazards.	ES&H Plan, Manufacturer specification.	Pre-job Briefing
Set up electrical generators	Electric shock: generator	Use containment to catch small leaks of fuel or fluids from generator. Follow manufacturer's recommendations. Assure the generator is grounded to the frame or to a grounding rod and assure the bond is protective. Routine maintenance on equipment will be provided by on-site personnel. Non-routine maintenance will be performed by qualified electrician only. Each 120-volt circuit must have a ground fault interrupter. Ground the generator per manufacturer's specifications; generally all generators ≥ 5 kW must be grounded. See requirements for "setting grounding rods under "Site Preparation". See requirements for refueling equipment listed under "Equipment inspection, maintenance, and refueling"	ES&H Plan Manufacturer's User Manual	Pre-job briefing.
Setting up the SONIC drill rig and/or the Dual Rotary Drill Rig -Raise mast	Failure of rig hoisting and rigging equipment	Competent person will inspect the drill rig each day and complete a Drilling Operations Verification Checklist Drill rig shall be operated per manufacturer specifications. Determine the load weight prior to hoisting, and verify that the lifting equipment is rated higher than the load weight. Wire rope shall be removed from service when any of the following conditions exists: In hoisting ropes, six randomly distributed broken wires in one rope lay or three broken wires in one rope lay; Abrasion, scrubbing, flattening, or peening, causing loss of more than one-third of the original diameter of the outside wires; Evidence of any heat damage resulting from a torch or any damage caused by contact with electrical wires; Reduction from nominal diameter of more than three sixty-fourths inch (3/64") for diameters up to and including three-fourths inch (3/4"). Other signs of damage are observed. Also remove any tape that may be on top of wire rope damage. Inspect for correct number and orientation of wire rope clamps (if used)	Manufacturer specifications	PPE training or equivalent.

		<p>or other wire rope terminations.</p> <p>Synthetic rope shall be removed from service when any of the following conditions exists:</p> <ul style="list-style-type: none"> • Abnormal wear • Powder between fibers is generated, • Broken or cut fibers, • Variations in size or roundness of strands, • Discoloration or rot, • Distortion of hardware in sling <p>Synthetic slings shall be removed from service when any of the following conditions exists:</p> <ul style="list-style-type: none"> • Acid or caustic burns • Melting or charring of any part • Snags, punctures, tears, of any part • Broken or worm stitches, or • Distortion of fittings. 		
--	--	---	--	--

SONIC DRILLING and/or DUAL ROTARY DRILLING

SONIC Drilling and/or Dual Rotary Drilling will involve the following activities: Moving drill pipe, casing, & tools; Connecting & disconnecting drill pipe and drill head; Drilling; Collection of drill cuttings and water samples from discharge system and/or casing; Welding and cutting; and Installing casing.

Water transport truck, filling & use during drilling operations	Mishap related to water truck use	<p>Inspect vehicle daily.</p> <p>Do not use vehicle with obvious problems on the project.</p> <p>Wear seatbelts</p> <p>Abide by posted speed limits.</p> <p>Determine the safest route to the water supply station.</p> <p>Be trained and use a back-flow preventor at water supply station.</p> <p>Immediately notify STR if an accident occurs</p>	ES&H Plan, Motor Vehicles and Powered Industrial Trucks	<p>Motor Vehicle Safety Program</p> <p>Operators must possess a valid state driver's license</p>
Making and breaking drill pipe connections and assembling	Exposure to Chemicals and Chemical Products (rod dope and lubricants)	<p>Avoid un-necessary contact with skin and clothing,</p> <p>Approved safety glasses with side shields</p> <p>Use the minimum amount of material required.</p> <p>Wipe excess material off of tooling after connections are made.</p> <p>LANL will provide waste containers.</p>	MSDS ES&H Program Hazard Communication Program	HAZCOM training (or employer's) PPE training or equivalent.

<p>Making and breaking drill pipe connections and assembling and disassembling tooling</p>	<p>Injury from wrenches</p>	<p>When tightening threaded connections with a wrench, ensure you have a firm grip and stable footing.</p> <p>Use the correctly sized wrench to the diameter of the pipe being manipulated.</p> <p>Use caution and keep knuckles clear in case of wrench slipping off pipe and ensure other workers and objects are clear of work area.</p> <p>Inspect tools and only use tools in good working condition.</p> <p>Wrenches with worn jaws or bent or damaged handle shall be taken out of service.</p> <p>Wear leather work gloves or equivalent to protect hands.</p>	<p>ES&H Program Tools and Equipment</p>	<p>PPE training.</p>
<p>Borehole Drilling</p>	<p>Employee Exposure to Excessive Noise</p>	<p>Refer to the controls, documents and training requirements under Yellow Jacket Drilling's Hearing Conservation Program if the noise exposure is at or above the ACGIH TLV of 85 dBA TWA (3 dB exchange). The Hearing Conservation Program includes baseline and annual audiograms, evaluation and training.</p> <p>Notify the ES&H Representative of any other areas with excessive noise levels (noise levels in the work area that cause workers to raise their voices when speaking). ES&H Representative or designee will conduct noise monitoring as follows:</p> <ul style="list-style-type: none"> • Perform a preliminary noise survey to characterize operations that might be excessively noisy. Adjust construction zone boundaries, if necessary, so that hearing protection is not required outside of the construction zone. • Use Noise Dosimeter to conduct representative noise dosimetry when the 8-hour TWA is suspected of being greater than the ACGIH TLV. • Determine the adequacy of hearing protectors using a method listed in 29 CFR 1910.95 Appendix B. "<i>Methods for estimating the adequacy of hearing protector attenuation</i>" in instances where the 8-hour TWA has the potential to exceed 95 dBA. <p>ES&H Representative or designee will post areas with noise levels at or above the occupational exposure limit (29 CFR 1910.95, Occupational Noise Exposure) with Noise Warning signs and entry requirements.</p> <p>ES&H Representative will determine the types of hearing protection to be used, or whether double hearing protection is required based on their evaluation this information will be conspicuously posted at the entrance to the work area.</p> <p>Workers shall wear hearing protection in the areas where the 8-hour TWA could exceed 85 dBA.</p>	<p>ES&H Plan Hearing Conservation Program Manufacturer's specification</p> <p>1910.95, Occupational Noise Exposure</p>	<p>PPE training or equivalent.</p> <p>Hearing Conservation training</p>

Borehole Drilling	Fall from elevation	Work on unprotected elevated surfaces (6 feet or more above next level) is not permitted without fall protection.	Fall Protection Program	
Core Sampling	Handling of Core Samples	Lifting loads of over 50lbs unassisted is unacceptable. Cores/Core Boxes can be heavy and somewhat awkward. Team lifting or winching of core samples must be used when necessary. Moving the core boxes and core tooling from hole to hole needs to be done with a forklift or truck and all loads must always be properly loaded and inspected to prevent any shift of the load while in transit.		
Using aerial work platforms (i.e. JLG, Hi- lift, etc) t, scissor-lift to perform elevated work	Fall from platform	Inspect full body harness before each use. Include the lift on the Major Equipment Declaration form. Work to the Fall Protection Program. The drilling supervisor or designee will obtain training on the specific lift from the vendor that supplies the lift and will train other crew members in use of the aerial lift.	ES&H Plan Aerial Work Platforms Project-specific ES&H Plan Fall Protection Program	Fall protection competent person /qualified person designation
Welding, cutting, grinding -General	Fire from spark- or flame-producing operation	Check LANL wildfire page or the TA-64 Operations Center for the latest fire conditions if spark- or flame- producing operations will be conducted outside. Complete a Spark- or Flame-Producing Operations Permit. The permit is available at http://enterprise.lanl.gov/forms/1563.pdf Work to the requirements of: The LANL Wildfire Hazard Control Plan (http://int.lanl.gov/fire_matrix.html) The site-specific Fire Protection and Prevention Plan Any case-by case instructions from the Area's Fire Marshall, and Spark flame permit conditions. In the event of a "red" flag condition, spark/flame operations will pause and be re-assessed before commencing or continuance of the activity Some steps may include the application of water to any area downwind of the spark/flame operations, especially if slash is adjacent to the drill pad. Ensure a fire extinguisher (minimum 10 BC) is present and in working condition. Ensure that containers/pipes are emptied, cleaned using non- flammable cleansers and/or purged of flammable and other materials before performing spark- or flame-producing operations on them. Provide trained fire watch whenever spark- or flame-producing operations are performed in locations where other than a minor fire might develop, or any of the following conditions exist:	Spark- or Flame-Producing Operations Permit ES&H Plan, Fire Protection & Prevention ES&H Plan, Welding, Cutting, Brazing and Grinding	Fire watch and designated worker: Pre-job brief to discuss appropriate PP, job responsibilities and other controls. LANL Course 15672 (Fire Extinguisher: Designated Worker and Fire Watch) or equivalent LANL Course 9893 (Fire Extinguisher Hands-on Training) or equivalent

		<p>combustibles are more than 35 ft away but are easily ignited by sparks or hot slag; combustible materials are adjacent to the opposite side of metal and are likely to be ignited by conduction or radiation.</p> <p>Appropriate PPE shall be prescribed by ES&H personnel and documented on daily tailgate meeting form.</p>		
<p>Welding, cutting grinding -Stick, MIG, TIG & gas</p>	<p>Welding and brazing</p>	<p>Obtain a spark-flame permit. Comply with reference documents. Inspect welding equipment before each use and periodically during use. Perform only within a building or approved area. Avoid breathing the fume plume directly (fume plume is the smoke- like cloud containing minute solid particles arising directly from the area of melting material). Only arc-weld on a dry, non-combustible surface. Do not arc weld in the rain. Check electrode connections before each weld and during the welding process. Coiled leads should be spread out to avoid overheating and damage to insulation. Ensure work piece is properly grounded. Select the correct filter lens for the welding process; consult with ES&H Representative if you are unsure of the welding shade requirements for your work. Wear Safety glasses meeting the requirements of ANSI Z87.1 having side shields. When operation produce flying debris, safety glasses with a full face shield shall be worn. Wear protective clothing as prescribed by ES&H personnel to protect from heat and radiation ex. flame-resistant gauntlet gloves and aprons, etc.) For heavy work, fire-resistant leggings, high boots or similar protection, or safety shoes. Provide shielding to protect personnel in the vicinity from bright light rays or exposure to flame or sparks. Appropriate PPE for the specific daily operation shall be prescribed by ES&H personnel and documented on daily tailgate meeting form</p>	<p>Spark-flame permit ES&H Welding, Cutting, Brazing and Grinding</p> <p>ES&H Plan Gas Cylinder Use and Storage Procedure</p> <p>MSDS for filler metal</p> <p>ES&H Plan, Fire Protection & Prevention</p>	<p>Welding Safety Self-Study course (Course #9519), or equivalent employer training. PPE training. Pre-job brief to discuss appropriate PP, job responsibilities and other controls.</p>

WELL CONSTRUCTION and SETTING SURFACE CASING

Well Construction, Setting Surface Casings and Borehole Abandonment (if necessary) involves: Moving casing manually, with lifting equipment, or with drill rig hoist, Welding and cutting casing, Hoisting casing into borehole, Mixing and emplacement of grout, Emplacing sand filter pack,

Well Construction and setting surface casing	Compressor and grout pump	<p>Inspect all hoses, fittings, valves, safety valves and regulators prior to the first use on each work shift and periodically throughout their use. Assume that compressors will start automatically. Do not expose body parts to compressed air or grout stream. Do not walk on, walk over, or straddle hoses. A positive means shall connect the hoses to the pump. Secure hoses to prevent whipping using whip checks at hose connections. Fully engage the whip checks by sliding the cable down the hoses. Hoses exceeding 1/2-inch in diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure. Persons working with compressed gas lines shall wear appropriate eye protection Ensure the pump housing cover is in place before activating. Either LOTO or maintain visual control and tag controls "out" when working on the pump system, e.g., chain pulley repair.</p>	ES&H Plan, Pressure Safety & Compressed Gas	Pre-job briefing. PPE training
--	---------------------------	---	---	--------------------------------

DOWNHOLE LOGGING

The boreholes will be geophysically logged. This activity is concerned with the general operations of insertion or removal and raising or lowering of objects from a borehole. Personnel involved include Schlumberger contract logging operations or the LANS geophysical logging team. If the LANS geophysical logging team does the logging, they will take control of the site during the logging operation, work to their own IWD, work authorization documents and training requirements. Personnel who must work in the immediate vicinity of the LANS geophysical logging operation will be briefed and supervised by LANS. Downhole logging require the following steps: Set up the trailer/vehicle at the borehole, Set up the test assembly (could be a radioactive source/detector assembly, video camera, or other device), Use the winch on the trailer/vehicle to insert the test assembly into the bore of the well, Lower to the desired level and obtain an observation or reading, Reposition and obtain the additional readings, as necessary, Use the winch to extract the test assembly, Stow the test assembly.
 All activities listed in this section are based on the contractual agreement that Schlumberger (Subcontractor) will perform logging functions.

Downhole logging	Inadequate work planning for Schlumberger work	<p>Schlumberger must obtain approval from Gilbert Estrada (LANL/RP-3, 505-665-5298 or 505-231-5188) prior to bringing radioactive sources onto LANL property. Yellow Jacket must follow this procedure and approval shall be routed thru STR to get Schlumberger authorized to begin downhole logging activities.</p> <ul style="list-style-type: none"> • Before start of work Schlumberger will submit documentation to Yellow Jacket in advance establishing that their equipment usage procedures have been reviewed and approved by LANS. This documentation will be provided to the STR. • Any equipment usage procedures that Schlumberger cannot demonstrate have been approved by LANS will be submitted in advance to Yellow Jacket. They will be forwarded to the STR for approval. • Schlumberger will complete a Major Equipment Declaration and it will be submitted to Yellow Jacket for transmittal to the STR. 	YJD-approved Schlumberger SOPs	GET Training HAZCOM Training Schlumberger-required training in applicable Schlumberger SOPs
------------------	--	---	--------------------------------	---

		<ul style="list-style-type: none"> Schlumberger will submit their hazardous materials list, MSDS, and hazardous materials inventory to Yellow Jacket. This documentation will be forwarded to the STR for approval, and This IWD will be reviewed by Yellow Jacket in light of Schlumberger's scope of work, hazardous materials list, and Major Equipment Declaration. If necessary a supplemental IWD will be modified and submitted to the STR for approval. LANS will have the opportunity to review the same information. LANS will inspect and approve equipment on the declaration for use. The Schlumberger downhole logging activity can begin once the STR authorizes this task to proceed. 		
Borehole Geophysical Logging -Schlumberger	Exposure to radiation from radiation generating device	<p>Only personnel trained to Schlumberger's radiation program are permitted in the work area when their radioactive source is in use. The area will be posted and controlled by Schlumberger to prevent entry.</p> <p>Non-Schlumberger personnel will maintain "observer" status while logging operations are performed.</p>	Schlumberger radioactive material license and procedures	Schlumberger radiation worker training
<p>WELL DEVELOPMENT, AQUIFER TESTING, AND GROUNDWATER WELL SAMPLING</p> <p>Groundwater Screening and Sampling: If saturation is encountered as a borehole is advanced, drilling will be stopped to determine whether sufficient water volume is available to analyze the water quality. Generally, a total volume of 0.5 to 1.0 L is required for the sample. If a zone is saturated sufficiently to test, the borehole will be advanced to the base of the saturation, and a monitoring well designed. The design will be submitted to NMED for approval. After the design has been approved, the well will be installed. A borehole will be drilled and the saturated zone isolated.</p>				
WELL DEVELOPMENT, AQUIFER TESTING, AND GROUNDWATER WELL SAMPLING	Exposure to acids	<input type="checkbox"/> Personnel shall obtain and review manufacturer MSDS <input type="checkbox"/> Wear required PPE as follows: <input type="checkbox"/> Safety glasses with side shields and face shields. <input type="checkbox"/> Long pants and sleeved shirt. <input type="checkbox"/> Nitrile or other suitable gloves for handling acids. <input type="checkbox"/> Emergency eye-rinse shall be immediately available (within 25 feet of work area). <input type="checkbox"/> Preservative (acid) is procured in ~2 ml ampoules. <input type="checkbox"/> Proper storage requirements for acids shall be followed. <input type="checkbox"/> Proper ventilation shall be provided in work area.	Onsite MSDS file	Pre-job briefing, HAZCOM Training PPE training, or equivalent

WELL DEVELOPMENT, AQUIFER TESTING, AND GROUNDWATER WELL SAMPLING	Wire lines and wire ropes	<input type="checkbox"/> Inspect each day before using and periodically during use. <input type="checkbox"/> Wear leather gloves (or equivalent) and safety glasses with side shields. <input type="checkbox"/> Be careful of the wire rope, it can whip dangerously if it becomes knotted or snagged. <input type="checkbox"/> Keep away from rotating parts and pinch points. <input type="checkbox"/> Use in accordance with manufacturer's recommendations. <input type="checkbox"/> Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be posted. <input type="checkbox"/> Synthetic slings shall inspected by a competent person and shall be removed from service when any of the following conditions exists: <input type="checkbox"/> Acid or caustic burns <input type="checkbox"/> Melting or charring of any part <input type="checkbox"/> Snags, punctures, tears, of any part <input type="checkbox"/> Broken or worm stitches, or <input type="checkbox"/> Distortion of fittings. <input type="checkbox"/> Wire rope shall be removed from service when any of the following conditions exists: <input type="checkbox"/> In hoisting ropes, six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay; <input type="checkbox"/> Abrasion, scrubbing, flattening, or peening, causing loss of more		Pre-job briefing. Competent person designation by employer for winch operator. PPE training, or equivalent
WELL DEVELOPMENT, AQUIFER TESTING, AND GROUNDWATER WELL SAMPLING	Moving drill pipe, tools, and casing	<input type="checkbox"/> Refer to the hazards and controls for this work step under "Setting up the rotary drill rig and ancillary equipment" and "Rotary Drilling."	ES&H Plan	None
WELL DEVELOPMENT, AQUIFER TESTING, AND GROUNDWATER WELL SAMPLING	Making and breaking drill pipe connections and assembling and disassembling tooling	<input type="checkbox"/> Refer to the hazards and controls for this work step under "Setting up the rotary drill rig and ancillary equipment" and "Rotary Drilling."	ES&H Plan	None

AQUIFER TESTING (Using packer)	Pressure system and gas cylinder used to inflate packer.	<ul style="list-style-type: none"> <input type="checkbox"/> Inspect before the first use of the day. <input type="checkbox"/> Do not perform maintenance or repair while system is pressurized <input type="checkbox"/> Wear leather gloves and safety shoes when handling cylinders. <input type="checkbox"/> Wear safety glasses w/ side shields. <input type="checkbox"/> Comply with requirements of reference documents. <input type="checkbox"/> Secure cylinders to a fixed object or gas cylinder cart. <input type="checkbox"/> Secure flexible (e.g., braided) tubing such that whipping in the event of breaking does not cause injury. <input type="checkbox"/> Complete leak test. <input type="checkbox"/> Not to be used in a confined space. <input type="checkbox"/> Never use a fitting adaptor or improper fittings between the regulator and cylinder. <input type="checkbox"/> Never use sealing tape, such as Teflon, on the connection between the regulator and the gas cylinder. <input type="checkbox"/> Do not lift cylinders by protective caps or with a lifting magnet. <input type="checkbox"/> Do not drop or slide cylinders or roll long distances. <input type="checkbox"/> When cylinder not in use, remove regulators, close valves, and install protective caps. <input type="checkbox"/> Store compressed gas regulators that are not in use in plastic bags and pelican case. Indicate on label the gas they regulate. <input type="checkbox"/> Regulators used must be appropriate for the gas in question. <input type="checkbox"/> Protect regulators and association pressure system components from potential damage. 	ES&H Plan	
AQUIFER TESTING (Prepare and use submersible pump and transducer).	"Rogue" electrical wiring of high voltage equipment (submersible pump).	<ul style="list-style-type: none"> <input type="checkbox"/> A LANL-ESO licensed electrician must inspect the submersible pump wiring each time it is re-wired. Initial wiring of a pump system must be conducted by a LANL-SSS licensed electrician 	ES&H Plan	Pre-job briefing.

WASTE MANAGEMENT

This step involves:

Direct Waste Sampling

Direct Waste Sampling Of Poly Tanks and Drums

Managing Investigative Derived Waste

<p>WASTE MANAGEMENT Direct waste sampling of poly tanks and drums</p>	<p>Containers of waste become pressurized</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Inspect drums before opening. <input type="checkbox"/> Open slowly. Do not stand directly over lid. <input type="checkbox"/> Use drums with bung on lid. <input type="checkbox"/> Loosen bung slowly to relieve pressure. <input type="checkbox"/> Wear safety glasses with side shield. <input type="checkbox"/> Do not use ladder on uneven surface. <input type="checkbox"/> Do not stand on top rung. <input type="checkbox"/> Ensure ladder weight requirements for personnel and materials are not exceeded. <input type="checkbox"/> Look out for overhead obstructions. (Power lines, tree limbs etc). <input type="checkbox"/> Use a spotter and the three point contact when climbing up and down ladders. <input type="checkbox"/> Only use non-electric conducting ladders around powerlines or where there is a potential for lighting strikes. <input type="checkbox"/> Monitor changing weather conditions. 	<p>Site specific ES&H Plan Personal Protective Equipment (PPE). Sample in concurrence of applicable Waste Characterization</p> <p>Strategy form Daily Tailgate Safety Meeting</p>	
<p>WASTE MANAGEMENT Managing Investigative Derived Waste</p>	<p>Mismanaging waste</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Consult with Waste Coordinator, as necessary <input type="checkbox"/> Comply with approved WSCF <input type="checkbox"/> Comply with all applicable waste requirements: These include, but are not limited to: requirements for Satellite Accumulation Areas and <90 Day Accumulation Areas: <input type="checkbox"/> Volume limits <input type="checkbox"/> Labeling <input type="checkbox"/> Time Constraints <input type="checkbox"/> Location <input type="checkbox"/> Inspections <input type="checkbox"/> Signs/positing. <input type="checkbox"/> Refer to reference documents for further details. 	<p>ES&H Plan</p>	

MAINTENANCE AND REFUELING

This could include the following activities such as refueling and adding fluids to equipment, arc welding, grinding, jump starting, charging batteries, equipment repairs, and repairs to systems involving hazardous energy. Sub steps for repairs to systems involving hazardous energy are:

- a) Isolate from hazardous energy (lockout/tagout if possible; otherwise block/chock/tagout).
- b) Repair or refuel.
- c) Remove lock/block/chock and tag

MAINTENANCE AND REFUELING	Fall from elevation	<input type="checkbox"/> Will work to their approved written Fall Protection Program	Project-specific ES&H Plan, Section 4.3.16, (Fall Protection)	
MAINTENANCE AND REFUELING	Battery charging	<input type="checkbox"/> Battery charging installations shall be located in areas designated for that purpose. <input type="checkbox"/> Battery charging apparatus shall be protected from damage by trucks. <input type="checkbox"/> Jump starting shall be performed at least 50 feet from structures and 50 feet from any waste accumulation area, or combustibles. <input type="checkbox"/> Battery charging areas shall be equipped to provide for the following <input type="checkbox"/> Emergency Eye-rinse, <input type="checkbox"/> Flushing spilled electrolyte, <input type="checkbox"/> Fire extinguisher (minimum rating 10 BC) , <input type="checkbox"/> Protection of charging apparatus against damage by trucks, <input type="checkbox"/> Adequate ventilation for dispersal of fumes from gassing batteries. <input type="checkbox"/> When adding electrolytes to batteries or when handling a leaking battery, personnel shall wear the following personal protective equipment: <input type="checkbox"/> Acid resistant, long cuff gloves and apron. <input type="checkbox"/> Safety glasses and face shield. <input type="checkbox"/> Never add water to acid. <input type="checkbox"/> When charging batteries, the vent caps shall be kept in place to avoid electrolyte spray. <input type="checkbox"/> Trucks shall be positioned properly and brakes shall be applied before attempting to charge batteries. <input type="checkbox"/> If equipment does not have a brake system, a chock will be used on at least one wheel/tire. <input type="checkbox"/> The battery compartment cover(s) shall be open to dissipate heat and gas. <input type="checkbox"/> Personnel involved with charging shall wear a full face shield and safety glasses, acid-resistant apron. Acid resistant gloves (butyl rubber or per manufacturer chemical resistance chart) that are elbow length. <input type="checkbox"/> Emergency shower with eye/face wash (per ANSI Z358) shall be located within 25 feet of battery charging location	ES&H Plan	

		<input type="checkbox"/> No open flame or spark shall be permitted during battery charging. <input type="checkbox"/> Tools and other metal objects such as watches and rings shall be kept away from the tops of uncovered batteries. Use the buddy system.		
MAINTENANCE AND REFUELING	Grinding: sparks, rotating parts, flying debris; --	<input type="checkbox"/> Spark/flame permit and approved designated area required. <input type="checkbox"/> Inspect grinder prior to use for damaged housing, insulation of the conduct and prong presence. <input type="checkbox"/> All guards shall be in place and no modifications shall be made. <input type="checkbox"/> Personnel shall wear safety glasses and face shield, long sleeved shirt, and leather (or equivalent) gloves. <input type="checkbox"/> Emergency eye rinse within 100 feet of work location. <input type="checkbox"/> Do not mix aluminum grinding dust with iron or steel grinding dust Such a mixture may explode. <input type="checkbox"/> Do not exceed the maximum rated speed of grinding wheel or blade.	Spark and Flame Permit ES&H Plan	PPE training
MAINTENANCE AND REFUELING	Hazardous energy control: contractor owned equipment	<input type="checkbox"/> Work to the Lockout/Tagout procedure given in the General ES&H Plan	ES&H Plan	
MAINTENANCE AND REFUELING	Maintenance: hot surfaces	<input type="checkbox"/> Exhaust pipes and other hot surfaces shall be guarded or insulated in areas where contact by employees is possible in the performance of normal duties. <input type="checkbox"/> Allow hot equipment to cool off before servicing or fueling it. <input type="checkbox"/> Workers shall wear heavy/leather or insulated gloves when handling/contacting potential hot surfaces/tools/equipment, etc.		PPE training or equivalent Pre-job Briefing

MAINTENANCE AND REFUELING	Refueling equipment	<input type="checkbox"/> ESH personnel for assistance, as appropriate. <input type="checkbox"/> Review the MSDS. <input type="checkbox"/> Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include, but are not limited to, open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, static, electrical, and mechanical sparks, spontaneous ignition, including heat-producing chemical reactions, and radiant heat. <input type="checkbox"/> Fire Extinguisher (20 BC) within 75' of refueling location. <input type="checkbox"/> Shut off equipment and let cool before refueling. <input type="checkbox"/> Use UL-listed and approved dispensing devices when flammable liquids are dispensed from drums. <input type="checkbox"/> Fuel cans shall meet OSHA requirements (no more than 5 gallons, spring closure). <input type="checkbox"/> Observe OSHA regulation 29 CFR 1910.106 (Flammable and Combustible Liquids) requirements for separation and maximum quantities.	29 CFR 1910.106 (Flammable and Combustible Liquids) Project-specific ES&H Plan Section 21: (Site Specific Fire Protection & Prevention Plan) On-site MSDS file	HAZCOM Training or equivalent Fire Extinguisher
MAINTENANCE AND REFUELING	Welding and brazing	<input type="checkbox"/> Refer to the controls for this hazard under "Welding drill casing joints together"	Spark-flame permit.	Welding Safety Self-Study course (Course #9519), or equivalent employer training. PPE training. Pre-job brief to discuss appropriate job responsibilities and other controls.
DECONTAMINATION Decontamination activities may consist of dry wiping, brushing, washing with detergent and water, or pressure washing. Decontaminate sampling equipment using dry decontamination procedures (Fantastic spray or equivalent and paper towels.) If dry decontamination proves inadequate, wet decontamination using Alconox detergent and DI water rinses may be required.				
Decontamination	Exposure to contaminants and decontamination fluids	<input type="checkbox"/> Wear required PPE as follows: <input type="checkbox"/> Long sleeved shirt and long pants. <input type="checkbox"/> Nitrile or other suitable gloves for examining samples. <input type="checkbox"/> Safety glasses with side shields.	MSDS file on-site.	HAZCOM. PPE training.

		<input type="checkbox"/> Avoid direct contact of sample media or decontamination fluids with skin. <input type="checkbox"/> Avoid hand-to-face contact. <input type="checkbox"/> Wash hands upon exiting the contamination reduction zone. <input type="checkbox"/> MSDS required for chemicals used on-site.		
Decontamination	Generation of decontamination waste	<input type="checkbox"/> Manage in accordance with approved Waste Characterization Strategy form	Waste Characterization Strategy form.	None
Decontamination	Pressure washer injury;	<input type="checkbox"/> Follow manufacturers operating limits for pressure and temperature. And do not point at another employee. Face shield, chemical gloves.	Manufacturer's specifications.	Pre-job briefing. PPE training or equivalent.
Decontamination	Incompatible materials;	<input type="checkbox"/> Do not place incompatible materials in the same waste container (e.g. acetone or (samples mixed with acetone) and oxidizers such as nitric acid). <input type="checkbox"/> Comply with approved waste Characterization strategy documents.	MSDS file on-site.	HAZCOM and general PPE training, or equivalent.
Collection of Cutting Samples	Working inside fence, water hazard, flying debris	Utilize the buddy system when accessing the sample collection area inside the fenced discharge pit. Make sure life ring (floatation device) is available for use.	ES&H Plan	