

IWD # 2007-R36		Revision#: 0		Activity/Task Title: IWD for Regional and Intermediate Aquifer Well Drilling	
Work Document		IWD # 2007-R36-WSP		[Mobilization, Site Preparation and Setup Stages].	
TA: 99	Building: Outdoors	TA: 99		Building: Outdoors	

Activity Description/Overview

This IWD applies to the rehabilitation of existing groundwater monitoring wells at Los Alamos National Laboratory and adjacent areas. It includes the following work elements:

IWD for Regional and Intermediate Aquifer Well Drilling

PR ID # 07P-0110 (R-36 Specific) Work Order # 291415-01

Note: Items 6-15 addressed under separate IWDs for later Phases of Work

1. **MOBILIZATION AND DEMOBILIZATION:** Activities related to transport of persons, equipment and supplies; common hazards for all tasks.
2. **SITE PREPARATION/RESTORATION:** Activities related to vegetation removal includes inspection of the site for hazards.
3. **HEAVY EQUIPMENT OPERATION:** Activities related to the use of forklifts, backhoe, and other heavy equipment.
4. **SETTING UP AND USE OF THE LINED RETENTION POND (CUTTINGS PIT):** Excavating containment structures for drilling fluid and installing liner.
5. **SETTING UP THE AIR ROTARY DRILL RIG AND ANCILLARY EQUIPMENT.** Multiple steps involved in setting up a drill rig, compressor, generator.

16. **EQUIPMENT INSPECTION, MAINTENANCE, AND REFUELING:** Inspecting, maintaining and refueling equipment onsite.
17. **MANAGE THE INVESTIGATION DERIVED WASTE:** Includes containerization, storage, and mobilization.

The mobilization/demobilization hazards labeled "Laborers-general field awareness" apply to all tasks, even if a hazard is not repeated. Non-LANL, subcontract employees shall comply with ISD101-12, ES&H Requirements for Subcontractors, and all health and safety policies and procedures and shall meet the training and qualification requirements either by completion of the specified training course or its equivalent. ~~LANS employees will not work under this IWD.~~

HAZWOPER work is not authorized under this IWD.

Handwritten notes:
MSE
D.L.C.
11/16/07
CRA
11/7/07



31031

Handwritten notes:
CRA 11/7/07
MSE D.L.C.
11/7/07

100972

IWD - PART 1 (ACTIVITY SPECIFIC INFORMATION)

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, TIDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Mobilization/De-mobilization (Laborers-general field awareness) <i>* pencil change of 2/15/08, see flip side of this page</i> <i>CSA 2/15/08</i>	Head, foot, and eye injury	All personnel shall wear steel-toed boots when working with rock or around heavy equipment. Hard hats shall be worn in all work zones where heavy equipment is being used or overhead hazards exist. Safety glasses/ <u>side shields</u> shall be worn in all work zones. Reflective safety vests shall be worn when vehicle traffic is present.	ISD101-6.0 (Personal Protective Equipment)	General PPE discussion by safety manager, technical lead, or field team lead.
Mobilization/De-mobilization (Laborers-general field awareness) Vehicular accident	Potential for property damage, injury or death from an accident	Vehicle accidents will be reported to Emergency Management and Response (EM&R). Personnel will wear warning vests or other suitable garments marked with or made of reflective or high-visibility material when exposed to vehicular traffic. Parking areas will be designated in the field. Wear seat belts and will not transport a passenger unless he/she is in a seat. Determine the safest route to the site prior to mobilization. Maintain vehicles in safe condition; use Weekly Vehicle Inspection Form. Minimize the use of cellular phones or like devices while the vehicle is in motion. Do not leave unattended vehicles idling. Ensure that the towing vehicle and associated equipment have the rated capacity to handle the trailer. Ensure that the trailer lights and brakes are functioning and that the safety chains are connected to the vehicle prior to moving the vehicle and trailer.	LIR402-1320.01.2, (Vehicle and Pedestrian Safety) ISD101-6.0 (PPE)	Valid Drivers License General PPE discussion by safety manager, technical lead, or field team lead.

Pencil Change of 2/5/08.

- 4: - All personnel shall: observe the 'two-man rule' defined as: working in remote locations with a minimum of (2) people within eyesight of one another.
- 3: - All work sites shall be equipped with (2) or more forms of communication.
- 2: - All personnel working in remote locations shall follow current LWSF communication policies. Current LWSF communication policy is to contact TA-64 Operations Center upon arrival at the start of shift, every (2) hours during the shift, and upon departure from the site. The TA-64 Operations Center can be contacted via phone at: 665-2824. Alternatively, if site departure is 'after-hours', the Shift Operations Manager (SOM) will be contacted

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Mobilization/De-mobilization (Laborers-general field awareness) Wild Land Fire	Potential for property damage, injury or death from wild land fire	Check LANL homepage, http://int.lanl.gov/fire_matrix.html or contact Emergency Management and Response (7-6211), for the latest fire conditions. Fire extinguishers will be available at the work site. Only trained personnel will be allowed to use fire extinguishers. At least one 10-lb. ABC-rated fire extinguisher shall be maintained readily accessible for each spark-producing piece of equipment or operation. Do not enter the retention pond. Do not occupy canyon bottoms during inclement weather. Carry a pager during monsoon season. If page is received for potential flooding or inclement weather, crew will immediately stop work and exit canyons.	LANL Alerts, Fire Danger Estimates, and Fire Matrix.	LANL Fire Extinguisher Training
Mobilization/De-mobilization (Laborers-general field awareness) Flash flooding	Potential for injury or drowning from flooding or pooled water.	Perform initial and periodic visual surveys of the area, monitor hazard trees within and surrounding work area, and wind levels. Use of buddy system is required.	Daily Tailgate Safety Meeting form	none
Mobilization/De-mobilization (Laborers-general field awareness) Falling trees	Potential for impact from falling trees	Perform initial and periodic visual surveys of the area, monitor hazard trees within and surrounding work area, and wind levels. Use of buddy system is required.	Daily Tailgate Safety Meeting form	none
Mobilization/De-mobilization (Laborers-general field awareness) Lightning	Potential for electrocution, burns or death	Consult ES&H REP. and/or comply with LIG402-10-01A.1, (Lightning Safety). Comply with "30-30 Rule": if the time between the flash and the boom of a lightning stroke is 30 seconds or less, stop work and take shelter in the field trailer or other designated safe area. Do not resume work until 30 minutes after the last lightning/thunder. Use good housekeeping on-site.	LIG402-10-01A.1, (Lightning Safety) Daily Tailgate Safety Meeting form	none
Mobilization/De-mobilization (Laborers-general field awareness) Hiking, outdoor work	Slips, trips, falls on uneven terrain Injury to limbs, head or body	Use caution and be observant while moving in areas of potential concern. Wear good boots with adequate soles for good traction. Wear steel toed boots when working around rock or moving equipment. Personnel will walk the work area to identify any potential hazards.	ISD101-6.0 (Personal Protective Equipment)	General PPE discussion by safety manager, technical lead, or field team lead.
Mobilization/De-mobilization (Laborers-general field awareness) Heavy lifting	Musculoskeletal injury due to heavy lifting	Use two (or more) people to lift and carry loads in excess of 50 pounds (lb.); or use mechanical lift assist equipment (i.e., dolly, forklift, etc.). Lift with legs and stand up in a smooth, even motion. Avoid twisting at the waist.	LIR402-870-01.0, (Ergonomics)	Proper lift training by safety manager, technical lead, or field team lead.

IWD – PART I (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
<p>Mobilization/De-mobilization (Laborers-general field awareness) Using a portable generator</p>	<p>Use of a generator: Electric shock or fire</p>	<p>Follow manufacturer's recommendations. Routine maintenance on equipment will be provided by on-site personnel. Non-routine maintenance will be performed by qualified electrician only. Ground portable generators only where required by manufacturer's specifications. Wiring Design and Protection: Grounding. Include a GFCI in each 120 volt circuit. Clear away combustible material from the generator for an area of at least ten feet. See refueling requirements listed in the "Equipment inspection, maintenance, and refueling" section of this IWD under "Refueling Equipment"</p>	<p>Excavation Permit, if grounding rod is required Manufacturer's recommendations. Wiring Design and Protection: Grounding. ENR-602-600-1.3 TSO 101-13.0 Electrical Safety. LIR 402-860-01.1 Lockout/Tagout for Personal Safety. TPMC Corporate Environment, Safety and Health Program</p>	<p>Pre-job briefing. Lockout/Tagout Red Lock Program (Course 29200)</p>
<p>Mobilization/De-mobilization (Laborers-general field awareness) Biological hazards</p>	<p>Potential for health problems/ injury/death from Wildlife, Hantavirus, ticks, insects, snakes, and blood borne pathogens</p>	<p>Look for and avoid rodent droppings and nests. If droppings or nests must be disturbed to complete work, notify the facility manager (FM) and/or KSL for disinfecting. All personnel will be informed to avoid animals (dead or alive) and all liquids from unknown animals. If exposure is suspected medical attention is required as soon as possible. Report all dead animals to EM&R (607-6211). All personnel need to be alert for and cautious of aggressive wildlife such as fire-displaced bears or mountain lions. Workers will not approach potentially dangerous wildlife. Workers will not to not run from or turn their backs on aggressive wildlife and to muster in a safe place, if possible and call for reinforcements. All personnel who encounter blood or other potentially infectious material from other persons must be medically monitored according to BBP or Potentially Infectious Materials. Field team members will observe/monitor each other for signs of heat stress. Provide personnel shelter from weather extremes. Contact with poison ivy and stinging nettles is possible in forested areas and in wetlands. Personnel will be instructed to wear long trousers, sleeved shirts, and work gloves. Washing soon after exposure may lessen the symptoms of poison ivy exposure</p>	<p>ISD101-15.0 (Biological Safety) Daily Tailgate Safety Meeting form TPMC Bloodborne Pathogen ECP</p>	<p>First Aid and CPR TPMC Bloodborne Pathogens ECP training</p>
<p>Mobilization/De-mobilization (Laborers-general field awareness) Physiological hazards: Heat stress, sunburn, skin dermatitis.</p>	<p>Potential for injury from heat exhaustion, poison ivy and other related ailments.</p>	<p>Field team members will observe/monitor each other for signs of heat stress. Provide personnel shelter from weather extremes. Contact with poison ivy and stinging nettles is possible in forested areas and in wetlands. Personnel will be instructed to wear long trousers, sleeved shirts, and work gloves. Washing soon after exposure may lessen the symptoms of poison ivy exposure</p>	<p>LIR 402-820-01.1 (Noise & Temperature Stress) TPMC Health and Safety Plan.</p>	<p>Daily Tailgate Safety Meeting form</p>

IWD - PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Mobilization/De-mobilization (Laborers-general field awareness) Cold weather	Hypothermia, cold stress	Use the buddy system. Dress properly and for the weather Several thinner layers of clothing are better than one heavy layer. Avoid getting your skin or clothing wet. Take breaks as necessary to stay warm. Consult ES&H REP. about the need for additional protective measures and protocols if air temperature is below 45 °F. ES&H REP. will follow ACGIH guidelines for cold stress to the degree warranted by the prevailing weather conditions.	Current ACGIH TLY booklet LIR 402-820-01 Noise and Temperature Stresses	Complete CT-ITS Thermal Stress Awareness self-study course (#18649), or equivalent information in briefing.
Mobilization/Demobilization (hauling a trailer)	Mishap while towing a trailer	Ensure that the brake, tail lights, 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 with 2-way radio when backing-up, if rear view is obscured. Use a spotter when backing or staging trailer to work location. Block tires and set stabilizer jacks after relocating.	LIR 402-1320-01 Vehicle and Pedestrian Safety.	Valid and current driver license for the type of vehicle driven.
Mobilization/Demobilization (parking a trailer)	Trailer moves or runs away.	Block tires and set stabilizer jacks after relocating.	LIR402-1320.01 Vehicle and Pedestrian Safety.	none
Mobilization/Demobilization (unloading heavy equipment from trailer)	Heavy Equipment tips off of trailer	Offload equipment from trailer in a safe and controlled manner. Use spotters to help direct the operator while driving equipment off the trailer. Remove all unauthorized personnel from the off-loading area. Maintain safe distance of 15 feet for transit operations with no load and boom lowered.	none	none
Mobilization/Demobilization (moving drill rigs and other "tall equipment")	Death or serious injury from getting too close to a power line during transit	Designate a qualified person to act as a spotter and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means..	ERR-402-600-01 Electrical Safety. TSUM-170 CA# 11/07/07	Pre-job briefing. Letter from employer stating that spotter is qualified.

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Heavy Equipment Operation (Forklift)	Forklift Operation, Accident or Injury	<p>Be familiar with operation and function of all controls and instruments before using the vehicle. 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 falling loads caused by:</p> <ul style="list-style-type: none"> Overloading, unbalanced loading, or other improper loading, 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, Driving the vehicle at excessive speed, and using equipment for a purpose for which it was neither intended nor designed, Use personal restraint devices, including seatbelts, if provided, Do not use forklifts to create temporary work surfaces or shelving (e.g., backfilling), Do not lift or transport personnel. <p>See requirements for refueling listed under "Equipment inspection, maintenance, and refueling."</p>	<p>Letter from Employer stating that operator is qualified</p> <p><u>ISD 101-4.0 Forklift and Powered Industrial Trucks</u></p>	<p>Operator must be trained and licensed for the equipment he/she will be operating</p> <p>LANL Forklift Qualified Operator not required since LANS employees will not operate fork lift under this IWD.</p>
Heavy Equipment operation (all equipment)	Excessive noise exposure; hearing loss	<p>Participate in the TPMC's Hearing Conservation Program if the noise exposure is at or above the action level 82 dBA TWA. The Hearing Conservation Program includes baseline and annual audiograms, evaluation and training.</p> <p>Notify the ES&H REP. of any areas with excessive noise levels (noise levels in the work area that requires workers to raise their voices when speaking).</p>	<p>TPMC's Hearing Conservation Program Manufacturer's specification</p> <p>LJR 402-1000-01, Personal Protective Equipment.</p> <p>LJR 402-820-01 Noise and Temperature Stresses</p> <p>TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p>	<p>TPMC's PPE training or equivalent.</p> <p>TPMC's Hearing Conservation training or equivalent.</p> <p>LANL Hearing Conservation program does not apply since LANS employees will work to their own IWD.</p>
Heavy Equipment operation (all equipment)	Heavy Equipment Operation (Bobcat, Backhoe, or small front end loader)	<p>Be observant as to your location with respect to heavy equipment.</p> <p>.Make eye contact with operator to be sure you are seen before entering work area on foot.</p> <p>Ensure a spotter is used when heavy equipment is backing up.</p>	<p>29 CFR 1926.601 Motor Vehicles, CFR 1926.602 Material Handling Equipment</p>	<p>None</p>

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Fall from equipment	<p>Ensure that the spotter is visible and wearing high visibility clothing. Maintain daily equipment inspection forms on site.</p> <p>Maintain three-point contact when using equipment steps to enter/exit cab.</p> <p>Be aware of clearance distance to ground and terrain before exiting from cab.</p> <p>Work on unprotected elevated surfaces (6 feet or more above next level) without fall protection is NOT ALLOWED without additional IWD controls.</p>	<p>Manufacturer's Specification.</p> <p>Daily Tailgate Safety Meeting form</p>	Qualified Operator
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Equipment rollover	<p>Operator must wear seat belt at all times when operating equipment.</p> <p>Ensure all rollover protections are in place.</p> <p>Set emergency brake and use chocks when parked on an incline.</p> <p>Operate only on stable slopes within equipment limits, but not on slopes greater than 30 degrees.</p> <p>Watch for stumps, holes, other hazards.</p> <p>Turn around and look behind machine before reversing.</p> <p>Position outriggers on pads or on stable surfaces.</p>	Daily Tailgate Safety Meeting form	Qualified Operator
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Fire and spills during equipment operation (excludes refueling)	<p>Maintain operable fire extinguisher on equipment.</p> <p>Periodically inspect equipment, hoses and fittings leaks during shift.</p> <p>Watch for tree limbs, stumps, hazards that may cause hose/tank punctures. Know what is behind you when backing up. Exit equipment and inspect area before backing.</p> <p>Contact PIC/STR immediately for any fire or spill that occurs.</p> <p>Heavy equipment will have a minimum 10 BC fire extinguisher on-board.</p> <p>See "Refueling Equipment" requirements under "Equipment inspection, maintenance, and refueling" section of this IWD.</p>	Daily Tailgate Safety Meeting form	<p>LANL course #15672, Fire Extinguisher and LANL course #9893, Fire Extinguisher Hands-On</p> <p>Qualified Operator</p>

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Rolling equipment	Ensure equipment is on level ground and brake is set and/or wheels chocked prior to moving around or under equipment. <u>Insure equipment is equipped with rollover protection.</u>	Daily Tailgate Safety Meeting form	Qualified Operator
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Properly serviced and safe equipment	Equipment inspection (backup alarm, fire extinguisher, seat belts, operating turn lights, hydraulic lines, brakes, rollover protection).	Pre shift equipment inspection checklist Operators Manual Daily Tailgate Safety Meeting form	Qualified Operator
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Working near equipment with stored energy	Place equipment is in the appropriate position when not in operation to alleviate any of the stored energy. Make sure buckets are down, etc.	Operators Manual Daily Tailgate Safety Meeting form	Qualified Operator
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Crushing hazard around compacting equipment and heavy equipment	Establish and control equipment work zones. Stop work when unauthorized personnel are in the work area. Familiarize workers with operation of the equipment and safe practices. Maintain clear visibility while operating equipment. Avoid distractions (cell phone, radio) during operation. Use audible signal prior to moving equipment. Ensure backup or bi-directional alarm works or use spotter for backing up. Establish positive visual contact with nearby workers before moving. Release stored energy of the equipment prior to allowing worker to approach.	ISD101-6.0, Personal Protective Equipment (PPE) LIR402-1320-01.4; Vehicle and Pedestrian Safety Daily Tailgate Safety Meeting form	Qualified Operator General PPE discussion by safety manager, technical lead, or field team lead.
Site Preparation/Restoration (disturbing ground surface, excavating, setting grounding rods, replacing fence posts)	Disturbing buried utilities that may cause bodily harm or equipment damage.	Confirm excavation permit and utility locates are current. If utilities are located within area to be excavated, insure utility shutoff is located and potholing is conducted prior to initiating excavation operations.	ISD101-17.0 (Excavation Soil Disturbance Permit Process) Excavation Permit Daily Tailgate Safety Meeting form	LANL course #31419, Excavation/Soil Disturbance Process (annual refresher required) Qualified Operator

IWD - PART I (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Site Preparation/Restoration (clearing vegetation)	Injury from operation of a weed wacker	<p>Inspect equipment before use. If equipment does not pass inspection, then either remove it from the site or tag "Do Not Use".</p> <p>Inspect area to be cut; remove objects that could become projectiles.</p> <p>Verify that a weed wacker can be safely operated at the location.</p> <p>Operate machinery in accordance with manufacturer's instructions.</p> <p>Do not remove guards or disable safety features.</p> <p>Wear safety glasses w/ <u>side shields</u>, face shield and safety toe shoes.</p> <p>Keep bystanders away from cutting blades or monofilament line.</p> <p>Keep them to wear safety glasses w/ <u>side shields</u> w/ side shields.</p> <p>Obtain an excavation/soil disturbance permit prior to commencing the activity. Excavation permit is located at this link: http://int.lanl.gov/safety/sdr/.</p> <p>See the "heavy equipment operation" section of this IWD.</p>	<p>LIR 402-1000-01 Personal Protective Equipment.</p> <p>TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p> <p>10/11/07 COA 117147</p> <p>Excavation Permit</p>	<p>TPMC's PPE training or equivalent.</p> <p>Pre-job briefing.</p>
Setting up and use of the lined retention pond (cuttings pit):	Excavation Permit Requirement		Excavation/Soil Disturbance (LANL Course No. 31419)	
Setting up and use of the lined retention pond (cuttings pit): Excavating the 6' deep cuttings pit and adding 2' berm.	Heavy Equipment Use			
Setting up and use of the lined retention pond (cuttings pit): Excavating the 6' deep cuttings pit and adding 2' berm.	Entering the excavation	Entering the excavation is prohibited.		
Setting up and use of the lined retention pond (cuttings pit):	Use of ladder	Do not use top step on ladder Set ladder on stable ground. If ladder is leaned against another structure; a spotter will brace the bottom of the ladder. Maintain three points of contact while on the ladder. A tailgate briefing shall be performed on ladder safety prior to use.	TPMC Ladder Training or equivalent	

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
<p>Setting up and use of the lined retention pond (cuttings pit):</p> <p>Handling the liner</p>	<p>Back Injury</p>	<p>Use mechanical lift assist equipment when practical. Repackage to reduce weight and/or bulk.</p> <p>Evaluate the load location and weight to determine if the load can be lifted safely. Ensure path of travel is clear.</p> <p>Use a wide balanced stance.</p> <p>Keep item being lifted as close to the body as possible.</p> <p>Keep lower back in normal arched position.</p> <p>Keep head and shoulders up as the lifting motion begins.</p> <p>Lift with legs and stand up in a smooth, even motion.</p> <p>Avoid twisting at the waist.</p> <p>When practical, use two (or more) people to lift and carry loads >50lbs or loads that are bulky or awkward.</p>		
<p>Setting up and use of the lined retention pond (cuttings pit)</p> <p>Cutting the liner:</p>	<p>Sharp Edges and Points(Custom Entry)</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>LIR 402-1000-01 Personal Protective Equipment</p>	<p>Pre-job briefing.</p>
<p>Setting up and use of the lined retention pond (cuttings pit):</p> <p>Liner Installation</p>	<p>Falling into Excavation During Liner Installation</p>	<p>-Liner shall be unrolled manually on the ground surface and walked over the excavation using adequate personnel to safely manage the liner.</p> <p>-Care should be taken to avoid overpowering personnel on the opposite side of the plastic sheet and potentially pulling them into the excavation.</p> <p>-Avoid installing liner in high-wind conditions where control of material could be lost.</p> <p>-Maintain a safe distance from the edge of the excavation.</p> <p>-Ensure there is a means of egress from the pit (ladder or side with shallow slope).</p>		

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Setting up and use of the lined retention pond (cuttings pit)	Fall into pit at any time	<p>A floatable life ring will be readily accessible to field personnel in the case of someone falling or slipping into the lined retention pond. Orange fencing, 4' in height will be installed 6' away from the perimeter of the bermed area encircling the lined retention pond completely enclosing the lined retention pond from any access.</p> <p>A rope ladder will be readily available for the incidental case of field personnel falling or slipping into the lined retention pond</p> <p>Do not use well work-over rig or development rig as a crane!</p> <p>Pipe must be staged very near the well development/ work-over rig so that moving the pipe is essentially a vertical lift.</p> <p>Do not lift items in a manner that causes them to swing wildly.</p> <p>Maintain at least the minimum distances from power lines for stationary operations:</p> <p>Maintain the following minimum distances for transit operations with no load and boom lowered:</p> <p>For live lines rated < 50 kV, maintain a minimum distance of 4 ft between live lines and any part of equipment or load,</p> <p>For live lines rated above 50 kV and up to and including 345 kV, maintain a minimum distance of 10 ft between live lines and any part of equipment or load, and</p> <p>For live lines rated above 345 kV and up to and including 750 kV, maintain a minimum distance of 16 ft between live lines and any part of equipment or load.</p> <p>Use 2-way radios and a spotter, if clearances are close</p> <p>Level the equipment</p> <p>Set brakes 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>	None	Pre-job briefing
Setting up the air rotary drill rig and ancillary equipment (Unloading materials)	Using rig as a crane.		LIR 402-600-01 Electrical Safety.	Pre-job briefing.
Setting up the air rotary drill rig and ancillary equipment (Position rig and ancillary trailers, Level the rig and set any cribbing necessary. Set outriggers (if any).)	Improper rig setup			

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
<p>Setting up the air rotary drill rig and ancillary equipment (Unload plastic, posts, and plywood and construct secondary containments</p> <p>Cut plastic and wood for secondary containments.</p> <p>Set up containment beneath rig. Set up generators and air compressor system.)</p>	<p>Portable power tools and hand tools</p>	<p>Inspect before use</p> <p>Use tools only for their intended purpose.</p> <p>Use the tool in accordance with manufacturer's operating rules or safe practices.</p> <p>Wear required personal protective equipment (PPE), long pants and shirt with sleeves, safety glasses with side shields, leather work gloves (or equivalent), and safety toe boots; ,</p> <p>Wearing hearing protection if sound pressure level is above 85 dbA.</p> <p>Comply with applicable requirements of reference documents</p>	<p>LIR 402-1000-01, Personal Protective Equipment.</p> <p>LIR 402-600-01 Electrical Safety.</p> <p>TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p>	<p>TPMC's PPE training or equivalent.</p>
<p>Setting up the air rotary drill rig and ancillary equipment (Raise mast)</p>	<p>Failure of rig hoisting and rigging equipment</p> <p>Note: Overhead power lines addressed under "Setting up a development or work-over rig" – "Improper rig setup" for stationary ops. Overhead power lines in transit addressed under "Mobilization/Demobilization (moving drill rigs and other "tall equipment")"</p>	<p>Comply with requirements of API 8 B (current version).</p> <p>Competent person will inspect the rig each day it is used and complete the applicable portions of the IHP-OS Drilling Operations Verification Checklist, or equivalent.</p> <p>Rig shall be operated per manufacturer specifications.</p> <p>Determine the load weight prior to hoisting, and verify that the lifting equipment is rated higher than the load weight.</p> <p>Establish a cone of safety with physical barriers prior to hoisting.</p> <p>Any damage or deficiencies shall be corrected prior to hoisting.</p> <p>Personal protective equipment shall include hard hats, safety glasses w/ side shields, and safety toe boots</p> <p>Comply with requirements of reference documents.</p>	<p>Manufacturer specifications</p> <p>LIR 402- 1000-01, Personal Protective Equipment</p> <p>TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p> <p>API 8 B, Recommended Practice for Procedures for Inspections, Maintenance, Repair and Remanufacture of Hoisting Equipment, (current version).</p>	<p>TPMC's PPE training or equivalent.</p> <p>Pre-job briefing.</p> <p>Competent person designation of rig operator by employer.</p> <p>Not required: Crane Incidental Classroom Instruction (Course: 20295)</p>
<p>Setting up the air rotary drill rig and ancillary equipment (Operating the hoist)</p>	<p>Crushing hazard and rotating parts</p>	<p>Do not operate machinery without guards in place.</p> <p>Keep hands away from meshing surfaces and rotating parts.</p> <p>Wear leather gloves or equivalent.</p> <p>Do not wear rings around equipment with rotating parts.</p> <p>Wear safety toe boots.</p> <p>Keep loose clothing and hair away from rotating drill rods and other rotating objects.</p> <p>Badge lanyards, neck ties, and other items worn around the neck shall be "breakaway" style or removed. Consider arm bands for badges.</p>	<p>LIR 402-1000-01, Personal Protective Equipment.</p> <p>Employer's PPE Training or equivalent.</p>	<p>Employer's PPE Training, or equivalent</p> <p>Pre-job briefing</p>

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Setting up the air rotary drill rig and ancillary equipment (Staging materials for later use/reuse).	Unstable stacks of materials and piping	Pipe shall be stacked and blocked to prevent spreading and rolling. Avoid staging materials in close proximity to work activities where they may be knocked over or fall on personnel.	None	None
Setting up the air rotary drill rig and ancillary equipment (air compressors).	Air compressor system, compressed air tools, and hose whip	Periodically inspect all hoses, fittings, valves, safety valves and regulators. Inspect compressed air tools before the first use of the day. Assume compressors will start automatically and without warning. Do not expose body parts to compressed air. A positive means shall connect the hoses to tools. Couple hosing into place, and use whip checks to secure hose connections. Hoses shall not be used for hoisting or lowering tools. 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. Protect workers from excessive noise exposure (see controls for "Excessive noise exposure; hearing loss" under "heavy equipment operation".	Compressor manufacturer's specification. Tool manufacturer's specification.	Pre-job briefing.
Setting up the air rotary drill rig and ancillary equipment (trailer mounted generator).	Electric Shock: trailer-mounted generator	Use containment to catch small leaks of fuel or fluids from generator. Follow manufacturer's recommendations. 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. See requirements for refueling equipment listed under " <i>Equipment inspection, maintenance, and refueling</i> ".	LIR 402-600-1.3 Electrical Safety. LIR 402-860-01.1 Lockout/Tagout for Personal Safety.	Pre-job briefing.
Setting up the air rotary drill rig and ancillary equipment (general).	Damage due to high winds	If the crew shuts down due to high winds and it is safe to do so, the mast shall be lowered.	none	none
Manage Investigation Derived Waste	Containers of waste become pressurized	Keep work area free of debris that can easily blow away. Inspect drums before opening.	none	none
(Opening waste containers)		Open carefully slowly. Use drums with bung on lid. Loosen bung slowly and stand back while internal pressure is	TPMC Corporate Environmental Safety and Health Program, section 15 (PPE). LIR 402-1000-01	Pre-job briefing. TPMC's PPE training, or equivalent.

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Equipment inspection, maintenance, and refueling: (Equipment Inspection)	Fall from elevation	<p>relieved, before proceeding to open the container.</p> <p>Perform work outdoors and stay upwind of potentially pressurized containers.</p> <p>Wear safety glasses w/ side shields.</p> <p>Comply with the Boart-Longyear Fall Protection Program where free falls of 6 feet or greater are possible.</p> <p>Use man basket for work conducted on drill rig over 6 feet above the lower level.</p> <p>Man basket will be attached to drill casing and a winch line that is connected to the drill rig mast at all times.</p> <p>Rig mast repairs shall only be conducted with the mast lowered.</p> <p>Note: Fall protection controls may not be required for inspections, investigations, or assessments of workplace conditions before work begins or after work is completed.</p>	<p>Personal Protective Equipment</p> <p>TPMC Corporate Environmental Safety and Health Program</p> <p>Drilling contractor's fall protection program (Boart-Longyear)</p>	<p>Boart-Longyear Fall Protection Program Training, or equivalent on the equipment to be used.</p>
Equipment inspection, maintenance, and repair of equipment on site)	Battery charging	<p>Jump starting and charging shall be performed at least 50 feet from structures and 50 feet from any waste accumulation area, or combustibles.</p> <p>Tools and other metal objects such as watches and rings shall be kept away from the tops of uncovered batteries.</p> <p>When adding electrolyte to batteries or when handling a leaking battery, personnel shall wear the following personal protective equipment:</p> <ul style="list-style-type: none"> Acid resistant, long cuff gloves and apron. Safety glasses w/ side shields and face shield. <p>Battery charging areas shall be equipped to provide for the following:</p> <ul style="list-style-type: none"> Emergency Eye-rinse, Fire extinguisher (minimum rating 10 BC) 	<p>LJR 402-1000-01 Personal Protective Equipment.</p> <p>TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p> <p>Battery charger manufacturer's manual</p>	<p>TPMC's PPE training.</p> <p>15672 (Designated Worker and Fire Watch) and 9893 (Hands on Fire Extinguisher Training), or equivalent.</p> <p>Pre-job briefing</p>

IWD - PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site)	Use of a generator: Electric shock or fire	See Use of a generator: Electric shock or fire under General Field Work Follow manufacturer's recommendations. Routine maintenance on equipment will be provided by on-site personnel	LIR 402-1000-0 Personal Protective Equipment LIR 402-840-01, Welding, Cutting and Other Spark- or Flame-Producing Operations.	TPMC PPE training.
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site) -Grinding Operations	Grinding: sparks, rotating parts, flying debris	Spark/flame permit and approved designated area required. Inspect grinder prior to use. All guards shall be in place and no modifications shall be made. Personnel shall wear safety glasses w/ side shields and face shield, long sleeved shirt, and leather (or equivalent) gloves.. Do not mix aluminum grinding dust with iron or steel grinding dust. Such a mixture may explode. Do not exceed the maximum rated speed of grinding wheel or blade.	LIR 402-1000-0 Personal Protective Equipment LIR 402-840-01, Welding, Cutting and Other Spark- or Flame-Producing Operations. TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).	TPMC PPE training.
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site) -Controlling hazardous energy	Hazardous energy control: contractor owned Work will be conducted in compliance with LIR 402-1000-01 using trained qualified and authorized LIR personnel	In lieu of developing a formal written procedure for a one-time activity, document how hazardous energy will be isolated in logbook Repairman will collect all keys to the ignition system and put them in his pocket in lieu of lockout with a red lock. Block or Chock as necessary. Where a tag(s) cannot be attached to the energy-isolating device, the tag shall be located as close as safely possible to the device. Place tags where they are clearly visible to potential equipment users to indicate that the operation or movement of the energy-isolating device is prohibited.	TPMC Corporate Environmental Safety and Health Program LANL ISD 101-3.1	Pre-task briefing. LANL training
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site)	Maintenance: hot surfaces.	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. Where feasible, allow hot equipment to cool off before servicing it.	none	none
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site)	Fire from spark- or flame-producing operation	Complete a Spark- or Flame-Producing Operations Permit. Ensure a fire extinguisher (minimum 10 BC) (other than existing facility	LIR 402-1000-01, Personal Protective	The fire watch shall have fire extinguisher

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
(Maintenance, and repair of equipment on site)		extinguishers) is present and in working condition. Ensure that containers 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 fire watch whenever spark- or flame-producing operations are performed. Provide shielding to protect personnel in the vicinity from bright light rays or exposure to flame or sparks.	Equipment <u>LANL Spark/Flame Permit</u>	training provided by (Course #15672).
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site)	Hazardous energy control: contractor owned equipment	In lieu of developing a formal written procedure for a one-time activity, document how hazardous energy will be isolated in logbook or in tailgate safety meeting minutes. Repairman will collect all keys to the ignition system and put them in his pocket in lieu of lockout with a red lock. Block or Chock as necessary. Where a tag(s) cannot be attached to the energy-isolating device, the tag shall be located as close as safely possible to the device. Place tags where they are clearly visible to potential equipment users to indicate that the operation or movement of the energy-isolating device is prohibited.	<input type="checkbox"/> TPMC Corporate Environmental Safety and Health Program	<input type="checkbox"/> Pre-task briefing.
Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site)	Fall from equipment	See "Fall from equipment" under "Heavy Equipment operation (all equipment)"		

IWD - PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
<p>Equipment inspection, maintenance, and refueling: (Maintenance, and repair of equipment on site)</p>	<p>Welding and brazing</p>	<p>Obtain a spark-flame permit. Comply with reference documents. Inspect welding equipment before each use. Perform only within a building or approved designated 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). Be alert to areas where stagnant air movement would allow gases to accumulate and displace breathing air or create an oxygen rich atmosphere. Check electrode connections before each weld. Coiled leads should be spread out to avoid heating and damage to insulation. Ensure work piece is properly grounded. Select the correct filter lens for the welding process per AWS F2.2 Shade Selector or 29 CFR 1910.133(a)(5) (shade selection table); consult with SSO if you are unsure of the welding shade requirements for your work. Wear safety glasses with side shields when chipping slag or removing surface coatings. Wear the following (or equivalent) protective clothing to protect from heat and radiation; flame-resistant gaitlet gloves (leather or resistant material), aprons made of leather or other flame resistant material. For heavy work, fire-resistant leggings, high boots or similar protection, or safety shoes.</p>	<p>LIR 402-1000-01, Personal Protective Equipment. spark-flame permit LIR 402-840-01, Welding, Cutting and Other Spark- or Flame-Producing Operations. TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p>	<p>Complete Welding Safety Self-Study course (Course #9519), or equivalent employer training. TPMC PPE training, or equivalent.</p>

*Permit Change 2/5/06 (A). Appropriate precautions shall be taken to prevent
 Site 2/5/03 electrocution during welding - precautions may include
 ensuring a dry work area and/or selection of appropriate PPE.*

IWD - PART 1 (ACTIVITY SPECIFIC INFORMATION)

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
Equipment inspection, maintenance, and refueling: (Re-fueling)	Refueling equipment	<p>Contact ES&H REP. for assistance, as appropriate. Review the MSDS. Prevent the ignition of flammable vapors. Fire Extinguisher (20 BC) within 75' of refueling location. Shut off equipment before refueling. Use UL-listed and approved dispensing devices when flammable liquids are dispensed from drums. Fuel cans shall meet OSHA requirements (no more than 5 gallons, spring closure).</p>	TPMC's HAZCOM Program.	TPMC's HAZCOM Training or equivalent
<p>Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ES&H/S&S hazards and associated controls.</p> <p> <input checked="" type="checkbox"/> Moderate-hazard <input type="checkbox"/> High-hazard/complex Standing <input checked="" type="checkbox"/> Repetitive <input type="checkbox"/> Qualified Worker </p>	<p>The RLM 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.</p> <p>Date when RLM re-approval is required <u>10/04/2009</u> Other Conditions for Re-Approval _____ Name of Primary PIC: <u>Steve Pearson</u> Name of Alternate PIC: <u>Mike Alexander</u> Name of Alternate PIC: <u>Dave Anderson</u></p>	<p>RLM (Signature / Date) Required <u>Tina Behr-Andres, 202853</u> <u>10/5/07</u></p>	<p>ANY required classification review completed, Signature/Date <u>N/A</u></p>	

CFF
 2/5/08
 10/19/07

FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

FOD must determine the facility entry and coordination requirements and identify the ESH&Q/S&S hazards and controls associated with the activity location.

FMU 8	TA 72	Bldg. N/A	Room N/A	Other Location Southern East Jemez Rd.
FOD Designated Facility Point-of-Contact	Name Lawrence Chavez	Phone 699 7606	Pager N/A	Email lvchavez@lanl.gov

Entry and Coordination Requirements (Check one or more of the following)

No entry/coordination requirements
 POTD/POTW
 Work must be scheduled
 Co-located Hazards/Concerns
 Review under AB/Safety Basis/USQ

FOD designated facility point-of-contact must sign IWD Part 3
 Check in at Start of Work
 Check in Daily
 Check out at End of Work
 Check out Daily

Work-Area Training Required
 Escort Required
 Quality Issues
 Other Bounding Conditions

Security Clearance Requirements
 Other Security Requirements

Additional Comments: All work must be approved by the Utilities FOD or OM. POD - 1:00pm Mon. thru Friday, POW - 1:00pm Thursday, location is TA-03-223 or 1437. No Smoking around Natural Gas Systems. Be aware of wild life in area.

Be aware of slippery ground (snow, ice) conditions during cold weather, wear appropriate foot wear for icy conditions.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s). Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH&Q/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards & Concerns Identify site hazards and concerns that could potentially affect the worker(s).	Work Area Hazard Present	Facility Controls/Preventive Measures/Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	Reference Documents List permits, operating manuals, and other reference procedures	Training and Qualification List training requirements
<input type="checkbox"/> No Work Area Hazards				
Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. Specify Hazard:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. Specify Hazard:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant
Activity Form

ESH&Q WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/ Concerns Identify site hazards and concerns that could potentially affect the Worker(s).	Work Area Hazard Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Facility Controls/Preventive Measures/Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	Reference Documents List permits, operating manuals, and other reference procedures	Training and Qualification List training requirements
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. <u>Specify Hazard:</u> _____	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. <u>Specify Hazard:</u> _____	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Elevated Work Surface Unprotected structures or work surfaces elevated by more than 4 feet. (Building Roof)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment. <u>Specify Hazard:</u> Close to PRS <u>Security or Other Hazard</u> <u>Specify Hazard:</u> _____	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Obtain and follow Excavation Permit requirements for soil disturbances.	ISD101-17.0	Excavation and Soil Disturbance Course.
I have confidence that the IWM process has been applied appropriately, and I approve this activity to be performed in my facility.				
FOD or Representative Approval (Signature / Z# / Date) Required <i>Sam J 10/19/07</i> Z# 186199 Date Approval Expires 10/1/08				

By signing below, I agree to the following:

- I agree to follow the work steps and implement the controls as written.
- I agree to stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and, fit to perform the work.

Worker (Signature / Z # / Date) Required <i>John White</i> 208872 10/10/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Steve Cook</i> 114967 10/10/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>David A. O'Neil</i> 223150 10/11/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>David McLeod</i> 226532 10-11-07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>John</i> 226759 10-11-07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Charles Pignatelli</i> 177916 10-11-07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>J. Shannon</i> 120686 10/11/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Raymond & Cynthia</i> 142692 10/11/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Larry R. Jones</i> 209912 10/11/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Rick Haaker</i> 114814 10/11/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Oliver Anderson</i> 096490 10/14/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Ryan A. McGill</i> 226212 10/16/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>John</i> 116843 10/17/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Thomas</i> 81579 11/3/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Paul</i> 20636 11/17/07	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>John</i> 116843 2/6/08	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>John</i> 208872 2/6/08	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>John</i> 120686 2/6/08	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>David</i> 226532 2/6/08	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>John</i> 223245 2/6/08	Worker (Signature / Z # / Date)
Worker (Signature / Z # / Date) <i>Michael</i> 226533 2/6/08	Worker (Signature / Z # / Date)

IWD - PART 1 (ACTIVITY SPECIFIC INFORMATION)

IWD # 2007-R36-phase2-WSP
Revision#: 0

Work Document

IWD # 2007-R36-phase2-WSP

TA: 99 Building: **Outdoors**

Building: **Outdoors**

Activity/Task Title: IWD for Regional and Intermediate Aquifer Well Drilling [Drilling Operations, Decontamination/Pressure Washing, Water Sampling, Borehole Geophysical Logging]

IWD for Regional and Intermediate Aquifer Well Drilling

PR ID # 07P-0110 (R-36 Specific) Work Order # 291415-01
Note: Items 1-5 and 16-17 are addressed under IWD # 2007-R36-WSP.

Activity Description/Overview

This IWD applies to drilling R-36 series of regional wells and related activities at Los Alamos National Laboratory. It includes the following work elements in bold-faced print:

1. MOBILIZATION AND DEMOBILIZATION: Activities related to transport of persons, equipment and supplies; common hazards for all tasks.
2. SITE PREPARATION RESTORATION: Activities related to vegetation removal includes inspection of the site for hazards.
3. HEAVY EQUIPMENT OPERATION: Activities related to the use of forklifts, backhoe, and other heavy equipment.
4. SETTING UP AND USE OF THE LINED RETENTION POND (CUTTINGS PIT): Excavating containment structures for drilling fluid and installing liner.
5. SETTING UP THE AIR ROTARY DRILL RIG AND ANCILLARY EQUIPMENT: Multiple steps involved in setting up a drill rig, compressor, generator.
6. Reserved
7. AIR ROTARY DRILLING AND CORE SAMPLING: Drilling operations, coring, sampling cuttings and water.
8. CASING INSTALLATION AND SURFACE COMPLETION: (Well Construction includes welding/cutting casing and installation.
9. WATER SAMPLING - Collecting water samples from well or borehole using a bailer on the drill rig or pump rig wire line system, preparing samples for submittal to analytical laboratory or onsite testing, and collecting water samples from drill system discharge and cuttings pit:
10. Reserved
- 10.1 WELL DEVELOPMENT AND TESTING: Running well development tools on development rig winch line (surging, swabbing, bailing), installing and operating submersible pump, purging and water sampling.
11. Reserved
12. DOWNHOLE LOGGING: Involves trailer setup, test assembly insertion, and extraction of the test assembly.
13. Reserved
15. DECONTAMINATION / PRESSURE WASHING: Includes washing items: auger stems and split spoons.
16. EQUIPMENT INSPECTION, MAINTENANCE, AND REFUELING: Inspecting, maintaining and refueling equipment onsite.
17. CLEANUP: THE REMOVAL OF EXCESSIVE WASTE includes decontamination, storage, and mobilization.
18. SITE RESTORATION

AWJ
10/10/07

The mobilization/demobilization hazards labeled "Laborers-general field awareness" in IWD-R36-WSP apply to all tasks in this IWD, even if a hazard is not repeated. Non-LANL, subcontract employees shall comply with ISD101-12, ES&H Requirements for Subcontractors, and all health and safety policies and procedures and shall meet the training and qualification requirements either by completion of the specified training course or its equivalent. LANL employees will not work under this IWD.

IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07
IWD for Regional and Intermediate Aquifer Well Drilling

HAZWOPER work is not authorized under this IWD.

Scope/Description:

This IWD breaks each of these activities into work elements and identifies hazards and controls.

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, TLDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
7. Air Rotary Drilling and Core Sampling – (a) Moving drill pipe, tools, and casing	Back Injury from Heavy Lifting	Use two (or more) people to lift and carry loads in excess of 50 pounds (lb.); or use mechanical lift assist equipment (i.e., dolly, forklift, etc.). Lift with legs and stand up in a smooth, even motion. Avoid twisting at the waist.	LJR402-870-01.0, (Ergonomics)	Proper lift training by safety manager, technical lead, or field team lead.
7(a) Moving drill pipe, tools, and casing	Crushing hazard and rotating parts	Do not operate machinery without guards in place. Keep hands away from meshing surfaces and rotating parts. Wear leather gloves or equivalent. Do not wear rings around equipment with rotating parts. Wear safety toe boots. Keep loose clothing and hair away from rotating parts Badge lanyards, neck ties, and other items worn around the neck shall be "breakaway" style or removed.	LIR 402-1000-01, Personal Protective Equipment	TPMC PPE Training, or equivalent

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
7(a) Moving drill pipe, tools, and casing	Forklift Operation, Accident or Injury	<p>Be familiar with operation and function of all controls and instruments before using the vehicle. 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 falling loads caused by:</p> <ul style="list-style-type: none"> Overloading, unbalanced loading, or other improper loading, 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, Driving the vehicle at excessive speed, and using equipment for a purpose for which it was neither intended nor designed, Use personal restraint devices, including seatbelts, if provided, Do not use forklifts to create temporary work surfaces or shelving (e.g., backfilling), Do not lift or transport personnel. <p>See requirements for refueling listed under "Equipment inspection, maintenance, and refueling" in closely related IWD # 2007-R36-WSP</p>	<p>Letter from Employer stating that operator is qualified</p> <p><u>ISD 101-4.0 Forklift and Powered Industrial Trucks</u></p>	<p>Operator must be trained and licensed for the equipment he/she will be operating</p> <p>LANL Forklift Qualified Operator not required since LANS employees will not operate fork lift under this IWD.</p>
7(a) Moving drill pipe, tools, and casing	Heavy Equipment Operation (Bobcat, Backhoe, or small front end loader)	<p>Inspect heavy equipment upon its arrival to the site and daily prior to start of work.</p> <p>Be observant as to your location with respect to heavy equipment.</p> <p>Make eye contact with operator to be sure you are seen before entering work area on foot.</p> <p>Ensure a spotter is used when heavy equipment is backing up.</p> <p>Ensure that the spotter is visible and wearing an orange vest.</p> <p>Maintain daily equipment inspection forms on site.</p> <p>Manufacturer's Specification.</p> <p>See requirements for refueling listed under "Equipment inspection, maintenance, and refueling" in IWD # 2007-R36-WSP</p>	<p>29 CFR 1926.601 Motor Vehicles.</p> <p>29 CFR 1926.602 Material Handling Equipment.</p>	
7(a) Moving drill pipe, tools, and casing	Off-loading/loading equipment from transport vehicles	<p>Do not use the rig as a crane!</p> <p>Offload equipment from trailer in a safe and controlled manner.</p> <p>Use spotters to help direct the operator while driving equipment off the trailer.</p> <p>Use additional personnel or mechanical aids for heavy loads.</p> <p>Remove all unauthorized personnel from the offloading area.</p> <p>Pre-job briefing</p>		Pre-job briefing
7(a) Moving drill pipe, IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07 IWD for Regional and Intermediate Aquifer Well Drilling	Parked trailer: runs away	Block tires and set stabilizer jacks.	LIR402-1320.01	Pre-job briefing

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
tools, and casing		Park on level ground to the extent feasible.	Vehicle and Pedestrian Safety	Training
7(a) Moving drill pipe, tools, and casing	Trailer: towing	<p>Ensure that the brake, tail lights, and trailer brakes are functioning properly before moving the vehicle.</p> <p>Connect the trailer safety chains to the vehicle.</p> <p>Ensure that the towing vehicle and associated equipment have the rated capacity to handle the trailer.</p> <p>Use a spotter when backing or staging trailer to work location.</p> <p>Pre-job briefing.</p>	LIR 402-1320-01 Vehicle and Pedestrian Safety	Pre-job briefing
7(a) Moving drill pipe, tools, and casing	Electric Shock: trailer-mounted generator	<p>Use containment to catch small leaks of fuel or fluids from generator.</p> <p>Follow manufacturer's recommendations.</p> <p>Routine maintenance on equipment will be provided by on-site personnel.</p> <p>Non-routine maintenance will be performed by qualified electrician only.</p> <p>Ground the generator per manufacturer's specifications.</p> <p>See requirements for refueling listed under "Equipment inspection, maintenance, and refueling" in IWD # 2007-R36-WSP</p>	LIR 402-600-1.3 Electrical Safety, LIR 402-860-01.1 Lockout/Tagout for Personal Safety.	Pre-job briefing.
7(a) Moving drill pipe, tools, and casing	Pinch Points	<p>Do not operate machinery without guards in place</p> <p>Keep fingers away from pinch points</p> <p>Wear leather gloves or equivalent when pinch points are present.</p>	LIR 402-1000-01, Personal Protective Equipment	TPMC PPE training or equivalent
7(b) Making and breaking drill pipe connections and assembling and disassembling tooling	Crushing hazard and rotating parts	<p>Do not operate machinery without guards in place.</p> <p>Keep hands, loose clothing and hair away from meshing surfaces and rotating parts.</p> <p>Wear leather gloves or equivalent.</p> <p>Do not wear rings around equipment with rotating parts.</p> <p>Wear safety toe boots.</p> <p>Badge lanyards, neck ties, and other items worn around the neck shall be "breakaway" style or removed.</p> <p>Avoid un-necessary contact with skin and clothing.</p> <p>Approved safety glasses with side shields</p>	LIR 402-1000-01, Personal Protective Equipment	TPMC PPE Training, or equivalent
7(b) Making and breaking drill pipe connections and assembling and disassembling tooling	Exposure to Chemicals and Chemical Products (rod dope and lubricants)	Approved safety glasses with side shields	MSDS LIR 402-1000-01, Personal Protective Equipment	TPMC HAZCOM training and PPE training or equivalent.
7(b) Making and breaking drill pipe connections and assembling and disassembling tooling	Hoisting and rigging equipment failure	Competent person inspect the drill rig each day it is used and complete the IHP-OS Drilling Operations Verification Checklist. Drill rig shall be operated per manufacturer specifications.	TPMC HAZCOM Programs LIR 402-1000-01, Personal Protective Equipment	TPMC PPE Training, or equivalent

IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07
IWD for Regional and Intermediate Aquifer Well Drilling

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
disassembling tooling		Determine the load weight prior to hoisting, and verify that the lifting equipment is rated higher than the load weight. Establish a cone of safety with physical barriers prior to hoisting. Any damage or deficiencies shall be corrected prior to use. Personal protective equipment shall include hard hats, safety glasses with side shields, and protective footwear. Inspect hoisting and rigging hardware for counterfeit or suspected counterfeit hardware. Inspect before use	ISD 101-25.0 IHP-OS Drilling Operations Verification Checklist	
7(b) Making and breaking drill pipe connections and assembling and disassembling tooling	Portable power tools and hand tools	Use tools only for their intended purpose. Use the tool in accordance with manufacturer's operating rules or safe practices. Wear required personal protective equipment (PPE): safety glasses with side shields, leather gloves or equivalent, steel-toe boots. If sound pressure level is above 85 dBA, wear hearing protectors All power tools must be: approved by a testing group such as Underwriter's Laboratory, and either double-insulated or grounded. *	LIR 402-1000-01, Personal Protective Equipment. LIR 402-600-01 Electrical Safety. TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).	TPMC's PPE training or equivalent.
7(b) Making and breaking drill pipe connections and assembling and disassembling tooling	Injury from wrenches	When tightening threaded couplers with a wrench, ensure you have a firm grip and stable footing. Use caution and keep knuckles clear in case of wrench slipping off pipe and ensure other workers and objects are clear of work area. Inspect tools and only use tools in good working condition. Wrenches with worn jaws or damaged handle shall be taken out of service. Don't use a "cheater". Wear work gloves to protect hands.	LIR 402-1000-01, Personal Protective Equipment	TPMC's PPE training or equivalent.
7(b) Making and breaking drill pipe connections and assembling and disassembling tooling	Overhead hazard	Secure overhead objects. Prior to raising mast, inspect to ensure there are no loose tools or parts, which could fall. Determine what overhead activities are in progress before entering work area. Watch out for objects falling from mast. Wear head protection (hard hat to protect from falling objects; bump cap to protect head in limited headspace areas).	LIR 402-1000-01, Personal Protective Equipment ANSI Z89.1-1986, Protective Headwear for Industrial Workers	TPMC PPE training, or equivalent Pre-job briefing
7(b) Making and breaking drill pipe connections and assembling and	Pinch Points	Same as above		

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
disassembling tooling 7(c) Borehole Drilling	Excavation permit requirement(20.40.0)	Obtain and comply with excavation permit.	IHS-IP web-based Excavation/Soil Disturbance Permit Review Process Excavation permit No. 07X-0133	Excavation/Soil Disturbance (LANL Course No. 31419)
7(c) Borehole Drilling	Back Injury from Heavy Lifting	Same as above		
7(c) Borehole Drilling	Exposure to Chemicals and Chemical Products (rod dope and lubricants)	Avoid un-necessary contact with skin and clothing. Approved safety glasses with side shields	MSDS LIR 402-1000-01, Personal Protective Equipment TPMC HAZCOM Programs	TPMC HAZCOM training and PPE training or equivalent.
7(c) Borehole Drilling	Contractor Exposure to Excessive Noise	Conduct noise monitoring as follows: Perform noise survey to characterize operations where action levels could be exceeded. Use Noise Logging Dosimeter to conduct representative noise dosimetry when the 8-hour TWA is suspected of being greater than 82 dBA. Areas with noise levels at or above the occupational exposure limit must be posted with Noise Warning signs. Areas with excessive noise levels (noise levels in the work area that cause workers to raise their voices when speaking) must be evaluated by qualified ES&H personnel to determine the required engineering and administrative controls. Wear hearing protection if 8-hr TWA noise exposure is at or above 85dBA.	LIR 402-1000-01, Personal Protective Equipment TPMC Hearing Conservation Program 29 CFR 1910.95	TPMC PPE training or equivalent.
7(c) Borehole Drilling	Crushing hazard and rotating parts	Same as above		
7(c) Borehole Drilling	Exposure to nuisance dust	Threshold for monitoring: sustained visible dust in breathing zone. 8-Hour TWA is 3.0 mg/m ³ for respirable particulates not otherwise classified. Monitor in workers BZ to characterize exposure as necessary with MIE Model pDR-1000, Personal Data-Logging Real Time Aerosol Monitor or equivalent. Reduce dust levels by wetting soils or adding more moisture to air-stream until level is below action level.	Follow Manufacturer manuals and calibration procedures for monitoring device. ACGIH TLV booklet, current year.	

IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07
IWD for Regional and Intermediate Aquifer Well Drilling

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
7(c) Borehole Drilling	Hoisting and rigging equipment failure	Have personnel move upwind of dust generating operations to the extent feasible. If unable to maintain dust levels below 3.0mg/m3, stop work and reevaluate operations.		
7(c) Borehole Drilling	High Wind Exposure	Same as above		
7(c) Borehole Drilling	Temperature extremes/heat and cold stress	If the crew shuts down due to high winds and it is safe to do so, the mast shall be lowered.		
7(c) Borehole Drilling	Electric Shock: trailer-mounted generator	Keep work area free of debris that can easily blow away.		
7(c) Borehole Drilling	Air compressor system, compressed air tools, and hose whip	See controls for heat stress and cold weather in IWD # 2007-R36-WSP See controls for using a trailer-mounted generator under section 7(a) "Moving drill pipe, tools, and casing" of this IWD. Periodically inspect all hoses, fittings, valves, safety valves and regulators.		
7(c) Borehole Drilling	Drowning in cuttings pit	Inspect compressed air tools before the first use of the day. Assume compressors will start automatically and without warning. Do not expose body parts to compressed air. A positive means shall connect the hoses to tools. Couple hosing into place and use whip checks to secure hose connections. Hoses shall not be used for hoisting or lowering tools. 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. Protect workers from excessive noise exposure (see controls for "Excessive noise exposure; hearing loss" under "heavy equipment operation"). Do not enter the pit.	Compressor manufacturer's specification. Tool manufacturer's specification.	Pre-job briefing.
7(c) Borehole Drilling	Refueling and changing	A floatable life ring will be readily accessible to field personnel in the case of someone falling or slipping into the lined retention pond. Orange fencing, 4' in height will be installed 6' away from the perimeter of the beamed area encircling the lined retention pond completely enclosing the lined retention pond from any access. A rope ladder or similar means of egress will be readily available for the incidental case of field personnel falling or slipping into the lined retention pond. Always use the buddy system when working inside the safety fence around pits. See requirements for refueling listed under "Equipment inspection,		Pre-job briefing

IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07
IWD for Regional and Intermediate Aquifer Well Drilling

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
7(c) Borehole Drilling <i>MTP 12/4/07</i> <i>CRA 12/4/07</i>	fluids Fall from elevation <i>* see notes on 'Aerial Work Platforms' on reverse side of this page (12/4/07)</i>	maintenance, and refueling" See requirements for refueling listed under "Equipment inspection, maintenance, and refueling" in IWD # 2007-R36-WSP Comply with the Boart-Longyear Fall Protection Program where free falls of 6 feet or greater are possible. Use man basket for work conducted on drill rig over 6 feet above the lower level. Man basket will be attached to drill casing and a winch line that is connected to the drill rig mast at all times. Rig mast repairs shall only be conducted with the mast lowered. Note: Fall protection controls may not be required for inspections, investigations, or assessments of workplace conditions before work begins or after work is completed. Check LANL homepage, or contact Emergency Management and Response (7-6211), 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 Ensure a fire extinguisher (minimum 10 BC) is present and in working condition. Ensure that containers 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 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: 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. Provide shielding to protect personnel in the vicinity from bright light rays or exposure to flame or sparks. Same as above	TPMC Corporate Environmental Safety and Health Program Drilling contractor's fall protection program (Boart-Longyear)	Boart-Longyear Fall Protection Program Training, or equivalent on the equipment to be used.
7(d) Welding drill casing joints together	Fire from spark- or flame-producing operation <i>Penail change 2/5/08, see flip side. CBA 2/5/08</i>	Same as above	Spark- or Flame-Producing Operations Permit (Attachment A of LIR 402-840-01). LIR 402-1000-01, Personal Protective Equipment,	The fire watch shall have fire extinguisher training provided by PS-13 (Course #15672).
7(d) Welding drill casing joints together	Failure hoisting and rigging equipment Crushing hazard and rotating parts	Same as above		
7(d) Welding drill casing joints together	Portable power tools and hand tools	See requirements under section "7(b) Making and breaking drill pipe connections and assembling and disassembling tooling"	LIR 402-1000-01, Personal Protective	TPMC PPE training or equivalent

IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07
 IWD for Regional and Intermediate Aquifer Well Drilling

12/4/07

Additional notes for 'Aerial Work Platforms' (manlifts) usage:

- Machines manufactured & used for elevated personnel platform work shall be operated & maintained in accordance w/ manufacturer's recommendations & only by trained & qualified individuals. Training records shall be made available to contractor, upon request.
- All persons inside work platforms shall wear a full body harness attached to a designated anchor point & stand on the floor of the platform or basket only. Climbing or sitting on the guardrail or enclosure is prohibited.
- A fire extinguisher shall be provided on all such equipment.
- Lifts shall not be used as a substitute for a material hoist. Do not rig from the boom or platform.

MJR 12/4/07

1737 12/4/07

* Appropriate precautions shall be taken to prevent electrocution during welding. Precautions may include: ensuring a dry work area and/or selection of appropriate PPE.

- Same pencil change as p.17 of Phase I.

62

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
7(e) Collecting drill cuttings and water samples from drill system discharge	Drowning in cuttings pit	Same as above	Equipment	
7(e) Collecting drill cuttings and water samples from drill system discharge	Air compressor system, compressed air tools, and hose whip	Same as above		
7(e) Collecting drill cuttings and water samples from drill system discharge	Exposure to Chemicals and Chemical Products (rod dope and lubricants)	Same as above		
7(e) Collecting drill cuttings and water samples from drill system discharge	Back Injury from Heavy Lifting	Same as above		
7(f) Core sampling: Assembling and handling Core Barrel and attaching to center rod	Portable power tools and hand tools	See requirements under section "7(b) Making and breaking drill pipe connections and assembling and disassembling tooling"	LIR 402-1000-01, Personal Protective Equipment	TPMC PPE training or equivalent
	Pinch Points	See requirements under section 7(a) Moving drill pipe, tools, and casing		
	Crushing hazard and rotating parts	Same as above		
7(g) Attaching or removing center-rod; inserting or extracting core/center-rod assembly.	Back Injury from Heavy Lifting	Same as above		
	Crushing hazard and rotating parts	Same as above		
	Back Injury from Heavy Lifting	Same as above		
	Failure hoisting and rigging equipment	Same as above		
	Overhead hazard	See "Overhead hazard" under "7(b) Making and breaking drill pipe connections and assembling and disassembling tooling"		
	Unstable stacks of materials and piping	Pipe shall be stacked and blocked to prevent spreading and rolling. Avoid staging materials in close proximity to work activities where	None	None

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
8. Casing installation and surface completion (well construction) - a) Assembly and installation of stainless-steel well casing. b) Extraction and cutting steel drill casing. c) Handling and emplacement of annular fill materials (sand, grout, cement). d) Constructing concrete pad and installing bollards.	Hand tools (wrenches)	they may be knocked over or fall on personnel.		
8(a) Assembly and installation of stainless-steel well casing		When tightening threaded couplers with a wrench, ensure you have a firm grip and stable footing. Use caution and keep knuckles clear in case of wrench slipping off pipe and ensure other workers and objects are clear of work area. Inspect tools and only use tools in good working condition. Wrenches with worn jaws or damaged handle shall be taken out of service. Don not use a "cheater" Wear work gloves to protect hands. Same as above	LIR 402-1000-01, Personal Protective Equipment	
8(a) Assembly and installation of stainless-steel well casing	Back Injury from heavy lifting	Same as above		
8(a) Assembly and installation of stainless-steel well casing	Pinch Points	Same as above		
8(a) Assembly and installation of stainless-steel well casing	Hoisting and rigging equipment failure	Same as above		
8(a) Assembly and installation of stainless-steel well casing	Crushing hazard and rotating parts	Same as above		
8(a) Assembly and installation of stainless-steel well casing	Contractor Exposure to Excessive Noise	Same as above		
8(b) Extraction and cutting of carbon-steel drill casing	Using a cutting torch	Obtain and comply with spark-flame permit requirements. Perform only within a building or approved designated area. Avoid breathing the fume plume directly. Inspect fuel gas systems for leaks before each use. Select the correct filter lens for the welding process per AWS F2.2 Shade Selector; consult with SSO if you are unsure of the welding shade requirements for your work. Wear safety glasses with side shields when chipping slag or removing surface coatings. Wear the following (or equivalent) protective clothing to protect from heat and radiation: flame-resistant gauntlet gloves and apron. For heavy work, fire-resistant leggings, high boots or similar	AWS F2.2 Shade Selector 29 CFR 1910.133(a)(5) (shade selection table) ANSI Z87.1-1989 Occupational and Educational Personal Eye and Face Protection Devices LIR 402-1000-01, Personal Protective	Complete Welding Safety Self-Study course (PS-13 Course #9519), or equivalent training. TPMC's PPE training, or equivalent.

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
		<p>protection, or safety shoes.</p> <p>Whenever heavy objects are handled for overhead work, capes or shoulder covers of leather or other suitable material should be used.</p> <p>Wear safety glasses and face shield when chipping and grinding.</p> <p>Gas cylinders shall be secured in the upright position.</p> <p>When not in use:</p> <ul style="list-style-type: none"> Gas cylinder valves shall be closed. Gas shall be released from the regulator and the regulator shall be removed. Gas cylinder valve protective caps shall be installed. <p>Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high and having a fire resistance rating of at least one-half hour.</p>	<p>Equipment.</p> <p>Spark-flame Permit LIR 402-840-01, Welding, Cutting and Other Spark- or Flame- Producing Operations.</p> <p>TPMC Corporate Environmental Safety and Health Program, section 15 (PPE).</p>	
8(b) Extraction and cutting of carbon-steel drill casing	Back Injury from heavy lifting	Same as above		
8(b) Extraction and cutting of carbon-steel drill casing	Pinch Points	Same as above		
8(b) Extraction and cutting of carbon-steel drill casing	Hoisting and rigging equipment failure	Same as above		
8(b) Extraction and cutting of carbon-steel drill casing	Crushing hazard and rotating parts	Same as above		
8(b) Extraction and cutting of carbon-steel drill casing	Contractor Exposure to Excessive Noise	Same as above		
8(c) Handling and emplacement of annular fill materials	Chemicals and Chemical Products	Same as above		
8(c) Handling and emplacement of annular fill materials	Forklift Operation, Accident or Injury	Same as above		
8(c) Handling and emplacement of annular fill materials	Back Injury from heavy lifting	Same as above		

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
fill materials				
8(c) Handling and emplacement of annular fill materials	Pinch Points	Same as above		
8(c) Handling and emplacement of annular fill materials	Exposure to nuisance dust	Same as above		
8(c) Handling and emplacement of annular fill materials	Crushing hazard and rotating parts	Silica "flour" not to be used as fill material.		
8(c) Handling and emplacement of annular fill materials	Contractor Exposure to Excessive Noise	Same as above		
8(c) Handling and emplacement of annular fill materials	Hoisting and rigging equipment failure	Same as above		
8(c) Handling and emplacement of annular fill materials	Exposure to Grout	Wear safety glasses with side shields, long pants, a shirt with sleeves, and leather (or equivalent) work gloves. Keep Portland cement dry prior to use. Do not attempt to pump grout that has clots of material, which will clog hoses or nozzles. Inspect hoses and hose connections before pumping grout. Emergency eyewash shall be immediately available (within 100 feet of work area)	LIR 402-1000-01, Personal Protective Equipment TPMC HAZCOM Plan TPMC Health and Safety Plan MSDS	TPMC HAZCOM and PPE training, or equivalent
8(d) Constructing concrete pad and installing bollards	Portable power tools and hand tools	Same as above		
8(d) Constructing concrete pad and installing bollards	Back Injury from heavy lifting	Same as above		
8(d) Constructing concrete pad and installing bollards	Fire from spark- or flame-producing operation	Same as above		
9.1 WATER SAMPLING -- (a) Collecting water samples from well or borehole using a bailer on the drill rig or pump rig wire line system and preparing samples for submittal to analytical laboratory or onsite testing. (b) Collecting water samples from drill system discharge and cuttings pit.				
9.1(a). Collect water samples from well or borehole	Injury from exposure to nitric acid, chemical reagents and standard solutions	No bottles of bulk chemical reagents will be used. Chemical reagents will be packaged and used in a manner which provides no potential for employee exposure. Examples include:	LIR 402-1000-01, Personal Protective Equipment (PPE).	TPMC's HAZCOM and PPE training, or equivalent.

IWD # 2007-R36-phase2-WSP, Revision # 0, 10/10/07
IWD for Regional and Intermediate Aquifer Well Drilling

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
		Using chemically-impregnated test media such as Dip-and-Read tests where a reagent strip is dipped into the specimen to be tested and the results are interpreted by comparing the color reaction to a color chart supplied by the manufacturer of the test strip, and Emergency eye-rinse required within 100 ft of point of use of chemicals or testing reagents. Minimum PPE for using chemical reagents is safety glasses w/ <u>side shields</u> , nitrile gloves and lab coat.	TPMC's HAZCOM Program. TPMC Corporate Environmental Safety and Health Program, section 15 (PPE). MSDS for on-site	
9.1(a). Collect water samples from well or borehole	Pinch Points	Same as above		
9.1(a). Collect water samples from well or borehole	Hoisting and rigging equipment failure	Same as above		
9.1(a). Collect water samples from well or borehole	Crushing hazard and rotating parts	Same as above		
9.1(b). Collect water samples from cuttings pit	Drowning in cuttings pit	Same as above		
9.1(b). Collect water samples from cuttings pit	Falling into cuttings pit	Use long-handled sampling device to retrieve samples while maintaining a safe distance from edge of pit. Avoid slippery surfaces at edge of pit. Use buddy system whenever working inside safety fence around pit. Same as above		
9.1(b). Collect water samples from cuttings pit	Injury from exposure to chemical reagents and standard solutions	Same as above		
10.1 WELL DEVELOPMENT AND TESTING: a) Running Well Development Tools on development rig pump and transducers. c) Collecting water samples.	10.1(a) Running Well Development Tools	Back injury from heavy lifting	Same as above	Installing and operating submersible
10.1(a) Running Well Development Tools	Pinch Points	Same as above		
10.1(a) Running Well Development Tools	Hoisting and rigging equipment failure	Same as above		

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
10.1 (a) Running Well Development Tools	Crushing hazard and rotating parts	Same as above		
10.1 (a) Running Well Development Tools	Contractor Exposure to Excessive Noise	Same as above		
10.1 (a) Running Well Development Tools	Hand tools (wrenches)	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Hand tools (wrenches)	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Back Injury from heavy lifting	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Pinch Points	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Hoisting and rigging equipment failure	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Crushing hazard and rotating parts	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Exposure to hazardous energy sources	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	"Rogue" electrical wiring of high voltage equipment (submersible pump).	A LANL licensed electrician must inspect the submersible pump wiring each time it is re-wired.	TPMC Corporate Environmental Safety and Health Program	Pre-job briefing
10.1 (b) Installing and Operating Submersible Pump and Transducers	No discharge of fluids	All fluids will be contained in frac tanks until waste determinations are made.	SWPPP/NOI WCSF	Pre-job Briefing
10.1 (b) Installing and Operating Submersible Pump and Transducers	Portable power tools	Same as above		
10.1 (b) Installing and Operating Submersible Pump and Transducers	Improper lighting for nighttime work	Assure that adequate lighting is available for nighttime work during the 24-hour pump tests.		

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
10.1 (b) Installing and Operating Submersible Pump and Transducers	Emptying bailer	Use a suitable tool for tripping ball valve on bottom-filling bailers to prevent injury to fingers. Minimize splashing and wear appropriate PPE to minimize contact with water.	LJR 402-1000-01, Personal Protective Equipment	TPMC PPE Training, or equivalent
10.1 (c) Collecting water sample	Contact with water	Use caution approaching pump or bailer discharge to ensure it is safe. Minimize splashing and wear appropriate PPE to minimize contact with water.	LJR 402-1000-01, Personal Protective Equipment	TPMC PPE Training, or equivalent
10.1 (c) Collecting water sample (testing and preservation)	Injury from exposure to chemical reagents and standard solutions	Same as above		
12. DOWNHOLE LOGGING: Schlumberger contract logging operations. LANS employees who conduct geophysical logging will work to EES Division Hazard Control Plan "Control and Handling of Radioactive Sealed Sources at EES-2"				
Downhole Logging	Exposure to radiation from radiation generating device	Only personnel trained to Schlumberger's radiation program are permitted in the work area when the radioactive source is in use. The area will be posted and controlled by Schlumberger to prevent entry. Non-Schlumberger personnel will maintain "observer" status while logging operations are performed.	Schlumberger radioactive material license and procedures	Rad Worker 1 training or equivalent Schlumberger radiation worker training
	Failure of rig hoisting and rigging equipment	See "Failure of rig hoisting and rigging equipment" under "Setting up a development or work-over rig" see p 12.		
	Damage due to high winds	Same as above		
	Crushing hazard and rotating parts	Refer to controls for "Crushing hazard and rotating parts" under section 7(b) "Making and breaking drill pipe connections and assembling and disassembling tooling"	none	none
15. DECONTAMINATION/PRESSURE WASHING – a) Pressure washing large items such as casing and drill pipe, washing and brushing smaller items with detergent and rinsing with water, and dry brushing.				
15(a) Decontamination / Pressure Washing	Fire resulting from portable generator or internal combustion device.	Same as above		
	Generation of Decontamination Waste	Manage in accordance with approved Waste Characterization Strategy Form	WCSF	Pre-job briefing
	Hand tools	Same as above		
	Portable power tools	Same as above		

Work Tasks/Steps	Hazards, Concerns, and Potential Accidents/Incidents	Controls, Preventive Measures, and Bounding Conditions	Reference Documents	Training
15(a) Decontamination / Pressure Washing	Pressure washer injury	Follow manufacturers operating limits for pressure and temperature. TPMC PPE training or equivalent. Face shield, chemical gloves. (LIR 402-1000-01), Personal Protective Equipment	LIR 402-1000-01, Personal Protective Equipment	TPMC PPE training or equivalent
18. SITE RESTORATION:				
18(a). Re-grading	a) Re-grading site, backfilling cuttings pits, b) Land-application of fluids, c) Re-seeding, mulching, and placement of storm water controls Heavy Equipment Operation (Bobcat, Backhoe, or small front end loader)	Same as above		
18(b). Land Application of Fluids	Contact with fluids	Minimize splashing Wear Safety glasses with side shields and work gloves	LIR 402-1000-01, Personal Protective Equipment	TPMC PPE training or equivalent
18(c). Re-seeding, mulching, and storm water controls	Hand tools	Same as above		

Drilling Phase

Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ES&H/S&S hazards and associated controls.

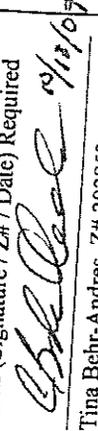
Moderate-hazard
 High-hazard/complex

Standing
 Repetitive
 Qualified Worker

The RLM 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.

Date when RLM re-approval is required __ 10/30/2009
Other Conditions for Re-Approval _____

Name of Primary PIC _____ Mark Everett
Name of Alternate PIC _____ Mike Alexander
Name of Alternate PIC _____ Dave Anderson

RLM (Signature / Z# / Date) Required
 Tina Behr-Andres, Z# 202853 12/12/07

Any required classification review completed, _____
Signature/Date _____

Changes Noted on page 8 of 16
WJR 12/21/07
CJA 12/4/07
CJA 2/15/08
K.C. HIC

FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

Rev #: _____

FOD must determine the facility entry and coordination requirements and identify the ESH&Q/S&S hazards and controls associated with the activity location.

FMU 8	TA 72	Bldg. N/A	Room N/A	Other Location Southern East Jemez Rd.
FOD Designated Facility Point-of-Contact	Name Lawrence Chavez	Phone 699 7606	Pager N/A	Email lvchavez@lani.gov

Entry and Coordination Requirements (Check one or more of the following)

- No entry/coordination requirements
- FOD designated facility point-of-contact must sign IWD Part 3
- POTD/POTW
- Work must be scheduled
- Check in at Start of Work
- Check in Daily
- Co-located Hazards/Concerns
- Check out at End of Work
- Review under AB/Safety Basis/USQ
- Check out Daily
- Work-Area Training Required
- Escort Required
- Quality Issues
- Other Bounding Conditions
- Security Clearance Requirements
- Other Security Requirements

Additional Comments: All work must be approved by the Utilities FOD or OM. POD - 1:00pm Mon. thru Friday, POW - 1:00pm Thursday, location is TA-03-223 or 1437. No Smoking around Natural Gas Systems. Be aware of wild life in area.

Be aware of slippery ground (snow, ice) conditions during cold weather, wear appropriate foot wear for icy conditions.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s). Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

Work Area Hazards & Concerns Identify site hazards and concerns that could potentially affect the worker(s).	Work Area Hazard Present	Facility Controls/Preventive Measures/Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	Reference Documents List permits, operating manuals, and other reference procedures	Training and Qualification List training requirements
<input type="checkbox"/> No Work Area Hazards				
Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. Specify Hazard: _____	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. Specify Hazard: _____	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

Rev #:

Work Area Hazards/ Concerns Identify site hazards and concerns that could potentially affect the Worker(s).	Work Area Hazard Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Facility Controls/Preventive Measures/Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	Reference Documents List permits, operating manuals, and other reference procedures	Training and Qualification List training requirements
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. <u>Specify Hazard:</u>				
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. <u>Specify Hazard:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Elevated Work Surface Unprotected structures or work surfaces elevated by more than 4 feet. (Building Roof)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment. <u>Specify Hazard:</u> Close to PRS <u>Security or Other Hazard</u> <u>Specify Hazard:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Obtain and follow Excavation Permit requirements for soil disturbances.	ISD101-17.0	Excavation and Soil Disturbance Course.

I have confidence that the IWM process has been applied appropriately, and I approve this activity to be performed in my facility.

FOD or Representative Approval
 (Signature / Z# / Date) Required Sam J 1019107 Z# 186199 Date Approval Expires 10/1/08

Form 2101

IMP 300.4

Aut 2205/ 10/19/07

IWD#: 2007-R-36 Revision #: 0

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

By signing below, I agree to the following:

- I agree to follow the work steps and implement the controls as written.
- I agree to stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and, fit to perform the work.

Worker (Signature/Z #/Date) Required <u>[Signature]</u> 136493 10/21/07	Worker (Signature/Z #/Date) <u>[Signature]</u> 223242 10/21/07
Worker (Signature/Z #/Date) <u>[Signature]</u> 116843 10/21/07	Worker (Signature/Z #/Date) <u>[Signature]</u> 226532 10/21/07
Worker (Signature/Z #/Date) <u>[Signature]</u> 142492 10/21/07	Worker (Signature/Z #/Date) <u>[Signature]</u> 082541 10/21/07
Worker (Signature/Z #/Date) <u>[Signature]</u> 209912 10/21/07	Worker (Signature/Z #/Date) <u>[Signature]</u> 120686 10/21/07
Worker (Signature/Z #/Date) <u>[Signature]</u> 226759 10/21/07	Worker (Signature/Z #/Date) <u>[Signature]</u> 223150 10/21/07
	Worker (Signature/Z #/Date) <u>[Signature]</u> 114967 10/21/07

By signing below, I verify this activity is compatible with current facility configuration and operating conditions FOD designated facility point-of-contact (Signature/Z #/Date) If required by FOD Approval of activity expires _____ Date

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
- The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers have been briefed.
- I have ensured coordination with any required FOD work-area representatives (e.g., area work coordinators).

PIC (Signature/Z #/Date) Required

Alternate PIC Signatures when PIC authority is assumed the first time (Note: alternate PICs are required to sign only once, but formal handoff and employee notification are required for each PIC change).

Alternate PIC (Signature/Z #/Date) Required	<u>[Signature]</u> 120686 10/21/07
Alternate PIC (Signature/Z #/Date) Required	<u>[Signature]</u> 096490 10/25/07
Alternate PIC (Signature/Z #/Date) Required	<u>[Signature]</u> 208877 10/25/07



IWD#: 2007-R36 Revision #: 0

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

By signing below, I agree to the following:	
<ul style="list-style-type: none"> • I agree to follow the work steps and implement the controls as written. • I agree to stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution. • I confirm that I am authorized, qualified, and, fit to perform the work. 	
Worker (Signature/Z #/Date) Required	Worker (Signature/Z #/Date)
<u>Chavira Reyes 177916 10/25/07</u>	<u>Duke McCloud 223242- 11-2-07</u>
Worker (Signature/Z #/Date)	Worker (Signature/Z #/Date)
<u>Dave Anderson 096490 10/25/07</u>	<u>Mark Maes 081579 11/3/07</u>
Worker (Signature/Z #/Date)	Worker (Signature/Z #/Date)
<u>217511 10/25/07</u>	<u>Stephen K Anderson 1085706 / 11/3/07</u>
Worker (Signature/Z #/Date)	Worker (Signature/Z #/Date)
<u>227059 11/2/07</u>	<u>11/16/07</u>
Worker (Signature/Z #/Date)	Worker (Signature/Z #/Date)
<u>223238 11/2/07</u>	<u>Mark Chubb 1226535 / 11/6/07</u>

By signing below, I verify this activity is compatible with current facility configuration and operating conditions
 FOD designated facility point-of-contact (Signature/Z #/Date) If required by FOD Approval of activity expires _____ Date

- By signing below, I have verified the following:
- I have verified authorization by ensuring approval signatures of the RLM and FOD.
 - I have jointly conducted a walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
 - The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
 - I have conducted the pre-job briefing, and all workers have been briefed.
 - I have ensured coordination with any required FOD work-area representatives (e.g., area work coordinators).

PIC (Signature/Z #/Date) Required

Alternate PIC Signatures when PIC authority is assumed the first time (Note: alternate PICs are required to sign only once, but formal handoff and employee notification are required for each PIC change).

Alternate PIC (Signature/Z #/Date) Required Mike Conroy 101789 / 11/9/07

Alternate PIC (Signature/Z #/Date) Required John Anderson

Alternate PIC (Signature/Z #/Date) Required Mark Maes 210636 11-7-07

IWD – PART 1 (ACTIVITY SPECIFIC INFORMATION)

IWD # 2007-R36-WSP-Addendum Revision#: <u>0</u>		Activity/Task Title: IWD for Regional and Intermediate Aquifer Well Drilling, Addendum [Working at Night and During Cold Weather]	
Work Document			
IWD # 2007-R36-WSP-Addendum			
TA: 99	Building: Outdoors	TA: 99	Building: Outdoors

IWD for Regional and Intermediate Aquifer Well Drilling

PR ID # 07P-0110 (R-36 Specific) Work Order # 291415-01

Note: Items 1-5 and 16-17 are addressed under IWD # 2007-R36-WSP.

Activity Description/Overview

Scope/Description:

This IWD Addendum addresses night work and cold-weather work at R-36 and other regional and intermediate drilling locations.

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, TLDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Transporting the lighting systems	Mishap while towing a trailer	See controls for "Mishap while towing a trailer" in the Mobilization / Demobilization section of IWD # 2007-R36-WSP		
Transporting the lighting systems	Death or serious injury from getting too close to a power line during transit Trailer moves or runs away.	See controls for this hazard in the Mobilization/Demobilization section of IWD # 2007-R36-WSP (moving drill rigs and other "tail equipment")		
Setting up generator/light system	Proximity to power lines	See controls for this hazard in the Mobilization/Demobilization section of IWD # 2007-R36-WSP. Maintain the following minimum distances for transit operations with no load and boom lowered: For live lines rated < 50 kV, maintain a minimum distance of 4 ft between live lines and any part of equipment or load, For live lines rated above 50 kV and up to and including 345 kV, maintain a minimum distance of 10 ft between live lines and any part of equipment or load, and For live lines rated above 345 kV and up to and including 750 kV, maintain a minimum distance of 16 ft between live lines and any part of equipment or load. Use a spotter, if clearances are close	ISD 101-13.0 Electrical Safety.	Pre-job briefing.
Setting up generator/light systems and operation around rig.	Integrated trailer-mounted generator / lighting system	Use containment to catch small leaks of fuel or fluids from generator. Follow manufacturer's recommendations. 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. If used as a 120 V/AC generator to operate power tools, each circuit must include a ground fault circuit interrupter.	ISD 101-13.0 Electrical Safety. Manufacturer's recommendations. Wiring Design and Protection: Grounding. ISD 101-13.0 Electrical Safety. TPMC Lockout/Tag out Program TPMC Corporate Environment, Safety and Health Program	Pre-job briefing.
Setting up generator/light system	Lights "blind" drivers	Set up lights in a manner that they do not shine onto roads in a way that interferes with vehicular traffic.		

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, TLDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Working at night	Alertness of workers	To the extent feasible, managers will avoid making double shift assignments or rotating schedule assignments to workers within a given week. Workers should get plenty of sleep.		
Working with a generator/light system	Inadequate illumination of work area and accessory structures	Set up at least two light systems around the drill rig location, or more so that they minimize shadows in the work area. Verify that the following minimum illumination levels are attained by taking foot-candle power reading 18 inches above the walking and working surfaces.: <ul style="list-style-type: none"> An average of five (5) footcandle power on the whole of the derrick floor, with no less than three (3) footcandle power at any point; and A minimum of three (3) footcandle 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. LANL electrician or ESO will inspect trailer wiring before connecting to generator. Illuminate sample trailer using a portable or trailer-mounted generator [see controls for Trailer-mounted generator / lighting system (above)].	Wyoming OSHA rules for Oil and Gas Drilling (Chapter 6 Section 5, Illumination Requirements) [provides more helpful intensity measurement instructions than 29 CFR 1926.56]	
Working at night under lights	Sample trailer with wiring in unknown condition			

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, TLDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Working at night under lights	General concerns	<p>Use integrated generator/light systems around the rig [they have no cords to trip over].</p> <p>Avoid looking directly into lights as it will reduce your ability to see clearly in dim lighting.</p> <p>Increase your visibility by wearing brightly colored safety vests in the drilling area.</p> <p>Observe good housekeeping practices to reduce the risk of trips and falls in the work area.</p> <p>Do a meticulous job of remove protruding roots and rocks, fill in holes and mitigate other trip hazards in the work areas.</p> <p>Work deliberately, reposition lighting systems as necessary, or use flash lights as necessary to better illuminate critical operations.</p> <p>Delay to the next day those tasks that cannot be safely performed under lights.</p>		
Working at night under lights	Power outage	<p>Flashlights will be kept in trailer, vehicles and other critical locations in case of power outage.</p> <p>Use flashlights to get around site, as necessary during power outage.</p> <p>Shutdown the rig and ancillary equipment.</p> <p>Restore lighting before resuming drilling and other site operations.</p> <p>If unable to restore lighting then leave the site until daylight.</p> <p>Make sure that lights are functional.</p> <p>Only operate in the well illuminated areas.</p> <p>Have workers wear reflective or high-visibility vests.</p>		
Working at night under lights	Operating forklift or heavy equipment at night			
Refueling generators, light plants and combustion heaters	Fire or injury	<p>See requirements for "Refueling" in the "Equipment Inspection, Maintenance, and Refueling" section of # 2007-R36-WSP.</p>		
Working in Cold Weather	Ice and water on work surfaces	<p>Make sure that mist discharge from rig is pointed into pit.</p> <p>Use hand tools as necessary to eliminate ice accumulations from work and walking surfaces.</p> <p>Use sand, rock salt or an approved non-hazardous de-icer on critical work surfaces (including water-truck deck, driller's platform, sampling area around pit berm, steps) and other locations where injury or slips could reasonably be anticipated.</p> <p>Avoid spills of fluids on work surfaces.</p>		

IWD # 2007-R36-WSP, Addendum, 11/06/2007
IWD for Regional and Intermediate Aquifer Well Drilling [Working at Night and During Cold Weather]

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, TLDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
Working in Cold Weather	Hypothermia and frostbite	<p>Keep power cords and connectors dry.</p> <p>Use the buddy system.</p> <p>Dress properly and for the weather</p> <p>Several thinner layers of clothing are better than one heavy layer.</p> <p>Avoid getting your skin or clothing wet.</p> <p>Take breaks as necessary to stay warm.</p> <p>Consult ES&H REP. about the need for additional protective measures and protocols if air temperature is below 45 °F.</p> <p>ES&H REP. will follow ACGIH guidelines for cold stress to the degree warranted by the prevailing weather conditions.</p> <p>Use rain gear, if necessary to keep dry.</p>	ACGIH TLV pocketbook, current year	
Working in Cold Weather	Portable heaters	<p>All portable heaters to be either Underwriters Laboratories (UL) Listed or American Gas Association (AGA) certified.</p> <p>Only electric heaters to be used in trailers.</p> <p>Inspect each day as you would a power tool.</p> <p>Fuel-fired heaters to be used for outdoor use only and will be located 35 ft. from any combustibles.</p> <p>Spark-flame permit required for fuel-fired (flame-producing) heaters. ABC fire extinguisher shall be on-site and available.</p> <p>Electric heaters shall be equipped with tip-over protection, which automatically shuts the unit off when tipped from its normal position.</p> <p>Do not overload electric circuits [mostly a risk with small portable (<5 kW) generators].</p> <p>Turn-off salamanders / combustion heaters and allow to cool before refueling.</p> <p>See requirements for "Refueling" in the "Equipment Inspection, Maintenance, and Refueling" section of # 2007-R36-WSP (Phase I IWD).</p>	<p>Manufacturer's specification</p> <p>LANL LIR 402-840-01.0, Welding, Cutting, and Other Spark - or Flame-Producing Operations</p> <p>Spark-Flame Permit</p>	Fire Extinguisher - Hands-on
Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ES&H/S&S hazards and associated controls.	<p>The RLM 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.</p>			
<p>RLM (Signature / Z# / Date) Required</p> <p><i>Tina Behr-Andres</i> 11/9/07</p> <p>Tina Behr-Andres, Z# 202853</p>				

Work Tasks/Steps Identify work steps/tasks in sequencing 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, TLDs, alarms, safes, recycle, waste minimization)	Reference Documents List permits, operating manuals, security plans, and other reference procedures.	Training List training and qualification requirements.
<input checked="" type="checkbox"/> Moderate-hazard <input type="checkbox"/> High-hazard/complex Standing <input checked="" type="checkbox"/> Repetitive <input type="checkbox"/> Qualified Worker	Date when RLM re-approval is required <u>11/06/2009</u> Other Conditions for Re-Approval _____ Name of Primary PIC: Mark Everett _____ Name of Alternate PIC: Jim Thomson _____ Name of Alternate PIC: Dave Anderson _____		Any required classification review completed, _____ Signature/Date _____	

J.C.
11/19/07

Mark Everett

From: Oliver Wilton [oliverw@lanl.gov]
Sent: Friday, November 09, 2007 12:02 PM
To: Mark Everett
Subject: Re: FW:R-36 IWD Addendum Clint's comments

Mark,

IWD looks fine.

Thanks for incorporating my recommendations on illumination.

Oliver

ps... site inspection yesterday revealed an well maintained site - great housekeeping, etc.. good job!

At 11:24 AM 11/9/2007, you wrote:

Mark Everett, PG
Drilling Project Lead
EP-WSP
LANL
(505) 667-5931 (o)
(505) 231-6002 (c)

From: Clint Daymon [<mailto:cdaymon@lanl.gov>]
Sent: Thursday, November 08, 2007 3:52 PM
To: meverett@lanl.gov
Subject: IWD Addendum

Mark: I have reviewed IWD for Regional and Intermediate Aquifer Well Drilling, Addendum [Working at Night and During Cold Weather]. I have placed my comments in red and have no other questions or concerns. I approve this IWD addendum with my comments in red incorporated. Thanks!!

11/9/2007

IWD#: 2007-R36-WSP-ADDENDUM Revision #: 0 (ADDENDUM)

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

Worker (Signature/Z #/Date) Required	
<i>Charles P...</i> 177916 / 11/13/07	<i>...</i> 223150 / 11/13/07
<i>...</i> 227059 / 11/13/07	<i>...</i> 085706 / 11-14-07
<i>...</i> 26533 / 11/14/07	<i>...</i> 155270 11/14/07
<i>...</i> 106521 / 11/14/07	<i>...</i> 210656 11/17/07
<i>...</i> 206759 / 11/14/07	<i>...</i> 223842 11-18-07

By signing below, I verify this activity is compatible with current facility configuration and operating conditions
 FOD designated facility point-of-contact (Signature/Z #/Date) If required by FOD Approval of activity expires _____ Date _____

- By signing below, I have verified the following:
- I have verified authorization by ensuring approval signatures of the RLM and FOD.
 - I have jointly conducted a walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
 - The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
 - I have conducted the pre-job briefing, and all workers have been briefed.
 - I have ensured coordination with any required FOD work-area representatives (e.g., area work coordinators).

PIC (Signature/Z #/Date) Required _____

Alternate PIC Signatures when PIC authority is assumed the first time (Note: alternate PICs are required to sign only once, but formal handoff and employee notification are required for each PIC change).

Alternate PIC (Signature/Z #/Date) Required *...* 120686

Alternate PIC (Signature/Z #/Date) Required *John A. ...*

Alternate PIC (Signature/Z #/Date) Required *Max Ynaes* 081574 11/17/07

