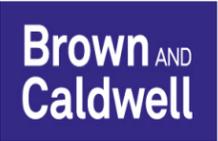


Project Risk Assessment

Document Control No.: WRA-08	Date Assessment Completed: Updated 8/9/2010	Location: Yerington Mine Site	
Project Name: Process Area Investigations	Project Description: Remedial investigations and removal actions in the Process Areas of the Yerington Mine, including soil, groundwater, radiological and other investigations.	Risk Assessment Leader: Penny Bassett	
		Risk Assessment Team: WRA Reviewed & Authorized to Proceed: SIMOPS: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Designated PIC: To be determined	

Work Plan (List Project Steps) List the jobs required to complete the project scope in the sequence they are carried out.	Any tools or heavy equipment needed? If YES, What Type	Is this a SIMOP? If YES, Include in Mitigation Plan.	Do any of the Golden Rules of Safety apply? If YES, Which of the 8?	Which of the 8 energy or biological root sources could possibly be involved in this job?	What would be the result of exposure to a biological or energy source? (e.g., Bites, Slips, trips, falls, exposures, electrocution, injury, death, etc.); and How, where, or when could an uncontrolled release or unwanted contact with a biological or energy source? Note: Humans are biological sources, and their physical abilities, competency, and training should also be considered here.	Environmental Impacts Could there be a release to the air, soil or water, and/or, will a waste be generated? If YES, What?	Pre-Mitigation Risk Evaluation				Permit(s) Required? If YES, What kind?	Energy / Biological / Waste Management Plan List control measures required to eliminate, control, or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Hierarchy of Controls: Elimination, Substitution, Isolation, Engineering/ Administrative, PPE	Who is responsible for Hazard Mitigation? Name or Title	Post-Mitigation Risk Evaluation			
							Frequency	Consequence	Likelihood	Risk Score				Frequency	Consequence	Likelihood	Risk Score
Process Areas General Hazards (Buildings, Tanks, Equipment) Consists of numerous buildings in various stages of disrepair, areas where buildings have been dismantled leaving exposed unprotected basement, process tanks and piping, fuel tanks, contaminated soil/materials (metals, hydrocarbons, radiological), active and inactive electrical systems (overhead power lines, building power systems, substation, transformers).	NA for Site	No	No	Motion	1) Driving... Areas of unprotected berms, washed out roadways, and obstacles/debris in roadways can cause damage to vehicles or loss of control. 2) Trip/Fall... Uneven walking surfaces, debris in work areas, sloped embankments, slippery (icy or muddy) surfaces can cause trip/fall hazards. 3) Wind and loose building parts or debris... Wind storms can pick up and throw debris such as building siding or plastic sheeting causing injury or damage. Unsecured doors and sheet metal on buildings can be blown around by wind causing damage to nearby equipment.		Frequent Exposure	Serious Consequence	Unusual but possible	Substantial Risk		1) Driving... Establish a sitewide speed limit of 25 mph, identify areas as primary roadways that are maintained regularly, other hazard areas should be marked when working there. 2) Trip/Fall... Remove or mark tripping hazards in work area, discuss routinely in morning safety meetings. 3) Wind and loose building parts or debris... Modify work task/schedule if wind creates hazardous condition; plan ahead by securely anchoring items that can be blown by wind (shade canopy, folding chair).		Frequent Exposure	Serious Consequence	Remotely possible	Low Risk
					Occasional Exposure		Disastrous Consequence	Unusual but possible	High Risk	Unusual Exposure				Serious Consequence	Remotely possible	Minimal Risk	
					Rare Exposure		Very Serious Consequence	Unusual but possible	Low Risk	Rare Exposure				Important Consequence	Remotely possible	Minimal Risk	
					Rare Exposure		Serious Consequence	Remotely possible	Minimal Risk	Very Rare Exposure				Important Consequence	Conceivable but unlikely	Minimal Risk	
					Rare Exposure		Serious Consequence	Remotely possible	Minimal Risk	Rare Exposure				Important Consequence	Remotely possible	Minimal Risk	
1. Radiological Soil Removal Action - Excavate select areas to 2 or 3 ft depth - Short haul to temporary stockpile area (Dump Leach Surge Pond) - Load to highway haul trucks - Haul to landfill for off-site disposal - Berm, backfill or otherwise protect open excavations	Excavator, dump truck, haul truck	Yes	Yes Permit to Work Ground Disturbance Driving Safety	Radiation Motion Gravity Chemical Biological	Radiation - Purpose of work is to remove radiation contaminated soil, potential exposure to low level alpha & gamma radiation sources; inhalation hazard. Motion - Use of heavy equipment for excavation and hauling of soil, potential for contact with persons or other equipment. Gravity - Open excavations; potential for workers or vehicles to fall into unprotected open excavations (2-3 ft deep). Chemical - Potential to strike or expose old process pipelines that may have chemical residues; dust from excavation may be elevated in metal or chemical contaminants. Biological - Potential for snakes, scorpions or stinging insects. Electrical - There are no know underground electrical lines in the work area but there is potential to encounter an unknown electrical line or to strike an overhead electrical line in certain areas.	Yes Rad/metal contaminated dust can migrate off-site, trucks can track contaminated soil onto public highways.	Continuous Exposure	Disastrous Consequence	Unusual but possible	Very High Risk	Yes Ground Disturbance	Radiation - External dose monitoring for workers (dosimeter badge); air monitoring and dust mitigation measures; equipment and personnel decontamination procedures. Motion - Restrict ground workers around heavy equipment; operators must be qualified and competent; equipment inspections; selection of proper equipment for the task; develop communication procedure when approaching heavy equipment. Gravity - Install warnings, protective barriers or other protection around open excavations; workers should not enter excavations unless inspected by a competent person. Chemical - Follow ground disturbance procedures to identify potential underground utilities, follow ground disturbance permitting procedures; implement air monitoring during work activities; implement dust control measures. Biological - Train personnel on biological hazards and what to watch for; wear gloves during manual handling of debris or work materials. Electrical - Scan area for potential electrical lines; do not work under live overhead power lines; follow GD permit procedures.	Removal Contractor Supervisor and operators	Continuous Exposure	Very Serious Consequence	Remotely possible	Substantial Risk

Project Risk Assessment

Work Plan (List Project Steps) List the jobs required to complete the project scope in the sequence they are carried out.	Any tools or heavy equipment needed? If YES, What Type	Is this a SIMOP? If YES, Include in Mitigation Plan.	Do any of the Golden Rules of Safety apply? If YES, Which of the 8?	Which of the 8 energy or biological root sources could possibly be involved in this job?	What would be the result of exposure to a biological or energy source? (e.g., Bites, Slips, trips, falls, exposures, electrocution, injury, death, etc.); and How, where, or when could an uncontrolled release or unwanted contact with a biological or energy source? Note: Humans are biological sources, and their physical abilities, competency, and training should also be considered here.	Environmental Impacts Could there be a release to the air, soil or water, and or, will a waste be generated? If YES, What?	Pre-Mitigation Risk Evaluation				Permit(s) Required? If YES, What kind?	Energy / Biological / Waste Management Plan List control measures required to eliminate, control, or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Hierarchy of Controls: Elimination, Substitution, Isolation, Engineering/ Administrative, PPE	Who is responsible for Hazard Mitigation? Name or Title	Post-Mitigation Risk Evaluation				
							Frequency	Consequence	Likelihood	Risk Score				Frequency	Consequence	Likelihood	Risk Score	
2. Vadose zone investigation: Sub-surface utility and dry well investigation (geophysical survey) - Electromagnetic and ground penetrating radar (GPR) survey done on ground surface for pipelines and dry wells - Insertion of micro-transmitter into accessible pipelines and detection on surface with a paired receiver and video camera survey of same accessible pipelines	Yes Handheld or buggy mounted survey tools; fiberglass probe for insertion into pipes.	No	No	Motion Chemical Biological Other	Motion/gravity - Walking/tripping hazard of uneven terrain and substantial demolition debris on ground surface; potential falling hazard around unprotected basements or steep slopes. Chemical/biological - Unknown chemicals or sewage waste may be present inside the pipelines, workers and equipment could come in contact with this during the down-pipe transmitter survey. Biological - High probability for the presence of insects and rodents inside vaults and pipelines, potential for spider bites, stings, exposure to animal feces or animal carcasses. Other - Potential to encounter permit and non-permit required confined spaces in vault boxes, sewer manholes, pipe tunnels or other confined areas; these confined spaces have potential for hazardous atmosphere or entrapment due to configuration.	No	Continuous Exposure	Serious Consequence	Unusual but possible	High Risk	No	Motion/gravity - Training for workers to be aware of this hazard and that they should avoid walking on debris, wear ankle supportive boots, select appropriate walking routes. Workers will receive training that they are not to enter basements or stand within 3' of unprotected edge. Chemical/biological - Nitrile or leather gloves will be required for handling equipment retrieved from pipeline interior surveys until equipment is inspected and deconned. Biological - Workers will receive training on insects, reptiles and other animals that are likely to be encountered and the appropriate precautions to be followed. Other - Workers will be trained to recognized confined spaces and will be instructed to not enter the space. Work is expected to be able to be done without entry into any confined spaces, if this changes then the work hazards will be reassessed and work will not proceed without authorization from ARC PM.	Spectrum Geophysics surveyor	Continuous Exposure	Important Consequence	Remotely possible	Low Risk	
3. Vadose zone investigation: Geoprobe drilling, soil core collection and lithology logging - Geoprobe drilling/core sampling for vadose zone soil samples - Continuous core collection in acetate core sleeves - Open core sleeves and log soil lithology	Yes Geoprobe drill	Yes	Yes Permit to Work Ground Disturbance	Motion Gravity Pressure Chemical Electrical	Motion - Vertical and rotational movement of drill head and hoist lines; movement of heavy equipment as positioning rigs at boreholes and raising mast; walking tripping hazards on uneven terrain. Gravity - Working under raised mast, potential for objects to fall from mast onto drillers. Pressure - Noise, hydraulic pressure, water pressure from pressure washer during equipment decon. Chemical - Potential for contact with unidentified old process pipelines with chemical residue; contact with contaminated groundwater or drilling fluids; contact with metal contaminated soils. Electrical - There are no know underground electrical lines in the work area but there is potential to encounter an unknown electrical line or to strike an overhead electrical line in certain areas.	No	Continuous Exposure	Disastrous Consequence	Unusual but possible	Very High Risk	Yes Ground Disturbance	Motion - Establish safety procedures and restricted areas for working around moving drill equipment; only trained and competent drill operators; use spotters when setting up drill and raising mast; identify trip hazards in work areas. Gravity - Daily equipment inspections. Pressure - Hearing protection; inspection of pressure hoses and air lines; whip checks; trained an competent operators on pressure washer. Chemical - Utility locating before drilling; follow ground disturbance permit procedures; wear appropriate gloves (nitrile) when handling chemicals or contaminated soil or water. Electrical - Utility locating & GD permit procedures; do not work within 25 ft of live overhead power lines.	Drilling contractor (supervisor, driller, helpers); BC field geologist	Continuous Exposure	Very Serious Consequence	Remotely possible	Substantial Risk	
4. Vadose zone investigation: Sonic drilling, zonal water sampling, soil sample collection and monitor well installation - Sonic drilling, zonal sampling and monitor well installation - Well development and sampling - Collection of soil samples for geochemical & geotechnical testing	Yes Sonic drill, development rig	Yes	Yes Permit to Work Ground Disturbance	Motion Gravity Pressure Chemical Electrical	Motion - Vertical and rotational movement of drill head and hoist lines; movement of heavy equipment as positioning rigs at boreholes and raising mast; walking tripping hazards on uneven terrain. Gravity - Working under raised mast, potential for objects to fall from mast onto drillers; potential to fall from elevated drill deck, drill equipment or support trucks. Pressure - Noise, hydraulic pressure, air or compressed gas pressure on sample pump or packer, water pressure from pressure washer during equipment decon. Chemical - Potential for contact with unidentified old process pipelines with chemical residue; contact with contaminated groundwater or drilling fluids; contact with sample preservatives (acid) and field test kit reagents; contact with metal contaminated soils. Electrical - There are no know underground electrical lines in the work area but there is potential to encounter an unknown electrical line or to strike an overhead electrical line in certain areas.	Yes Purged groundwater from wells/boreholes could be contaminated and release to soil	Continuous Exposure	Disastrous Consequence	Unusual but possible	Very High Risk	Yes Ground Disturbance	Motion - Establish safety procedures and restricted areas for working around moving drill equipment; only trained and competent drill operators; use spotters when setting up drill and raising mast; identify trip hazards in work areas. Gravity - Daily equipment inspections; use of railings on drill deck and stairs; fall protection and working at heights permit if no other protection available. Pressure - Hearing protection; inspection of pressure hoses and air lines; whip checks; trained an competent operators on air compressor and pressure washer. Chemical - Utility locating before drilling; follow ground disturbance permit procedures; wear appropriate gloves (nitrile) when handling chemicals or contaminated soil or water. Electrical - Utility locating & GD permit procedures; do not work within 25 ft of live overhead power lines.	Drilling contractor (supervisor, driller, helpers); BC field geologist	Continuous Exposure	Very Serious Consequence	Remotely possible	Substantial Risk	
																	Minimal Risk	
																		Minimal Risk