# APPENDIX A

# HEALTH AND SAFETY SOPs

# 1. HEAT STRESS PREVENTION AND MONITORING

## 1.1 Hazard

Heat stress may occur at any time work is being performed at elevated temperatures. Wearing chemical-protective clothing in most cases results in a decrease of natural body heat loss and increases the risk of heat stress.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur, with symptoms ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration or dexterity) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventative measures are vital to ensure safe working conditions.

## 1.2 Recognition and Risk Assessment

In the planning stages of a project, the potential for heat stress disorders must be considered as physical hazards in the site-specific HSP. Risk assessment can be accomplished in the development stages of a project by listing in the HSP the most likely heat stress disorders that may occur. The true determination of risk must often be made on-site by the Site Health and Safety Coordinator (SSO). It is important that the SSO be alert to these hazards, does not take them simply as a matter of fact, and has time to notice them. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Four common heat stress disorders and their associated prevention and treatment methods are identified below.

### 1.2.1 Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

Symptoms - Red, hot, dry skin, although a person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; unconsciousness or coma.

Treatment - Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool, but not cold water; sponge the body with cool water or pour water on the body to reduce the temperature to a safe level (less than 102°F). Monitor the victim's vital signs and obtain immediate medical help. Do not give coffee, tea, or alcoholic beverages.

### 1.2.2 Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms - Pale, clammy, moist skin; profuse perspiration; and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

Treatment - Remove the person to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a head-low (shock prevention) position, and provide rest. Consult a physician, especially in severe cases. Have patient drink one to two cups of water immediately, and every 20 minutes thereafter until symptoms subside.

### 1.2.3 Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue causing cramping.

Symptoms - Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

Treatment - Remove the victim to a cool area and loosen clothing. Have the patient drink one to two cups of lightly salted water or diluted commercial electrolyte solution immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery (i.e., Gatorade, Quench, etc.); however, it is best to double the amount of water required by package directions and/or add water to the liquid form.

### 1.2.4 Heat Rash

Heat rash is caused by continuous exposure to heat and humid air, and is aggravated by chafing clothes. The condition decreases the ability to tolerate heat and can be extremely uncomfortable.

Symptoms - Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment - Decrease the amount of time in protective gear and provide body powder to help absorb moisture and decrease chafing.

## 1.3 Prevention and Protection Programs

### 1.3.1 General Prevention Programs

Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventative heat stress management such as in the following:

Have workers drink 16 ounces of water before beginning work, at established breaks and in the morning or after lunch. The body's normal thirst mechanism is not sensitive enough to ensure body fluid replacement; therefore, pre- and post-work loading is necessary. Under heavy work and hot conditions the body may lose up to 2 gallons of body fluids per day. In order to prevent heat stress conditions, the individual must ensure replacement of this moisture.

Provide disposable 4-ounce cups, and water that is maintained at 50 to 60°F. Urge workers to drink one to two of these cups of water every 20 minutes, for a total of I to 2 gallons per day. Provide a cool, shaded area for rest breaks. Discourage the intake of coffee during working hours. Monitor for signs of heat stress.

Ensure that all workers maintain a good diet during these periods. In most cases, a balanced diet and lightly salting foods should be the only requirement to maintain the body's electrolyte balance.

If utilizing commercial electrolyte mixes, double the amount of water called for in the directions. Indications are that "foil-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.

Provide various fruits for workers as snacks. Bananas are especially good at maintaining the body's potassium level.

Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities.

Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

In extremely hot weather, conduct field activities in the early morning and evening.

Ensure that adequate shelter is available to protect personnel against heat and direct sunlight, which can decrease physical efficiency and increase the probability of heat stress. If possible, set up the command post in the shade.

In hot weather, rotate shifts of workers wearing impervious clothing.

Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

### 1.3.2 Heat Stress Monitoring and Work Cycle Management

For strenuous field activities that are part of ongoing site work activities in hot weather, the following guidelines should be used to monitor the body's physiological response to heat and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HSP and/or Site Safety Officer if questions arise as to the need for specific heat stress monitoring. In all cases, the SSO and site personnel must be aware of the signs and symptoms of heat stress, and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate - The heart rate should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The heart rate at the beginning of the rest period should not exceed 110 beats/minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats/minute.

Measure Body Temperature - When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the resting period. If the oral temperature exceeds 99.6 °F (or 1° change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1° change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss - Body water loss greater than 1.5% of the total body weight is indicative of a heat stress condition. Body weight is measured before PPE is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale; however, it must be sensitive to 0.5-half-pound increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

Note: For the purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

### 1.3.3 Physiological Monitoring Schedule

A physiological monitoring schedule is determined by following the steps below.

1) Measure the air temperature with a standard thermometer.
2) Estimate the fraction of sunshine by judging what percent the sun is out. Refer to Table 1.
3) Calculate the adjusted temperature based on the following formula

**Adjusted Temperature = actual temperature + 13 X (fraction of the percent sunshine factor).**

4) Using Table 2 to determine the frequency of the physiological monitoring schedule for fit and acclimated workers.

The length of work period is governed by the frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature).

For example, site personnel anticipate wearing Level C during site activities. The air temperature is 80°F and it is partly cloudy. The adjusted temperature is calculated in the following manner.

Adjusted Temperature = Actual Temperature + 13 X (fraction of the percent sunshine factor). Adjusted Temperature = 80°F +13 (0.50). Adjusted Temperature = 86.5°F.

Using Table 2, the pulse rate, oral temperature, and body water loss monitoring would be conducted after each 60 minutes of work. The adjusted temperature may need to be re-determined if the percent sunshine and ambient temperature drastically change during site work.

If an individual's heart rate exceeds 110 beats/minute at the beginning of the rest period, that individual will remain on rest-time until his/her heart rate drops to baseline, and their next work period is decreased by 33%.

**Table 1**

**Percent Sunshine Factors**
**Heat Stress Prevention and Monitoring**
**SPOPSFLD05**

| Percent Sunshine (%) | Cloud Cover | Sunshine fraction |
|---|---|---|
| 100 | No cloud cover | 1.0 |
| 50 | 50% cloud cover | 0.5 |
| 0 | Full cloud cover | 0.0 |

**Table 2**

**Physiological Monitoring Schedule**
**Heat Stress Prevention and Monitoring**
**SPOPSFLD05**

| Adjusted Temperature | Level D (Permeable clothing) | Level C, B, or A (Nonpermeable clothing) |
|---|---|---|
| 90°F (32.2°C) or above | After each 45 minutes of work | After each 15 minutes of work |
| 87.5°-90°F (30.8°-32.2°C) | After each 60 minutes of work | After each 30 minutes of work |
| 82.5°-87.5° (28.1-32.2°C) | After each 90 minutes of work | After each 60 minutes of work |
| 77.5°82.5°F (25.3°-28.1°C) | After each 120 minutes of work | After each 90 minutes of work |
| 72.5°-77.5°F (22.5°-25.3 °C) | After each 150 minutes of work | After each 120 minutes of work |

## 2.0 COLD STRESS

### 2.1 Hazard

Persons working outdoors in low temperatures (normally <40°F), and especially at or below freezing, are subject to cold stress. Exposure to extreme cold for a short time can cause severe injury to the surface of the body, or result in profound generalized cooling, which, unchecked, could ultimately cause death. Areas of the body that have high surface area-to-volume ratios such as fingers, toes, and ears are the most susceptible.

Chemical-protective clothing generally does not afford protection against cold stress. In many instances, it increases susceptibility. Chemical hazard site workers must learn to dress carefully

to provide chemical protection and thermal insulation, while not dressing so warmly that exercise or strenuous activity will result in cold stress.

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core.

Loss of body heat can occur through:

1. Respiration: In extreme cold, cover the mouth and nose with wool or fur to "prewarm" the air you breathe.

2. Evaporation: Wear layered clothing, and remove outer layers prior to sweating to avoid soaking clothing. Replace layers prior to becoming chilled. Wear clothing that will "breathe" or allow water vapor to escape to reduce cooling effect of evaporation.

3. Conduction: Sitting on snow, touching cold equipment, and being rained on are examples of how heat can be lost by conduction. Extreme amounts of heat are lost rapidly when a person becomes wet. Deaths from hypothermia have occurred in immersion in water at temperatures of 40°F or lower. Perspiration or rain should never be allowed to saturate clothing; such soaking will seriously reduce the insulative properties of the clothing in addition to increasing heat loss. Most clothing loses approximately 90% of its insulative properties when wet.

4. Radiation: The greatest amounts of body heat are lost from uncovered surfaces of the body, especially the head, neck, and hands. Covering these areas is, therefore, extremely important.

5. Convection: The body continually heats a thin layer of air next to the skin. As long as this warm air is retained next to the body it will remain warm. If this warm air is removed by air currents (wind), then the body will be cooled attempting to rewarm the surface air. The primary function of clothing is to retain this warm surface layer of air, while allowing water vapor to pass through. Ensure that clothing remains secure around the body especially the neck and waist. Wind chill or equivalent chill temperature indices describe the chilling effect of moving air in combination with low temperature.

Two major factors that influence the potential of cold injury are ambient temperature and wind velocity. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. In addition, water conducts heat 240 times faster than air; thus, the body cools suddenly when protective equipment is removed if the clothing underneath is perspiration-soaked.

Tables 3 and 4 should be consulted to adjust working schedules for wind chill conditions. These tables are meant as guides only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted, as required. Workers' physical symptoms or condition will also be an indicator to modify work schedule.

## 2.2 Recognition and Risk Assessment

In the planning stages of a project and safety plan, the potential for cold stress disorders must be considered as physical hazards in the site-specific HSP. Risk assessment can be accomplished in the development stages of a project by listing in the HSP the most likely cold stress disorders that may occur. The true determination of risk must often be made on-site by the SSO. It is important that the SSO is alert to these hazards, does not take them simply as a matter of fact, and has time to notice them. Two common cold stress disorders and treatment methods are identified below.

### 2.2.1 Frost Bite

Local injury resulting from cold is included in the generic term frostbite. By definition, frostbite is the freezing of tissue; however, typically several stages are recognized based upon the degree of injury. Frostbite most commonly affects the toes, fingers, and face and occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may also result from direct exposure to extreme cold or high wind as happens with the nose, ears, and hands. Damp feet may freeze because of the conduction of heat away from the skin's surface.

Frostbite of the extremities can occur in three forms:

- Frost nip or incipient frostbite is characterized by sudden blanching or whitening of skin.
- Superficial frostbite is characterized by skin with a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient.
- Deep frostbite is characterized by tissues that are cold, pale, or darkened, and solid.

Treatment for frostbite:

- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Superficially frostbitten areas are best warmed by placing them next to warm skin. The basic tenant to rewarming frostbitten areas is to not raise the temperature much above that of the body. The abdomen and the armpit are body areas that can be used to rewarm frostbitten areas. Water at 99 to 104°F can be used. Avoid fires, hot water, and external heaters.
- Give a warm drink - water or juices, **not** coffee, tea, or alcohol. The victim must not smoke.
- If using water to rewarm the affected areas, keep the frozen parts in warm water until all paleness has turned to pink or burgundy red, but no longer. Remember, the tissue will be very painful as it thaws.
- After rewarming, elevate the injured area and protect it from injury.
- Do not allow blisters to be broken.
- Use sterile, soft, dry material to cover the injured areas.

- Keep the victim warm and obtain medical care, as necessary.
- Do **not** rub the frostbitten part (this may cause gangrene).
- Do **not** use ice, snow, gasoline, or anything cold on the frostbitten area.
- Do **not** use heat lamps or hot water bottles to rewarm the part.
- Do **not** place the part near a hot stove.

### 2.2.2 Hypothermia

Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 99°. While many hypothermia cases are caused by extremely cold temperatures, one must remember that most cases develop in air temperatures between 30 and 50°F, especially when compounded with water immersion or soaking, and windy conditions.

Symptoms of hypothermia can include one or more of the following listings. Remember that the victim of hypothermia may not know, or refuse to admit, that he or she is undergoing signs of hypothermia. All personnel must be observant for these signs for themselves and for other team members.

Uncontrolled fits of shivering. Vague, slow, slurred speech. Irrational actions. Memory lapses. Incoherence.

Fumbling hands, frequent stumbling, and lurching gait. Apathy, listlessness, and sleepiness; inability to get up after a rest. Unconsciousness, glassy stare, slow pulse, and slow respiration.

If left untreated, hypothermia can result in death.

Below the critical body core temperature of 95°F, the victim cannot produce enough body heat by himself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim can slip into hypothermia in a matter of minutes, and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold wet clothing. If necessary, based upon the victim's condition, external sources of heat (e.g., warm blankets, warm water baths, or body contact) will be necessary to rewarm the victim.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. No alcohol or caffeine.
- Keep the victim awake, monitor ABCs, perform first aid as appropriate, and obtain medical assistance as soon as possible.

## 2.3 Prevention and Protection Programs

Site workers must learn to recognize and treat the various forms of cold stress. The best approach is preventative cold stress management such as the following:

- Wear loose, layered clothing, masks, woolen scarves, and hats in extreme cold weather.
- Keep clothes dry by wearing water- and wind-resistant clothing and footwear.
- Eat well-balanced meals, ensure adequate intake of liquids, and avoid alcoholic beverages. Dehydration will increase the risk of cold stress.
- Have warm shelter available and implement work-rest schedules.
- Monitor yourself and others for changes in physical and mental conditions.
- If wearing face protector, remove periodically to check for frostbite.
- Never touch cold metal with bare hands.

The following guidelines should be used when working in air temperatures below 40°F.

- When cold surfaces below -7°C (19.4°F) are within reach, a warning should be given to each worker by the SSO to prevent inadvertent contact by bare skin.
- If the air temperature is -17.5°C (0°F) or less, the hands should be protected by mittens. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.

Provisions for additional total body protection are required if work is performed in an environment at or below 4°C (39.2°F). Workers should wear cold protective clothing appropriate for the level of cold and physical activity:

- If the air velocity at the jobsite is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.
- If only light work is involved, and if the clothing on the worker may become wet on the jobsite, the outer layer of the clothing in use may be of a type impermeable to water. With more severe work under such conditions, the outer layer should be water-repellent, and the outerwear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation to prevent wetting of inner layers by sweat. If work is done at normal temperatures or in a hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating. If clothing is wet, the employee should change into dry clothes before entering the cold. The workers should change socks and any removable felt insoles at regular daily intervals or use vapor barrier boots. The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.
- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.
- Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 4°C (39.2°F) should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

### 2.3.1 Work/Warming Regimen

If work is performed continuously in the cold at an equivalent chill temperature (ECT) or below -7°C (19.4°F), heated warming shelters, tents, cabins, rest rooms, etc., should be made available nearby. The workers should be encouraged to use these shelters at regular intervals, the frequency depending on the severity of the environmental exposure. The onsets of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation or a change of dry work clothing provided. A change of dry work clothing should be provided as necessary to prevent workers from returning to work with wet clothing. Dehydration, or the loss of body fluids, occurs insidiously in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the worksite to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effects.

For work practices at or below -12°C (10.4°F) ECT, the following should apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not *be* so high as to cause heavy sweating that will result in wet clothing; if heavy work must be done, rest periods must be taken in heated shelters and opportunity for changing into dry clothing should be provided.
- New employees should not be required to work full-time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting still or standing still for long periods is minimized. The worker should be protected from drafts to the greatest extent possible.
- The workers should be instructed in safety and health procedures. The training program should include, at a minimum, instruction in:
    - Proper rewarming procedures and appropriate first aid treatment. Proper clothing practices. Proper eating and drinking habits.
    - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
    - Safe work practices.

## 3. HEAVY LIFTING

When lifting objects, use the following proper lifting techniques:

- Keep your feet shoulder width apart to get the best footing possible.
- Bend at the knees, not at the waist.
- Tighten stomach muscles to offset the force of the load.
- Grasp the object at opposite corners.
- Lift with the legs instead of the back muscles.
- Keep the back upright and avoid twisting.
- Most importantly, think before lifting.

**Table 3**

**Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature***

| Estimated Wind Speed (mph) | Actual Temperature Reading (°F) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| | Equivalent Chill Temperature (°F) | | | | | | | | | | | |
| Calm | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| 5 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -36 | -47 | -57 | -68 |
| 10 | 40 | 28 | 16 | 4 | -9 | -24 | -33 | -46 | -58 | -70 | -83 | -95 |
| 15 | 36 | 22 | 9 | -5 | -18 | -32 | -45 | -58 | -72 | -85 | -99 | -112 |
| 20 | 32 | 18 | 4 | -10 | -25 | -39 | -53 | -67 | -82 | -96 | -110 | -121 |
| 25 | 30 | 16 | 0 | -15 | -29 | -44 | -59 | -74 | -88 | -104 | -118 | -133 |
| 30 | 28 | 13 | -2 | -18 | -33 | -48 | -63 | -79 | -94 | -109 | -125 | -140 |
| 35 | 27 | 11 | -4 | -20 | -35 | -51 | -67 | -82 | -98 | -113 | -129 | -145 |
| 40 | 26 | 10 | -6 | -21 | -37 | -53 | -69 | -85 | -100 | -116 | -132 | -148 |
| (Wind speeds greater than 40 mph have little additional effect.) | **LITTLE DANGER** In <l hour with dry skin. Maximum danger of false sense of security. | | | | **INCREASING DANGER** Danger from freezing of exposed flesh within 1 minute. | | | **GREAT DANGER** Flesh may freeze within 30 seconds. | | | | |
| | Trenchfoot and immersion foot may occur at any point on this chart. | | | | | | | | | | | |

- Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

**Table 4**

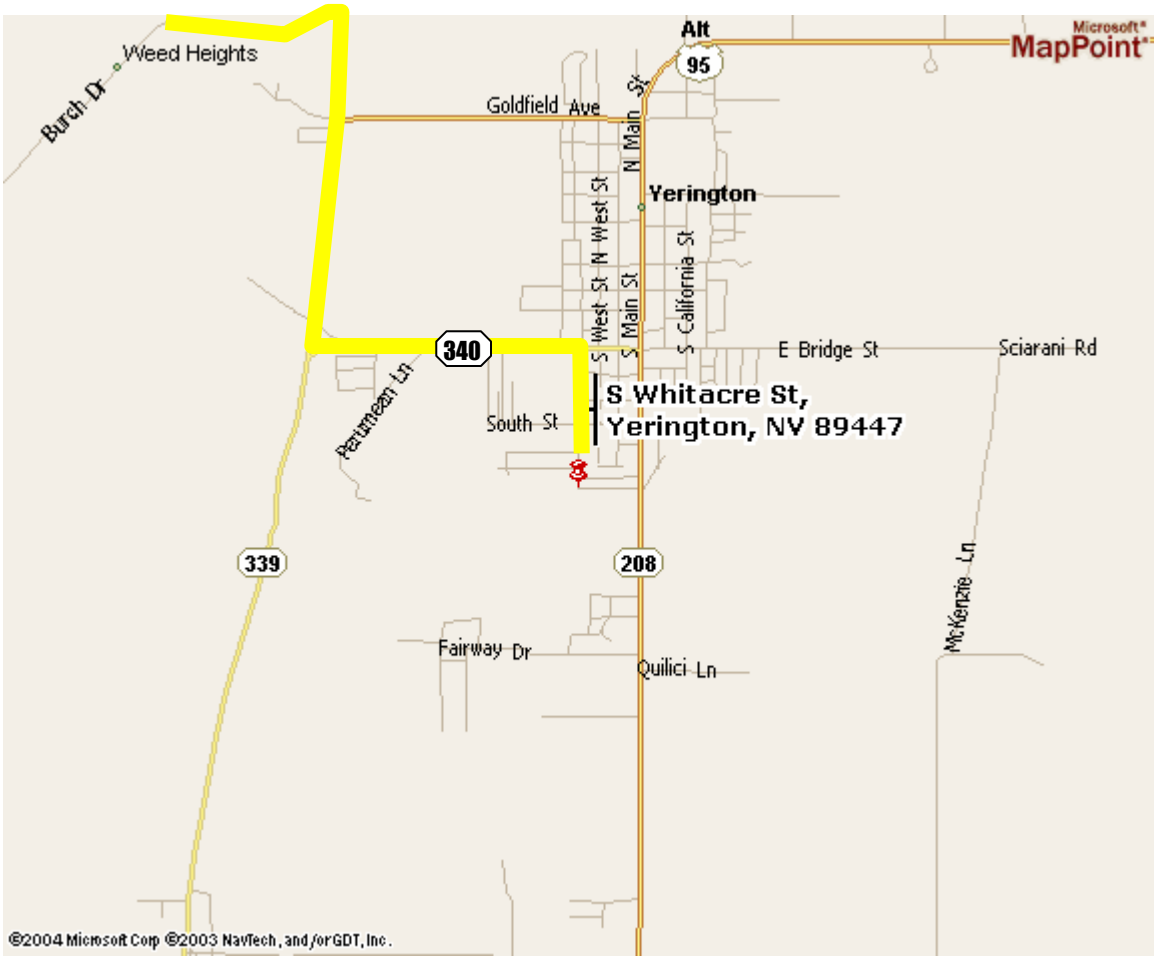
## Cold Work/Warm-up Schedule for 4-Hour Shifts

| Equivalent Chill Temperature | Maximum Work Period | No. of Breaks |
|---|---|---|
| ≥-24°F | Normal | 1 |
| -25° to -30°F | 75 minutes | 2 |
| -31° to -35°F | 55 minutes | 3 |
| -36° to -40°F | 40 minutes | 4 |
| -41° to -45°F | 30 minutes | 5 |
| ≤-46°F | Stop work | Stop work |

## APPENDIX B

## MAP OF ROUTE TO HOSPITAL

South Lyon Medical Center Hospital (Emergency Room)
213 S Whitacre St
Surprise and Whitaker Street
Yerington, NV
(775) 463-2301



## APPENDIX C

## EMERGENCY TELEPHONE NUMBERS

| Organization | Telephone |
|---|---|
| South Lyon Medical Center Hospital (Emergency Room)<br>Surprise and Whitaker Street<br>Yerington, NV | 775-463-2301 |
| Ambulance (Ground) | 911 |
| Ambulance (Helicopter) | 911 |
| Fire Department | 911 or<br>775-463-2261 |
| Police/Sheriff | 911 |
| Poison Control Center | 800-342-9293 |
| CHEMTREC (consultation on spills) | 800-424-9300 |
| National Response Center (to report a spill) | 800-424-8802 |
| Contact Telephone Numbers: | |
| Earle Dixon, BLM Project Manager | 775-885-6079 (office) |
| Gabriel Venegas, BLM Project Coordinator | 775-885-6113 (office) |
| | |
| | |
| | |
| Walker Associates, Inc. | |
| Bill Walker, Ph.D. Site Safety Officer | 916-442-5304 (office)<br>916-446-5771 (home)<br>916-716-1053 (cell) |
| Fred Mueller | 916-442-5304 (office)<br>916-395-3253 (home) |
| CRE Inc | |
| Ron Peery, P.E On-Site Project Manager | 406-665-1770 (office)<br>406-698-6465 (cell) |
| Eric Mason, E.I.T. | 406-656-1770 (office)<br>406-698-8617 (cell) |
| SRK | |
| Joe Sawyer, On-Site Project Manager | 775-463-9388 (office) |

# APPENDIX D

# WORKPLAN USED FOR DEVELOPMENT OF HASP

# Workplan used for HASP development
# Process Area at the Yerington Mine, NV

## Introduction

CRE Inc. and Walker and Associates, Inc have been contracted by the Bureau of Land Management (BLM) to conduct a radionuclide and metal survey in soils and buildings within the process area at the Yerington Mine, NV. The purpose of the survey and sampling is to provide data for the development of an expedited Health and Safety Program (HASP) such that the possible hazards at the site can be quantified and workers protected from unnecessary exposure.

The work to be conducted at the site, with some detail is outlined below.

**Work Tasks and Protocols**

**Task 1. Meeting with BLM and Site Visit.**

This task will occur immediately to allow the contractors to discuss the project in detail, exchange information and become oriented with the site. Site orientation will allow identification of various process area features and various pads and ponds that are to be sampled.

**Task 2. Site Sampling**

This task consists of the following elements:

1. **Geological reconnaissance to determine area for background measurement**. This will be based on existing site geological maps. Background should be neared in similar geologic formations as those that contain the Cu and U ores. Radiation measurements will be taken at several candidate locations. Tentative locations include:

    a. Similar granodiorite intrusions west of the mine site that are either undisturbed or minimally disturbed by mining. The GM dosimeter will be used to determine CPM and mRem/hr at a minimum of 3 locations.

    b. Areas in the town of Yerington. Since the town is situated immediately east of the mine, this will represent a reasonable location to determine ambient off-site exposure dosages.

2. **Building clearance.** Buildings possibly useful for project staging and decontamination will be identified and surveyed to ensure that radiation does not exceed background levels noted above.

3. **Gridding of site and identification of all features of interest**. A site grid, with 100 ft centers will be established in the process area. The grid will be established by finding a fixed monument at the intersection of the two roads running northeast and southwest

surrounding the process area. At the monument, GM clearance will be done and then a rope will be strung which will be marked with 100 ft lengths in the desired direction using a transit. The worker stringing the rope will be wearing a dosimeter badge to ensure that no excessively "hot" areas are encountered. At each 100 ft mark, a flag or stake will be placed and the location entered via a GPS unit. Once the rows are established the grid will be completed by adding the columns at 100 ft intervals such that perfect squares will be created with flags at each corner. Off-sites will occur and noted by GPS and site map markings. A code for each location will be used for permanent identification.

4. **Radiological survey**. After the grid is layed out, the basic radiological survey will be conducted. The GM counter and dosimeter will placed at each flagged location and the total counts per ten minutes recorded and compared to the background CPM (and mR/hr). Locations with CPM of 100 CPM above background will be noted at each location. Background CPM may range up to 200 CPM, therefore CPM of 300 or more may be considered excess radioactivity. Counts approaching 2000 CPM will require a worker to leave that location, since it approaches the 5 Rem/yr, safety standard. The basic OSHA safety standard of 5Rem/yr will be followed at the site which translates to 1.7 mRem/day allowable exposure assuming an 8 hr working period. Film badges will be worn by all personnel with a blank left at the workers lodging. In this way whole body doses can be determined for the work period of the project. All sample information will be entered in a notebook and then entered into a spread sheet

5. **Sampling** Every sample node will be sampled yielding approximately 100 to 120 samples. Each surface sample will be analyzed for:

    a. Gross alpha, beta, and gamma radiation (by ACZ labs)

    b. U and Th using a hand held XRF instrument (in the field)

    c. At each sample location the contractors will collect 500 g of sample from the 0 to 6" interval (if a location contains more than 100 CPM above background the next 6" interval will be analyzed and collected). Samples will be collected with polyethylene disposal trowels. Samples will be placed in polyethylene containers provided by ACZ Laboratories. Workers will wear nitrile gloves and dust masks which will be discarded between samples. Samples will be labeled and placed in a cooler. Workers will not eat, drink or smoke in any of the gridded sample locations. If wind generating airborne dust is present, then sampling will not occur until it has subsided.

6. **Laboratory shipment**. After each day of sampling, COCs will be filled out and the samples shipped by FedX to the laboratory.

7. **Laboratory QA/QC** – This task involves the submission and testing of NIST samples assessing overall laboratory precision and accuracy for all analytes of concern. Samples

obtained from NIST will be submitted blind to the laboratories to determine the overall capabilities of the laboratories to conduct radiological analysis.

8. **Site Data Analysis** – This task involves the incorporation of all available site data into a series of GIS files that will allow analysis of the occurrence and distribution of chemicals on site along with important structural features. The data will be analyzed to determine such things as if isotope equilibrium exists and fingerprint development for pond water and local groundwater.

**Task 3. Reporting**

1. Each week the BLM will be updated electronically with the project progress.

2. Once the laboratory data has been completed, a Final Report and HASP will be submitted to the BLM.

The contents of the plan will discuss the following:

a. Distribution of radioisotopes in the process area
b. Field dosimeter results
c. Correlation of Geiger-Mueller counter to isotope data
d. Comparison of chemical distributions to health levels established by agencies (USEPA, NRC, etc)
e. Calculation of on-site acceptable dose to off-site acceptable dose
f. Inclusion of existing site data into distribution maps
g. Hot spot identification
h. Exposures due to soil and windblown dust or evaporative salts
i. Identification of problem areas
j. Overall hazard assessment
    i. Required health and safety gear/precautions
    ii. Identification of all hazards and hazardous areas
    iii. Daily safety management, protocols and meetings
    iv. Decontamination
    v. Disposal of on-site materials
    vi. Signage
    vii. Location of first aid and hospital/medical personnel

# APPENDIX E

## DATA CURRENTLY AVAILABLE FROM SITE SAMPLING EVENTS JUNE/JULY 2004

## THIS APPENDIX WILL BE UPDATED AS REMAINING DATA BECOMES AVAIALBE

**Table E1 (page 1 of 6).** *Yerington mine radiological survey data available as of 8/6/04.*

| Sample ID | Easting m | Northing m | Date | ACZ rpt | Gross Alpha pCi/g | Gross Beta pCi/g | Solids % | Ra 226 pCi/g | Ra 228 pCi/g | Th mg/kg | U mg/kg | CPM | mR/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAG-AP1 | 309110 | 4318904 | 6/23/2004 | L46452 | 7.97 | 4.87 | 99.9 | n/a | n/a | n/a | n/a | 95 | 0.025 |
| **PAG-AP10** | **309124** | **4318884** | **6/23/2004** | **L46419** | **242** | **152** | **98.2** | **16.7** | **9.25** | **80** | **177** | **192** | **0.059** |
| PAG-AP11 | 309133 | 4318874 | 6/23/2004 | L46447 | 49.1 | 28.3 | 99.3 | n/a | n/a | n/a | n/a | 202 | 0.066 |
| PAG-AP2 | 309097 | 4318897 | 6/23/2004 | L46447 | 19.6 | 15 | 86.1 | n/a | n/a | n/a | n/a | 136 | 0.041 |
| PAG-AP3 | 309045 | 4318872 | 6/23/2004 | L46447 | 9.03 | 5.42 | 99.4 | n/a | n/a | n/a | n/a | 113 | 0.035 |
| PAG-AP4 | 309022 | 4318885 | 6/23/2004 | L46452 | 5.08 | 5.37 | 99.3 | n/a | n/a | n/a | n/a | 95 | 0.029 |
| PAG-AP5 | 309039 | 4318905 | 6/23/2004 | L46447 | 18.2 | 11.8 | 99.4 | n/a | n/a | n/a | n/a | 109 | 0.031 |
| PAG-AP6 | 309030 | 4318912 | 6/23/2004 | L46452 | 7.89 | 5.11 | 99.5 | n/a | n/a | n/a | n/a | 104 | 0.032 |
| PAG-AP7 | 309046 | 4318945 | 6/23/2004 | L46447 | 6.9 | 4.77 | 99.4 | n/a | n/a | n/a | n/a | 108 | 0.033 |
| PAG-AP8 | 309018 | 4318957 | 6/23/2004 | L46452 | 5.45 | 4.27 | 99.7 | n/a | n/a | n/a | n/a | 99 | 0.026 |
| PAG-AP9 | 309117 | 4318893 | 6/23/2004 | L46447 | 84 | 50.5 | 99 | n/a | n/a | n/a | n/a | 181 | 0.056 |
| PAG-E13 | 309286 | 4318584 | 6/23/2004 | L46449* | 11.6 | 9.19 | 98.4 | n/a | n/a | n/a | n/a | 91 | 0.025 |
| PAG-E14 | 309388 | 4318497 | 6/23/2004 | L46449 | 12.4 | 6.42 | 99.4 | n/a | n/a | n/a | n/a | 81 | 0.033 |
| PAG-E15 | 309478 | 4318412 | 6/23/2004 | L46436 | 13.8 | 6.2 | 100 | n/a | n/a | n/a | n/a | 152 | 0.038 |
| PAG-F13 | 309397 | 4318527 | 6/23/2004 | L46449 | 12.1 | 4.93 | 99.5 | n/a | n/a | n/a | n/a | 83 | 0.027 |
| PAG-F14 | 309503 | 4318441 | 6/23/2004 | L46449 | 18.9 | 9.69 | 99.8 | n/a | n/a | n/a | n/a | 113 | 0.034 |
| PAG-G03 | 309114 | 4318843 | 6/23/2004 | L46436 | 19.1 | 9.17 | 99.6 | n/a | n/a | n/a | n/a | 105 | 0.032 |
| PAG-G04 | 309136 | 4318823 | 6/23/2004 | L46435 | 32.8 | 10.8 | 99.5 | n/a | n/a | n/a | n/a | 87 | 0.029 |
| PAG-G05 | 309159 | 4318803 | 6/23/2004 | L46448 | 15.8 | 10.5 | 99.2 | n/a | n/a | n/a | n/a | 130 | 0.040 |
| PAG-G06 | 309182 | 4318782 | 6/23/2004 | L46435 | 80.9 | 36.6 | 98.3 | n/a | n/a | n/a | n/a | 160 | 0.051 |
| PAG-G07 | 309204 | 4318762 | 6/23/2004 | L46435 | 14 | 6.98 | 99.4 | n/a | n/a | n/a | n/a | 75 | 0.027 |
| PAG-G08 | 309227 | 4318742 | 6/23/2004 | L46449* | 18 | 6.8 | 99.7 | n/a | n/a | n/a | n/a | 118 | 0.036 |
| PAG-G09 | 309249 | 4318721 | 6/23/2004 | L46448 | 11.5 | 8.08 | 99.6 | n/a | n/a | n/a | n/a | 126 | 0.039 |
| PAG-G10 | 309260 | 4318702 | 6/23/2004 | L46449* | 43.1 | 20.4 | 99 | n/a | n/a | n/a | n/a | 109 | 0.034 |
| PAG-G11 | 309294 | 4318681 | 6/23/2004 | L46449* | 22.7 | 11.3 | 99.2 | n/a | n/a | n/a | n/a | 101 | 0.031 |
| **PAG-G12** | **309322** | **4318657** | **6/23/2004** | **L46419** | **7.86** | **7.96** | **98.9** | **3.34** | **1.75** | **10** | **1.8** | **91** | **0.030** |
| PAG-G13 | 309394 | 4318592 | 6/23/2004 | L46452 | 7.75 | 7.12 | 99.7 | n/a | n/a | n/a | n/a | 91 | 0.027 |
| PAG-G14 | 309461 | 4318535 | 6/23/2004 | L46449* | 17.6 | 10.6 | 99.8 | n/a | n/a | n/a | n/a | 132 | 0.025 |
| PAG-G15 | 309519 | 4318472 | 6/23/2004 | L46447 | 8.01 | 4.55 | 100 | n/a | n/a | n/a | n/a | 101 | 0.031 |

**Table E1 (page 2 of 6).** *Yerington mine radiological survey data available as of 8/6/04.*

| Sample ID | Easting m | Northing m | Date | ACZ rpt | Gross Alpha pCi/g | Gross Beta pCi/g | Solids % | Ra 226 pCi/g | Ra 228 pCi/g | Th mg/kg | U mg/kg | CPM | mR/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAG-H02 | 309107 | 4318888 | 6/23/2004 | L46436 | 13.1 | 6.72 | 99.3 | n/a | n/a | n/a | n/a | 87 | 0.025 |
| PAG-H03 | 309139 | 4318862 | 6/23/2004 | L46436 | 17.9 | 10.9 | 99.1 | n/a | n/a | n/a | n/a | 109 | 0.036 |
| PAG-H04 | 309172 | 4318835 | 6/23/2004 | L46448 | 24.3 | 15.6 | 99.2 | n/a | n/a | n/a | n/a | 109 | 0.033 |
| PAG-H05 | 309204 | 4318808 | 6/23/2004 | L46436 | 31.6 | 13 | 99.4 | n/a | n/a | n/a | n/a | 209 | 0.071 |
| PAG-H06 | 309236 | 4318782 | 6/23/2004 | L46448 | 14.1 | 9.18 | 99.4 | n/a | n/a | n/a | n/a | 136 | 0.038 |
| PAG-H07 | 309268 | 4318756 | 6/23/2004 | L46436 | 10.7 | 7.25 | 99.5 | n/a | n/a | n/a | n/a | 136 | 0.036 |
| PAG-H08 | 309301 | 4318730 | 6/23/2004 | L46448 | 11.7 | 6.35 | 99 | n/a | n/a | n/a | n/a | 93 | 0.029 |
| PAG-H09 | 309333 | 4318704 | 6/23/2004 | L46436 | 19.6 | 9.7 | 99.6 | n/a | n/a | n/a | n/a | 101 | 0.024 |
| PAG-H10 | 309365 | 4318677 | 6/23/2004 | L46448 | 11.5 | 7.59 | 99.2 | n/a | n/a | n/a | n/a | 103 | 0.032 |
| PAG-H11 | 309321 | 4318700 | 6/23/2004 | L46448 | 18.2 | 7.87 | 99.2 | n/a | n/a | n/a | n/a | 105 | 0.028 |
| PAG-H12 | 309430 | 4318628 | 6/23/2004 | L46448 | 8.73 | 6.37 | 99.5 | n/a | n/a | n/a | n/a | 116 | 0.032 |
| PAG-H13 | 309462 | 4318598 | 6/23/2004 | L46435 | 10.5 | 6.5 | 99.3 | n/a | n/a | n/a | n/a | 122 | 0.034 |
| PAG-H14 | 309558 | 4318506 | 6/23/2004 | L46449 | 21.4 | 10.8 | 99.6 | n/a | n/a | n/a | n/a | 71 | 0.028 |
| PAG-I10 | 309317 | 4318742 | 6/23/2004 | L46436 | 12.4 | 7.21 | 99.4 | n/a | n/a | n/a | n/a | 101 | 0.029 |
| PAG-I11 | 309341 | 4318720 | 6/23/2004 | L46448 | 21.4 | 11.7 | 99 | n/a | n/a | n/a | n/a | 111 | 0.033 |
| PAG-I12 | 309320 | 4318696 | 6/23/2004 | L46448 | 16.6 | 8.28 | 99.6 | n/a | n/a | n/a | n/a | 109 | 0.031 |
| PAG-I13 | 309484 | 4318630 | 6/23/2004 | L46435 | 10.8 | 8.16 | 99.4 | n/a | n/a | n/a | n/a | 111 | 0.025 |
| PAG-I14 | 309584 | 4318542 | 6/23/2004 | L46435 | 21.6 | 10.9 | 99.4 | n/a | n/a | n/a | n/a | 101 | 0.031 |
| PAG-II1 | 309114 | 4318903 | 6/23/2004 | L46452 | 56.3 | 34.8 | 99.9 | n/a | n/a | n/a | n/a | 138 | 0.041 |
| PAG-II2 | 309370 | 4318696 | 6/23/2004 | L46452 | 66.4 | 44.3 | 98.6 | n/a | n/a | n/a | n/a | 164 | 0.051 |
| PAG-II3 | 309160 | 4318887 | 6/23/2004 | L46452 | 18.2 | 13.2 | 99.2 | n/a | n/a | n/a | n/a | 103 | 0.034 |
| PAG-II4 | 309183 | 4318866 | 6/23/2004 | L46447 | 22.1 | 15.3 | 99.1 | n/a | n/a | n/a | n/a | 140 | 0.043 |
| PAG-J2 | 309154 | 4318927 | 6/23/2004 | L46452 | 17.8 | 11.8 | 99.1 | n/a | n/a | n/a | n/a | 103 | 0.032 |
| PAG-J3 | 309177 | 4318907 | 6/23/2004 | L46452 | 12.2 | 9.56 | 99.7 | n/a | n/a | n/a | n/a | 71 | 0.022 |
| PAG-J4 | 309200 | 4318886 | 6/23/2004 | L46452 | 10.4 | 8.93 | 99.2 | n/a | n/a | n/a | n/a | 97 | 0.030 |
| PAG-J5 | 309223 | 4318866 | 6/23/2004 | L46452 | 12.1 | 6.78 | 99.7 | n/a | n/a | n/a | n/a | 77 | 0.020 |
| PAG-J6 | 309246 | 4318845 | 6/23/2004 | L46447 | 15.3 | 11.7 | 99.6 | n/a | n/a | n/a | n/a | 69 | 0.021 |
| PAG-J7 | 309269 | 4318826 | 6/23/2004 | L46452 | 8.57 | 6.53 | 99.8 | n/a | n/a | n/a | n/a | 97 | 0.030 |
| PAG-J8 | 309292 | 4318805 | 6/23/2004 | L46452 | 8.34 | 7.71 | 99.9 | n/a | n/a | n/a | n/a | 95 | 0.029 |

**Table E1 (page 3 of 6).** *Yerington mine radiological survey data available as of 8/6/04.*

| Sample ID | Easting m | Northing m | Date | ACZ rpt | Gross Alpha pCi/g | Gross Beta pCi/g | Solids % | Ra 226 pCi/g | Ra 228 pCi/g | Th mg/kg | U mg/kg | CPM | mR/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAG-J9 | 309315 | 4318784 | 6/23/2004 | L46447 | 10.5 | 8.31 | 99.8 | n/a | n/a | n/a | n/a | 75 | 0.023 |
| PAG-J10 | 309338 | 4318764 | 6/23/2004 | L46452 | 9.1 | 5.74 | 99.9 | n/a | n/a | n/a | n/a | 71 | 0.024 |
| PAG-J11 | 309361 | 4318744 | 6/23/2004 | L46452 | 8.45 | 7.24 | 99.7 | n/a | n/a | n/a | n/a | 79 | 0.025 |
| PAG-J12 | 309384 | 4318724 | 6/23/2004 | L46452 | 11.8 | 6.74 | 99.8 | n/a | n/a | n/a | n/a | 91 | 0.031 |
| PAG-K06 | 309263 | 4318863 | 6/23/2004 | L46451 | 14.2 | 10.3 | 99.2 | n/a | n/a | n/a | n/a | 105 | 0.030 |
| PAG-K3 | 309187 | 4318926 | 6/23/2004 | L46451 | 15.7 | 12 | 98.8 | n/a | n/a | n/a | n/a | 128 | 0.040 |
| PAG-K4 | 309216 | 4318903 | 6/23/2004 | L46451 | 13.6 | 10.6 | 98.9 | n/a | n/a | n/a | n/a | 89 | 0.027 |
| PAG-L01 | 309293 | 4318924 | 6/23/2004 | L46447 | 33.8 | 19.3 | 99.2 | n/a | n/a | n/a | n/a | 119 | 0.030 |
| PAG-L02 | 309340 | 4318878 | 6/23/2004 | L46447 | 8.26 | 8.57 | 99.4 | n/a | n/a | n/a | n/a | 99 | 0.027 |
| PAG-L03 | 309374 | 4318831 | 6/23/2004 | L46447 | 6.35 | 7.49 | 99.5 | n/a | n/a | n/a | n/a | 111 | 0.034 |
| PAG-M01 | 309257 | 4319058 | 6/23/2004 | L46447 | 31 | 18.6 | 99.6 | n/a | n/a | n/a | n/a | 135 | 0.041 |
| PAG-M02 | 309298 | 4319011 | 6/23/2004 | L46449 | 49.4 | 18.7 | 99 | n/a | n/a | n/a | n/a | 144 | 0.046 |
| PAG-M03 | 309336 | 4318965 | 6/23/2004 | L46447 | 12.3 | 9.68 | 99.6 | n/a | n/a | n/a | n/a | 133 | 0.032 |
| PAG-M04 | 309378 | 4318919 | 6/23/2004 | L46436 | 25 | 10.4 | 99.9 | n/a | n/a | n/a | n/a | 97 | 0.032 |
| PAG-M05 | 309418 | 4318873 | 6/23/2004 | L46447 | 10.3 | 7.52 | 99.8 | n/a | n/a | n/a | n/a | 103 | 0.029 |
| PAG-N01 | 308926 | 4318932 | 6/24/2004 | L46451 | 9.52 | 8.71 | 99.6 | n/a | n/a | n/a | n/a | 101 | 0.021 |
| PAG-N02 | 308957 | 4318968 | 6/23/2004 | L46447* | 4.96 | 5.39 | 99.7 | n/a | n/a | n/a | n/a | 91 | 0.027 |
| PAG-N03 | 308994 | 4319004 | 6/23/2004 | L46447 | 8.07 | 5.12 | 98.1 | n/a | n/a | n/a | n/a | 112 | 0.032 |
| PAG-N04 | 309014 | 4319038 | 6/23/2004 | L46452 | 7.37 | 5.13 | 99.7 | n/a | n/a | n/a | n/a | 115 | 0.036 |
| PAG-N05 | 309047 | 4319068 | 6/23/2004 | L46447 | 10.8 | 8.29 | 99.7 | n/a | n/a | n/a | n/a | 91 | 0.028 |
| PAG-N06 | 309080 | 4319106 | 6/23/2004 | L46447 | 14.3 | 11.3 | 99.1 | n/a | n/a | n/a | n/a | 122 | 0.041 |
| PAO-DP1 | 309239 | 4318935 | 6/23/2004 | L46449 | 93.7 | 30.4 | 98.2 | n/a | n/a | n/a | n/a | 149 | 0.045 |
| **PAO-DP2** | **309207** | **4318954** | **6/23/2004** | **L46419** | **194** | **85.4** | **96.6** | **24.9** | **16.3** | **170** | **13.9** | **300** | **0.099** |
| PAO-DP3 | 309219 | 4318984 | 6/23/2004 | L46449 | 1240 | 327 | 79.6 | n/a | n/a | n/a | n/a | 801 | 0.251 |
| **PAO-DP4** | **309242** | **4318975** | **6/23/2004** | **L46419** | **1440** | **592** | **91.4** | **157** | **139** | **1350** | **31.1** | **967** | **0.322** |
| PAO-DP5 | 309489 | 4318736 | 6/23/2004 | L46452* | 7.92 | 6.27 | 99.5 | n/a | n/a | n/a | n/a | n/s | n/a |
| PAO-DP6 | 309464 | 4318762 | 6/23/2004 | L46435 | 81.8 | 32.3 | 98 | n/a | n/a | n/a | n/a | 128 | 0.032 |
| PAO-DP7 | 309476 | 4318778 | 6/23/2004 | L46435 | 612 | 166 | 96.1 | n/a | n/a | n/a | n/a | 274 | 0.078 |
| PAO-DP8 | 309461 | 4318792 | 6/23/2004 | L46435 | 28.8 | 15.9 | 94.7 | n/a | n/a | n/a | n/a | 203 | 0.063 |

**Table E1 (page 4 of 6).** *Yerington mine radiological survey data available as of 8/6/04.*

| Sample ID | Easting m | Northing m | Date | ACZ rpt | Gross Alpha pCi/g | Gross Beta pCi/g | Solids % | Ra 226 pCi/g | Ra 228 pCi/g | Th mg/kg | U mg/kg | CPM | mR/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAO-DP9 | 309434 | 4318818 | 6/23/2004 | L46435 | | 17.2 | 98.4 | n/a | n/a | n/a | n/a | | 0.053 |
| PAO-DP10 | 309446 | 4318832 | 6/23/2004 | L46449 | 14.7 | 9.02 | 99.7 | n/a | n/a | n/a | n/a | 111 | 0.034 |
| **PAO-DP11** | **309470** | **4318820** | | **L46419** | **736** | **391** | **97.9** | **76** | **4.1** | | **430** | **480** | **0.146** |
| PAO-DP12 | 309468 | 4318800 | 6/23/2004 | L46452 | 250 | 174 | 99.8 | n/a | n/a | n/a | n/a | 189 | 0.057 |
| PAO-DP13 | | 4318786 | 6/23/2004 | L46449 | 34.9 | 22.2 | 96.7 | | n/a | n/a | n/a | 99 | 0.057 |
| **PAO-DP14** | **309496** | **4318755** | **6/23/2004** | **L46419** | **199** | **107** | **98.1** | **26.2** | **7.47** | **120** | **99.5** | **270** | **0.08** |
| | 309510 | 4318755 | 6/23/2004 | L46435 | 55.1 | | 99.6 | n/a | n/a | n/a | n/a | 134 | |
| PAO-DP16 | 309524 | 4318753 | 6/23/2004 | L46448 | 40 | 22.7 | 99 | n/a | n/a | n/a | n/a | 91 | 0.028 |
| PAO-DP17 | 309529 | 4318740 | 6/23/2004 | L46435 | 14 | 8.12 | 98.1 | n/a | n/a | n/a | n/a | 111 | 0.034 |
| **PAO-HH1** | **309192** | **4318817** | **6/24/2004** | **L46419** | **325** | **262** | **99.4** | **12.9** | **2.8** | **20** | **4.1** | **6200** | **1.92** |
| **PAO-HH2** | **309193** | **4318817** | **6/24/2004** | **L46419** | **55.3** | **35.4** | **98.7** | **37.9** | **4.55** | **50** | **5.7** | **640** | **0.202** |
| PAO-MP04 | 309148 | 4318675 | 6/24/2004 | L46448 | 23.1 | 14 | 98.3 | n/a | n/a | n/a | n/a | 207 | 0.064 |
| PAO-MP1 | 309157 | 4318536 | 6/24/2004 | L46451 | 18.5 | 19.7 | 83.6 | n/a | n/a | n/a | n/a | 91 | 0.024 |
| PAO-MP2 | 309068 | 4318614 | 6/24/2004 | L46451 | 17.1 | 19.1 | 89.7 | n/a | n/a | n/a | n/a | 111 | 0.034 |
| PAO-MP3 | 309195 | 4318631 | 6/24/2004 | L46451 | 17.2 | 11.3 | 99.3 | n/a | n/a | n/a | n/a | 244 | 0.076 |
| SP-01 | 310610 | 4317937 | 6/23/2004 | L46436 | 15 | 15.6 | 96.2 | n/a | n/a | n/a | n/a | 111 | 0.032 |
| SP-02 | 310620 | 4317867 | 6/24/2004 | L46448 | 21.9 | 12.3 | 96.3 | n/a | n/a | n/a | n/a | 111 | 0.038 |
| SP-03 | 310605 | 4317864 | 6/23/2004 | L46436 | 64.1 | 39.1 | 80.1 | n/a | n/a | n/a | n/a | 99 | 0.028 |
| SP-04 | 310603 | 4317906 | 6/24/2004 | L46448 | 21.2 | 12.3 | 84.9 | n/a | n/a | n/a | | 118 | 0.036 |
| SP-05 | 310580 | 4317973 | 6/24/2004 | L46448 | 29.5 | 17.5 | 97.4 | n/a | n/a | n/a | n/a | 93 | 0.034 |
| SP-06 | 310590 | 4318048 | 6/23/2004 | L46436 | 18.4 | 14 | 97.6 | n/a | n/a | n/a | n/a | 85 | 0.034 |
| SP-07 | 310644 | 4317919 | 6/24/2004 | L46448 | 44.2 | 19.6 | 94.9 | n/a | n/a | n/a | n/a | 120 | 0.036 |
| TP1-1 | 309733.6 | 4318835 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 295 | 0.094 |
| TP2-1A | 309838 | 4318822 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 830 | 0.285 |
| TP2-1B | 309793.3 | 4318858 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 814 | 0.250 |
| TP3-1 | 309825.5 | 4318897 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 435 | 0.140 |
| TP4-1 | 309696.9 | 4318986 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 468 | 0.170 |
| TP5-1 | 309707.1 | 4318925 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 478 | 0.149 |
| TP6-1 | 309671 | 4318871 | 7/07/2004 | n/a | 110.0 | 21.60 | 11.00 | 28.10 | 145.0 | n/a | n/a | 468 | 0.140 |

**Table E1 (page 5 of 6).** *Yerington mine radiological survey data available as of 8/6/04.*

| Sample ID | Easting m | Northing m | Date | ACZ rpt | Gross Alpha pCi/g | Gross Beta pCi/g | Solids % | Ra 226 pCi/g | Ra 228 pCi/g | Th mg/kg | U mg/kg | CPM | mR/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TP7-1 | 309653.9 | 4318817 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 848 | 0.270 |
| TP8-1 | 309624.5 | 4318813 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 451 | 0.160 |
| VLT-6 | 308626 | 4320705 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| VLT-7 | 308613 | 4320734 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| VLT-DA1 | 308784 | 4320792 | 6/24/2004 | L46451 | 14.8 | 10.5 | 96.9 | n/a | n/a | n/a | n/a | 142 | 0.038 |
| VLT-DA2 | 308766 | 4320876 | 6/24/2004 | L46451 | 172 | 76.3 | 97.4 | n/a | n/a | n/a | n/a | 223 | 0.067 |
| **VLT-DA3** | **308707** | **4320802** | **6/24/2004** | **L46419** | **15** | **11.8** | **98.7** | **4.21** | **4.55** | **20** | **2.2** | **162** | **0.047** |
| VLT-DA4 | 308638 | 4320691 | 6/24/2004 | L46451 | 45.7 | 26.6 | 99.1 | n/a | n/a | n/a | n/a | 201 | 0.076 |
| VLT-DA5 | 308626 | 4320705 | 6/24/2004 | L46451 | 119 | 72.2 | 96.5 | n/a | n/a | n/a | n/a | 331 | 0.092 |
| VLT-DA6 | 308613 | 4320734 | 6/24/2004 | L46451 | 311 | 136 | 97 | n/a | n/a | n/a | n/a | 382 | 0.118 |
| VLT-DA7 | 308608.7 | 4321102 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 146 | 0.045 |
| VLT-DA8 | 308550.9 | 4321062 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 270 | 0.084 |
| VLT-DA9 | 308512.1 | 4320930 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 429 | 0.129 |
| VLT-E1 | 308760 | 4320180 | 6/24/2004 | L46451 | 26.7 | 35.3 | 72.9 | n/a | n/a | n/a | n/a | 223 | 0.052 |
| VLT-E2 | 308822 | 4320228 | 6/24/2004 | L46451 | 23.3 | 24.9 | 92.1 | n/a | n/a | n/a | n/a | 91 | 0.034 |
| VLT-E3 | 308864 | 4320248 | 6/24/2004 | L46448 | 68.4 | 35 | 89 | n/a | n/a | n/a | n/a | 142 | 0.034 |
| VLT-LP1 | 309121.6 | 4320362 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 101 | 0.022 |
| VLT-ORE1 | 307600 | 4320700 | 6/24/2004 | L46451 | 8.59 | 7.93 | 99.7 | n/a | n/a | n/a | n/a | 109 | 0.031 |
| VLT-UP1 | 308655.8 | 4321146 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 492 | 0.153 |
| VLT-UP2 | 308738.6 | 4321074 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 415 | 0.129 |
| VLT-UP3 | 308858 | 4320962 | 7/07/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 189 | 0.059 |
| Bldg Edge | 309312 | 4318630 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| FS-01 | 309084.7 | 4319057 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.24 |
| FS-02 | 309099.1 | 4319074 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.25 |
| FS-03 | 309125.1 | 4319068 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.27 |
| FS-04 | 309141.6 | 4319045 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.20 |
| FS-05 | 309113 | 4319051 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.24 |
| FS-06 | 309095.2 | 4318927 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.17 |
| FS-07 | 309119.9 | 4318920 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.18 |
| FS-08 | 309137.7 | 4318902 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.12 |

**Table E1 (page 6 of 6).** *Yerington mine radiological survey data available as of 8/6/04.*

| Sample ID | Easting m | Northing m | Date | ACZ rpt | Gross Alpha pCi/g | Gross Beta pCi/g | Solids % | Ra 226 pCi/g | Ra 228 pCi/g | Th mg/kg | U mg/kg | CPM | mR/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FS-09 | 309205.5 | 4318852 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.13 |
| FS-10 | 309237.2 | 4318823 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.11 |
| FS-11 | 309267.6 | 4318796 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.10 |
| FS-12 | 309100.8 | 4318791 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.12 |
| FS-13 | 309098.2 | 4318760 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.11 |
| FS-14 | 309126.9 | 4318770 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.14 |
| FS-15 | 309149.4 | 4318751 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.12 |
| FS-16 | 308799.7 | 4321094 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.17 |
| FS-17 | 308784.9 | 4321047 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.29 |
| FS-18 | 308817.1 | 4321017 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.27 |
| FS-19 | 308916.1 | 4321004 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.20 |
| FS-20 | 308990.8 | 4320985 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.19 |
| FS-21 | 309023.8 | 4320923 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.21 |
| FS-22 | 308991.6 | 4320833 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.24 |
| FS-23 | 308949.9 | 4320879 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.30 |
| FS-24 | 308902.2 | 4320920 | 7/20/2004 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 0.29 |
| Slab | 309297 | 4318736 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Slab | 309317 | 4318760 | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Count | | | | | 119 | 119 | 119 | 9 | 9 | 9 | 9 | 134 | 158 |
| Max | | | | | 1440 | 592 | 100 | 157 | 139 | 1350 | 430 | 6200 | 1.92 |
| Min | | | | | 4.96 | 4.27 | 72.9 | 3.34 | 1.75 | 10 | 1.8 | 69 | 0.02 |
| Average | | | | | 69.2 | 33.4 | 97.8 | 39.9 | 21.1 | 247.8 | 85.0 | 228.5 | 0.1 |

Note:

PAG = Process Area G gridline
PAO = Process Area Other
SP = Sewage Pond
TP = Tailings Pond
Bold = expedited samples
n/a = not analyzed.

MP = Mega Pond
DP = Disposal Pond
VLT = Vat Leach Tailings
FS = Field Survey with dosimeter only
DA = Disposal Area

**Table E2 (page 1 of 1)** *Supplemental Soil Sample Data*

| Sample ID | Date | Gross Alpha pCi/g | Gross Beta pCi/g | Ra-226 pCi/g | Ra-228 pCi/g | Th-228 pCi/g | Th-230 pCi/g | Th-232 pCi/g | U-234 pCi/g | U-235 pCi/g | U-238 pCi/g |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TP1-1 | 7/07/2004 | 392 | 110 | 21.6 | 11 | 28.1 | 145 | 27.1 | 46.5 | 0.12 | 11.4 |
| TP2-1A | 7/07/2004 | 2110 | 613 | 78.5 | 31.1 | 91.5 | 943 | 95.5 | 431 | 8.76 | 147 |
| TP2-1B | 7/07/2004 | 1840 | 470 | 59.6 | 17.7 | 92.5 | 722 | 93.9 | 375 | 8.88 | 71.6 |
| TP3-1 | 7/07/2004 | 761 | 230 | 26 | 5.57 | 34.7 | 308 | 36.4 | 196 | 4.15 | 58.6 |
| TP4-1 | 7/07/2004 | 1180 | 353 | 34.1 | 0.0 | 69.7 | 329 | 72 | n/a | n/a | n/a |
| TP5-1 | 7/07/2004 | 1460 | 408 | 40.7 | 26.6 | 91 | 420 | 94.5 | 31.6 | 5.9 | 29.5 |
| TP6-1 | 7/07/2004 | 610 | 172 | 20.1 | 12.6 | 41.6 | 204 | 42.4 | 71.4 | 2.7 | 36.1 |
| TP7-1 | 7/07/2004 | 1220 | 350 | 49.6 | 19.1 | 98.5 | 482 | 96.5 | 143 | 4.02 | 56.7 |
| TP8-1 | 7/07/2004 | 1220 | 378 | 49.9 | 14.3 | 84.1 | 438 | 78.3 | 150 | 4.38 | 70.8 |
| VLT-DA4 REP | 7/07/2004 | 2370 | 615 | 78.8 | 0.94 | 51.1 | 161 | 103 | 129 | 2.21 | 33.4 |
| VLT-DA7 | 7/07/2004 | 169 | 56.9 | 11.9 | 0.6 | 9.93 | 52 | 10.6 | 19.2 | 0.88 | 11.8 |
| VLT-DA8 | 7/07/2004 | 560 | 175 | 31.4 | 37.2 | 42.2 | 207 | 48.1 | 91.9 | 1.11 | 22.1 |
| VLT-DA9 | 7/07/2004 | 1160 | 384 | 74 | 0.75 | 91.4 | 388 | 90.8 | 112 | 3.27 | 43.4 |
| VLT-LP1 | 7/07/2004 | 14 | 10.2 | 1.75 | 0.0 | 2.53 | 3.91 | 2.07 | 3 | 0.11 | 2.19 |
| VLT-UP1 | 7/07/2004 | 734 | 242 | 26.6 | 45 | 51 | 270 | 57.2 | 82.9 | 22.6 | 48.5 |
| VLT-UP2 | 7/07/2004 | 620 | 191 | 35.9 | 37.6 | 45.7 | 285 | 51.2 | 190 | 8.93 | 20.7 |
| VLT-UP3 | 7/07/2004 | 125 | 52.9 | 6.41 | 11.6 | n/a | n/a | n/a | 23 | 0.48 | 7.31 |
| HH-COMP | 7/07/2004 | 31.9 | 14 | 4.31 | 3.51 | 1.74 | 8.71 | 1.77 | 4.12 | 0.52 | 1.41 |

Note:
VLT = Vat Leach Tailings
TP = Tailings Pond
REP = Replicate
COMP = Composite
Blue = Supplemental Data
DA = Disposal Area

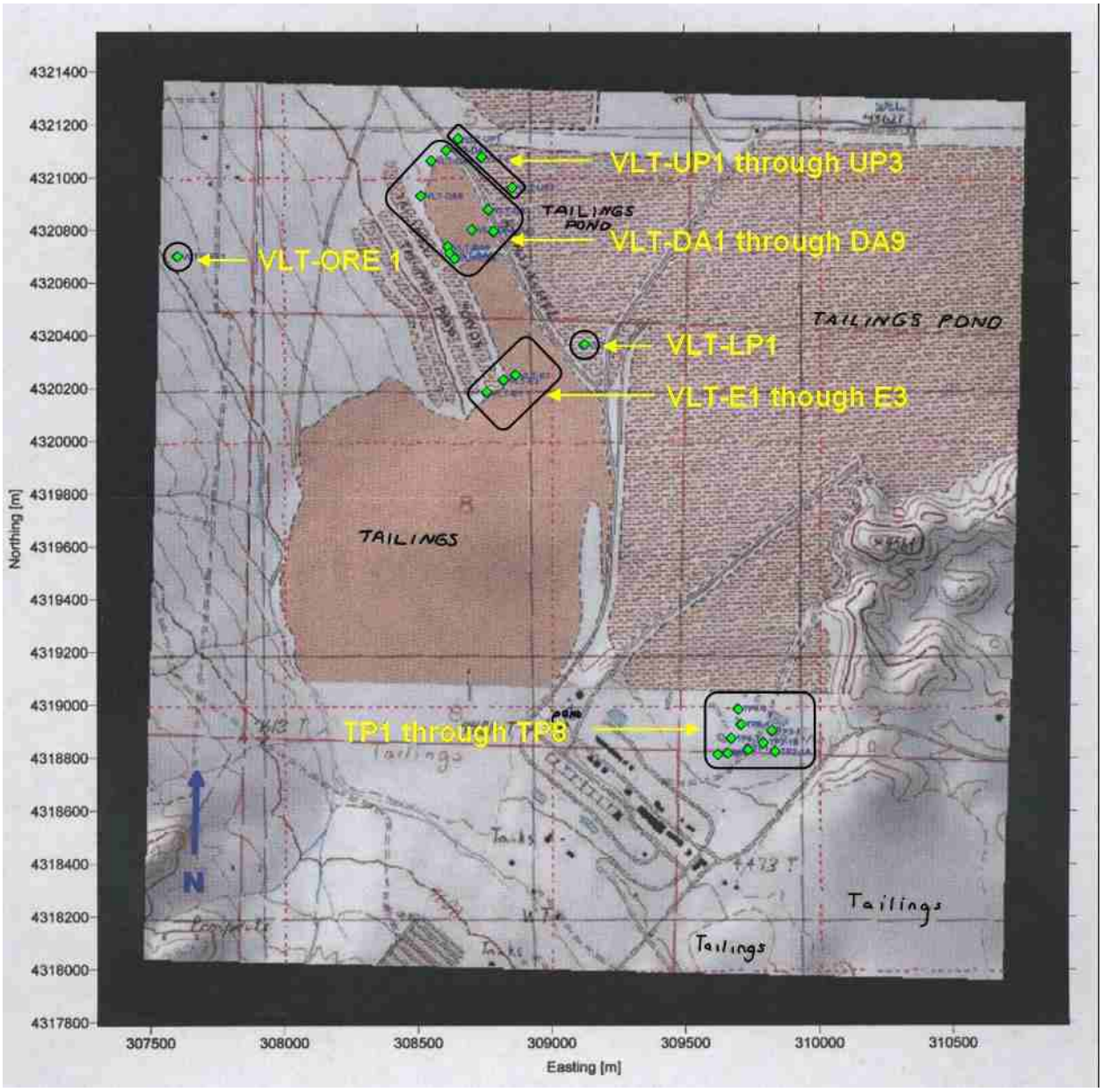



**Figure E2-1: Supplemental Soil Sample Locations Outside of the Process Area**

**Table E3.** *Expedited Soil Sample Final Results from Process Area, Yerington Mine, July 2004.*

| Location | Sample ID | Alpha pCi/g | Beta pCi/g | Ra 226 pCi/g | Ra 228 pCi/g | U mg/kg | Th mg/kg |
|---|---|---|---|---|---|---|---|
| BKG PROCESS AREA | G12 | 7.9 | 8 | 3.3 | 1.8 | 2 | 10 |
| SULFIDE PLANT | AP10 | 242 | 152 | 17 | 9.3 | 177 | 80 |
| CEMENTATION VATS | HH1 | 325 | 262 | 13 | 3 | 4 | 20 |
| CEMENTATION VATS | HH2 | 55 | 35 | 38 | 5 | 6 | 50 |
| LOWER DISPOSAL POND | DP2 | 194 | 85 | 25 | 16 | 14 | 170 |
| LOWER DISPOSAL POND | DP4 | 1440 | 592 | 157 | 139 | 31 | 1350 |
| LOWER DISPOSAL POND | DP11 | 736 | 391 | 76 | 4 | 430 | 410 |
| LOWER DISPOSAL POND | DP14 | 199 | 107 | 26 | 7.5 | 100 | 120 |
| VLT DISPOSAL/COVERED | VLT-DA3 | 15 | 12 | 4.2 | 5 | 2 | 20 |

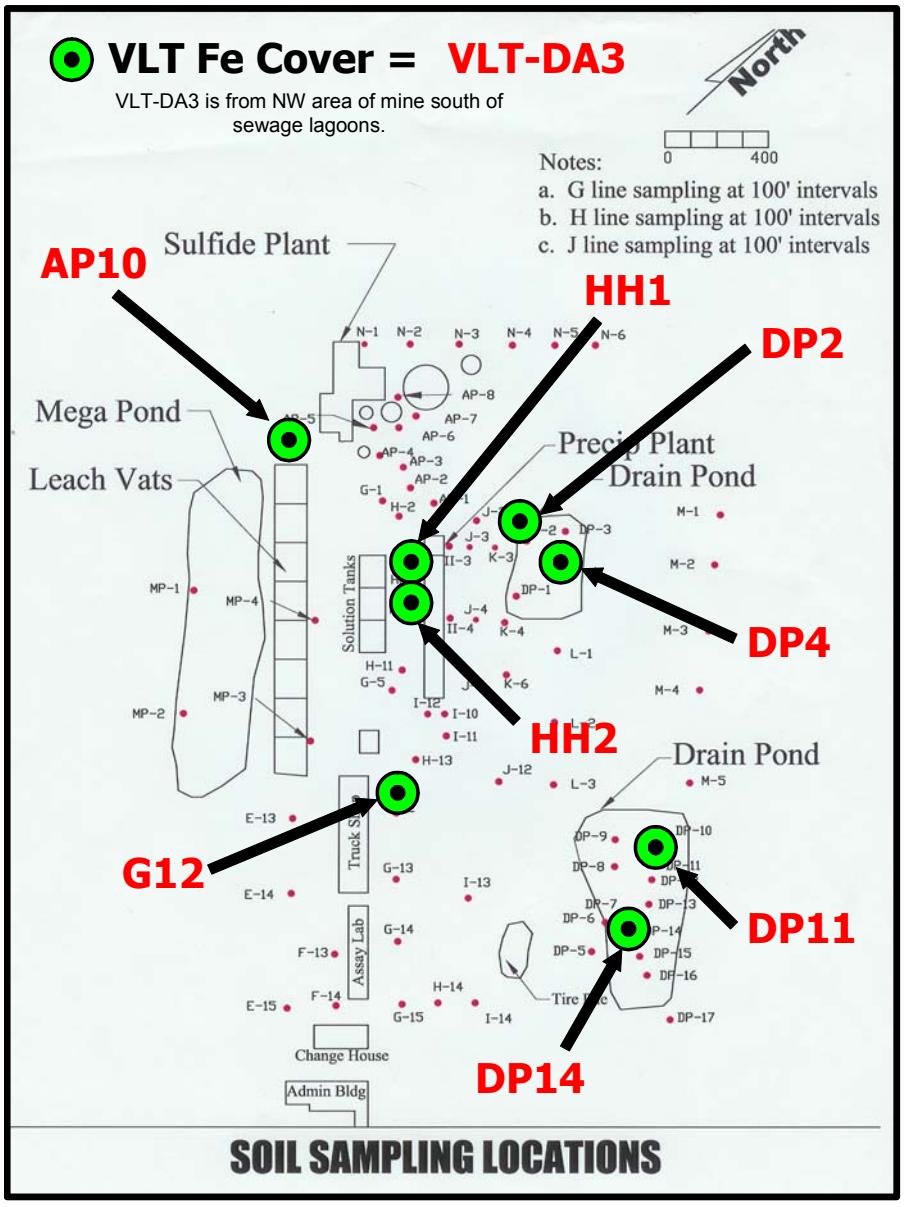
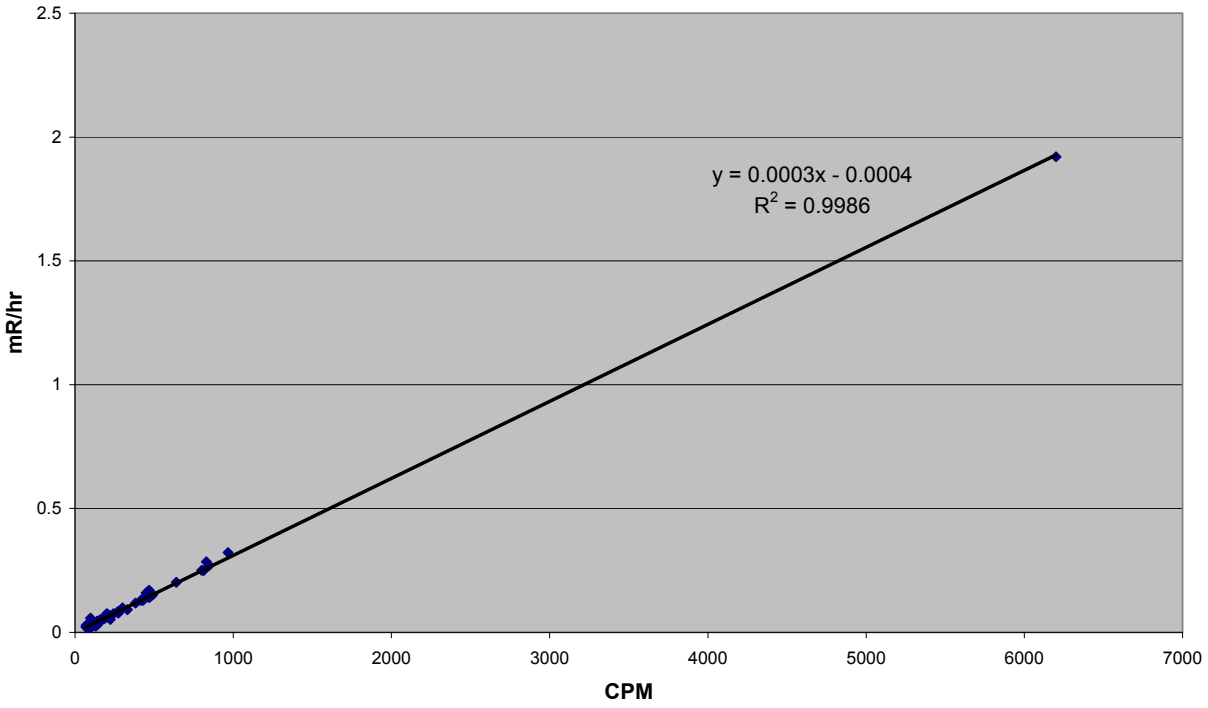


**Table E4.** *Yerington Mine VOC data.*

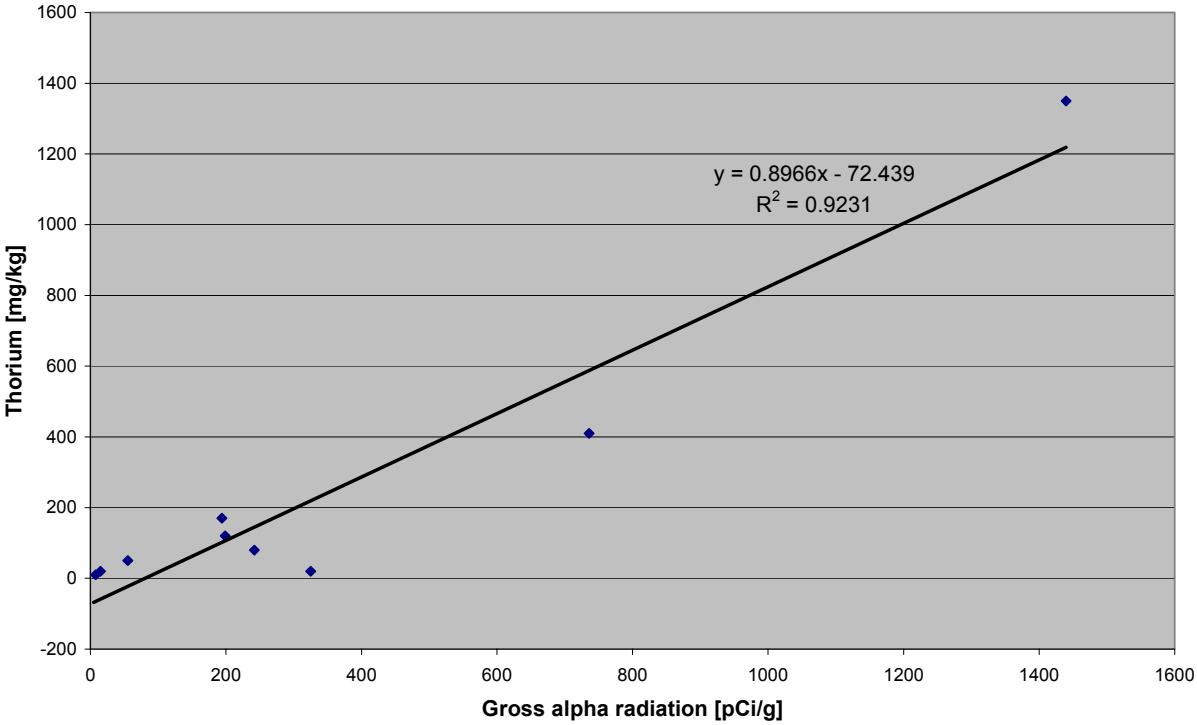
| Sample ID | Easting m | Northing m | Date | ACZ rpt | 2-Butanone ug/Kg | 2-Hexanone ug/Kg | Acetone ug/Kg | Bromofluorobenzene % | Dibromofluoromethane % | Toluene-d8 % |
|---|---|---|---|---|---|---|---|---|---|---|
| PAO-P1 | 309309 | 4318667 | 6/24/2004 | L46427 | | <10 | 90 | 92.4 | 115.3 | 110.4 |
| PAO-P2 | | | 6/24/2004 | L46427 | 30 | <10 | 40 | 91.7 | 115.4 | 107.8 |
| PAO-P3 | 309473 | 4318733 | 6/24/2004 | L46427 | 20 | <10 | 90 | 93.3 | 116.5 | 108.2 |
| PAO-P4 | 309503 | 4318760 | 6/24/2004 | L46427 | 90 | 10 | 210 | 95.8 | 108.2 | 104.3 |
| PAO-P5 | 309508 | | 6/24/2004 | L46427 | 20 | <10 | 70 | 95.7 | 107.1 | 107.2 |

Compounds not detected in any of the above 5 samples:

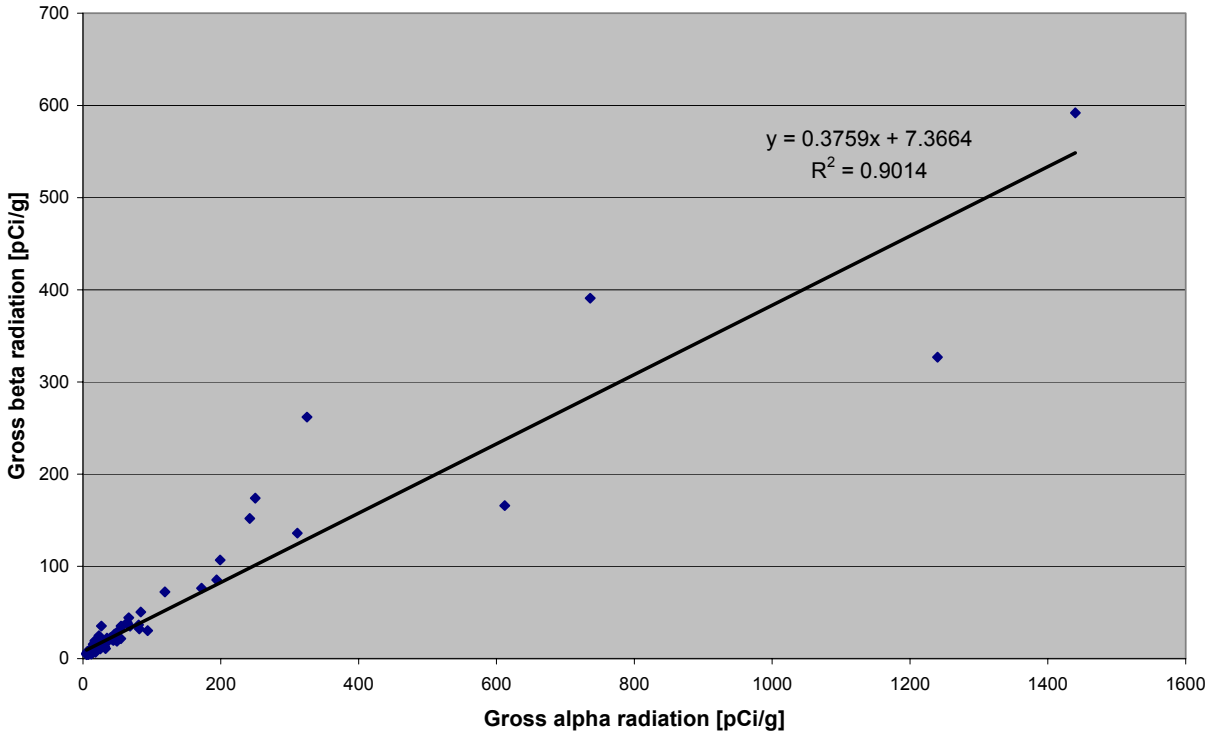
| | | | | | |
|---|---|---|---|---|---|
| 1,1,1,2-Tetrachloroethane | ug/Kg | <4 | Carbon Disulfide | ug/Kg | <4 |
| 1,1,1-Trichloroethane | ug/Kg | <10 | Carbon Tetrachloride | ug/Kg | <10 |
| 1,1,2,2-Tetrachloroethane | ug/Kg | <3 | Chlorobenzene | ug/Kg | <4 |
| 1,1,2-Trichloroethane | ug/Kg | <4 | Chloroethane | ug/Kg | <4 |
| 1,1-Dichloroethane | ug/Kg | <4 | Chloroform | ug/Kg | <4 |
| 1,1-Dichloroethene | ug/Kg | <4 | Chloromethane | ug/Kg | <4 |
| 1,1-Dichloropropene | ug/Kg | <4 | cis-1,2-Dichloroethene | ug/Kg | <4 |
| 1,2,3-Trichlorobenzene | ug/Kg | <4 | cis-1,3-Dichloropropene | ug/Kg | <4 |
| 1,2,3-Trichloropropane | ug/Kg | <4 | Dibromochloromethane | ug/Kg | <4 |
| 1,2,4-Trichlorobenzene | ug/Kg | <3 | Dibromomethane | ug/Kg | <4 |
| 1,2,4-Trimethylbenzene | ug/Kg | <4 | Dichlorodifluoromethane | ug/Kg | <5 |
| 1,2-Dibromo-3-chloropropane | ug/Kg | <4 | Ethylbenzene | ug/Kg | <4 |
| 1,2-Dibromoethane | ug/Kg | <4 | | ug/Kg | <4 |
| 1,2-Dichlorobenzene | ug/Kg | <4 | Isopropylbenzene | ug/Kg | <4 |
| 1,2-Dichloroethane | ug/Kg | <4 | m,p-Xylene | ug/Kg | <10 |
| 1,2-Dichloropropane | ug/Kg | <4 | Methyl Tert Butyl Ether | ug/Kg | <4 |
| 1,3,5-Trimethylbenzene | ug/Kg | <4 | Methylene Chloride | ug/Kg | <4 |
| 1,3-Dichlorobenzene | ug/Kg | <4 | Naphthalene | ug/Kg | <3 |
| 1,3-Dichloropropane | ug/Kg | <4 | n-Butylbenzene | ug/Kg | <4 |
| 1,4-Dichlorobenzene | ug/Kg | <4 | n-Propylbenzene | ug/Kg | <4 |
| | ug/Kg | <4 | o-Xylene | ug/Kg | <4 |
| 2-Chloroethyl vinyl ether | ug/Kg | <5 | sec-Butylbenzene | ug/Kg | <4 |
| 2-Chlorotoluene | ug/Kg | <4 | Styrene | | <4 |
| 4-Chlorotoluene | ug/Kg | <4 | tert-Butylbenzene | ug/Kg | <4 |
| 4-Isopropyltoluene | | <4 | Tetrachloroethene | ug/Kg | <4 |
| 4-Methyl-2-Pentanone | ug/Kg | <10 | Toluene | ug/Kg | <4 |
| Acrylonitrile | ug/Kg | <20 | trans-1,2-Dichloroethene | ug/Kg | <4 |
| Benzene | ug/Kg | <4 | trans-1,3-Dichloropropene | ug/Kg | <3 |
| Bromobenzene | ug/Kg | <4 | Trichloroethene | ug/Kg | <5 |
| Bromochloromethane | ug/Kg | <4 | Trichlorofluoromethane | ug/Kg | <4 |
| Bromodichloromethane | ug/Kg | <4 | Vinyl Acetate | ug/Kg | <4 |
| Bromoform | ug/Kg | <4 | Vinyl Chloride | ug/Kg | <4 |
| Bromomethane | ug/Kg | <4 | | | |




**Radiation dose vs. Counts per minute**
**in soils samples from the Yerington Process Area**




**Throrium vs. Gross Alpha radiation**
**in soils samples from the Yerington Process Area**




**Gross Beta Radiation vs. Gross Alpha Radiation in soils samples from the Yerington Process Area**