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

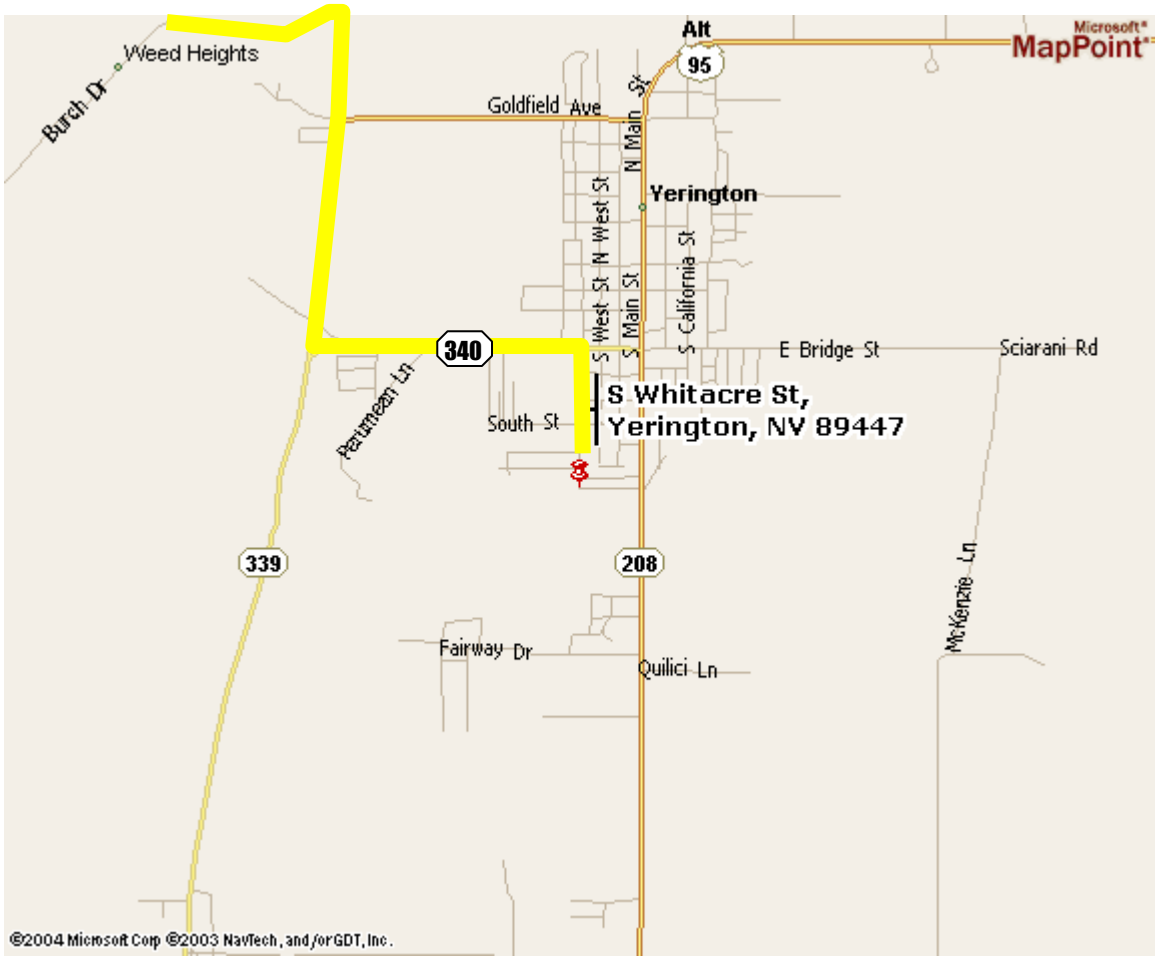
Cold Work/Warm-up Schedule for 4-Hour Shifts

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) Surprise and Whitaker Street Yerington, NV	775-463-2301
Ambulance (Ground)	911
Ambulance (Helicopter)	911
Fire Department	911 or 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) 916-446-5771 (home) 916-716-1053 (cell)
Fred Mueller	916-442-5304 (office) 916-395-3253 (home)
CRE Inc	
Ron Peery, P.E On-Site Project Manager	406-665-1770 (office) 406-698-6465 (cell)
Eric Mason, E.I.T.	406-656-1770 (office) 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					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		
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	34.2	17.2	98.4	n/a	n/a	n/a	n/a	170	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**	**6/23/2004**	**L46419**	**736**	**391**	**97.9**	**76**	**4.1**	**410**	**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	309483	4318786	6/23/2004	L46449	34.9	22.2	96.7	n/a	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**
PAO-DP15	309510	4318755	6/23/2004	L46435	55.1	21.5	99.6	n/a	n/a	n/a	n/a	134	0.041
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	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		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	295	0.094
TP2-1A	309838	4318822		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	830	0.285
TP2-1B	309793.3	4318858		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	814	0.250
TP3-1	309825.5	4318897		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	435	0.140
TP4-1	309696.9	4318986		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	468	0.170
TP5-1	309707.1	4318925		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	478	0.149
TP6-1	309671	4318871		n/a	n/a	n/a	n/a	n/a	n/a	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		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	848	0.270
TP8-1	309624.5	4318813		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
VLT-7	308613	4320734		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		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	146	0.045
VLT-DA8	308550.9	4321062		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	270	0.084
VLT-DA9	308512.1	4320930		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		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		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	492	0.153
VLT-UP2	308738.6	4321074		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	415	0.129
VLT-UP3	308858	4320962		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	
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
Slab	309317	4318760		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
MP = Mega Pond
DP = Disposal Pond
VLT = Vat Leach Tailings
FS = Field Survey with dosimeter only
Bold = expedited samples.
n/a = not analyzed, not applicable; not all data available as of latest printing date.

Table E2. *Expedited Soil Sample Final Results from Process Area, Yerington Mine, July 2004.*

		Alpha	Beta	Ra 226	Ra 228	U	Th
Location	**Sample ID**	**pCi/g**	**pCi/g**	**pCi/g**	**pCi/g**	**mg/kg**	**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

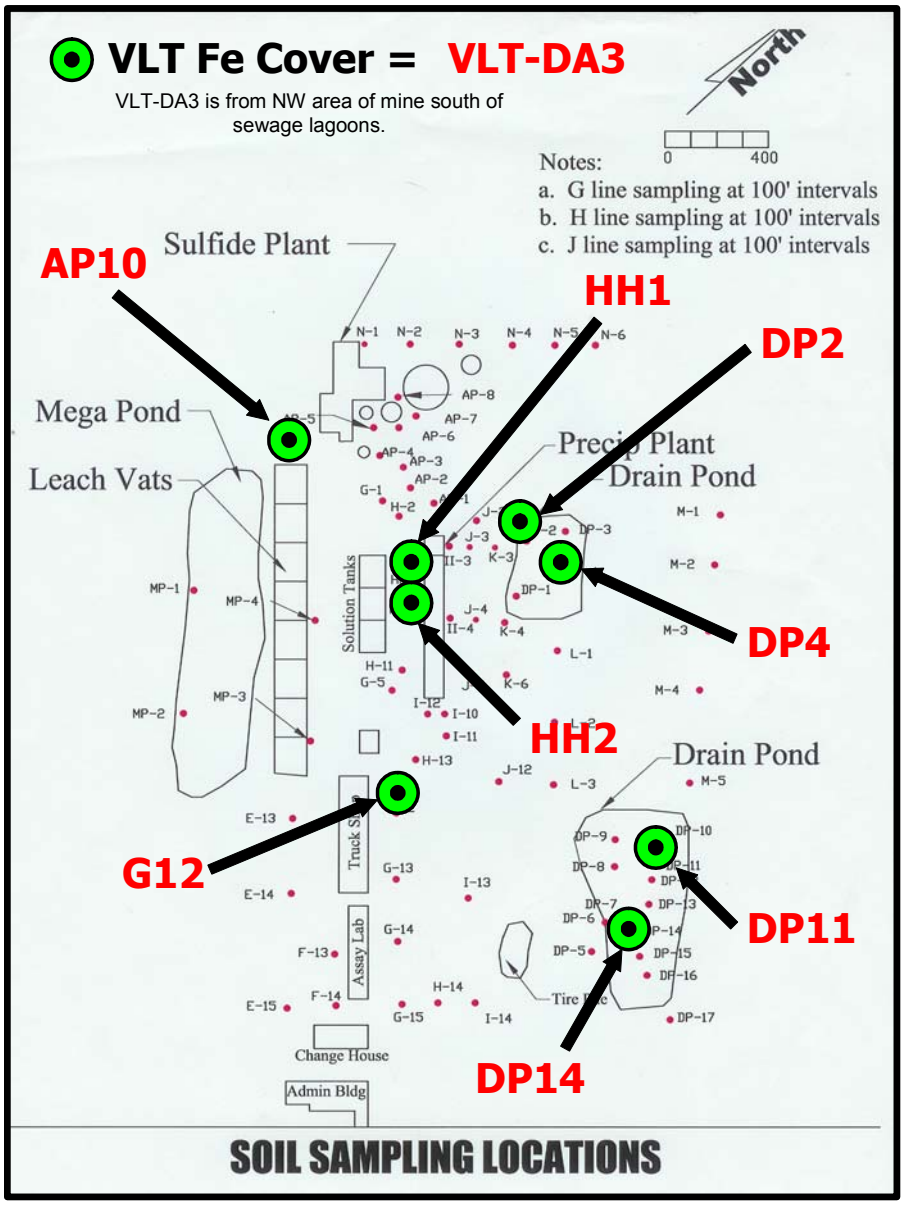
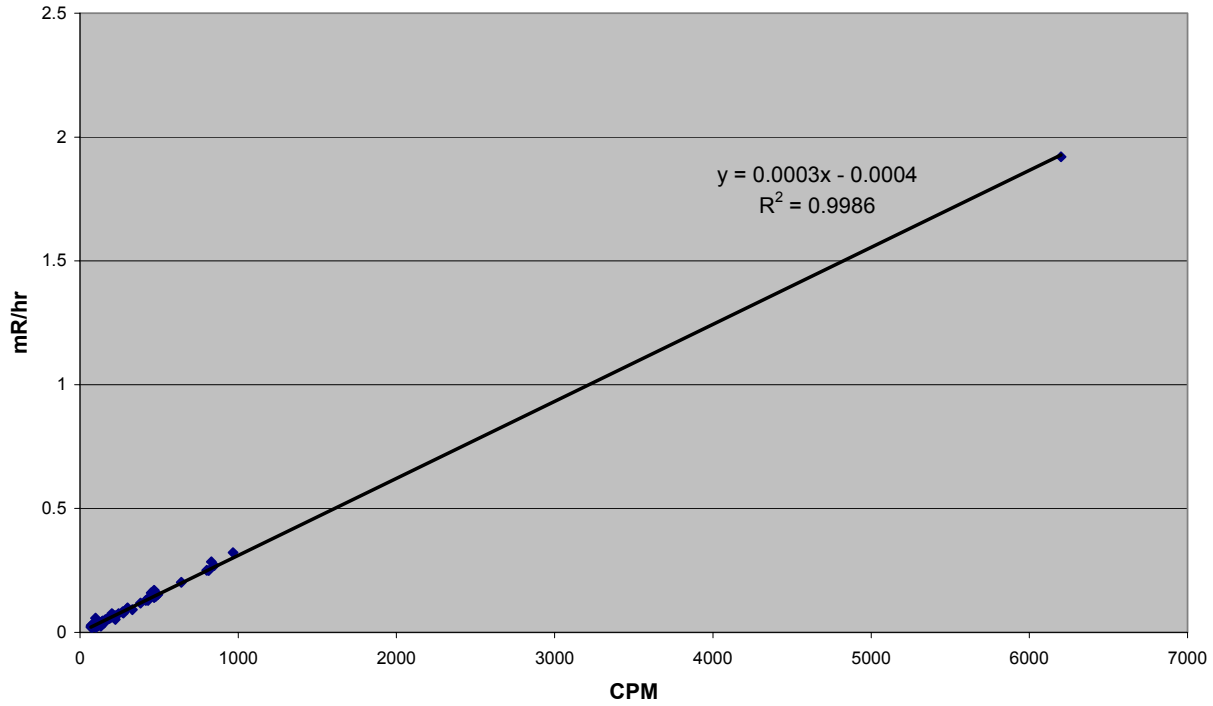


Table E3. *Yerington Mine VOC data.*

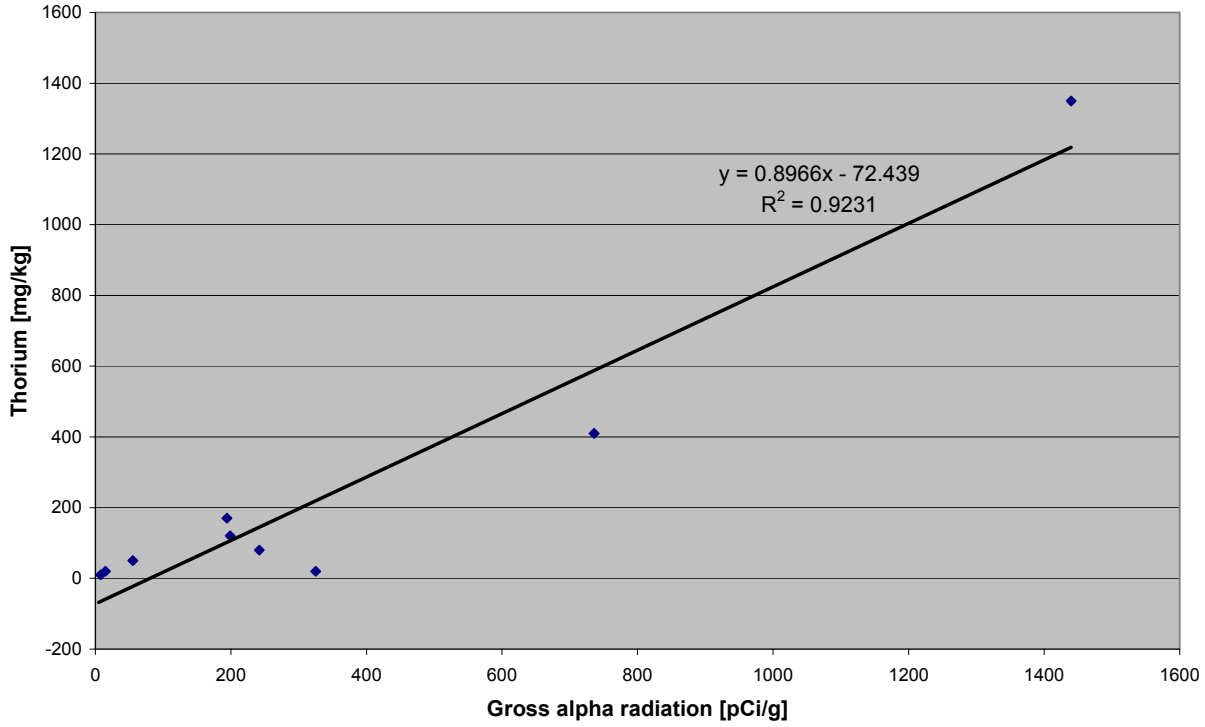
Sample ID	Easting m	Northing m	Date	ACZ rpt	2-Butanone ug/Kg	2-Hexanone ug/Kg	Acetone ug/Kg	Bromofluorobenzene %	Dibromofluoromethane %	Toluene-d8 %
PAO-P1	309309	4318667	6/24/2004	L46427	30	<10	90	92.4	115.3	110.4
PAO-P2			6/24/2004	L46427	30	<10	40	91.7	115.4	107.8
PAO-P3	309473	4318733	6/24/2004	L46427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

Compounds not detected in any of the above 5 samples:

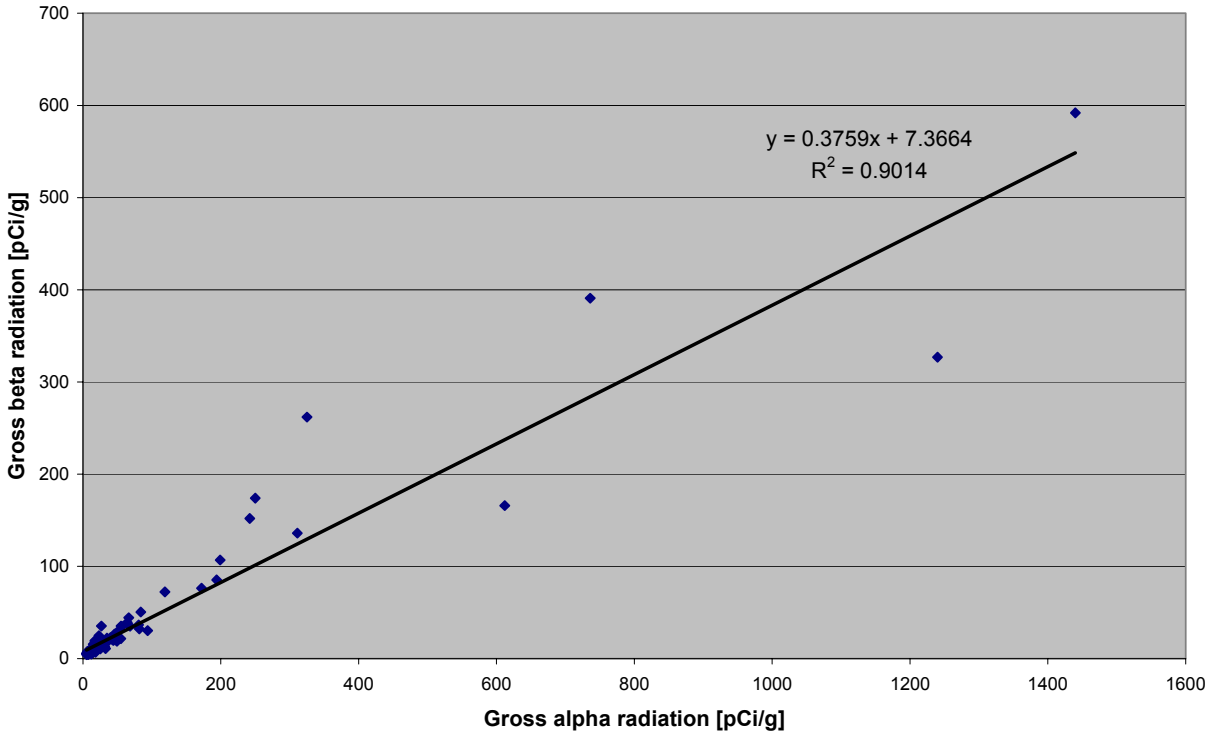
1,1,1,2-Tetrachloroethane	ug/Kg	<4	Carbon Disulfide	ug/Kg	<4
1,1,1-Trichloroethane	ug/Kg	<10	Carbon Tetrachloride	ug/Kg	<10
1,1,2,2-Tetrachloroethane	ug/Kg	<3	Chlorobenzene	ug/Kg	<4
1,1,2-Trichloroethane	ug/Kg	<4	Chloroethane	ug/Kg	<4
1,1-Dichloroethane	ug/Kg	<4	Chloroform	ug/Kg	<4
1,1-Dichloroethene	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	Hexachlorobutadiene	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
2,2-Dichloropropane	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	ug/Kg	<4
4-Chlorotoluene	ug/Kg	<4	tert-Butylbenzene	ug/Kg	<4
4-Isopropyltoluene	ug/Kg	<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			



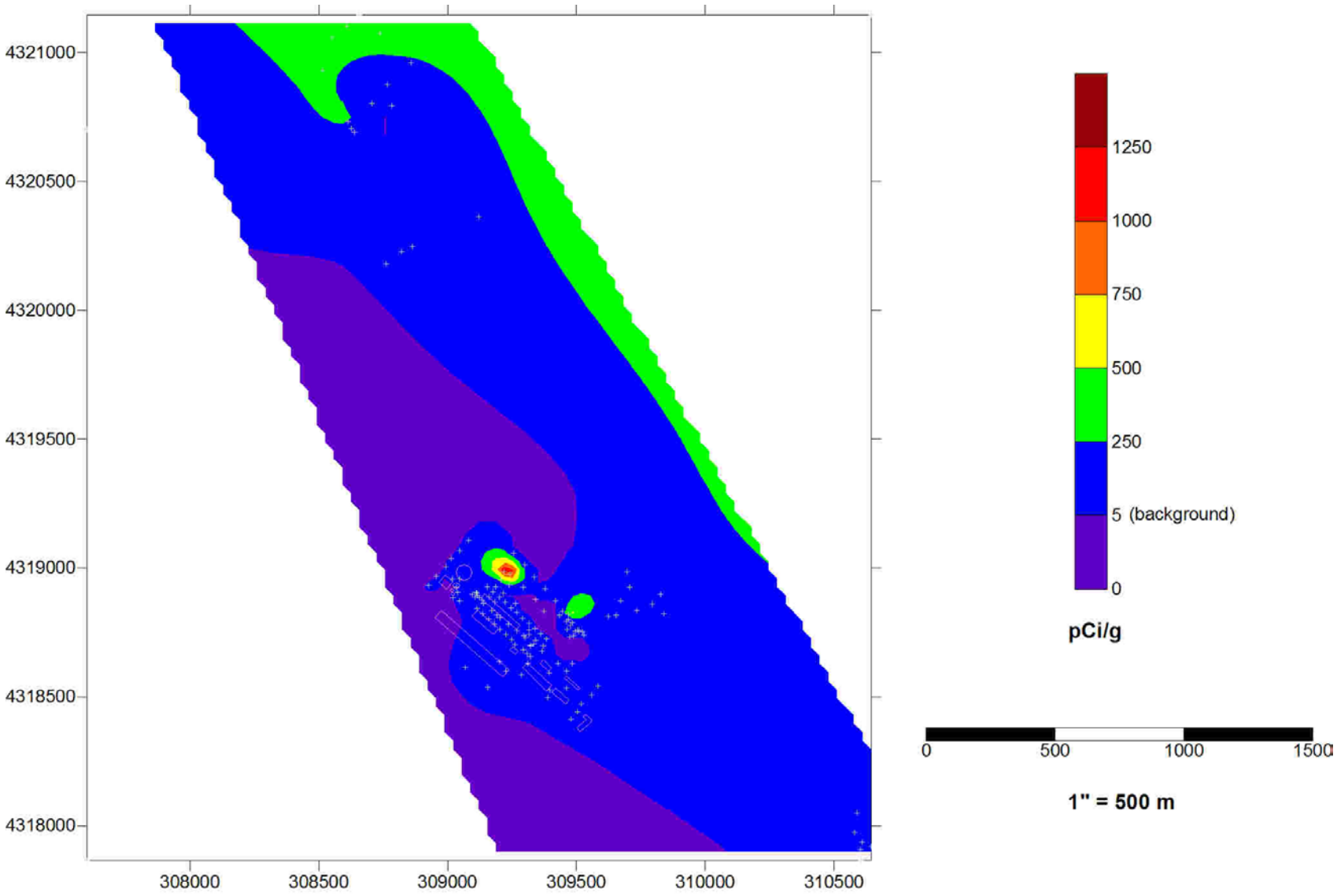
Radiation dose vs. Counts per minute
in soils samples from the Yerington Process Area



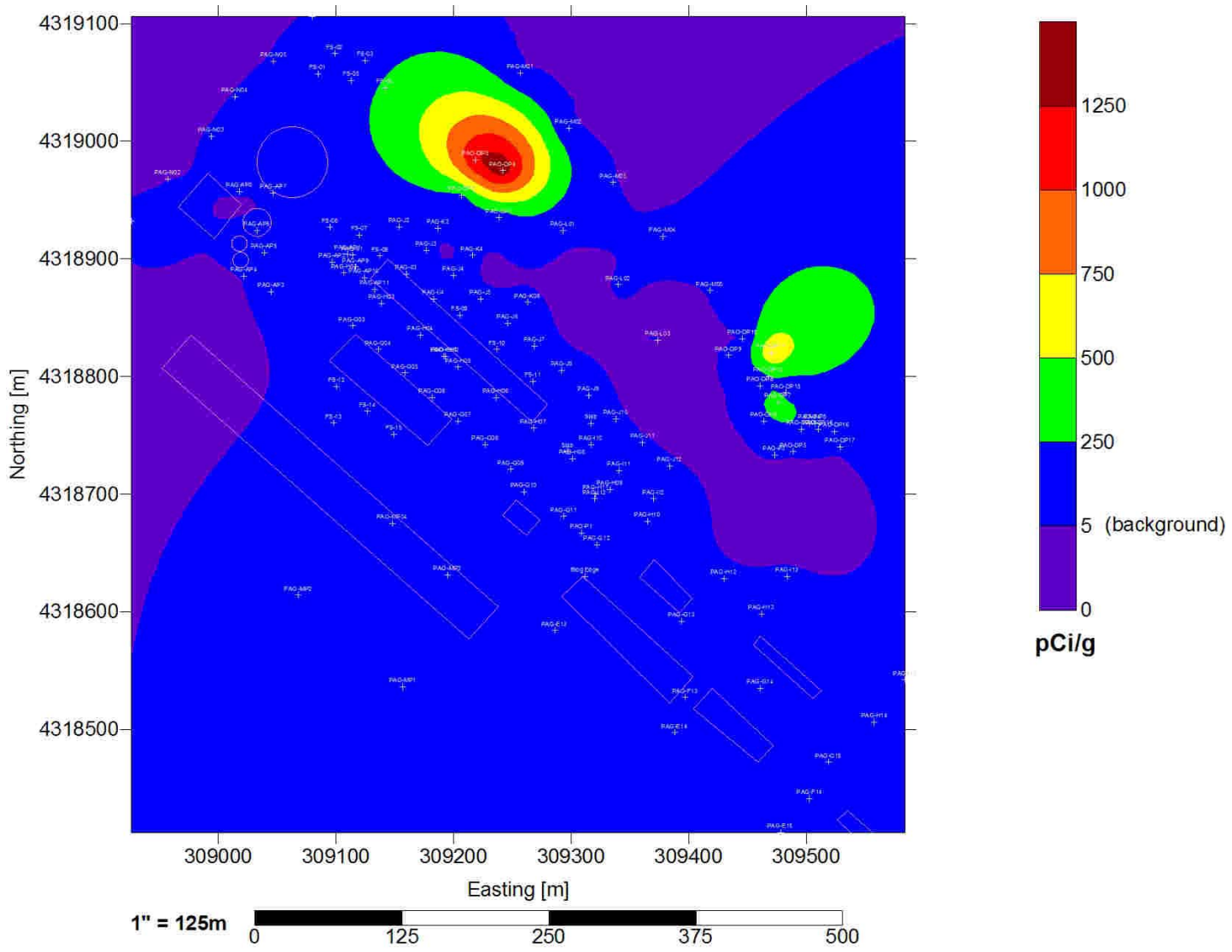
Throrium vs. Gross Alpha radiation
in soils samples from the Yerington Process Area



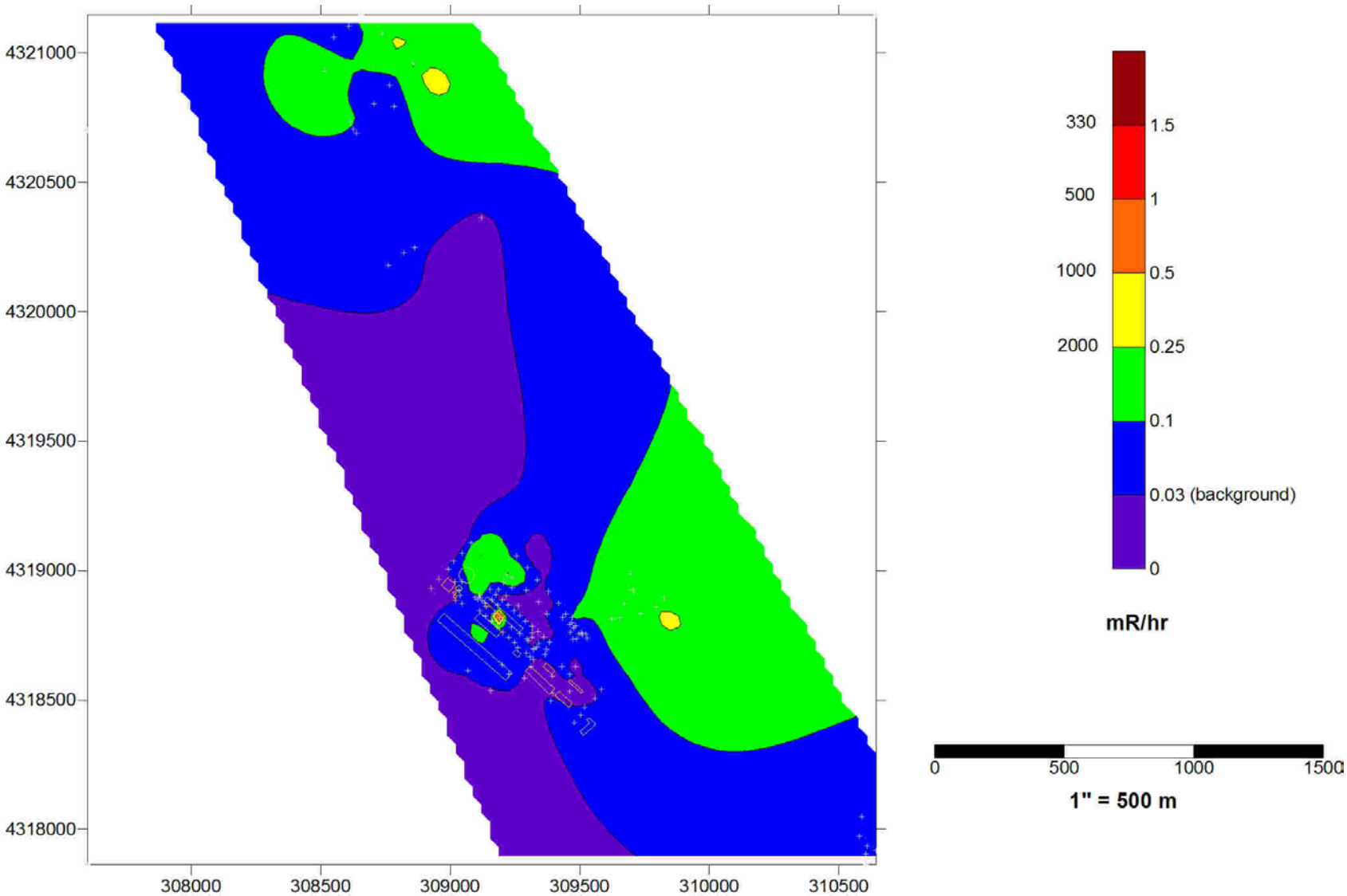
Gross Beta Radiation vs. Gross Alpha Radiation in soils samples from the Yerington Process Area



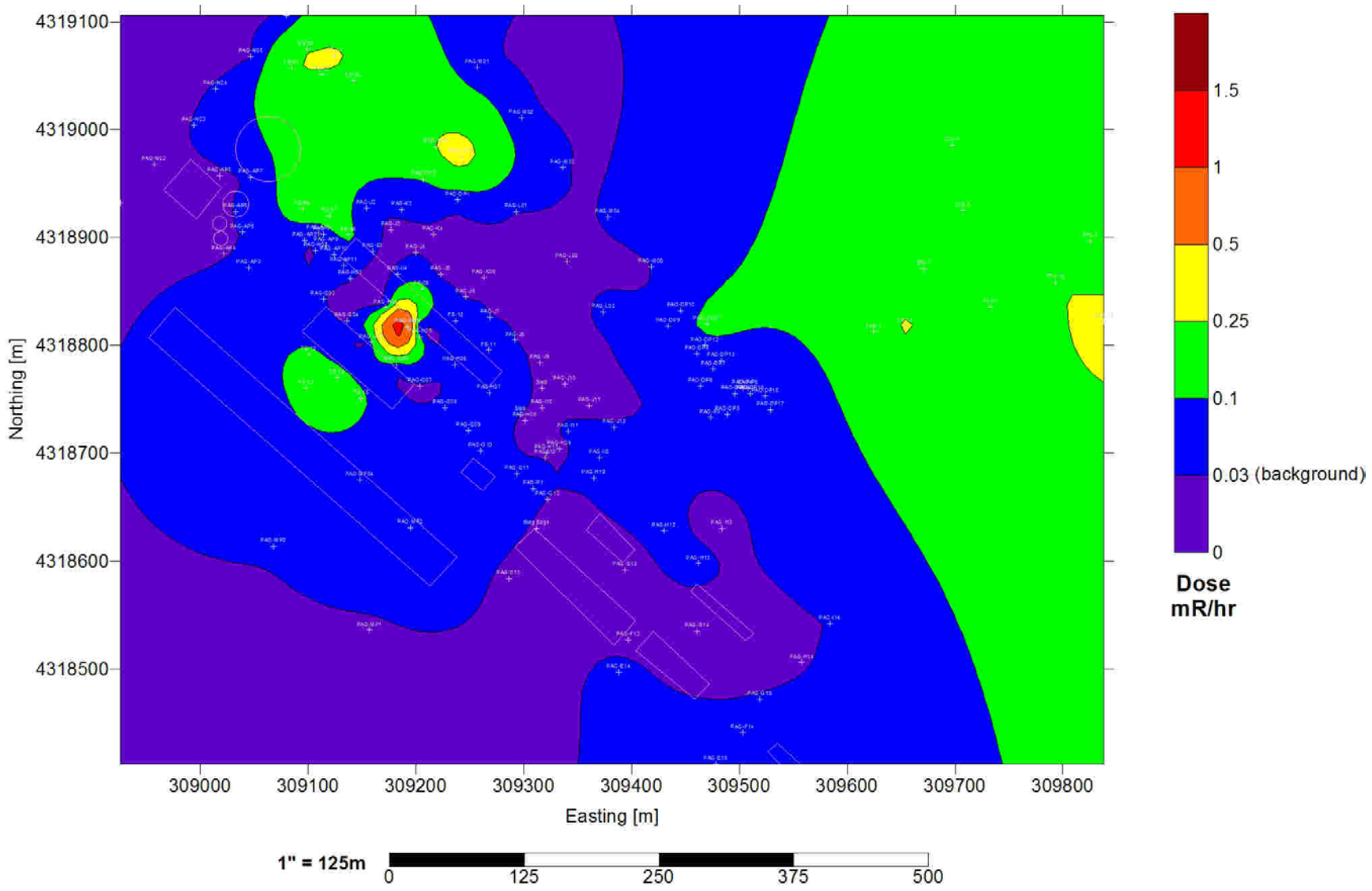
Yerington Gross Alpha radiation [pCi/g]
June 2004



Yerington Process Area Gross Alpha radiation [pCi/g]
June 2004



Yerington radiation dose measurements [mR/hr]
taken on-site by Walker & Associates in June/July 2004



Yerington radiation dose measurements [mR/hr]
taken on-site by Walker & Associates in June/July 2004

APPENDIX F

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WASHINGTON, D.C. 20240

September 27, 2002

In Reply Refer To:
1703 (360) N
Ref. IM No. 93-106 and
IM No. 2002-138

EMS TRANSMISSION 10/07/2002
Instruction Memorandum No. 2003-008
Expires: 09/30/2004

To: ll Washington Office and Field Officials

From: Assistant Director, Minerals, Realty and Resource Protection

Subject: Policy for Entry of BLM Personnel onto Sites with Potential or Known Hazardous Substance Releases

Program Area: Protection and Response, Field Operations Safety

Purpose: This Instruction Memorandum (IM) provides guidance for all BLM employees who enter sites with potential or known hazardous substances for specific purposes within their job responsibilities. The goals of this policy are to protect the health and safety of all BLM employees, minimize potential liability for BLM , and emphasize compliance with regulations under the Occupational Safety and Health Administration (OSHA), which apply to all BLM employees.

This policy does not apply to situations where BLM employees enter active industrial operations that are permitted or authorized to be on public lands, and which are in compliance with environmental and safety regulations of other agencies. For example, active aboveground and underground mines are subject to the regulations and standards enforced by the Mine Safety and Health Administration (MSHA). Oil and gas surface operations and facilities on rights of way (e.g., power plants) are subject to the regulations and standards enforced by OSHA. Entry onto sites not regulated by industry-specific safety requirements such as these is subject to the guidance contained in this policy.

Policy/Action: This IM establishes conditions under which it is permissible for an authorized BLM employee to enter known or potential hazardous substance release sites for specific purposes within the scope of their job responsibilities. **This policy does not impose any**

additional requirements on any BLM employee to enter hazardous substance sites. Rather, it is intended to clarify requirements for those who currently are authorized to enter such sites. Furthermore, this policy provides flexibility for each State to determine which employees, if any, will be authorized to enter such sites, and the responsibility for these determinations remains with each State Director.

A hazardous substance release site involves the spilling, leaking, emptying, dumping or disposing of hazardous substances into the environment. The term "hazardous substance" is an inclusive term, encompassing substances identified in several environmental statutes. Definitions of these terms are provided in Attachment 1. Any disposal of hazardous wastes on the public lands becomes, by definition, a hazardous substance release.

EPA has identified four categories of personal protective equipment (PPE), ranging from Level D to Level A, with Level A as the most protective (these categories are summarized in Attachment 2). In general, most BLM field employees encounter situations that require a minimal level of personal protective equipment, or Level D. However, in some limited situations, BLM employees do enter sites utilizing Level C or B PPE. Such trained employees may be members of hazardous materials response teams, or technical experts providing on-site assistance, who utilize Level B PPE as a greater measure of protectiveness when dealing with unknown substances. This policy accommodates a range of response strategies that may be implemented by the States, however, two limitations on site entry are contained in this policy:

1. Once a site-specific decision is made that Level B protection is warranted and necessary to perform on-site activities, all BLM employees are to withdraw, and rely on contractor or other hazmat response team support (e.g., County hazmat team) to conduct such activities.

2. Under no circumstances are BLM employees to enter a site that has been determined to require Level A protection. Level A is excluded from this site entry policy.

In order to enter sites that require any level of protection (Levels D, C, or B), certain health and safety requirements must be met, which are contained in OSHA regulations at 29 CFR 1910.120 (also known as the HAZWOPER regulations), or 40 CFR 311.1 of the National Contingency Plan (NCP). In order to ensure compliance with these regulations, BLM is establishing a system of State Rosters that list the names of those employees who are authorized to enter sites with known or potential hazardous substance releases. These Rosters will be maintained by the State or Center Directors, or their designees (e.g., State Hazardous Materials Program Leads or State Safety Officers), and will be updated as necessary, but at least once a year. The rosters will contain the following information:

$ risk level (i.e., Level D, C, and/or B) for which the employee is authorized by the State Director;

$ medical monitoring that will be conducted for the employee, if any;

$ health and safety training courses completed (including dates); and

$ indication that authorization to enter sites with known or potential hazardous substance releases is included in employee's position description.

As a matter of policy, BLM is requiring those employees authorized to enter sites with Level B protection to receive medical monitoring in the form of an annual physical. State Directors may determine that additional requirements for medical monitoring are appropriate (e.g., evaluations for employees authorized for Levels C and/or D). The annual physical for Level B authorization is a minimum requirement.

Another BLM and OSHA requirement for entering a site with known or potential releases of hazardous substances is preparation of a site-specific Health and Safety Plan (HASP) (see Departmental Manual 1112-1 Safety, Chapter 26, and 29 CFR 1910.120). An outcome of the HASP is that a level of protection (i.e., personal protective equipment required) is assigned to the site/job task. This assessment allows employees and supervisors to use management controls and PPE to reduce risk to an acceptable level. A HASP must be prepared before BLM employees enter a site with known or potential hazardous substances.

Finally, there are situations where BLM personnel who are not authorized to enter hazardous substance release sites (i.e, are not included on the State Roster) may need to visit a site. Such personnel may go onto a hazardous substance release site only if authorized by management, and provided they stay at a designated command post area or off-site area as designated by the site safety officer. Such personnel may not enter areas of contamination if they have not completed required HAZWOPER training.

BLM is developing a manual that will incorporate the guidance contained in this IM. In addition, BLM is consolidating information on existing health and safety requirements to include on the Hazmat website, located at http://web.blm.gov/internal/wo-300/wo-360/hazmatweb/index.htm. This website will provide specific information on existing training requirements and personal protective equipment, and include example formats for site-specific Health and Safety Plans.

Timeframe: This IM is effective upon receipt.

Budget Impact: This IM should have no effect upon the budget.

Background: This IM updates IM 93-106. This policy is intended to protect the health and safety of BLM personnel by establishing requirements for personnel who enter sites with known or potential hazardous substance releases for specific purposes within their job responsibilities. BLM also developed a policy for BLM field personnel who encounter suspected

hazardous substances in the course of conducting their job responsibilities (see Hazardous Substance Discovery Policy, IM 2002-138, March 29, 2002).

Manual/Handbook Sections Affected: Manual Section 1703 is affected by this policy.

Coordination: This policy has been coordinated with a wide range of WO offices, including the Fluid Minerals Group, the Solid Minerals Group, the Lands and Realty Group, the BLM Safety Manager, Renewable Resources and Planning, and Law Enforcement. In addition, this policy was distributed for review by all State Offices.

Contact: Questions or comments concerning this policy should be directed to Andrea McLaughlin, Protection and Response Group, at 202-452-7717.

Signed by:
Bob Anderson
Acting Assistant Director
Minerals, Realty and Resource Protection

Authenticated by:
Barbara J. Brown
Policy & Records Group, WO-560

2 Attachments
1 - Definitions (2 pp)
2 - EPA Standard Levels of Protection (2 pp)

Attachment 1: Definitions

1. The term "release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or contaminant) (National Contingency Plan, 40 CFR 300.5). **Any disposal of hazardous wastes on the public lands becomes, by definition, a hazardous substance release.**

2. The term "hazardous substance" is defined in the Hazardous Waste Operations and Emergency Response regulations (29 CFR 1910.120) as:

   $ Any substance defined under Section 101(14) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), also known as Superfund;

   $ Any biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring;

   $ Any substance listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101; and

   $ Hazardous wastes as defined in Department of Transportation regulations at 49 CFR 171.8, and regulations implementing the Resource Conservation and Recovery Act (RCRA) at 40 CFR 261.3.

3. For the purpose of this IM, a hazardous substance release site is defined as:

   $ A location which has been reported to the appropriate authority, including the Coast Guard (hotline), the Environmental Protection Agency (EPA), or to a State agency with competent jurisdiction, or has been entered into the Comprehensive Response, Compensation and Liability Information System (CERCLIS), or placed on the Federal Facilities Docket;

- A site where conditions require either Level A, B, C, or D protection in accordance with the EPA standard levels of protection (Attachment 2); or

- A site which has not been reported, assessed or investigated, but where past or present land uses or conditions or apparent evidence indicate that a response is warranted under Sections 104 or 106 of CERCLA. When in doubt, assume the worst case until additional information becomes available.

Attachment 2: EPA Standard Levels of Protection

Level A

1. One or more hazardous substances have been identified and the highest level of protection for skin, eyes and the respiratory system is required due to either the measured (or potential for) high concentrations of atmospheric vapors, gases or particulates, or the site operations and work functions involve a high potential for splash, immersion or exposure to unexpected vapors, gases or particulates of materials that are harmful to skin or capable of being absorbed through the skin;

2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or

3. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A protection have not been determined.

Level B

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection;

2. The atmosphere contains less than 19.5 percent oxygen; or

3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

Level C

1. The atmospheric contaminants, liquid splashes or other direct contact will not adversely affect or be absorbed through any exposed skin;

2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and

3. All criteria for the use of air-purifying respirators are met.

Level D

1. The atmosphere contains no known hazard; and

2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

STATE ROSTER for Site Entry Policy
(In compliance with WO IM-2003-008)

Note: # indicates an employee that is pending training or their training has lapsed and is now out of compliance with the Bureau Site Entry Policy.

Office	Name	Title	Level	24*- 40 hr	8 hr
NSO	Robert Kelso	Envir. Prot. Spec.	D	06/94	05/04
	Chris Ross	Nat. Res. Spec. – AML	D		Pending#
NV010	Deb McFarlane	Geologist	D		05/04
	Frank Bergwall	Geologist	D		03/04
NV020	Rod Herrick	Geologist	D		05/04
NV030	Terry Neumann	Envir. Prot. Spec.	D		Pending#
	Earle Dixon	Envir. Prot. Spec.	D	07/92	05/04
NV040	Dan Netcher	Geologist - Team Lead	D		05/04
	Jeanette Matovich	Envir. Prot. Spec.	D	07/03	05/04
NV050	Mike Moran	Envir. Prot. Spec.	D		05/04
NV060	Steve Drummond	Mining Engineer.	D	05/04	05/04
NV911	Mark Pirtle	Special Agent	D		Pending#
	Brian Richards	Special Agent	D		Pending#
	Randy August (LV)	Special Agent	D		Pending#

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