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# SITE SPECIFIC SAFETY PLAN FOR THE K-65 VERTICAL BORING OPERATIONS

3-1-91

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REPORT

Orig.

# SITE SPECIFIC SAFETY PLAN

FOR

THE K-65 VERTICAL BORING OPERATIONS

MARCH, 1991

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## 1.0 INTRODUCTION

This site specific safety plan has been prepared as a supplement to the overall Site Safety Plan - Volume II and contains information that is unique to the K-65 Vertical Boring Operations. Considerations unique to this location and tasks are presented in the body of the text; those that apply to the entire facility are also included.

## 2.0 K-65 BACKGROUND INFORMATION

### Contents of the Silo

The K-65 silos contain waste from the World War II Manhattan Project. For this work, a uranium-rich ore called pitchblende was imported from the Belgian Congo. Pitchblende was treated with nitric acid to dissolve the uranium away from the ore. The remaining residues were mixed with water and pumped into the silos, where the solids settled. The liquids at the surface were pumped back out of the silos into a treatment facility. What remains in the silos now is about 9,700 tons of residual solids.

The residues in the silos emit radiation. The radioactivity levels of the residues are higher than ordinary tailings from uranium mining and milling. Like other uranium ore tailings, these residues produce radon gas, although in considerably larger quantities.

The stored residues present a potential hazard and require careful storage techniques to ensure safety and isolation from the environment.

Table 2-1 provides analytical results from previous sampling efforts of the refined slurry.

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TABLE 2-1
Characteristics of K-65 Residues

| Radionuclides | Silo 1 pCi/g | Silo 2 pCi/g | Average pCi/g |
|---|---|---|---|
| Am-241 | 0 | 2 | 1.0 |
| Th-228 | 425 | 568 | 496.5 |
| Th-230 | 29700 | 28000 | 28850.0 |
| Th-232 | 436 | 614 | 525.0 |
| Ra-226 | 145000 | 74400 | 109700.0 |
| Ra-228 | 1570 | 715 | 1142.5 |
| Pb-210 | 83800 | 167000 | 125400.0 |
| U-234 | 676 | 885 | 780.5 |
| U-235/236 | 46 | 52 | 49.0 |
| U-238 | 636 | 784 | 710.0 |
| U-Total (ppm) | 1910 | 2350 | 2130.0 |

| Inorganics | ppm | ppm | ppm |
|---|---|---|---|
| Aluminum | 811.1 | 1229.2 | 1020.2 |
| Antimony | 0.0 | 2.3 | 1.2 |
| Arsenic | 49.9 | 427.5 | 238.7 |
| Barium | 4031.4 | 3866.5 | 3949.0 |
| Beryllium | 1.6 | 2.5 | 2.1 |
| Cadmium | 3.6 | 6.8 | 5.2 |
| Calcium | 4112.9 | 61301.7 | 32707.3 |
| Chromium | 61.6 | 38.3 | 50.0 |
| Cobalt | 767.9 | 820.2 | 794.1 |
| Copper | 266.3 | 457.2 | 361.8 |
| Iron | 21538.6 | 16990.0 | 19264.3 |
| Lead | 59742.9 | 18792.2 | 39267.6 |
| Magnesium | 3130.0 | 4688.3 | 3909.2 |
| Manganese | 105.2 | 204.2 | 154.7 |
| Mercury | 0.8 | 1.0 | 0.9 |
| Nickel | 1380.6 | 974.4 | 1177.5 |
| Potassium | 319.6 | 185.8 | 252.7 |
| Selenium | 156.7 | 87.8 | 122.3 |
| Silver | 11.0 | 10.2 | 10.6 |
| Sodium | 5361.4 | 1625.5 | 3493.5 |
| Thallium | 0.2 | 0.6 | 0.4 |
| Vandium | 126.3 | 155.5 | 140.9 |
| Zinc | 53.8 | 53.2 | 53.5 |
| Cyanide | 1.9 | 1.8 | 1.9 |

NOTE: Data from 1989 WMCO Sampling - Data currently being validated

## 3.0 TASKS TO BE PERFORMED

Four vertical borings will be performed in the berms adjacent to K-65 silos 1 and 2, as seen in Figure 3-1. Soil cuttings will be monitored and soil sampling conducted during this operation. Borings to be refilled with grout compound upon completion of sampling.

Will Site Activities:

| | | | |
|---|---|---|---|
| yes | Disturb Surface Soil | no | Sample Surface Water |
| yes | Disturb Subsurface Soil | no | Sample Lagoons |
| yes | Use Heavy Equipment | no | Use Boat |
| no | Enter Confined Space | yes | Involve Radioactivity |
| no | Disturb Containerized Matter | no | Involve Trenches |

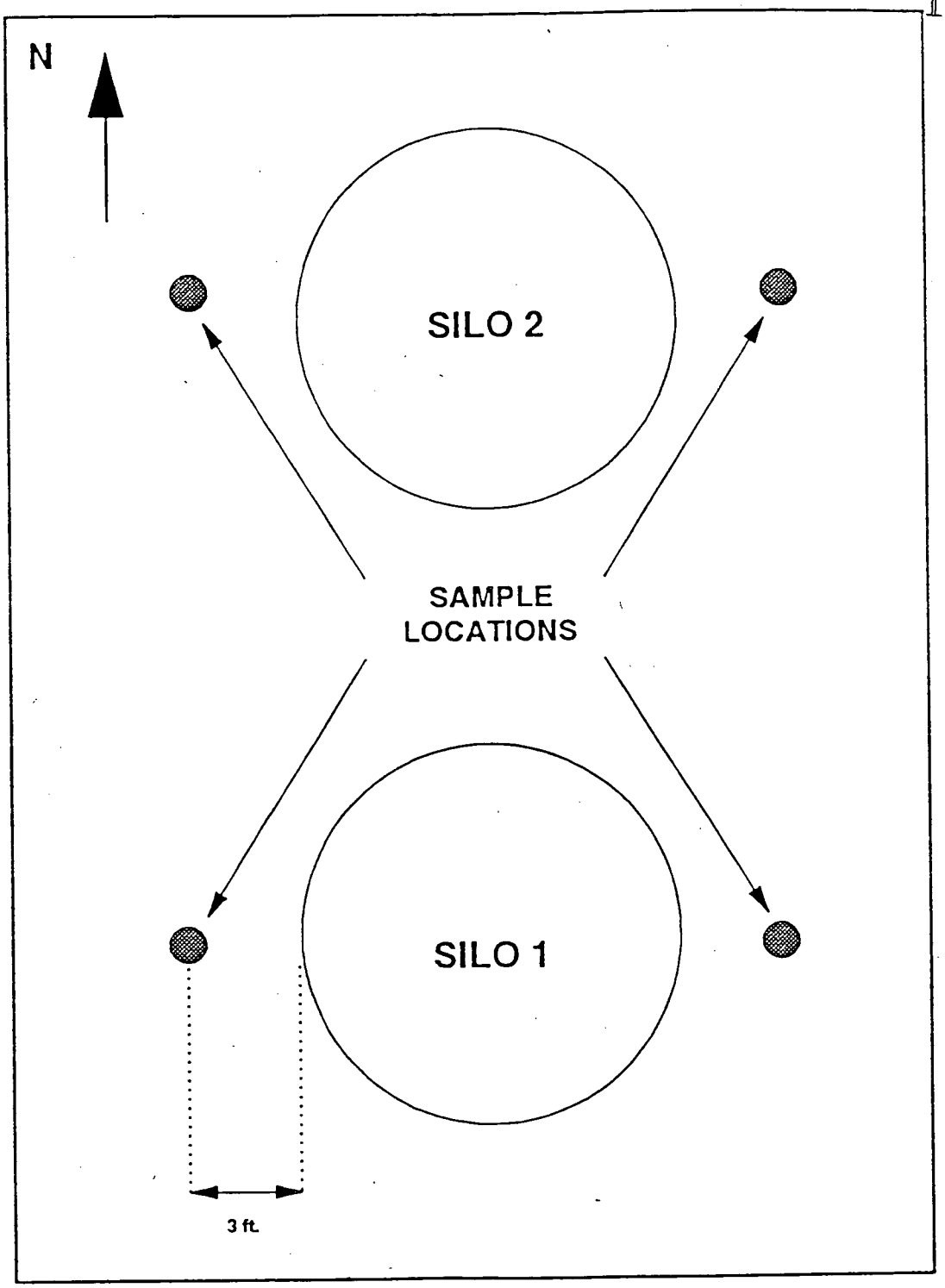


FIGURE 3-1 VERTICAL BORING LOCATIONS

## 4.0 TASK SPECIFIC HAZARD ANALYSIS

The following hazard assessment is based on historical information and previous sample results in the area. Boring logs and sampling results for monitoring wells 1032, 2032 (West of K-65), 1033 (East of K-65), and 1034, 2034, 3034 (South of K-65) were reviewed and showed no detectable volatile organics or radioactivity above the established action limits. The field team routinely reassesses the hazards before starting work to assure that conditions have not changed. All newly identified hazards will be addressed with the ASI health and safety department to determine the degree of hazard and if any changes to the safety plan are needed.

### 4.1 Physical Hazards

- Radiological Hazards
  - External
  - Internal
- Radionuclides of Concern
  - U-238 and daughters
  - U-235 and daughters
  - Ra-226 and daughters
  - Th-232 and daughters
- Noise
- Heat Stress
- Cold Stress
- Crane/Drill Rig Operations
- Underground Utilities

RADIOLOGICAL ASSESSMENT

On-Site Measurements (contamination readings for soil boring surface and exposure rate readings at 3 foot height):

**Boring 1**

| | | |
|---|---|---|
| Alpha contam. | 0-10 cpm (Loose) | <110 dpm/100 $cm^2$ (Total) |
| Exposure Rate | ~5.0 mR/hr | |

**Boring 2**

| | | |
|---|---|---|
| Alpha contam. | 0-10 cpm (Loose) | <110 dpm/100 $cm^2$ (Total) |
| Exposure Rate | ~5.0 mR/hr | |

**Boring 3**

| | | |
|---|---|---|
| Alpha Contam. | 0-10 cpm (Loose) | <110 dpm/100 $cm^2$ (Total) |
| Exposure Rate | ~5.0 mR/hr | |

**Boring 4**

| | | |
|---|---|---|
| Alpha Contam. | 0-10 cpm (Loose) | <110 dpm/100 $cm^2$ (Total) |
| Exposure Rate | ~5.0 mR/hr | |

All Boring Locations

Average radon gas concentration at handrail = 42pCi/l on top of K-65 silos.

Corresponding working level (Radon daughters 50% equilibrium) = 0.021WL.

## 4.2 Radiological Hazards

| Contaminant | Derived Air Concentration (DAC) | Action Level |
|---|---|---|
| Thorium-230 | 3E-12 uCi/ml | 1E-12 uCi/ml |
| Ra-226 | 3E-10 uCi/ml | 1E-10 uCi/ml |
| Uranium-238 | 2E-11 uCi/ml | 1E-11 uCi/ml |
| Radon Daughters (Po-218, Pb-214, Bi-214, Po-214) | 0.3 WL | 0.075WL (WMCO's guide) |
| Rn-222 | 60 pCi/l (50% equilibrium) | 15 pCi/l |
| Uranium-235 (trace levels of actinium series) | 2E-11 uCi/ml | 1E-11 uCi/ml |
| Uranium-234 | 2E-11 uCi/ml | 1E-11 uCi/ml |

## 4.3 Chemical Hazards

| Chemical Hazards | PEL | Action Level |
|---|---|---|
| Lead | 50 ug/m$^3$ | 30 ug/m$^3$ |
| Nitric Acid (trace) | 2 ppm | 1 ppm |
| Organics (unknown) | Default Value | See Section 5.1 (HNu) |
| Methanol (eqpt. Decontamination) | 200 ppm | 100 ppm |

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## 4.4 Routes of Entry

All of the potentially significant site contaminants are particulate in nature except for radon gas and methyl alcohol vapors. Small volumes of methyl alcohol used in open air conditions have not produced air concentrations in excess of the ASI action limit. This is expected to remain true for the K-65 silo work. (Respirators will be used to minimize inhalation of radioactive materials which might spatter during decontamination.)

Radiological exposures are calculated to be almost entirely from external gamma radiation if respiratory protection is used.

## 5.0 MONITORING AND ACTION LIMITS

Air monitoring will be performed to assure that contaminant concentrations in the breathing zone do not exceed the concentrations specified by established occupational exposure levels. The ASI action levels for chemical exposures include an additional safety factor of two to account for potential inaccuracies associated with the use of field measurements. For potential exposures to radionuclides, an additional factor of four is used. (If air concentrations exceed 25% of the Derived Air Concentration for exposure to the worst case radionuclide, respiratory protection will be used.) If identities of airborne organic concentrations are unknown, default values will be used.

ASI policy requires use of administrative controls, engineering controls, or the use of personnel protective equipment (PPE) to limit onsite exposures to levels below the ASI action limit. It is advisable to keep exposures to chemicals as low as possible since combined effects of most chemical mixtures are not understood.

## 5.1 Action Limits

| Instrument | Need | Interval | Limit | Action |
|---|---|---|---|---|
| Exposure Rate Meter | Y | Pre-Job | >2mR/hr | H.P. Review |
| Alpha Probe[7] | Y | Pre-Job & Intermittent | 500 cpm[1] | APR[2] Level C |
| | | | 25,000 cpm | Withdraw |
| Beta/Gamma Probe[7] | Y | Pre-Job & Intermittent | 5000 cpm[1] | APR Level C |
| | | | 250,000 cpm | Withdraw |
| HNu Meter (Breathing Zone[4]) | Y | Intermittent[3] | Detection to 10 ppm [5] | APR Level C |
| | | | 10-25 ppm | SAR[6] |
| | | | >25 ppm | Withdraw |
| Radon and WL Monitor (CAM) | Y | Intermittent Continuous | 0-0.075 WL | None |
| | | | 0.075-16.5 WL | APR |
| | | | 16.5-300 WL | SAR/SCBA |
| | | | >300 WL | Withdraw |
| Airborne Lead (Breathing Zone Sampler) | Y | Continuous | NA-No real time results | |
| pH Paper (Moist Tailings) | Y | Intermittent | <3 | Stop |
| | | | >12 | |
| Quest Noise Dosimeter | Y | Intermittent | >85 dba | Hearing protection required |

Detection is defined by ASI/IT as an HNu reading of 1 ppm above the background reading. The reading must persist for one minute or more. For HNu monitoring around drilling operations the breathing zone is defined as two to three feet above the hole.

1 Above background.
2 Full-face air purifying respirators with organic vapor, acid gas, fume cartridges. Disposable protective clothing, such as Saranax coveralls and a step-off decontamination will also be required at any time APRs are used.
3 At intervals of 30 minutes or less at the split spoon and in the breathing zone.
4 Two to three feet from borehole for drilling, <14" in front of employee's shoulder for other operations.
5 "Detection" is defined as 1 ppm above background
6 Supplied Air Respirator.
7 Split spoon samples/tailings monitored for alpha contamination and beta/gamma contamination using hand-held alpha scintillator and Geiger Mueller detectors respectively.

## 6.0 ALARA MEASURES:

1. Eating, drinking, and smoking will be prohibited in the K-65 area, except in designated break areas.

2. Breaks and/or planning meetings will be held in a low exposure area, in order to minimize time in elevated radiation areas.

3. In order to minimize time in elevated radiation areas, maintenance of equipment requiring more than one hour will not be done within the K-65 fence area.

4. Work will be preplanned. Experienced workers will be used to ensure efficiency and minimize exposure times in the K-65 area.

5. Respirators will be utilized as described in section 5.1, in order to minimize internal exposures.

6. To minimize the collective exposure, the work crews will utilize the minimum number of personnel which can effectively perform the work.

## 6.1 Radiological Exposure Assessment

### 6.1.1 External Exposure

A radiological survey was conducted at boring locations 1 through 4 around the K-65 silos on November 20, 1990, by IT Radiological Safety. Exposure rates as measured with an air ionization chamber approached 5.0 mR/hr at all four locations. Based on these measurements and time and manpower estimates supplied by ASI/IT operations supervisors, the total external collective dose to our workers was estimated to be 1.920 Man-Rem.

These calculations can be reviewed below. The dose estimates are well below applicable WMCO and DOE guides and limits.

**ASSUMPTIONS:**
a) Operating crew will consist of 4 people.
b) The entire operation will require a total of (16) six hour days of exposure time.
c) Average radiation levels are 5 mR/hr.

16 days x 4 men x 6 hours/day x 5.0 mR/hr = 1.92 Man-Rem

Estimated external dose equivalent to each individual:
= 1.c.

1920 Man-mRem/4 men = 0.48 Rem

### 6.1.2 Internal Exposure

Radon gas concentration at the K-65 security fence averaged 42 pCi/l during 1989.

The total cumulative whole body dose equivalent from internal exposure is estimated to be 0.593 Man-Rem for the crew at the average concentration of 42 pCi/l.

Air sampling by a constant air monitor during work each day will assure levels of airborne radioactivity below action levels, thus keeping internal exposures to a minimum. All internal dose estimates including the maximums are well below recognized guides and limits in DOE Order 5480.11 and 10 CFR20.

### 6.1.3 Total Whole Body Dose Equivalent (Internal and External)

A radiation dose equivalent to a whole body dose of 0.628 Rem, is projected for each individual of the drilling crew if the same persons are used for all 4 borings and the work takes 16 days to complete. It is worth noting that 76% of the radiation dose expected to be received during the work will be from external exposure from the radioactive elements contained in the K-65 silos. The total collective whole body dose equivalent expected to complete the K-65 vertical borings is estimated at approximately 2.513 Man-Rem.

1.92 Man-Rem + 0.593 Man-Rem = 2.513 Man-Rem

External Internal Collective Dose Equivalent

The maximum internal dose to an unprotected worker is calculated to be 0.148 Rem in 16 days of operation. However, full face respiratory protection will be required inside the K-65 fence and internal exposures should be much less than the estimated exposures.

## 7.0 TASK SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

All employees in the task exclusive area will wear the following personal protective equipment.

| ITEM | Level C NEED | Level C JUSTIFICATION |
|---|---|---|
| APR | Y | WMCO Policy |
| Cartridges - Combination OV,AG, HEPA | Y | |
| Hearing Protection | Y | For Sampling if above 90dBA |
| Hard Hat | Y | Minimum Requirement |
| Latex Boots | N | |
| Gloves | Y | |
| Inner Gloves | N | |
| Leather-Palm Gloves | Y | For Sampling |
| Nitrile Gloves | Y | For methanol decontamination of eqpt./soil handling. |
| Process Coveralls | Y | Minimum requirement |
| Plain Tyvek | Y | Required inside K-65 fence |
| PE Tyvek | Y | Required only when decontaminating equipment |
| PVC Gloves | N | |
| SAR | N | |
| Safety Glasses | Y | Minimum Requirement |
| Safety Goggles | Y | Required only when decontaminating equipment |
| Safety Shoes | Y | Minimum Requirement |
| Saranex | N | |

7.0 TASK SPECIFIC PERSONAL PROTECTIVE EQUIPMENT (CONTINUED)

| ITEM | NEED | JUSTIFICATION |
|---|---|---|
| TL Dosimeter | Y | |
| Personal Radon Monitor | Y | |
| Self-Reading Dosimeter | Y | |

# 8.0 SITE ACCESS

## 8.1 Access

Access to the Feed Materials Production Facility is limited by Westinghouse Security. All site personnel and visitors must register and be issued a pass to enter the DOE property.

## 8.2 Bioassay Sampling and Whole Body Counting

### Bioassay Sampling

A baseline 24-hour urine sample will be submitted to WMCO prior to the start of boring activities and analyzed for Thorium-230 and Radium-226. Sampling kits will be provided by WMCO.

A post-work, 24-hour urine sample will be submitted to WMCO upon completion of work and analyzed for Thorium-230 and Radium-226.

Additional urine samples will be required if air samples indicate an acute exposure of 40 DAC-hours (2 percent of the annual limit of Intake (ALI)). This correlates to a gross alpha activity for the most conservative nuclide, Thorium-230, of $1E-10^{-6}$ µCi/ml averaged over a one-hour exposure. A one-hour exposure leading to 40 DAC-hours for Radon daughters is 12.0 WL or $1.2 \times 10^{-6}$ µCi/ml for Rn-222 in 100% equilibrium with its daughters. A point worth noting is that no respirator protection factors are built into these action levels.

### Whole Body Counting

A pre and post work whole body count will be required for the K-65 vertical boring program. Additional counts may be required if the 40 DAC-hour action levels are exceeded.

## 8.3 Medical Monitoring

In accordance with 29 CFR 1910.120 OSHA requirements, all ASI and subcontractor field personnel are required to participate in a medical monitoring program which includes:

- A baseline medical examination
- Annual medical examination
- Medical examinations may be required after potential exposures.
- Exit medical examination

## 8.4 Training Requirements

All ASI and ASI subcontractor personnel assigned to the site tasks will, as a minimum, meet OSHA training requirements including:

- 40-hour OSHA training
- 8-hour annual refresher training
- 8-hour supervisory training (for supervisors)
- 24-hour supervised field experience
- Review of site specific hazards and procedures (tailgate safety meetings)
- WMCO radiation safety training
- WMCO respiratory training and fit test

## 8.5 Contamination Zones

The Exclusion Zone is the zone of high potential hazard due to physical or chemical dangers. Access to the Exclusion Zone is restricted to employees who are required to enter in order to perform their job functions.

A minimum radius of four feet from the sampling device will be considered to be the Exclusion Zone. The zone may be expanded if airborne hazards are detected. The Exclusion Zone will be marked with cones or other easily recognizable devices.

The K-65 control fence will be utilized as an exclusion zone since it is a highly secure area. The fence will also serve as a contamination reduction zone, if warranted.

## 9.0 SITE ENTRY PROCEDURES

- X Each site crew will radio CONTROL daily to establish radio contact, location, start time and stop time.
- X Procure IT radiation work permit for sampling operations.
  - Identifies degree of radiological hazard.
  - May limit allowable work time.
  - May specify minimum PPE requirements.
- X Procure penetration permit from WMCO for sampling operations.
  - Identifies potential underground hazards such as utilities and buried tanks.
- X Procure utilities clearance from WMCO subcontractor.
- X Conduct ASI/IT Magnetometer survey in area where boring is to be initiated.
- X Assign/Issue Personal Radon Dosimeters.
- X Rezero/Issue Self Reading Dosimeters (SRD).
- X Read SRD's at a minimum of every 2 hours and have reading recorded at the end of the work shift.
- X All heavy equipment is required to undergo a safety inspection by WMCO Fire and Safety personnel upon initial entry to the FMPC.
- X Perform tailgate meeting to familiarize team with site specific hazards. Identify exclusion zone and break area. Discuss alternate communications signals (if applicable).
- X Calibrate instruments and log calibrations.
- X Perform respirator check out and fit test prior to use.
- X Monitor for volatile organics using real time instruments such as an HNU.
- X Monitor for radiation using radiation meters for alpha and beta/gamma.
- X Use buddy system.
  Teams of at least two individuals will be used for all activities within an exclusion zone. Team members will monitor each other for signs of heat stroke or other distress and will render aid.

Note: The ASI Site Safety Officer (SSO) and any member of the ASI/IT field team have the authority to stop work when imminent or serious safety hazards or conditions exist. Restart of work will be allowed only after the hazard or condition has been abated or reduced to a level deemed acceptable by the SSO (or his designated representative) and Project Manager.

## 10.0 SITE EXITING PROCEDURE

### 10.1 Contamination Detection

All site personnel are required to be monitored for contamination upon exit from contamination areas. This will be accomplished by frisking with hand-held radiation monitors.

Personnel monitoring will be performed using portable survey instruments equipped with a Zinc Sulfide Scintillation Detector (Alpha). For alpha contamination monitoring, the detector should be held as close as possible to the surface being frisked (not in contact) and surveyed at a rate of 1 to 2 inches per second. All personnel will perform a whole body frisk upon exit from a contamination area.

In the event that contamination can not be removed to below the action level (100 cpm beta/gamma or detectable alpha above background), contact Health Physics personnel. Health Physics should be notified of any contamination incidents.

Vehicles and other equipment used onsite must be monitored for contamination (and decontaminated if necessary) before moving them to non-contaminated areas. Health Physics personnel will determine when the equipment is safe to move to clean areas.

### 10.2 Decontamination

Decontamination reduces contaminant concentrations to acceptable levels, but does not generally remove it totally. Try to avoid contamination where possible by making minimum contact with the contaminant.

Personnel: Remove disposable protective equipment, wash hands, face and any other exposed skin. Detergent and water should be used to scrub skin surfaces which have contacted potentially contaminated wastes.

The effectiveness of decontamination must be confirmed by frisking or the use of hand and foot monitors.

Monitoring Equipment: Any exposed areas of the monitoring equipment surface will be wiped with a damp paper towel/cloth to remove contamination. Wiping with cloth dampened with detergent solution may be necessary to remove greasy materials.

Heavy Equipment: Heavy equipment generally requires decontamination at the equipment pad for non-production area environmental work. Frisking and/or wipe tests will be performed to confirm the effectiveness of decontamination.

### 10.3 Dosimetry

Log in self reading dosimeter results and turn in Radon dosimeter with ASI/IT Health and Safety.

## 11.0 INVESTIGATION DERIVED WASTES

Investigation derived wastes are wastes generated in the performance of onsite activities. These wastes include, but are not limited to:

- Sampling device cuttings.
- Disposable PPE such as Tyvek coveralls, gloves, and booties.
- Excess sample materials such as soil or water.
- Decontamination solutions such as methanol.

All potentially contaminated waste materials resulting from ASI site activities will be collected and placed in drums or other containers specified by the client. Protective clothing will be placed in plastic bags and disposed of as compactible, potentially contaminated waste through WMCO. Wastes will be segregated, specifically waste solvent such as methanol will not be combined with other wastes such as disposable protective clothing.

Investigation derived wastes are the property of the client and are to be left onsite unless otherwise specified in the written contract.

The client will be responsible for proper transport, shipment or disposal unless otherwise specified in the written contract.

## 12.0 CONTINGENCY PLANS

WMCO has an established Emergency Response Plan and this plan will be utilized for all emergencies except minor injuries. ASI personnel will not attempt to treat major injuries, fight significant fires or control chemical spills.

Injuries

In the event of minor injuries, site personnel will try to reduce or eliminate the consequences when possible. The process of determining what is appropriate to do requires that each situation be evaluated on a case by case basis.

If it is safe for the worker to attempt rescue, it should be done without delay to minimize the victim's injuries.

### 12.1 Minor Injuries

Minor injuries (sprains, strains, and cuts) are expected to be controlled by onsite personnel using standard first aid practices. ALL INJURIES WILL BE TREATED BY WMCO MEDICAL AND REPORTED TO ASI PROJECT HEALTH AND SAFETY (KEN FLEMING).

### 12.2 Serious Injuries Radio CONTROL

The WMCO Medical Department maintains an emergency life squad crew and ambulance on all shifts, seven days a week. This crew will be notified immediately of any serious injury. The ASI crew will use standard first aid procedures to stabilize the injury pending arrival of WMCO response personnel.

CPR should be administered only by persons currently certified in CPR. Prior to performing CPR, the rescuer should consider what caused the victim to collapse. Chemicals around the nose and mouth can endanger the rescuer.

### 12.3 Injuries Complicated by Contamination Radio CONTROL

All injuries within the process area will be assumed to involve contamination until proven otherwise by WMCO. Injuries complicated by chemical contamination will be evaluated after considering the hazards associated with the contamination. In most instances, the site contamination is of concern only if long term exposures occur. In these instances, the injury will be given the highest priority and contamination reduced as soon as practical.

12.0 CONTINGENCY PLANS (CONTINUED)

12.3 Injuries Complicated by Contamination (continued)

Injuries of persons contaminated with acutely toxic chemicals will be treated so as to minimize the hazard to both the rescuer and the victim. If the rescuer can not safely attempt rescue, he/she should not attempt it.

- The victim should be moved into an uncontaminated area and given a preliminary decontamination.
- Preliminary decontamination generally consists of flushing with water to dilute and remove most of the chemical. It also includes removal of contaminated clothing.
- As soon as the chemical hazard has been reduced to an acceptable level, the rescuer should stabilize the victim.
- More thorough decontamination can be performed at a later time.
- Care should be taken to minimize the spread of contaminant through run off.
- Notify the ambulance dispatcher of: the chemical involvement, extent of injuries, what treatment has been performed (including decontamination), number of victims, your location, and telephone number.
- You HANG UP LAST. The dispatcher is trained to be calm and ask for the appropriate information in the order that it appears on his/her form. In some instances, the facility may be complex and require additional information such as cross streets or an escort from the entrance to the site.
- If you call the hospital, notify the emergency room of the chemical involvement so that they can prepare for the arrival.

**12.4 Fire Hazards Radio CONTROL**

Fire hazard operations include field activities such as sampling near pipelines, using flammable decontamination solutions, etc. All uncontrolled fires will be reported to WMCO, and the fire brigade requested before attempting any fire suppression activity. Emergency requests will be made by radio to CONTROL.

Small fires which appear to be controllable by field personnel should be controlled only if the safety of the field personnel is not jeopardized. Resources such as water, fire extinguishers, and soil may be used to contain or extinguish small grass or solvent fires.

## 12.5 Chemical/Radiological Releases Radio CONTROL

If a release in the form of a spill, leak or vapor cloud is observed, ASI personnel will withdraw at least 300 feet upwind and immediately notify authorities in the following order:

1. Radio to "CONTROL".
   Control will dispatch the necessary personnel to handle the situation.

If possible, the following information should be included in the notification:

- Cause of release, if known
- Location of release
- Time of release
- Chemical identity
- Quantity involved
- If there is radioactivity involved
- If materials are leaving the area as a vapor/gas
- If there is fire involvement
- The number of known exposures or injuries (if any)

Additional information may be requested such as:

- What has been/is being done to minimize the hazard.
- Degree of hazard to responders based on your knowledge of the contaminants.

## 12.6 Chemical Splashes

Eyes
Move the victim to an uncontaminated area. Hold the victims eyes open[1] and flush eyes for 15 minutes with water (or isotonic saline).

- Notify Control.
- Tell the Control the name of the chemicals, if known.
- Tell them what was done to treat the patient(s).
- Tell how many patients to expect.

Skin
Move the victim to an uncontaminated location. Remove contaminated clothing and wash the affected skin areas. Flush the skin for 15-30 minutes and notify Medical.

ROUTE TO HOSPITAL FROM SITE

First aid station and ambulance service is available onsite. Radio contract CONTROL. WMCO maintains an emergency response capability which includes an ambulance and EMT medical personnel. The route to the WMCO Medical Facility is depicted in Figure 12-1.

HOSPITALS

The nearest medical facility is the WMCO Medical Facility. It is the primary choice for onsite injuries. The WMCO ambulance will transport the injured to the nearest hospital if necessary.

## 12.7 Adverse Weather

Work will be stopped if lightning, rain or other adverse weather conditions are in the area.

1 The natural response to eye pain is to close the eyes. The rescuer must keep the eyes open to remove chemical from under the eyelids. The flushing solution can cause extreme discomfort if it is too hot or too cold. Try to maintain solution near body temperature.

12.8 Emergency Telephone Numbers

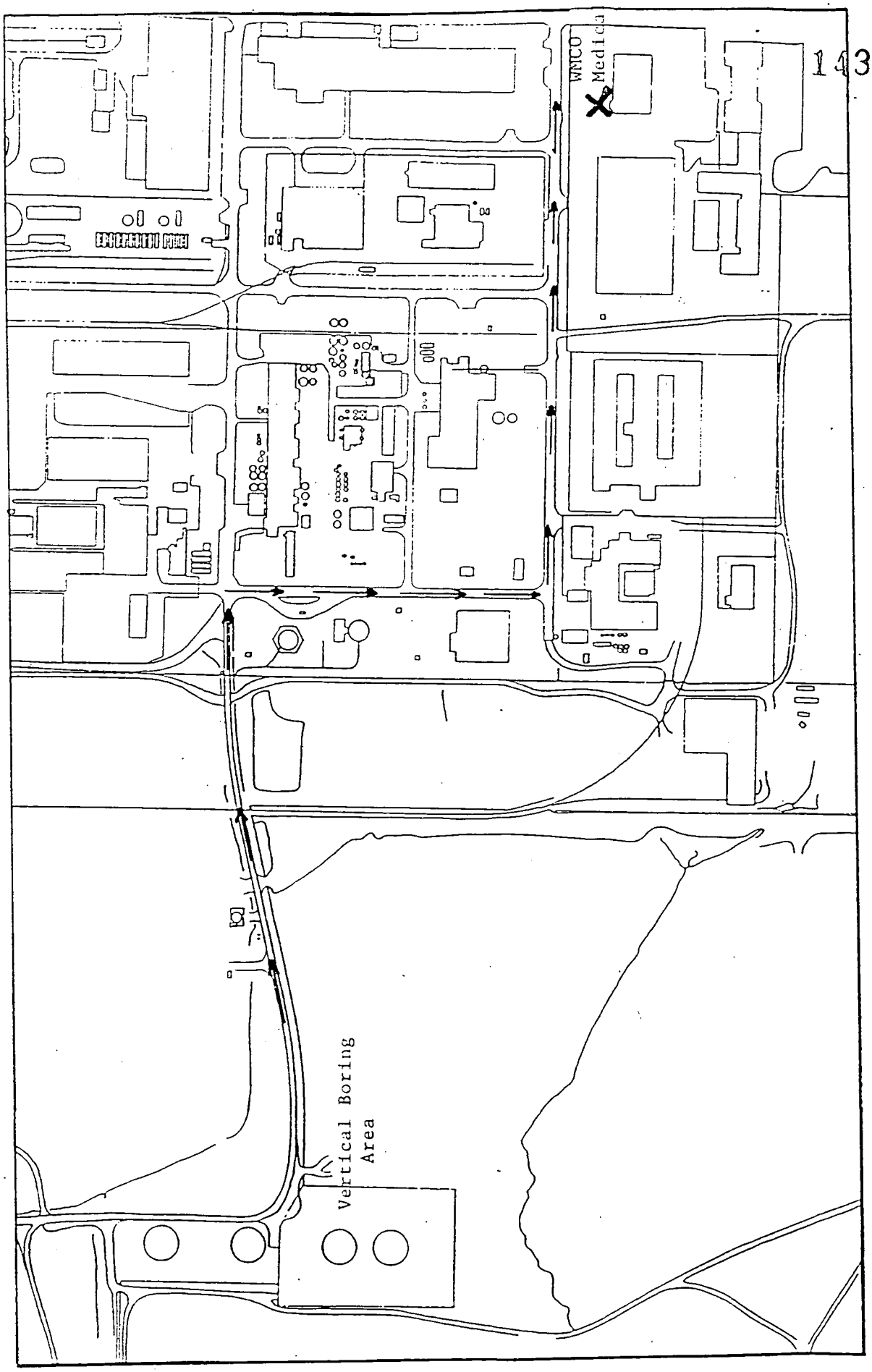
Ambulance: Radio to Control
Hospital: Radio to Control
Fire: Radio to Control

| | Work | Home | Radio |
|---|---|---|---|
| John Wood: Project Manager: | (513)738-3100 | (513)825-0738 | |
| Steve Duce, H.P. | (513)738-3100 | | |
| Oba Vincent (DOE) | (513)738-6937 | (513)779-6210 | |
| **EMERGENCY RESPONSE** | **(513)738-6511** | **or** | **CONTROL** |
| Industrial Hygiene (WMCO): | (513)738-6207 | | 357 |
| Radiation Safety (WMCO): | (513)738-6889 | | 355 |
| Fire and Safety (WMCO): | (513)738-6235 | | 303 |
| Utility Engineer (WMCO): | ..... | ..... | 202 |
| **PROJECT CONTACTS:** | | | |
| IT Project Manager-Dick Boyd | (1) 646-5068 | (513)245-0291 | |
| | Beeper-(800) 759-7243 PIN #2673610 | | |
| IT Ops. Supervisor-Doug Moore | (1) 646-5068 | (513)742-3401 | |
| | Beeper-(800) 759-7243 PIN #2673609 | | |
| WMCO Health Physics Supervisor Don Spahr | (513) 738-6672 | | |
| | Beeper-844-5893 | | |

John Simak, (DOE)
Greg McAnarney, (ASI-Albuquerque)
Lee Vittitow, IH

**NATIONAL HOTLINES FOR EMERGENCY REPORTING AND INFORMATION**

| | |
|---|---|
| Center for Disease Control | 404-28 |
| 633-5313 | |
| Chemtrec | 800-424-9300 |
| CMA Chemical Referral Center | 800-262-8200 |
| DOT Hazardous Materials Information | 202-366-4488 |
| Emergency Planning and Community Right-to-Know | 800-535-0202 |
| Federal Emergency Management Agency | 817-898-9104 |
| National Response Center Hotline | 800-424-8802 |
| Occupational Safety and Health Administration | 800-582-1708 |
| **OHM Corporation** | **800-537-9540** |




ROUTE TO WMCO INFIRMARY

## 13.0 CONFINED SPACE ENTRY

No Confined Space Entry is Permitted.

## 14.0 PERSONAL PROTECTIVE EQUIPMENT

This discussion of personal protective equipment is generic in nature. Specific site requirements are presented in the site specific section.

### 14.1 Level-B

Hardhat: Required during drilling operations
Face Shield: (optional)
Safety glasses (or inserts)
Self contained breathing apparatus (Supplied Air Hood, Air line or bottled air)
Disposable coveralls: Saranex, Tyvek or equivalent
Inner gloves: Latex or PVC
Outer gloves: (chemical resistant): Nitrile, butyl etc.
Chemical resistant boots
Latex booties (optional)
Level-B PPE is to be worn in any of the following environments:

- Atmospheres containing chemicals having poor warning properties.
- Unknown atmospheres
- IDLH atmospheres
- Air concentrations exceeding 3X exposure standard
- Contaminants do not pose significant threat of exposure through skin absorption.

### 14.2 Level-C

Hardhat: Required during drilling operations
Face Shield: (optional)
Safety glasses (or inserts)
Air purifying respirator cartridges (organic vapors, acid gas, pesticides, radionuclides, particulates)
5-minute escape apparatus (optional)
Disposable coveralls: Saranex, Tyvek or equivalent
Inner gloves: Latex or PVC
Outer chemical resistant: Nitrile, butyl etc.
Chemical resistant boots
Outer Disposable booties:latex
Level-C is intended to be used where:

- Contaminants have good warning properties
- Cartridges are approved for use with the contaminant
- Oxygen concentrations are between 19.5 and 25%
- Toxic contaminant concentrations are not IDLH
- Concentrations are known and continuously monitored
- **Contaminant concentrations do not exceed 3X occupational exposure concentrations**

## 14.0 PERSONAL PROTECTIVE EQUIPMENT (CONTINUED)

Respirator cartridges will be changed:

- Daily.
- If color indicator shows that the cartridge is spent.
- If breakthrough is detected.

## 15.0 CALIBRATION OF SITE ENTRY EQUIPMENT

It is the designated Site Safety Officer's duty to check the log book(s) before site entry to verify that the site entry equipment was calibrated. If the following information is not present, the designated SSO should notify his supervisor, the team leader who is ultimately responsible for the overall operation. The team leader is responsible for getting the items corrected.

### 15.1 HNU Photoionization Detector

Annual calibration by the manufacturer.
Calibrate daily before entry and at the end of the shift.
Record the following information for each calibration:

- Date
- Time
- Site name

Calibration gas: Concentration and identity
Span potentiometer setting
Difficulties (if applicable)
Calibrator's name (printed)
Probe type

### 15.2 Radiation Meter

Semi-annual calibration by manufacturer with National Institute of Science of Technology (NIST) traceable standard.
Daily field function check using check source.
Record:

- Date
- Time
- Radiation source
- Calibrator's name
- Instrument responses to the check source.

Results: Note that the readings should be stable. If the results start to change while testing under the same conditions, notify the ASI Health and Safety Department.

### 15.3 Noise Dosimeter

Annual calibration by the manufacturer using NIST traceable standards.
Annual calibration by the manufacturer of the tone generator.
Daily calibration and function check using a pure-tone generator.
Record the following data:

- Date
- Time
- Calibration source
- Battery charge status

## 16.0 SAMPLING OPERATIONS

All sampling operations are dangerous. Several safety tips will make operations near drill rigs safer.

UNDERGROUND HAZARDS

**No ground penetration employing heavy equipment is permitted until public/facility representatives have determined that underground utilities are not present.**

Electricity
Gas
Sewer
Telephone(metallic and fiberoptical cables)
Water
Steam
Cave-in hazards may be present in Karst topography or near storage tanks
Fire and explosion hazards are also present if containerized chemicals are present underground. (geophysical testing should be performed if there is doubt about the presence or location of underground structures.)

OVERHEAD HAZARDS

Wires

- 10 feet from a 50 KV or less line;
- 20 feet from a 50 KV to 345 KV line; and
- 34 feet from a 345 KV to 750 line.

Buildings (25′ clearance needed to raise boom)
Tree limbs (25′ clearance needed to raise boom)

MISCELLANEOUS HAZARDS

Lightning
Weak cables, ropes or hydraulic lines
Noise
Loose clothing may snag on moving parts

REQUIREMENTS

Only sampling technicians should be within 4 feet of the sampling device. Monitoring of the sample hole or sample material is only permitted when the vibracorer is stopped. Monitoring of samples, for chemical and radiological hazards, can be performed at a safe distance from the sampling activities.

The operation crew is responsible for maintaining the sample device and stopping work if unsafe conditions develop.

## 16.0 SAMPLING OPERATIONS (CONTINUED)

The designated health and safety personnel are expected to be familiar with the chemical and radiological hazards associated with the site operations. If the Site Safety Officer (or his designee) notices what appears to be a mechanical hazard on the vibracorer, the Site Safety Officer will notify the operator. The vibracorer operator will assess the condition to determine the hazard potential. Actions taken (including no action) will be documented. The safety personnel will also assure that:

1. A minimum of two persons will be present at the sampling site at all times of operation.

2. Respiratory protection is worn when conditions warrant its use. Respiratory protection is required at all times within the K-65 fence. Personal protective equipment impairs the operator's vision. Gloves and other safety equipment can make "normal operations" more difficult to perform. Unnecessary use of respiratory equipment should not be required. If an operator feels more comfortable using respiratory protection to reduce exposures which will not exceed the published exposure levels, he must be aware of the increased physical hazards.

3. That at least four (4) feet of clearance is maintained on all sides of the sample device for emergency egress.

NOISE

Noise can exceed the levels set by OSHA during certain operations such as sample device operation. Hearing protection shall be worn any time noise levels exceed 85 dBA.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment is addressed in Section 7.0

DECONTAMINATION

Decontamination of large sampling equipment generally requires the use of power cleaners such as pressure sprayers or steam cleaners. Wipe tests are required to confirm the effectiveness of decontamination efforts. No contaminated heavy equipment is to leave the site without the written permission of the site operator (Westinghouse).

CHEMICAL AND RADIOLOGICAL HAZARDS

Will be dealt with in the hazard assessment section.

## 17.0 HEAT STRESS

Heating of the body occurs from three sources:

1. Radiant heating from heat sources or sunlight.
2. Convective heating from contact with a warmer object or liquid.
3. Metabolic heating caused by activity.

Cooling occurs through three mechanisms:

1. Respiration: The air we exhale is warm. As the body overheats, the respirations become more rapid.
2. Radiation: Heat is released at the surface of the skin. As the body overheats, the surficial blood vessels dilate and allows more heat to be lost.
3. Evaporation: Perspiration is released to the skin surface and evaporates. The skin is cooled by evaporative cooling.

Personal protective equipment reduces the body's ability to shed excess heat through radiation and evaporation of sweat. Personal protective equipment (for chemicals) can also act like a greenhouse and prevent heat dissipation by preventing evaporation.

These facts mean that heat stress can be a serious problem to hazardous waste site workers. The following discussion is intended to familiarize personnel with the symptoms of heat stress.

Heat stress is a progressive condition. Its mildest form is a slight elevation of body temperature. Normal body temperature is generally near 98.6°F. Working in high temperatures may elevate the temperature to 100-101°F. By the time that the body temperature reaches 101 F, the worker generally has a headache. This is not a serious condition and can be treated through increased rest periods and cool fluid intake. The worker should not be allowed to work until the body temperature has been reduced to below 99°F.

If work continues when the first symptoms occur, the person may develop Heat Cramps. Heat Cramps are brought about by long exposure to heat. The outside temperature does not have to be much higher than the "normal" environment. The person perspires heavily, often drinking large quantities of water. As the sweating continues, salts are lost by the body bringing about painful muscle cramps.

Treatment: **Any person with heat related illness or emergency will be immediately transported to the WMCO medical department for medical evaluation**. The worker should be given rest, cool fluids, and removed from work for at least the remainder of the day. The person is likely to have an increased susceptibility to heat for the next few days.

## 17.0 HEAT STRESS (CONTINUED)

### Heat Exhaustion

Heat exhaustion symptoms include a near normal body temperature and profuse sweating. The temperature may reach 103°F. Victims of heat exhaustion have cold, wet, pale, clammy skin and can feel lethargic, dizzy, and/or nauseous.

### Treatment of Heat Exhaustion

Remove the person from field work. Have the person rest in a cool area such as an air conditioned car or shaded area. Provide cool liquids to drink. Avoid beverages which contain caffeine or alcohol. Do not allow the victim to go back to work for at least one or two days.

### Heat Stroke

Heat stroke is a life threatening condition. The person's body temperature regulating mechanism fails and his body can not rid itself of excess heat. Heat stroke symptoms include high body temperatures and HOT DRY SKIN. Most cases of heat stroke are reported on hot humid days.

HEAT STROKE VICTIMS MUST BE TRANSPORTED TO A HOSPITAL FOR IMMEDIATE TREATMENT. The individual must not be allowed to drive himself, since cases are on record where the victim's condition worsens, he lapses into unconsciousness and dies. Heat stroke victims are not to return to field work without a physician's written consent.

**PREVENTION OF HEAT STRESS**

Become acclimatized to heat for several days whenever possible. Work in the cooler portions of the day. Early morning hours and evening hours are cooler.

Take frequent breaks and consume at least one pint of cool fluid every hour. Replenish electrolytes through the consumption of diluted drinks. The body loses more water than electrolytes. Concentrated salt, electrolyte, or juices can make you more suspectable to heat stress.

Monitoring:

Heat Stress Monitoring is required whenever ambient temperatures exceed 80° F and respiratory protection is required. Oral temperatures and pulse rates will be taken at the end of each break. Elevated temperatures or elevated pulse rates will be handled as follows:

| | | |
|---|---|---|
| Oral Temp.: | less than 99°: | Continue Work |
| Oral Temp: | 99°-100.3°F | Reduce rate of work or take more frequent breaks. Consume more cool fluids. |
| Oral Temp: | > 100.4°F | Remove from work until oral temp. reduced to 99°F or less. |
| Pulse Rate: | > 110 bpm | Remove from work until pulse rate falls below 110 beats per minute. |

If the body temperature exceeds 100.4°F, the pulse rate exceeds 110 bpm at rest, the person must not continue to work. These conditions have been found to prevent most heat related illnesses. Occasionally, high heat conditions combined with poor eating, sleeping and drinking habits has resulted in heat stroke occurring in less than 20 minutes.

Heat stress monitoring must be performed at least once per hour for documentation, but may have to be increased under severe circumstances.

## Signs and Symptoms of Heat Stress

- **Heat rash** may result from continuous exposure to heat or humid air.

- **Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement.

  Signs and symptoms include:
  - muscle spasms
  - pain in the hands, feet, and abdomen

- **Heat exhaustion** occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:
  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting

- **Heat stroke** is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms include:
  - red, hot, usually dry skin
  - lack of/or reduced perspiration
  - dizziness and confusion
  - strong, rapid pulse
  - coma

Because the incidence of heat stress depends on a variety of factors, all workers, even those not wearing protective equipment, should be monitored.

## 18.0 COLD STRESS

Cold stress is manifested in many different ways, but generally follows the following progression:

1. Frostnip
2. Frostbite
3. Hypothermia

### 18.1 FROSTNIP

Frostnip is the most likely form of cold stress to occur at FMPC. This is because warm buildings and warm vehicles are generally within a few feet of the environmental work being performed. These site resources are used to prevent more serious forms of cold stress from occurring.

Frostnip is a mild form of frostbite. Frostnip mainly involves the extremities and exposed skin. Affected areas usually include ears, fingers, toes, and facial skin. Frostnip is not a serious condition, but may progress into more severe frostbite if not treated. Frostnip is the local freezing of surface layers of skin and is characterized by initial reddening and then whitening of the affected area. Frostnip is aggravated by handling of metal objects or working in cold solutions such as those used for decontamination of field equipment.

The signs of frostnip are often ignored by the affected person. The victim feels numbness in the affected area and may even by unaware of the condition. Team members must remember to observe each other to detect early sign of frostnip.

**Prevention of frostnip:**

* Cover all skin areas. Be sure to wear gloves and a warm hat.
* Avoid direct skin contact with cold air or cold fluids.
* If protective equipment gets wet, change into dry protective equipment.
* Visually observe your partner for signs of frostnip. Treat if signs appear.

**Treatment of frostnip: Warm the affected area**, by resting inside a heated area such as a heated vehicle, or building.

## 18.2 FROSTBITE

Frostbite is a deeper freezing of the surface skin and is characterized by a white or waxy appearance. A mottled or blotchy appearance is sometimes seen. The frostbitten area often feels numb to the victim. Exposed skin areas and the extremities are the most likely parts to be affected.

**Prevention of frostbite: Same as prevention of frostnip.**

**Treatment of frostbite:**

If frostbite occurs, the worker should report to the WMCO infirmary for treatment.

If medical attention is not available, the part should be carefully warmed. If warming is done, it should be done by immersing the affected area in water that is approximately body temperature (100-105°F). Do not allow the affected body parts to touch the sides or bottom of the container (bath tub). Do not place pressure on the affected area.

Warming of the affected area will be painful to the victim. The presence of pain is usually a good indicator of successful rewarming. The warmed part should be wrapped in gauze and the victim transported to the hospital for treatment.

## 18.3 HYPOTHERMIA

Hypothermia is the general cooling of the entire body. Hypothermia is extremely unlikely unless the victim has had a long-term exposure or has been immersed in a cold liquid. Hypothermia can be life threatening.

Symptoms of hypothermia include:

Shivering
Numbness
Slowed breathing and pulse rate
Drowsiness and an unwillingness to do even the simplest of activities
Failing eyesight
Incoordination
Unconsciousness
Freezing of body parts

**Prevention of hypothermia**

* Schedule work for warm times of year when possible
* Work during warmer times of day, when sun is shining
* Set up wind blocks to minimize the wind chill factor
* Layer clothing so that layers can be added/removed as necessary to prevent sweating and maintain body temperature.
* Change into dry clothing if it becomes wet
* Do not "overdress". Too much clothing causes sweating and reduces the effectiveness of your protective clothing.
* Monitor oral temperature periodically. If the oral temperature drops below 96.8°F, remove the worker from field work. Get him to a warm building or vehicle so he can warm up. Do not allow the person to work unit the body temperature is back to normal.
* Only perform emergency work when the wind chill index is below Minus 40°F. Refer to 1990-1991 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. (This will allow drillers to work up to 55 minutes before a break is required.)

**Monitoring**

Monitoring should be performed at least once every four hours at temperatures below 68°F. The frequency of monitoring should be increased as the temperatures drop below freezing. The frequency of monitoring requires some judgement, and should reflect the work activity level required to perform each job function. Personnel performing sedentary functions such as documentation, will be more susceptible to cold stress than will physically active workers.

| Oral Temperature | Action |
|---|---|
| 97.6 - 99.6°F | Body temperature is approximately normal, to keep on working. |
| 97.5 - °F | Increase monitoring frequency to at least once per hour. |
| 96.8 °F | Remove employee from field work; move into heated environment. |
| Below 96.8 | Treat for mild hypothermia. See medical attention. |

**Treatment of Hypothermia**

If the oral temperature drops below normal, it is likely that the person has other cold stress injuries such as frostbite. Take the individual to the WMCO infirmary for treatment.

If medical attention is not readily available:

* Remove wet clothing
* Dry the person
* Keep victim at rest
* Slowly warm core without warming legs

* If person is alert, give warm (not hot) liquids
* Transport to hospital as soon as possible

**NOTE 1:** If a person has recently been a victim of cold stress, he/she is very likely to remain more susceptible to cold for an indefinite period of time.

**NOTE 2:** Bulky winter clothing is dangerous for sampling operations. Safe sampling operations generally recommend that loose fitting/bulky clothing be avoided because it snags on moving parts.

**NOTE 3:** Cold may interfere with the operation of monitoring equipment. Check the manufacturers recommended operating temperatures to determine if the instrument(s) will be affected. Other monitoring may have to be chosen for certain cold weather operations.

## 19.0 APPROVAL AND COMPLIANCE STATEMENT

This site specific safety plan was produced for the use of ASI employees and ASI subcontractors. It was intended for the Feed Materials Production Center, Fernald, Ohio.

The undersigned persons have read and understand the attached site specific safety plan and agree to follow its provisions*1:

| Name (lettered) | Signature | Date |
|---|---|---|
| _____ | _____ | _____ |
| TEAM LEADER | | |
| _____ | _____ | _____ |
| DESIGNATED SITE SAFETY OFFICER | | |
| _____ | _____ | _____ |
| EQUIPMENT OPERATOR | | |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

The following individuals are not obligated, by contract, to follow ASI safety policies, but have read and understood the safety plan:

| | | |
|---|---|---|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

*1 Compliance with the provisions of this HASP may be audited through announced or unannounced site visits. Be sure that you are implementing the provisions of the safety plan and documenting the reasons for field actions/changes when they are necessary. Site visits may be performed:

___ By ASI

___ By Client

___ By OSHA

K-65 SILOS VERTICAL BERM SAMPLING PROCEDURES

## 1.0 PURPOSE

The purpose of this procedure is to provide the steps for sampling the soil berms around Silos 1 and 2 using the Vibra-Core Sampling Device.

## 2.0 APPLICABILITY

This procedure is applicable to the berm soil sampling operation at K-65 Silos 1 and 2 in the Waste Storage Area.

## 3.0 RESPONSIBILITY

3.1 The IT Supervisor shall be responsible for the following:

3.1.1 Ensuring that only trained personnel perform the sampling operation.

3.1.2 Contacting Radiological Safety to determine the appropriate respiratory protection for the process being performed.

3.1.3 Provides operators with the required respiratory protection and anti-contamination clothing.

3.1.4 Ensures sampling materials and equipment are available for operators usage.

3.1.5 Ensures Radiation Safety is notified and performs the required radiation monitoring and measurements during this operation.

3.1.6 Ensures pocket dosimeters and TLDs are worn by all personnel involved in the sampling operations.

3.1.7 Obtain Radiation Work Permit.

3.1.8 Reports exceptional circumstances not addressed by this DWP in a "Minor Event Report" (Refer to FMPC-704) and notifies the IT Project Manager and WMCO Assistant Emergency Duty Officer (AEDO) of the circumstance.

3.2 All personnel shall be responsible for complying with this procedure and reporting any abnormal condition and/or procedure nonconformances to the IT Supervisor.

3.3 Radiation Safety Technicians (RST) shall be responsible for:

3.3.1 Reading and recording personnel Self-Reading Pocket Dosimeters (SRPD) at a minimum of two-hour intervals.

3.3.2 Recording the end-of-day readings in the RST Log.

3.3.3 Performing all monitoring (airborne, radiation, and contamination) specified by procedures and/or as instructed.

3.3.4 Reporting any unusual circumstances to the IT Supervisor and/or WMCO AEDO.

## 4.0 DEFINITIONS

4.1 Vibra-Core Sampling Device - Solids sampling equipment consisting of an air-driven head assembly connected to a pipe barrel with a threaded penetrating probe containing inner LEXAN sleeve used to extract long core samples. If required, a cutter/catch assembly located at the bottom of the pipe barrel is used to penetrate and retain the sample residues.

4.2 IT Supervisor - For the purposes of this procedure, the word "Supervisor" refers to the IT supervisor in charge of the silo berm sampling.

4.3 Project Manager - The Project Manager is the senior IT member of the K-65 Berm Sampling Team.

4.4 Operations Technician/Personnel - Personnel performing the sampling operations.

4.5 Radiation Safety Technician (RST) - IT/WMCO Health Physics Personnel supporting sampling operations.

## 5.0 REFERENCES

5.1 WMCO SOP 65-C-106, "Silo Waste Handling"

5.2 FMPC 704, "Minor Event Reporting"

5.3 WMCO Procedures RES-01-001, "Radon Treatment System Operation"

5.4 RI/FS, FMPC Quality Assurance Project Plan, QAPP

## 6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS

6.1 Safety glasses with side shields shall be worn unless other eye protection is specified by WMCO ISR & T.

6.2 Respiratory protection provided by IT Supervisor shall be worn as required.

6.3 Anti-contamination clothing shall be worn when working on the berms.

6.4 Leather-palm gloves shall be worn when handling rough, sharp-edged, or contaminated material.

6.5 Nitrile gloves shall be worn when sampling the berms.

6.6 HEPA type filter vacuum cleaners or a vacuum system approved by WMCO IRS & T with a current (tested within last 6 months) DOP penetration test sticker shall be used for cleaning.

6.7 A Radiation Work Permit and full-time radiological coverage is required for work performed within the K-65 Area.

6.8 Operator exposure as determined from self-reading pocket dosimeters (SRPD) shall not exceed 300 mRem/week, per individual. Individual exposure shall not exceed the DOE limit of 5.0 Rem/year or the site limit of 3.0 Rem/year.

6.9 Any circumstances which could have resulted in an intake of radioactive materials by inhalation, ingestion or absorption shall immediately be reported to the IT Supervisor.

6.9.1 The IT Supervisor shall immediately report the circumstance of possible radioactive materials intake to WMCO IRS & T for evaluation.

6.9.2 The involved employee shall report to WMCO IRS & T at the end of their shift or as directed to submit a urine sample and again report at the start of their next shift to submit another urine sample.

6.9.3 The IT Supervisor shall consider the circumstance to be a minor event and shall immediately complete a "Minor Event Report" per FMPC-704.

6.10 All 120 volt 15 & 20 amp circuits shall be protected by GFCI. Electrical cords will not be permitted to be on the ground or in walk ways.

## 7.0 PROCEDURE

### 7.1 PRE-OPERATIONAL START-UP

**7.1.1** If required, the IT Supervisor shall instruct the Operations Personnel to assemble the sampling barrels by completing steps 7.1.1.1 through 7.1.1.4.

**7.1.1.1** Insert the LEXAN tube into the sampling barrel casing.

NOTE

If instructions in Steps 7.1.1.2 through 7.1.1.4 are deemed inappropriate by the Supervisor or if sampling barrels have already been assembled, proceed to Step 7.1.2.

**7.1.1.2** Coat a mop head with nonhydrogenated Crisco and swab the 30-foot section of the LEXAN tube, if required. Using a rag, clean residual lubricant from external threads on barrel casing.

**7.1.1.3** Place the catcher with the tines in an upward position inside the cutter, if required.

**7.1.1.4** Thread cutter assembly onto sampling barrel and tighten with two pipe wrenches.

**7.1.2** As notified by the IT Supervisor, mark sampling barrels by completing steps 7.1.2.1 through 7.1.2.5. If sampling barrels are marked, proceed to Step 7.1.3.

**7.1.2.1** Starting at the bottom of the assembled sampling barrel, mark the outer casing in one foot increments using a permanent ink marker by drawing a circle completely around the casing.

NOTE

Mark the entire 30-foot casing

7.1.2.2 Wrap 2-inch wide tape around the barrel at each foot marking.

NOTE

Ensure bottom of tape is placed at the foot marking.

7.1.2.3 Numerically identify each one foot marking on the tape using a permanent ink marker.

NOTE

Numbering shall start at the bottom of the cutting shoe as "0" feet.

7.1.2.4 Place 4-inch wide clear, adhesive tape over each foot marking.

7.1.2.5 Every 5 feet, wrap 4-inch red adhesive tape above the tape.

## 7.2 BERM SAMPLING

**WARNING**

The crane operator/rigger must complete a routine inspection of the crane at the beginning of each sampling operation shift.

7.2.1 The rigger shall attach the crane lines to the sampling device with the Vibra-Core Head attached.

7.2.1.1 Connect the air supply line to the Vibra-Core head and to the compressor.

7.2.2 The rigger shall signal the crane operator to slowly raise the sampling device off the flatbed truck to a vertical position, one to two feet off the ground.

7.2.3 The rigger shall disconnect the lower rigging from the sampling barrel assembly.

7.2.4 Operations personnel shall start the compressor and check to ensure it is working properly.

7.2.5 With the Supervisor's concurrence, the rigger shall signal the crane operator to slowly raise the sampling device and to move it directly over the location to be sampled.

7.2.6 The crane operator shall lower the sampling device over the selected location until the cutter is within six inches from the soil.

7.2.7 When the operations technician acknowledges conditions are correct and the berm sampling can proceed, a second operations technician shall adjust the vibrating mechanism by operating the throttle control valve.

7.2.8 The operations technician shall instruct the rigger to signal the crane operator to slowly lower the sampling device into the soil.

7.2.9 Increase or decrease throttle as directed by the supervisor, to ensure the sample barrel is moving smoothly.

7.2.10 The rigger shall signal the crane operator to lower the sampling device to the twenty-foot mark or as directed by the supervisor.

7.2.11 Foot markings shall be read at ground level.

7.2.12 When the designated depth has been reached, the Supervisor will instruct the technician with the throttle valve to stop the vibrating mechanism.

7.2.13 With the concurrence of the IT Supervisor, the

7.2.10 The rigger shall signal the crane operator to lower the sampling device to the thirty-foot mark or as directed by the supervisor.

7.2.11 Foot markings shall be read at ground level.

7.2.12 When the designated depth has been reached, the Supervisor will instruct the technician with the throttle valve to stop the vibrating mechanism.

7.2.13 With the concurrence of the IT Supervisor, the rigger shall signal the crane operator to start removal of the sampling device from the berm.

**CAUTION**

SAMPLING DEVICE SHALL BE REMOVED SLOWLY FROM BERM.

**CAUTION**

DO NOT OPERATE THE VIBRATING MECHANISM DURING REMOVAL OF SAMPLE DEVICE.

**NOTE**

As the barrel is raised, the RST shall monitor for contamination and organic vapors.

**NOTE**

As the barrel is raised, wipe the exterior to reduce soil debris from falling during transportation.

7.2.14 If the sampling device cannot be easily removed, activate the vibrating mechanism.

7.2.15 When the sampling device has cleared the top of the berm opening a minimum of 3 feet, the crane operator shall stop removal of crane line and a bag placed on the end of the sampling device.

7.2.16 Crane operator shall slowly raise the sampling device to clear any obstacles around the work area.

7.2.17 Rigger shall signal crane operator to move sampling device near the flatbed trailer.

7.2.18 Operations personnel shall steady end of core barrel as necessary during transport of sampling device to flatbed trailer.

7.2.19 Rigger shall connect a load line to the lower end of the sampling barrel.

7.2.20 Crane operator shall carefully position sampling device above the flatbed trailer and slowly lower the device horizontally, positioning the Vibra-Corer cutting head even with the end of the trailer.

7.2.21 When the sampling device is securely in the trough, rigger shall signal crane operator to hold the position.

7.2.22 The rigger shall disconnect the sampling device from the crane.

7.2.23 Operations personnel shall unscrew the head assembly from the core barrel and bolt the assembly to the next sampling barrel.

7.2.24 Repeat steps 7.2.1 through 7.2.23 as directed by the IT Supervisor if additional samples are to be collected from the berm.

7.2.25 IT Supervisor shall notify Transportation to transport truck to Examination Trailer. A-RST shall survey the core exterior to determine contamination levels.

## 8.0 APPLICABLE FORMS

Figure 1 - "Berm Sampling Operations"

# K-65 SILO BERM SAMPLE CORE HANDLING PROCEDURE

## 1.0 PURPOSE

The purpose of this document is to establish the procedure for removing the sample core from the Vibra-Core sampling device and cleaning, inspecting, sectioning, and packaging the sample core.

## 2.0 APPLICABILITY

This procedure is applicable to sample core handling at the Silo Area.

## 3.0 RESPONSIBILITIES

3.1 The IT Supervisor shall be responsible for the following:

3.1.1 Contacting Radiological Safety to determine the appropriate respiratory protection for the process being performed.

3.1.2 Provide operators with the required respiratory protection and anti-contamination clothing.

3.1.3 Ensure that only trained personnel perform this procedure.

3.1.4 Ensure sectioning and/or packaging equipment is available.

3.1.5 Obtain Radiation Work Permit.

3.1.6 Reporting exceptional circumstances not addressed by this SOP in a "Minor Event Report" (Report to FMPC-704) and notifying the IT Project Manager and the Assistant Emergency Duty Officer of the circumstances.

3.1.7 Ensures pocket dosimeters and TLDs are worn by all personnel involved in sampling operations.

3.2 IT Operators shall be responsible for the following:

3.2.1 Compliance with this procedure.

3.2.2 Report unusual occurrences to the IT Supervisor.

3.3 Radiation Safety Technicians (RST) shall be responsible for:

3.3.1 Reading and recording personnel Self-Reading Pocket Dosimeters (SRPD) at a minimum of two-hour intervals.

3.3.2 Recording the end-of-day readings in the RST Log.

3.3.3 Performing all monitoring (airborne, radiation,and contamination) specified by procedures and/or as instructed.

3.3.4 Reporting any unusual circumstances to the IT Supervisor and/or WMCO AEDO.

3.4 The IT Analytical Technician shall be responsible for assisting with the sectioning,labeling, and sample collecting of core sections.

3.4.1 IT Analytical Technician shall be responsible for reporting unusual circumstances to the IT Supervisor and AEDO.

## 4.0 DEFINITIONS

4.1 IT Supervisor - For the purposes of this procedure, the word "supervisor" refers to the IT Supervisor in charge of the sampling.

4.2 Radiation Safety Technician (RST) - IT/WMCO Health Physics Personnel supporting sampling operations.

## 5.0 REFERENCES

5.1 SOP 65-C-106, "Silo Waste Handling"

5.2 FMPC-704, "Minor Event Reporting"

5.3 RI/FS, FMPC Quality Assurance Project Plan, QAPP

## 6.0 INDUSTRIAL HEALTH AND SAFETY REQUIREMENTS

6.1 Safety glasses with side shields shall be worn unless other eye protection is specified.

6.2 Personnel shall wear respiratory protection provided by the supervisor as required.

6.3 Anti-contamination clothing shall be worn when handling sample material from the berm.

6.4 Leather-palm gloves shall be worn when handling drums/boxes/containers, operating equipment, and when handling rough, sharp-edged, or contaminated material.

6.5 HEPA type filter vacuum cleaners with knock-out drum or a vacuum system approved by WMCO IRS&T with a current (tested within last 6 months) DOP penetration test sticker shall be used for cleaning.

6.6 Personnel exposure as determined from self-reading pocket dosimeters (SRPD) shall not exceed 300 mR/week per individual. Individual exposures shall not exceed the DOE limit of 5.0 Rem/year of the site limit of 3.0 Rem/year.

6.7 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion or absorption shall immediately be reported to the supervisor.

6.7.1 The IT Supervisor shall immediately report the circumstance of possible radioactive materials intake to WMCO IRS&T for evaluation and to the WMCO AEDO.

6.7.2 The involved employees shall report to WMCO IRS&T at the end of their shift or as directed to submit a urine sample and again report at the start of their next shift to submit another urine sample.

6.7.3 The IT Supervisor shall consider the circumstance to be a minor event and shall immediately complete a "Minor Event Report" per FMPC-704.

## 7.0 PROCEDURE

7.1 Removing the lexan tube from the Vibra Core barrel.

7.1.1 Unscrew the lower "cutting shoe unit" of the Vibra Corer.

7.1.2 Place a plastic cap on the open end of the LEXAN plastic tube and tape in place.

7.1.3 Pull the lexan tube out of the steel casing and into the Examination Trailer.

7.1.4 Place a plastic cap on the remaining open end of the Lexan plastic tube and tape in place.

7.1.4.1 Cut the metal casing into lengths specified by the IT Supervisor.

7.1.4.2 Place cut lengths as a unit in a metal box lined with plastic and uncalcined diatomaceous earth per WMCO Procedure SOP 65-C-106.

7.2 Cleaning and Inspecting Cores

7.2.1 Using an Alconox solution and paper towels, decontaminate the exterior of the LEXAN tube, if necessary.

7.2.2 Obtain a sample numbering label. (Refer to Figure 2)

7.2.3 The IT Analytical Technician shall affix the label to the clean core tube.

7.2.4 The IT Analytical Technician shall mark the top and bottom sections of the tube.

7.2.5 The IT Analytical Technician shall inspect and videotape the core.

7.2.6 The IT Analytical technician shall enter work completed and any other applicable information in the project logbook.

7.2.7 After completion of inspection, video recording and radiological scanning, the LEXAN encased core shall remain in the inspection trough.

7.2.8 If no further samples are to be taken, set the Vibra-Corer outer tube aside for decontamination/disposal.

7.3 Sectioning and Labeling Core Sections

7.3.1 After the cores are visually inspected by the IT Analytical Technician:

7.3.1.1 The IT Analytical Technician shall complete the "Sectioning Plan", Figure 1.

7.3.1.2 The IT Analytical Technician shall give copies of the plan to the IT Supervisor.

7.3.2 Using a permanent marker, identify the top and bottom of the core sample as indicated in the Sectioning Plan.

7.3.3 Check the "Sectioning Plan" (See Figure 1) for sectioning information.

7.3.4 Using a permanent marker, identify the sample core sections to be analyzed. Mark the Lexan Liner on the top of each section with an arrow.

7.3.5 Cut through the LEXAN liner along the line marking the top of the core. Minimize loss of sample when cutting and capping by holding the entire liner securely and making a clean cut.

**CAUTION**

**DO NOT ATTEMPT TO COLLECT LOST SAMPLE IN ANY CORE SECTION AS CROSS CONTAMINATION OF LAYERS COULD RESULT**

7.3.6 Recap the top end of the LEXAN liner with a plastic cap and seal the end with plastic vinyl tape.

7.3.7 Cut through the LEXAN liner at the next section marker using a new blade for each cut.

7.3.8 Securely cap and tape adjoining ends of the liner exposed by each cut.

7.3.9 After cutting, rotate the core section to an upright position.

7.3.10 Using an Alconox solution and paper towels, decontaminate the outside of the LEXAN liner and capped ends of the core section.

7.3.11 Dry each removed section with paper towels and affix a sample label near the top of the core section.

7.3.12 Sample labels (See Figure 2) assigned to the core shall be prepared by the IT Analytical Technician.

7.3.13 The IT Technician shall record the unique core sample number on the sample label and complete the appropriate line on the "Sample Collection Log" (See Figure 3) and the "Chain-of-Custody Record" (See Figure 4).

7.3.14 Protect the label with a overlay of clear tape.

7.4 Collecting Samples of Core Sections for Analysis

**CAUTION**

**OPERATORS SHALL WORK WITH ONE CORE SECTION AT A TIME**

NOTE

Any sampling equipment coming in contact with sample material shall have equipment rinsate samples performed prior to sampling to determine if cross-contamination of the sample material has occurred

7.4.1 Obtain sample bottles from the Analytical Technician.

7.4.2 The IT Analytical technician shall attach a sample label (see Figure 3) on the sample bottle.

7.4.3 The sample bottle label shall duplicate the core sample label number.

7.4.4 The IT Analytical Technician shall record the core sample label number in the Sample Collection Log.

7.4.5 Place a sheet of disposable paper on the work area. Place the core section on the paper.

7.4.6 A new sheet of paper will be used for each core section.

7.4.7 Remove the tape-sealed end cap from the core section.

7.4.7.1 Remove a small layer of material around the opening and inner sides of the lexan tube to prevent cross contamination.

7.4.7.2 Dispose of unwanted portion in a radioactive waste container.

7.4.8 Remove the lid from the sample bottle.

**CAUTION**

**ENSURE SAMPLE MATERIAL DOES NOT SPILL**

7.4.9 Using the pipe sampler, carefully remove a proper sample aliquot from the core section and transfer the sample into the bottle. Tighten lid on bottle.

7.4.10 Use a disposable spatula or spoon to break up the sample material if the material will not flow.

7.4.11 After each sample, place the used spatula or spoon in a "radioactive waste" plastic bag per WMCO Procedure SOP-65-c-106.

7.4.12 Personnel documenting sample data shall read back label information to reverify data.

7.4.13 The RST shall monitor sample bottle for radiation and record reading on bottle label. This step should be performed in a low background area, if practical.

7.4.14 Decontaminate the outside of the sample bottle with Alconox solution. Dry with paper towels. Monitor bottle exterior for loose contamination.

7.4.15 Seal the cap on the bottle with custody tape.

7.4.16 The IT Analytical Technician shall complete the "Chain-of-Custody Record" (See figure 4).

7.4.17 Repeat Steps 7.4.5 and 7.4.6 as directed by the IT Analytical Technician or IT Supervisor if additional samples are to be collected from one core section.

7.4.18 Each additional sample shall be place in separate bottles.

7.4.19 Seal the core section with an end cap and tape.

7.4.20 Repeat Steps 7.4.2 thru 7.4.19 for other core sections as instructed by IT Supervisor or IT Analytical Technician.

7.4.21 Place paper, used work gloves and used spatulas/spoons in rad waste bag per WMCO Procedures SOP-65-C-106.

7.5 Packaging Sample Bottles for Shipment

7.5.1 Clean sample bottles with an Alconox solution. Dry with paper towels.

7.5.2 Place the sample bottle in a plastic sample bag and heat seal the bag.

7.5.3 Heat sealed bags shall be prepared for shipment to analytical laboratory as directed by WMCO.

7.5.4 Roll up the disposable paper in repackaging work area.

7.5.5 Place paper, used work gloves, and used spatulas/spoons in the "radioactive Waste" plastic bag per WMCO Procedure SOP-65-C-106.

7.5.6 Notify IT Supervisor the shipping container(s) are ready for transfer to Analytical Laboratory.

7.6 Repackaging Core Sections

7.6.1 Clean the core section with an Alconox solution. Dry with paper towels. Monitor the core section for loose contamination.

7.6.2 Place the core section in a plastic sample bag and heat seal the bag.

7.6.3 Heat sealed bags shall b prepared for long term storage per WMCO Procedure SOP 65-C-105.

7.6.4 Roll up the disposable paper in the repackaging work area.

7.6.5 Place paper, used work gloves in the "Radioactive Waste" plastic bag per WMCO Procedure SOP 65-106.

7.6.6 Using the HEPA filtered vacuum cleaner, remove visible dust. Turn off vacuum cleaner when finished.

7.6.7 Notify IT Supervisor that core sections are ready for long term storage.

7.7 Decontamination of Equipment

7.7.1 Notify IT Supervisor that sampling equipment is ready for movement to designated decontamination area.

7.7.2 IT Supervisor shall request WMCO Transportation to move sampling equipment for decontamination.

NOTE

Sampling equipment shall be decontaminated per WMCO Procedure SOP 1-C-915

## 8.0 APPLICABLE FORMS

8.1 Figure #1, "Sectioning Plan"

8.2 Figure #2, "Analytical Sample Labels"

8.3 Figure #3, "Sample Collection Log"

8.4 Figure #4, "Chain-of-Custody Record"

Berm

COLLECTOR _____ ID NO: _____
DATE COLLECTED: _____ SECTION: _____
TIME COLLECTED: _____ ANALYSIS REQUIRED: _____
SAMPLE WEIGHT: _____

ANALYTICAL SAMPLE BOTTLE LABEL
Figure 5

PAGE _____ OF _____
CHECKED BY _____

SECTIONING PLAN

K-65 Verticle Berm Sampling

DATE STARTED: _____ DATE COMPLETED: _____
TIME STARTED: _____ TIME COMPLETED: _____
TOTAL LENGTH OF CORE: _____

| SECTION | LENGTH OF SECTION | NOTES | FOR ARCHIVE PURPOSES |
|---|---|---|---|
| | | | |
| | | | |

CORE SECTIONS ARE TO BE APPROXIMATELY 18 INCHES IN LENGTH

SIGNATURE _____ DATE/TIME _____

| NO. | DISTRIBUTION OF COPIES |
|---|---|
| 1 | Solid Waste Engineering |
| 2 | Sampling Task Manager |
| 3 | Laboratory Supervisor |
| 4 | ARchive Building (Bldg. 68) |

SECTIONING PLAN
FIGURE 1

RESIDUES ANALYTICAL SAMPLE

COLLECTOR: _____ I.D. NO.: _____
DATE COLLECTED: _____ SILO NO.: _____
TIME COLLECTED: _____ MANWAY: _____
GROSS WEIGHT: _____ ZONE: _____
TARE WEIGHT: _____ SECTION: _____
SAMPLE WEIGHT: _____ ANALYSIS REQUIRED: _____

RESIDUES LEXAN TUBE LABEL

COLLECTOR: _____ I.D. NO.: _____
DATE COLLECTED: _____ SILO NO.: _____
TIME COLLECTED: _____ MANWAY: _____
ZONE: _____
SECTION: _____

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**FERNALD RI/FS** 23-8-85

Project Name _____ Project No. _____
Sample Location _____ Number _____
Boring/Well No. _____ Date _____
Collector's Name _____ Time _____
Sample Type: _____ Ground Water _____ Surface Water
_____ Soil _____ Sludge/Waste
Parameters _____ Preservative _____
Bottle _____ of _____ _____ Filtered _____ Nonfiltered

ANALYTICAL SAMPLE LABELS
Figure 2

FERNALD RI/FS

| | |
|---|---|
| DATE | |
| TIME | |
| PAGE ____ OF ____ | |
| PAGE | |
| PROJECT NO. | |

## SAMPLE COLLECTION LOG

PROJECT NAME _____

SAMPLE NO. _____

SAMPLE LOCATION _____

SAMPLE TYPE _____

COMPOSITE _____ YES _____ NO

COMPOSITE TYPE _____

DEPTH OF SAMPLE _____

WEATHER _____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| | |
| | |
| | |
| | |

COMMENTS:

PREPARED BY: _____

Figure 3

FERNALD
RI/FS

# CHAIN-OF-CUSTODY RECORD

R/A Control No. _____

C/C Control No. 00150

PROJECT NAME/NUMBER _____ LAB DESTINATION _____

SAMPLE TEAM MEMBERS _____ CARRIER/WAYBILL NO. _____

| Sample Number | Sample Location and Description | Date and Time Collected | Sample Type | Container Type | Condition on Receipt (Name and Date) | Disposal Record No |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
| | | | | | | |

Special Instructions: _____

Possible Sample Hazards: _____

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: _____

   Received By: _____

2. Relinquished By: _____

   Received By: _____

3. Relinquished By: _____

   Received by: _____

4. Relinquished By: _____

   Received By: _____

WHITE - To accompany samples
YELLOW - Field copy

Figure 4