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STATE OF NORTH CAROLINA



*Department of Environment, Health,
and Natural Resources
Division of Solid Waste Management
Superfund Section*

**Tungston Queen Mine
NCD 082 362 989**

**Phase II
Abbreviated Sampling Plan and
Health and Safety Plan**

May 1991

By:

Greenhorne & O'Mara, Inc.



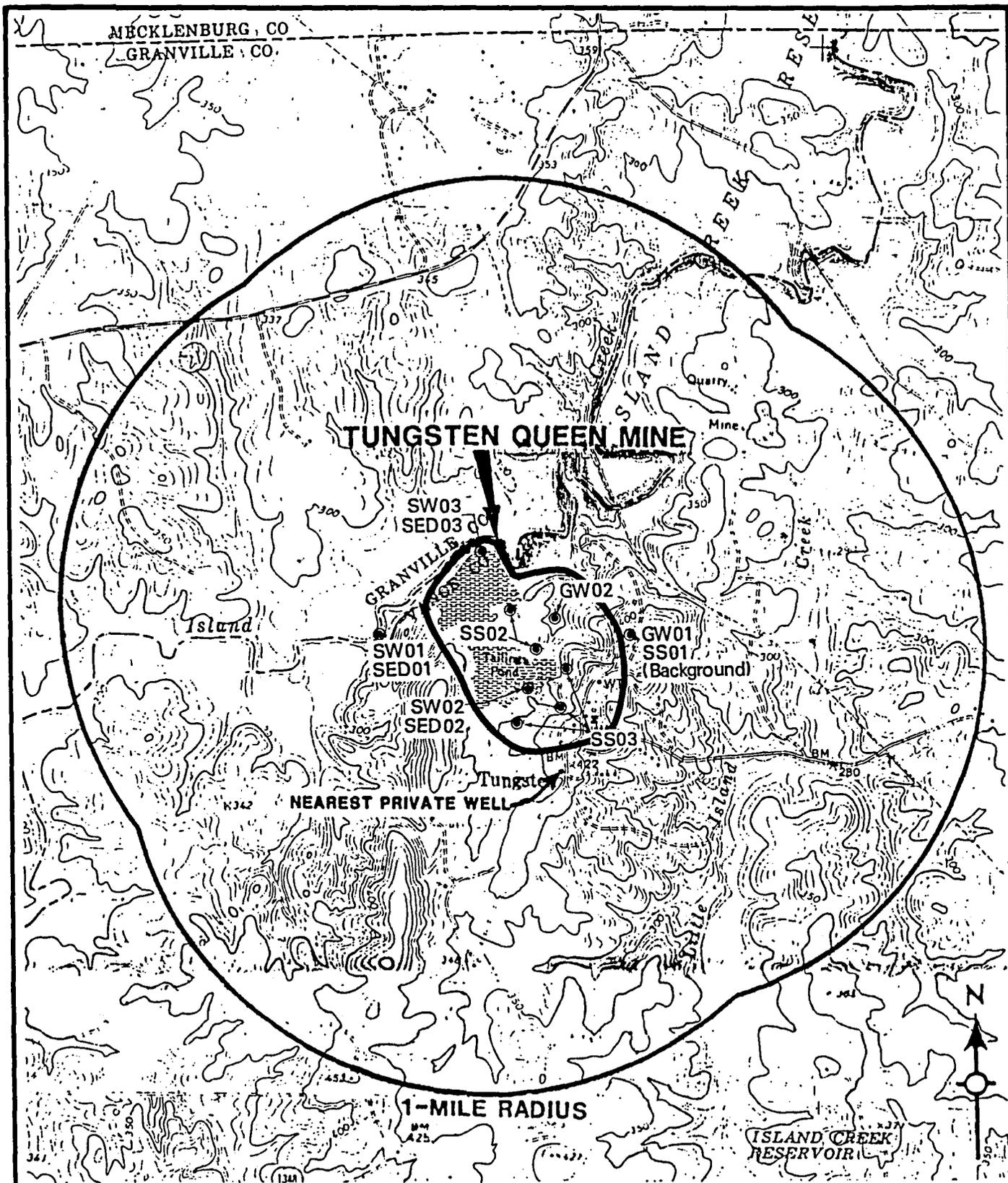
**TUNGSTEN QUEEN MINE
SITE SUMMARY**

The Tungsten Queen Mine is located on State Road 1348 in northern Vance County, 3.5 miles northwest of Townsville, North Carolina. The land surrounding the mine property is predominantly rural and forested. The John H. Kerr Reservoir is located approximately 2 miles to the north.

The property is approximately 150 acres which consists of several buildings, a guard house, a mine shaft, associated processing mills, and several tailing ponds. An office building is located approximately 1/2 mile south of the pond area. The mine is owned by Atlas Mine and Mill of Spokane, Washington and is currently not active.

The mine was worked for a total of 6 years between 1942 and 1972. Huebnerite and scheelite mineral ores were extracted from an underground vertical vein. The crude ore was crushed and milled and then concentrated via gravity separation, hydraulic sizing, and magnetic separation. Remaining tailings were used as slope fill and placed in tailing ponds. An analysis of the tailings, conducted for a previous owner in November, 1975, detected significant amounts of copper, zinc, lead, iron, titanium, and tungsten. The estimated amount of tailings present is 2,038,000 tons.

The Tungsten Queen Mine is currently not a RCRA-classified facility.



TUNGSTEN QUEEN MINE

Scale in Feet
0' 1000' 2000'

FIGURE 1



ENGINEERS • ARCHITECTS • PLANNERS • SCIENTISTS • SURVEYORS • PHOTOGRAMMETRISTS
GREENHORNE & O'MARA, INC.
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**SITE LAYOUT
SAMPLING POINTS**

CERCLA

PHASE II
SCREENING SITE INVESTIGATION
HEALTH & SAFETY PLAN
FOR THE
TUNGSTEN QUEEN MINE
TOWNSVILLE, VANCE COUNTY, NORTH CAROLINA

NCD 082362989

Submitted to:

State of North Carolina
Department of Environment, Health,
and Natural Resources
Division of Solid Waste Management
Superfund Section
Raleigh, North Carolina

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MAY, 1991

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1.0 SITE DESCRIPTION

1.1 SITE NAME AND ADDRESS: Tungsten Queen Mine, NC Route 1348
(3 miles northwest of Townsville), Vance County, North Carolina.

1.2 EPA SITE NUMBER: NCD082362989

1.3 PROJECT NUMBER: 5051-TQ3-316

1.4 DATES PLANNED ON-SITE: May 21, 1991

1.5 HAZARDS PRESENT OR SUSPECTED:

Groundwater Contamination - Copper, zinc, lead, iron, titanium,
tungsten contained in tailing sediments used as fill and placed
in tailing ponds.

Soil Contamination - Same as above.

Surface Water Contamination - Same as above.

1.6 TOTAL AREA OF SITE: 150 acres

1.7 AREA BEING STUDIED: 150 acres

1.8 SURROUNDING POPULATION:

On-Site: Not Available

0 - 1/4 Mile: Not Available

1/4 - 1/2 Mile: Not Available

1/2 - 1 Mile: 80

1.9 TOPOGRAPHY OF SITE:

Surface runoff from the tailing ponds would travel 100 feet
northwest to Island Creek. This creek flows northeast for 4.2
miles and then enters the John H. Kerr Reservoir.

1.10 WEATHER CONDITIONS AND FORECAST:

1.11 SITE ACCESS MAPS:

Site and Sample Location Map: Figure 1

2.0 ENTRY OBJECTIVES

The purpose(s) of this site entry are:

- To identify the suspected contamination of air, soil, groundwater, surface water in the vicinity of the site.
- To determine the extent of contamination of (air, soil, groundwater, surface water) in the vicinity of the site.
- To further assess the potential for other areas of buried waste to be present on-site.

The exact number and location of samples will be determined in the field by the G&O Field Sampling Team and the NCDEHNR representative. The proposed number of samples (including background samples) is given below:

- 3 Soil Samples
- 0 Soil Gas Samples
- 2 Groundwater Samples (These may include: On-Site Well Water Samples and Hand Augured Well Water Samples)
- 3 Surface Water Samples
- 3 Sediment Samples
- 0 Air Samples
- 0 Storage Container Samples (e.g: drums)

3.0 ORGANIZATION AND COORDINATION

3.1 ONSITE PERSONNEL

The following personnel are designated to carry out the stated job functions onsite. One person may carry out more than one job function. In case of absence of personnel, the alternate will be designated by the Site Manager and/or authorized personnel.

<u>JOB FUNCTION</u>	<u>NAME</u>	<u>WORK PHONE</u>
Site Manager	<u>Jeff Tyburski, G&O</u>	<u>(919)782-9088</u>
Site Safety Officer	<u>Helene Kasser, G&O</u>	<u>(301)982-2800</u>
Field Quality Assurance Officer	<u>Jeff Tyburski</u>	<u>see above</u>
Sampling Team	<u>Helene Kasser</u>	<u>see above</u>
	<u>Jerry Johnston, G&O</u>	<u>(919)782-9088</u>
	<u>Jeff Tyburski</u>	<u>see above</u>
	<u>Harvey Allen, NCDENHR</u>	<u>(919)733-2801</u>
Drilling Team	<u>NA</u>	<u></u>
	<u></u>	<u></u>

3.2 STATE REPRESENTATIVES:

<u>AGENCY</u>	<u>NAME</u>	<u>WORK PHONE</u>
North Carolina, Superfund Section	Harvey Allen	(919)733-2801
_____	_____	_____
_____	_____	_____

3.3 FEDERAL AGENCY REPRESENTATIVES:

<u>AGENCY</u>	<u>NAME</u>	<u>WORK PHONE</u>
NA	_____	_____
_____	_____	_____
_____	_____	_____

3.4 LOCAL AGENCY REPRESENTATIVES:

<u>AGENCY</u>	<u>NAME</u>	<u>WORK PHONE</u>
NA	_____	_____
_____	_____	_____
_____	_____	_____

3.5 CONTRACTOR REPRESENTATIVES:

<u>AGENCY</u>	<u>NAME</u>	<u>WORK PHONE</u>
G&O	Helene Kasser	(301)982-2800
G&O	Jeff Tyburski	(301)982-2800
G&O	Jerry Johnson	(919)782-9088

4.0 ONSITE WORK PLAN

The following onsite tasks will be performed by the designated personnel with the first person listed as the task team leader. The Site Manager may reassign personnel to different tasks:

<u>TASK</u>	<u>TEAM MEMBERS</u>
Decontamination Zone Setup	<u>Helene Kasser</u>
Grid System Setup	<u>NA</u>
On-Site Well Sampling	<u>Jeff Tyburski</u>
	<u>Jerry Johnson</u>
Soil Gas Survey	<u>NA</u>
Soil Sampling	<u>Helene Kasser</u>
	<u>Jerry Johnson</u>
Production Well Sampling	<u>NA</u>
Temporary Monitoring Well Sampling	<u>Jeff Tyburski</u>
	<u>Jerry Johnson</u>
Surface Water Sampling	<u>Harvey Allen</u>
Air Sampling	<u>NA</u>
Sediment Sampling	<u>Harvey Allen</u>

TASK

TEAM MEMBER

Residential Well Sampling

Harvey Allen

Rescue Team

Jeff Tyburski

Helene Kasser

Decontamination Team

Jerry Johnson

Helene Kasser

5.0 SITE CONTROL WORK ZONES

The following personnel have been designated to coordinate access control and security onsite during the sampling investigation:

Harvey Allen, NC DEHNR

Jeff Tyburski, G&O

Controlled work zones and control points should be set up and marked to prevent or reduce the migration of contaminants and to prevent interference and possible exposure of on-site residents. The work zones include Exclusion Zone (Hot Zone), Contamination Reduction Zone (Decon Zone), and Support Zone (Clean Zone). No unauthorized person should be within these areas. Command Post (Support Zone) should be located upwind from the Exclusion Zone. The control boundaries and access control points into each zone will be marked on the day of the site visit and made known to all personnel during the daily briefing.

An on-site reconnaissance will be performed in the field to select exact sampling locations and to ensure that the sampling team avoid overhead power lines and areas where underground cables may be buried when conducting intrusive sampling. All sampling equipment will be kept at a minimum distance of 25 feet away from suspected power sources to avoid the possibility of electrical arcing.

6.0 SAFETY AND SPECIAL TRAINING REQUIRED

All personnel permitted in sampling areas requiring personal protective equipment and clothing (the hot zone and decontamination zone) must have, as a minimum requirement, attended EPA's Personal Protection and Safety Training Course (165-2) or equivalent (165-5). A safety and task briefing meeting will be conducted each day before site entry. The safety procedures, evacuation procedures, escape procedures, as well as the day's planned activities will be discussed.

7.0 HAZARD EVALUATION

The following is a list of materials documented and/or suspected as being present in soil and groundwater on the site. It is also possible that these and other unknown site related hazardous substances may be present in surface waters and associated sediments on and near the site. This list is designed as a quick reference source to obtain pertinent information regarding the location, physical properties and health effects of hazardous materials onsite (From the NIOSH Pocket Guide to Chemical Hazards, September 1985, and the American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1988-1989).

7.1 SUBSTANCE HAZARD

Substance Name	Lead	Copper	Zinc Oxide	Titanium Oxide
Chemical Class	metal	metal	inorganic	inorganic
Physical State (s.l.gas)	solid	solid	solid	solid
Corrosivity (pH)	NA	NA	NA	NA
Flammability	LEL (Z) NA UEL (Z) NA	NA NA	NA NA	NA NA
Volatility (Vapor Pressure) (mm)	0	0	0	0
Reactivity	*	**	Chlorinat rubber	none
Radioactivity	NA	NA	NA	NA
Toxicity	PEL (8 hr. TWA) 0.15 mg/m ³ STEL (ppm/15 min) - IDLH (ppm) 700 mg/m ³	1.0 mg/m ³ - N.E.	5.0 mg/m ³ 10 mg/m ³ N.E.	10.0 mg/m ³ - N.E.
Highest Observed Concentration				
Air	NA	NA	NA	NA
Soil (ppm)	0.18Z	0.15Z	17Z	13Z
Water	NA	NA	NA	NA
Photoionization Potential (EV)	NA	NA	NA	NA

* Reactivity: strong oxidizers, hydrogen peroxide, acids

** Reactivity: Oxidizers, alkalis, sodium azide, acetylene

Do any of the above listed hazardous materials react adversely when mixed together? No

PHYSICAL DESCRIPTION OF SUSPECTED CONTAMINANTS:

Lead - metal: a heavy ductile, soft gray solid

Copper - metal: reddish, lustrous, malleable odorless solid

Zinc oxide: Fine white, odorless particulate dispersed in air

Titanium oxide: white, odorless powder

7.2 PHYSICAL HAZARDS

	Exclusion Zone	Contamination Reduction Zone	Support Zone
Non-Ionizing Radiation	not suspected	not suspected	not suspected
Ionizing Radiation			
alpha	not	not	not
beta	suspected	suspected	suspected
gamma			
Noise	NA	NA	NA
Vibration	NA	NA	NA
Heat and Cold Stress	possible	possible	possible
Confined Spaces	none	none	none
Electrical	none	none	none
Vehicle Traffic Safety	NA	NA	NA
Contact Through:			
Inhalation	possible	possible	possible
Skin	possible	possible	not probable
Ingestion	possible	possible	not probable
Eyes	possible	possible	not probable

8.0 PERSONAL PROTECTION EQUIPMENT

8.1 TASK TEAM PROTECTION LEVEL

Based on evaluation of potential hazards, the following levels of personal protection have been designated for each task team:

<u>TASK TEAM</u>	<u>CHEMICALS ENCOUNTERED</u>	<u>PROTECTION LEVEL A,B,C,D, OTHER</u>
Decontamination Zone Setup	Metals Inorganics	D*
Grid System Setup	NA	NA
Soil Gas Survey	NA	NA
Soil Sampling	Metals Inorganics	C*
Production Well Sampling	NA	NA
Temporary Monitoring Well	Metals Inorganics	C*
Surface Water Sampling	Metals Inorganics	C*
Sediment Sampling	Metals Inorganics	C*
Residential Well Sampling	NA	NA
Air Sampling	NA	NA
Container Sampling	NA	NA
Rescue Team	Metals Inorganics	C*
Decontamination Team	Metals Inorganics	C*

*Upgrades in the levels of personal protective equipment may be determined by field team leaders. Level D may be upgraded to Level C based upon significant increases (>2 ppm sustained) as detected on monitoring PIDs, or as dictated by dusty conditions or when encountering visible wastes and residues. Level B PPE will be used when trace organic compounds are detected in the worker's breathing zone area for more than ten minutes at concentrations between 15 to 25 ppm or above. Level B may also be used

when drilling into known source areas. Field team leaders will determine the minimum PPE to be used by analyzing the sampling point conditions and instrument readings in the field. Sampling team members may upgrade personal protection levels or abandon sample locations at their discretion based on field conditions. Level D will normally be used to collect intrusive or surface background or control media samples.

8.2 SPECIFIC PROTECTIVE EQUIPMENT

Specific protective equipment for each level of protection (Ref. 1):

LEVEL A

- Fully encapsulating chemical-resistant suit
- Pressure-demand, self-contained breathing apparatus (SCBA)
- Coveralls*
- Long cotton underwear*
- Gloves (inner), chemical resistant
- Boots, chemical-resistant, steel toe and shank
- Hard hat (under suit)*
- Disposable gloves and boot covers* (over encapsulating suit)
- Cooling unit*
- 2-way radio communications (inherently safe)

LEVEL B

- Pressure-demand, self-contained breathing apparatus (SCBA)
- Chemical-resistant clothing (includes: overalls and long-sleeved jacket; hooded, one or two-piece chemical-splash suit; disposable chemical-resistant, one-piece suits)
- Long cotton underwear*
- Coveralls*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots, chemical-resistant, steel toe and shank
- Disposable boot covers, chemical-resistant*
- Hard hat (face shield)*
- 2-way radio communications (inherently safe)*

(*) Optional

LEVEL C

Air-purifying respirator, full-face, canister-equipped
Chemical-resistant clothing (includes: coveralls; hooded one or two-piece chemical-splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls)

Coveralls*

Long cotton underwear*

Gloves (outer), chemical-resistant

Gloves (inner) chemical-resistant

Boots, chemical-resistant, steel toe and shank

Disposable boot covers, chemical-resistant*

Hard hat (face shield)*

Escape mask*

2-way radio communications (inherently safe)*

(*) Optional

LEVEL D

Hard Hat

Gloves

Boots/Shoes, leather or chemical-resistant, steel toe and shank

Safety glasses, chemical-splash goggles, or hard hat face shield

Disposable boot covers*

Escape mask*

(*) Optional

OTHERS

Level B or Level C can be modified to fit the actual situation when necessary upon approval from Safety Officer. If air-purifying respirators are selected, the appropriate cartridge for use corresponding to the involved substances and concentrations will be designed as:

<u>SUBSTANCE</u>	<u>CARTRIDGE</u>
<u>Metal</u>	<u>GMC-H</u>

No changes to the specified levels of protection shall be made without the approval of the Safety Officer and the Site Manager.

8.3 SAFETY EQUIPMENT CHECK-OUT

LEVEL C

Inspection of respirators will be conducted prior to each use. Thoroughly check all connections for gaskets and "O" rings and for proper tightness. Check the condition of the facepiece and all its parts, connecting air tube, and head bands. Inspect rubber or elastomer parts for pliability and signs of deterioration. Wearer will perform a negative pressure test just before entering the hazardous Exclusion Zone. In this test, the user closes off the inlet of the canister, cartridge(s), or filter(s) by covering with the palms or squeezing the breathing tube so that it does not pass air; inhales gently so that the facepiece collapses slightly; and holds breath for about 10 seconds. If the facepiece remains slightly collapsed and no inward leakage is detected, the respirator passes the negative pressure test and the wearer may enter the Exclusion Zone. If leakage is detected, the straps are readjusted and the test procedure is repeated. If leakage is still detected, the respirator may not be worn. In addition wearers will perform a positive pressure test. The test is conducted by covering the exhalation valve and exhaling. If the respirator fits properly, no leakage of air will be detected around the facepiece with moderate exhalation pressure (Ref. 1).

All personnel wearing respirators have had a qualitative or quantitative fit-test prior to using a respirator; and will have passed all of the needed medical qualifications.

9.0 MONITORING

9.1 ENVIRONMENTAL MONITORING

The following environmental monitoring instrument shall be used onsite (circle when applicable) at the specified intervals.

<u>INSTRUMENT</u>	<u>FREQUENCY</u>
Combustible Gas Indicator	Continuous/hourly/daily/other <u>Continuous when performing intrusive sampling.</u>
Oxygen Monitor	Continuous/hourly/daily/other <u>Continuous when performing intrusive sampling.</u>
Colorimetric Tubes	Continuous/hourly/daily/other <u>NA</u>
Metal Detector	Continuous/hourly/daily/other <u>NA</u>
Photo Ionization Detector (Photo Vac Micro-Tip)	Continuous/hourly/daily/other <u>Continuous</u>
Photo Vac Micro-Tip and/or HNu <u>* Calibration</u>	<u>Start-up and as needed throughout the sampling event.</u>

Radiation Detector Equipment:

Super Mini Alpha, Beta, Gamma, X-ray Detectors shall be used during the initial site reconnaissance to identify the presence of radiation levels exceeding background levels. The monitors shall be utilized continuously if the initial site survey indicates elevated levels.

< 2 mrem/hr Radiation above background level (normally 0.01 - 0.02 mrem/hr) signifies the possible presence of radiation sources. Continue investigation with caution. Perform thorough monitoring. Consult with health physicist.

> 2 mrem/hr Potential radiation hazard. Evacuate site. Continue evaluation only upon advice of a health physicist.

*Calibration Procedures:

The PhotoVac Micro-Tip and HNu PID must be calibrated in order to display concentrations in units equivalent to ppm. Each trace organic vapor monitor is calibrated in a similar manner using a known concentration of isobutylene gas. The isobutylene gas is used to calibrate the instruments to benzene concentrations in ppm at standard temperatures and pressures (i.e. ppm in ambient air). For complete instructions on the calibration of the Micro-Tip or HNu refer to the appropriate users manuals.

9.2 HEAT STRESS MONITORING

- For monitoring the body's recuperative ability to handle excess heat, one or more of the following techniques should be used as a screening technique. Monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When temperatures exceed 80 degrees Fahrenheit, workers must be monitored for heat stress after every work period.
- Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33%.
- Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the OT exceeds 99.7 degrees Fahrenheit at the beginning of the next rest period, the following work cycle should be further shortened by 33%. OT should be measured again at the end of the rest period to make sure that it has dropped below 99 degrees Fahrenheit.
- Body water loss (BWL) due to sweating should be measured by weighing the worker in the morning and in the evening. The clothing worn should be similar at both weighing; preferably the worker should be nude. The scale should be accurate to plus or minus 1/4 pound. BWL should not exceed 1.5% of the total body weight. If it does, workers should be instructed to increase their daily intake of fluids by the weight lost. Ideally, body fluids should be maintained at a constant level during the work day. This requires replacement of salt lost in sweat as well.

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

10.0 COMMUNICATION PROCEDURES

10.1 EMERGENCY SIGNAL - LEAVE HOT ZONE

The following signal is the emergency signal to indicate that all personnel should leave the Exclusion Zone (the hot zone):

Air Horn

Is a loud hailer required (Yes/No) No

10.2 HAND SIGNALS

The following standard hand signals will be used in case of radio communication failure:

<u>HAND SIGNALS</u>	<u>INDICATIONS</u>
Hand gripping throat	Out of air, can't breath
Pat on partner's shoulders	Leave area immediately
Both hands around waist or grip partner's wrist	Leave area immediately
Hands on top of head	Need assistance
Thumps up	OK, I am alright, I understand
Thumbs down	No, negative

10.3 LOCATION OF TELEPHONE

The location of onsite telephone: Office Building

The location of the nearest off-site telephone (need to be mentioned during briefing): Commercial buildings adjacent to the site.

11.0 DECONTAMINATION PROCEDURES

(Refer to Attachment A.)

12.0 EMERGENCY PLAN

12.1 EMERGENCY MEDICAL CARE FACILITY

Medical Facility: Maria Parham Hospital

Address: Ruin Creek Road

Henderson, North Carolina

Phone Number: (919) 438-4143

Time Needed to Access Facility: approximately 25 minutes

Local ambulance available: Vance County Fire and Ambulance

Phone Number for ambulance: (919) 438-6656 or 911

Ambulance response time: approximately 30 minutes

(Whenever possible, arrangements should be made for on-site standby.)

12.2 FIRST-AID EQUIPMENT ON-SITE

First-aid equipment is available onsite at the following locations:

First-Aid Kit: Support Zone, Field Truck

Emergency Eye Wash: Field Truck

_____:

_____:

12.3 EMERGENCY MEDICAL INFORMATION

Emergency medical information for substances present (from NIOSH Pocket Guide to Chemical Hazards, September 1985):

<u>SUBSTANCES</u>	<u>EXPOSURE SYMPTOMS</u>	<u>FIRST-AID INSTRUCTIONS</u>
Lead	Weakness, lassitude, insomnia; facial pallor, anorexia, weight-loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; ankle, wrist paralysis; encephalopathy; nephropathy; eye irritation; hypotension.	Eye: irrigate immediately Skin: soap wash immediately Breath: respiratory support Swallow: medical attention immediately
Copper	Irritation of nasal mucous membrane, pharynx; nasal perforation; eye irritation; metallic taste; dermatitis.	Eye: irrigate immediately Skin: soap wash Breath: respiratory support Swallow: medical attention immediately
Zinc Oxide	Sweet, metallic taste; dry throat, cough; chills, fever, tight chest, dyspnea, rales, reduced pulmonary function; headache; blurred vision; muscle cramps, lower back pain; nausea, vomiting; fatigue, lassitude, malaise.	Breath: respiratory support
Titanium	Slight lung fibrosis. Carcinogen	Breath: respiratory support

12.4 OTHER EMERGENCY PHONE LIST

List of Emergency Phone Numbers:

<u>AGENCY/FACILITY</u>	<u>CONTACT</u>	<u>PHONE NUMBER</u>
Police	Vance County Deputy	911
Fire	Vance County Fire and Ambulance	911 or (919) 438-6656

13.0 EMERGENCY PROCEDURES

The following standard emergency procedures will be used by onsite personnel in case of emergencies. The Site Manager will be responsible for ensuring that the appropriate procedures are followed.

13.1 PERSONNEL INJURY IN HOT ZONE

Designated emergency signal: Air Horn

Upon notification of an injury in the Exclusion Zone, the designated emergency signal shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the hot zone with proper level of protection to remove the injured person to the decontamination zone. The Site Safety Officer and Site Manager should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The Site Safety Officer shall initiate the appropriate first aid, and contact should be made for an ambulance and at the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms are determined.

13.2 PERSONNEL INJURY IN THE CLEAN ZONE

Designated Emergency Signal: Air Horn

Upon notification of an injury in the Support Zone, the Site Manager and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not effect the performance of site personnel, operations may continue, with the Site Safety Officer initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk of others, the designated emergency signal shall be sounded and all site personnel shall move to the decontamination line for further instructions. Activities onsite will stop until the added risk is removed or minimized.

13.3 FIRE OR EXPLOSION

Designated Emergency Signal: Air Horn

Upon notification of a fire or explosion onsite, the designated emergency signal shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

13.4 PERSONAL PROTECTIVE EQUIPMENT FAILURE

If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

13.5 OTHER EQUIPMENT FAILURE

If any other equipment onsite fails to operate properly, the Site Manager and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations onsite. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken. Standby protective monitoring equipment will be provided to ensure adequate protection in the event of equipment failure.

13.6 ALTERNATE ESCAPE ROUTE FROM HOT ZONE

The designated emergency escape routes will be established on the site in case of a situation where exit from the Exclusion Zone cannot occur through the decontamination corridor.

13.7 REENTRY AFTER EMERGENCY EVACUATION

In all situations, when an onsite emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

- (1) The conditions resulting in the emergency have been corrected;
- (2) The hazards have been reassessed;
- (3) The Site Safety Plan has been reviewed; and
- (4) Site personnel have been briefed on any changes in the Site Safety Plan.

ATTACHMENT A
DECONTAMINATION PROCEDURES

LEVEL C DECONTAMINATION

A. EQUIPMENT WORN

The full decontamination procedure outlined is for workers wearing Level C protection (with taped joints between gloves, boots, and suit) consisting of:

- One-piece, hooded, chemical-resistant splash suit.
- Canister equipped, full-face mask.
- Hard hat.
- Chemical-resistant, steel toe and shank boots.
- Boot covers.
- Inner and outer gloves.

B. PROCEDURE FOR FULL DECONTAMINATION

Station 1: Segregated Equipment Drop

Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Equipment: various size containers
 plastic liners
 plastic drop cloths

Station 2: Boot Cover and Glove Wash

Scrub outer boot covers and gloves with decon solution or detergent/ water.

Equipment: container (20-30 gallons)
 decon solution or
 detergent water
 2-3 long-handle, soft-bristle scrub-
 brushes

Station 3: Boot Cover and Glove Rinse

Rinse off decon solution from Station 2 using copious amounts of water. Repeat as many times as necessary.

Equipment: container (30-50 gallons) or
high-pressure spray unit
water
2-3 long-handle, soft bristle scrub-
brushes

Station 4: Tape Removal

Remove tape around boots and gloves and deposit in container with plastic liner.

Equipment: container (20-30 gallons)
plastic liners

Station 5: Boot Cover Removal

Remove boot covers and deposit in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners
bench or stool

Station 6: Outer Glove Removal

Remove outer gloves and deposit in container with plastic liner.

Equipment: container (20-30 gallons)
plastic liners

Station 7: Suit/Safety Boot Wash

Thoroughly wash splash suit and safety boots. Scrub with long handle, soft-bristle scrub brush and copious amounts of decon solution or detergent/water. Repeat as many times as necessary.

Equipment: container (30-50 gallons)
decon solution or
detergent/water
2-3 long-handle, soft-bristle scrub-
brushes

Station 8: Suit/Safety Boot Rinse

Rinse off decon solution or detergent/water using copious amounts of water. Repeat as many times as necessary.

Equipment: container (30-50 gallons) or
high-pressure spray unit
water
2-3 long-handle, soft-bristle scrub-
brushes

Station 9: Canister or Mask Change

If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boots covers donned, and joints taped. Worker returns to duty.

Equipment: canister (or mask)
tape
boot covers
gloves

Station 10: Safety Boot Removal

Remove safety boots and deposit in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners
bench or stool
boot jack

Station 11: Splash Suit Removal

With assistance of helper, remove splash suit. Deposit in container with plastic liner.

Equipment: container (30-50 gallons)
bench or stool
liner

Station 12: Inner Glove Wash

Wash inner gloves with decon solution or detergent/water that will not harm skin. Repeat as many times as necessary.

Equipment: decon solution or
detergent/water
basin or bucket

Station 13: Inner Glove Rinse

Rinse inner gloves with water. Repeat as many times as necessary.

Equipment: water
basin or bucket
small table

Station 14: Facepiece Removal

Remove facepiece. Avoid touching face with gloves. Deposit facepiece in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners

Station 15: Inner Glove Removal

Remove inner gloves and deposit in container with plastic liner.

Equipment: container (20-30 gallons)
plastic liners

Station 16: Inner Clothing Removal

Remove clothing soaked with perspiration. Place in container with plastic liner. Do not wear inner clothing off-site since there is a possibility small amounts of contaminants might have been transferred in removing splash suite.

Equipment: container (30-50 gallons)
plastic liners

Station 17: Field Wash

Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.

Equipment: water
soap
tables
wash basins/buckets
field showers

Station 18: Redress

Put on clean clothes. A dressing trailer is needed in inclement weather.

Equipment: tables
 chairs
 lockers
 clothes

C. FULL DECONTAMINATION (SITUATION 1) AND THREE MODIFICATIONS (SITUATION 2, 3, & 4)

SIT.	STATION NUMBER																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X									
3	X						X	X		X	X			X	X	X	X	
4	X						X	X	X									

Situation 1: The individual entering the Contamination Reduction Corridor is observed to be grossly contaminated or extremely skin corrosive substances are known or suspected to be present.

Situation 2: Same as Situation 1 except individual needs new canister or mask and will return to Exclusion Zone.

Situation 3: Individual entering the CRC is expected to be minimally contaminated. Extremely skin-corrosive materials are not present. No outer gloves or boot covers are worn. Inner gloves are not contaminated.

Situation 4: Same as Situation 3 except individual needs new canister or mask and will return to Exclusion Zone.

(Source: Ref. 1)

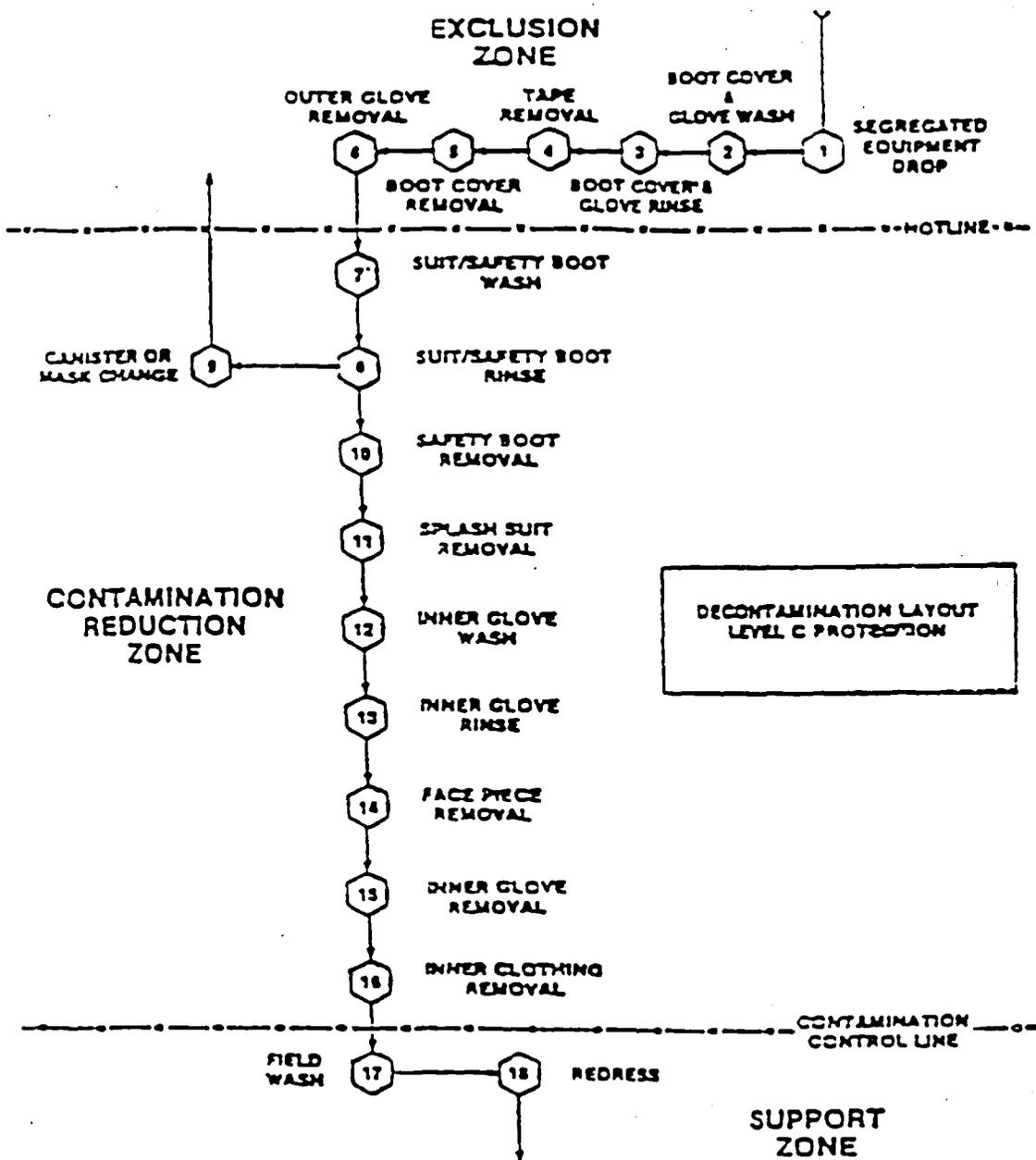


FIGURE A -1

EQUIPMENT DECONTAMINATION

A. Cleaning Procedures For Stainless Steel Or Metal Sampling Equipment Used For The Collection Of Samples For Trace Organic Compounds And/Or Metals Analyses

- (1) Wash equipment thoroughly with laboratory detergent and water using a brush to remove any particulate matter or surface film;
- (2) Rinse equipment thoroughly with tap water;
- (3) Rinse equipment thoroughly with deionized water;
- (4) Wrap equipment completely with aluminum foil to prevent contamination during storage and/or transport to the field; and
- (5) Rinse the stainless steel or metal sampling equipment thoroughly with tap water in the field as soon as possible after use.