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MOBILIZATION OF A FIELD ANALYTICAL LABORATORY

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12.0 REFERENCES

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- B - High Hazard Mobile Laboratory Set Up*

* This section affected by Revision 0.1.



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MOBILIZATION OF A FIELD ANALYTICAL LABORATORY

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) provides guidelines to set up a mobile analytical laboratory for on-site analysis of volatile (VOAs), semi-volatile (BNAs), pesticides/polychlorinated biphenyls (Pesticide/PCBs) and metals present in solid waste, soil, sludge/sediments, and other matrices. Mobile laboratory instrumentation and analytical methods must meet all relevant U.S. Environmental Protection Agency/Environmental Response Center (EPA/ERT) / Scientific, Engineering, Response and Analytical Services (SERAS) and OSHA regulations to ensure the safety of personnel working in the laboratory. All applicable U.S. EPA and U.S. DOT regulations regarding the handling, accumulation, storage and removal of hazardous wastes must be met. On-site mobile laboratories provide quick turnaround on critical data needed for field decisions concerning site characterization, treatability, and remediation/removal activities. Rigorous Quality Assurance/Quality Control (QA/QC) procedures ensure the reliability of the analytical data and also achieve detection limits well below contaminant action levels.

2.0 METHOD SUMMARY

The typical field analytical laboratory is designed and constructed to provide a mobile analytical laboratory for on-site evaluation of hazardous and toxic substances. The trailer must contain an analytical/test laboratory area and a personnel area. The trailer must be equipped with the necessary utilities, benches, safety equipment and laboratory furnishings, including two glove box/hood units, to accommodate chemical analyses, treatability tests and pilot-scale studies. The personnel area houses lockers, showers, and a commode. Care must be taken to plan the laboratory equipment and supplies in accordance with the required analytical procedures and scope of work.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

- Sample custody maintenance and documentation must comply with ERT/SERAS SOP #2002, Sample Documentation, and ERT/SERAS SOP #4005, Chain of Custody procedures.
- Sample storage and handling must comply with ERT/SERAS SOP #1502, Handling Potentially High Hazard Environmental Samples.
- Samples must be protected from light and refrigerated at 4°C ($\pm 2^\circ\text{C}$) from the time of receipt until extraction, analysis, and disposal.

4.0 INTERFERENCE AND POTENTIAL PROBLEMS

- Interferences by phthalates can pose a problem in organic analysis. These compounds generally appear in the chromatogram as large late eluting peaks. Cross contamination of clean glassware routinely occurs when plastics are handled during extraction steps, especially when solvent wetted surfaces are handled. Interferences from phthalates can be minimized by avoiding contact with any plastic materials and by baking glassware.
- The laboratory performing volatile analysis should be completely free of solvents. Any solvents, or solvent waste containers, used or stored in the laboratory during the analysis must be kept in a vented hood or vented storage room.



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- Samples contaminated or suspected to be contaminated with dioxin or other acutely hazardous contaminants must be analyzed in a high hazard laboratory.
- The flame Ionization Detector (FID) is a universal detector and can give false positive identification due to interference. Mass Spectrometry must be considered for positive identification of compounds.
- Modification of sample preparation methods may be necessary due to the following reasons:
 - Results needed in 24 hours
 - Site limitations, i.e., water, glassware cleaning
 - Availability of a hot water bath to concentrate the sample
 - Work and hood space

5.0 EQUIPMENT/APPARATUS

A detailed listing of the laboratory supplies, safety supplies, and general supplies required for laboratory set-up is given in the following sections. A determination of the exact supplies and quantity needed should be made prior to mobilization.

5.1 Organic Laboratory Supplies

5.1.1 GC/MS supplies

<u>Quantity</u>	<u>Supply</u>
2	Hewlett Packard HP 5890 GCs equipped with FID detector
1	HP 5890 GCs equipped with an Electron Capture Detector
1	HP 5971A Mass Selective Detector, equipped with 5890 Series II GC
1	Tekmar concentrator (LSC 2000) equipped with an autosampler (ALS2016)
1	HP 7837A Auto Sampler
1	HP Chemstation 1 DOS 5.0 software driven IBM compatible computer
2	Autosampler trays
3	Integrators HP-3396A
3	Controllers HP-7673A
2	Disk drive HP-9114B
1	GC manual, integrator manual, and disk drive manual
2	HP battery pack
4	Printer cartridges
2	Printer trays
2	Restek RTX-5, 0.53 mm x 30 m megabore columns (0.50 μ m film)
3	DB - 624, 0.53 mm x 30 M ID fused silica capillary column
2	DB - 608, 0.53 mm x 30 M ID - 0.83 μ m film column
2	Rack for GC column
10	Graphite ferrules for column
30	Restek uniliners: injection port liners
5 boxes	1-mL autosampler vials
1	Tub of crimptops



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1	Crimper for 1 mL vials
1	Crimper for 22 mm crimp tops
1 pkg	Crimp caps w/Teflon lined septa 11 mm
10 pkg	Crimp caps w/Teflon lined septa 20 mm
2	Replacement syringes for autosampler
1 tin	11-mm thermogreen septum for GC
4 boxes	Printer paper
3 boxes	Diskettes for integrator 3 1/2"
3	Spare printhead for integrator
1 box	Various fuses for instrument
1 box	Various injector port connections
1 box	Various swagelok fittings for GC
1	Bubble flowmeter
1	Uniliner sleeve adapter
1 pkg	HP glass liner
2	Restek glass liner
8	Uniliner sleeves GC
1	Metal sleeves
1	5-mm uniliner
10	8-cm injection ports

5.1.2 Lab and Extraction Supplies

<u>Quantity</u>	<u>Supply</u>
6	Sample vial racks
1 bag	Crimp tops
1	Top loader scale
1	Shaker table
1 bottle	Boiling chips
1	Snoop
1	Centrifuge
1	Hot plate
1	Hot plate w/stirrer
3 pkgs	Soil weigh dishes (600)
1 pkg	Funnels
1	Forceps CAT #10951-0010, Vendor Macalaster
1	Forceps CAT #10951-0012, Vendor Macalaster
2	Forceps CAT #10964-0000, Vendor Macalaster
1 case	Support rings
4	Flask support rings, cork
10	Sample trays
1	Lab tray, stainless steel
2 cases	Pasteur pipettes and rubber bulb
4	Pipette bulbs
1 case	Pipettes, disposable, Kimax N-51A
5 pkg	Whatman filter paper



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100	Metal spatula
1 bottle	Sand (500 g)
1 roll	Tygon tubing, 1/4" x 1/16"
5	Cylinder clamps
2	Deionized water wash bottles
2	Thermometers
1 box	pH paper
1 box	Stirring bars, magnetic
1 box	Labeling tape
1 box	Label - blank
1 pkg	Label - hazardous waste
1 case	Kimwipe tissues
1 case	Disposable paper towels
10	Waste pails, 5-gallon DOT-approved

5.1.3 Glassware

<u>Quantity</u>	<u>Supply</u>
[x]	Syringes 2x10 µL, 1x25 µL, 5x250 µL, 2x500 µL, 1x1 mL, 2x50 µL
10	Separatory funnels
10	KD flasks
1 case	10-mL serum vials
10 case	100-mL serum bottles
40	10-mL graduated receiving vessels for concentration
50	Amber vials 50-mL or 100-mL
2 box	VOA vials
1 box	Diazomethane preparation kit
3 each	10 mL, 25 mL, 50 mL, 100 mL, 250 mL volumetric flasks
2 boxes	2-mL screw cap vials
4 boxes	100-mL screw cap vials

5.1.4 Gases

<u>Quantity</u>	<u>Supply</u>
1 L 160	Hydrogen generator/tank of hydrogen
1 L 160 Tank	Argon/methane
1 L 160 Tank	Nitrogen with regulator
2	Hydrocarbon filters for each gas line except nitrogen
1 50 ft	1/4" copper tubing
1 50 ft	1/8" copper tubing
2 bags	Various swagelok fittings
4	Gas tank support straps
1	Vacuum pump
1	Helium regulator
1	Air regulator



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1 Argon/methane regulator

5.1.5 Safety Supplies

<u>Quantity</u>	<u>Supply</u>
1	Portable eyewash
1	First aid kit
1	Fire extinguishers
1	Fire blanket
1	Fume hood
1	Solvent waste cans - DOT approved
1 case	Hazard spill control pillows
1 case	Safety gloves
1 pkg	Safety glasses
1 pkg	Safety shields
1 case	Disposable tyvek

5.1.6 General Supplies

<u>Quantity</u>	<u>Supply</u>
2	Notebooks
2	GC log books
2	Extraction logbook
2	Shelves for supply storage
1	Small refrigerator for extracts and samples
2	Coolers for sample storage
1 pkg	Lab Markers, indelible
1 pkg	Rulers
2	Extension cords
1 pkg	Clear tape
2	Garbage cans, standard size
1 case	Plastic bags, garbage can size
1 case	White paper
1	Portable computer with Lotus 123
1	Printer
1 case	Printer paper
5 pkgs	Diskettes (3½")
1	Tool kit
1	Capillary tool kit
12	Federal express mailers
12	Blank Chain of Custody forms

5.2 Inorganic Laboratory Supplies

5.2.1 Instrument and Digestion Supplies



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<u>Quantity</u>	<u>Supply</u>
1	SpectrAA-20, Atomic Absorption (AA) Spectrometer
1	AA instrument, Buck Scientific, Model 200A
1	Automatic sampler
1	Graphite tube atomizer
1 each	Burners for both air-Acetylene and Nitrous Oxide-Acetylene
1	Citizen MSP-10 printer
1 pkg	2.0-mL polyethylene sample cups
2 pkg	Graphite tube and graphite platform (partition or nonpartition)
1	Cleaning wire
2 each	Tube capillary
1	Hot plate
4 each	Dispensers for acids
1 each	Hollow cathode lamps
1 box	Diskette for analysis and report reduction
1	Balance capable of weighing ± 0.1 g
1	Fume hood
1	Refrigerated water recirculator for furnace
1	VGA-76 pump tubing
1	Mercury cell
1 pkg	Weigh dishes
2	Pipet bulb
6 dozen	Spatulas
2	Deionized water wash bottles
1 box	Labels to write sample names
1 bottle	Sand (pure) 500 g
1 dozen	Labels -- Hazardous Waste
1 case	Kimwipe tissue
3	Waste pails
4 cases	Nalgene bottles
4 rolls	Duct tape
1 roll	Surface protection paper
4	Wash bottles for acetone
1	Explosion proof refrigerator
1	Sample preparation logbook
1	Total percent solids logbook
1	Lab logbook

5.2.2 Glassware Supplies

<u>Quantity</u>	<u>Supply</u>
30-40	100-mL beakers
10 each	500-mL, 100-mL, 50-mL volumetric flasks
50	Watch glasses, 9 cm



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2 boxes each	1-mL, 5-mL, 10-mL pipets
50	Disposable funnels, 9 cm
30	BOD bottles (Hg)
1	Water bath (Hg), 12" x 30", 3" deep

5.2.3 Gases

<u>Quantity</u>	<u>Supply</u>
1 L160 Tank	Nitrous Oxide
1 L160 Tank	Compressed air
1 L160 Tank	Argon
1	Acetylene
4	Regulators
50 ft	Copper tubing
50 ft	Stainless steel tubing
4	Gas tank support strap

5.2.4 Chemical Supplies

Amounts of each will vary depending on the scope of work.

<u>Quantity</u>	<u>Supply</u>
1 case	Nitric Acid
1 case	Hydrochloric Acid
5 pts	Hydrogen Peroxide
1 bottle	Nickel Nitrate (100 g)
1 bottle	Acetone, 1L
1 each	Standards
1 bottle	Stannous Chloride (Hg)
1 bottle	Potassium Permanganate
1 bottle	Hydroxylamine Hydrochloric Acid (Hg)
1 bottle	Sulfuric Acid
1 each	QC standards

5.2.5 Safety Supplies

<u>Quantity</u>	<u>Supply</u>
1	Portable eyewasher
1	First aid kit
1	Fire extinguisher
1	Fire blanket
1 box	Hazard spill control pillows
1 box	Safety gloves
1 pkg	Safety glasses



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5.2.6 General Supplies

<u>Quantity</u>	<u>Supply</u>
1	Portable computer with Lotus 1-2-3
1	Printer
1 box	Printer paper
2 each	Printer cartridges
1 box	Permanent markers
1	Extension cord, 220V., 9 ft.
1	Ruler
1 box	White paper
10	Binders
1	Calculator
1 box	Plastic bags
1 box	Manilla envelope mailers

6.0 REAGENTS

<u>Quantity</u>	<u>Supply</u>
1 set	Standards (appropriate for analytical method)
1 set	Surrogates (appropriate for analytical method)
1 bottle	Sodium Hydroxide (1L)
1 bottle	Sulfuric Acid (1L)
1 case	High Purity Hexane (4 x 4L)
1 case	Acetone (4 x 4L)
1 case	Methylene Chloride (4 x 4L)
1 case	Ethyl Ether (4 x 1L)
2 bottles	Sodium Sulfate (2.5 kg)
1 bottle	Diazald (100 g)
1 bottle	Carbitol (100 g)
1	Diazald kit
1 bottle	Acetic Acid (1L)
2 bottles	Deionized water (gallon each)

7.0 PROCEDURE

7.1 Laboratory Selection

A mobile laboratory should be selected to accommodate on-site sample screening and analysis in a professional, safe and comfortable surrounding. It must meet all relevant U.S. EPA/ERT SERAS and OSHA regulations to ensure the safety of the personnel operating the instruments. Samples may be routinely analyzed in a regular Mobile Laboratory; however, if samples are contaminated with dioxin or acutely hazardous contaminants, they must be handled in a High Hazard laboratory.



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The size of the laboratory is based upon the number of samples handled in a day and also sample matrix. For instance, soil samples require a smaller hood compared to water samples. Analytical methods, instruments, contaminant types and levels handled in the mobile laboratory should be considered before selecting the laboratory. The High Hazard laboratory must meet all the health and safety requirements specified in ERT/SERAS SOP #1502, Handling Potentially High Hazard Environmental Samples. The configurations of the Mobile Laboratory and the High Hazard Mobile Laboratory are given in Appendices A and B.

7.2 Site Preparation and Location

The mobile laboratory should be located away from the contaminated area to provide laboratory personnel free access to the laboratory. If the on-site laboratory is located in the contaminated area then the chemist must comply with site specific and laboratory health and safety regulations. The laboratory trailer should be located on a compacted, level surface, properly graded to allow for efficient surface water run off. It is not required that the trailer pad be paved. However, the pad should be adjacent to an access road and have the required utilities and services available (i.e., electricity, water, and sewage). If power is not available, a generator should be rented to operate the mobile laboratory and instrumentation.

If running water, glassware washing facilities, and concentrating apparatus are not available then modification of analytical methods is needed. An example of lab set up is provided in Appendix B.

7.3 Procurement

A list of all the supplies and equipment must be prepared and proper procurement procedures must be followed.

7.4 Analytical Methods

One of the critical factors for selection of analytical methods is the resources available on site. The following information should be considered before selecting or modifying any method.

- Turnaround time for analytical data
- QA/QC requirements
- Safety of personnel operating the analytical instrumentation
- Resources availability: sewage, water and concentrating apparatus
- Availability of hood and bench space
- Site specific detection limits
- Positive identification of compounds
- Mobile laboratory limitations
- Sample matrix

The following modified sample preparation method for BNA and PCB/Pesticide may be used to provide analytical results with fast turnaround time.

BNA Extraction Procedure

Ten to thirty grams of sample is spiked with a CLP BNA surrogate mixture, mixed with



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anhydrous sodium sulfate, and extracted three times with portions (40, 30, 30 mL) of methylene chloride using the shaker method. The extracts are combined, and concentrated to 1 mL - 10 mL final extract volume before analysis, depending upon the nature of the sample matrix.

Oil waste is extracted by diluting 1 g of sample with 10 mL of methylene chloride and an aliquot is analyzed. Further dilution may be required.

PCB/Pesticide Extraction Procedure

The soil samples are extracted by the shaker method. A 10-30 g sample is mixed with the surrogate and anhydrous sodium sulfate, and the mixture is extracted with 40 mL 1:1 methylene chloride: acetone solution for 30 minutes. The extraction is repeated two more times with 30-mL portions of solvent. After extraction, the combined extracts are reduced in volume to 10 mL. The solvent mixture is cleaned by florisil column cleanup and/or sulfur cleanup and again reduced in volume to 1 to 10 mL.

Oil waste is extracted by diluting 1 g of sample to 10-mL with hexane and an aliquot will be cleaned by florisil and/or copper or TBA sulfite for analysis.

The following analytical methods may be used for analysis.

- ERT/SERAS SOP #1804, Routine Analysis of Semi-volatiles in Water by GC/MS
- ERT/SERAS SOP #1805, Routine Analysis of Semi-volatiles in Soil/Sediment by GC/MS
- ERT/SERAS SOP #1806, Volatile Organic Analysis in Water by GC/MS
- ERT/SERAS SOP #1807, Volatile Organic Analysis in Soil/Sediment by GC/MS
- ERT/SERAS SOP #1808, Routine Analysis of Pesticide/PCB in Water by GC/ECD
- ERT/SERAS SOP #1809, Routine Analysis of Pesticide/PCB in Soil/Sediment by GC/ECD
- ERT/SERAS SOP #1818, Determination of Metal by Atomic Absorption (AA) Method

7.5 Waste Residuals Disposal

All of the treated and untreated samples are maintained for 60 days after the issuance of the final report. If no additional testing has been requested at the end of the 60 days, arrangements are made for disposal or return to the site. Refer to ERT/SERAS SOP #1501, Hazardous Waste Management.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL



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Refer to the Analytical Method or the QA Work Plan for QA objectives and protocols. The following documentation must be provided:

BNA and VOA analysis by GC/MS

- Data-spectra and ions table for BFB/DFTPP for every twelve hours of analysis.
- Initial calibration standard data and daily calibration checks with tabulated response factors and percent relative standard deviation (%RSD) calculated for each compound and percent difference (%D).
- Short form quant reports (integration table and labeled chromatogram) for standard runs, matrix spike and matrix spike duplicate (MS/MSD).
- Table showing MS/MSD recoveries.
- Table showing sample, blank, MS/MSD surrogate recoveries. Explanatory footnote indicating problems with surrogate recoveries, if they are out of limits.
- Full format (integration table, labeled chromatograms, internal standards/surrogate and detected compounds spectra both raw and background subtracted) sample and blank reports.
- List of quantified tentatively identified compounds with integration table including area counts, scan numbers and spectra of the identified peaks for each sample and blank.
- A copy of the lab instrument log for GC/MS.
- A copy of the GC/MS extraction log sheets for the BNA fraction, including percent solids table.
- Final report of sample analysis with the list of target compounds, amount found, and detection limit of each compound.

PCB/Pesticide analysis by GC

- Clearly labeled copies of the most recent calibration range for the compounds of interest.
- Method detection limits for each compound analyzed.
- Chromatograms for all samples, daily standards, and blanks. All chromatograms must be clearly labeled with the standard or sample identity, date, time and dilution/concentration factors. One standard for each parameter must be analyzed for every twelve hours of analysis.
- All instrument conditions including oven temperature, detector type, detector temperature, column sensitivity, and chart speed.
- Tabulation of sample results.
- Tabulation of any surrogate standard results.



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- Copies of lab notes, extraction log pages, injection log pages or bench sheets, including percent solids table.
- Tabulated MS/MSD results.
- Tabulated retention time windows for all target compounds on primary column and retention time windows for all identified compounds on the secondary column.

Metal analysis by AA

- Copies of the analysts' notebook pages, which show not only results, but also the standard curve used.
- A list of instrument and method detection limits for each compound analyzed.
- A copy of the sample digestion method.
- Tabulated samples results.
- Tabulated MS/MSD results.
- All instrument printouts.

10.0 DATA VALIDATION

Data validation is performed as per guidance in the ERT/SERAS SOP #1016, Data Validation Procedures for Routine Organic Analysis and/or ERT/SERAS SOP #1017, Data Validation Procedures for Routine Inorganic Analysis. If a modified analytical method is used then data validation is performed as per protocols set up by new method.

11.0 HEALTH AND SAFETY

Chemists working in high hazard laboratory must follow ERT/SERAS SOP #1502, Handling Potential High Hazard Environmental Samples.

A site specific Health and Safety plan must be prepared before mobilization to the site. Refer to ERT/SERAS SOP #3012, SERAS Health and Safety Guidelines for Activities at Hazardous Waste Sites.

12.0 REFERENCES

Supply Specialist to the Environmental Laboratory, Hazco Services, Inc., 2006 Springboro West, Dayton, Ohio 45439.



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APPENDIX A
Mobile Laboratory Configurations
SOP #1400
February 1995



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MOBILIZATION OF A FIELD ANALYTICAL LABORATORY

Mobile Laboratory Facility
Hazlab™
Mobile Laboratory





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Standard Features

First Aid Kit & Two 5-Minute Escape Apparatus	6-Gallon, 120-Volt Water Heater
Vented Fume Hood	2 Skylights
Muffle Furnace & Explosion-Proof Hot Plate	3 240-Volt Ceiling Heaters
Laboratory Oven	5 120-Volt Fluorescent Interior Lights
12-Gallon Acid Storage Cabinet with Fan	120-Volt Demand Water Pump
12-Gallon Flammable Storage Cabinet with Fan	8 120-Volt Interior Receptacles
FRP Panel Interior Cabinetry - Base & Overhead	2 GFI Protected 120-Volt Exterior Receptacles
Desk with Formica Top & Filing Cabinet	Curbside Slide Window with screen
Eyewash Station & Drench Hose	Fully Uninsulated Underbelly
6-Cubic Foot Refrigerator	8" Double Jr I-Beam Frame
Solideck Rubberized Tile Flooring	Electric Brakes
Roof-Mounted Air Conditioner	Locking Lugnuts
2-Bowl, Stainless-Steel Sink	White Modular Steel Wheels
60-Gallon Holding Tank	Goodyear Steel Belted Radial Tires
50-Gallon Water Tank	Spare Tire & Wheel in Locking Compartment
Heavy-Duty Rub Rail	Break-Away Switch w/Battery
Rear Step Bumper	Hitch & Safety Chain (2 5/16" Coupler)
Pull-out Side Step	3/4" FRP Exterior Walls & Roof
Rubber Ride Suspension	Fiberglass Interior Wall & Ceiling
Exterior Lights (DOT)	Steel Roof Bow Reinforcement
Side and Rear Doors	Filtered Ventilation System

General Specifications

Body Size: 8 Ft. W x 24 Ft.-1 1/2" L
Overall Unit: 28 Ft. - 4 1/2"
Ground Clearance: 13"
Interior Ceiling Height: 7 Ft.
GVWR: 10,400 Pounds
Gross Weight: 8400 Pounds
Tongue Weight: 1170 Pounds
Tongue Capacity: 5000 Pounds
Cargo Capacity: 3170 Pounds
Axles: 5200 Pounds each
Electric: 120/240 V 100 Amp
Single Phase 60Hz

Custom Options Available

Zero Air Systems for Instrumentation
Climate Control Systems
Chemsurf® or Stainless-Steel Countertops
HEPA Filters
Stainless Steel Backsplash
Upgraded Refrigerated Storage Space
Drench Shower
Infra-Red Ceiling Heat
Surge Protection
Power Conditioner
Generator/Transfer Switch
Water Purification Systems

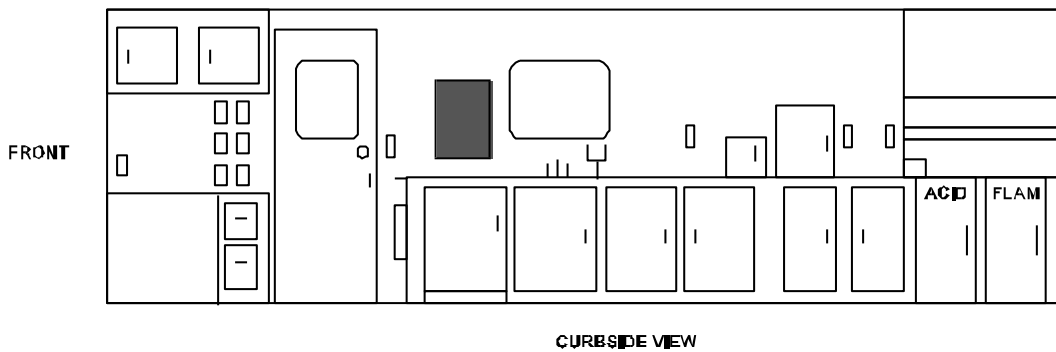


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Figure 1. Hazlab Curbside View



HAZCO SERVICES, INC. MOBILE FACILITIES	HAZLAB 1991	FLOORPLAN BY: TRM DATE: 8-8-81 CURBSIDE
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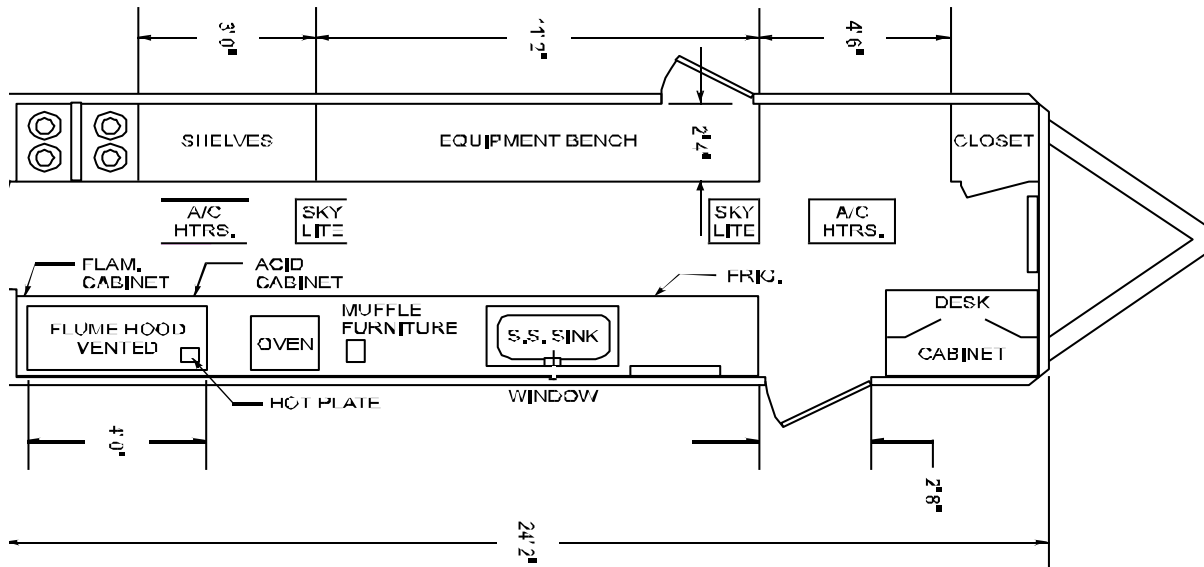


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Figure 2. Hazlab Floor Plan



HAZCO SERVICES, INC. MOBILE FACILITIES	HAZLAB 1991	FLOORPLAN BY: TRIM DATE: 8-8-91
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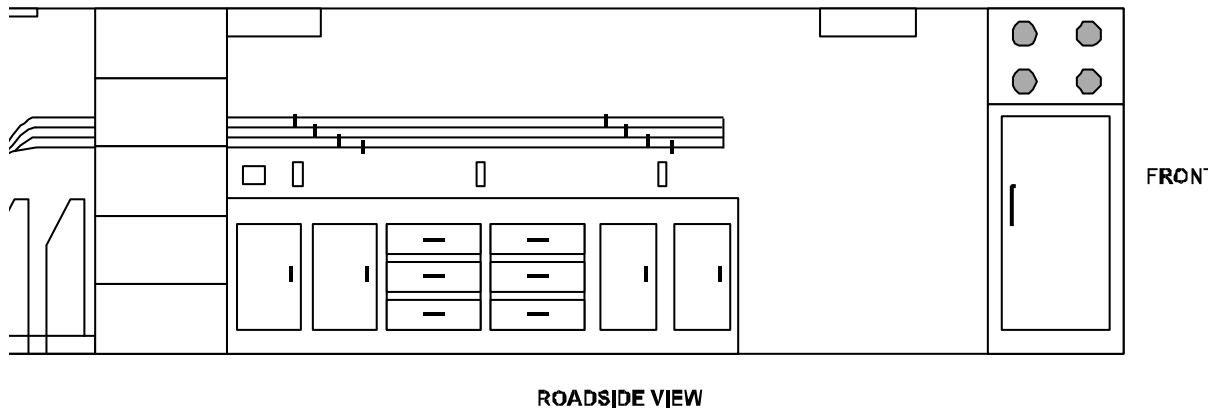


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Figure 3. Hazlab Roadside View



HAZCO SERVICES, INC. MOBILE FACILITIES	HAZLAB 1991	FLOORPI BY; TRIM DATE: 8- ROADSD
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APPENDIX B
High Hazard Mobile Laboratory Set Up
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HIGH HAZARD MOBILE LABORATORY SET UP

The Mobile Treatability/Pilot Test Laboratory has been designed and constructed to provide a mobile analytical laboratory for on-site evaluation of hazardous and toxic substances for SERAS is described here. The 40 foot long 8 foot wide trailer contains an analytical/test laboratory area and a personnel area. The trailer is equipped with the necessary utilities, benches, safety equipment, and laboratory furnishings, including two glove box/hood units, to accommodate chemical analyses, treatability tests and pilot-scale studies. The personnel area houses lockers, showers and a commode.

A detailed description of the operating and maintenance procedures for the trailer and the laboratory personnel equipment is given in the following sections.

Mobile Lab Trailer Mobilization

SITE PREPARATION & LOCATION

The Lab Trailer should be located on a compacted, level surface, properly graded to allow for efficient surface water run-off. It is not required that the trailer pad be paved. However, the pad should be adjacent to an access road and have the required utilities and services available.

TRAILER SET-UP

The trailer landing gear are lowered onto the steel grounding plates, provided with the trailer, and locked in position. The trailer is leveled using the three leveling jacks stored with the trailer. A three point leveling system is to be used as shown in Figure 1. The jacks must be positioned on the frame of the trailer under carriage. The large jack is to be used at the front of the trailer and the two smaller jacks in the rear positions.

The jacks are placed on a pier of 12" x 12" wooden ties, fitted on the top with a steel plate. The jacks are adjusted to stabilize and level the trailer.

UTILITIES AND SERVICES

The Mobile Lab Trailer requires the following utilities and services:

- Electrical

220v. 225 amp, 3 phase.

The electrical distribution box is located next to the air conditioning unit at the front of the trailer (see Figure 2). The electrical connections must be made by a qualified electrician, and conform to local codes.

- Water

Potable, water is required for the lab and personnel areas. The water inlet valve is located on the under carriage of the trailer behind the left rear wheels (see Figure 1).



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- Sewage

The sewage discharge connection is located on the undercarriage of the trailer at the right rear. A 50 foot length of a 2 inch hose is provided with the trailer for sewage discharge. This hose is stored in the racks under the trailer (see Figure 1).

Prior to connecting and using the sewage discharge system, all required compliance with local regulations must be obtained.

OUTSIDE STAIRS - INSTALLATION

A set of stairs, including a landing deck and hand rails is provided for both the rear entrance and side emergency exit doors. These stairs are stored and secured for travel in the two compartments located on the under carriage of the trailer (see Figures 1 & 2).

The rear landing deck is folded and secured to the back of the trailer for travel. The rear staircase is set-up by unfolding the deck, attaching the stairs and securing the hand rails.

The side stairs are set-up by attaching the landing deck to the trailer body. The deck support legs and stairs are secured to the deck and then the hand rails are attached.

STAIRWAY LIGHTS - INSTALLATION

Each outside stair case is provided with a light located above and next to the door on the outside of the trailer body. The side door light fixture is removed and stored inside the trailer for travel. This fixture is to be installed after the stairs are in place.

TRAILER WATER SYSTEM

The water supply to the Mobile Lab Trailer is to be potable drinking water only. The water will supply the lab, the toilet, showers, sinks, and hot water heater. The water inlet valve is located under the trailer as shown in Figure 1.

Low point water drain valves are provided in the showers, under the lab sink as well as the main water inlet valve under the trailer.

HOT WATER HEATER

The hot water heater is located behind a screened panel at the rear of the trailer, next to the rear door, see Figure 1.

To access the water heater, the screws securing the screen are removed. The inlet and outlet valves must be in the open position before electrical power to the unit is turned on. The water temperature can be set by adjusting the units temperature control.

INTERIOR LIGHT FIXTURES

The plastic covers for the interior fluorescent light fixtures are removed and stored inside the trailer for travel. These covers are to be re-installed prior to operations. The covers snap on over the metal frame of the fixtures.



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COMPRESSED AIR

The Lab Trailer is equipped with a portable electric air compressor. For travel, this unit is stored and secured inside the trailer.

For operation, the unit is placed on a wooden frame under the rear of the trailer. The flexible air line supplied with the unit is attached to the air inlet fitting located under the right side of the trailer, (see Figure 1).

SAFETY EQUIPMENT

The Mobile Lab Trailer is equipped with the following safety equipment. The location of this equipment is shown in Figure 3.

1. Fire extinguishers
ABC Type:
One unit is in the lab, the second unit in the personnel area.
2. Fire blanket - located in lab.
3. Eye Wash Fountain - located in lab.
4. Emergency lights - located in lab and personnel area.
5. Door alarm - located on side emergency door.
6. First Aid Kit - located in personnel area.

HEATING/AIR CONDITIONING SYSTEM

The Mobile Lab Trailer is equipped with an Air Flow Model Bard 5 ton 3-phase air conditioner/heat pump unit.

The unit is designed to provide cooling, heating, air exchange, and dehumidification to the trailer. The air conditioner and exhaust fan at the rear of the trailer are part of the safety controls in the trailer. Their operation ensure complete air exchanges (4 to 12 room exchanges per hour). The thermostatic control for the unit is located in the laboratory. The unit is fully automatic, once the controls are set, the unit should maintain the trailer at the set level without further adjustments. The exhaust fan switch is also located in the laboratory (Figure 3).

All required connection and adjustments to the unit have been made at the time of installation. The maintenance procedures, as described in the operating manual, should be followed.

INCINOLET - ELECTRIC INCINERATING TOILET

The incinolet is an electric incinerating disposal system that uses only electric power for its operation. The incinolet reduces human waste to an odorless, bacteria-free inorganic ash that may be disposed of in a manner similar to the disposal of wood



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ash.

HOOD/GLOVE BOXES

Two hood/glove box combination units are installed in the laboratory (see Figure 3). These units provide an isolated, well ventilated space in which experimentation and analysis on hazardous and toxic materials can be performed.

Each hood is equipped with its own ventilating fan and exhaust duct extending a minimum of 6 feet above the roof. The on/off switch for the fan and light are located on the front face of the hood.

The front sash of the hood should be in the closed position except when actual work in the hood is being conducted. To maintain the proper air balance in the trailer and the proper air flow through the face of the hood, all trailer doors and windows must be closed when the hoods are in use. Also, the air conditioning unit must be on.

EQUIPMENT LIST

1. Incinolet Electric Incinerating Toilet - Model TR
2. Lab-line Explosion-Proof Refrigerator/Freezer
3. Lab-Line Explosion-Proof Freezer
4. Pilferguard - Door Alarm - Model PG-10
5. Air Flow Air Conditioning Unit - Model Bard 5 ton 3-phase air conditioner/heat pump
6. Nuaire Glove Box/biological Safety Cabinet (2 Units)
7. Fire Extinguisher - Class ABC - 18 LB (2 Units)
8. Screw Jack - 12 Tons (4 Units)
9. First Aid Kit
10. Trailer Jack - 20 Tons (1 Unit)
11. Eye Wash Station
12. Hot Water Heater
13. Lockers (4 Units)
14. Emergency Lights (2 Units)
15. Side Door Stairs Assembly
16. Rear Door Stairs Assembly
17. Air compressor
18. Jack Supports
Steel Plates
Wooden Tie
19. Showers (2 Units)
20. Smoke Alarms (2 Units)

Figure 1. Mobile Treatability/Pilot Test Laboratory
Under Carriage View



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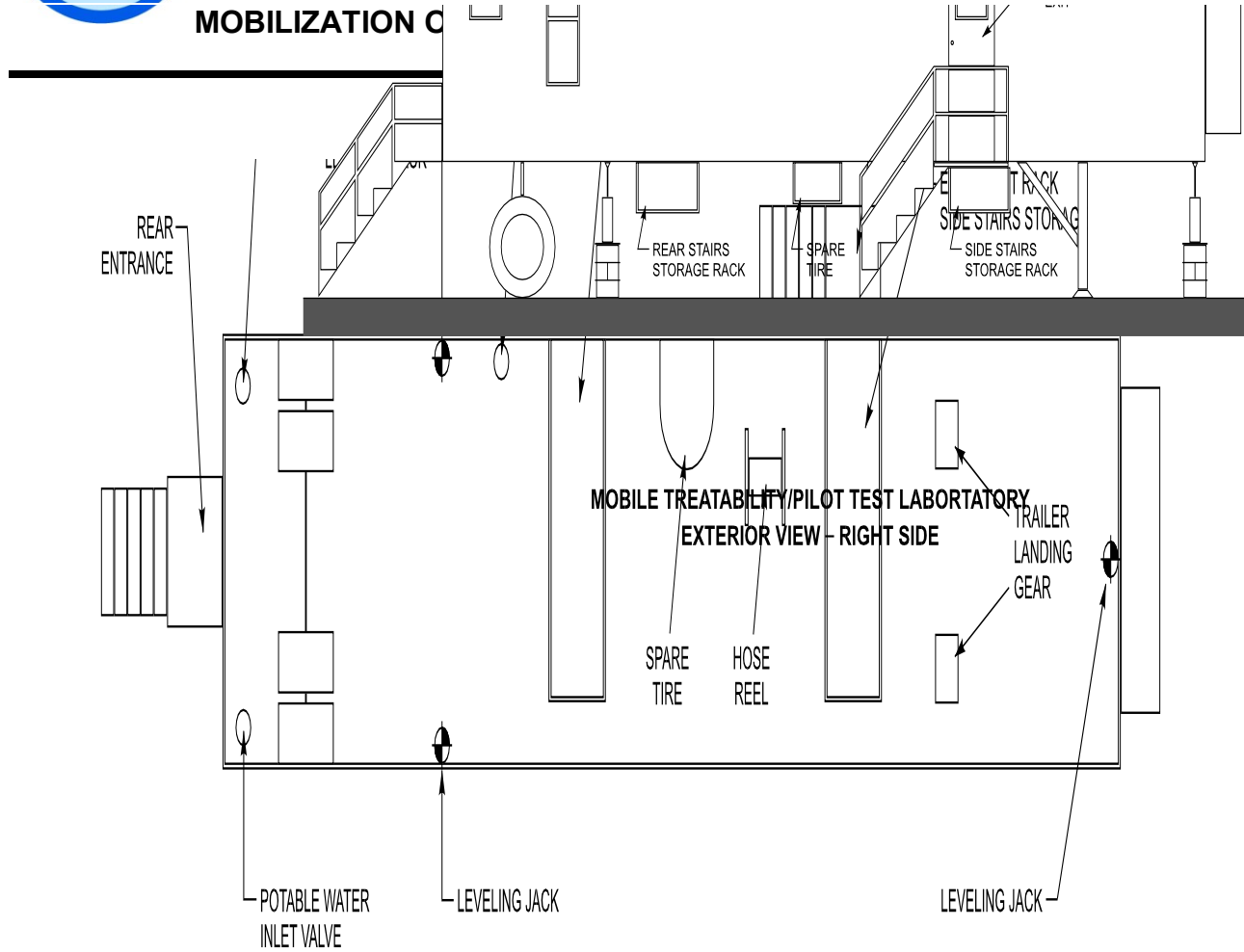


Figure 2. Mobile Treatability/Pilot Test Laboratory
Exterior View - Right Side

Figure 3. Mobile Treatability/Pilot Test Laboratory
Interior Area-Equipment Layout



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