Navy Environmental Health Center

Standard Operating

Procedures for

Environmental Health Site Assessments

Intended Use: This Standard Operating Procedure (SOP) provides a series of steps designed to obtain sufficient information to evaluate potential environmental exposures that may affect the health of deployed personnel. The procedures and methods described herein are based on the **America Society for Testing and Materials (ASTM), International** standard guide ***E2318-03, Standard Guide for the Environmental Health Site Assessment Process for Military Deployments***. This document is specifically designed to foster informed operational risk management of potential environmental health threats to deployed U.S. Forces, however, data gathered via these methods may also be useful for more definitive health risk analyses.

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Standard Operating Procedures for Environmental Site Assessments

Table of Contents

Figures

Appendices

Standard Operating Procedures for Environmental Site Assessments

Purpose. Environmental site assessments are conducted to determine if environmental contaminates from current and/prior land use, disease vectors, or other environmental conditions exist at deployment sites that could pose health risks to deployed personnel. Additionally, they identify industrial facility operations, and/or commodities on/near a deployment site that, if destroyed, damaged, or released could result in catastrophic health risk to deployed forces.

The assessment protocol outlined below describes a mission-oriented approach to determine the nature and magnitude of the health risks associated with industrial, agricultural and urban activities so that commanders can make informed risk management decisions.

Pre-Deployment Activities. Before deploying, information should be gathered, processed, condensed, and presented to all team members.

Define the Mission: The type of mission supported dictates what level of assessment will be necessary. When possible, review the Operation Plan and/or meet with mission planners to define:

1. Where the operation(s) will occur?

2. When the operation(s) will occur and how long will it last?

3. Why the operation is being conducted (training, consequence management, disaster relief, combat, nation building, etc.)?

4. Who is involved?

5. Task specifics
    a. What tasks will be performed
    b. How many people will perform the task?
    c. Will these tasks be continual or intermittent?
    d. What are the potential stressors involved (i.e., environmental/occupational)

6. What are the current and historic weather patterns in the area?

7. What are the topographic/geological conditions in the area

8. What are the commander's expectations?

Preliminary Hazard Analysis: A Preliminary hazard analysis is completed by reviewing relevant intelligence data for the area of interest.

1. All team members should review the Armed Forces Medical Intelligence Center's Environmental Health Risk Assessments, Infectious Disease Risk Assessments and Industrial Facility Health Risk Assessments for each country in the area of interest.

2. Other intelligence should be compiled and reviewed, such as weather patterns (historic/current), topographic/geologic concerns, etc.
    a. Compile intelligence information from non-secure sites. (See appendix A)
    b. Compile intelligence information from secure sites (see appendix A)
    c. If there is no readily available intelligence for an area of interest, contact the Plans & Operations Directorate at Navy Environmental Health Center who will validate and request

intelligence production from the *Community On-line Intelligence System for End Users and Managers* (COLISEUM).

d. Emergent requests for Industrial Facility Health Risk Assessment information should be directed to AFMIC Operations directly at (301) 619-7574. The U.S. Army Center for Health Promotion and Preventive Medicine's Industrial Hazard Assessments (IHAs) provide similar Information for the CENTCOM AOR. Information on IHAs completed within the CENTCOM AOR may be obtained by contacting Mr. Jeffrey Kirkpatrick at (410) 436-8155. Points of contact for other theaters are listed in Appendix I.

Preliminary Site Conceptual Model: Develop a preliminary Conceptual Site Model (CSM) based on the nature of the mission and the intelligence products reviewed. Prioritize potential environmental health vulnerabilities. (Appendix B shows an example of a Conceptual Site Model for a chemical (PCB) release in soil in which there are five completed exposure pathways associated with the single environmental release.)

Activities Upon Arrival in Country.

Preparing for Onsite Reconnaissance: Prior to physically entering the site, investigate the area around the site.

1. Review information from the preliminary hazard analysis.
2. If the site is currently occupied or is locked, seek the manager to obtain site entry permission, and try to obtain contact information on individuals who may be able to provide information on the present and historic uses of the site as well as potential site related health risks. Interviews with these individuals can be conducted before, during, or after the onsite reconnaissance.
3. Seek an elevated location (hill, rooftop, etc) to observe the site and surrounding area.
4. Drive or walk the perimeter of the site.
    a. Identify onsite environmental releases, potential releases, possible releases, and/or other environmental conditions that might compromise the assessment team's safety.
    b. Identify potential hazardous/radioactive material/waste sources, including source types, dimensions, locations and evidence of poor containment. To the extent possible, estimate the area or volume of these sources.
    c. Identify any potential environmental conditions that may require the use of personal protective equipment during site reconnaissance.
    d. Look for evidence of hazardous/radioactive material migration on or from the site, including stressed vegetation, areas of visible stained soil, or outfalls discharging to holding ponds or other surface bodies of water (see Appendix C)
    e. Identify potential harborage areas, breeding sites and/or other evidence of pest infestation.
    f. Record observations, including a physical and operational description of the site in a logbook, Personal Digital Assistant (PDA), etc. and begin to construct a site map (see Appendix D). If possible, photograph the site, focusing on areas where a suspected environmental release has occurred.
    g. Prioritize each potential source of release for further investigation based on its potential to create health risk or mission impact.

Interviews: Interviews are conducted to obtain historical information that may not be available from other sources and to further refine information gained by reviewing intelligence data, direct observations during site reconnaissance and/or or the industrial hazard assessment.

1. Individuals or agencies to consider interviewing include: the U.S. Embassy Defense Attaché, the host nation military liaison, health officials, local fire brigade, emergency responders, site occupants, site workers, and occupants of adjacent properties.

2. The U.S. Embassy's Defense Attaché Office should be contacted prior to scheduling interviews with Host Nation military or Host Nation government officials. The Defense Attaché may also be able to assist in arranging interviews and/or identify other persons that may be appropriate to interview.

3. Interviews may be conducted by telephone or in person.
    a. Seek information concerning past and present operations;
    b. Ask about waste disposal practices and if there are any environmental problems. (i.e. have there ever been spills on the site, problems with contaminated wells (either onsite or on adjacent properties), health problems in site workers, complaints from occupants of adjacent properties about odors or other environmental impacts.
    c. For agricultural lands, ask about commonly used pesticides, herbicides, and fertilizers.
    d. Attempt to obtain information about communicable and/or infectious disease prevalence within the local population.
    e. Ask about the incidence of crime in the area surrounding the deployment site and/or any other areas in the vicinity that will be frequented by deployed personnel.

Site Reconnaissance: Site reconnaissance is designed to fill data gaps remaining after reviewing data from intelligence sources and completing the perimeter survey.

1. Prior to actual site entry, ensure that all necessary site safety precautions, including personal protective equipment, have been considered. Appendix E provides an outline of standing orders for initial site entry.

2. Focus on confirming or refuting the presence of environmental releases or suspected/potential releases that have a complete/potentially complete exposure pathways. Appendix F describes exposure pathways that must be evaluated at each site. Figure 1 shows the components of a completed exposure pathway.

Figure 1

3. Visibly and physically observe the property and all structures on the site. Use site screening instrumentation and organoleptic senses as appropriate, to identify potential areas of contamination, insect breeding and vermin infestation. See Appendix I for more information on

vector-borne disease threat assessment. Record the position of any confirmed/suspected releases with a GPS and document your findings with photographs.

4. If the opportunity arises to review facility records, look specifically for documents that provide information about processes, raw materials used, intermediate/final products formed, and waste produced. Additionally, review past/present disposal practices. Record all source information in the logbook/PDA.

5. Building Interiors:

    a. Any structures that will be occupied by deployed forces must be visually inspected for conditions that may pose health risk. When doing a walk-through inspection look for faulty building infrastructure; slip, trip, and fall hazards; hazardous materials used in processes currently or formerly performed within the structure and/or in construction; moisture accumulation from leaks or broken plumbing; pest infestations; etc.
    b. The inspection must include all common areas (such as lobbies, hallways, utility rooms, etc.) maintenance and repair areas, boiler rooms, and a representative sample of areas that will be routinely occupied. Document your findings with photographs.
    c. It is not necessary to look under floors, above ceilings or behind walls unless construction/ demolition activities are planned or when necessary to identify the source and initiate control of pest infestations.
    d. Building materials suspected of containing asbestos and/or lead based paint need not be routinely sampled if they are in good condition and the activities of the deployed forces will not disturb the integrity of the suspect materials. If the suspect materials are deteriorated or construction or demolition activities will disrupt the suspect building materials, sampling is appropriate and remedial action is required to minimize potential exposures.

Industrial Hazard Assessment: The industrial hazard assessment can be accomplished as a windshield (driving) survey. It is performed to verify the existence and locations of major industrial facilities in the area of the deployment site that may pose a health risk to deployed forces.

1. Locate all industrial/nuclear facilities, operations, and/or commodities near a deployment site that, if destroyed, damaged, or released could result in health risks to deployed forces. As a minimum, all industrial facilities within a 6-mile radius of the deployment site fence line must be identified. Record the position of each facility with a GPS. All nuclear power plants within a 200-mile radius of the deployment site should be identified.
2. If the local area is heavily industrialized and/or the weather or terrain could enhance the transport of an environmental release, the survey distance may need to be increased.
3. Identify industrial discharges such as smoke plumes and/or wastewater outfalls (photograph if possible)

4. Record the location of each facility using a GPS and/or describe the distance and direction to the deployment site.
    a. Describe hazardous/nuclear material/waste sources, including source types, dimensions and the relative location of all storage containers. If possible, photograph and record all markings or labels on storage containers that may aid in identifying the contents. Estimate the storage volume and describe the condition of the container. If safe to do so, photograph each location for documentation purposes and record each photograph in your logbook/PDA.

b. If large storage volumes of toxic industrial materials (TIMs), toxic industrial chemicals (TICs) and/or nuclear power plants are present within the search radii, modeling should be accomplished using the Hazard Prediction and Assessment Capability (HPAC) and The Consequences Assessment Tool Set (CATS) automated software systems. For PM-MMART/FDPMUs deploying without this capability, HPAC/CATS modeling support may be available from a DTRA detachment or Navy meteorological detachment deployed in theater.
c. Record the names of all existing roads, if applicable.

Negative Determinations. Negative determinations are made when complete and/or potentially complete exposure pathways are absent. Upon completion of site reconnaissance, the industrial hazard assessment and interviews, the assessment team should finalize the site map and revise the CSM. If the revised CSM indicates that there are no complete/potentially complete exposure pathways, no further assessment is needed. (Note: Should site conditions or the mission change, re-evaluation of your initial site assessment findings may be required.)

1. Document findings, conclusions, and recommendations, including rationale for any negative determinations in a site report.
2. If complete/potentially complete exposure pathways exist, continue the assessment as dictated by the revised CSM.

Environmental Sampling for Chemical Contaminants. The purpose of environmental sampling is to obtain information about the contaminants present at a site and to what extent they have migrated from the area of initial release. Environmental sampling serves to validate the CSM and provides the information necessary to estimate potential health risks associated with completed exposure pathways by documenting exposure point concentrations. All sampling will be accomplished in accordance with a dynamic, site-specific sampling and analysis plan.

The sampling and analysis plan defines the locations, type and number of samples that will be taken. The fundamental objective of developing the plan is to ensure that all samples collected are representative of the environmental media under investigation. The sampling and analysis plan need not be a stand-alone document as long as all elements discussed below are included in the site report.

1. The sampling and analysis plan should include the following:

    a. The purpose of sampling and rationale for sampling strategies employed.
    b. The environmental media to be sampled and the target analytes.
    c. The sampling equipment and/or direct reading instrumentation that will be used
    d. Quality assurance/Quality control procedures, and
    e. Decontamination procedures.

The sampling and analysis plan is based on the CSM, but is dynamic and may change with in-the-field sampling results. All changes made to the sampling and analysis plan should be tracked and documented. Specific sampling procedures, sample submission forms, and sample shipping procedures are discussed in Appendix G.

Screening Health Risk Assessments for Chemical Contaminants. Screening health risk assessments for deployments will be completed within an Operational Risk Management context using the guidance provided in the U.S. Army Center for Health Promotion and Preventive Medicine Technical Guide 230 (TG-230). A **deployment** is defined as a troop movement resulting from a Joint Chiefs of Staff combatant command deployment order for 30 continuous days or greater to a land-based location outside the United States. The deployment location does not have permanent U.S. military medical treatment

facilities and may not be directly supported by deployed medical forces. For operations that fall outside this definition, Naval and/or other service specific occupational exposure guidelines will apply.

Application of the TG 230:

The TG 230 provides military exposure guidelines (MEGs) for chemicals in air, water, and soil applicable to deployment conditions. The MEGs were specifically developed as a tool to characterize health risks associated with the type of exposure conditions likely to be encountered during military deploys. The following conventions apply when using the TG-230:

1. If two or more chemicals have the same target organs or systems, then their effects should be considered additive.

2. In addition to the potential additive effects of multiple contaminants, military personnel may be exposed to the same contaminants from multiple sources (e.g., air, water, and soil). The effects of exposure to the same or similar chemicals through different media should be considered additive.

If there is a completed exposure pathway for a chemical that lacks a MEG, contact the Plans and Operations Directorate at the Navy Environmental Health Center for assistance. Points of contact are listed in Appendix I. Plans and Operations will work with the appropriate technical experts to establish a site specific MEG for the chemical of concern and/or establish a risk estimate based on chemicals with similar toxicological properties.

Screening Health Risk Assessment Procedures:

1. Determining exposure point concentrations to compare to the MEG:

    a. Environmental monitoring may indicate fluctuations in actual concentrations over time. The MEGs should be compared with the most representative exposure concentration associated with the actual scenario of concern.
    b. Averaging exposure levels spatially and temporally is one way to look at data, however, it should be noted that peaks of short duration may have health effects.
    c. The user should assess data against all guidelines and durations for initial health risk screening,
    d. If any MEG is exceeded, then in most cases that exposure scenario should proceed to Step 2 of the process.

2. Determine the probability of occurrence from Table 3-2, Chemical Hazard Probability Ranking Chart for Military Deployments, in the TG 230.

3. Determine the severity of effect from Table 3-1, Chemical Hazard Severity Ranking Chart for Military Deployments, of the TG 230 (REF).

4. Risk Characterization:

    a. Estimating the Risk: The risk level is estimated using the probability and severity information from TG 230 using Table 3-3, Risk Assessment Matrix.
    b. Determine Confidence in Risk Estimate: A confidence level should be assigned to each risk estimate. The degree of confidence will be important when determining possible courses of action.
        i. Confidence levels should be simple categories that can be rationally explained (e.g., high, medium, low).

ii. The confidence level assigned to a risk estimate should integrate uncertainty associated with each of the elements of the risk assessment.
iii. Key areas of uncertainty that should be considered include: sampling or field data quality, actual exposures of field personnel, field unit attributes (e.g., demographics, activity patterns), comparability of standard guideline assumptions (e.g., exposure duration, exposure frequency, and route of exposure) to expected field exposure patterns, expected symptoms of exposure (i.e., hazard severity), including consideration of exposure to multiple hazards, other uncertain/missing information relevant to the process, whether the predicted health outcome is plausible, given weight of evidence or real-world experiences

5. Evaluate risk management and risk communication options. Whenever possible, a variety of management and communications options should be developed to present to the Commanding Officer.

For more information on derivation and use of the MEGs, consult the USACHPPM TG230.

Site Assessment Reports. Upon completion of the site assessment, the assessment team must evaluate all information obtained and prepare a written and verbal health risk analysis for the operational commander. In order to effectively complete the evaluation process, four key elements must be considered: Findings, Conclusions, Opinions, and Recommendations

Findings. Findings are the facts uncovered during the course of the environmental assessment. All findings concerning environmental conditions that may pose a health risk to deployed forces and/or impact the intended mission should be reported. The guiding principle is that the commander must make a decision about what to do about environmental conditions at a specific site that could impact the mission. Findings that will aid in that decision-making process should be reported.

Conclusions. Conclusions are based on the evaluation of the findings. They are determinations that potential health risks to deployed forces and/or potentially mission compromising environmental conditions exist or do not exist at a site. A conclusion can be a determination that no environmental conditions exist that pose health risks or could impact the mission.

Opinions. Opinions are a determination of the potential impacts of existing environmental conditions on the health of deployed forces and/or the mission. They are based on quantitative and qualitative data collected during the site assessment and the screening health risk assessment performed using the TG 230. Opinions assist the commander's risk management decision-making by prioritizing environmental conditions for remedial action.

Recommendations. Recommendations range from taking no action, to continued monitoring or, if the potential risk is severe enough, relocating an encampment site. Providing a commander with a selection of risk reduction options is better than recommending a single risk management strategy. Recommendations should always be formulated in a mission context and supported by scientifically defensible data. A recommended report format is included as Appendix H.

Useful References

Presidential Review Directive 5, Planning for Health Preparedness and Readjustment of the Military, Veterans, and Their Families After Future Deployments, August 1998

Department of Defense Instruction (DODI) 6490.3, *Implementation and Application of Joint Medical Surveillance for Deployments*, 1997.

Office of the Chairman, The Joint Chiefs of Staff Memorandum MCM-0006-02, *Updated Procedures for Deployment Health Surveillance and Readiness*, February 2002

Technical Bulletin, Medical (TB MED) 577, *Sanitary Control and Surveillance of Field Water Supplies*.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) TG 248, *Guide for Deployed Preventive Medicine Personnel on Health Risk Management,* August 2001.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) TG 230, *Chemical Exposure Guidelines for Deployed Military Personnel (Draft)*, 2001.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) TG 236A, *Basic Radiological Dose Estimation – A Field Guide (Draft)*, June 2000.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Draft TG 251, *A Soldiers Guide to Environmental and Occupation Field Sampling for Military Deployment*, August 2001

Department of the Army Field Manual, FM 4-02.7, *Health Service Support In A Nuclear, Biological, And Chemical Environment Tactics, Techniques And Procedures*, October 2002.

NATO Handbook for Sampling and Identification of Radiological Agents (SIRA), Volumes 1 and 2, August 2000.

Marine Corps Order 6200.1e, *Marine Corps Heat Injury Prevention Program*, 6 Jun 2002

OPNAV Instruction 3500.39A/Marine Corps Order 27A, *Operational Risk Management*

Department of the Army Field Manual, FM 100-14, *Risk Management*, April 1998

Air Force Instruction 90-901, *Operational Risk Management*, April 2000

U.S. Agency for International Development, Bureau for Humanitarian Response, Office of Foreign Disaster Assistance, *Field Operations Guide for Disaster Response*.

Appendix A
Environmental Site Assessment Information Resources

SIPRNET Sources	Open Sources
AFMIC http://www.dia.smil.mil/intel/afmic/afmic.html **NGIC (CBR)** http://www.ngic.army.smil.mil/functionpgs/nbc/index.php **GEMINI** http://magellan.dia.smil.mil/gemini **OTHER GENERAL SITES** http://www.dia.smil.mil/ http://ismc.sgov.gov/ http://www.ismc.sgov.gov.Intelink_servers/Text_listing/ **NIMA (National Image and Mapping Agency)** http://www.nima.smil.mil/products.html#force **PACE (Port and Airfield Collaborative Environments)** http://intelinks-s.intel.scott.af.smil/pace/query.cfm **COLISEUM (Community On-line Intelligence System for End Users and Managers)** http://coliseum.dia.smil.mil **USACHPPM** http://usachppm1.army.smil.mil **U.S. Air Force Institute for Operational Health** https://www.brooks.af.smil.mil/afiera/afiohmain.htm	**The Library of Congress Country Studies** http://lcweb2.loc.gov/frd/cs/cshome.html **State Department Country Background Notes** http://www.state.gov/r/pa/ei/bgn/ **Department of Energy Country Analysis Briefs** http://www.eia.doe.gov/emeu/cabs/contents.html **CIA World Factbook** http://www.odci.gov/cia/publications/factbook/indexgeo.html **Perry-Castañeda Library Map Collection** http://www.lib.utexas.edu/maps/ **CountryWatch** http://www.countrywatch.com/ **WHO Health Intelligence Network for Advanced Planning** http://www.who.int/disasters/ **Environmental Network** http://unep.net/ **U.S. Environmental Protection Agency** http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/index.html

APPENDIX B
Example of a Conceptual Site Model for PCBs in Soil

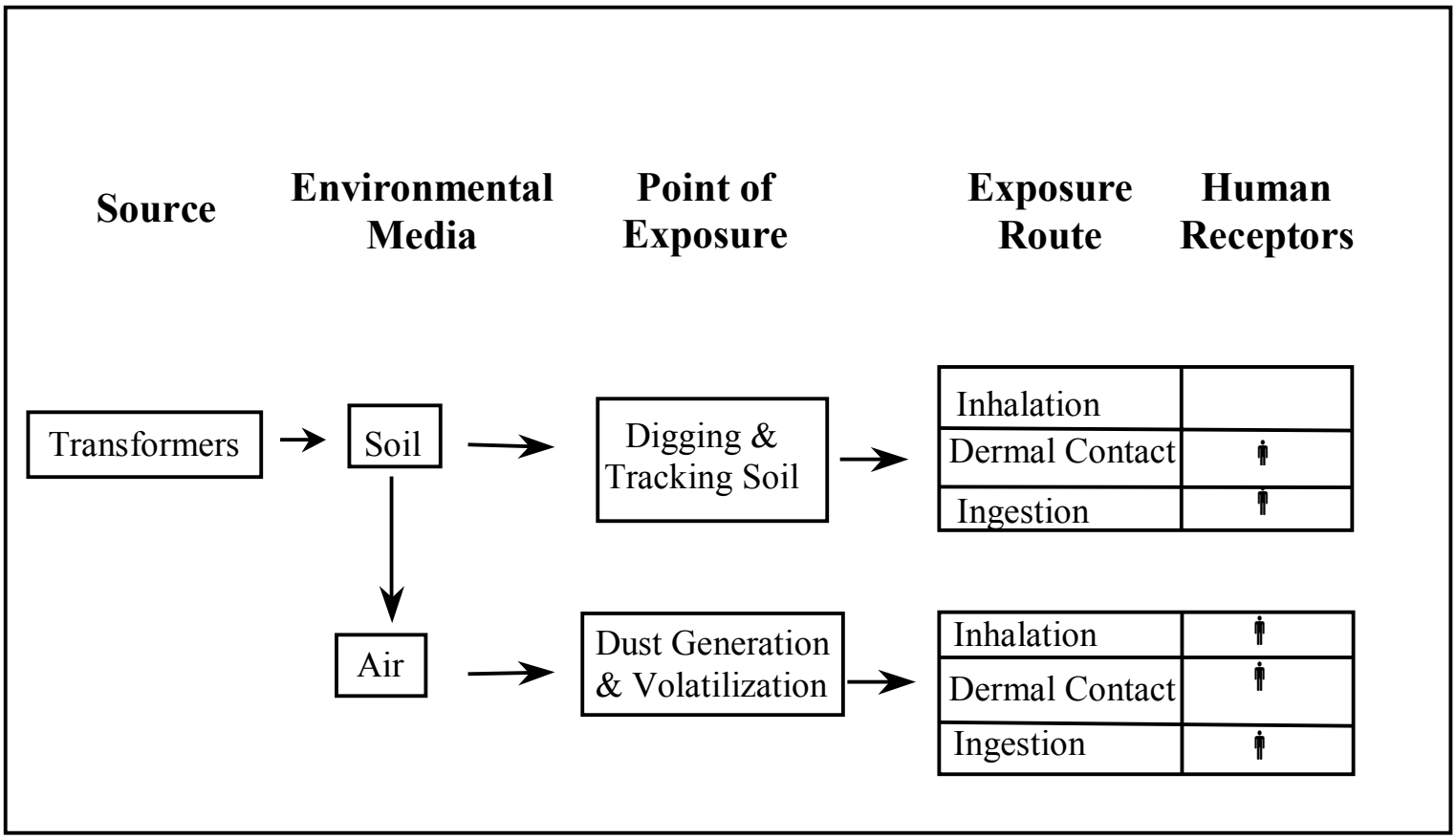


Figure (2)

The Conceptual Site Model serves as the basis for all further evaluation of completed exposure pathways, including any environmental sampling necessary to document exposure point concentrations. Exposure point concentrations are used to determine the magnitude of the health risk posed by the site.

Appendix C
Visual Inspection Checklist

✓ Note the types of containers, impoundments, and/or other storage systems:

- Metal or plastic barrels or drums.
- Underground tanks.
- Aboveground tanks.
- Compressed gas cylinders.
- Pits, ponds or lagoons.
- Paper or wood packages and containers.

✓ Note any information on tags, labels, markings or other identifying indicators.

✓ Note the condition of all waste containers and storage systems:

- Undamaged
- Visibly rusted or corroded
- Leaking or bulging
- Size and type of container
- labels on containers indicating corrosive, explosive, flammable, radioactive or toxic materials

✓ Note the physical condition of the materials:

- Gas, liquid or solid.
- Color and turbidity.
- Behavior, e.g., foaming, crystallizing, Vaporizing or corroding.
- Conditions conducive to splash or other means of contact.

✓ Identify wind barriers:

- Buildings.
- Fences.
- Vegetation.

✓ Determine the potential pathways of exposure

- Air.
- Soil.
- Surface Water.
- Ground Water.

✓ Note any indicators of past or ongoing environmental release

- Dead fish, animals or vegetation.
- Dust or spray in the air.
- Fissures or cracks in solid surfaces that reveal buried waste layers.
- Pools of liquid.
- Gas generation or effervescence.
- Deteriorated or leaking containers.
- Cleared land areas representing possible landfill areas
- Subsiding areas or other anomalous topography indicating possible waste burial locations

✓ Note any safety hazards. Consider:

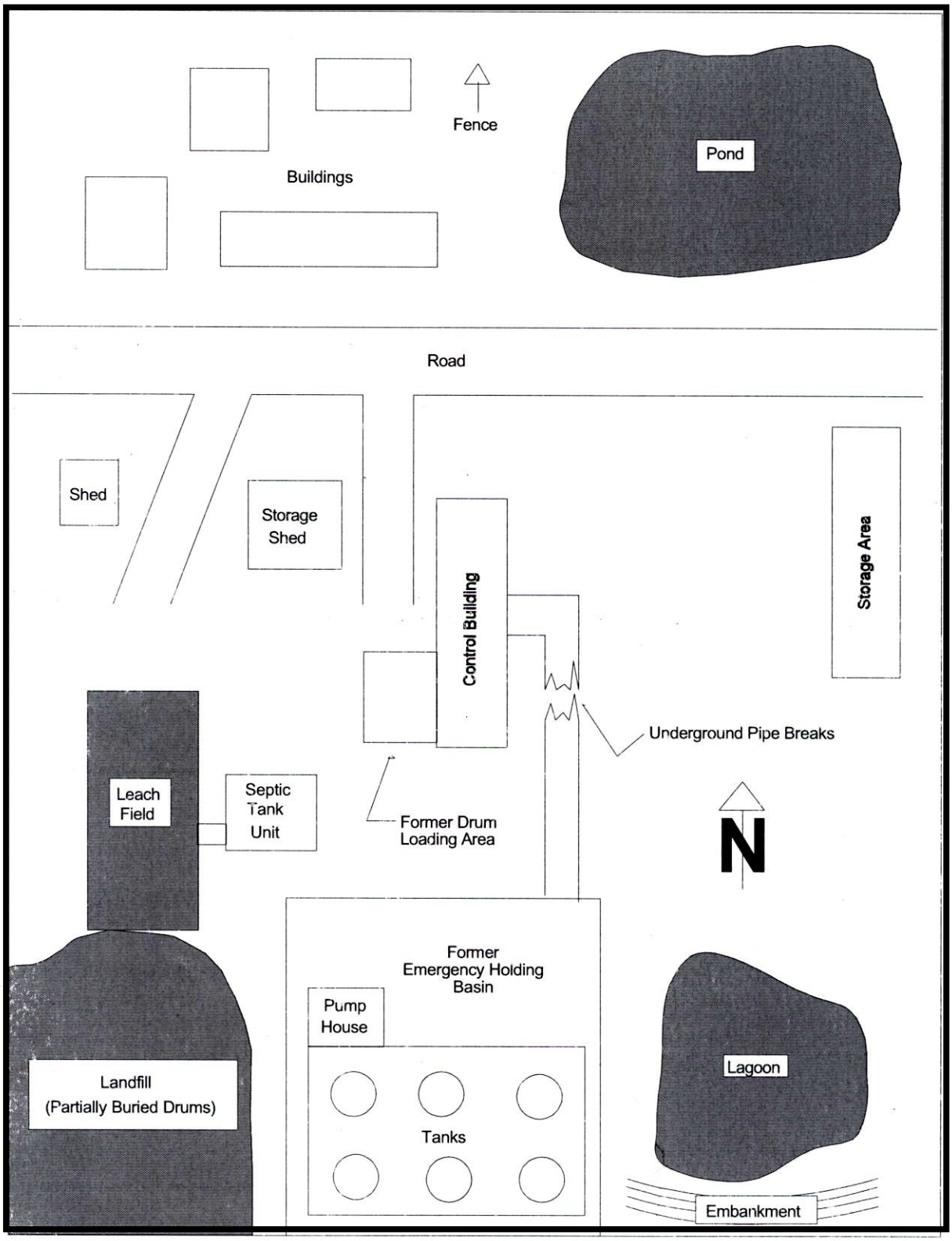
- Condition of site structures.
- Obstacles to entry and exit.
- Terrain homogeneity.
- Terrain Stability.
- Stability of stacked materials.
- Metal protruding from the ground or other surfaces

✓ Identify any potentially radioactive, reactive, incompatible, flammable or highly corrosive materials or wastes.

✓ Note land features

✓ Note the presence of any poisonous plants or animals

Appendix D
Sample Site Drawing



Appendix E
Standing Orders for Initial Site Entry

The standing orders for initial site entry listed below assume that the site is currently unoccupied and the assessment is being conducted by an advance party for future use. The guidelines are necessarily conservative due to incomplete knowledge of site conditions. If the site is currently occupied, or after completing initial site entry, it will be possible to implement site specific (and less restrictive) health and safety procedures for the remainder of the site assessment.

1. Based on the perimeter survey, designate a rallying location and an entry/exit point for initial site entry. Both the rallying location and entry/exit point should be upwind and uphill (if possible) of any suspected environmental releases.
2. Assemble all required personal protective equipment (PPE) at the rallying point. Interviews and the perimeter survey should provide some insight into appropriate PPE. Don all required PPE prior to sight entry as required.
3. At least one FDPMU member must remain at the rallying point at all times to monitor weather conditions and call for assistance if necessary.
4. Set a time limit for initial site entry. The assessment team(s) and the FDPMU staff member at the rallying location must agree upon any extension of the established time limit.
5. All initial site entries will be accomplished using the buddy system. Buddies shall remain in line of site and maintain voice communication all times during initial site entry.
6. Establish and maintain radio communications between the assessment team(s) and the rallying point. The Assessment team(s) should contact the rallying point via radio at regular intervals.
7. The assessment team(s) must contact the rallying point before entering and upon exiting any onsite structure.
8. If multiple assessment teams will be performing initial site entry, radio contact between teams must be made via radio at regular intervals.
9. Assemble at rallying point at the agreed upon time and report observations.
10. Based on observations from initial site entry, develop site-specific health and safety procedures as required for completing the site assessment.

Appendix F
Exposure Pathways

Pathway	Accounts for
Soil Exposure	Potential threat to individuals on or near a site who come in contact with contaminated areas. Includes skin absorption and incidental ingestion.
Air	Hazardous substance migration, in gaseous or particulate form through the air representing a potential threat to individuals via inhalation.
Ground Water	Hazardous substance migration to and within aquifers representing a potential threat to individuals who use groundwater sources for drinking or other domestic purposes.
Surface Water	Hazardous substance migration to surface water bodies representing potential threats to individuals who use surface water for drinking and/or who have skin contact or incidental ingestion resulting from recreational use.

Appendix G

Environmental Sampling

Forms

USACHPPM Data Forms

Shipping Forms

Environmental Sampling

SAMPLING CONSIDERATIONS

The nature of the media or materials under investigation must be determined before selecting a specific sampling technique or strategy. Materials can be divided into two basic groups.

1. Homogeneous materials are those in which there is no change in the characteristics of the material on the site.

2. Heterogeneous materials are those in which there are either discrete or continuous changes in the characteristics of the material on the site.

Obtaining representative samples from homogeneous materials represent few problems for the sampler as they are of uniform composition throughout. Heterogeneous materials, on the other hand, present problems in that the characteristics of the site change over distance. In general, more samples will be required to assess heterogeneous sites than homogeneous sites

SAMPLING STRATEGIES

Implementing an appropriate sampling strategy depends on three essential points, the amount of time available to assess the site, the equipment and/or materials available for sampling and the amount of information available on the parameters of interest, i.e. time elapsed since the release, spatial distribution of contaminants on the site and the variability of the site itself. The following lists the different sampling strategies that can be employed for site assessment.

Random Sampling - Random sampling uses the theory of random chance to choose representative sample locations. Random sampling is generally used when there is little information available about the nature and/or distribution of contaminants at a site. It is most effective when the population of available sampling locations is large enough to lend statistical validity to the random selection process. Since one of the main difficulties with random sampling is achieving a truly random sample, a table of random numbers is typically used to reduce bias.

Systematic Sampling – Systematic sampling involves collecting samples at predetermined, regular intervals. It is the most often used sampling strategy, but care is required to avoid bias. For example, if there is considerable variation in the material to be sampled and/or the terrain at a site and the sampling interval becomes partially phased to this variation, bias results.

Stratified Sampling – Data obtained from site reconnaissance, previous assessments and/or experience with similar sites can be useful in reducing the number of samples needed for assessing potential health risks associated with a site. Stratified sampling essentially involves dividing the site into homogenous sections based on soil type, terrain, etc. The purpose of this approach is to increase the precision of the sampling results. Sampling within the homogenous division is handled by a simple random approach.

Judgment Sampling – Judgment sampling is a biased approach used when the intent is only to document the presence of contamination, e.g. sampling only in the immediate area of a suspected or confirmed environmental release. Judgment sampling is of little value for risk assessment purposes. It is most often used in enforcement procedures.

SAMPLING EQUIPMENT AND DIRECT READING INSTRUMENTATION

The concept of operation under which the FDPMU was formulated requires rapid assessment of potential health risks to meet the time constraints faced by operational commanders for risk management decision-making. To that end, state of the art field screening and field analytical instruments will be used to the maximum extent possible for qualitative and quantitative confirmation of the presence of environmental contaminants that could pose a health risk to deployed forces. Collection of samples for shipment to out of theater laboratories should be minimized. The decision to collect samples for shipment to out of theater laboratories ultimately lies with the Chemical Team Leader. Some of the factors to be considered include:

- ✓ The amount of time available for the assessment
- ✓ Can the specific chemicals or classes of chemicals of potential concern be quantified with the available instrumentation
- ✓ Does the field analytical instrument possess the required sensitivity to yield a result usable for assessing potential impacts to health

When necessary to ship samples out of theater for more rigorous analysis, field-screening instruments such as the photo-ionization detector should guide the collection of these samples.

REACHBACK ANALYTICAL LABORATORY SUPPORT

The laboratory at the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) in Aberdeen, Maryland will provide all required laboratory support for PM-MMART/FDPMUs deployed in support of ongoing military operations and/or designated exercises. These support services are free of charge if shipped in accordance with the procedures outlined below.

SHIPPING PROCEDURES

Preparation:

Determine shipment options (military airlift or commercial carrier) and departure times as soon as possible after arriving at the site. **RETURN SAMPLES TO:**

USACHPPM
ATTN: MCHB-TS-LID (Heidi Taylor) Bldg E2100
5158 Blackhawk Road Bldg E2100
Aberdeen Proving Ground, MD 21010-5403
phone 410.436.6096

1. Verify shipment options and departure times immediately before sampling.
2. Prior to shipping, contact the USACHPPM-Europe Deployment Environment Surveillance Program (DESP) Manager and/or the DESP Combatant Commander point of contact as appropriate (see Appendix J) and inform them of the following:
    a. Number and type of samples being shipped
    b. Number of coolers shipped
    c. Date of shipment
    d. Carrier used (Fed Ex, DHL, military airlift)
    e. Shipper's tracking number for commercial shipments or TCN (see below) and flight number for military airlift

Sample Packaging:

1. Secure glass containers with bubble wrap or other suitable material.
2. Fill voids in shipping container(s) with suitable packing material.
3. Chill shipment (freeze bricks or ice). Do not freeze the samples!
4. Insure all field data sheets and other required documents are properly filled out and packed with the samples.
5. Seal and label shipping container(s).

Military Airlift Shipments:

Two forms are required to ship via Military Airlift. The DD 1384, Transportation Control and Movement Document and DD Form, DD Form 1387, Military Shipment Label. The forms and instructions for completing them appear on pages 46-49 of this appendix.

Commercial Shipments:

If commercial shipping is available ship as follows:
1. Obtain commercial carrier's International Air Waybill
2. Fill out Air Waybill using USACHPPM FEDEX or DHL account numbers as listed below:

FedEx Number: 1005-5372-4
DHL Number: 965666697

QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC) PROCEDURES

The two primary QA/QC concerns are quality control samples and document control.

Quality Assurance Samples – Quality Assurance samples should be collected periodically in order to ensure the quality of the data being collected. The following lists the types of quality assurance samples typically used:

- ✓ Blank Samples – Blanks are samples of deionized/distilled water, rinses of collection devices or containers, sampling media, etc. that are handled and analyzed in the same manner as environmental samples. They are useful in identifying contamination that occurs during collection, preservation, handling and transport.

- ✓ Duplicates – Duplicates are identical samples collect at the same time, in the same manner and contained, preserved and transported in the same manner. They are useful in verifying reproducibility.

Document Control – The purpose of document control is to ensure that all project documents are accounted for upon completion of the site assessment. Essential documents include, site maps/drawings, photographs, logbooks, sample forms, sampling and analysis plans, assessment reports, calibrations logs, maintenance records, sample analysis reports, and operator training records. These records need to be readily accessibly to defend the scientific rigor of the assessment.

Media Specific Sampling Procedures

SOIL SAMPLING

The purpose of soil sampling during a deployment is to determine the health risks to deployed personnel from exposure to the soil. There is one basic requirement that will determine the need for soil sampling. Will U.S. forces be exposed to the soil? If the answer to this question is no, there is no need for soil samples. Also, if there are areas where there are high levels of suspected contaminants (strong chemical odors coming from the soil), the personnel conducting the Initial Entry sampling can recommend against soil exposures in that area based on professional judgment.

Soil samples are used to determine the nature and extent of contamination and to identify hazardous substance source areas. With knowledge about the nature and extent of soil contamination, the appropriate measures to mitigate exposures can be implemented. For most deployment scenarios, the most appropriate method of mitigation is avoidance of the contaminated area.

SYSTEMATIC GRID SAMPLING

Systematic grid sampling is the most appropriate method used to complete the soil assessment. Systematic grid sampling involves the collection of samples at fixed intervals when contamination is assumed to be randomly distributed. This method is commonly used when estimating trends or patterns of contamination. The grid and starting points should be randomly laid out over the site, yet the method allows for rather easy location of exact sample locations within each grid.

Determining the number of samples to collect is the first step in conducting systematic grid sampling. The following table provides guidance for sample collection at various size sites based on sound statistical principles.

Appropriate Number of Samples to Collect

Area to be Sampled (Acres)	Area to be Sampled (Meters^2)	Number of Samples
2	8100	7
7	28000	15
10+	40500	26
20+	81000	40

The next step is developing the sample grid. The size of the grid is calculated by dividing the area of the site by the number of samples required. The product of this calculation is the area of each grid. By taking the square root of the grid area, the length of a grid side is determined.

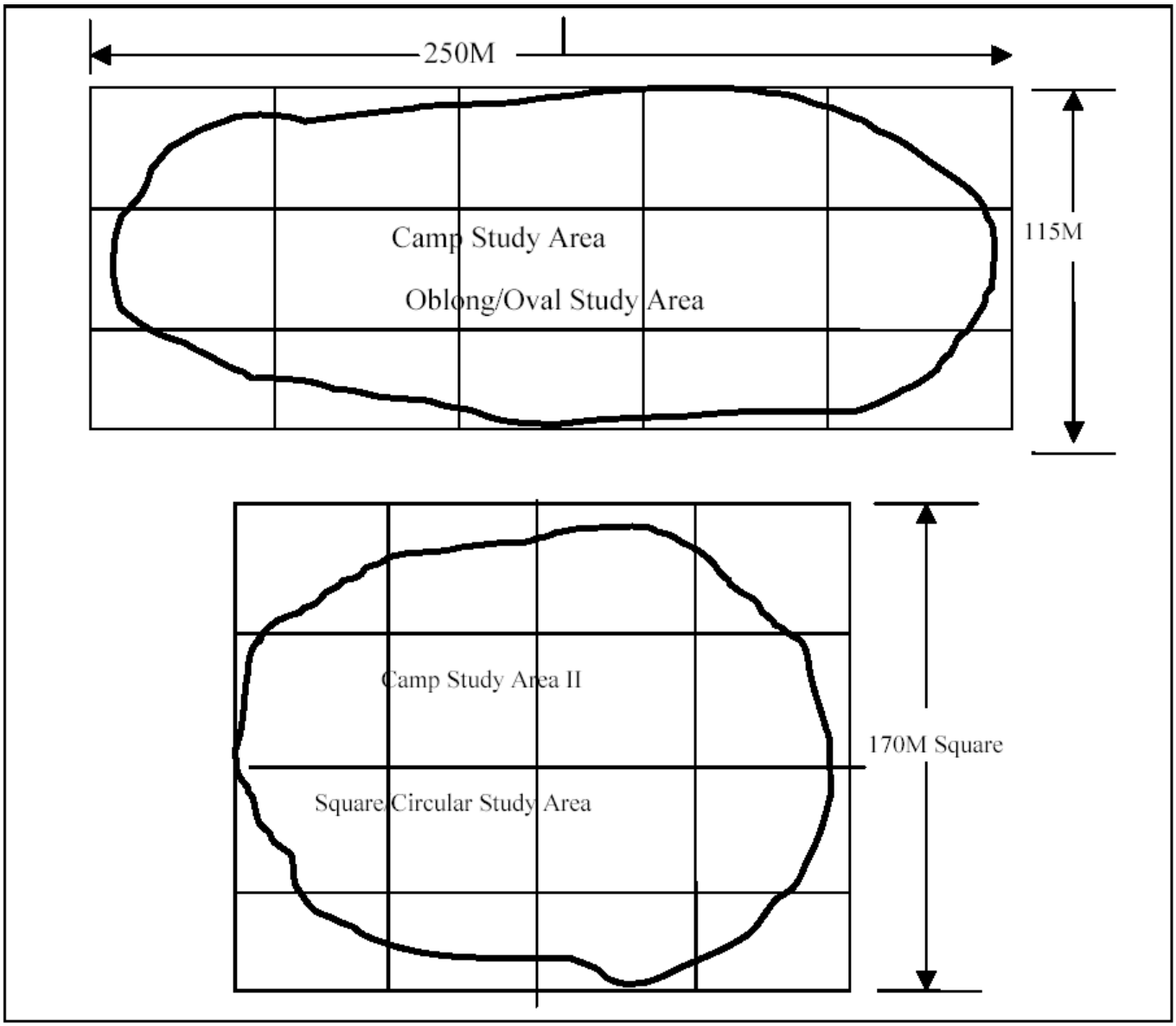
$$G = (a/n)_{1/2}$$

Where:
G = length per side of each individual grid
a = area
n = number of samples required

A composite sample should be collected within each grid to provide representative data. Composite samples within the grid will have the effect of averaging the contaminate concentrations in a grid. Figure G-1 shows two simulated base camps with study grids overlaid. Four to six aliquots should be collected from each grid of the oval example (15 samples) and then mixed to collect each composite sample. For the square/oval example, use the random number table in on page 22 to select 15 of the 16 grid squares to sample. To determine where in each grid to collect the aliquots, lay a five by five or six by six grid over each main grid, number the new grid, and then select four to six sample points within the new grid using the random number table. Figure G-2 shows how to select the composite sample points.

After the sample points have been located in this manner, they may have to be moved if they fall within buildings or paved surfaces. If this occurs, move the sampling points a few feet in any direction. If a large area of soil is covered, eliminate that numbered grid and select the next random number to get another grid to sample.

Grid Overlays for Hypothetical Base Camps – Figure G-1



Random Number Table

	1	2	3	4	5	6	7	8	9	10
1	96268	11860	83699	38631	90045	69696	48572	05917	51905	10052
2	03550	59144	59468	37984	77892	89766	86489	46619	50236	91136
3	22188	81205	99699	84260	19693	36701	43233	62719	53117	71153
4	63759	61429	14043	44095	84746	22018	19014	76781	61086	90216
5	55006	17765	15013	77707	54317	48862	53823	52905	70754	68212
6	81972	45644	12600	01951	72166	52682	37598	11955	73018	23528
7	06344	50136	33122	31794	86723	58037	36065	32190	31367	96007
8	92363	99784	94169	03652	80824	33407	40837	97749	18361	72666
9	96083	16943	89916	55159	62184	86206	09764	20244	88388	98675
10	92993	10747	08985	44999	35785	65036	05933	77378	92339	96151
11	95083	70292	50394	61947	65591	09774	16216	63561	59751	78771
12	77308	60721	96057	86031	83148	34970	30892	53489	44999	18021
13	11913	49624	28519	27311	61586	28576	43092	69971	44220	80410
14	70648	47484	05095	92335	55299	27161	64486	71307	85883	69610
15	92771	99203	37786	81142	44271	36433	31726	74879	89384	76886
16	78816	20975	13043	55921	82774	62745	48338	88348	61211	88074
17	79934	35392	56097	87613	94627	63622	08110	16611	88599	02890
18	64698	83376	87527	36897	17215	74339	69856	43622	22567	11518
19	44212	12995	3581	37618	94851	63020	65348	55857	91742	79508
20	89292	00204	00579	70630	37136	50922	83387	15014	51838	81760
21	08692	87237	87879	01629	72184	33853	95144	67943	19345	03469
22	67927	76855	50702	78555	97442	78809	40575	79714	06201	34576
23	62167	94213	52971	85794	68067	78814	40103	70759	92129	46716
24	45828	45441	74220	84157	23241	49332	23646	09390	13031	51569
25	01164	35307	26526	80335	58090	85871	07205	31749	40571	51755
26	29283	31581	04359	45538	41435	61103	32428	94042	39971	63678
27	19868	49978	81699	84904	50163	22652	07845	71308	00859	87984
28	14292	93587	55960	23159	07370	65065	06580	46285	07884	83928
29	77410	52135	29495	23032	83242	89938	40516	27252	55565	64714
30	36580	6921	35675	81645	60479	71035	99380	59759	42161	93440
31	07780	18093	31258	78156	07871	20369	53977	08534	39433	57216
32	07548	08454	36674	46255	80541	42903	37366	21164	97516	66181
33	22023	60448	69344	44260	90570	01632	21002	24413	04671	05665
34	20827	37210	57797	34660	32510	71558	78228	42304	77197	79168
35	47802	79270	48805	59480	88092	11441	96016	76091	51823	94442
36	76730	86591	18978	25479	77684	88439	34112	26052	57112	91653
37	23439	02903	20935	76297	15290	84688	74002	09467	41111	19194
38	32927	83426	07848	59372	44422	53372	27823	25417	27150	21750
39	51484	05286	77103	47284	00578	88774	15293	50740	07932	87633
40	45142	96804	92834	26886	70002	96641	36008	02239	91563	66423

Selecting Sample Points in a Single Area of Grid – Figure G-2

1	6	11	16	21
2	7	12	17	22
3	8	13	18	23
4	9	14	19	24
5	10	15	20	25

1. Overlay a 5X5 grid on the area of the overall sample grid.
2. Select 4-6 areas of the grid overlay to collect sample aliquots using the random number table. For the example to the left, the first two digits of column 1 were used. The numbers highlighted in gray were the ones selected from the random number table.
3. For the next grid, start at the endpoint on the random number table for the previous grid. Otherwise, the sample points will be the same for every grid.

Other than sampling for VOCs, all samples collected during the soil assessment should be composite samples collected from areas were soldiers are living and working. Generally, only surface soil samples (from 0-6 inches) will be collected. If there is advanced knowledge of subsurface excavation that is going to be conducted, shallow subsurface samples to a depth of 5 or 6 feet can be collected using the procedure below. If excavation work is ongoing, samples may be collected from the bottom and /or sides of the excavation.

SOIL SAMPLE COLLECTION PROCEDURES

1. Determine the extent of the sampling effort, the sampling methods to be employed.
2. Specific site factors, including extent and nature of contaminant, should be considered when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. If there is a possibility that underground utilities are present, clearance should always be confirmed before beginning work. Record the location of each sample with GPS.
3. PM-MART/FDPMUs will use the Backpack Sampling Kits developed by USACHPPM for the vast majority of their soil sampling needs. Follow the instructions for collecting and packing surface soil samples provided with the backpack sampling kit.
4. Sampling at Depth with Augers and Thin Wall Tube Samplers:

   This system consists of an auger, or a thin-wall tube sampler, a series of extensions, and a "T" handle. The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the auger. If a core sample is to be collected, the auger tip is then replaced with a thin wall tube sampler. The system is then lowered down the borehole, and driven into the soil to the completion depth. The system is withdrawn and the core is collected from the thin wall tube sampler. The following procedure is used for collecting soil samples with the auger:

   a. Attach the auger bit to a drill rod extension, and attach the "T" handle to the drill rod.
   b. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter). It may be advisable to remove the first three to six inches of surface soil for an area approximately six inches in radius around the drilling location.
   c. Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

d. After reaching the desired depth, slowly and carefully remove the auger from the hole. When sampling directly from the auger, collect the sample after the auger is removed from the hole and proceed to Step 10.
e. Remove auger tip from the extension rods and replace with a pre-cleaned thin wall tube sampler. Install the proper cutting tip.
f. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Do not scrape the borehole sides. Avoid hammering the rods as the vibrations may cause the boring walls to collapse.
g. Remove the tube sampler, and unscrew the drill rods.
h. Remove the cutting tip and the core from the device.
i. Discard the top of the core (approximately 1 inch), as this possibly represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container. Sample homogenization is not required.
j. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. If composite samples are to be submitted for analysis follow the procedures provided in the USACHPPM Backpack Sampling Kit for preparing a composite sample.
k. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the auger and tube sampler between samples.
l. Backfill the hole with the removed soil.

5. Record the date, time, location, sample type, media sampled, a discrete sample number, any direct reading instrument results, etc. for each sample on the Field Data Sheet.
6. Enter the (approximate) location of each sample on the site map.

WATER SAMPLING

Sampling situations vary widely; therefore, no universal sampling procedure can be recommended. However, streams, rivers, lakes, ponds, lagoons, surface impoundments, groundwater and treated water is generally sampled using one of the following techniques:

- ✓ Direct method
- ✓ Dip sampler

PROCEDURES

Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed.
2. Obtain the necessary sampling and monitoring equipment.
3. Record the sampling location(s) with a GPS.
4. PM-MART/FDPMUs will use the Backpack Sampling Kits developed by USACHPPM for the vast majority of their water sampling needs. Follow the instructions for collecting and packing water samples provided in the backpack sampling kit. The following information is intended to augment procedures provide with the backpack sampling kits.

Sample Collection

a. Direct Method: For streams, rivers, lakes, and other surface waters the direct method may be used to collect water samples from the surface directly into the sample bottle. This method is not to be used for sampling lagoons or other impoundments where contact with contaminants is a concern. Using adequate protective clothing, access the sampling location by appropriate means. For shallow streams, collect the sample under the water surface while pointing the sample container upstream; the container must be upstream of the collector. Avoid disturbing the substrate. For lakes and other impoundments, collect the sample under the water surface avoiding surface debris and the boat wake (if used). When using the direct method, do not use pre-preserved sample bottles as the collection method may dilute the concentration of preservative necessary for proper sample preservation.

b. Dip Sampler: A dip sampler is useful in situations where a sample is to be recovered from an outfall pipe or along a lagoon bank where direct access is limited. The long handle on such a device allows access from a safe location. Sampling procedures are as follows:

   i. Assemble the device in accordance with the manufacturer's instructions.
   ii. Extend the device to the sample location and collect the sample by dipping the sampler into the substance.
   iii. Retrieve the sampler and transfer the sample to the appropriate sample container.

5. Record the date, time, location, sample type, media sampled, a discrete sample number, etc. for each sample on the Field Data Sheet.
6. Enter the (approximate) location of each sample on the site map.

Procedures for screening potential sources of potable water and certifying potable water sources can be found in **Standard Operating Procedures for Screening Risk Assessment of Potential Sources of Potable Water**.

AMBIENT AIR QUALITY SAMPLING USING THE MINIVOL™ PORTABLE AIR SAMPLER

Basic Operation

Particulate Sampling

The MiniVol™ Portable Air Sampler can be configured to collect $PM_{2.5}$, PM_{10}, or TSP samples – but only one type at a time.

The MiniVol's pump draws air at 5 liters/minute through a particle size separator (impactor) and then through a 47mm filter. The 10 micron or 2.5 micron particle separation is achieved by impaction. A TSP sample can be collected by removing the impactor(s). Gas samples can be taken simultaneously with particulate matter samples.

The particulate sample is caught on the filter, which must be weighed pre- and post-exposure with a microbalance accurate to one microgram. The Unit States Army Center for Health Promotion and Preventive Medicine (USACHPPM) provides pre-weighed filters and post sampling weighing and chemical analysis. Sampling results are reported in micrograms/cubic meter. Coordinate with USACHPPM before deployment to make sure you have a sufficient supply of pre-weighed filters to take with you.

The battery can power the sampler for 24 hours of continuous sampling before the battery pack must be exchanged for a freshly charged one.

The MiniVol flow rate must be established for each sampling project using the MiniFlo transfer standard. This calibration ensures that the sampler has an ambient flow rate of 5 liters per minute and that there is consistent performance of the inertial size separator. The calibration accounts for the differing air temperatures and atmospheric pressures due to elevation and seasonal changes.

Note: The actual ambient temperature and barometric pressure must be measured or obtained locally. The USACHPPM soil sampling backpack contains a thermometer/barometer useful for this purpose.

Gas sampling

When used for gas sampling the MiniVol pumps air into six-liter Tedlar bags over a predetermined length of time. The bags are contained within collection canisters arranged on either side of the sampler, hanging from a common 24" bale.

The MiniVol uses an adjustable pulse circuit that allows the operator to set a sampling rate over a specific time period, up to 24 hours. One or both bags can be filled during a sampling run, and particulate matter samples can be collected simultaneously.

To reduce the effective flow rate low enough to permit two 6-liter bags to fill in about 16 hours, the MiniVol is equipped with a tunable intervalometer circuit and a sequencing valve. The intervalometer is programmed to direct pulses of gas to the canisters and can be adjusted for frequency (from one to fifteen seconds) and duration (from 50 to 750 milliseconds), allowing for sample collection over minutes or hours.

Getting Started

Inspecting Components

Visually inspect the components. Each MiniVol Portable Air Sampler for particulate matter and non-reactive gases includes:

1 MiniVol sampler unit (figure 4)
2 pre-separator/filter holder assemblies with rain hats (figure 3)
2 multiple impactor adapters (figure 3)
2 PM_{10} jet assemblies (figure 3)
2 $PM_{2.5}$ jet assemblies (figure 3)
2 MiniVol battery packs (figure 4)
1 18-volt transformer
1 mounting cradle
1 Y-Bracket Assembly (for pole mounting sampler)
4 collection canisters, each with a 6-liter Tedlar ® bag
1 24-inch bale bar with handle and removable end caps
1 operating manual and video
1 Field Calibration kit (MiniFlo Transfer Standard) consisting of a series 475 Mark III digital manometer, calibration orifice, and plastic tubing. (Figure 4)
1 maintenance/spare parts kit
1 Cassette Separator

Note: The actual ambient temperature and barometric pressure must be measured or obtained locally. The USACHPPM sampling backpack contains a thermometer/barometer for this purpose.

Consumables include:

Filters: Three kinds of weighed 47 mm filters are readily available. Other types and sizes may be special ordered.

Fiber Film filters are recommended if only gravimetric analysis is needed.

Quartz filters are recommended if chemical analysis for carbon-based compounds is also needed.

Teflon filters are recommended if chemical analysis for non-carbon-based compounds is also needed.

Petrislides (for shipping and storing filters)

Impactor grease

Tedlar® bag (should one become damaged)

Charging Batteries

1. Connect the charging plug of the transformer to the charging jack on a battery pack.

2. Plug the transformer into an AC outlet.

3. **A fully discharged battery requires at least 18 hours to completely recharge.** A green LED on the top of the battery indicates the battery is charging. When the light goes out, the battery continues to receive a "trickle" charge as long as it is plugged in.

NOTE: If the battery is to be used frequently, leave it plugged in until its next use. Do not, however, store the battery for extended periods while it is plugged in. **DO NOT store the sampler attached to the battery.** The indicator lights that remain on when the sampler is connected to the battery will discharge the battery beyond its 10.3-volt safety cut-off point.

NOTE: The AC adaptor is rated for 100-240 volts AC, 50-60 Hz and features a 3-pole plug. A standard computer power cord with local plug configuration may be used to recharge the battery.

Connecting the Sampler and Battery Pack

1. Remove the packing foam from the bottom of the sampler.

2. Place the sampler on the battery pack; carefully inserting the banana pins on the bottom of the sampler into the sockets on the top of the battery pack.

NOTE: The pins are unevenly spaced and can only fit one way- **the pin closest to one latch on the sampler body inserts into the odd colored receptacle on the battery pack.**

3. Clamp the two latches on the sampler to the battery pack.

Circuit Board Battery

An AA battery on the circuit board operates the "Programmable Timer". The lifetime for this battery is approximately six months when it is left in place on the circuit board.

Removing Pump and Timer Assembly

To remove the pump and timer assembly from inside the sampler body:

1. Press the two silver colored detent buttons on the side of the sampler body and slide the top off being careful not to separate the two parts too far and thereby damaging the power cord inside the sampler.

Turning the Sampler On/Off …
Press the "ON/AUTO/OFF" button on the circuit board. The "_" curser above the word "OFF" curser will appear above the word "AUTO". Press the "ON/AUTO/OFF" button on the circuit board again. The "_" curser will appear above the word "ON", and the pump will turn on. Let the pump run for 2 minutes to stabilize before making any flow rate adjustments.

PM $_{2.5}$ SAMPLING PROCEDURES

Note: **Turn off the power (SW-5) on the auxiliary valve driver board** before sampling **unless integrated gas samples will be collected simultaneously with the particulate matter samples.** The Solenoid Output Indicator lights are off when the auxiliary valve driver board is off.

The assembly for PM $_{2.5}$ sampling uses both the PM $_{10}$ and PM $_{2.5}$ impactors in sequence.

1) Ensure that the multiple impactor adapter with the PM $_{10}$ impactor (silver colored) is installed on top of the pre-separator assembly, while the PM $_{2.5}$ impactor (gold colored) is installed in the pre-separator assembly.

2) Clean and lubricate the target disk at every 2-4 sampling periods, or more frequently depending on the degree of impaction stage soiling.

3) After the sampler has been assembled, calibrated, verified to be in proper working order, and a filter loaded in the filter holder assembly, **set flow rate adjustment** in accordance with procedures as shown in the Operation Manual.

PM $_{10}$ SAMPLING PROCEDURES

Note: **Turn off the power (SW-5) on the auxiliary valve driver board** before sampling **unless integrated gas samples will be collected simultaneously with the particulate matter samples.** The Solenoid Output Indicator lights are off when the auxiliary valve driver board is off.

1) Ensure that the PM $_{10}$ impactor (silver colored) is installed in the pre-separator assembly. The multiple impactor adaptor is not needed, not is the PM $_{2.5}$ impactor (gold colored).

2) Clean and lubricate the target disk at every 2-4 sampling periods, or more frequently depending on the degree of impaction stage soiling.

3) After the sampler has been assembled, calibrated, verified to be in proper working order, and a filter loaded in the filter holder assembly, set flow rate adjustment in accordance with procedures as shown in the Operation Manual.

TSP SAMPLING PROCEDURES

Note: **Turn off the power (SW-5) on the auxiliary valve driver board** before sampling **unless integrated gas samples will be collected simultaneously with the particulate matter samples.** The Solenoid Output Indicator lights are off when the auxiliary valve driver board is off.

For TSP sampling, the following changes must be made to the filter holder:

1) Remove the multiple impactor adapter (if present).

2) Remove the impactor from the pre-separator assembly.

Note: Clean the cap and pre-separator assembly every 2-4 sampling periods, or more frequently if soiling is observed.

3) Connect the cap and pre-separator assembly to the sampler.

3) After the sampler has been assembled, calibrated, verified to be in proper working order, and a filter loaded in the filter holder assembly, set flow rate adjustment in accordance with procedures as shown in the Operation Manual.

INTEGRATED GAS SAMPLING PROCEDURES

MiniVol collects non-reactive gasses. Samples may then be analyzed in the field using colorimetric tubes, photo-ionization detector (PID), or portable gas chromatograph/mass spectrometer (GC/MS); or shipped to a supporting laboratory for analysis.

Siting Requirements

The MiniVol should be positioned with the intake upward and located in an unobstructed area at least 30 cm from any obstacle to air flow.

Attaching the Mounting Cradle

Use the Y-bracket Assembly to mount the MiniVol on a pole.

Preparing the Sampler

To prepare the sampler for integrated gas sampling:

1) Evacuate the 6-liter Tedlar® bags inside the bag canisters using the Gilian® GilAir-5 air sampling pump.

2) Attach the bag canister quick connectors to MiniVol sampling pump quick connectors.

3) Turn on the Valve driver board.

Note: **Turn on the power (SW-5) on the auxiliary valve driver board** for **integrated gas samples.** One of the solenoid output Indicators lights (figure 2, item 2) will turn on when the auxiliary valve driver board is on.

Operation Modes-Standard Mode or Overlap Mode

In the Standard Mode only one bag can be filled during a given period.
To operate in Standard Mode:

1. Plug the solenoids into desired positions 1-4.

2. **Remove the Overlap Jumper** and keep it in a safe place (such as a small plastic bag in the bottom of the sampler).

3. Advance to desired starting channel with Manual Advance Button.

Note: The Manual Advance only functions when the pump is off. **The channel advances automatically each time the pump is turned off.**

4. Set timer as desired.
See "Setting the Programmable Timer" (see below)

Active Solenoid Output Indicators in standard mode:

*000 channel 1 on
0*00 channel 2 on
00*0 channel 3 on
000* channel 4 on

Example 1: We wish to take two CO samples, one bag from 7:00 am to 3:00 pm, and the second from 3:00 pm to 11:00 pm.

1) Plug Bag 1 solenoid into Solenoid Output Connector 1; plug bag 2 solenoid into Solenoid Output Connector 2.

2) Set the timer Program 1 to turn on at 7:00 am and off at 3:00 pm. Set timer Program 2 to turn on at 3:01 pm and off at 11:00 pm.

Note: The one-minute delay between the first program's off time and the second program's on time is necessary to advance the sequencing valve to the next cycle.

Example 2: We wish to take two CO samples (from 7:00 am to 3:00 pm, and from 3:00 pm to 11:00 pm) while also collecting a PM_{10} sample from 1:00 am to 11:pm.

1) Plug bag1 solenoid into Solenoid Output Connector 2; plug bag 2 solenoid into Solenoid Output Connector 3.

2) Set the timer:

a) Set timer Program 1 to turn on at 1:00 am and off at 7:00 am. During this program, neither bag will be filled, but air will be drawn through the PM_{10} filter.

b) Set timer Program 2 to turn on at 7:01 am and off at 3:00 pm. Air will be drawn through the filter and bag 1 will be filled.

c) Set timer Program 3 to turn on at 3:01 pm and off at 11:00 pm. Air will be drawn through the filter and bag 2 will be filled during this program step.

In the Overlap Mode the sampler can be set to overlap the sampling periods for the bags. For example; the operator could set the sampler to collect air in one bag from 10:00 am to 6:00 pm and in the other bag from 3:00 pm to 11:00 pm. During the overlapping period from 3:00 pm to 6:00 pm the sampler would be collecting air in both bags simultaneously.

To operate in the Overlap Mode:

1. Plug solenoids into positions 2 and 4.

2. **Place the Overlap Jumper on the pins as shown in figure 2.**

3. **Press the Manual Advance Button** (figure 2, item 1) **to advance to channel 2**. The second of four Active Solenoid Output Indicators (figure 2, item 2) will light up indicating channel 2 is on: 0*00 = channel 2 on.

Note: The Manual Advance only functions when the pump is off. Each time the pump is turned off the channel advances automatically.

4. Set timer as desired.

Active Solenoid Output Indicators in Overlap Mode:

*000 channel 1 on (this setting does nothing
0*00 channel 2 on
0*** channels 2 and 4 on
000* channel 4 on

Example: We wish to collect air in one bag from 10:00 am to 6:00 pm and in the other bag from 3:00 pm to 11:00 pm.

1) **Place the Overlap Jumper on the pins as shown in figure 2.**

2) **Plug bag 1 solenoid into Solenoid Output Connector 2**.

3) **Plug bag 2 solenoid into Solenoid Output Connector 4**.

4) **Set the programable timer:**

a) Set timer program 1 to turn on at 10:00 am and off at 3:00 pm. During this program, bag 1 will be filling.

b) Set timer Program 2 to turn on at 3:01 am and off at 6:00 pm. During this time both solenoids will be active and both bags will be filling simultaneously.

c) Set timer Program 3 to turn on at 6:01 pm and off at 11:00 pm. During this programmed step, only bag 2 will be filling.

ADJUSTING PULSE FREQUENCY AND DURATION

Set the integrated gas sampling pulse frequency using the 1-15 second pulse interval rotary switch (figure 2, Item 5). Use a jewelers flat tip screwdriver to set the pulse frequency. 1=1second …9 = every nine seconds, etc.

Calibration and Auditing Procedures
The following presents calibration and auditing procedures specific to the MiniVol sampler, which is designed to operate at an actual total flow rate of 5.0 liters per minute (L/min), and the MiniFlow transfer standard, calibrated over the appropriate flow range.

Discussion of Flow Rate Measurement and General Aspects of $PM_{10}/PM_{2.5}$ Sampler Calibration

A MiniVol sampler consists of three basic components: a specially designed inlet, size-fractioning impactors, and a flow rate controlling system. The particle size discrimination characteristics of both the inlet and the impactors depend critically on specified air velocities. A change in velocity will result in a change in the nominal particle size collected. For this reason it is imperative that the flow rate through the sampler be maintained at a constant value that is as close as possible to the design flow rates. The design flow rate of the MiniVol is 5.0 L/min. The sampler's flow rate should be within +/- 10% of 5 L/min or 4.5 to 5.5 L/min.

As indicated above, the true of actual flow rate through the sampler inlet must be known and controlled to ensure that only those particles nominally less than 10 μm/2.5 μm are being collected. A common source of error in a $PM_{10}/PM_{2.5}$ monitoring program is confusion between various air measurement units. Before calibration procedures are initiated, operators should review the following flow rate designations:

Q_{act}: Actual volumetric airflow rates that are measured and expressed at existing conditions of temperature and pressure are denoted by Q_{act} (Q_{actual}). Typical units are L/min and cubic meters per minute (m^3/min). Inlet design flow rates are always given in actual volumetric flow units.

Q_{std}: Airflow rates that have been corrected to EPA standard conditions of temperature and pressure (25°C or 298°K, and 760 mm Hg or 101 kPa) are denoted by Q_{std} ($Q_{standard}$). Typical units are std. L/min and std. m^3/min. Standard volume flow rates are often used by engineers and scientists and are equivalent to mass flow units.

Sampler Calibration

This procedure is applicable to orifice meter transfer standards, specifically, the Airmetrics MiniFlo Transfer Standard. The MiniFlo transfer standard is designed to connect to the inlet tube of the MiniVol filter holder

A MiniVol flow rate transfer standard device is used as the flow rate reference to calibrate the sampler's rotameter. To be valid, the MiniFlo transfer standard must have been calibrated against a primary standard traceable to the NIST within the last year.

A calibrated digital manometer is required to measure the pressure drop across the MiniFlo orifice element.

The actual ambient temperature and barometric pressure must be measured or obtained locally. The USACHPPM sampling backpack contains a thermometer/barometer for this purpose.

Pre-calibration System C heck

1. Place a filter into the Minivol sampler filter holder. Filters used for flow rate calibrations should not be used for subsequent sampling.)

2. Turn on the sampler and allow it to run for at least 2 minutes (to allow it to warm up to full operating temperature).

3. While the sampler is running, depress and hold the reset button. (This allows the sampler to continue to run without tripping the low flow shutoff circuit.) Close off the inlet using the palm of your hand. Observe the rotameter, if there are no leaks the rotameter should drop to zero and remain there.

Troubleshooting

Should the "low battery indicator" be on at the end on the sampling period, check the "Elapsed Time Totalizer" to determine the length of time the sampler ran before shutting off. If the time is short, (e.g. only 12 hours out of a programmed 24 hours) perhaps the battery was not completely charged or is failing to hold a charge. Note the battery number and, after recharging it, observe performance in the next sampling period. If the battery fails again, on a different pump, it is most likely defective and should be replaced.

If a different battery performs in the same manner after being fully charged, the pump motor may be drawing more current than it should.

Rotameter Calibration (Not needed)

1. Verify that the MiniFlo transfer standard calibration equation is current and traceable to an acceptable primary standard.

2. Connect the manometer to the MiniFlo transfer standard

3. Install the MiniFlo transfer standard on the inlet tube of the MiniVol sampler filter holder.

4. Turn on the sampler and allow it to run for at least 2 minutes (to allow it to warm up to full operating temperature).

5. Read and record the ambient temperature (T_{act}), °K and barometric pressure (P_{act}), mm Hg.

6. Read and record the transfer standard pressure drop (ΔH), inches of water; and sampler rotameter indication (Q_{ind}), liters per minute.

Potable Water Sampling Field Data Sheet

Section I - Administrative Data

1. Sample ID:*	*6. Sampling Date*:*	*9. Percent of personnel exposed?**
2. Location:	*7. Sampling Time*:*	
3. Country:	*8. Lenght of Stay*:* < 2 weeks / < 6 months / < 1 year / > 1 year (Select One)	
4. Operation:	*10. Exposure Notes**	
5. Collecting Unit:*		

Section II - Field Data

11. Collectors Name:*	*15. Water Use*:* (Select One, if non-drinking see 15a) Drinking / Non-Drinking
12. Collectors Phone No:*	*15a. Non-Drinking uses* (Select all that apply, and/or add others.) Personal Hygeine, Cooking, _____, _____
13. Water Source:* (Select One) Source / Treated / Distribution System	*16. Is this the primary drinking water?** (Select One) Yes / No
14. Water Type:* (Select One) RWW / RS / ROWPU / T /WC / WT / WB / DS / FD	*17. Estimated Consuption Rate (liters per day)** (Select One) less than 5 / between 5 & 15 / greater than 15
18. Inital pH:	*21. Turbidity:* *NTU*
19. Water Temperature: *oC*	*22. Free Available Chlorine* *mg/L*
20. Conductivity: *mV*	*23. Total Dissolved Solids* *mg/L*

GEOLOCATION	*Decimal Degrees*		*26. MGRS*:*
24. Latitude:*		*OR*	
25. Longitude:*			*27. Datum*:*

28. Field Notes:*

29. Sampling Site Graphic

** Required Fields* *12-Jan-03*

POTABLE WATER SAMPLING FIELD DATA SHEET INSTRUCTIONS

----------SECTION I - ADMINISTRATIVE DATA----------

1. **Sample ID** - Sample ID number CCC_LLL_MMM_YYDDD
   Where: CCC – Country 3 letter abbreviation code
   LLL - Camp abbreviation (i.e. first three letters of camp name)
   MMM - Water sample number for that camp on that particular day (e.g. 01W, 02W, 03W, etc)
   YYDDD - jday code, last two digits of the year & three digit julian day of the year [e.g 03015 for 15-Jan-2003].
2. Location – Camp or location of sample
3. Country – Country in which location or camp is located.
4. Operation – Name of operation ongoing in the area of the sample [e.g. Operation Allied Force (OAF), etc] if applicable
5. **Collecting Unit** - Unit collecting the sample (e.g. TAML, 71st MEDDET, etc).
6. **Sampling Date** – Date sample was collected (e.g. 15-Jan-2003)
7. **Sampling Time** – Time sample was taken (e.g. 16:00)
8. **Length of Stay** – How long are troops expected to stay at the location where the sampling was conducted?
9. **Percent of Personnel Exposed** – What percentage of troop at the site could be exposed to the water source?
10. **Exposure Notes** – Any notes or comments associated with troop exposure to the sample.

---------- SECTION II - FIELD DATA----------

Note: The Sample ID, Sampling Date, and Sampling Time at minimum should also be recorded on the sample label.

11. **Collectors Name –** The name of the person collecting the sample.
12. **Collectors Phone No** - The phone number of the person collecting the sample.
13. **Water Source**:
    Source Water - Raw water before treatment
    Treated Water - Collected after the water passes through a typical type of treatment such as a ROWPU
    Distribution System - Collected at representative points in the distribution system
14. **Water Type**:

RWW - Raw Well Water	**RS** - Raw Surface	**ROWPU** – Reverse Osmosis Water Purification Unit
T – Tap	**WC** - Water Coolers	**WT** – Water Tanker
WB – Water Blivet	**DS** - Distribution System	**FD** - First Draw

15. **Water Use** – Is water used for drinking or non-drinking? (Select one, if non-drinking see 15a)
    15a. Non-Drinking Uses – What are other uses of water? (e.g. Personal hygiene, Cooking, other)
16. **Is this the primary drinking water?** – Is the source tested the primary drinking water? Yes / No (Circle One)
17. **Estimated Consumption Rate (liters per day)** – Less than 5, Between 5 and 15, greater than 15? (Circle One)
18. Initial pH – The initial pH of the water before the sample is taken or before preservatives are added, if known
19. Water Temperature – The initial ambient temperature of the water being sampled, if known
20. Conductivity – The initial conductivity of the water being sampled, if known
21. Turbidity – The initial turbidity of the water being sampled, if known
22. Free available chlorine – The initial free-available chlorine (FAC) of the water being sample, if known
23. Total dissolved solids – The initial total-dissolved-solids (TDS) of the water being sampled, if known
24. **Latitude** – Sample latitude location in decimal degrees [from GPS]
25. **Longitude** – Sample longitude location in decimal degrees [from GPS]
26. **MGRS** – Location in Military Grid Reference System (MGRS) from GPS, ten digit grid with grid square identifier (e.g. 34TEN1234567890)
27. **Datum**: Datum from map or GPS used (e.g. WGS84, etc)
28. **Field Notes** - Notes relating to sampling episode (e.g. unusual circumstance, weather, potential pollution sources, etc)
29. Sampling Site Graphic – Any graphical or pictorial description of the sampling site. May include a digital picture of the sampling site once sample is processed.

Soil Sampling Field Data Sheet

Section I - Administrative Data

1. Sample ID*:	6. Sampling Date*:	9. Percent of personnel exposed?*
2. Location:	7. Sampling Time*:	
3. Country:	8. Lenght of Stay*: (Select One) < 2 weeks / < 6 months / < 1 year / > 1 year	
4. Operation:	10. Exposure Notes*	
5. Collecting Unit*:		

Section II - Field Data

11. Collectors Name*:	14. Sample Type*: (Select One) Surface / Sub-Surface
12. Collectors Phone No*:	15. Collection Type*: (Select One) Composite / Discrete
13. Temperature (oC)*:	16. Weather Conditions*:

17. Field Notes* (Location Description / Current Uses / Potential Contamination):

18. Potential Exposure to soil*: (Check One)

- ☐ HIGH: fighting position, maintenance area, PT area, excavating, filling sandbags, etc
- ☐ MEDIUM: walking area, common areas, grassy athletic fields, etc
- ☐ LOW: non traffic areas, restricted areas, etc

19. Sampling Site Graphic and MGRS Corners**:

MGRS Corner locations of sampling area

1. _____ 2. _____

3. _____ 4. _____

20. Single Area of Grid Graphic**

Area designation from sample area_____

Shade in composite sample locations

Location Number	MGRS

* Required Fields 12-Jan-03

** Graphic required if sample is part of systematic area samplin

SOIL SAMPLING FIELD DATA SHEET INSTRUCTIONS

----------SECTION I - ADMINISTRATIVE DATA----------

1. **Sample ID** - Sample ID number CCC_LLL_MMM _YYDDD
   Where: CCC – Country 3 letter abbreviation code
   LLL - Camp abbreviation (i.e. first three letters of camp name)
   MMM - Soil sample number for that camp on that particular day (e.g. 01S, 02S, 03S, etc)
   YYDDD - jday code, last two digits of the year & three digit julian day of the year [e.g 03015 for 15-Jan-2003].
2. Location – Camp or location of sample
3. Country – Country in which location or camp is located.
4. Operation – Name of operation ongoing in the area of the sample [e.g. Operation Allied Force (OAF), etc] if applicable
5. **Collecting Unit** - Unit collecting the sample (e.g. TAML, 71st MEDDET, etc).
6. **Sampling Date** – Date sample was collected (e.g. 15-Jan-2003)
7. **Sampling Time** – Time sample was taken (e.g. 16:00)
8. **Length of Stay** – How long are troops expected to stay at the location where the sampling was conducted?
9. **Percent of Personnel Exposed** – What percentage of troop at the site could be exposed to the water source?
10. **Exposure Notes** – Any notes or comments associated with troop exposure to the sample.

----------SECTION II - FIELD DATA----------

Note: The Sample ID, Sampling Date, Sampling Time, Collectors Name, and MGRS (if applicable) should also be recorded on the sample label.

11. **Collectors Name –** The name of the person collecting the sample.
12. **Collectors Phone No** - The phone number of the person collecting the sample.
13. **Temperature** – Temperature of soil, if known in degrees Celsius.
14. **Soil Sample Type**:
    Surface – Soil sample taken within 6 inches of the surface
    Sub-surface – Soil sample taken below 6 inches of surface
15. **Collection Type**:
    Composite –Soil sample taken from several locations and consolidated into one sample
    Discrete – Soil sample taken from one unique location.
16. Weather Conditions – weather conditions at the time of sampling.
17. **Field Notes** - Notes relating to sampling episode (e.g. Location description, current uses, potential contamination)
18. **Potential Exposure to Soil** – Troops potential exposure to soil; High, Medium or Low. (Check One)
    HIGH: fighting position, maintenance area, PT area, excavating, filling sandbags, etc
    MEDIUM: walking area, common areas, grassy athletic fields, etc
    LOW: non traffic areas, restricted areas, etc
19. **Sampling Site Graphic and MGRS Corners** –
    Record location of sampling site corners and graphic showing site grid with sub-area numbers.
    If site is a discrete sample site of contamination, show sketch of site and MGRS location of sample
20. **Single Area of Grid Graphic –** Required if sample is part of an area site grid. Sub-area sketch with sub-grid and MGRS locations of composite sample locations.

*__MGRS__ – Location in Military Grid Reference System (MGRS) from GPS, ten-digit grid with grid square identifier (e.g. 34TEN1234567890)

Air - PM10 Low Volume Field Data Sheet

Section I - Administrative Data

1. Sample ID*:	6. Sampling Date*:	9. Percent of personnel exposed?*
2. Location:	7. Sampling Time*:	
3. Country:	8. Lenght of Stay*: (Select One) < 2 weeks / < 6 months / < 1 year / > 1 year	
4. Operation:	10. Exposure Notes*	
5. Collecting Unit*:		

Section II - Field Data

11. Filter No*:	15. Collectors Name*	18. Battery ID*:
12. Filter Type:	16. Collectors Phone*:	19. Blank?: (Select One) No / FB / TB / LB
13. Holder ID*:	17. Unit Type:	20. Invalid Sample?:
14. Sampler ID*:	21. Flow Meter Used*: (Select One) Unit Flow Meter / Gilibrator / Calibration Manometer	
22. Flow Calibrator ID*:	25. Calibration Target Flow (H): inches of H2O	
23. Slope (m):	$\Delta H = \left(\frac{5.0 - b}{m}\right)^2 * \left(\frac{P_{amb}}{T_{amb}}\right)$	Where: Pamb = Ambient pressure in mm of Hg (1 inch Hg = 25.4 mm Hg)
24. Intercept (b):		Tamb = Ambient temp in degrees K (oK = oC + 273)

SAMPLER DATA	Start/Pre	End/Post	Average
26. Date*:			
27. Time*:			
28. Ambient Temperature (oC)*:			
29. Ambient Pressure (inHg)*:			
30. Flow Calibration (in H2O)*:			
31. Elapsed Time Reading (hrs)*:			

32. Is industry surrounding location?* (Select One) Yes / No / Not Known	34. Type of industry, if present*?
33. If industry is present is it active?* (Select One) Yes / No / Not Known	

GEOLOCATION	Decimal Degrees	OR	
35. Latitude*:			37. MGRS*:
36. Longitude*:		38. Datum*:	
39. Field Notes*:			

* Required Fields

12-Jan-03

AIR – PM10 LOW-VOLUME SAMPLING FIELD DATA SHEET INSTRUCTIONS

---SECTION I - ADMINISTRATIVE DATA ---

1. **Sample ID** - Sample ID number CCC_LLL_MMMM_YYDDD_ZZ
   Where: CCC – Country 3 letter abbreviation code
   LLL - Camp abbreviation (i.e. first three letters of camp name)
   MMMM - Method type (e.g. PM10)
   YYDDD - jday code, last two digits of the year & three digit julian day of the year [e.g 03015 for 15-Jan-2003].
   ZZ – Sample type: **P** – Primary sample; **C** – Collocated sample; **FB** – Field Blank
2. Location – Name of camp or location of sample.
3. Country – Name of country in which location or camp is located.
4. Operation – Name of operation ongoing in the area of the sample [e.g. Operation Allied Force (OAF), etc] if applicable
5. **Collecting Unit** - Unit collecting the sample (e.g. TAML, 71st MEDDET, etc).
6. **Sampling Date** – Date sample was collected (e.g. 15-Jan-2003)
7. **Sampling Time** – Time sample was taken (e.g. 16:00)
8. **Length of Stay** – How long are troops expected to stay at the location where the sampling was conducted?
9. **Percent of Personnel Exposed** – What percentage of troop at the site could be exposed to the water source?
10. **Exposure Notes** – Any notes or comments associated with troop exposure to the sample.

--- SECTION II - FIELD DATA ---

11. **Filter No** - The filter ID number that will be on the filter cassette. (e.g. 47-03-001)
12. Filter Type - **TF** – Teflon; **QM** – Quartz; **GF** – Glass fiber; **CE** – Cellulose ester
13. **Holder ID** - The ID associated with the filter holder assembly
14. **Sampler ID** - The serial number off the top of the sampler (e.g. 1884) or "FB if filter is a field blank
15. PM Type – PM10 - Particulate matter less than 10 microns (DEFAULT CHOICE)
    TSP - Total Suspended Particulate
    PM25 - Particulate matter less than 2.5 microns
16. **Collectors Name** - Name of the person operating the sampler.
17. **Unit Type** – Type of sampling unit (e.g. Airmetrics, etc)
18. **Battery ID** - The battery number (BATT #) off the top of the battery used (e.g. 97-421) or "FB" if filter is a field blank
19. Blank - Is the sample a QA/QC blank, if it is what type? (Circle appropriate one))
    NO – not a blank (DEFAULT CHOICE) **WB** – weighing blank
    FB – field blank **LB** – lab blank
20. Invalid Sample - Is the sample invalid, if so why? (Select appropriate code)
    NO - Sample is valid (DEFAULT CHOICE)
    M – Missing Field Data – e.g. sample time, flow rates, etc
    B – Battery Failure – battery failed during sampling episode.
    F – Flow Differential –pre and post flow calibrations deviation was greater than 10%
    T – Timer Malfunction –pump timer failed.
    S – Sample Malfunction –other part of sampler failed, e.g. tubing, etc
    D – Damage Sampling Media – filter was damage during shipment or sampling episode
21. **Flow Meter Used** - Indicate which meter was used to determine flow. (Circle One)
22. **Flow Calibrator ID** – ID of Mini-Flow calibrator (e.g. MNF 0023) or Gilibrator SN if used to obtain flow rate
23. **Slope (m)** – Slope from Mini-Flow Calibrator.
24. **Intercept (b)** – Intercept from Mini-Flow Calibrator
25. **Calibration Target Flow (ΔH) –** Target flow for Mini-Flow Calibrator Manometer in inches of water calculated using the associated equation.
26. **Date** - Date which the sampling episode was started and ended - DD MON YR - (e.g. 15 Jan 03)
27. **Time** - Time which the sampling episode was started and ended in a 24 hour standard format
28. **Ambient Temperature** - Ambient Temp in degrees Celsius from thermometer at the start and end of the sampling episode
29. **Ambient Pressure** - Ambient Pressure in inches Hg from barometer at the start and end of the sampling episode
30. **Flow Calibration (in H2O)** – Mini-Flow calibration reading off of digital manometer attached to calibration office in inches of water.
31. **Elapsed Time reading** –Elapsed Time Reading in hours from sampler at the start and end of the sampling episode
32. **Is Industry around sampling location**? Yes, No, Not Know (Select One) if yes, go to 33 and 34.
33. **If Industry is present is it active**? Yes, No, Not Know (Select One)
34. **Type of industry present**. (e.g. petroleum, manufacturing, power production, etc)
35. **Latitude** – Sample latitude location in decimal degrees [from GPS]
36. **Longitude** – Sample longitude location in decimal degrees [from GPS]
37. **MGRS** – Location in MGRS from GPS, ten digit grid with grid square identifier (e.g. 34TEN1234567890)
38. **Datum**: Datum from map or GPS used (e.g. WGS84, etc)
39. **Field Notes** - Notes relating to sampling episode (e.g. unusual circumstance, weather, potential pollution sources, etc)

Air - TO-17 Field Data Sheet

Section I - Administrative Data

1. Sample ID*:	7. Collecting Unit*:	11. Lab ID:
2. Location:	8. Unit Spec ID:	12. Job No:
3. Country:	9. Mission ID:	13. Project No:
4. Operation:	10. Shipping ID:	14. Europe ID:
5. Sampling Date*:	15. Sample Notes:	
6. Sampling Time*:		

Section II - Calibration Data

16. Calibration Location*:	20. Pump ID*:	
17. Calibrator ID*:	21. Flow Rate Pre*:	cc/min
18. Calibration Operator*:	22. Flow Rate Post*:	cc/min
19. Calibration Date*:	23. Flow Rate Average:	cc/min
25. Calibration Notes:	24. Range: $\text{Range} = \frac{\text{Flow Rate Pre} - \text{Flow Rate Post}}{\text{Flow Rate Post}} \times 100$	

Section III - Field Data

26. Collectors Name*:	29. VOC Type: (Circle One) S / FB / TB	32. Invalid Sample?:
27. Collectors Phone No*:	30. VOC Method:	33. Rain (Yes/No)?:
28. Field Blank ID*:	31. Tube ID* :	

SAMPLER DATA	Start	End
34. Date*:		
35. Time*:		
36. Sample Time: min	37. Sample Volume : [=(Sample Time * Flow Rate Average) / 1000]	Liters

GEOLOCATION	Decimal Degrees		40. MGRS*:
38. Latitude*:		OR	
39. Longitude*:			

41. Field Notes*:

* Required Fields

22-Oct-02

AIR – TO17 SAMPLING FIELD DATA SHEET INSTRUCTIONS

----------SECTION I - ADMINISTRATIVE DATA----------

1. **Sample ID** - Sample ID number CCC_LLL_MMMM_YYDDD_ZZ
   Where: CCC – Country 3 letter abbreviation code
   LLL - Camp abbreviation (i.e. first three letters of camp name)
   MMMM - Method type (e.g. TO17)
   YYDDD - jday code, last two digits of the year & three digit julian day of the year [e.g 02001 for 1-Jan-2002].
   ZZ – Sample type: **P** – Primary sample; **C** – Collocated sample; **FB** – Field Blank; **TB** – Trip Blank
2. Location – Camp or location of sample.
3. Country – Country in which location or camp is located.
4. Operation – Name of operation ongoing in the area of the sample [e.g. Operation Allied Force (OAF), etc] if applicable
5. **Sampling Date** – Date sample was collected (e.g. 01-Jan-2002)
6. **Sampling Time** – Time sample was taken (e.g. 16:00)
7. **Collecting Unit** - Unit collecting the sample (e.g. TAML, 71st MEDDET, etc).
8. Unit Spec ID – Unit specific ID associated with the sample if any.
9. Mission ID – Unit mission ID associated with the sample if any.
10. Shipping ID – Shipping ID associated with sample (e.g. Fedex tracking number)
11. Lab ID – Unique ID number assigned at CHPPM-Main laboratory, if applicable.
12. Job No. – Job number assigned at laboratory.
13. Project No. – Project number assigned by laboratory or project officer.
14. Europe ID - Unique ID number assigned at CHPPM-Europe laboratory, if applicable.
15. **Sampling Notes** – Any notes or comments associated with the sample (e.g. short holding time, unusual circumstances, etc).

----------SECTION II - CALIBRATION DATA----------

16. **Calibration Location** - Camp or location samplers were calibrated.
17. **Calibrator ID** - Identification number of calibrator (e.g. serial number).
18. **Calibration Operator** - Operator of calibration equipment.
19. **Calibration Date** – Date of calibration
20. **Pump ID** - Pump ID number, either MMCN number or serial number.
21. **Flow Rate Pre (cc/min)** – Pre-sampling calibration sampler flow rate.
22. **Flow Rate Post (cc/min)** – Post-sampling calibration sampler flow rate.
23. Average Flow Rate (cc/min) ***(Calculated)*** - [Average = (Flow Rate Pre + Flow Rate Post)/2]
24. Range ***(Calculated)*** – [Range = [(Flow Rate Pre - Flow Rate Post) / Flow Rate Post]*100]
25. Calibration Notes – Notes relating to calibration (e.g. unusual circumstance, etc)

---------- SECTION III - FIELD DATA----------

[Note: The Sample ID, Pump ID, Start Date and Tube ID (if present on tube) should also be recorded on the sample label.]

26. **Collectors Name –** The name of the person collecting the sample.
27. **Collectors Phone No** - The phone number of the person collecting the sample.
28. **Field Blank ID** – ID of field blank associated with the particular sample. For a field blank sample this entry would be blank.
29. VOC Type: **S** – Sample; **FB** – Field Blank; **TB** – Trip Blank
30. VOC Method - Method (e.g. TO1, TO17, DAAMS)
31. Tube ID – Unique ID on tube, or tube ID (e.g. C3025) on shipping container.
32. **Invalid Sample** – Was the sample determined to be invalid? If so, why?
    No – Sample is valid (*default if entry is left blank*)
    M – Missing Field Data – e.g. sample time, flow rates, etc
    B – Battery Failure – battery failed during sampling episode.
    F – Flow Differential –pre and post flow calibrations deviation was greater than 10%
    T – Timer Malfunction –pump timer failed.
    S – Sample Malfunction –other part of sampler failed, e.g. tubing, etc
    D – Damage Sampling Media – sampling media was damage during shipment or sampling episode.
33. Rain (Yes/No)? - Indicate whether or not it rained at the sample location during the sampling episode.
34. **Date** - Date which the sampling episode was started and ended - DD MON YR - (e.g. 01 Jan 99)
35. **Time** - Time which the sampling episode was started and ended in military time
36. **Sample Time** – Time pump ran in minutes, from the pump's LCD at the end of the sampling episode.
37. Sample Volume (liters) ***(Calculated)*** – [Volume = (Sample Time * Average Flow Rate) / 1000]
38. **Latitude** – Sample latitude location in decimal degrees [from GPS]
39. **Longitude** – Sample longitude location in decimal degrees [from GPS]
40. **MGRS** – Location in MGRS from GPS, eight to ten digit grid with grid square identifier (e.g. 34TEN1234567890)
41. **Field Notes** - Notes relating to sampling episode (e.g. unusual circumstance, weather, potential pollution sources, etc)

TOXIC SUBSTANCE CONTROL ACT (TSCA)
CERTIFICATION

DATE 1.

POSITIVE CERTIFICATION:

__XXX__ "I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rule or order thereunder."

NEGATIVE CERTIFICATION:

_____ "I certify that all chemicals in this shipment are not subject to TSCA.

2. Company Name and Address

3. Name

4. Signature

5. Title

6. Method of Shipment

7. Shipment Number

Instructions:

Block 1. Date. Enter the date of the shipment.

Block 2. Company Name and Address. Print the unit name and unit address of the unit **shipping** the samples.

Block 3. Name. Print the name of the individual making the shipment.

Block 4. Signature. Signature of the shipper.

Block 5. Title. Put your job title or MOS of the shipper (e.g. Preventive Medicine Technician, Industrial Hygienist, etc.)

Block 6. Method of Shipment. Indicate whether the samples are being sent by Federal Express, Military Airlift, or some other method is being used.

Block 7. The Airway Bill Number (Federal Express) or shipping manifest number.

Soil Permit

Permit Number: S-38232 Revised

UNITED STATES DEPARTMENT OF AGRICULTURE

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Issued To: US Army, Center for Health Promotion and Preventive Medicine
(William Smithson)
Ground Water and Solid Waste Program
Aberdeen Proving Ground, Maryland 21010-5422

TELEPHONE: (410) 671-4211

Under the authority of the Federal Plant Pest Act of May 23, 1957, permission is hereby granted to the facility/individual named above subject to the following conditions:

1. Valid for shipments of soil not heat treated at the port of entry, only if a Compliance Agreement (PPQ Form 519) has been completed and signed. Compliance Agreements and Soil Permits are non-transferable. If you hold a Soil Permit and you leave your present employer or Company, you must notify your local USDA office promptly. A copy of this permit must accompany all shipments.
2. To be shipped in sturdy, leakproof, containers.
3. To be released without treatment at the port of entry to permittee or authorized user.
4. To be used only for analysis and only in the facility of the permittee at US Army, Center for Health Promotion and Preventive Medicine, located in Aberdeen Proving Ground, Maryland.
5. No use of soil for growing purposes is authorized, including the isolation or culture of organisms imported in soil.
6. All unconsumed soil, containers, and effluent is to be autoclaved, incinerated, or heat treated by the permittee at the conclusion of the project as approved and prescribed by PPQ.
7. This permit authorizes shipments from all foreign sources, including Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands through any U.S. port of entry.

MARCH 31, 2009
Expiration Date

Approving Official LIA STEWART

WARNING: Any alteration, forgery, or unauthorized use of this Federal form is subject to civil penalties of up to $250,000 (7 U.S.C. s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. s 1001).

PPQ FORM 525B (8/94)

PART 1 - PERMITTEE

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

COMPLIANCE AGREEMENT

1. NAME AND MAILING ADDRESS OF PERSON OR FIRM
US ARMY CENTER FOR HEALTH PROMOTION AND
PREVENTATIVE MEDICINE
GROUND WATER AND SOLID WASTE PROGRAM
ABERDEEN PROVING GROUND MD 21010-5403
ATTN : WILLIAM SMITHSON

2. LOCATION
Shaefer Road BLDG E-1958
Edgewood area of APG
410-436-4211

3. REGULATED ARTICLE(S)
SOIL SAMPLES

4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS
GOLDEN NEMATOD, IMPORTED FIRE ANT AND WITCH WEED

6. I/We agree to the following
That in authorizing and participating in these treatments as a basis for the certification of regulated articles, no liability shall be attached either to the United States Department of Agriculture, to cooperation agencies or to any of their employees in the event of injury to the property or regulated article; to handle, move, and process regulated articles in accordance with the provisions of applicable plant quarantines; to use all permits and certificates in accordance with instructions; to maintain and offer for inspections such records as may be required; to carry out all additional conditions, treatments, precautions and sanitary measures as may be required by the inspector in the following stipulations:
See attachments for Stipulations:
Attachment 1 Handling soil samples
Attachment 2 Cleaning of soil moving equipment
Attachment 3 Soil movement map
Attachment 4 Laboratories approved to receive soil

7. SIGNATURE
William B. Smithson

8. TITLE
Sup. Eng. Tech.

9. DATE SIGNED
27 Feb 2000

The affixing of the signatures below will validate this agreement which shall remain in effect until cancelled, but may be revised as necessary or revoked for noncompliance.

10. AGREEMENT NO.
ES-00-01

11. DATE OF AGREEMENT
27JAN00

12. PPQ OFFICIAL (NAME AND TITLE)
Michael D. Ward
PPQ Officer

13. ADDRESS
2200 Broening Highway Suite 140
Baltimore MD 21224

14. SIGNATURE
Michael D. Ward

15. STATE AGENCY OFFICIAL (NAME AND TITLE)

16. ADDRESS

17. SIGNATURE

PPQ FORM 519
(AUG77)

TRANSPORTATION CONTROL AND MOVEMENT DOCUMENT										PAGE NO.
1. DOC ID	2. TRLR CTR	3. CONSIGNOR		4. COMMODITY SPECIAL HANDLING		5. AIR DIM	6. POE		7. POD	
8. MODE	9. PACK	10. TRANSPORTATION CONTROL NO.		11. CONSIGNEE		12. PRI	13. RDD	14. PROJ	15. DATE SHPD	16. ETA	17. TR ACCT
18. CARRIER		19. FLIGHT-TRUCK-VOY-DOC NO.	20. REF	21. REMARKS					22. PIECES	23. WEIGHT	24. CUBE

a. Transship Point	b. Date Rec	c. Bay Whse	d. Date Shpd	e. Mode Carrier	f. Flight-Truck-Voy Doc No.	g. Ref	h. Stow Loc	i. Split	j. Cond	k. Signature-Remarks
25.										
26.										
27.										

28. CONSIGNEE	29. DATE RECEIVED/OFFERED *(Sign)*	30. CONDITION	31. REMARKS

32. DOC ID	33. TRAILER - CON-TAINER	34. CONSIGNOR COMM ABBR OTHER	35. COMMODITY SPECIAL HANDLING	36.VOY NO		37. POD	38. MODE	39. TYPE PACK	40. TRANSPORTATION CONTROL NUMBER	41. CONSIGNEE	42. PRI	43. REMARKS AND/OR					44. ADDITIONAL REMARKS OR		
				Air Dim a.	POE b.							RDD a.	Proj b.	Stow Loc Shpd c.	Stow Loc ETA d.	Tac e.	Pieces a.	Weight b.	Cube c.

DD FORM 1384, OCT 2000 PREVIOUS EDITIONS MAY BE USED.

DD Form 1348: Transportation Control and Movement Document

Fill in the blocks as follows:

1. TX1
3. WK4UPX
5. A
4. MU
6. GET INFO FROM CARGO PERSON
7. RMS
8. F
9. CT
10. WK4UPX2O520100XXX [NOTE: The TCN# consist of the DODDAC (WK4UPX), the next digit will be the current year 2002, just use the last digit (2), The next 3 digits will be the present day JULIAN DATE example (052), The next four digits are the item number, USE ANY NUMBERS BETWEEN 0100-0300, example (0100), The last three digits will AWAYS BE XXX.]
11. WK4UPX
12. 1
13. 999
17. GET (TAC CODE) INFO FROM CARGO PERSON
21. Environmental sample for immediate analysis
22. Number of pieces
23. Estimate weight of cargo: (pounds)
24. Cubic feet of cargo
31. Commander, U.S. Army Center for Health Promotion and Preventive Medicine - Europe
    ATTN: MCHB-AE-EE (Hourican)
    CMR 402 BLDG 3810 RM 316
    APO AE 09180
    DSN: (314) 486-8556

MILITARY SHIPMENT LABEL		Form Approved. OMB No. 0704-0188
1. TRANSPORTATION CONTROL NUMBER		2. POSTAGE DATA
3. FROM		4. TYPE SERVICE
5. SHIP TO/POE		6. TRANS PRIORITY
7. POD		8. PROJECT
9. ULTIMATE CONSIGNEE OR MARK FOR	10. WT. *(This piece)*	11. RDD
	12. CUBE *(This piece)*	13. CHARGES
	14. DATE SHIPPED	15. FMS CASE NUMBER
	16. PIECE NUMBER	
	17. TOTAL PIECES	

DD FORM 1387, JUL 1999 PREVIOUS EDITION IS OBSOLETE.

DD Form 1387: Military Shipment Label

Fill in the blocks as follows:

1. WK4UPX2052010XXX This is the TCN# that is on the DD Form 1384
3. GET (TAC CODE) INFO FROM CARGO PERSON
4. GET INFO FROM CARGO PERSON
5. AMSS
6. 1
7. RMS
9. Commander, U.S. Army Center for Health Promotion and Preventive Medicine - Europe
   ATTN: MCHB-AE-EE (Hourican)
   CMR 402 BLDG 3810 RM 316
   APO AE 09180
   DSN: (314) 486-8556
10. Estimate weight of cargo (pounds)
11. 999
12. Cubic feet of cargo
16. Number of pieces (example: if you have two pieces you will Number one piece 1 of 2 and the other piece 2 of 2)
17. Total number of pieces

Appendix H
Recommended Site Assessment Report Format

Executive Summary
- Prepared in Issue/Point Paper format
- Includes prioritized list of health/mission issues from site assessment
- Contains a preferred and secondary remedial alternative for each issue

Introduction
- Purpose
- Methodology i.e., employed American Society For Testing & Materials protocol for Phase I & II Environmental Site Assessments
- Limitations of Assessment e.g., time on site, weather conditions, pending laboratory results, etc.

Site Description
- Location
- Site and Vicinity characteristics including the physical setting
- Description of structures, roads, drinking water source, waste disposal, other improvements
- Current and past uses of property
- Current and past uses of adjoining properties

Information Sources
- What pre-deployment information sources were consulted
- What sources were consulted during site reconnaissance (who did you interview, what records were reviewed, etc.)

Information from Site Reconnaissance
- Hazardous/unidentified Substances present (storage, handling, disposal)
- Potential radioactive sources present
- Storage tanks (contents, storage volume, past releases, potential for release)
- Evidence of other hazardous material use/release
- Indications of solid waste disposal
- Migration of hazardous materials release on or off site
- Presence of friable asbestos
- Industrial operations in surrounding environs with potential site impacts
-Site map and photographs
-Presence of Animals
-Agricultural fields in surrounding area
-Other Environmental pollutants

Environmental Sampling Data (if done)
- sampling and analysis plan
- sample results tables

Findings and Conclusions
- Detail environmental conditions of health/mission significance
- Explain completed exposure pathways
- Explain basis for hazard assessment i.e., USACHPPM TG 230

Recommendations
- Detail risk reduction options

Appendix I
Vector Control Annex

Vector-borne diseases are much more predictable than many other types of illness. Vectors are dependent upon environmental conditions which change little and slowly, if at all. Historical data are extremely valuable, even information that is decades old.

Pre-deployment Activities:

1. Determine what information is available prior to deployment (VECTRAPs, DVEPs, MEDIC).

2. Determine the level of confidence, precision. Contact the Defense Pest Management Information Analysis Center, the Armed Forces Medical Intelligence Center, and the cognizant DVECC.

Potential Information Surces

DPMIAC - http://www.afpmb.org/mission/dpmiacstatement.htm
AFMIC - http://mic.afmic.detrick.army.mil/
DVECC Bangor - http://www.ndvecc.navy.mil/
DVECC JAX - http://dvecc-jax.med.navy.mil/

3. Determine potential risks from location, season, nature and duration of mission, and historical data. Incidence of diseases such as typhus and plague may increase in colder weather, particularly in urban environments.

What is the risk periodicity?	year-round, seasonal, variable
What is the risk distribution?	countrywide, area-wide, focal, mostly urban, mostly rural

4. Gather known information on biology of important vector and reservoir species. Possible, potential, suspected vectors or reservoirs may become important, but effort should be concentrated on the known important vectors. Determine documented pesticide resistance in vectors, and drug resistance in parasites. If available, local information on resistance may be more accurate. The following information sources may prove useful when collecting this data.

Walter Reed Biosystematics Unit - http://wrbu.si.edu/wrbu.html
DPMIAC - http://www.afpmb.org/mission/dpmiacstatement.htm

5. Determine human distribution patterns and historic endemicity of major diseases.

Consider anticipated level of medical care, medical assets, and acceptable level of attrition. Ensure that medical planners consider assets required to support those ill with vector borne disease. Remember that some diseases may be easily treated if diagnosed early (primary plague, typhoid, malaria) and others may require extended intensive supportive care (dengue, encephalitides, hantaviruses).

6. Determine what vector control assets (equipment, pesticides) and personal protective measures will be available. Deploying forces routinely neglect the need for DEET, permethrin, permethrin treated uniforms, and bednets.

7. Determine what transportation will be available for surveillance or control operations.

On-site Activities:

1. Ensure that Commanders know who you are and what you need to do, and that they INFORM security personnel. Demonstrate your equipment for security personnel. **Remember that your priorities are secondary to theirs.**

2. If there is evidence of mosquito, tick, or mite activity, begin stressing personal protection measures actively at all levels in the chain of command. Ensure that camp sanitation is being appropriately stressed to reduce fly and rodent problems. Remember that large rodent populations may equate to increased snake populations.

3. Quickly cover as much of the area as possible by vehicle or on foot, to determine likely problem areas. Consider the following in your assessment:

Breeding sources:
water - mosquitoes, blackflies, deerflies, ceratopogonids
garbage - flies, rodents
caves, tunnels, burrows - phlebotomine sandflies

Nature of vegetation:
lush, dry, ground cover, canopy, aquatic, sparse, extensive

Access for control efforts: Roads or paths to breeding sites, roads located where prevailing winds favor ULV pesticide applications.

Recent and current weather, and seasonal weather patterns:
floods, drought, low temperatures

Farming activity:
unintentional vector control, resistance issues, movement of rodents from fields post-harvest

Nature and location of berthing:
tents, existing structures, screens, sanitation

Prevailing winds

Proximity to reservoirs: humans, livestock

Talk with local health officials
Request information on known or possible vector-borne illness in local population, infection rates, drug resistance

Concurrently, begin standard vector surveillance.

4. If temperatures allow insect activity at night, begin light trapping as soon as possible. If security is an issue, try to run the traps without light, with some attractant. If no other option is available, continue to run traps without light or attractant, if any specimens are collected.

5. Conduct landing/biting collections if possible. Use volunteers judiciously. Remember, DEET WILL affect results!

6. Determine which bodies of water contain mosquito larvae. Treat during surveys if possible.

7. Use baited cone traps or nets to collect flies from garbage, feces, and carcasses.

8. Place live or snap traps in appropriate likely established habitats, and around the operation's food storage, preparation, and eating areas. To collect rodents and determine location, species, and level of infestation.

Proper preservation and curation of specimens are not primary objectives, but are necessary for correct identification. Ensure preservation of what may become very valuable information. New specific biological information may be very valuable for future risk assessments.

Estimating risks.

Military Exposure Guidelines (MEG) don't fit. However, some of the MEG standard terms can be used to help communicate consistently in terms more familiar to decision-makers and other medical personnel. Other groups use the following four elements to characterize risk. What we do fits these terms easily.

> **Findings** (facts) - vectors and diseases present
>
> **Conclusions** (based on findings) - logical application of facts to current situation, "probability of occurrence"
>
> **Opinions** (evaluation of potential impact) - What is the "severity of effect." Are troops likely to become ill, how ill will they be and how long will they be out of action.
>
> **Recommendations** - scientifically defensible, within context of mission

Risk analysis must include continuing on-site surveillance, which should allow continually improving precision and accuracy.

Appendix J
PM-MMART/FDPMU Reachback Support

NEHC has established a reachback technical support cell for supporting deployed PM-MMART/FDPMUs. The technical support cell consists of representatives from the Occupational and Environmental Medicine, Industrial Hygiene, Preventive Medicine and Environmental Programs Directorates as well as various contractors.

The technical support cell can be activated by contacting any of the individuals listed below:

Steve Sorgen: ofc: 757.953.0694, hm: 757.638.3943, cell: 757.617.2816,
ofc email: sorgens@nehc.med.anvy.mil, hm email: sorgens@charter.net

LCDR Haissig ofc: 757.953.0696, ofc email: haissigw@nehc.med.navy.mil

LCDR Rankin: ofc: 757.953.0691, hm: 757.482.658, cell: 757.621.7502
ofc email: rankins@nehc.med.navy.mil, hm email:

CDR Henderson ofc: 757.953.0698, hm: 757.410.2321, cell: 757.651.3069
ofc email: hendersonm@nehc.med.navy.mil, hm email:

The DSN prefix for all the office telephone numbers listed above is 377.
All the above contacts may be reached via SIPRNET at plansop@nehc.navy.smil.mil.
STU III: 757.953.0699

USACHPPM Contacts for Analytical Laboratory Support and Backpack Sampling Kits

USACHPPM - Europe, James J. Hourican, 049.06371.86.8556, DSN: 314.486.8556,
Cell – 049-0151-1420-6587, james.hourican@cpe.amedd.army.mil
SIPRNET: William.Shepler@us.army.smil.mil - please pass to Jim Hourican

USACHPPM Combatant Commander Points of Contact

EUCOM - Brad Hutchens, 410.436.8162, hutchens@usachppm.army.smil.mil

PACOM - Wilbert Moultrie, 410.436.8132, moultrie@usachppm.army.smil.mil

SOUTHCOM - Jackie Howard, 410.436.8106, howardj@usachppm.army.smil.mil

NORTHCOM - Dave Reed, 410.436.8153, david.reed@usachppm.army.smil.mil

CENTCOM, Jim Sheehy, 410.436.5211, james.sheehy@usachppm.army.smil.mil

The DSN prefix for all points of contact at USACHPPM is 584
The STU-III number is 410.436.4244.