U.S. Army Center for Health Promotion and Preventive Medicine

INDUSTRIAL HYGIENE SAMPLING GUIDE

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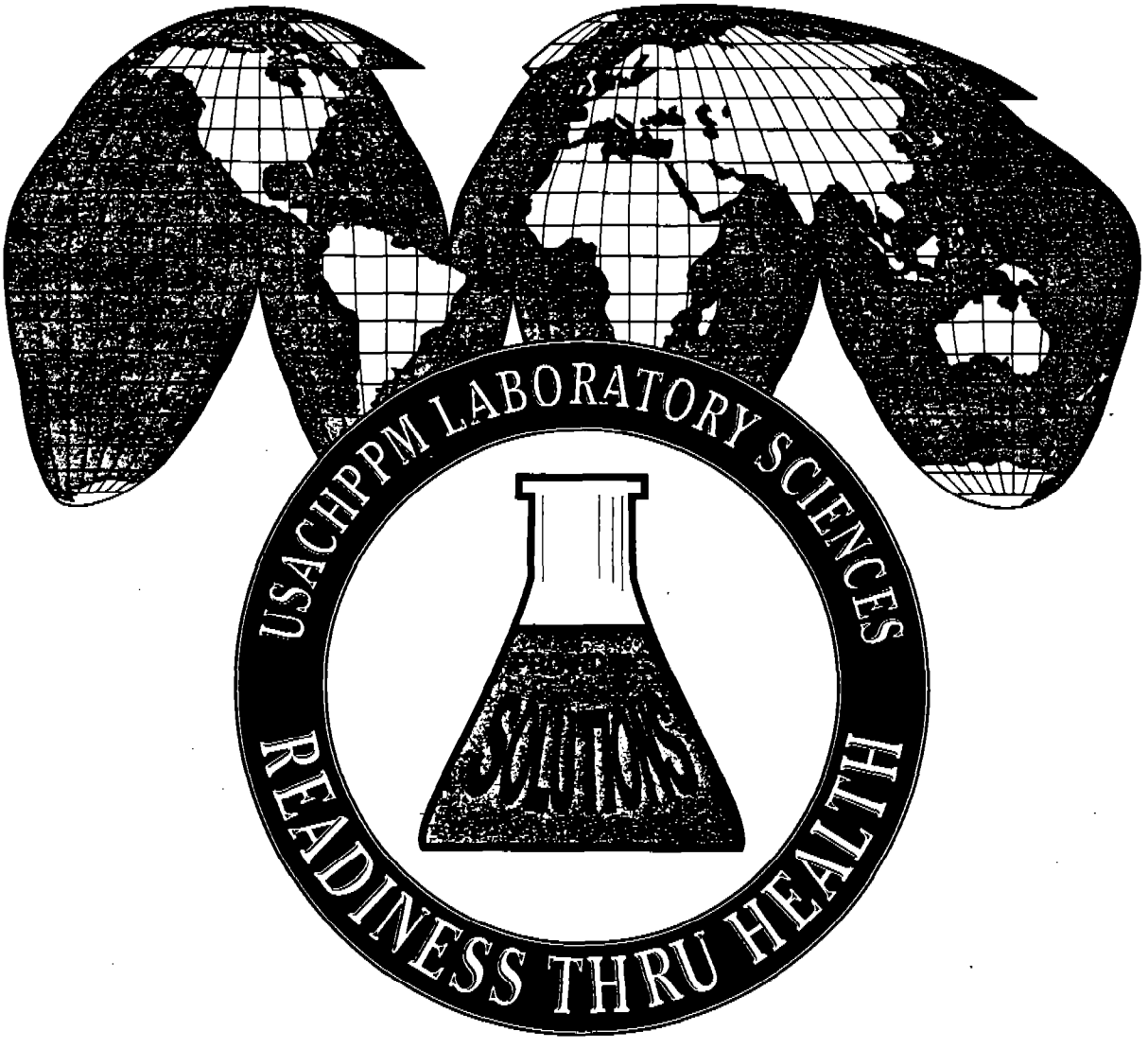

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USACHPPM LABORATORY SCIENCES RESOURCES

	Telephone	Fax	E- Mail Address/Internet	Mailing Address
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DSA-South	404-464-3332 (Commercial) 367- 3332 (DSN)	404-464-2126 (Commercial) 367- 2126 (DSN)	cc-mail (Network): CPT Reginald Richards at CHPPM_FTMCPHRSN E-mail: *cpt_reginald_richards_at_chppm_ftmcphrsn@chppm-ccmail.apgea.army.mil*	Commander USACHPPM-DSS ATTN: MCHB-AS-L 1312 Cobb Street, S.W. Fort McPherson, GA 30330-1075
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CHPPM-Europe	06371-86-8381 (Commercial) 486-8381/7052 (DSN) 011-49-6371-86-8381 (From CONUS)	486-7054 (DSN)	E-Mail: *DLS-HOTLINE @chppm-eur-ccmail.army.mil*	*APO Address:* Commander USACHPPM-EUROPE Department of Laboratory Sciences ATTN: MCHB-AE-LS CMR 402 APO AE 09180-3619 *Commercial or Civilian Address:* USACHPPM-EUROPE Department of Laboratory Sciences Bldg. 3810, Room 307 Kirchberg Kaserne 66849 Landstuhl Germany
CHPPM-Pacific	011 81 3117 63 8418 (Commercial outside of Japan) 0462-51-1520, Ext. 273-8418 (Commercial within Japan) 268-8418 (DSN)	011 81 3117 63 8430 (Commercial outside of Japan) 0462-51-1520, Ext. 273-8430 (Commercial within Japan) 268-8430 (DSN)	E-Mail: *apaj-eh-el@zama-emhi.army.mil*	*APO Address:* Commander USACHPPM-PACIFIC ATTN: MCHB-AJ-L/ Sample Coordinator APO AP 96343-5006 *Commercial or Civilian Address:* USACHPPM-PAC Beign Jutaku No 715 Camp Zama Zama-shi Kanagawa-ken Japan T228

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This TG supersedes TG-141, *Industrial Hygiene Air Sampling and Bulk Sampling Instructions*, December 1990.

* **This TG supersedes TG-141, *Industrial Hygiene Air Sampling and Bulk Sampling Instructions*, December 1990.**

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CHAPTER 1
INTRODUCTION

1-1. PURPOSE.

This Technical Guide (TG) provides information and guidance to Industrial Hygiene (IH) customers in using the services of the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Laboratories. The information provided describes:

- IH Air and Bulk Material Sample Collection
- Factors to Consider Before Collecting Samples
- Required USACHPPM Shipping Forms (USACHPPM Form 8-R-E, *Bulk Sample Data* and USACHPPM Form 9-R-E, *Industrial Hygiene Air Sample Data*)
- Submission of IH Samples to USACHPPM Laboratories
- Using a USACHPPM DLS-Main Laboratory Comment/Complaint/Problem Form (USACHPPM Form 332-R)

1-2. SUGGESTED REFERENCES.

Appendix A contains a list of references which provide information about regulatory requirements, reference methods, and sample collection techniques. The references listed include, but are not limited to, pertinent regulatory and Army documents, other USACHPPM TGs, and selected scientific publications.

1-3. USACHPPM CONTINENTAL UNITED STATES (CONUS) CUSTOMER SUPPORT SERVICES AND IH PROCEDURE LIST.

Appendix B contains two sections:

Section 1 Gives information about the Customer Support Services available at each USACHPPM CONUS Laboratory.

Section 2: Lists the USACHPPM CONUS Laboratory Sciences IH Test Procedures and gives specific information about the sampling, collection, and special handling requirements for each analyte.

1-4. USACHPPM OUTSIDE OF THE CONTINENTAL UNITED STATES (OCONUS) CUSTOMER SUPPORT SERVICES AND IH PROCEDURE LIST.

Appendix C contains two sections:

Section 1: Gives information about the Customer Support Services available at each USACHPPM OCONUS Laboratory.

Section 2: Lists the USACHPPM-Europe Laboratory Sciences IH Test Procedures and gives specific information about the sampling, collection, and special handling requirements for each analyte.

1-5. INFORMATION ABOUT IH MONITORING SUPPLIES.

Appendix D contains two sections:

Section 1: Gives suggested sources for IH Monitoring Supplies

Section 2: Offers examples of acceptable IH Monitoring Supplies

1-6. USACHPPM FORMS.

Appendix E provides examples of USACHPPM forms referenced in this TG. Reproducing these forms is permitted and encouraged.

1-7. ABBREVIATIONS AND TERMS.

The Glossary explains the abbreviations and terms used in this TG.

1-8. QUALITY ASSURANCE (QA).

a. USACHPPM Quality Systems.

All USACHPPM Laboratories maintain Quality Systems that meet the requirements of national and international laboratory accrediting bodies such as the American Industrial Hygiene Association (AIHA), the American Association for Laboratory Accreditation (A2LA), and International Organization for Standardization (ISO). Check with the USACHPPM Laboratory you plan to use about their current accreditation status. All USACHPPM Laboratories are responsible for ensuring the quality of the work they perform.

b. Contracted Laboratory Analyses.

(1) When any customer decides to send samples to a commercial contract laboratory instead of a USACHPPM Laboratory, they must accept responsibility for ensuring the quality of the laboratory work in the same way they would other contracted work. The customer must specify the quality requirements for the deliverables to be completed for the project. If a contract laboratory fails to meet these requirements or makes mistakes, they may not be paid, but the Government is still responsible and liable for the sample results. To minimize the possibility of costly laboratory errors, a contract laboratory should be chosen because of their ability to perform quality work, not just because of their prices and turnaround time.

(2) The following practices have been determined to be the most effective means of ensuring the quality of contracted laboratory work by the U.S. Environmental Protection Agency

(USEPA) (See Reference 30) and the State of California (See Reference 29). They are also recommended by the Department of Defense (DOD) Inspector General (See Reference 31).

(a) ***Perform a laboratory audit.*** This audit should be an onsite inspection of the facility which includes a review of the entire laboratory Quality System. Procedures, equipment, records, performance on evaluation samples, and the qualifications of staff members should all be carefully reviewed. This inspection is necessary to verify the ability of the laboratory to perform quality work. The audit must be done by a qualified and knowledgeable assessor.

(b) ***Validate data.*** Laboratory data should be reviewed thoroughly before use to ensure there are no gross errors in values or units.

(c) ***Submit double-blind performance evaluation (PE) samples.*** PE samples are QA samples that look like routine samples but are samples spiked with a known concentration of a target contaminant. Results of the PE samples should be compared to the known, spiked value to determine acceptability of other data reported by the laboratory. The results of the PE samples are an indication of the ability of the laboratory to produce accurate results.

(d) ***Use split samples for QA.*** Split samples are best suited for homogenous bulk samples. When split samples are used, a routine sample is divided into at least two separate portions. One portion is sent to the contract laboratory and another portion is sent to a reliable "referee" laboratory. The results reported by each laboratory should be comparable.

(3) The following actions have been determined to be less effective when determining the quality of contracted laboratory work:

(a) ***Consideration of Laboratory Certifications.*** Certifications indicate that the laboratory met the minimum requirements of the certifying agency at some point in time, but the certifications themselves are not good indications of ongoing quality work.

(b) ***Submission of single blind PE samples.*** Single blind PE samples are similar to double-blinds PE samples because they are spiked blank samples. However, laboratory analysts are often aware these samples are "different" from the "real world" samples. As a result, the analyst is usually more careful when analyzing known spiked samples.

(c) ***Reviewing past performance.*** It is not unusual in contract laboratories for both management personnel and technical staff members to change frequently. Because of this the quality of the analytical work, which is dependent upon the skills of the analysts and the management climate, can vary significantly.

1-9. COMMUNICATIONS WITH THE LABORATORY.

Good communication is the key to customer satisfaction. It is critical for the success of a project for customers and laboratory staff members to work together from the earliest planning stages of a project until after the final reports have been issued. Means of communications with USACHPPM laboratories are given in this TG in the following places:

a. The inside front and back covers
b. Appendix B, Section 1
c. Appendix C, Section 1

CHAPTER 2
IH AIR AND BULK MATERIAL SAMPLE COLLECTION

2-1. GENERAL INFORMATION.

a. USACHPPM IH Procedure Lists.

(1) The IH Procedure Lists for USACHPPM CONUS and OCONUS Laboratories are in Appendix B, Section 2 and Appendix C, Section 2, of this TG. These lists provide guidelines for IH sample collection and shipment, summarize recommended parameters for sampling, and indicate any special instructions or requirements for each analyte.
(2) The lists are also available electronically on the CHPPM DLS-Main Internet HomePage at "http://chppm-www.apgea.army.mil/dls/".
(3) See Chapter 3 and Appendix B, Section 2, for details concerning the information given in the USACHPPM Laboratory IH Procedure Lists.

b. Method References.

The Reference Methods listed and the information and guidelines given in the USACHPPM Laboratory IH Procedure Lists are from documented procedures published by:

(1) The National Institute for Occupational Safety and Health (NIOSH)
(2) The Occupational Safety and Health Administration (OSHA)
(3) The U.S. Environmental Protection Agency (USEPA)
(4) The American Society for Testing and Materials (ASTM)
(5) Manufacturers of sampling media
(6) Professional scientific publications

2-2. RADIOCHEMICAL AND HEALTH PHYSICS LABORATORY ANALYSES.

For questions regarding Radiochemical, Health Physics, and Ionizing Radiation, please contact one of the Programs listed below. Usually only one call is necessary because the person contacted will provide the appropriate interaction needed with other USACHPPM personnel.

a. For Ionizing Radiation concerns contact the Program Manager for Industrial Health Physics at DSN 584-3502.

b. For Medical Health Physics questions contact the Program Manager at DSN 584-3548.

c. For sampling and sample collection questions contact the Division Chief for Radiochemical Testing at the Directorate of Laboratory Sciences (DLS) at DSN 584-3983.

2-3. SUBMISSION OF SWIPE, WIPE, AND SWAB SAMPLES.

Prior coordination with the USACHPPM Laboratory where the samples are going to be analyzed is needed before these types of samples are submitted to the laboratory. ***Please contact Laboratory Customer Support Services for guidance before collecting these types of samples*** because:

a. Specific and specialized types of wipes are needed for different test methods.

b. Often the sample collecting material itself causes interferences during analysis, especially if the proper type of wipe has not been used.

c. Recent developments in the National Lead Poisoning Prevention Program have provided new procedures for wipes and sample collection. See References 13 and 14 for further information.

2-4. RECOMMENDED SAMPLE FLOW RATES AND AIR COLLECTION VOLUMES.

a. The sampling parameters recommended in the USACHPPM Laboratory IH Procedure Lists should be used whenever possible. When these parameters are used under ***normal sampling conditions:***

(1) The test result should be accurate for the sample being collected
(2) The detection limit for the analytical measurement system (the instrumentation and the method used for testing) can be met
(3) The possibility of sample breakthrough is minimized
(4) The final sample concentration will usually range between 0.1 of a Threshold Limit Value (TLV) parameter and two times the TLV parameter for most analytes

b. The air collection volumes recommended in the Procedure Lists include a safety factor that will usually minimize problems with sample breakthrough. However, it is important to keep in mind that:

(1) Factors such as high humidity or the presence of adsorbing compounds may significantly reduce this safety factor. The sampling plan should be take these factors into consideration.
(2) Higher than recommended air collection volumes should be used only when required by an approved sampling plan because of the possibility that sample breakthrough or overloading may occur.

2-5. DEPARTURES FROM RECOMMENDED SAMPLING PARAMETERS.

a. Sampling situations may arise where departures from the recommended sample flow rates and air collection volumes are necessary. When such departures are required, they should be done only when based on an approved sampling plan.

b. Departures from recommended guidelines may be necessary if:

(1) The concentration of the analyte in question is expected to be high. An air collection volume at or near the lower limit of the recommended range should be used in this situation.

(2) Filter sampling in dusty areas is required. A lower than recommended total air collection volume should be used when sampling in this environment.

(3) The concentration of the analyte in question is expected to be much lower than the TLV or Permissible Exposure Limit (PEL) parameter. An air collection volume at or near the upper limit of the recommended range should be used in this situation.

The minimum air collection volume needed to obtain an adequate concentration of the desired analytes under these conditions can be calculated using the following formula:

$$\text{Minimum Air Collection Volume (in L) Necessary for the Sampling Environment} = \frac{LOD}{E * F}$$

Where: LOD = Analytical Limit of Detection (micrograms) Note: The LOD can be found in the NIOSH or OSHA standard method.

E = Exposure Limit (mg/m^3)

F = Estimate of the Exposure Limit in the Sampling Environment expressed as a percent (in decimal form) of the Standard TLV or PEL paramater. For example, if it is estimated that the sampling environment is 10% of the TLV, "0.1" would be used. The exposure limit units are mg/L.

* = Multiplication

For example: The Minimum Air Collection Volume (in L) Necessary for the Sampling Environment = **4 Liters**

When: LOD = 2 micrograms

E = 5 mg/m^3

F = 0.1 (decimal) (an estimate of 10%)

* = Multiplication

$$\textbf{4 Liters} = \frac{2\ \text{micrograms} * \frac{1\ \text{mg}}{1000\ \text{microgram}}}{5\ \text{mg} * 0.1 * \frac{1\ m^3}{1000\ \text{Liters}}}$$

c. Specific needs or considerations to use when sampling for different types of analytes are given in later sections of this Chapter.

2-6. CORRECTION OF AIR COLLECTION VOLUMES FOR SITE TEMPERATURE AND PRESSURE.

a. When site conditions differ significantly from Standard Temperature and Pressure (STP) conditions, the gram molecular volume (24.45 liters/mole) of gas or vapor is altered. If the air collection volumes are not corrected to STP, significant errors in the final analytical value may result. (Note: These corrections only apply to gases and vapors and not necessary for particulates.)

b. The air collection volumes reported to the laboratory can be corrected to STP using the following formula:

$$V_{STP} = V_m * [(P_{bar}-P_w)/760] * [298/(273 + T)]$$

Where:

V_{STP}	=	Volume of Air (in L) at Standard Temperature (25°C) and Pressure (760 mm of Hg)
V_m	=	Volume of Air (in L) collected at site
P_{bar}	=	Barometric pressure (mm of Hg) at site
P_w	=	Partial pressure of water vapor at site (mm of Hg). The partial pressure of water is disregarded in most situations. However, such information can be obtained from a handbook of physical constants if desired.
T	=	Temperature (°C) at which the sample was collected
*	=	Multiplication

For Example:

V_{STP} = **792 L**

When:

V_m	=	800 L
P_{bar}	=	740 mm of Hg
P_w	=	0 mg of Hg (Parameter Disregarded)
T	=	20 °C
*	=	Multiplication

792 Liters = 800 L * [(740 - 0)/760] * [298/(273 + 20)]

2-7. SAMPLING PUMP FLOW RATE CALIBRATION AND REPORTING.

The accuracy of a final laboratory result for an IH air sample is impacted by the accuracy of the air volume measurement used to collect the sample. Therefore, accurate calibration of the pump and the airflow through the sample collection device is an absolute necessity.

a. **Flow Rate Pre-Use Calibration Adjustments and Post-Use Checks:**

(1) The flow rate through the sample collection device must be determined for each individual sampling pump before field use (pre-calibration, same day) and after field use (post-use flow rate check, same day).

(2) Both pre-use and post-use flow rate checks must be done using an unused sample device (tube or filter) from the same lot number used for the actual air samples. Only one tube needs to be checked since all tubes in a given lot number are packed to provide a uniform pressure drop at the prescribed flow rate.

(3) Before pre-calibration adjustments, run a fully charged air sampling pump equipped with Nickel-Cadmium (NI-CAD) batteries for at least 10 minutes in order to achieve a normal stable flow rate. This is necessary because fully charged NI-CAD batteries have an initial high voltage peak and the 10 minute operating time allows the battery voltage to stabilize.

(4) After field use, determine the post-use flow rate before recharging the batteries. Record this reading.

b. **Flow Rate Pre-Calibration and Post-Use Check Reporting:**

(1) If the difference between the pre-calibration flow rate and the post-use check is equal to or less than 5%, report the average of the pre-calibration reading and the post-use check.

(2) If the difference between the flow rate is greater than 5%, use the lower flow rate (either pre-use or post-use). By using the lower flow rate, the concentration of the analyte(s) reported by the laboratory will ensure an over estimation of the airborne concentration in the sampling environment.

2-8. FIELD BLANKS.

a. Field blanks are quality control samples used in the sampling process which are required for each set of samples and every type of IH collection media.

(1) As stated in the NIOSH Manual of Analytical Methods, 4th Edition (Reference 3), field blanks measure signal contribution from the collection media itself and any contamination that can occur during shipping, handling, and storage.

(2) Field blanks must always be from the same lot number as the sample tubes, filters, or monitors used for sampling. If more than one lot number is used for sampling, then blanks from each lot number are required.

b. A minimum of one field blank must be submitted for every 10 samples from the same sampling series, or any fraction thereof, even if there is only one sample in the set. All test procedures require an absolute minimum of one field blank.

Note: A set is one or more samples that are collected and submitted for analysis at the same time for the same contaminant(s). A sample set is also referred to as a sample batch.

(1) Many analytes require a minimum of two or more blanks even if the number of samples in the set is less than ten.
(2) Always refer to the Special Instructions indicated for a specific analyte in the CHPPM IH Procedure Lists before collecting or submitting samples.

c. Field blanks are clean samplers taken to the sampling site that are handled in exactly the same manner as the air samples, except:

(1) They have no air is drawn through them
(2) They must be opened very quickly in the sampling area, and then resealed immediately

2-9. MEDIA BLANKS.

a. Media blanks are quality control samples which are simply new unopened samplers which are sent to the laboratory with the exposed samplers. When necessary, they are required in addition to field blanks.

(1) As stated in the NIOSH Manual of Analytical Methods, 4th Edition (Reference 9), media blanks measure the signal contribution from the collection media itself.
(2) They may be needed as a reference for some spectrophotometric analytical methods.
(3) They must always be from the same lot number as the sample tubes or monitors used for sampling. If more than one lot number is used for sampling, then blanks from each lot number are required.

b. ***Always refer to the Special Instructions indicated for a specific analyte in the CHPPM IH Procedure Lists before collecting or submitting samples to determine if media blanks are required.***

c. Media blanks are never opened by the IH or sample collector. They are opened by the laboratory performing the test procedure immediately before analysis.

2-10. ASBESTOS SAMPLING AND OPTIMAL FILTER LOADING FOR FIBER COUNT ANALYSIS BY PHASE CONTRAST MICROSCOPY.

a. **Optimize the Sample Flow Rate.**

OSHA regulations specify a sample flow rate of 0.5 to 2.5 liters per minute (LPM). However, in order to obtain optimal fiber loading in clean work areas, higher sample flow rates (up to 16 LPM) are sometimes necessary. The higher flow rate is required to achieve an appropriate fiber density for counting the fibers under the microscopy for the laboratory analysis. Refer to past sampling data, if available, to determine appropriate sample flow rates and sampling times.

b. **Optimize the Sample Loading.**

When a fiber density (E) between 100 to 1300 Fibers/mm^2 is achieved, then optimum sample loading has been accomplished. A fiber density in this range allows for more accurate counting of the asbestos fibers under the microscopy. Using past data expressed as a fiber count (C) in Fibers/cc, the optimum sample loading and/or the volume required to achieve it can be calculated using the following formula:

$$E = \frac{C * V * 1000}{Ac}$$

Where: E = Fiber density (f/mm^2)
C = Fiber concentration in f/cc (fiber count result from past data)
V = Volume sampled (L)
Ac = Collection area (A 25 mm filter has an effective collection area of 385 mm^2.)
* = Multiplication

For example: E = **102.3 f/mm^2**

When: C = 0.0511f/cc (fiber count result from past data)
V = 770.8 L
Ac = 385 mm^2
* = Multiplication

$$\textbf{102.3 f/mm}^2 = \frac{0.0511 * 770.9 * 1000}{385}$$

c. **Optimize the Sample Flow Rates and Time for Best Fiber Density.**

Sampling should be done at a sample flow rate greater than 0.5 LPM. The sampling time necessary to produce a fiber density of 100 to 1300 f/mm^2 can be calculated using the formula below. This range for fiber density allows for optimum accuracy when performing the fiber count. The OSHA PEL-Time Weighted Average (TWA) for asbestos is 0.1 f/cc as of the date of this publication. (Reference: 59 Federal Register (FR) 40964, 10 Aug 94; 60 FR 33973, 29 Jun 95.)

$$t = \frac{Ac * E}{Q * C * 1000}$$

Where:
- t = Sampling Time (Minutes)
- Ac = Collection Area (A 25 mm filter has an effective collection area of 385 mm^2.)
- E = Fiber density (f/mm^2)
- Q = Flow rate (LPM)
- C = Fiber concentration (f/cc)
- * = Multiplication

For example: t = **385.4 Minutes**

When:
- Ac = 385 mm^2
- E = 102.3 f/mm2)
- Q = 2 LPM
- C = 0.0511 f/cc
- * = Multiplication

385.4 Minutes = $\frac{385 * 102.3}{2 * 0.0511 * 1000}$

d. **Use High Sample Flow Rates and Short Sampling Times for Episodic Exposures.**

For episodic exposures, use high flow rates (7 - 16 LPM) over short periods of time to achieve appropriate filter loading.

e. **Optimize the Air Collection Volume.**

(1) Use High Air Collection Volumes for Very Clean Environments When Necessary:

(a) Usually air collection volumes between 400 and 2000 Liters are adequate to achieve a suitable sample detection limit which is above the PEL. However, if the sampling environment is very clean and the final air collection volume is too low, the fiber density obtained on the sample filter may not be adequate.

(i) This means the sample result will not be representative of the environmental conditions.

(ii) The sample result may appear to be reportable as less than the detection limit, but the calculated detection limit for the sample may be higher than the OSHA PEL-TWA which is 0.1 f/cc as of the date of this publication.

(iii) This situation occurs because the calculated detection limit for a sample is based on the air collection volume for that sample.

(b) For expected low fiber concentrations (significantly less than 0.1 f/cc), such as those found in very clean environmental conditions, high air collection volumes in the range of 3,000 - 10,000 L are often required to ensure a quantifiable fiber count on the filters and to achieve a detection limit which is lower than the OSHA PEL-TWA.

(c) When using high air collection volumes care must be taken not to overload the filter with ambient background dust which may bias the asbestos analysis and make it difficult to obtain accurate fiber counts.

Figure 2-1: EXAMPLES OF THE RELATIONSHIP BETWEEN THE SAMPLE VOLUME AND THE LOD

AIR COLLECTION VOLUME (L)	CALCULATED LOD as Fibers/cc	CALCULATED LOD as Fibers/mm²
16	0.1685	<7.0
100	0.0270	<7.0
300	0.0090	<7.0
1000	0.0027	<7.0
For a Graticule Area of 0.0080119 mm² and an effective Collection Area of 385 mm² for the 25 mm Filter.		

(2) Use Low Air Collection Volumes for Very Dirty Environments When Necessary:

When sampling in a very dirty environment it may be necessary to collect a sample volume that is lower than the recommended minimum of 400 Liters. When this is necessary, it is advisable to collect several control samples using air collection volumes in the recommended range in case environmental conditions are not as suspected.

2-11. FILTER SAMPLING.

a. Overview.

Filter sampling is used to evaluate potential airborne particulate hazards, such as dusts, fumes, mists, and aerosols. For filter sampling a pump is used to actively pull a known volume of air through a filter appropriate for the hazard. After the particulate matter has been deposited on the filter, the concentration (mass) of the analyte of interest can be determined by analytical methods which include microscopic counting, gravimetric analysis, or atomic absorption, atomic emission, or mass spectrophotometric techniques.

b. **Different Types of IH Filters.**

There are several types of filters used for airborne hazard sampling. The specific type of filter required for a specific analyte for each test is given in the CHPPM Laboratory Sciences IH Procedure Lists in Appendices B and C. A list of suggested sources for collection filters can be found in Appendix D.

c. **Metals, Dust, and Oil Mist Sampling.**

(1) Use the appropriate sampling rate to meet or exceed the minimum recommended volume for reliable analysis.
(2) Use care to prevent filter overloading when collecting air samples for metals during sanding and grinding operations because of the short-term generation of large volumes of particulate materials.

d. **Conversion of Sample Results from an Element to a Compound Containing That Element.**

In order to convert a sample result from an element to a compound containing that element, the following formula should be used:

$$RC = RR * \frac{MWC}{MWE}$$

Where:
RC = Result for Compound (mg/m^3)
RR = Reported Result for Element (mg/m^3)
MWC = Molecular Weight (MW) of Desired Compound
MWE = Molecular Weight of Reported Element
* = Multiplication

For Example: To convert a Sodium (Na) result of 100 mg/m^3 to a comparable result for Sodium Hydroxide (NaOH) in mg/m^3, the calculation would be:

$$\textbf{174 mg/m}^3\textbf{ of NaOH} = 100\ mg/m^3\ Na * \frac{40\ (MW\ of\ NaOH)}{23\ (MW\ of\ Na)}$$

Note: MW of Na is 23
MW of NaOH is Na (23) + O (16) + H (1)

e. **Simultaneous Sampling for Multiple Analytes.**

Some air contaminants may be collected and analyzed on the same filter; however, there may be problems with interference or filter overload that may affect the analyses. ***Always contact the USACHPPM Laboratory where the samples are going to be analyzed before collecting samples for multiple analytes.***

f. **Single Analyte Sampling.**

The Special Instructions in the USACHPPM CONUS IH Procedure List clearly indicate when single analyte filter sampling is required. Refer to the Procedure Lists in Appendix B or C for more information.

g. **Special Considerations for Trace Element Analysis by NIOSH Method 7300.**

(1) There is a *potential* for erroneous trace element quantification when air samples are analyzed by NIOSH Method 7300. This method determines trace elements by Inductively Coupled Plasma, Atomic Emission Spectroscopy (ICP-AES) using simultaneous (or scanning) elemental analysis that can determine up to 27 elements on one sample, if needed.

(a) The method is subject to spectral interferences which may cause a significant bias for a given sample or element.

(b) For example, if the spectral interferences are not known and the appropriate interelemental correction factors are not used during the analysis, the results reported for a given element could be biased and lead to reporting erroneous data. The biased data can indicate either over- or under-exposure.

(2) When submitting samples for trace element analysis to the laboratory, the IH should alert the laboratory about the potential for spectral interferences by adding a note in the "Comments to Laboratory" block (Item 38) on USACHPPM Form 9-R-E. This comment should inform the laboratory of any elements suspected of being present in the sample(s) that are in addition to the specific elements requested for analysis in Section B: Analysis Information. When submitting samples the IH should consider the following factors:

(a) Interfering elements may be deposited on sampling filter media even when they are not included on the list of requested analytes. For instance, when a sample is analyzed for arsenic, aluminum can cause a positive interference if it is present in the sample. If the laboratory is made aware of the potential interfering elements the spectral interferences can be eliminated by using the necessary interelemental correction factors.

(b) Interelemental correction factors are particularly important to use when analyzing for elements with very low airborne exposure limits (such as arsenic,

cadmium, lead, etc.) where biases can have a significant impact on reported results.

h. **Special Considerations for Chromic Acid and/or Hexavalent Chromium (Cr^{+6}) Analyses by OSHA Draft Method ID-215.**

(1) There is a *potential* for a high bias on results for Hexavalent Chromium when air samples are analyzed by OSHA Draft Method ID-215. This potential bias exists because of analytical limitations and the chemistry involved in the sample preparation for this analysis. A detailed discussion of this method can be found in the Reference 27 in Appendix A.

(2) When reviewing results from this method, it is important to remember that:

(a) The final sample results usually indicate a positive bias (or no bias), and because of this the reported results for Cr^{+6} may be higher than the true concentration in the sample.

(b) Unfortunately, the final sample results may lead to the false conclusion that there is an overexposure problem to Cr^{+6} when this may not be the case.

(3) Personnel at DLS-Main are working with OSHA to resolve these analytical limitations. As soon as acceptable resolutions have been authorized by OSHA, the changes will be incorporated into the DLS-Main procedure.

2-12. SOLID SORBENT TUBE SAMPLING.

a. **Overview.**

Many gases and vapors are collected using solid sorbent sample tubes which usually consist of a glass tube containing two sections of a solid absorbent material. When air is actively pulled through the tube, airborne gases and vapors are adsorbed by the first sorbent section, while the second section serves as a backup in case analyte breakthrough occurs. The first and second sections of the sorbent tube are analyzed separately in order to monitor breakthrough into the second section. Prior to laboratory analysis, the sorbent material is removed from the sampling tubes and the analytes of interest are extracted and analyzed.

b. **Different Types of Solid Sorbent Tubes.**

There are several types of solid sorbent tubes used for IH sample collection. The specific type of tube required for each test is listed in the USACHPPM IH Laboratory Procedure Lists in Appendices B and C. A list of suggested sources for solid sorbent tubes can be found in Appendix D.

c. **Simultaneous Sampling for Multiple Analytes.**

Several air contaminants may be collected and analyzed on the solid sorbent tube; however, there may be problems with interference or sample overload that may affect the analyses. ***Always contact the USACHPPM Laboratory where the samples are going to be analyzed before collecting samples for multiple analytes.***

d. **Single Analyte Sampling.**

The Special Instructions in the USACHPPM CONUS IH Procedure List clearly indicate when single analyte sampling is required. Refer to the Procedure Lists in Appendix B or C for more information.

e. **Capacity of Charcoal Tubes and Passive Monitors.**

(1) The absorptive capacity of charcoal tubes and passive monitors may be *reduced* by:

(a) High humidity (greater than 50 percent relative humidity) in combination with high ambient temperatures (greater than 85 Degrees Fahrenheit).
(b) Very high humidity (greater than 80 percent relative humidity) with normal ambient temperatures.

(2) To reduce the probability of breakthrough and sample loss, do not exceed one-half of the recommended maximum sample volume under the above conditions.

2-13. IMPINGER SAMPLING.

a. **Overview.**

(1) In this TG and in the USACHPPM Laboratory IH Procedure Lists, impinger sampling generally indicates the use of midget impingers fitted with fritted bubbler nozzles. *One exception is ozone*, which requires a standard nozzle with a 1 mm internal diameter opening.
(2) When this type of sampling is used, a known volume of air is bubbled through the impinger containing a liquid medium. The liquid chemically reacts with or physically dissolves the analyte of interest. The liquid in the impinger is then analyzed to determine airborne concentrations of the analyte of interest.

b. **Sample Transfer after Collection.**

Samples collected in glass fritted bubblers should be transferred to clean, glass-stoppered bottles with Teflon®-lined caps. *Rinse the glass fritted bubblers* with a small amount of unused absorption solution and *add the rinse to the sample.*

Note: Samples collected for ozone analysis should be transferred to stoppered bottles with Teflon septum caps *without* rinsing.

c. **Special Procedures for Sodium Hydroxide Absorbent.**

When sodium hydroxide is used as the absorbent, the ground-glass surfaces and fritted bubblers used for sampling should be thoroughly rinsed or purged with water after sampling. This prevents freezing or fusion of the ground-glass.

d. **Absorbing Solution Considerations.**

(1) Reagent grade chemicals and high quality deionized or distilled water must be used in preparation of absorbing solutions.
(2) One media blank must be submitted with each set of samples. The media blank is an aliquot, or separate portion, of the same absorbing solution that is used for the actual sampling event.

2-14. PASSIVE MONITORS.

a. **Overview.**

Some gases and vapors can be sampled without a monitoring pump using special passive monitors or badges. Several different types of collection media can be used in these badges, including solid adsorbents, liquid medium, chemically impregnated tape, and reagent-filled tubes. No matter what kind of media is used, the analyte of interest is collected in the badge by diffusion when the air sample comes into contact with the collection media.

b. **Organic Solvent Vapor Collection.**

(1) Passive monitors are not recommended for ceiling or short term exposure sampling.
(2) Passive monitors should ***not*** be used for collecting unknown organic vapors.

c. **Simultaneous Sampling for Multiple Analytes.**

Mixtures of several solvents may be collected and analyzed by the same procedure if the same type of passive monitor and a similar sampling time are used. However, there may be problems with interference or sample overload that may affect the analyses. ***Always contact the USACHPPM Laboratory where the samples are going to be analyzed before collecting samples for multiple analytes.***

d. **Single Analyte Sampling.**

The Special Instructions in the USACHPPM CONUS IH Procedure List clearly indicate when single analyte sampling is required. Refer to the Procedure Lists in Appendix B or C for more information.

e. **Ethylene Oxide (ETO) Sample Collection.**

Passive monitors for organic solvent vapors shall not be used for ETO.

2-15. BULK SAMPLING.

a. **Organic Solvent/Metals Simultaneous Analyses.**

When requesting an analysis for organic solvents and metals in the same sample (such as a paint), submit two portions; one for solvents and one for metals.

b. **Bulk "Unknown" Composition and Identification.**

The composition of bulk "unknowns" can often be identified from the information in the Material Safety Data Sheets (MSDS). Submit the MSDS with the bulk sample whenever possible.

(1) Databases for MSDS information may be accessed on the Internet through the DLS HomePage at the address given in Section 2-1.
(2) If the National Stock Number (NSN) of the bulk sample is known, similar information on product composition may be available in the Military Item Disposal Instruction (MIDI).
(3) For information on "unknowns" not found in the in MSDS databases, or the MIDI, it may be necessary to obtain the MSDS for the product from the manufacturer. If, after review of the MSDS, sample analysis is still required, include the MSDS when the samples are submitted for analysis.

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CHAPTER 3
FACTORS TO CONSIDER BEFORE COLLECTING SAMPLES

3-1. OVERVIEW.

Several factors necessary for successful laboratory analyses should be considered ***before samples are collected.*** These factors include:

a. The most appropriate analytes for the project
b. Special sampling or collection requirements
c. Special instructions, handling, or shipping requirements
d. Sample priority designations
e. Safety considerations
f. Sample or site history

3-2. INFORMATION ABOUT THE USACHPPM LABORATORY IH PROCEDURE LISTS.

a. The USACHPPM Laboratory IH Procedure Lists offer IH customers a correct, current, and centralized source of the information they need to know for proper sampling for the analytes tested at USACHPPM Laboratories.

b. The USACHPPM Laboratories continually update the analyses available to IH customers. ***If the test methodology desired for a project is not on the USACHPPM Laboratory Procedure Lists, please contact the IH Consultant at DLS-Main or the Customer Support Services Division at the appropriate laboratory for updated information on test methodologies available.*** Some tests are not performed routinely, but are available upon special request.

c. USACHPPM IH Procedure Lists:

(1) The CONUS Procedure List is Appendix B, Section 2 of this TG.
(2) The OCONUS Procedure List is Appendix C, Section 2 of this TG.
(3) Both lists are available in electronic formats on the Internet on the CHPPM DLS-Main Laboratory HomePage at the web address given in Chapter 2, Section 2-1. A special section indicates new tests and updates.

d. The USACHPPM Laboratory Procedure Lists do ***not*** contain information concerning airborne exposure limits:

(1) Pertinent references, such as the American Conference of Governmental Industrial Hygienists (ACGIH) publication on Threshold Limit Values and Biological Exposure Indices should be consulted for this information. (See Reference 21.)
(2) Army Regulation 40-5, *Preventive Medicine*, Paragraph 5-3c, (Reference 1) describes the relevant Army occupational health standards.

(a) In industrial Department of the Army (DA) military or civilian workplaces the more stringent of the ACGIH TLV, OSHA PEL, DOD, or DA exposure limit must be applied.

(b) Other airborne exposure limits may be applicable to soldiers during training/combat scenarios during use of military-unique tactical equipment, munitions, and weaponry. Consult USACHPPM, Program 55, Industrial Hygiene Field Services Program, concerning these types of situations.

e. The USACHPPM CONUS Procedure List :

(1) Gives the:

(a) **Analyte Name**
The name of the chemical as it appears in the Reference Method.

(b) **Chemical Abstracts Service (CAS) Number**
A number assigned by CAS which offers a concise, unique means of material identification which identifies specific chemicals except when followed by an asterisk (*) which signifies a compound (often naturally occurring) of variable composition.

(c) **DLS Test Code**
See Section 3-3 for more information concerning the DLS Test Code and its importance.

(d) **Reference Method**
The analytical methodology used for sample analysis. Information from the Reference Method serves as the basis for the other parameters in the Procedure List. (See Chapter 2 for more information.)

(e) **Statistical Parameters**
Statistical information from the Reference Method, when available. For NIOSH Methods the parameters listed will include Bias (B) expressed as a percent (%), Overall Precision (sr), and Accuracy (A), expressed as a plus/minus percentage (+/-%). For OSHA and other Reference Methods, parameters such as Standard Error of Estimate and Precision will be given if available in the method.

(f) **Collection Media**
The type of collection media required and detailed information concerning the specific requirements for the listed analyte.

(g) **Sample Flow Rate**
The recommended range (Minimum-Maximum) in liters of air per minute (LPM) which can be used in collection of the sample. After the sample flow rate has been selected, the appropriate sampling time should be determined by dividing the recommended collection volume by the sampling rate. See Chapter 2 for a detailed discussion concerning air and bulk material sample collection.

(h) **Air Collection Volume**
The recommended range (Minimum-Maximum) for the total volume of air in liters (L) to be collected during the sampling process. See Chapter 2 for a detailed discussion concerning air sample collection.

(i) **Special Instructions**
Any comments or special requirements necessary when collecting, handling or shipping samples that are to be tested for the selected analyte.

3-3. THE IMPORTANCE OF THE DLS TEST CODE.

a. ***What is the DLS Test Code?*** The DLS Test Code is a unique three- or four- digit number assigned by the DLS-Main to each laboratory procedure used by the Laboratories. This code applies only to those procedures performed at USACHPPM CONUS Laboratories. It is indicated as the second item on the USACHPPM CONUS IH Procedure List.

b. ***Why should the DLS Test Code be used?*** The DLS Test Code is the simplest and most accurate means of referencing and identifying a specific analyte test method. Occasionally there are different methods available for the same analyte, or different tests for different forms of a given compound or analyte may exist. The DLS Test Code offers a unique means of differentiating between these test methods or the compound form, and clearly indicates to the personnel at the USACHPPM Laboratories exactly what the customer wants and needs. The DLS Test Code is often the only unique identifying feature for each analyte listed.

c. ***When should the DLS Test Code be selected and used?***

(1) The DLS Test Code should be selected by the customer at the same time the analyte to be tested is determined. The DLS-Main Laboratory IH Technical Consultant can assist customers in making their selection.

(2) The DLS Test Code should be used as a point of reference for customers and DLS-Main Laboratory in the communication and correspondence process associated with each project. Consistent use of a specific DLS Test Code eliminates the possibility of miscommunications as to which test method is actually needed by the customer.

3-4. SAMPLE ANALYSIS PRIORITY DESIGNATIONS.

Sample analysis priorities are critical in determining the turnaround times (TATs) and the cost for each analysis. Samples are assigned processing priority based on three DLS sample analysis priorities: Standard, High-priority, and Top-priority. Table 3-1 summarizes the guidelines for DLS sample analysis priorities. Unless otherwise specified, all samples are assigned standard priority. ***High-priority and top-priority requests must be coordinated in advance with the Laboratory that is going to perform the analyses.***

TABLE 3-1. GUIDELINES FOR DLS-MAIN SAMPLE ANALYSIS PRIORITIES

	STANDARD	HIGH-PRIORITY	TOP-PRIORITY
BASIC SELECTION CRITERIA	Routine Analytical Response is Involved	Rapid Analytical Response is Desired	Fastest Analytical Response Possible is Needed
COSTS	DLS Published Fee	1.5 Times the Published Fee	2.0 Times the Published Fee
TURNAROUND TIME (TAT)	Dependent on Project Requirements	75%-25% Less Than Standard TAT	5 Calendar Days or Less
	(1) The TAT for each analysis should be determined as part of the project requirements and by mutual agreement with USACHPPM Laboratory performing the analyses. (2) The specific TAT for each sample is analysis and project dependent. (3) TATs are affected by the number of samples involved for each analysis.		

3-5. SAMPLE SAFETY CONSIDERATIONS.

a. ***USACHPPM Laboratory personnel must be informed about samples that are known or suspected of containing hazardous materials, either chemical or biological. The laboratory must be informed before the samples are being submitted.***

(1) Appropriate precautionary measures must be taken to protect everyone who will have any contact with these kinds of samples.

(2) Information concerning hazards, or possible hazards, must be part of the communication process with DLS and clearly indicated on all the paperwork (USACHPPM Forms 8-R-E or 9-R-E) and on the samples.

b. Databases for MSDS information may be accessed on the Internet through the DLS HomePage at the address given in Chapter 2, Section 2-1.

3-6. ADDITIONAL SAMPLE OR PROJECT CONSIDERATIONS.

a. **Sample or Site Histories.** Improved customer service and sample TAT is possible if the following sample or site information is provided:

(1) Known or suspected high concentrations of the analyte of interest.

(2) Known or suspected interfering substances that may impede the analysis of the sample.

b. **Special Instructions, Handling or Shipping Requirements.**

(1) These requirements are indicated on the CHPPM CONUS and OCONUS Laboratory IH Procedure List.

(2) The DLS-Main IH Technical Consultant can be contacted for clarification and advice with respect to these requirements.

CHAPTER 4
COMPLETING REQUIRED USACHPPM SHIPPING FORMS

4-1. OVERVIEW.

a. **Required USACHPPM Shipping Forms.**

One of the following forms must accompany IH samples when they are submitted to the laboratory:

(1) USACHPPM FORM 8-R-E, *Industrial Hygiene Bulk Sample Data,* **or**
(2) USACHPPM FORM 9-R-E, *Industrial Hygiene Air Sample Data.*

b. **Advance Notice of Incoming Samples to DLS-Main.**

(1) Advance notification of incoming samples to DLS-Main is requested. IH Customers and other USACHPPM Laboratories should submit a ***duplicate*** copy of the completed Form 8-R-E or 9-R-E as soon as possible when samples are being sent to the DLS-Main Laboratory. ***The original form must be sent with the sample shipment.*** The completed advance notification form can be submitted either:

(a) Electronically using the "sampnews" bulletin boards. See Appendix B, Section 1, for information about and the addresses for "sampnews."
(b) Faxing or mailing a hard copy. See Appendix B, Section 1, for the mailing address and the fax number.

(2) See Chapter 5, Section 5-2 for additional information.

c. **Form Revisions and Future Electronic Data Transfer Requirements.**

(1) Work is underway to develop a two-way interface (i.e., electronic data transfer utility) between the Defense Occupational Health Readiness System/Occupational Health Management Information System (DOHRS/OHMIS) and the USACHPPM Laboratory Information Management System (LIMS).
(2) In order to accommodate this interface more easily in the future, both USACHPPM Form 8-R-E, *Industrial Hygiene Bulk Sample Data*, and USACHPPM Form 9-R-E, *Industrial Hygiene Air Sample Data*, have been revised to accommodate the DOHRS/OHMIS Health Hazard Information Module (HHIM) functional data field requirements, and to facilitate the generation of both hardcopy forms and electronic forms.
(3) The HHIM database fields are limited to a specific number of characters:

(a) The hardcopy and the wordprocessing formats of the USACHPPM forms indicate the maximum number of characters allowed in each DOHRS/OHMIS HHIM data field.

(b) ***Important: Before one of the currently available electronic forms is going to be filled out in a wordprocessing program, it is necessary to change the keyboard function over to "Typeover" by pressing the "Insert" key before typing in the characters. By using "Typeover" the lines are replaced with the alpha/numeric character being typed in its place.***

(c) The forms available in a Delrina FormsFlow format automatically limit the number of characters allowed in each HHIM required data field.

(4) Refer to the DOHRS/OHMIS HHIM User's Guide for detailed instructions on transferring data between the DOHRS/OHMIS and the USACHPPM LIMS.

d. Availability of USACHPPM Forms 8-R-E and 9-R-E.

(1) Both forms are available electronically on the DLS-Main and/or the USACHPPM HomePage at the address given in Chapter 2, Section 2-1 in:

(a) WordPerfect and Microsoft Word formats. Copies of the files on disc are also available upon request.

(b) A Delrina FormsFlow format.

(2) Appendix E includes blank hard copies of both forms. Reproducing these forms is permitted and encouraged.

4-2. INSTRUCTIONS FOR COMPLETING USACHPPM FORM 8-R-E, *INDUSTRIAL HYGIENE BULK SAMPLE DATA.*

Figure 4-1 is an example of a blank hardcopy of USACHPPM Form 8-R-E. Step-by-step instructions for completing this form are given below.

a. **Section A: General Information.**

Item 1 – ***Is This A Duplicate Copy for Advanced Notice of Incoming Sample?:*** Enter "Y" for Yes or "N" for No to indicate whether this is a duplicate copy of the form. ***The original copy of the form must be submitted with the samples.*** See Chapter 5, Section 5-2, for additional details concerning advance notice of incoming samples.

Item 2 – ***Is a MSDS Enclosed for Safety Information for Laboratory Personnel?*** Indicate Yes or No.

Item 3 – ***Project Number:*** Enter the project number assigned to the project. This item is limited to 15 characters.

Item 4 – ***IH Resource POC ID #:*** Enter the ID number of the IH Resource who is in charge of the sampling project. This item is limited to 20 characters.

Item 5 – ***Primary Resource?:*** Enter "Y" for Yes or "N" for No to indicate the status that specifies the primary resource for the survey. This item is limited to 1 character.

Item 6 – ***LAST Name*** *(of the IH Resource):* Self explanatory. This item is limited to 20 characters.

Item 7 – ***FIRST Name*** *(of the IH Resource*): Self explanatory. This item is limited to 20 characters.

Item 8 – ***Phone Number*** *(of the IH Resource*): Enter the commercial phone number where the IH resource can be contacted. This item is limited to 20 characters.

Item 9 – ***DSN:*** Enter the DSN phone number where the IH Resource can be contacted.

Item 10 – ***Street*** *(Address of the IH Resource):* Self explanatory. This item is limited to 25 characters.

Item 11 – ***City*** *(of the IH Resource):* Self explanatory. This item is limited to 25 characters.

Item 12 – ***State*** *(of the IH Resource):* Self explanatory. This item is limited to 2 characters.

Item 13 – ***Zip Code + 4*** *(of the IH Resource):* Self explanatory. This item is limited to 10 characters.

Item 14 – ***Country*** *(of the IH Resource):* Self explanatory. This item is limited to 20 characters.

Item 15 – ***Name of Sampled Installation:*** Self explanatory. This item is limited to 50 characters. Note: See SECTION E: LOCATION AND OPERATION INFORMATION for more codes and information.

Item 16 – ***ARLOC:*** Enter the Army Location Code (ARLOC) that uniquely identifies the installation. This item is limited to 10 characters. Refer to the DOHRS/OHMIS HHIM User's Guide for additional information.

Item 17 – ***Associated Complaints/Investigative/HHIM:*** List worker complaints about exposure problems arising from the operation (e.g., dizziness, nausea, skin irritation, etc.). Be Specific/State "NONE" if applicable.

Item 18 – ***Sample Collector ID #:*** Enter the ID number of the person who collected the sample(s). This item is limited to 20 characters.

Item 19 – ***LAST Name*** *(of the Collector):* Self explanatory. This item is limited to 20 characters.

Item 20 – ***FIRST Name*** *(of the Collector*): Self explanatory. This item is limited to 20 characters.

Item 21 – ***Associated Air Samples:*** Enter "Y" for Yes or "N" for No to indicate whether air samples related to the bulk samples are being submitted for this project.

Item 22 – ***Air Sample Field ID Numbers, If Applicable:*** List the Field Sample ID Numbers which identify these air samples, when applicable. Field Sample ID Numbers are limited to 15 characters. ***Note: Air samples must be shipped in a separate container from bulk samples.***

Item 23 – ***Date Collected:*** Self explanatory. Use an eight-character date field with a four-digit year (mmddyyyy).

Item 24 – ***Date Shipped:*** Self explanatory. Use an eight-character date field with a four-digit year (mmddyyyy).

b. **Section B: Sample Analysis Information.**

Item 25 – Analysis or Analyses Desired: Heading only, no information required.

(1) *Item 25a – Analysis #1-Hazard Name:* Indicate the full name or description of the analysis desired when it is known or suspected to be present. Otherwise, indicate the general type of analysis desired (e.g., unknown solvents, etc.). Consult the DLS IH Technical Consultant if guidance is needed. Refer to the CHPPM CONUS and OCONUS IH Procedure Lists in Appendices B and C of this TG. This item is limited to 38 characters.

(2) *Item 25b – DLS Test Code:* Indicate the number given in the CHPPM CONUS Procedure List in Appendices B of this TG. See Chapter 3, Section 3-3, for additional information concerning the DLS Test Code.

(3) *Item 25c – CAS #:* Indicate the CAS Number assigned to the hazard name. CAS Numbers are given in the CHPPM CONUS and OCONUS IH Procedure Lists in Appendices B and C of this TG. This item is limited to 10 characters. Note: If the Analyte indicates the CAS# is "various", leave the space for CAS# blank.

Item 26 a, b, and c: – Analysis or Analyses Desired #2: Self explanatory.
Item 27 a, b, and c: – Analysis or Analyses Desired #3: Self explanatory.
Item 28 a, b, and c: – Analysis or Analyses Desired #4: Self explanatory.
Item 29 a, b, and c: – Analysis or Analyses Desired #5: Self explanatory.

c. **Section C: Sample Information.**
Note: All Samples Will Be Analyzed For All The Tests Indicated In Section B.

Item 30 – Field Sample ID Number: Indicate the unique Field Sample Identification (ID) Number given to each sample. This number is assigned locally, at the time of collection, by the Industrial Hygiene resource or the sample collector.

(1) A consecutive numbering system should be used to avoid duplication of numbers from batch to batch of samples.
(2) A maximum of 15 alpha/numeric characters is allowed in the DOHRS/OHMIS HHIM Database.
(3) Number all samples and clearly indicate which samples are field blanks, media blanks, and duplicates.
(4) See Table 5-1 for the information required on each sample label.

Item 31 – Laboratory Number: Leave blank. This item will be completed by the laboratory.
Item 32 – Remarks: Indicate any special comments or instructions concerning the specific sample.
Item 33 – Comments to Laboratory: Give any comments or information relating to the sample(s) which may be helpful to the laboratory.

d. **Section D: Label Information.**

Item 34 – Trade Name: Enter the Trade Name of the Bulk Material; if unknown, so indicate. This item is limited to 30 characters.
Item 35 – NSN: Enter the National Stock Number (NSN), if available. This item is limited to 15 characters.

Item 36 – ***MSDS Attached:*** Enter "Y" for Yes or "N" for No to indicate whether an MSDS has been included with the shipment. This item is limited to 1 character.

Item 37 – ***Manufacturer:*** Enter the name of the Manufacturer; if unknown, so indicate. This item is limited to 25 characters.

Item 38 – ***Street (Address of the Manufacturer):*** Self explanatory; if unknown, so indicate. This item is limited to 25 characters.

Item 39 – ***City (of the Manufacturer):*** Self explanatory; if unknown, so indicate. This item is limited to 25 characters.

Item 40 – ***State (of the Manufacturer):*** Self explanatory; if unknown, so indicate. This item is limited to 2 characters.

Item 41 – ***Zip Code + 4 (of the Manufacturer):*** Self explanatory; if unknown, so indicate. This item is limited to 10 characters.

Item 42 – ***Country (of the Manufacturer):*** Self explanatory; if unknown, so indicate.. This item is limited to 20 characters.

e. **Section E: Location and Operation Information.**

Item 43 – ***Building/Area:*** Enter the name of the Building/Area where the samples were collected. This item is limited to 20 characters.

Item 44 – ***Location Name:*** Enter the name/description of the location where the samples were collected. This item is limited to 50 characters.

Item 45 – ***Operation Name:*** Enter the name/description of the operation involved where the samples were collected. This item is limited to 50 characters.

Item 46 – ***Operation Employee(s) Perform:*** Briefly describe the industrial operation (e.g., degreasing metal parts, spray painting, vehicles, etc.) performed by the employees involved in the sampling event.

Item 47 – ***# of Persons Exposed:*** Self explanatory. This item is limited to 3 characters.

Item 48 – ***Exposure Duration and Frequency.***

(1) ***Item 48a – Minutes.*** This is limited to 4 characters.
(2) ***Item 48b – Time(s) per Day.*** This is limited to 4 characters.
(3) ***Item 48c – Total Minutes/Day.*** This is limited to 4 characters.
(4) ***Item 48d – Days/Week.*** This is limited to 1 character.
(5) ***Item 48e – Days/Month.*** This is limited to 2 characters.
(6) ***Item 48f – Months/Year.*** This is limited to 2 characters.

Item 49 – ***Source of Contaminant:*** Self explanatory.

f. **Section F: Field Notes/Additional Comments.**

Item 50 – ***HHIM Submitted?:*** Enter "Y" for Yes or "N" for No to indicate whether the HHIM has been submitted.

Item 51– ***Field Notes/Comments:*** The remainder of the block is available for Field Notes or Additional Comments.

re 4-1: Example of USACHPPM Form 8-R-E

DUSTRIAL HYGIENE BULK SAMPLE DATA
SACHPPM FORM 8-R-E

FOR DLS USE ONLY
LIMS Job #: _____
Date Received: _____
Processor's Initials: _____

IMPORTANT

ore the form is filled out electronically in a wordprocessing program, ANGE THE KEYBOARD FUNCTION OVER TO "TYPEOVER" BY ESSING THE "INSERT" KEY before typing in the characters which will lace the lines.

SECTION A: GENERAL INFORMATION

IS THIS A DUPLICATE COPY FOR ADVANCED NOTICE OF INCOMING SAMPLES? **Y (Yes) or N (No)**

Is a MSDS Enclosed for Safety Information for Laboratory Personnel? **Y (Yes) or N (No)**

PROJECT NUMBER (15 Characters Maximum): _____

IH Resource POC ID # (20 Characters): _____ *5. Primary Resource?:* **Y or N**

LAST Name (20 Characters Maximum): _____

FIRST Name (20 Characters Maximum): _____

Phone Number (20 Characters Maximum): _____ *9. DSN:* _____

Street (25 Characters Maximum): _____

City (25 Characters Maximum): _____

State (2 Characters Maximum): _____ *13. Zip Code + 4 (10 Characters Maximum):* _____

Country (20 Characters Maximum): _____

Name of Sampled Installation (50 Characters Maximum): _____

ARLOC (10 Characters Maximum): _____

SECTION E: LOCATION AND OPERATION INFORMATION for more codes and information)

Associated Complaints/Investigative/HHIM ***(Be Specific/State "NONE" if applicable)***

Sample Collector ID # (20 Characters Maximum): _____

LAST Name (20 Characters Maximum): _____

FIRST Name (20 Characters Maximum): _____

Associated Air Samples?: **Y (Yes) or N (No)**

Air Sample Field ID Numbers, If Applicable:

_____

_____

e: Air Samples Must Be Shipped in a Separate Container from Bulk Samples.

Date Collected (mmddyyyy): _____ *24. Date Shipped (mmddyyyy):* _____

e 1 of 4 CHPPM Form 8-R-E, 1 Nov 97 **Replaces AEHA Form 8-R, 1 Oct 84 which is obsolete.**

SECTION B: ANALYSIS INFORMATION

NOTE: 1) *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN THIS SECTION.
2) IF AN ANALYTE INDICATES THE CAS# IS "VARIOUS", LEAVE THE SPACE FOR CAS# BLANK.

25a. Analysis #1 Hazard Name: _____
25b. #1 DLS Test Code: _____ *25c. #1 CAS #:* _____
26a. Analysis #2 Hazard Name: _____
26b. #2 DLS Test Code: _____ *26c. #2 CAS #:* _____
27a. Analysis #3 Hazard Name: _____
27b. #3 DLS Test Code: _____ *27c. #3 CAS #:* _____
28a. Analysis #4 Hazard Name: _____
28b. #4 DLS Test Code: _____ *28c. #4 CAS #:* _____
29a. Analysis #5 Hazard Name: _____
29b. #5 DLS Test Code: _____ *29c. #5 CAS #:* _____

SECTION C: SAMPLE INFORMATION

NOTE: *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN SECTION B.

30. Field Sample ID Number *(15 Characters Maximum)*	*31. Laboratory Number* *(Leave Blank)* *(To Be Completed by the Laboratory)*	*32. Remarks*

33. COMMENTS TO LABORATORY

SAMPLE

SECTION D: LABEL INFORMATION

Trade Name (30 Characters Maximum): _____
NSN (15 Characters): _____ *36. MSDS Attached:* Y (Yes) or N (No)
Manufacturer (25 Characters Maximum): _____
Street Address (25 Characters Maximum): _____
City (25 Characters Maximum): _____
State (2 Characters): _____ *41. Zip Code + 4 (10 Characters Maximum)* _____
Country (20 Characters Maximum): _____

SECTION E: LOCATION AND OPERATION INFORMATION

Building/Area (20 Characters Maximum): _____
Location Name (50 Characters Maximum): _____
Operation Name (50 Characters Maximum): _____
Operation Employee(s) Perform

# of Persons Exposed (3 Characters Maximum): _____
Exposure Duration and Frequency
18a. Minutes (4 Char.) _____ *48b. Time(s) per Day (4 Char.)* _____ *48c. Total Minutes/Day (4 Char.)* _____
18d. Days/Week (1 Char.) ____ *48e. Days/Month (2 Char.)* _____ *48f. Months/Year (2 Char.)* _____

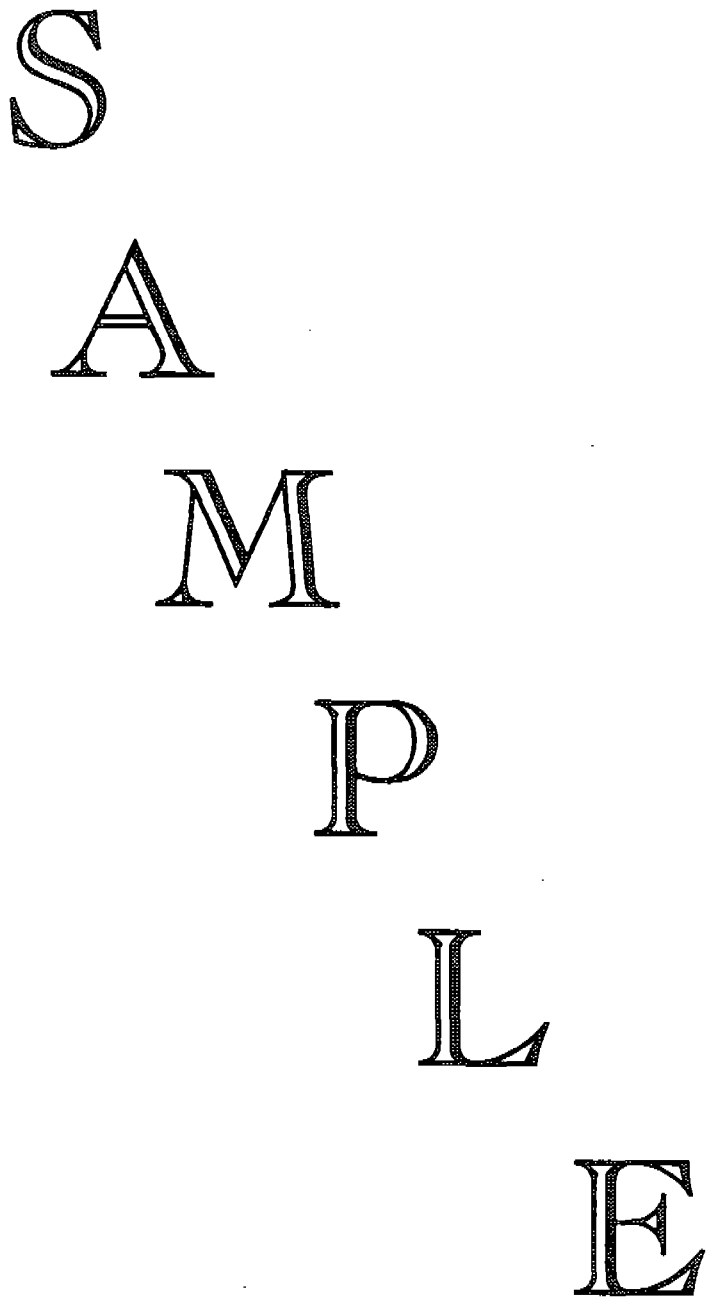
Source of Contaminant:

SAMPLE

SECTION F: FIELD NOTES/ADDITIONAL COMMENTS

50. HHIM Submitted ?: **Y (Yes) or N (No)**

51. Field Notes/Comments



4-3. INSTRUCTIONS FOR COMPLETING USACHPPM FORM 9-R-E, *INDUSTRIAL HYGIENE AIR SAMPLE DATA.*

Figure 4-2 is an example of USACHPPM Form 9-R-E. Step-by-step instructions for completing this form are given below.

a. Section A: General Information.

Item 1 – ***Is This a Duplicate Copy for Advanced Notice of Incoming Samples?:*** Enter "Y" for Yes or "N" for No to indicate whether this is a duplicate copy of the form. ***The original copy of the form must be submitted with the samples.*** See Chapter 5, Section 5-2, for additional details concerning advance notice of incoming samples.

Item 2 – ***Is a MSDS Enclosed for Safety Information for Laboratory Personnel?*** Indicate Yes or No.

Item 3 – ***Project Number:*** Enter the project number assigned to the project. This item is limited to 15 characters.

Item 4 – ***IH Resource POC ID #:*** Enter the ID number of the IH Resource who is in charge of the sampling project. This item is limited to 20 characters.

Item 5 – ***Primary Resource?:*** Enter "Y" for Yes or "N" for No to indicate the status that specifies the primary resource for the survey. This item is limited to 1 character.

Item 6 – ***LAST Name (of the IH Resource):*** Self explanatory. This item is limited to 20 characters.

Item 7 – ***FIRST Name (of the IH Resource):*** Self explanatory. This item is limited to 20 characters.

Item 8 – ***Phone Number (of the IH Resource):*** Enter the commercial phone number where the IH Resource can be contacted. This item is limited to 20 characters.

Item 9 – ***DSN:*** Enter the DSN phone number where the IH Resource can be contacted.

Item 10 – ***Street (of the IH Resource):*** Self explanatory. This item is limited to 25 characters.

Item 11 – ***City (of the IH Resource):*** Self explanatory. This item is limited to 25 characters.

Item 12 – ***State (of the IH Resource):*** Self explanatory. This item is limited to 2 characters.

Item 13 – ***Zip Code + 4 (of the IH Resource):*** Self explanatory. This item is limited to 10 characters.

Item 14 – ***Country (of the IH Resource):*** Self explanatory. This item is limited to 20 characters.

Item 15 – ***Name of Sampled Installation:*** Self explanatory. This item is limited to 50 characters. Note: See SECTION E: LOCATION/OPERATION INFORMATION for more codes and information.

Item 16 – ***ARLOC:*** Enter the Army Location Code (ARLOC) that uniquely identifies the installation. This item is limited to 10 characters. Refer to the DOHRS/OHMIS HHIM User's Guide for additional information.

Item 17 – ***Associated Complaints/Investigative/HHIM:*** List worker complaints about exposure problems arising from the operation (e.g., dizziness, nausea, skin irritation, etc.). Be Specific/State "NONE" if applicable.

Item 18 – ***Sample Collector ID #:*** Enter the ID number of the person who collected the sample(s). This item is limited to 20 characters.

Item 19 – ***LAST Name (of the Collector):*** Self explanatory. This item is limited to 20 characters.

Item 20 – ***FIRST Name (of the Collector):*** Self explanatory. This item is limited to 20 characters.

Item 21 – ***Associated Bulk Samples:*** Enter "Y" for Yes or "N" for No to indicate whether bulk samples related to the air samples are being submitted for this project.

Item 22 – ***Bulk Sample Field ID Numbers, If Applicable:*** List the sample numbers which identify these bulk samples, when applicable. ***Note: Bulk samples must be shipped in a separate container from air samples in order to avoid contamination of the air samples.***

Item 23 – ***Collection Method/Media:*** Indicate the kind of air sampling medium used to collect samples (i.e., charcoal tube, 0.8 mm CE filter, etc.). This item is limited to 25 characters.

Item 24 – ***Date Collected:*** Self explanatory. Use an eight-character date field with a four-digit year (mmddyyyy).

Item 25 – ***Date Shipped:*** Self explanatory. Use an eight-character date field with a four-digit year (mmddyyyy).

b. Section B: Sample Analysis Information.

Item 26 – ***Analysis or Analyses Desired:*** Heading only, no information required.

(1) *Item 26a –* ***Analysis #1-Hazard Name:*** Indicate the full name or description of the analysis desired when it is known or suspected to be present. Otherwise, indicate the general type of analysis desired (e.g., unknown solvents, etc.). This item is limited to 38 characters. Consult the DLS IH Technical Consultant if guidance is needed. Refer to the CHPPM CONUS and OCONUS IH Procedure Lists in Appendices B and C of this TG.

(2) *Item 26b –* ***DLS Test Code:*** Indicate the number given in the CHPPM CONUS IH Procedure List in Appendices B of this TG. See Chapter 3, Section 3-3, for additional information concerning the DLS Test Code.

(3) *Item 26c –* ***CAS #:*** Indicate CAS Number assigned to the hazard name. This item is limited to 10 characters. CAS Numbers are given in the CHPPM CONUS and OCONUS IH Procedure Lists in Appendices B and C of this TG. Note: If an Analyte indicates the CAS# is "various", leave the space for the CAS# blank.

Item 27 a, b, and c: – Analysis or Analyses Desired #2: Self explanatory.
Item 28 a, b, and c: – Analysis or Analyses Desired #3: Self explanatory.
Item 29 a, b, and c: – Analysis or Analyses Desired #4: Self explanatory.
Item 30 a, b, and c: – Analysis or Analyses Desired #5: Self explanatory.

c. **Section C: Collection and Sampling Data.**

Item 31 – ***Field Sample ID Number:*** Indicate the unique Field Identification (ID) Number given to each sample. This number is assigned locally, at the time of collection, by the industrial hygiene resource or the sample collector.

(1) A consecutive numbering system should be used to avoid duplication of numbers from batch to batch of samples.
(2) A maximum of 15 characters is allowed in the DOHRS/OHMIS/HHIM Database.
(3) Number all samples and clearly indicate field blank, media blank, and duplicate samples.
(4) See Table 5-1 for the information required on each sample label.

Item 32 – ***Pump Serial #:*** Indicate the serial number of the sampling pump used to collect the sample. This item is limited to 10 characters.

(1) ***Item 32a – Time On:*** Fill in the start time of the pump (example: 1430).
(2) ***Item 32b – Time Off:*** Fill in the stop time of the pump (example: 1615).
(3) ***Item 32c – Total Time (Minutes):*** Indicate the Total Sampling Time in minutes (example: 105).

Item 33 – ***Flow Rate (LPM):*** Indicate the amount of air pulled through the pump per unit of time, expressed as liters per minute (LPM). See Chapter 2, Section 2-10f, *Sampling Pump Flow Rate Calibration and Reporting*, for a detailed discussion on how to calibrate and report flow rates.

Item 34 – ***Total Volume (in L): Use the Formula "Flow Rate x Total Time":*** Report the total air collection volume. When sampling for vapors and gases is done under conditions which are significantly different than STP conditions (i.e., 25 °C and 760 mm of Hg), correct the total collection volume as indicated in *Chapter 2, Section d, Departures from Recommended Sample Flow Rates and Air Collection Volumes.*

Item 35 – ***GA/BZ/S:*** Enter "GA" if a general area sample; "BZ" if a breathing zone/personal sample, and "S" if a source sample (i.e., a GA sample that is very close to the source of contaminant generation).

Item 36 – ***Employee ID:*** Enter the Identification Number (ID), such as the Social Security Number, of the worker that the sampling pump was attached to for Breathing Zone samples only. This item is limited to 20 characters.
Note: Name and Social Security Number are considered to be Privacy Act Information and should be protected.

Item 37 – ***Laboratory #:*** Leave Blank. To be assigned by the Laboratory.

Item 38 – ***Comments to Laboratory:*** Give any comments or information relating to the sample(s) which may be helpful to the laboratory.

d. **Section D: Calibration Information.**

Item 39 – ***Pump Calibrator ID #:*** Enter the ID number of the person who calibrated the sampling pump(s). This item is limited to 20 characters.

Item 40 – ***LAST Name (of the Calibrator):*** Self explanatory. This item is limited to 20 characters.

Item 41 – ***FIRST Name (of the Calibrator)*****:** Self explanatory. This item is limited to 20 characters.

Item 42 – ***Pump Serial #:*** Self explanatory. This item is limited to 10 characters.

Item 43 – ***Flow Rate Calibration Information*****:** Heading only, no information required. (Note: For additional information about Sampling Pump Flow Rate Calibration and Reporting, see ***Chapter 2, Section 2-10.f.)***

(1) *Item 43a –* ***Pre-Cal Result*****:** Self explanatory. Enter the value of the pre-calibration flow rate.

(2) *Item 43b –* ***Pre-Cal Date:*** Self explanatory. Use an eight-character date field with a four-digit year (mmddyyyy).

(3) *Item 43c -* ***Post-Use Result:*** Self explanatory. Enter the value of the post-use flow rate check.

(4) *Item 43d –* ***Post-Use Date:*** Self explanatory. Use an eight-character date field with a four-digit year (mmddyyyy).

Item 44 – ***Unit Code:*** Use Liters per Minute (LPM) for all air samples. This item is limited to 3 characters.

Item 45 – ***Calibration Setting:*** Enter the method used for calibration (e.g., electronic air flow calibrator, manual buret bubble meter). This item is limited to 30 characters.

e. **Section E: Location and Operation Information.**

Item 46 – ***Building/Area:*** Enter the name of the Building/Area where the samples were collected. This item is limited to 20 characters.

Item 47 – ***Location Name:*** Enter the name/description of the location where the samples were collected. This item is limited to 50 characters.

Item 48 – ***Operation Name:*** Enter the name/description of the operation where the samples were collected. This item is limited to 50 characters.

Item 49 – ***Operation Employee(s) Perform:*** Briefly describe the industrial operation (e.g., degreasing metal parts, spray painting, vehicles, etc.) performed by the employees involved in the sampling event.

Item 50 – ***# of Persons Exposed:*** Self explanatory. This item is limited to 3 characters.

Item 51 – ***Exposure Duration and Frequency.***

(1) *Item 51a –* ***Minutes.*** Limited to 4 characters.

(2) *Item 51b –* ***Time(s) per Day***. Limited to 4 characters.

(3) *Item 51c –* ***Total Minutes/Day***. Limited to 4 characters.

(4) *Item 51d –* ***Days/Week***. Limited to 1 character.

(5) *Item 51e –* ***Days/Month***. Limited to 2 characters.

(6) *Item 51f –* ***Months/Year***. Limited to 2 characters.

Item 52 – ***Source of Contaminant:*** Self explanatory.

f. **Section F: Field Notes/Additional Comments.**

Item 53 – ***HHIM Submitted?:*** Enter "Y" for Yes or "N" for No to indicate whether the HHIM has been submitted.

Item 54 – ***Field Notes/Comments:*** Remainder of block is available for Field Notes or Additional Comments.

Figure 4.2: Example of USACHPPM Form 9-R-E

INDUSTRIAL HYGIENE AIR SAMPLE DATA
USACHPPM FORM 9-R-E

FOR DLS USE ONLY
LIMS Job #: _____
Date Received: _____
Processor's Initials: _____

IMPORTANT

Before the form is filled out electronically in a wordprocessing program, CHANGE THE KEYBOARD FUNCTION OVER TO "TYPEOVER" BY PRESSING THE "INSERT" KEY before typing in the characters which will replace the lines.

S

SECTION A: GENERAL INFORMATION

A

1. *IS THIS A DUPLICATE COPY FOR ADVANCED NOTICE OF INCOMING SAMPLES?* Y (Yes) or N (No)
2. *Is a MSDS Enclosed for Safety Information for Laboratory Personnel?* Y (Yes) or N (No)
3. *PROJECT NUMBER (15 Characters Maximum):* _____
4. *IH Resource POC ID # (20 Characters):* _____ *5. Primary Resource?:* Y or N
6. *LAST Name (20 Characters Maximum):* _____
7. *FIRST Name (20 Characters Maximum):* _____
8. *Phone Number (20 Characters Maximum):* _____ *9. DSN:* _____
10. *Street (25 Characters Maximum):* _____
11. *City (25 Characters Maximum):* _____
12. *State (2 Characters Maximum):* _____ *13. Zip Code + 4 (10 Characters Maximum):* _____
14. *Country (20 Characters Maximum):* _____

M

15. *Name of Sampled Installation (50 Characters Maximum):* _____
16. *ARLOC (10 Characters Maximum):* _____

(See SECTION E: LOCATION AND OPERATION INFORMATION for more codes and information)

P

17. *Associated Complaints/Investigative/HHIM* (Be Specific/State "NONE" if applicable)

L

18. *Sample Collector ID # (20 Characters Maximum):* _____
19. *LAST Name (20 Characters Maximum):* _____
20. *FIRST Name (20 Characters Maximum):* _____

E

21. *Associated Bulk Samples?:* Y (Yes) or N (No)
22. *Bulk Sample Field ID Numbers, If Applicable:* _____

Note: Bulk Samples Must Be Shipped in a Separate Container from Air Samples.

23. *Collection Method/Media (25 Characters Maximum):* _____

24. *Date Collected (mmddyyyy):* _____ 25. *Date Shipped (mmddyyyy):* _____

Page 1 of 4 CHPPM Form 9-R-E, 1 Nov 97 **Replaces AEHA Form 9-R, 1 Oct 84 which is obsolete.**

SECTION B: ANALYSIS INFORMATION

)TE: 1) *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN THIS SECTION.
2) IF AN ANALYTE INDICATES THE CAS# IS "VARIOUS", LEAVE THE SPACE FOR CAS# BLANK.

a. Analysis #1 Hazard Name: _____
26b. #1 DLS Test Code: _____ *26c. #1 CAS Number:* _____
a. Analysis #2 Hazard Name: _____
27b. #2 DLS Test Code: _____ *27c. #2 CAS Number:* _____
a. Analysis #3 Hazard Name: _____
28b. #3 DLS Test Code: _____ *28c. #3 CAS Number:* _____
a. Analysis #4 Hazard Name: _____
29b. #4 DLS Test Code: _____ *29c. #4 CAS Number:* _____
a. Analysis #5 Hazard Name: _____
30b. #5 DLS Test Code: _____ *30c. #5 CAS Number:* _____

SECTION C: SAMPLE INFORMATION

NOTE: *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN SECTION B.

Field Sample ID # (15 Char. Max)						
Pump Serial # (10 Char. Max)						
32a. Time On						
32b. Time Off						
32c. Total Time (Minutes)						
Flow Rate (LPM)						
Total Volume(L) [Flow Rate X Total Time]						
GA/BZ/S						
Employee ID						
Laboratory # (To Be Assigned By Lab)						

BLANK

COLLECTION AND SAMPLING DATA - TABLE 2 (If Needed for Additonal Samples)

Field Sample ID # (15 Char. Max)						DO NOT USE
Pump Serial # (10 Char. Max)						
32a. Time On						
32b. Time Off						
32c. Total Time (Minutes)						
Flow Rate (LPM)						
Total Volume(L) [Flow Rate X Total Time]						
GA/BZ/S						
Employee ID						
Laboratory # (To Be Assigned By Lab)						

38. COMMENTS TO LABORATORY

SAMPLE

SECTION D: CALIBRATION INFORMATION

39. Pump Calibrator ID # (20 Characters Maximum): _____

40. LAST Name (20 Characters Maximum): _____

41. FIRST Name (20 Characters Maximum): _____

42. Pump Serial# (10 Characters Maximum)	*Calibration Information* Note: See TG 141, Chapter 2, Section 2-10f for Information on Sampling Pump Flow Rate Calibrations and Reporting				*44. Unit Code (LPM)*	*45. Calibration Setting (30 Character Maximum)*
	43a. Pre-Cal Result	*43b. Pre-Cal Date*	*43c. Post-Use Result*	*43d. Post-UseDate*		

SECTION E: LOCATION AND OPERATION INFORMATION

46. Building/Area (20 Characters Maximum): _____

47. Location Name (50 Characters Maximum): _____

48. Operation Name (50 Characters Maximum): _____

49. Operation Employee(s) Perform

50. # of Persons Exposed (3 Characters Maximum): _____

51. Exposure Duration and Frequency

51a. Minutes (4 Char.) _____ *51b. Time(s) per Day (4 Char.)* _____ *51c. Total Minutes/Day (4 Char.)* _____

51d. Days/Week (1 Char.) ____ *51e. Days/Month (2 Char.)* _____ *51f. Months/Year (2 Char.)* _____

Source of Contaminant:

S

SECTION F: FIELD NOTES/ADDITIONAL COMMENTS

HHIM Submitted ?: **Y (Yes) or N (No)**

Field Notes/Comments:

A

M

P

L

E

CHAPTER 5
SUBMITTING SAMPLES TO THE LABORATORY

5-1. SAMPLE COORDINATION REQUIREMENTS.

a. **CONUS Customers.**

Refer to Appendix B, Section 1, for information on Customer Support Services available at the DLS-Main and the DSA Laboratories.

b. **OCONUS Customers.**

Refer to Appendix C, Section 1, for information on Customer Support Services available at the USACHPPM-EUROPE and USACHPPM-PACIFIC.

c. **IH Customers outside of Army Medical Department Channels.**

These customers should coordinate their sampling activities with their local installation IH.

5-2. ADVANCE NOTICE OF INCOMING SAMPLES.

a. **Advance notice of incoming samples to DLS-Main is requested.**

(1) Advance notification of incoming samples allows DLS-Main personnel to review the information concerning the samples and to address any questions concerning the samples or the shipment immediately and allows DLS to address and solve any problems prior to the receipt of the samples themselves.
(2) IH Customers and other USACHPPM Laboratories should submit a ***duplicate*** copy of a completed Form 8-R-E or 9-R-E as soon as possible for samples being sent to the DLS-Main Laboratory. ***The original form must be sent with the sample shipment.***

b. **This completed form can be submitted either:**

(1) Electronically using the "sampnews" bulletin board. See Appendix B, Section 1, for information about, and the addresses for, "sampnews."
(2) Faxing or mailing a hard copy. See Appendix B, Section 1, for the mailing address and the fax number.

5-3. MODIFYING REQUESTS FOR LABORATORY SERVICES.

a. Contact DLS-Main immediately for any change to a processed USACHPPM Form 8-R-E or 9-R-E.

b. Submit all changes through "sampnews." This e-mail system is the most effective means of communicating with CHPPM DLS-Main Laboratory because all the staff members have access to this bulletin board.

5-4. SAMPLE REJECTION.

a. Samples that do not meet the acceptance criteria for a valid sample will be rejected. Sample management and technical staff members have the right to reject samples. The Laboratory will initiate contact with the appropriate Project Officer or IH Resource. At DLS-Main a sample rejection form is used for documentation and states:

(1) Who rejected the sample
(2) The reason for the rejection
(3) When the project officer was notified

b. When a project officer or other approval authority makes a decision to have rejected samples analyzed, the request will be documented (at DLS-Main), and the report for the sample will be qualified.

c. Rejected samples will either be properly disposed of, or returned to, the customer by laboratory personnel. The disposition or return is documented on the sample rejection form and/or other applicable documents.

5-5. REQUIRED SHIPMENT FORMS.

a. One of the forms listed below *must* accompany the samples when they are submitted.

(1) USACHPPM Form 8-R-E, *Bulk Sample Data, or*
(2) USACHPPM Form 9-R-E, *Industrial Hygiene Air Sample Data*

b. Detailed instructions about USACHPPM Forms 8-R-E and 9-R-E are given in Chapter 4.

5-6. SAMPLE FIELD IDENTIFICATION AND LABELING.

a. Identify each sample with the unique Field ID Number assigned locally, at the time of collection, by the IH Resource or the sample collector.

(1) A consecutive numbering system should be used to avoid duplication of numbers from batch to batch of samples.
(2) This ID number is limited to a maximum of 15 characters so that it can be incorporated into the DOHRS/OHMIS HHIM database.
(3) Number all samples and clearly indicate field blank, media blank, and duplicate samples.
(4) Accurately reference each sample on the paperwork included in the shipment.

b. Complete each sample label as required. Table 5-1 outlines the information needed on each sample label.

Table 5-1. REQUIRED INFORMATION FOR EACH FIELD SAMPLE LABEL

PRINT EACH LABEL NEATLY USE PERMANENT WATERPROOF INK
(1) **Sample Field ID number (Maximum of 15 Characters)** (2) **Collector's initials** (3) **Date of collection**

c. If the samples are placed in a plastic bag or other container before shipment, the bag or container holding the samples can be labelled with additional information. Table 5-2 outlines this supplementary information.

Table 5-2. SUPPLEMENTARY INFORMATION REQUESTED FOR EACH SAMPLE.

PRINT NEATLY USE PERMANENT WATERPROOF INK
(1) **Project number** (2) **Installation or site name** (3) **Project officer's name or initials** (4) **DLS-Main Test Code(s)**

5-7. SAMPLE PACKING INSTRUCTIONS.

a. Contact the Support Services at the appropriate USACHPPM Laboratory facility prior to shipping samples if there are any concerns about proper packing or shipping of samples.

b. Know which types of samples require special handling, packing, or shipment. The Special Instructions in the Procedure Lists indicate any special sample requirements.

c. Verify that all sample collection tubes or impingers are capped tightly.

d. ***Never ship bulk liquid samples in the same shipping container as air samples.*** This is necessary to avoid contamination of the air samples.

e. Mark the level of liquid in sample containers (such as bulk samples) with indelible ink. If a sample leaks during shipment, the project officer will be contacted and a decision will be made as to whether the sample needs to be recollected.

f. Place an absorbent in the shipping container if liquid samples are being shipped. This is absolutely necessary if any samples contain, or are suspected of containing, hazardous material. Be sure to include enough material to absorb all of the liquid in the shipment if sample leakage occurs. Any leakage from the container will halt the transportation by the carrier.

g. Use suitable packing materials to prevent breakage of samples.

(1) Wrap each glass container with enough packing material to prevent contact with other containers or the outer box. The samples should be packed to withstand a 6-foot drop.
(2) Seal small vessels containing liquids in plastic bags or aluminum foil depending on the analysis requested. This practice ensures sample integrity and prevents contamination of an entire shipment if a sample leaks.

h. Use refrigerants, and a cooler or styrofoam box when necessary, to maintain the samples at the temperature required for special handling and shipping. The Special Instructions in the Procedure List indicate this requirement.

(1) Store samples in refrigerator until just before packing. If samples must be frozen, store in the freezer.
(2) Precool shipping containers to 4 °C before shipping, if possible.
(3) Use prefrozen gel blocks whenever possible. Do not allow blocks to come in direct contact with the samples. Keep samples and gel blocks sealed in one or more plastic bags. Always send for next day delivery (am is better than pm). Any leakage from the container will halt the transport by the carrier, so be careful to seal well.
(4) Use dry ice only when special sample requirements require its use. Verify shipping regulations before shipping samples.
(5) Use ice as a refrigerant only when gel blocks are not available. When used, it must be sealed in heavy double-layered plastic bags to prevent leakage as the ice melts. Zip-Lock® freezer bags are recommended because of their extra thickness.

5-8. SHIPMENT REQUIREMENTS AND SPECIFICS.

Table 5-3 outlines shipment requirements and specifics.

Table 5-3. SHIPMENT REQUIREMENTS AND SPECIFICS

1. STANDARD ANALYSIS SAMPLES **For U.S. Mail Correspondence or Shipments:** **CDR, USACHPPM** **ATTN: MCHB-TS-LSM** **(Sample Mgt Lab)** **5158 Blackhawk Road** **APG, MD 21010-5422**	**CAN BE SENT BY:** ▸ Priority First Class Mail ▸ Certified U.S. Mail NOTE: 1) ***Do Not Send Hazardous Materials by U.S. Mail.*** Consult with carrier and reference DOT shipping requirements when applicable. 2) ***Do Not Use Registered Mail.*** It Is Not Delivered Directly To Building E2100. ▸ Commercial Carriers such as Federal Express or United Parcel Service (UPS) ▸ Hand Carried to Building E2100, APG, Edgewood Area (Sample Mgt Lab, Lower Level, Room 0202)
2. PRIORITY SAMPLES OR SHIPMENTS WITH SAMPLES THAT REQUIRE SPECIAL HANDLING	**MUST BE :** ▸ Shipped By Overnight Express e.g., Federal Express or UPS ▸ Hand Carried to Building E2100, APG, Edgewood Area

3. FEDERAL EXPRESS/ COMMERCIAL CARRIER SPECIFICS **For Shipments by FedEx, UPS, or other Commercial Carriers:** **CDR, USACHPPM** **ATTN: MCHB-TS-LSM** **(Sample Mgt Lab)** **Bldg E2100** **APG, MD 21010-5422**	▸ Packages shipped overnight arrive by 1200 the next day ▸ Samples cannot be picked up on Sunday ▸ Samples sent on Friday will be delivered Monday unless the shipment is clearly marked *"Saturday Delivery"*.
4. SHIPMENTS ARRIVING OUTSIDE OF NORMAL DUTY HOURS (0700 - 1600 HOURS)	***Require advance arrangements with the Sample Management Lab before the samples are shipped. This is necessary to ensure samples are properly received and processed.***
5. SHIPMENTS MUST COMPLY WITH ALL APPLICABLE REGULATIONS	▸ Department of Transportation (DOT) ▸ State and Local Governments ▸ Hazardous Waste ▸ Radiochemical ▸ Biohazard

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CHAPTER 6
SUBMITTING A USACHPPM DLS-MAIN CUSTOMER COMMENT FORM

6-1. OVERVIEW.

a. The DLS-Main Customer Comment Form (USACHPPM Form 332-R-E) is provided to facilitate feedback concerning issues that include, but are not limited to:

(1) Complaints, comments, or compliments about service or data
(2) Suggestions for process improvements that will improve the efficiency or quality of DLS work
(3) Health or safety problems and concerns
(4) Known or suspected deficiencies in approved data, including audit samples outside acceptable ranges
(5) Ideas for new services or products

b. All comments directed to DLS-Main are answered after appropriate review and corrective action. The originator of the comment will be contacted concerning the action taken.

6-2. ACCESSING AND TRANSMITTING A USACHPPM FORM 332-R-E.

a. This Form can be:

(1) Mailed or faxed to DLS-Main. See Appendix B, Section 1, for fax numbers and addresses.
(2) Accessed through the DLS-Main HomePage on the Internet and submitted electronically.
(3) See Chapter 2, Section 2-1 for the HomePage address.
(4) E-mailed to DLS-Main using the "sampnews" bulletin board. See Appendix B, Section 1, for details.

b. A hard copy of this form is included in Appendix E.

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APPENDIX A

RECOMMENDED REFERENCES AND INTERNET ADDRESSES OF INTEREST

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SECTION 1
RECOMMENDED REFERENCES

1. Army Regulation 40-5, *Preventive Medicine,* Headquarters, Department of the Army, Washington DC, 15 October 1990.

2. *DOD 6050.5-LR: DOD Hazardous Materials Information System Hazardous Item Listing.* (This listing is for U.S. Government use only limited because it contains proprietary [limited rights] data.) Copies are available from the U.S. Army AG Publication Center at the above address.

3. *DOD 6050.5-L: DOD Hazardous Materials Information System Hazardous Item Listing.* (Copies are available from the U.S. Army AG Publication Center, 2800 Eastern Blvd., Baltimore, MD 21220-2896.)

4. *A Model for the Identification of High Risk Occupational Groups Using RTECS and DOHS DATA,* U.S. Department of Health and Human Services (DHHS), Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH) Publication No. 83-117.

5. *Occupational Exposure Sampling Strategy Manual,* U.S. Department of Health, Education and Welfare (DHEW), Public Health Service, Center for Disease Control, NIOSH Publication No. 77-173.

6. *Exposure Measurement Action Level and Occupational Variability,* DHEW, NIOSH Publication No. 76-131.

7. *Statistical Methods for the Determination of Noncompliance with Occupational Health Standards,* DHEW, NIOSH Publication No. 75-159.

8. *Handbook of Statistical Tests for Evaluating Employee Exposure to Air Contaminants,* DHEW, NIOSH Publication No. 75-147.

9. *NIOSH Manual of Analytical Methods,* 4th Edition, 1994, Peter M. Eller, Editor. (This publication is available from Publications Dissemination, DTS, NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226.) NIOSH Publication No. 94-113.

10. Title 49 CFR Chapter 1, Subchapter C: *Hazardous Materials Regulations.*

11. Title 29 CFR, Part 1910: *Occupational Safety and Health Standards.*

12. Title 40 CFR, Part 763: *Asbestos.*

13. ASTM Method-E-1728-95, *Standard Practice for Field Collecting of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination,* 1995.

14. ASTM Method E-1792-96a, *Standard Specification of Wipe Sampling Materials for Lead in Surface Dust,* 1996.

15. *Standard Reference Materials: Handbook for SRM Users, National Institute of Standards and Technology (NIST),* NIST Special Publication No. 260-100.

16. *Use of NIST Standard Reference Materials for Decisions on Performance of Analytical Chemical Methods and Laboratories*, NIST Special Publication 829, January 1992.

17. *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994 Edition.

18. *Accuracy (Trueness and Precision) of Measurement, International Organization for Standardization (ISO)*, ISO 5751-1.

19. *Harmonized Guidelines for Internal Quality Control in Analytical Chemistry Laboratories*, International Union of Pure and Applied Chemistry (IUPAC) 1995, and ISO/REMCO 1995.

20. *Quantifying Uncertainty of Measurement*, EURACHEM Draft 1994.

21. *Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs),* (for the current year). This publication is available from American Conference of Governmental Industrial Hygienists (ACGIH), Kemper Woods Center, 1330 Kemper Meadow Drive, Cincinnati, OH 45240.

22. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM): *Defense Occupational Health Readiness System/Occupational Health Management Information System (DOHRS/OHMIS) Health Hazard Information Module (HHIM) 3.0 User's Guide,* 1997.

23. USACHPPM TG No. 214, *Customer Service Manual,* February, 1997.

24. USACHPPM *DLS Quality Assurance Manual*, August, 1996.

25. USACHPPM TG No. 211, *Radiobioassay Collection, Labeling, and Shipping Requirements*, May 1996.

26. Sax, N.I., *Dangerous Properties of Industrial Materials,* Van Nostrand Reinhold Company. 8th Edition (1992).

27. Wang, Jin, Kevin Ashley, et.al., *Determination of Hexavalent Chromium in Industrial Hygiene Samples by Flow Injection Analysis*, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Conrol and Prevention, National Institute for Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, OH 45226, 1997.

28. *3M Organic Vapor Monitor Sampling and Analysis Guide for Organic Vapor Monitors 3500/3510 and Organic Vapor Monitors 3520/3530*, October 1993.

29. *Best Practices for the Detection and Deterrence of Laboratory Fraud.* California Military Environmental Coordination Committee; March 1997.

30. *Laboratory Data Quality at Federal Superfund Sites.* EPA Office of the Inspector General; March 20, 1997.

31. *Laboratory Support Services for Environmental Testing.* Department of Defense, Office of the Inspector General Audit Report; February 21, 1997.

32. *Guide to the Expression of Uncertainty in Measurement*, Jointly Developed by: ISO, the International Electrotechnical Commission (IEC), the International Organization of Legal Metrology (OIML), and the International Bureau of Weights and Measures (BIPM), First Edition 1992.

SECTION 2
INTERNET ADDRESSES OF INTEREST

Federal Government Sites

Army Industrial Hygiene
http://chppm-www.apgea.army.mil/Armyih

CHPPM
http://chppm-www.apgea.army.mil/ *or* http://131/92/88.201/

DLS
http://chppm-www.apgea.army.mil/dls/

EPA
http://www.epa.gov/

Federal Government - The DIRECTory
http://www.okdirect.com/(sic)/sic-9/9840.html

OSHA
http://www.osha.gov/

NOISH
http://www.cdc.gov/niosh/homepage.html

Other Helpful Sites

Agency for Toxic Substances and Disease Registry
http://atsdr1.atsdr.cdc.gov:8080/cx.html

ACS Division of Chemical Health and Safety
http://dchas.cehs.siu.edu/

American College of Occupational and Environmental Medicine
http://www.acoem.org/

ACGIH HomePage
http://www.acgih.org/

AIHA
http://www.aiha.org/

APPENDIX B

USACHPPM CONUS SUPPORT SERVICES AND IH PROCEDURE LIST

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SECTION 1
USACHPPM CONUS LABORATORY SUPPORT SERVICES

B-1. DIRECT SUPPORT ACTIVITIES (DSA) CUSTOMER LABORATORY SUPPORT SERVICES.

Staff members at USACHPPM Laboratories continually work to improve customer services and believe good communication is the key to customer satisfaction. It is important for customers to start working with laboratory personnel during the earliest planning stages of a project until after the final reports have been issued. Good communication between customers and the laboratory throughout the life of a project helps ensure customers they will get laboratory results that meet the objectives of their project and they will get those results when they need them.

a. **Northern Region IH Customers** should coordination their projects with the DLS-Main Laboratory. See Parts B-2 to B-3 for detailed information.

b. **IH Customers in the Southern and Western Regions** should coordinate their sampling activities with the Laboratory at their respective DSA at the addresses listed below:

(1) DSA-SOUTH

COMMANDER USACHPPM-DSS
ATTN: MCHB-AS-L
1312 Cobb Street, S.W.
Fort McPherson, GA 30330-1075

Telephone: (Commercial) 404-464-3332
(DSN) 367-3332

Fax: (Commercial) 404-464-2126
(DSN) 367-2126

cc-mail: (Network) CPT Reginald Richards at CHPPM_FTMCPHRSN

E-mail cpt_reginald_richards_at_chppm_ftmcphrsn @chppm-ccmail.apgea.army.mil

(2) DSA-WEST*

COMMANDER
USACHPPM-DSW
ATTN: MCHB-AW-L
U.S. Army Garrison Fitzsimmons
12101 East Colfax Avenue
Aurora, CO 80045-5001

Telephone: (Commercial) 303-361-8288
(DSN) 943-8288

Fax:	303-361-8143 No DSN Number
cc-mail: (Network)	Dave Morrow at CHPPM_FAMC
E-mail	dave_morrow_at_chppm_famc @chppm-ccmail.apgea.army.mil

*At the time of the printing for this TG, the DSA West Laboratory has been scheduled to cease operations NLT July 1998. Consult the DLS HomePage or the DSA-West Laboratory about the current status of laboratory operations.

c. **OCONUS IH Customers:** Information is given in Appendix C, Section I.

d. **IH Customers outside of Army Medical Department channels** should contact their local installation IH for guidance.

B-2. DLS-MAIN CUSTOMER SUPPORT SERVICES.

a. Table B-1 lists various means of communicating with DLS-Main Laboratory staff members.

TABLE B-1. Means of Communicating with the DLS-Main Laboratory.

TELEPHONE	584-2208 (DSN) 410-671-2208 (Commercial)
E-MAIL	Sampnews Electronic Bulletin Board: 1. Internal customers: Access cc:Mail on the USACHPPM Network; click on the PREPARE Button and type "*#SAM" and "#SAMPNEWS*" will automatically appear as the addressee 2. External customers: (Outside USACHPPM Network) E-Mail to: *#SAMPNEWS@chppm-ccmail.apgea.army.mil* Note: For detailed information concerning the Sampnews Electronic Bulletin Board see Section B-3b.
INTERNET	DLS HomePage at: *http://chppm-www.apgea.mil/dls/*
FAX	584-4108 (DSN) 410-671-4108 (Commercial)

MAILING ADDRESS FOR Sample Mgt Lab **For U.S. Mail Correspondence and Shipments Only**	Commander, USACHPPM ATTN: MCHB-TS-LSM (Sample Mgt Lab) 5158 Blackhawk Road Aberdeen Proving Ground, MD 21010-5422
SHIPPING ADDRESS FOR Sample Mgt Lab **For FedEx, UPS, and other Commercial Carriers**	Commander, USACHPPM ATTN: MCHB-TS-LSM (Sample Mgt Lab) Building E2100 Aberdeen Proving Ground, MD 21010-5422

b. To provide the best customer service possible, the USACHPPM DLS-Main Laboratory has established support services designed to help IH Customers with the technical and administrative matters relating to their projects.

(1) The DLS-Main IH Consultant.

(a) Offers customers the assistance they need to make sound decisions concerning the *analytical and technical* aspects of their projects.

(i) This assistance involves sampling and collection advice as well as information concerning proper quality assurance factors, such as ensuring appropriate field blanks are collected and special handling and shipping requirements are met.

(ii) The IH Technical Consultant should also be involved in coordinating special and priority projects.

(b) Acts as the liaison between customers and the USACHPPM DLS-Main Laboratory, helps to coordinate efforts among the DSA IH and Laboratory Divisions, and interacts with Installation IH personnel.

(2) **"Sampnews": An E-Mail Bulletin Board.**

(a) "Sampnews" is an electronic mail (e-mail) bulletin board established to offer DLS-Main Laboratory customers a convenient, effective, and efficient way to exchange information with the Laboratory.

(b) The use of this bulletin board facilitates the communication process with DLS-Main Laboratory because messages on "sampnews" can be:

(i) Accessed simultaneously by all appropriate DLS staff members. Responses can be made quickly and directly.
(ii) Sent 24 hours a day. Worldwide time zones are not restrictive.
(iii) Can be answered quickly. Questions about the status of samples and laboratory reports are addressed promptly.
(iv) Used to contact the laboratory about incoming samples. Duplicate copies of completed Forms 8-R-E or 9-R-E can be electronically submitted. See Chapter 5, Section 5-2, for more information.

TABLE B-2. DLS- MAIN LABORATORY IH CUSTOMER SUPPORT SERVICES

CUSTOMER'S NEED	IH CONSULTANT	SAMPNEWS E-MAIL BULLETIN BOARD
Selection of the proper **DLS TEST CODE**	X	
Choice of the most appropriate **SAMPLE ANALYSIS PRIORITY**	X	
Technical information on analyses	X	
Coordination of priority, complex, or special projects	X	
Guidance pertaining to requirements for sample collection or shipping		X
Advance Notification of Incoming Samples by Submission of a Duplicate Form 8-R-E or 9-R-E		X
Notification of **PROJECT MODIFICATIONS** after a USACHPPM Form 8-R-E or 9-R-E has been received or processed.		X
Details concerning sample processing and status reports		X

c. Duty Hours for the DLS-Main Laboratory.

(1) ***Technical Information and Routine Sample Receipt.*** Routine duty hours are from 0700 to 1600 hours EST, Monday through Friday, except for Federal holidays.
(2) ***Sample Receipt Outside of Normal Duty Hours.*** Special arrangements must be made with the Sample Management Laboratory (SML) prior to the shipment of any samples that will arrive outside of DLS routine duty hours. These arrangements are necessary to ensure appropriate DLS personnel will be available to receive, process, and preserve the samples.

B-3. CUSTOMER INFORMATION NEEDED WHEN CORRESPONDING WITH THE LABORATORY.

a. Date of Request or Communication
b. Necessary Customer Information:

(1) Full name of customer
(2) DSN and/or commercial telephone number

(3) Mailing address
(4) E-mail address
(5) Fax number

c. Installation or Project Site
d. Project Number (If applicable)
e. Brief Description of Services or Information Being Requested

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SECTION B
CONUS IH PROCEDURE LIST

EXPLANATION OF TERMS

Analyte Name: The name of the chemical as it appears in the Reference Method. Most synonyms are listed and cross referenced in this list.

CAS Number: A number assigned by the Chemical Abstracts Service (CAS) which offers a concise, unique means of material identification which identifies specific chemicals except when followed by an asterisk (*) which signifies a compound (often naturally occurring) of variable composition.

DLS Test Code: The unique three- or four-digit number assigned by DLS-Main to each laboratory procedure. ***These Codes only apply to procedures done at USACHPPM CONUS Laboratories.*** The DLS Test Code should be selected by the customer at the same time the analyte to be tested is determined and it should be used as a point of reference in communications associated with each project. See Chapter 3 for details concerning the DLS Test Code and its importance.

Reference Method: The analytical methodology used for sample analysis. Information from the Reference Method serves as the basis for the other parameters in the Procedure List. (See Chapter 2 for more information.)

Statistical Parameters: Statistical information from the Reference Method when available. For NIOSH Methods the parameters listed include Bias (B) expressed as a percent (%), *Overall* Precision (sr) expressed as a decimal, and Accuracy (A), expressed as a plus/minus percentage (+/-%). For OSHA and other Reference Methods, parameters such as Standard Error of Estimate and Overall Precision are given if available in the method.

Collection Media: The type of collection media required and detailed information concerning the specific requirements for the listed analyte.

Sample Flow Rate: The recommended range (Minimum-Maximum) in Liters of air per minute (LPM) which can be used in collection of the sample. After the sample flow rate has been selected, the appropriate sampling time should be determined by dividing the recommended collection volume by the sampling rate. See Chapter 2 for a detailed discussion concerning air and bulk material sample collection.

Air Collection Volume: The recommended range (Minimum-Maximum) for the total volume of air in liters (L) to be collected during the sampling process. See Chapter 2 for a detailed discussion concerning air sample collection.

NOTE: The recommended ranges given for 100 mg/50 mg tubes are from the NIOSH or OSHA Reference Method. The recommended ranges for the 400 mg/200 mg size tubes have been established by the DLS-Main Laboratory. The information for both sizes of sampling tube is given for the convenience of the customer.

Special Instructions: Any comments or special requirements necessary when collecting, handling or shipping samples that are to be tested for the selected analyte.

NOTES:

1) The Limit of Detection (LOD) is not given in this Procedure List because the LOD is sample dependent and is based on the Air Collection Volume of each individual sample. When a sample has an analyte concentration at or below the LOD this is clearly indicated on the Final Report along with the LOD for that sample.

2) Unless clearly indicated on the Procedure List the analytes and methods listed are available at all of the USACHPPM CONUS Laboratories.

3) For questions regarding Radiochemical, Health Physics, and Ionizing Radiation Laboratory Analyses, please contact one of the Programs listed below. Usually only one call is necessary because the person you contact will provide the appropriate interaction needed with other USACHPPM personnel.

   a. For Ionizing Radiation concerns contact the Program Manager for Industrial Health Physics at DSN 584-3502.
   b. For Medical Health Physics questions, please contact the Program Manager at DSN 584-3548.
   c. For sampling and sample collection questions, please contact the Division Chief for Radiochemical Testing at DLS-Main at DSN 584-3983.

TRADEMARKED NAMES USED IN THIS PROCEDURE LIST

Use of trademarked names does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.

® 3M is a registered trademark of Minnesota Mining and Manufacturing Co., St Paul, MN.
® Cellosolve is a registered trademark of Union Carbide Corp., 270 Park Ave, New York, NY.
® Chromosorb is a registered trademark of Johns-Mannville Products Corp., Denver, CO.
® Dursban is a registered trademark of Dow Chemical Co., Midland, MI.
® Florisil is a registered trademark of Floridin company, ITT System, Pittsburgh, PA.
® Freon is a registered trademark of E. I. DuPont de Nemours and Co., Wilmington, DE.
® ORBO is a registered trademark of Supelco, Inc., Supelco Park, Bellefonte, PA.
® Tenax is a registered trademark of GC-Enka N.V., The Netherlands.
® Teflon is a registered trademark of E.I. DuPont de Nemours and Co., Wilmington, DE.
® XAD-2 is a registered trademark of Rohm and Hass, Philadelphia, PA.

CONUS IH PROCEDURE LIST

Acetic Acid [CAS Number: 64-19-7] **DLS-MAIN ONLY**

DLS Test Code: 027
Reference Method: CAD CAB 54.1
Statistical Parameters: Not Available
Collection Media: ORBO® -70 tube
Sample Flow Rate: Minimum-Maximum (LPM): 0.1 - 0.5
Air Collection Volume: Minimum-Maximum (L): 15 - 60
Special Instructions: *DO NOT SHIP ACETIC ACID SAMPLES IN THE SAME CONTAINER WITH SAMPLES COLLECTED FOR HYDROQUINONE (WHICH REQUIRE PRESERVATION IN 1% ACETIC ACID). THE 1% ACETIC ACID SOLUTION FROM THE HYDROQUINONE SAMPLES WILL CONTAMINATE THE ACETIC ACID ORBO 70 TUBES.*

Acetic Acid [CAS Number: 64-19-7] **DSA-WEST ONLY**

DLS Test Code: 1300
Reference Method: NIOSH 1603, 4th Edition
Statistical Parameters: B = 5.4%; sr = 0.058; A = +/-15.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 1.0
Air Collection Volume: Minimum-Maximum (L): 20 - 300
Special Instructions:
1. *DO NOT SHIP ACETIC ACID SAMPLES IN THE SAME CONTAINER WITH SAMPLES COLLECTED FOR HYDROQUINONE (WHICH REQUIRE PRESERVATION IN 1% ACETIC ACID). THE 1% ACETIC ACID SOLUTION FROM THE HYDROQUINONE SAMPLES WILL CONTAMINATE THE ACETIC ACID ORBO 70 TUBES.*
2. *STABLE AT LEAST 7 DAYS AT 25 DEGREES CENTIGRADE..*

Acetone [CAS Number: 67-64-1]

DLS Test Code: 028
Reference Method: NIOSH 1300, 4th Edition
Statistical Parameters: B = Not Given; sr = 0.082; A = Not Given
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.02 - 0.1
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 0.5 - 3
400 mg/200 mg Tube Size: 1 - 6
Special Instructions: *SAMPLE STABILITY UNKNOWN.*

IMPORTANT

PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

The last revision of the hard copy of this Procedure List was completed in September, 1997.
If an Analyte of Interest is not listed, please contact the DLS CHPPM-MAIN IH Technical Consultant at 584-2208 (DSN) or 410-671-2208 (Commercial). Some tests are not performed routinely, but are available upon Special Request .

Acetonitrile [CAS Number: 75-05-8]
DLS Test Code: 031
Reference Method: NIOSH 1606, 4th Edition
Statistical Parameters: B = 4.0%; sr = 0.072; A = +/-15.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 400 mg/200 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 3 - 25
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Acrolein [CAS Number: 107-02-8] **DLS-MAIN ONLY**
DLS Test Code: 030
Reference Method: OSHA 52
Statistical Parameters: Standard Error of Estimate = 7.1%; Precision = +/- 13.8%
Collection Media: Solid Sorbent Tube [2-(hydroxymethyl)piperidine on XAD-2®, 120 mg/60 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.1
Air Collection Volume: Minimum-Maximum (L): 13 - 48
Special Instructions: *SAMPLE STABLE AT LEAST 18 DAYS AT AMBIENT TEMPERATURE.*

Aldrin [CAS Number: 309-00-2] **DSA-WEST ONLY**
DLS Test Code: 1301
Reference Method: NIOSH 5502, 4th Edition
Statistical Parameters: B = -0.44%; sr = 0.092; A = +/- 16.9%
Collection Media: FILTER AND BUBBLER (Glass Fiber + 15 mL Isooctane)
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 to 1
Air Collection Volume: Minimum-Maximum (L): 18 - 240
Special Instructions:
1. *TRANSFER BUBBLER SOLUTIONS AND FILTER IN SCINTILLATION VIALS; PACK CAREFULLY.*
2. *STABLE AT LEAST 1 WEEK AT 25 DEGREES CENTIGRADE.*

Aluminum [CAS Number: 7429-90-5]
DLS Test Code: 033
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester (CE) membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 100
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Ammonia [CAS Number: 7664-41-7]
DLS Test Code: 034
Reference Method: CAD CAB 59.1/OSHA ID-188
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [ORBO 77 or equivalent]
Sample Flow Rate: (LPM): 0.1 [TWA] (No Range Given in Reference Method)
0.5 [STEL] (No Range Given in Reference Method)
Air Collection Volume (L): 24 [TWA] (No Range Given in Reference Method)
7.5 [STEL] (No Range Given in Reference Method)
Special Instructions: None

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n-Amyl Acetate [CAS Number: 628-63-7]
DLS Test Code: 155
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = 0.3%; sr = 0.051; A = +/-10.3%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.02 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 10
400 mg/200 mg Tube Size: 5 - 40
Special Instructions: *1. STORE AND SHIP REFRIGERATED.*
2. SAMPLE STABILITY NOT DETERMINED.

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sec-Amyl Acetate [CAS Number: 626-38-0]
DLS Test Code: 036
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = -4.1%; sr = 0.071; A = +/-15.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.02 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 10
400 mg/200 mg Tube Size: 5 - 40
Special Instructions: *1. STORE AND SHIP REFRIGERATED.*
2. SAMPLE STABILITY NOT DETERMINED.

Antimony [CAS Number:]
DLS Test Code: 037
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester (CE) membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 100
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

IMPORTANT
PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

The last revision of the hard copy of this Procedure List was completed in September, 1997.
If an Analyte of Interest is not listed, please contact the DLS CHPPM-MAIN IH Technical Consultant at 584-2208 (DSN) or 410-671-2208 (Commercial). Some tests are not performed routinely, but are available upon Special Request.

Arsenic [CAS # 7440-38-2]

DLS Test Code: 663
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 2000
Special Instructions *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Asbestos Fiber Count – Air Sample – By Phase Contract Microscopy [CAS # - Various]

DLS Test Code: 001
Reference Method: NIOSH 7400, Revision 3, Issue 2, 15 Aug 94
Statistical Parameters: Not Available
Collection Media: Filter [0.45 to 1.2 micron Cellulose Ester (CE) Membrane, 25 mm, in Open-faced Cassette with 50 mm Conductive Extension Cowl]
Sample Flow Rate: Minimum-Maximum (LPM): 0.5 to 16
Air Collection Volume: Minimum-Maximum (L): See NIOSH METHOD 7400, Page 3 and 4, Paragraphs 4, 5, and 6 under "Sampling" and Chapter 2, Section 2-8 of this TG for detailed discussions on Asbestos Sample Collection.
Special Instructions:
1. *A MINIMUM OF TWO FIELD BLANKS OR 10% OF THE TOTAL SAMPLES (WHICHEVER IS GREATER) MUST BE SUBMITTED WITH EACH SET OF SAMPLES.*
2. *COLLECT SAMPLES WITH THE OPEN END OF THE SAMPLER FACING DOWNWARD.*
3. *SHIP SAMPLES IN A RIGID CONTAINER WITH SUFFICIENT PACKING MATERIAL TO PREVENT JOSTLING OR DAMAGE TO THE CASSETTES.*

Asbestos Fiber Count – Water – By Transmission Electron Microscopy (TEM) [CAS # - Various]

DLS Test Code: 755
Reference Method: EPA 600/4-83-043 (Modified Chatfield Method)
Statistical Parameters: Not Available
Collection Media: Water (Approximately 800 ml in a 1L Dark Glass Bottle)
Before Collection, Rinse Bottle with Fiber-free water for 30 seconds and discard the rinse water.
Sample Flow Rate: (LPM): NA
Air Collection Volume (L): NA
Special Instructions:
1. *SUBMIT A MINIMUM OF ONE BLANK WITH EACH SET OF 10 SAMPLES OR ANY FRACTION THEREOF. SUBMIT THE FIBER-FREE WATER USED FOR RINSING AS THE BLANK.*
2. *SAMPLES SHOULD BE COLLECTED AND MUST BE STORED IN DARK GLASS BOTTLES AT 4 DEGREES CENTIGRADE. TO PREVENT BACTERIAL GROWTH.*
3. *SAMPLES SHOULD BE FILTERED IN THE FIELD WITHIN 48 HOURS AFTER COLLECTION. CONTACT CUSTOMER SUPPORT SERVICES FOR INFORMATION ON FILTERING IN THE FIELD.*
4. *OPTIMUM NUMBER OF SAMPLES:*
   a. *FOR A BULK STORAGE SUPPLY COLLECT TWO OR THREE SAMPLES BOTH VERTICALLY AND HORIZONTALLY IF POSSIBLE.*
   b. *FOR A COMMON TYPE OF DISTRIBUTION CENTER, TURN ON THE FAUCET AND ALLOW THE WATER TO RUN FOR SEVERAL MINUTES BEFORE COLLECTING SAMPLES. COLLECT AT LEAST ONE OR TWO SAMPLES FROM EACH SITE.*

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Asbestos Bulk Sample Identification [CAS # - Various]

DLS Test Code: 002
Reference Method: EPA 600.0/R93/116
Statistical Parameters: Not Available
Collection Media: Bulk Material
Sample Flow Rate (LPM): NA
Air Collection Volume (L): NA
Special Instructions:
1. *SAMPLES SHOULD BE SHIPPED IN DOUBLE PLASTIC BAGS OR CONTAINERS.*
2. *ENOUGH SAMPLES SHOULD BE COLLECTED TO REPRESENT THE TESTED MATRICES AND TO COVER ALL THE MATRICES PRESENT IN THE ENVIRONMENT TO BE TESTED. CONTACT THE IH CONSULTANT FOR INFORMATION OR GUIDANCE.*

Asbestos – Heavily Loaded – By TEM [CAS # - Various]

DLS Test Code: 761
Reference Method: Modified AHERA (40CFR, Part 763, Oct 1987)
Statistical Parameters: Not Available
Collection Media: Filter [0.10 to .45 micron Mixed Cellulose Ester (MCE) *or* Polycarbonate (PC), 25 or 37 mm, *or* PM10, Quartz or Teflon®, 8 x 10 square inches]
Sample Flow Rate: Minimum-Maximum (LPM): For MCE or PC Filters: 0.5 - 16
For PM10 Filter: 100 for up to 24 Hours
Air Collection Volume: Minimum-Maximum (L): For MCE or PC Filters: 800 - 3000
For PM 10 Filter: Up to 14,400
Special Instructions:
1. *OPTIMUM NUMBER OF SAMPLES TO COLLECT: FIVE SAMPLES INSIDE; FIVE SAMPLES OUTSIDE; TWO FIELD BLANKS.*
2. *USE GLOVES WHEN HANDLING FILTERS. FILTERS SHOULD BE REVERSE-FLUSHED BEFORE ANALYSIS.*
3. *SHIP SAMPLES IN PARTITIONED CARDBOARD BOXES TO PREVENT DAMAGE TO THE CASSETTES.*

Asbestos – Clean – By TEM [CAS # - Various]

DLS Test Code: 760
Reference Method: AHERA (40CFR, Part 763, Oct 1987)
Statistical Parameters: Not Available
Collection Media: Filter [0.10 to .45 micron Mixed Cellulose Ester (MCE) *or* Polycarbonate (PC), 25 or 37 mm, *or* PM10, Quartz or Teflon®, 8 x 10 square inches]
Sample Flow Rate: Minimum-Maximum (LPM): For MCE or PC Filters: 0.5 - 16
For PM10 Filter: 100 for up to 24 Hours
Air Collection Volume: Minimum-Maximum (L): For MCE or PC Filters: 800 - 3000
For PM 10 Filter: Up to 14,400
Special Instructions:
1. *OPTIMUM NUMBER OF SAMPLES TO COLLECT: FIVE SAMPLES INSIDE; FIVE SAMPLES OUTSIDE; TWO FIELD BLANKS.*
2. *USE GLOVES WHEN HANDLING FILTERS.*
3. *SHIP SAMPLES IN PARTITIONED CARDBOARD BOXES TO PREVENT DAMAGE TO THE CASSETTES.*

IMPORTANT
PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

The last revision of the hard copy of this Procedure List was completed in September, 1997.
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Barium [CAS Number:]
DLS Test Code: 040
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester (CE) membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 100
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Benzene [CAS # 71-43-2]
DLS Test Code: 041
Reference Method: NIOSH 1501, 4th Edition
Statistical Parameters: B = 0.4%; sr = 0.059; A = +/-11.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum(LPM):	100 mg/50 mg Tube Size:	Equal to or Less Than 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	5 - 30
	400 mg/200 mg Tube Size:	25 - 40

Special Instructions: None

Benzene Solubles, Coal Tar Pitch Volatiles [CAS # 8007-45-2]
DLS Test Code: 042
Reference Method: NIOSH 5023, 4th Edition
Statistical Parameters: B = Unknown; sr = Not Determined; A = Unknown
Collection Media: Filter [PTFE membrane, 37-mm, 2 micron pore size]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 500 - 2400
Special Instructions: ***SAMPLE STABILITY UNKNOWN.***

1,4-Benzenediol [CAS # 123-31-9] -- See Hydroquinone, DLS Test Code: 107

Beryllium and compounds [CAS # 7440-41-7]
DLS Test Code: 757
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1- 4
Air Collection Volume: Minimum-Maximum (L): 1250 - 2000
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Bulk and Special Analyses
DLS Test Code: 045
Special Instructions: Contact the DLS IH Technical Consultant for Information.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

2-Butanol [CAS # 78-92-2] -- See sec-Butyl Alcohol, DLS Test Code:

2-Butanone [CAS # 78-93-3] -- See Methyl Ethyl Ketone, DLS Test Code: 134

2-Butoxyethanol (Butyl Cellosolve®, Ethylene Glycol Monobutylether, EGBE) [CAS # 111-76-2]

DLS Test Code: 025
Reference Method: NIOSH 1403, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.060; A = +/-17%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM)	100 mg/50 mg Tube Size:	0.01 - 0.05
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	2 - 10
	400 mg/200 mg Tube Size:	10 - 40

Special Instructions:
1. *STORE IN FREEZER AND SHIP REFRIGERATED.*
2. *SINGLE ANALYTE SAMPLE TUBE REQUIRED.*
   Note: The Analytical Protocol For This Contaminant Requires The Use Of A Modifier To The Desorption Solvent. Because Of This Requirement, Use A Separate Sampling Tube If Other Analyses Are Desired.
3. *SAMPLE STABILITY UNKNOWN.*

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n-Butyl Acetate [CAS # 123-86-4]

DLS Test Code: 156
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = 0.3%; sr = 0.069; A = +/-10.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 10
	400 mg/200 mg Tube Size:	5 - 40

Special Instructions:
1. *STORE AND SHIP REFRIGERATED.*
2. *SAMPLE STABILITY NOT DETERMINED.*

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sec-Butyl Acetate [CAS # 105-46-4]

DLS Test Code: 047
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = -2.4%; sr = 0.054; A = +/-11.3%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 10
Special Instructions:
1. *STORE AND SHIP REFRIGERATED.*
2. *SAMPLE STABILITY NOT DETERMINED.*

IMPORTANT

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tert-Butyl Alcohol (2-methyl-2-propanol) [CAS # 75-65-0]

DLS Test Code: 1226
Reference Method: NIOSH 1400, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.075; A = +/-14%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 10
400 mg/200 mg Tube Size: 2 - 20
Special Instructions: *1. STORE IN FREEZER AND SHIP REFRIGERATED.*
2. SINGLE ANALYTE SAMPLE TUBE REQUIRED.
NOTE: The Analytical Protocol for this Contaminant Requires the Use of a Modifier to the Desorption Solvent. Because of this Requirement, Use a Separate Sampling Tube If Other Analyses Are Desired.
3. SAMPLE STABILITY UNKNOWN.

Butyl Cellosolve [CAS # 111-76-2] -- See 2-Butoxyethanol, DLS Test Code: 025

Cadmium [CAS # 7440-43-9]

DLS Test Code: 664
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 13 - 2000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Calcium [CAS # various]

DLS Test Code: 1031
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 200
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Carbinol [CAS # 67-56-1] -- See Methanol, DLS Test Code: 128

Carbon disulfide (CS2, Dithiocarbonic Anhydride) [CAS # 75-15-0]

DLS Test Code: 051
Reference Method: NIOSH 1600, 4th Edition
Statistical Parameters: B = -0.78%; sr = 0.059; A = +/-12.9%
Collection Media: Solid Sorbent Tube and Drying Tube
[Coconut Shell Charcoal, 100 mg/50 mg and Sodium Sulfate (Drying Tube), 270 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 2 - 25
Special Instructions: *1. STORE AND SHIP REFRIGERATED WITH DRYER TUBE ATTACHED TO CHARCOAL TUBE.*
2. STABLE ONE WEEK AT 25 DEGREES CENTIGRADE; SIX WEEKS AT 0 DEGREES CENTIGRADE.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Carbon tetrachloride [CAS # 56-23-5]

DLS Test Code: 052
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -1.6%; sr = 0.092; A = +/-18.0%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 3 - 150
400 mg/200 mg Tube Size: 25 - 40
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Cellosolve [CAS # 110-80-5] – See 2-Ethoxyethanol, DLS Test Code: 053

Cellosolve Acetate [CAS # 111-15-9] – See 2-Ethoxyethyl Acetate, DLS Test Code: 026

Chlordane (Toxichlor, Octachlor) [CAS # 57-74-9]

DLS Test Code: 1126
Reference Method: NIOSH 5510, 4th Edition
Statistical Parameters: B = 3.0%; sr = 0.070; A = +/-15.3%
Collection Media: Filter and Solid Sorbent Tube [0.8 micron cellulose ester membrane and Chromasorb 102, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.5 - 1
Air Collection Volume: Minimum-Maximum (L): 10 - 200
Special Instructions *1. EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 MEDIA BLANKS.*
2. SAMPLE STABLE GREATER THAN ONE WEEK AT 25 DEGREES CENTIGRADE..

Chlorobenzene [CAS # 108-90-7]

DLS Test Code: 994
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = 0.3%; sr = 0.056; A = +/-11.0%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.25
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1.5 - 40
400 mg/200 mg Tube Size: 15 - 40
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

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o-Chlorobenzylidene malonitrile (CS) [CAS # 2698-41-1]

DLS Test Code: 055
Reference Method: NIOSH P&CAM 304, 2nd Edition
Statistical Parameters: Not Available
Collection Media: Filter and Solid Sorbent Tube [37-mm, 1.0 micron PTFE Membrane and Tenax®, 70 mg/35 mg]
Sample Flow Rate (LPM): 1.5 (No Range Given in Reference Method)
Air Collection Volume (L): 90 (No Range Given in Reference Method)
Special Instructions: None

IMPORTANT

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Chloroform [CAS # 67-66-3]

DLS Test Code: *056*
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = 1.3%; sr = 0.057; A = +/-11.6%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 50
	400 mg/200 mg Tube Size:	25 - 40

Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Chloropyrifos (Dursban®) [CAS # 2921-88-2] **DLS-MAIN ONLY**

DLS Test Code: 1304
Reference Method: OSHA 62
Statistical Parameters: Standard Error of Estimate = 5.3%; Precision = +/-10.2%
Collection Media: Filter **and** Solid Sorbent Tube [13-mm, Glass Fiber Filter **and** XAD-2, 270 mg/140 mg]

Sample Flow Rate (LPM):	1.0	(No Range Given in Reference Method)
Air Collection Volume (L):	480	(No Range Given in Reference Method)

Special Instructions: None

Chromium [CAS # 7440-47-3]

DLS Test Code: 058
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5-1000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: ***See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.***

Chromium, Hexavalent (Cr^{+6}) [CAS #18540-29-9]

DLS Test Code: 1111
Reference Method: OSHA ID-215 (Draft)
Statistical Parameters: Not Available
Collection Media: Filter [Pure homopolymer of PVC, low ash, low moisture pickup, suitable for chromic acid, chromates, and chromium hexavalent: 37-mm, 5 micron]

Sample Flow Rate (LPM):	2.0	(No Range Given in Reference Method)
Air Collection Volume (L):	960	(No Range Given in Reference Method)

Special Instructions: *Note:* ***See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.***

Coal Tar Pitch Volatiles [CAS # 8007-45-2] -- See Benzene Solubles, DLS Test Code: 042

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Cobalt [CAS # 7440-48-4]
DLS Test Code: 059
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 25 - 2000
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Copper [CAS # 7440-50-8]
DLS Test Code: 060
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 1000
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Cresol, All Isomers [CAS # 1319-77-3 (Mixture)] **DLS-MAIN ONLY**
DLS Test Code: 995
Reference Method: Modified OSHA 32
Statistical Parameters: Standard Error of Estimate = 5.41%; Overall Precision = +/- 10.6%
Collection Media: Solid Sorbent Tube [XAD-7, 100 mg/50 mg]
Sample Flow Rate (LPM): 0.1 (No Range Given in Reference Method)
Air Collection Volume (L): 24 (No Range Given in Reference Method)
Special Instructions: ***STABLE AT LEAST 15 DAYS AT AMBIENT TEMPERATURE.***

Cresol, All Isomers [CAS # 1319-77-3 (Mixture)] **DSA-WEST ONLY**
DLS Test Code: 1305
Reference Method: NIOSH 2001, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.068; A = Not Given
Collection Media: Solid Sorbent Tube [Silica Gel, 150 mg/75 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 5 - 20
Special Instructions: ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

CS [CAS # 2698-41-1] – See o-Chlorobenzylidene malonitrile, DLS Test Code: 055

CS2 [CAS # 75-15-0] – See Carbon disulfide, DLS Test Code: 051

IMPORTANT
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Cyanide [CAS # 74-90-8]
DLS Test Code: 1289
Reference Method: NIOSH 7904, 4th Edition
Statistical Parameters: B = -7.6%; sr = 0.062 [HCN], 0.103 [KCN]; A = +/- 20%
Collection Media: Filter and Bubbler [0.8 micron CE membrane + 15 ml 0.1N KOH]
Sample Flow Rate: Minimum-Maximum (LPM): 0.5 - 1.0
Air Collection Volume: Minimum-Maximum (L): 10 - 180
Special Instructions: *1. ANALYZE WITHIN FIVE DAYS.*
2. PARTICULATE ON FIBER MAY LIBERATE HCN GAS.

Cyclonite [CAS # 121-82-4] – See RDX, DLS Test Code: To Be Assigned

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Diacetone Alcohol [CAS #123-42-2]
DLS Test Code: 1308
Reference Method: NIOSH 1402, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.104; A = +/-20%
Collection Media: Solid Sorbent Tubes [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 10
Special Instructions: *1. STORE IN FREEZER*
2. STABILITY UNKNOWN.

Diazinon [CAS # 333-41-5] **DLS-MAIN ONLY**
DLS Test Code: 1309
Reference Method: OSHA 62
Statistical Parameters: Standard Error of Estimate = 5.3%; Precision = +/-10.3%
Collection Media: Filter and Solid Sorbent Tube [13-mm Glass fiber filter and XAD-2 Tube, 270 mg/140 mg]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 480 (No Range Given in Reference Method)
Special Instructions: None

Dibromomethane (Ethylene Dibromide) [CAS # 106-93-4]
DLS Test Code: 1310
Reference Method: NIOSH 1008, 4th Edition
Statistical Parameters: B = Not Significant; sr = Not Determined; A = Not Determined
Collection Media: Solid Sorbent Tubes [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.02 - 0.2
Air Collection Volume: Minimum-Maximum (L): 0.1 - 25
Special Instructions: *1. SHIP FROZEN IN INSULATED CONTAINER IN DRY ICE.*
2. STORE IN FREEZER STABLE TWO WEEKS AT MINUS 25 DEGREES CENTIGRADE OR BELOW.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

o-Dichlorobenzene [CAS # 95-50-1]

DLS Test Code: 161
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -1.9%; sr = 0.068; A = +/-13.7%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 60
	400 mg/200 mg Tube Size:	7.5

Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

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p-Dichlorobenzene [CAS # 106-46-7]

DLS Test Code: 174
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -4.3%; sr = 0.052; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.1 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 10
	400 mg/200 mg Tube Size:	7.5 - 40

Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Dichlorodifluoromethane (Freon 12) [CAS # 75-71-8]

DLS Test Code: 094
Reference Method: NIOSH 1018, 4th Edition
Statistical Parameters: B = -1.8%; sr = 0.063; A = +/-12.8%
Collection Media: Two Solid Sorbent Tubes in Series [Coconut Shell Charcoal, 400 mg/200 mg and 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.05
Air Collection Volume: Minimum-Maximum (L): 1 - 4
Special Instructions: 1. *STORE AND SHIP REFRIGERATED.*
2. *SAMPLE STABLE AT LEAST SEVEN DAYS AT 25 DEGREES CENTIGRADE.*

1,1-Dichloroethane [CAS # 75-34-3]

DLS Test Code: 1311
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = 2.6%; sr = 0.057; A = +/-12.4%
Collection Media: Solid Sorbent Tubes in Series [Coconut Shell Charcoal 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 0.5 - 15
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

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1,2-Dichloroethane (Ethylene Dichloride) [CAS # 107-06-2]

DLS Test Code: 067
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -2.0%; sr = 0.079; A = +/-15.7%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 50
	400 mg/200 mg Tube Size:	7.5 - 20

Special Instructions: ***SAMPLE STABILITY NOT DETERMINED.***

Dichloromethane [CAS # 75-09-2] – See Methylene Chloride, DLS Test Code: 141

1,2-Dichloropropane [CAS #]

DLS Test Code: 068
Reference Method: Modified NIOSH 1003, 4th Edition
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tubes in Series [Coconut Shell Charcoal 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.02
Air Collection Volume: Minimum-Maximum (L): 1 - 50
Special Instructions: ***SAMPLE STABILITY NOT DETERMINED.***

Dichlorvos (DDVP) [CAS # 62-73-7] **DLS-MAIN ONLY**

DLS Test Code: 1312
Reference Method: OSHA 62
Statistical Parameters: Standard Error of Estimate = 5.3%; Precision = +/-10.3%
Collection Media: Filter **and** Solid Sorbent Tube [13-mm, Glass fiber filter **and** XAD-2, 270/140 mg]

Sample Flow Rate (LPM):	1.0	(No Range Given in Reference Method)
Air Collection Volume (L):	480	(No Range Given in Reference Method)

Special Instructions: None

Dieldrin [CAS # 60-57-1]

DLS Test Code: 1313
Reference Method: NIOSH S283, 2nd Edition
Statistical Parameters: Not Available
Collection Media: Filter [37-mm, Glass fiber filter, binder free, closed face]

Sample Flow Rate (LPM):	1.5	(No Range Given in Reference Method)
Air Collection Volume (L):	180	(No Range Given in Reference Method)

Special Instructions: ***FILTER MUST BE TRANSFERRED TO GLASS VIAL WITHIN ONE (1) HOUR AFTER SAMPLING AND BEFORE SHIPMENT TO LABORATORY.***

Diesel Exhaust – Please Call the DLS Technical Consultant for Information.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Dimethyldinitrobutane (DMDNB) [CAS # 3964-18-9] **DLS-MAIN ONLY**

DLS Test Code: 1048
Reference Method: CAD MUS 8.1
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [Tenax-GC 110 mg/50 mg or equivalent]
Sample Flow Rate (LPM): 0.2 (No Range Given in Reference Method)
Air Collection Volume (L): 10 (No Range Given in Reference Method)
Special Instructions: None

2,4-Dinitrotoluene (DNT) [CAS # 121-14-2]

DLS Test Code: 1224
Reference Method: CAD CAB 13.1 for Sample Analysis
OSHA 44 for Sampling Requirements
Statistical Parameters: Standard Error of Estimate = 8.0% Overall Precision = +/- 15.6%
Collection Media: Solid Sorbent Tube [ORBO 79 or equivalent]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 60 (No Range Given in Reference Method)
Special Instructions:
1. ***THE AIR SAMPLING PUMP MUST BE CERTIFIED BY NIOSH OR MSHA AS INTRINSICALLY SAFE FOR USE IN COAL MINES.***
2. ***SAMPLES STABLE AT LEAST 19 DAYS AT AMBIENT TEMPERATURE.***

Dioctylphthalate (DOP) [CAS # 117-81-7]

DLS Test Code: 074
Reference Method: NIOSH 5020, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.057; A = Not Given
Collection Media: Filter [0.8 micron cellulose ester (CE) membrane or equivalent]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 -3.0
Air Collection Volume: Minimum-Maximum (L): 10 - 200
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY AT LEAST 2 FIELD BLANKS OR A 10% FREQUENCY, WHICHEVER IS GREATER.***

Dithiocarbonic Anhydride [CAS # 75-15-0] – See Carbon disulfide, DLS Test Code: 051

DMDNB [CAS # 3964-18-9] – See Dimethyldinitrobutane, DLS Test Code: 1048

DNT (2,4-Dinitrotoluene) [CAS # 121-14-2] – See 2,4-Dinitrotoluene, DLS Test Code: 1224

DOP [CAS # 117-78-6] – See Dioctylphthalate, DLS Test Code: 074

Dursban® [CAS # 2921-88-2] – See Chloropyrifos, DLS Test Code: 1304

Dust, Nuisance (Respirable)

DLS Test Code: 175 for IH
1188 for Metals
Reference Method: NIOSH 0600, 4th Edition
Statistical Parameters: B; sr; and A are all dependent on dust size distributions.
Collection Media: Cyclone **and** Filter [10-mm Nylon Cyclone] ***or*** Higgins-Dewell (HD) Cyclone **and** Tared 5 micron PVC membrane]
Sample Flow Rate (LPM): For Nylon Cyclone: 1.7 (No Range Given in Reference Method)
For HD Cyclone: 2.2 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 20 - 400
Special Instructions: ***SAMPLE STABLE INDEFINITELY.***

IMPORTANT

PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

The last revision of the hard copy of this Procedure List was completed in September, 1997.
If an Analyte of Interest is not listed, please contact the DLS CHPPM-MAIN IH Technical Consultant at 584-2208 (DSN) or 410-671-2208 (Commercial). Some tests are not performed routinely, but are available upon Special Request.

Dust, Nuisance (Total)

DLS Test Code: 189 for IH
1227 for Metals
Reference Method: *NIOSH 0500, 4th Edition*
Statistical Parameters: B = 0.01%; sr = 0.056; A = +/- 11.04%
Collection Media: Filter [Tared, 37-mm, 5 micron PVC membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 25 - 133
Special Instructions: *1. EACH SET OF TEN SAMPLES SHOULD BE ACCOMPANIED BY 2 FIELD BLANKS.*
2. SAMPLE STABLE INDEFINITELY.

EGBE [CAS # 111-76-2] – See 2-Butoxyethanol, DLS Test Code: 025

EGDN [CAS # 628-96-6] – See Ethylene Glycol Dinitrate, DLS Test Code: 1162

EGEE [CAS # 110-80-5] – See 2-Ethoxyethanol, DLS Test Code: 053

Endrin [CAS # 72-20-8]

DLS Test Code: 1315
Reference Method: NIOSH 5519, 4th Edition
Statistical Parameters: B = -0.7%; sr = 0.071; A = +/- 13.9%
Collection Media: Filter and Solid Sorbent Tube [0.8 micron cellulose ester membrane and Chromosorb® 102 tube, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.5 - 1.0
Air Collection Volume: Minimum-Maximum (L): 12 - 400
Special Instructions: *SAMPLE STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.*

Enflurane (Ethrane) [CAS # 13838-16-9]

DLS Test Code: 075
Reference Method: OSHA 29
Statistical Parameters: Standard Error of Estimate = 8.01%; Precision = +/- 15.6%
Collection Media: Two Solid Sorbent Tubes in Series [Coconut Shell Charcoal, 100 mg/50 mg] or 3M Organic Vapor Monitor (OVM)

Sample Flow Rate (LPM):	Sorbent Tubes:	0.1	(No Range Given in Reference Method)
	OVM:	1 to 8 Hours	
Air Collection Volume (L):	Sorbent Tubes:	10	(No Range Given in Reference Method)
	OVM:	Not Applicable	

Special Instructions: *1. SEPARATE THE FRONT AND BACK TUBES AND CAP EACH TUBE BEFORE SHIPMENT TO PREVENT MIGRATION OF ENFLURANE BETWEEN TUBES.*
2. SAMPLES STABLE AT LEAST 15 DAYS AT AMBIENT TEMPERATURE.

Epichlorohydrin [CAS # 106-89-8]

DLS Test Code: 081
Reference Method: NIOSH 1010, 4th Edition
Statistical Parameters: B = 4.2%; sr = 0.057; A = +/- 14.3%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.2 - 0.2
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	2 - 30
	400 mg/200 mg Tube Size:	10 - 40

Special Instructions: *SAMPLE STABLE AT LEAST TWO WEEKS AT 25 DEGREES CENTIGRADE.*

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Ethanol (Ethyl Alcohol) [CAS # 64-17-5]

DLS Test Code: 084
Reference Method: NIOSH 1400, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.065; A = +/-14%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	Equal to or Less than 0.05
	400 mg/200 mg Tube Size	0.02 - 0.05
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	0.1 - 1.0
	400 mg/200 mg Tube Size:	0.5 - 2.0

Special Instructions:
1. *STORE IN FREEZER AND SHIP REFRIGERATED.*
2. *SINGLE ANALYTE SAMPLE TUBE REQUIRED.*
   NOTE: The Analytical Protocol for this Contaminant Requires the Use of a Modifier to the Desorption Solvent. Because of this Requirement, Use a Separate Sampling Tube If Other Analyses Are Desired.
3. *SAMPLE STABILITY UNKNOWN.*

2-Ethoxyethanol (Cellosolve, Ethylene Glycol Monoethylether, EGEE) [CAS # 110-80-5]

DLS Test Code: 053
Reference Method: NIOSH 1403, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.059; A = +/-17%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.05
	400 mg/200 mg Tube Size:	0.1 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 6
	400 mg/200 mg Tube Size:	25 - 40

Special Instructions:
1. *STORE IN FREEZER AND SHIP REFRIGERATED.*
2. *SINGLE ANALYTE SAMPLE TUBE REQUIRED.*
   NOTE: The Analytical Protocol for this Contaminant Requires the Use of a Modifier to the Desorption Solvent. Because of this Requirement, Use a Separate Sampling Tube If Other Analyses Are Desired.
3. *SAMPLE STABILITY UNKNOWN.*

2-Ethoxyethyl Acetate (Cellosolve Acetate) [CAS # 111-15-9]

DLS Test Code: 026
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = 9.6%; sr = 0.062; A = +/-19.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.1 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 10
	400 mg/200 mg Tube Size:	25 - 40

Special Instructions:
1. *STORE AND SHIP REFRIGERATED.*
2. *SAMPLE STABILITY NOT DETERMINED.*

IMPORTANT

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Ethrane [CAS # 13838-16-9] -- See Enflurane, DLS Test Code: 075

Ethyl Alcohol [CAS # 64-17-5] -- See Ethanol, DLS Test Code: 084

Ethyl Acetate [CAS # 141-78-6]

DLS Test Code: 083
Reference Method: NIOSH 1457, 4th Edition
Statistical Parameters: B = -2.1%; sr = 0.058; A = +/-11.8%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 0.1 - 10
Special Instructions:
1. *SHIP REFRIGERATED.*
2. *SAMPLE STABLE SIX DAYS AT 5 DEGREES CENTIGRADE.*

Ethyl Benzene [CAS # 100-41-4]

DLS Test Code: 085
Reference Method: NIOSH 1501, 4th Edition
Statistical Parameters: B = -7.6%; sr = 0.089; A = +/-17.1%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	Equal To or Less Than 0.20
	400 mg/200 mg Tube Size:	0.05 - 0.50
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 24
	400 mg/200 mg Tube Size:	5 - 40

Special Instructions: None

Ethyl 2-Cyanoacrylate (ECA) [CAS# 7085-85-0]

DLS Test Code: 1098
Reference Method: OSHA 55
Statistical Parameters: Standard Error of Estimate = 5.8%; Overall Precision = +/- 11.4%
Collection Media: Solid Sorbent Tube [Phosphoric Acid Treated XAD-7]
Sample Flow Rate: (LPM): 0.1 (No Range Given in Reference Method)
Air Collection Volume: (L): 12 (No Range Given in Reference Method)
Special Instructions:
1. *STORE SAMPLES IN REFRIGERATOR.*
2. *SHIP SAMPLES FROZEN ON DRY ICE.*
3. *STABLE 17 DAYS AT REFRIGERATED TEMPERATURE.*

Ethyl Ether [CAS # 60-29-7]

DLS Test Code: 754
Reference Method: NIOSH 1610, 4th Edition
Statistical Parameters: B =5.2%; sr = 0.053; A = +/-14.6%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.1
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	0.25 - 3
	400 mg/200 mg Tube Size:	1-6

Special Instructions:
1. *SHIP REFRIGERATED*
2. *SINGLE ANALYTE SAMPLE TUBE REQUIRED*
   NOTE: The Analytical Protocol for this Contaminant Requires the Use of a Modifier to the Desorption Solvent. Because of this Requirement, Use a Separate Sampling Tube If Other Analyses Are Desired.
3. *SAMPLE STABILITY UNKNOWN.*

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Ethylene Dichloride [CAS # 107-06-2] – See 1,2-Dichloroethane, DLS Test Code: 067

Ethylene Glycol [CAS # 107-21-1]
DLS Test Code: 1034
Reference Method: NIOSH 5500, 4th Edition
Statistical Parameters: B = 3.3%; sr = 0.084; A = +/-20.4%
Collection Media: Filter and Sorbent (Glass Fiber Filter and Silica Gel, 520 mg/260 mg)
Sample Flow Rate (LPM): 0.2 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 0.3 - 60
Special Instructions:
1. *PLACE FILTER IN GLASS VIAL WITH 1 ML 2% (V/V) 2-PROPANOL/H2O DIRECTLY AFTER SAMPLING.*
2. *SEAL SILICA GEL TUBE WITH PLASTIC CAPS.*
3. *SAMPLES STABLE AT LEAST 15 DAY AT 25 DEGREES CENTIGRADE.*

Ethylene Glycol Dinitrate (EGDN, Ethylene Dinitrate) [CAS # 628-96-6]
DLS Test Code: 1162
Reference Method: NIOSH 2507, 4th Edition
Statistical Parameters: B = -0.02%; sr = 0.089; A = +/-20.3%
Collection Media: Solid Sorbent Tube [Tenax-GC tube, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 1.0
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: *STABLE AT LEAST 25 DAYS AT 25 DEGREES CENTIGRADE.*

Ethylene Glycol Monobutylether [CAS # 111-76-2] – See 2-Butoxyethanol, DLS Test Code: 025
Ethylene Glycol Monomethylether (EGME) [CAS # 109-86-4] – See 2-Methoxyethanol, DLS Test Code: 649
Ethylene Glycol Monomethyl Ether Acetate [CAS # 110-49-6] – See 2-Methoxyethyl Acetate, DLS Test Code: 998
Ethylene Glycol Monoethylether [CAS # 110-80-5] – See 2-Ethoxyethanol, DLS Test Code: 053

Ethylene oxide (ETO) [CAS # 75-21-8]
DLS Test Code: 088
Reference Method: CAD CAB # 28.1
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [ORBO 78 tube] or 3M® ETO Passive Monitor
Sample Flow Rate: Minimum-Maximum (LPM): ORBO 78 tube: 0.02 - 0.2
PASSIVE MONITOR: MONITOR EIGHT (8) HOURS
Air Collection Volume: Minimum-Maximum (L): ORBO 78 tube: 9.6 - 20
Special Instructions: None

Ethylene Trichloride [CAS # 79-01-6] – See Trichloroethylene, DLS Test Code: 184
ETO [CAS # 75-21-8] – Ethylene oxide, DLS Test Code: 088

Fiberglass Dust
DLS Test Code: 090
Reference Method: NIOSH 0500, 4th Edition
Statistical Parameters: B = 0.01%; sr = 0.056; A = +/- 11.04%
Collection Media: Filter [Tared, 37-mm, 5 micron PVC membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 25 - 133
Special Instructions:
1. *EACH SET OF TEN SAMPLES SHOULD BE ACCOMPANIED BY 2 FIELD BLANKS.*
2. *SAMPLE STABLE INDEFINITELY.*

IMPORTANT
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Fluorides (Aerosol and Gas) [CAS # (HF) 7664-39-3]

DLS Test Code: 1254
Reference Method: NIOSH 7906, 4th Edition
Statistical Parameters: Not Determined
Collection Media: Filter and Treated Pad [0.8 Micron Cellulose Ester Membrane and Sodium Carbonate-Treated Cellulose Pad]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 1 - 800
Special Instructions: None

Fluorides (Particulate) [CAS # Various]

DLS Test Code: 1253
Reference Method: NIOSH 7906, 4th Edition
Statistical Parameters: Not Determined
Collection Media: Filter and Treated Pad [0.8 Micron Cellulose Ester Membrane and Sodium Carbonate-Treated Cellulose Pad]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 1 - 800
Special Instructions: None

Fluorotrichloromethane (Freon 11, Monofluorotrichloromethane) [CAS # 75-69-4]

See Trichlorofluoromethane, DLS Test Code: 996

Forane (Isoflurane) [CAS # 2667-54-67]

DLS Test Code: 091
Reference Method: Modified OSHA 29
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal tube, 400 mg/200 mg] or 3M Organic Vapor Monitor (OVM)
Sample Flow Rate: Minimum-Maximum (LPM): Sorbent Tube: 0.025 - 0.5; OVM: 1 to 8 Hours
Air Collection Volume: Minimum-Maximum (L): 5 - 20
Special Instructions: None

Formaldehyde (HCHO) [CAS Number: 50-00-0]

DLS Test Code: 092
Reference Method: NIOSH 2541, 4th Edition
Statistical Parameters: Not Determined
Collection Media: Solid Sorbent Tube [2-(hydroxymethyl)piperidine on XAD-2, 120/60 mg]
Sample Flow Rate (LPM): 0.01 - 0.10
Air Collection Volume (L): 1 - 36
Special Instructions: *SAMPLES STABLE THREE WEEKS AT 25 DEGREES CENTIGRADE.*

Freon® 11 [CAS # 75-69-4] – See Trichlorofluoromethane, DLS Test Code: 996

Freon 12 [CAS # 75-71-8] – See Dichlorodifluoromethane, DLS Test Code: 094

Freon 113 [CAS #76-13-1] – See 1,1,2-Trichloro-1,2,2-trifluoroethane, DLS Test Code: 093

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Fuel Oil #2

DLS Test Codes: 096
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: Unknown
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 400 mg/200 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 400 mg/200 mg Tube Size: 10 - 40
Special Instructions: ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

Gasoline [CAS Number: 8006-61-9]

DLS Test Code: 097
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: Unknown
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal tube, 400 mg/200 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 7.5 - 20
Special Instructions: ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

Glutaric Dialdehyde [CAS Number: 111-30-8] -- See Glutaraldehyde, DLS Test Code: 099

Glutaraldehyde (Glutaric Dialdehyde, 1,5-Pentanedial) [CAS Number: 111-30-8]

DLS Test Code: 099
Reference Method: OSHA 64
Statistical Parameters: Standard Error of Estimate = 6.2%; Overall Precision = Less Than 25%
Collection Media: Open-Faced Cassette with Two Glass-Fiber Filters Each of Which is Coated with 2,4-Dinitrophenylhydrazine and Phosphoric Acid
Sample Flow Rate: Minimum-Maximum (LPM): 1 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 15 (No Range Given in Reference Method)
Special Instructions: ***STABLE AT LEAST 30 DAYS AT 25 DEGREES CENTIGRADE.***

Glutaraldehyde (Glutaric Dialdehyde, 1,5-Pentanedial) [CAS Number: 111-30-8]

DLS Test Code: 1316
Reference Method: NIOSH 2532, 4th Edition
Statistical Parameters: Not Determined
Collection Media: Solid Sorbent Tube [Silica Gel Coated with 2,4-Dinitrophenylhydrazine HCl, 300 mg/150 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 1-30
Special Instructions: ***STABLE AT LEAST 30 DAYS AT 25 DEGREES CENTIGRADE.***

Glycol Monomethyl Ether Acetate [CAS # 110-49-6] -- See 2-Methoxyethyl Acetate, DLS Test Code: 998

H_2SO_4 [CAS # 7664-93-9] -- See Sulfuric acid, DLS Test Code: 182

H_3PO_4 [CAS # 7664-38-2] -- See Phosphoric acid, DLS Test Code: 170

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Halothane [CAS # 151-67-7]

DLS Test Code: 101
Reference Method: OSHA 29
Statistical Parameters: Standard Error of Estimate = 6.43%; Precision = +/- 12.6%
Collection Media: Two Solid Sorbent Tubes in Series [Coconut Shell Charcoal, 100 mg/50 mg] or 3M Organic Vapor Monitor (OVM)
Sample Flow Rate (LPM): Sorbent Tubes: 0.1 (No Range Given in Reference Method)
OVM: 1 to 8 Hours
Air Collection Volume (L): Sorbent Tubes: 10 (No Range Given in Reference Method)
OVM: Not Applicable
Special Instructions: 1. *SEPARATE THE FRONT AND BACK TUBES AND CAP EACH TUBE BEFORE SHIPMENT TO PREVENT MIGRATION OF HALOTHANE BETWEEN TUBES.*
2. *SAMPLES STABLE AT LEAST 15 DAYS AT AMBIENT TEMPERATURE.*

HCHO [CAS Number: 50-00-0] – See Formaldehyde, DLS Test Code: 092

HCl [CAS # 7647-01-0] – See Hydrogen chloride, DLS Test Code: 105

HDI [CAS # 822-06-0] – See 1,6-Hexamethylene Diisocyanate, DLS Test Code: 019

HEALTH PHYSICS LABORATORY ANALYSES (INDUSTRIAL AND MEDICAL):

For questions regarding Ionizing Radiation contact the Program Manager for Industrial Health Physics at DSN 584-3502. For Medical Health Physics questions, please contact the Program Manager at DSN 584-3548. For sampling and sample collection questions, please contact the Division Chief for Radiochemical Testing at DLS-Main at DSN 584-3983. Usually only one call is necessary, since USACHPPM personnel work closely together and will provide the appropriate interaction needed.

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n-Heptane [CAS # 142-82-5]

DLS Test Code: 997
Reference Method: NIOSH 1500, 4th Edition
Statistical Parameters: B = -6.5%; sr = 0.065; A = +/-15.0%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): Equal to or Less Than 0.2
Air Collection Volume: Minimum-Maximum (L): 4 (No Range Given in Reference Method)
Special Instructions: *STABLE AT LEAST TWO WEEKS AT 25 DEGREES CENTIGRADE.*

Hexachloroethane [CAS # 62-72-1]

DLS Test Code: 103
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -6.6%; sr = 0.121; A = +/-25.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 3 - 70
400 mg/200 mg Tube Size: 10 - 40
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

1,6-Hexamethylene Diisocyanate (HDI) [CAS # 822-06-0]
DLS Test Code: 019
Reference Method: OSHA 42
Statistical Parameters: Standard Error of Estimate = 7.79%; Overall Precision = +/- 15.2%
Collection Media: Treated Filter [ORBO 80 Filter, or equivalent]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 15 (No Range Given in Reference Method)
Special Instructions: *SAMPLING MEDIA MUST BE STORED IN REFRIGERATOR PRIOR TO USE.*

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n-Hexane [CAS # 110-54-3]
DLS Test Code: 102
Reference Method: NIOSH 1500, 4th Edition
Statistical Parameters: B = -1.8%; sr = 0.062; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal Tube]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: Equal to or Less Than 0.2
400 mg/200 mg Tube Size: 0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 4 (No Range Given in Method)
400 mg/200 mg Tube Size: 10 - 40
Special Instructions: *STABLE AT LEAST TWO WEEKS AT 25 DEGREES CENTIGRADE.*

2-Hexanone [CAS # 591-78-6]
DLS Test Code: 1319
Reference Method: NIOSH 1300, 4th Edition
Statistical Parameters: B = Not Given; sr = 0.053; A = Not Given
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 10
Special Instructions: *SAMPLE STABILITY UNKNOWN.*

Hexavalent Chromium, (Cr^{+6}) [CAS #18540-29-9] --See Chromium Hexavalent, DLS Test Code: 1111

Hydrochloric acid [CAS # 7647-01-0] -- See Hydrogen Chloride, DLS Test Code: 105

Hydrofluoric Acid [CAS # 7664-39-3] -- See Hydrogen Fluoride, DLS Test Code: 106

Hydrogen Chloride (Hydrochloric acid, HCl) [CAS # 7647-01-0]
DLS Test Code: 105
Reference Method: NIOSH 7903, 3rd Edition
Statistical Parameters: B = Not Given; sr = 0.059; A = +/- 11.9%
Collection Media: Solid Sorbent Tube: High Purity Washed Silica Gel, 400 mg/200 mg [ORBO 53 Tube or Equivalent]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 0.5
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: *STABLE AT LEAST 21 DAYS AT 25 DEGREES CENTIGRADE.*

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Hydrogen Cyanide [CAS # 74-90-8]
DLS Test Code: 108
Reference Method: NIOSH 7904, 4th Edition
Statistical Parameters: B = -7.6%; sr = 0.062; A = +/- 20%
Collection Media: Filter and Bubbler [0.8 Micron Cellulose Ester (CE) Membrane + 15 ml 0.1N KOH]
Sample Flow Rate (LPM): 0.5 - 1.0
Air Collection Volume (L): 10 - 180
Special Instructions: *1. ANALYZE WITHIN FIVE DAYS.*
2. PARTICULATE ON FIBER MAY LIBERATE HCN GAS.

Hydrogen Fluoride (Hydrofluoric Acid) [CAS # 7664-39-3]
DLS Test Code: 106
Reference Method: NIOSH 7903, 4th Edition
Statistical Parameters: B = Not Given; sr = 0.116; A = +/- 23.4%
Collection Media: Solid Sorbent Tube: High Purity Washed Silica Gel, 400 mg/200 mg [ORBO 53 Tube or Equivalent]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 0.3
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: *STABLE AT LEAST 21 DAYS AT 25 DEGREES CENTIGRADE..*

Hydroquinol [CAS # 123-31-9] -- See Hydroquinone, DLS Test Code: 107

Hydroquinone (Hydroquinol, 1,4-Benzenediol) [CAS # 123-31-9]
DLS Test Code: 107
Reference Method: NIOSH 5004, 4th Edition
Statistical Parameters: B = 4.4%; sr = 0.061; A = +/-15.0%
Collection Media: Filter [Cellulose Ester Membrane, 0.8 micron, 37-mm]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 30 - 180
Special Instructions: *1. AFTER SAMPLING, FILTERS MUST BE PRESERVED IN 10 ML OF 1 % ACETIC ACID SOLUTION. THE BLANKS MUST BE TREATED IN THE SAME MANNER*
NOTE: Do Not Ship Hydroquinone Samples in The Same Container With Samples Collected For Acetic Acid (Orbo 70 Tubes). The 1% Acetic Acid Solution From The Hydroquinone Samples Will Contaminate The Acetic Acid Orbo 70 Tubes.
2. STABLE AT LEAST SEVEN DAYS AT 25 DEGREES CENTIGRADE.

Industrial Hygiene Organics, Unknowns
DLS Test Code: 116
Special Instructions: Contact the DLS IH Technical Consultant for Information..

Iron [CAS # 1309-37-1]
DLS Test Code: 117
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 4
Air Collection Volume: Minimum-Maximum (L): 5 - 100
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Isoamyl Acetate [CAS # 123-92-2]

DLS Test Code: 1320
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = -7.1%; sr = 0.056; A = +/-15.6%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM) 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 10
Special Instructions: *1. SHIP REFRIGERATED.*
2. SAMPLE STABILITY NOT DETERMINED.

Isobutyl Acetate [CAS # 110-19-0]

DLS Test Code: 119
Reference Method: NIOSH 1450, 4th Edition
Statistical Parameters: B = 1.8%; sr = 0.065; A = +/-11.1%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM) 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 10
400 mg/200 mg Tube Size: 5 - 40
Special Instructions: *1. STORE AND SHIP REFRIGERATED.*
2. SAMPLE STABILITY NOT DETERMINED.

Isophorone [CAS # 78-59-1]

DLS Test Code: 121
Reference Method: NIOSH 2508, 4th Edition
Statistical Parameters: B =+/-15.3; sr = 0.059; A = Not Given
Collection Media: Solid Sorbent Tube [Petroleum-based Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 1
Air Collection Volume: Minimum-Maximum (L): 2 - 25
Special Instructions: *STABLE AT LEAST SEVEN DAYS AT 25 DEGREES CENTIGRADE.*

Isoflurane [CAS # 2667-54-67] – See Forane, DLS Test Code: 091

JP-4

DLS Test Code: 124
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = -4.37%; sr = 0.052; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal Tube, 400 mg/200 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 7.5 - 20
Special Instructions: *STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.*

JP8 Exhaust and Vapors – Please call the DLS Technical Consultant for Information.

IMPORTANT

PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

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Kerosene [CAS # 8008-20-6]

DLS Test Code: 064
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = -4.37%; sr = 0.052; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1.3 - 20
400 mg/200 mg Tube Size: 10 - 40
Special Instructions: ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

Lead [CAS # 7439-92-1]

DLS Test Code: 125
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 1250 - 2000
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: ***See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.***

Lead [CAS # 7439-92-1]

DLS Test Code: 667
Reference Method: SW 846/EPA 7421 Report Limit (PQL): 2.5 mg/Kg
Statistical Parameters: Not Available
Collection Media: Paint Chips (PC)
Sample Flow Rate: Minimum-Maximum (LPM): NA
Air Collection Volume: Minimum-Maximum (L): NA
Special Instructions: ***PLACE 500 MG SAMPLE IN PLASTIC BAG OR GLASS VIAL.***

Lead [CAS # 7439-92-1]

DLS Test Code: 666
Reference Method: SW 846/EPA 6010A Report Limit (PQL) : 50 mg/Kg
Statistical Parameters: Not Available
Collection Media: Paint Chips (PC)
Sample Flow Rate: Minimum-Maximum (LPM): NA
Air Collection Volume: Minimum-Maximum (L): NA
Special Instructions: ***PLACE 500 MG SAMPLE IN PLASTIC BAG OR GLASS VIAL.***

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Lead [CAS # 7439-92-1]
DLS Test Code: 668
Reference Method: SW 846/ EPA 6010A Report Limit (PQL): 20 micrograms/wipe
Statistical Parameters: Not Available
Collection Media: Dust Wipes (LW)
Sample Flow Rate: Minimum-Maximum (LPM): NA
Air Collection Volume: Minimum-Maximum (L): NA
Special Instructions: *1. USE BABY WIPES WHICH DO NOT CONTAIN ALCOHOL OR ALOE. FILTER PAPER WIPES MAY BE USED.*
2. SEND BLANK WIPES AT A 20% FREQUENCY.
3. PLACE WIPES IN PLASTIC TUBE OR BAG PRIOR TO SHIPMENT.

Lead [CAS # 7439-92-1]
DLS Test Code: 669
Reference Method: SW 846/EPA 7421 Report Limit (PQL): 1 micrograms/wipe
Statistical Parameters: Not Available
Collection Media: Dust Wipes (LW)
Sample Flow Rate: Minimum-Maximum (LPM): NA
Air Collection Volume: Minimum-Maximum (L): NA
Special Instructions: *1. USE BABY WIPES WHICH DO NOT CONTAIN ALCOHOL OR ALOE. FILTER PAPER WIPES MAY BE USED.*
2. SEND BLANK WIPES AT A 20% FREQUENCY.
3. PLACE WIPES IN PLASTIC TUBE OR BAG PRIOR TO SHIPMENT.

Lindane [CAS #]
DLS Test Code: 1322
Reference Method: Modified NIOSH 5502, 4th Edition
Statistical Parameters: Not Available
Collection Media: FILTER AND BUBBLER (Glass Fiber + 15 mL Isooctane)
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 to 1
Air Collection Volume: Minimum-Maximum (L): 18 - 240
Special Instructions: *1. TRANSFER BUBBLER SOLUTIONS AND FILTER IN SCINTILLATION VIALS; PACK CAREFULLY.*
2. STABLE AT LEAST 1 WEEK AT 25 DEGREES CENTIGRADE.

Magnesium [CAS # 1309-48-4]
DLS Test Code: 126
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 67
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

IMPORTANT
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Malathion [CAS # 121-75-5] **DLS-MAIN ONLY**

DLS Test Code: 1323
Reference Method: OSHA 62
Statistical Parameters: Standard Error of Estimate = 5.6%; Precision = +/-10.8%
Collection Media: Filter and Solid Sorbent Tube [13-mm Glass fiber filter and XAD-2 tube, 270/140 mg]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 60 (No Range Given in Reference Method)
Special Instructions: None

Manganese [CAS # 7439-96-5]

DLS Test Code: 127
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 200
Special Instructions: ***EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.***
Note: ***See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.***

MDI [CAS # 101-68-8] – See Methylene Bisphenyl Isocyanate, DLS Test Code: 073

MEK [CAS # 78-93-3] – See Methyl Ethyl Ketone, DLS Test Code: 134

MEK Peroxide – Please Call the DLS Technical Consultant for Information.

Mercury [CAS # 7439-97-6] – Please Call the DLS Technical Consultant for Information.

Methanol (Methyl Alcohol, Carbinol, Wood Alcohol) [CAS # 67-56-1]

DLS Test Code: 128
Reference Method: NIOSH 2000, 4th Edition
Statistical Parameters: B = -4.4%; sr = 0.063; A = +/-14.5%
Collection Media: Solid Sorbent Tube [Silica gel tube, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.02 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 5
Special Instructions: ***SAMPLES STABLE SIX WEEKS.***

2-Methoxyethanol (Methyl Cellosolve, Ethylene Glycol Monomethyl ether, EGME) [CAS # 109-86-4]

DLS Test Code: 649
Reference Method: NIOSH 1403, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.068; A = +/-17%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.05
400 mg/200 mg Tube Size: 0.1 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 6 - 50
400 mg/200 mg Tube Size: 25 - 40
Special Instructions:
1. ***STORE IN FREEZER AND SHIP REFRIGERATED.***
2. ***SINGLE ANALYTE SAMPLE TUBE REQUIRED.***
Note: ***The Analytical Protocol for this Contaminant Requires the Use of a Modifier to the Desorption Solvent. Because of this Requirement, Use a Separate Sampling Tube If Other Analyses Are Desired.***
3. ***SAMPLE STABILITY UNKNOWN.***

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Methyl Acetate [CAS # 79-20-9] **DLS-MAIN ONLY**

DLS Test Code: 130
Reference Method: Modified NIOSH 1450, 4th Edition
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.02 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 10
	400 mg/200 mg Tube Size:	5 - 40

Special Instructions: *1. STORE AND SHIP REFRIGERATED.*
2. SAMPLE STABILITY NOT DETERMINED.

Methyl Alcohol [CAS # 67-56-1] – See Methanol, DLS Test Code: 128

Methyl- 2-Cyanoacrylate (MCA) [CAS# 137-05-3]

DLS Test Code: 1097
Reference Method: OSHA 55
Statistical Parameters: Standard Error of Estimate = 6.5%; Overall Precision = +/- 12.7%
Collection Media: Solid Sorbent Tube [Phosphoric Acid Treated XAD-7]
Sample Flow Rate: (LPM): 0.1 (No Range Given in Reference Method)
Air Collection Volume: (L): 12 (No Range Given in Reference Method)
Special Instructions: *1. STORE SAMPLES IN REFRIGERATOR.*
2. .SHIP SAMPLES FROZEN ON DRY ICE.
3. STABLE 17 DAYS AT REFRIGERATED TEMPERATURE.

Methyl Cellosolve [CAS # 109-86-4] – See 2-Methoxyethanol, DLS Test Code: 649

Methyl Cellosolve Acetate [CAS # 110-49-6] — See 2-Methoxyethyl Acetate, DLS Test Code: 998

Methyl Isoamyl Ketone (5-Methyl-2-Hexanone) – See MIAK [CAS # 110-12-3], DLS Test Code 1078

Methylchloroform (1,1,1-Trichloroethane) [CAS # 71-55-6]

DLS Test Code: 133
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -0.6%; sr = 0.054; A = +/-10.6%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	0.1 - 8
	400 mg/200 mg Tube Size:	10 - 40

Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Methylene Bisphenyl Isocyanate (MDI) [CAS # 101-68-8]

DLS Test Code: 073
Reference Method: OSHA 47
Statistical Parameters: Standard Error of Estimate = 6.2%; Overall Precision = Not Given
Collection Media: Treated filter [ORBO 80 filter, or equivalent]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 15 (No Range Given in Reference Method)
Special Instructions: *SAMPLING MEDIA MUST BE STORED IN REFRIGERATOR PRIOR TO USE.*

IMPORTANT
PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

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Methylene Chloride (Dichloromethane, Methylene Dichloride) [CAS # 75-09-2]

DLS Test Code: 141
Reference Method: NIOSH 1005, 4th Edition
Statistical Parameters: B = -4.1%; sr = 0.073; A = 14.1%
Collection Media: **TWO** Solid Sorbent Tubes in Series [Coconut Shell Charcoal, 100/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 0.5 - 2.5
Special Instructions:
1. ***SEPARATE THE FRONT AND BACK TUBES AND CAP EACH TUBE BEFORE SHIPMENT TO PREVENT MIGRATION OF METHYLENE CHLORIDE BETWEEN TUBES.***
2. ***SAMPLE STABILITY NOT DETERMINED.***

Methylene Dianiline -- Please Call the DLS IH Technical Consultant for Information.

Methylene Dichloride [CAS # 75-09-2] -- See Methylene Chloride, DLS Test Code: 141

Methyl Ethyl Ketone (2-Butanone, MEK) [CAS # 78-93-3]

DLS Test Code: 134
Reference Method: OSHA 16
Statistical Parameters: Standard Error of Estimate = 5.9%; Overall Precision = Not Given
Collection Media: **TWO** Solid Sorbent Tubes in Series [Silica gel tubes, 150/75 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.1 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 3 (No Range Given in Reference Method)
Special Instructions: ***SEPARATE THE FRONT AND BACK TUBES AND CAP EACH TUBE BEFORE SHIPMENT TO PREVENT MIGRATION OF METHYL ETHYL KETONE BETWEEN TUBES.***

Methyl Ethyl Ketone Peroxide -- Please Call the DLS Technical Consultant for Information.

Methyl Isobutyl Ketone (MIBK) [CAS # 108-10-1]

DLS Test Code: 138
Reference Method: NIOSH 1300, 4th Edition
Statistical Parameters: B = Not Given; sr = 0.064; A = Not Given
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2; 400 mg/200 mg Tube Size: 0.02 - 0.25
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 10; 400 mg/200 mg Tube Size: 1 - 20
Special Instructions: None

Methyl Methacrylate [CAS # 80-62-6]

DLS Test Code: 140
Reference Method: NIOSH 2537, 4th Edition
Statistical Parameters: B = 2.55%; sr = 0.063; A = +/- 12.6%
Collection Media: Solid Sorbent Tube [XAD-2, 400 mg/200 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.05
Air Collection Volume: Minimum-Maximum (L): 1 - 8
Special Instructions:
1. ***STORE FROZEN.***
2. ***SHIP SAMPLES FROZEN IN DRY ICE OR AT 4 DEGREES CENTIGRADE OR LOWER.***
3. ***SAMPLES STABLE GREATER THAN SEVEN DAYS AT 25 DEGREES CENTIGRADE; GREATER THAN 32 DAYS AT FOUR DEGREES CENTIGRADE.***

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

2-Methyl-2-propanol [CAS # 75-65-0] – See Tert-butyl Alcohol, DLS Test Code: 1226

MIAK (Methyl Isoamyl Ketone, 5-Methyl-2-Hexanone) [CAS # 110-12-3]

DLS Test Code: 1078
Reference Method: Modified NIOSH 1300, 4th Edition
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 10
Special Instructions: None

MIBK [CAS Number: 108-10-1] – See Methyl Isobutyl Ketone, DLS Test Code: 138

Mineral Oil

DLS Test Code: 198
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: Unknown
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1.3 - 20
400 mg/200 mg Tube Size: 10 - 40
Special Instructions: ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

Mineral Spirits [CAS # 8052-41-3]

DLS Test Code: 142
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = -4.37%; sr = 0.052; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1.3 - 20
400 mg/200 mg Tube Size: 10 - 40
Special Instructions:
1. ***A SMALL BULK SAMPLE (5 to 10 ML) IS REQUIRED. THE BULK SAMPLE MUST BE SHIPPED IN A SEPARATE CONTAINER TO AVOID CONTAMINATION OF SAMPLING TUBES.***
2. ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

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Molybdenum [CAS # 7439-98-7]

DLS Test Code: 143
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 67
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Monofluorotrichloromethane [CAS # 75-69-4] -- See Trichlorofluoromethane, DLS Test Code: 996

Naphthalene [CAS # 91-20-3]

DLS Test Code: 149
Reference Method: NIOSH 1501, 4th Edition
Statistical Parameters: B = -2.6%; sr = 0.055; A = +/-11.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: Equal to or Less Than 1.0
400 mg/200 mg Tube Size: 0.2 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 100 - 200
400 mg/200 mg Tube Size: 25 - 40
Special Instructions: None

Nickel [CAS # 7440-02-0]

DLS Test Code: 652
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 25 - 1000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Nitric Acid [CAS # 7697-37-2]

DLS Test Code: 152
Reference Method: NIOSH 7903, 3rd Edition
Statistical Parameters: B = Not Given; sr = 0.085; A = +/-18.7%
Collection Media: Solid Sorbent Tube: High Purity Washed Silica Gel, 400/200 mg [ORBO 53 tube or equivalent]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 0.5
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: *STABLE AT LEAST 21 DAYS AT 25 DEGREES CENTIGRADE.*

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Nitric Oxide and Nitrogen Dioxide (NO/NO_2)[CAS # 10102-43-9 and 10102-44-0]

DLS Test Code: 109
Reference Method: CAD CAB 61.2
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [Custom ORBO 76 or equivalent]]
Sample Flow Rate: Minimum-Maximum (LPM): 0.02 - 0.05
Air Collection Volume: Minimum-Maximum (L): 2 - 12
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY A MINIMUM OF THREE FIELD BLANKS.*

Nitrous Oxide – Please Call the DLS Technical Consultant for information.

Nitroglycerin (NG) [CAS # 55-63-00] **DLS-MAIN ONLY**

DLS Test Code: 018
Reference Method: NIOSH 2507, 4th Edition
Statistical Parameters: B = -0.02%; sr = 0.089; A = +/-20.3%
Collection Media: Solid Sorbent Tube [Tenax-GC tube, 100/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 1.0
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: *STABLE AT LEAST 25 DAYS AT 25 DEGREES CENTIGRADE.*

Nuisance Dust (Respirable) – See Dust, Nuisance (Respirable), DLS Test Code: 1188

Nuisance Dust (Total) – See Dust, Nuisance (Total), DLS Test Code: 1227

Octachlor [CAS # 57-74-9] – See Chlordane, DLS Test Code: 1126

Oil Mist

DLS Test Code: 159
Reference Method: Modified NIOSH 0500, 4th Edition (Note: This analysis is performed gravimetrically.)
Statistical Parameters: Not Available
Collection Media: Filter [PVC membrane, 5 micron, closed-face]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 400 - 1000
Special Instructions: None

Organophosphorus Pesticides (OP) [CAS # Various] **DLS-MAIN ONLY**

Includes Chloropyrifos (Dursban), DDVP (Dichlorvos), Diazinon ,Malathion, and Parathion
DLS Test Code: 531
Reference Method: OSHA 62
Statistical Parameters: See Individual Listings
Collection Media: Filter **AND** Solid Sorbent Tube [13-mm, Glass fiber filter **AND** XAD-2, 270/140 mg]

Sample Flow Rate (LPM):	1.0 for All Parameters	(No Range Given in Reference Method)
Air Collection Volume (L):	480 L at 1.0 L/min except for Malathion	(No Range Given in Reference Method)
	60 L at 1.0 L/min for Malathion	(No Range Given in Reference Method)

Special Instructions: None

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Ozone [CAS # 10028-15-6]
DLS Test Code: 160
Reference Method: NIOSH S297, 2nd Edition
Statistical Parameters: Not Applicable
Special Instructions: ***THIS ANALYTE HAS AN EXTREMELY SHORT HOLDING TIME PRIOR TO ANALYSIS DUE TO RAPID DEGRADATION. PLEASE CALL THE DLS CHPPM-MAIN IH TECHNICAL CONSULTANT PRIOR TO COLLECTION OF SAMPLES IN ORDER TO COORDINATE SHIPMENT AND ANALYSIS.***

Parathion [CAS # 56-38-2] **DLS-MAIN ONLY**
DLS Test Code: 1325
Reference Method: OSHA 62
Statistical Parameters: Standard Error of Estimate = 5.3%; Precision = +/-10.3%
Collection Media: Filter **AND** Solid Sorbent Tube [13-mm, Glass fiber filter **AND** XAD-2, 270/140 mg]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 480 (No Range Given in Reference Method)
Special Instructions: None

PAH's [CAS # various] – See Polynuclear Aromatic Hydrocarbons, DLS Test Code: 020

PCB's [CAS # various] – See Polychlorinated Biphenyls, DLS Test Code: 524

PCP [CAS # 87-86-5] – See Pentachlorophenol, DLS Test Code: 999

Pentachlorophenol (PCP) [CAS # 87-86-5]
DLS Test Code: 999
Reference Method: OSHA 39
Statistical Parameters: Standard Error of Estimate = 6.9%; Overall Precision = Not Given
Collection Media: Solid Sorbent Tubes [Two XAD-7 Tubes in Series, each 175 mg and one extra XAD-7 Tube, 175 mg; (SKC Catalog # 226-97]
Sample Flow Rate (LPM): 0.2 (No Range Given in Reference Method)
Air Collection Volume (L): 48 (No Range Given in Reference Method)
Special Instructions: ***TWO TUBES IN SERIES ARE USED FOR SAMPLING. AFTER SAMPLING, THE THIRD XAD-7 TUBE (WHICH WAS NOT USED IN THE SAMPLING TRAIN) MUST BE PLACED IN FRONT OF THE FIRST SAMPLING TUBE IN THE SERIES. THIS THIRD TUBE CAPTURES ANY PCP WHICH MIGHT VOLATILIZE FROM THE FILTERS AFTER SAMPLING. PLEASE CONTACT THE DLS CHPPM-MAIN IH TECHNICAL CONSULTANT FOR ADDITIONAL GUIDANCE.***

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n-Pentane [CAS # 111-65-9]
DLS Test Code: 1000
Reference Method: NIOSH 1500, 4th Edition
Statistical Parameters: B = -8.4%; sr = 0.055; A = +/-16.6%
Collection Media: Solid Sorbent Tubes [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): Equal to or less than 0.05
Air Collection Volume: Minimum-Maximum (L): 2 (No Range Given in Reference Method)
Special Instructions: None

1,5-Pentanedial [CAS Number: 111-30-8] – See Glutaraldehyde, DLS Test Code: 099

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Perchloroethylene (Tetrachloroethylene) [CAS # 127-18-4]

DLS Test Code: 165
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -7.2%; sr = 0.052; A = +/-15.1%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	0.2 - 40
	400 mg/200 mg Tube Size:	5 - 30

Special Instructions: ***SAMPLE STABILITY NOT DETERMINED.***

Petroleum Distillates

DLS Test Codes: 166
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = -4.37%; sr = 0.052; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1.3 - 20
	400 mg/200 mg Tube Size:	10 - 40

Special Instructions:
1. ***A SMALL BULK SAMPLE (5 to 10 ML) IS <u>REQUIRED</u>. THE BULK SAMPLE MUST BE SHIPPED IN A SEPARATE CONTAINER TO AVOID CONTAMINATION OF SAMPLING TUBES.***
2. ***STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.***

Petroleum Naphtha

DLS Test Codes: 167
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = -4.37%; sr = 0.052; A = +/-12.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1.3 - 20
	400 mg/200 mg Tube Size:	10 - 40

Special Instructions:
1. **A SMALL BULK SAMPLE (5 to 10 ML) IS <u>REQUIRED</u>. THE BULK SAMPLE MUST BE SHIPPED IN A SEPARATE CONTAINER TO AVOID CONTAMINATION OF SAMPLING TUBES.**
2. **STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.**

Phenol [CAS # 108-95-2]

DLS Test Code: 169
Reference Method: Modified OSHA 32
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [XAD-7 tube, 100/50 mg]

Sample Flow Rate (LPM):	0.10	(No Range Given in Reference Method)
Air Collection Volume (L):	24	(No Range Given in Reference Method)

Special Instructions: None

IMPORTANT

<u>PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.</u>

The last revision of the hard copy of this Procedure List was completed in September, 1997.
If an Analyte of Interest is not listed, please contact the DLS CHPPM-MAIN IH Technical Consultant at 584-2208 (DSN) or 410-671-2208 (Commercial). Some tests are not performed routinely, but are available upon Special Request.

Phosphoric acid (H_3PO_4) [CAS # 7664-38-2]
DLS Test Code: 170
Reference Method: NIOSH 7903, 3rd Edition
Statistical Parameters: B = Not Given; sr = 0.096; A = +/- 19.7%
Collection Media: Solid Sorbent Tube: High Purity Washed Silica Gel, 400/200 mg [ORBO 53 tube or equivalent]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 0.5
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: ***STABLE AT LEAST 21 DAYS AT 25 DEGREES CENTIGRADE.***

Phosphorus, White or Yellow [CAS # 7723-14-0]
DLS Test Code: 917
Reference Method: NIOSH 7905, 4th Edition
Statistical Parameters: B = 5.5%; sr = 0.090; A = +/- 21.3%
Collection Media: Solid Sorbent Tube [Tenax-GC tube, 100/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 5 - 100
Special Instructions: ***STABLE AT LEAST 21 DAYS AT 25 DEGREES CENTIGRADE.***

PNA's [CAS # various] – See Polynuclear Aromatic Hydrocarbons, DLS Test Code: 020

Polychlorinated Biphenyls (PCB's) [CAS # various]
DLS Test Code: 524
Reference Method: NIOSH 5503, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter **AND** Solid Sorbent Tube [13-mm Glass fiber filter **AND** Florisil® tube, 100/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1- 50
Special Instructions: *1. GLASS FIBER FILTER MUST BE TRANSFERRED TO GLASS VIAL FOR SHIPMENT TO LABORATORY.*
2. SAMPLE STABILITY FOR FILTERS UNKNOWN; TWO MONTHS FOR FLORISIL.

Polynuclear Aromatic Hydrocarbons (PAH's, PNA's) [CAS #: Various]
DLS Test Code: 020
Reference Method: NIOSH 5506 or 5515, 4th Edition
Statistical Parameters: Not Measured
Collection Media: Filter **and** Solid Sorbent Tube [37-mm PTFE, 2 micron **and** ORBO 43 tube]
Sample Flow Rate (LPM): 2.0 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 200 - 1000
Special Instructions: *1. PTFE FILTER MUST BE TRANSFERRED TO A GLASS VIAL AFTER SAMPLING.*
2. BOTH THE FILTER AND TUBE SHOULD BE WRAPPED IN FOIL.
3. STORE AND SHIP SAMPLES FROZEN AT 0 DEGREES CELSIUS.
4. EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 6 TO 10 MEDIA BLANKS.
5. SAMPLE STABILITY UNKNOWN; PROTECT FROM HEAT AND UV RADIATION.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Potassium [CAS # 7440-09-7]

DLS Test Code: 172
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 25 - 2000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

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n-Propyl Alcohol (1-Propanol) [CAS # 71-23-8]

DLS Test Code: 1326
Reference Method: NIOSH 1401, 4th Edition
Statistical Parameters: B = Not Significant; sr = 0.075; A = +/-15%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 10
400 mg/200 mg Tube Size: 2 - 20
Special Instructions: *1. STORE IN FREEZER AND SHIP REFRIGERATED.*
2. SINGLE ANALYTE SAMPLE TUBE REQUIRED.
NOTE: The Analytical Protocol for this Contaminant Requires the Use of a Modifier to the Desorption Solvent. Because of this Requirement, Use a Separate Sampling Tube If Other Analyses Are Desired.
3. SAMPLE STABILITY UNKNOWN.

RADIOCHEMICAL/HEALTH PHYSICS LABORATORY ANALYSES:

For questions regarding Ionizing Radiation contact the Program Manager for Industrial Health Physics at DSN 584-3502. For Medical Health Physics questions, please contact the Program Manager at DSN 584-3548. For sampling and sample collection questions, please contact the Division Chief for Radiochemical Testing at DLS-Main at DSN 584-3983. Usually only one call is necessary, since USACHPPM personnel work closely together and will provide the appropriate interaction needed.

RDX (Cyclonite) [CAS # 121-82-4]

DLS Test Code: To Be Assigned
Reference Method: CAD CAB 13.1 for Sample Analysis
OSHA 44 for Sampling Requirements
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [ORBO 79 tube, or equivalent]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 15 - 50
Special Instructions: *1. THE AIR SAMPLING PUMP MUST BE CERTIFIED BY NIOSH OR MSHA AS INTRINSICALLY SAFE FOR USE IN COAL MINES.*
2. SAMPLES STABLE AT LEAST 19 DAYS AT AMBIENT TEMPERATURE.

IMPORTANT
PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

The last revision of the hard copy of this Procedure List was completed in September, 1997.
If an Analyte of Interest is not listed, please contact the DLS CHPPM-MAIN IH Technical Consultant at 584-2208 (DSN) or 410-671-2208 (Commercial). Some tests are not performed routinely, but are available upon Special Request .

Refractory Ceramic Fibers – Please Call the DLS Technical Consultant for Information.

Respirable Dust, Nuisance – See Dust, Nuisance (Respirable), DLS Test Code: 1188

Selenium [CAS # 7782-49-2]

DLS Test Code: 989
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 2000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Silica-Crystalline, Respirable [CAS # 7631-86-9] **DLS-MAIN ONLY**

DLS Test Code: 176
Reference Method: NIOSH 7500, 4th Edition
Statistical Parameters: B = None Known; sr = 0.09; A = +/- 18%
Collection Media: Cyclone **and** Filter [10-mm Nylon Cyclone *OR*
Higgins-Dewell (HD) Cyclone **and** Tared 5 micron PVC membrane]
Sample Flow Rate: Minimum-Maximum (LPM): For Nylon Cyclone: 1.7 (No Range Given in Reference Method)
For HD Cyclone: 2.2 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 400 - 1000
Special Instructions: *BLANKS SHOULD ACCOMPANY SAMPLES AT A 10% FREQUENCY RATE.*

Silver [CAS # 7440-22-4]

DLS Test Code: 177
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum(L): 250 - 2000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Sodium [CAS # 7440-23-5]

DLS Test Code: 654
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 13 - 2000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Stoddard Solvent [CAS # 8052-41-3]
DLS Test Code: 180
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = -3.10%; sr = 0.052; A = +/-11.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1.3 - 20
400 mg/200 mg Tube Size: 5 - 400
Special Instructions: *STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.*

Styrene [CAS # 100-42-5]
DLS Test Code: 181
Reference Method: NIOSH 1501, 4th Edition
Statistical Parameters: B = -7.9%; sr = 0.058; A = +/-16.7%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: Equal to or Less Than 1.0
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 14
400 mg/200 mg Tube Size: 5 - 400
Special Instructions: None

Sulfur dioxide [CAS # 7446-09-5] **DLS-MAIN ONLY**
DLS Test Code: 183
Reference Method: CAD CAB 55.1
Statistical Parameters: Not Available
Collection Media: Solid Sorbent Tube [Custom ORBO 76 or equivalent (SKC 226-80)]
Sample Flow Rate: Minimum-Maximum (LPM): 0.02 - 0.05
Air Collection Volume: Minimum-Maximum (L): 2 - 12
Special Instructions: None

Sulfuric acid (H_2SO_4) [CAS # 7664-93-9]
DLS Test Code: 182
Reference Method: NIOSH 7903, 3rd Edition
Statistical Parameters: B = Not Given; sr = 0.087; A = +/- 19.4%
Collection Media: Solid Sorbent Tube: High Purity Washed Silica Gel, 400/200 mg [ORBO 53 tube or equivalent]
Sample Flow Rate: Minimum-Maximum (LPM): 0.2 - 0.5
Air Collection Volume: Minimum-Maximum (L): 3 - 100
Special Instructions: *STABLE AT LEAST 21 DAYS AT 25 DEGREES CENTIGRADE.*

TCE [CAS # 79-01-6] -- See Trichloroethylene, DLS Test Code: 184

TDI [CAS # Various] -- See Toluene Diisocyanates, DLS Test Code: 188

Tetrachloroethylene [CAS # 127-18-4] -- See Perchloroethylene, DLS Test Code: 165

IMPORTANT

PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

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1,1,2,2-Tetrachloroethane [CAS # 79-34-5]
DLS Test Code: 1001
Reference Method: NIOSH 1019, 4th Edition
Statistical Parameters: B = 6.6%; sr = 0.057; A = +/- 16.7%
Collection Media: Solid Sorbent Tube [Petroleum Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 3 - 30
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Tetrahydrofuran [CAS # 109-99-9]
DLS Test Code: 185
Reference Method: NIOSH 1609, 4th Edition
Statistical Parameters: B = - 3.9%; sr = 0.055; A = +/- 12.6%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.25
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 9
400 mg/200 mg Tube Size: 5 - 24
Special Instructions: *SAMPLE STABILITY UNKNOWN.*

Tin [CAS #]
DLS Test Code: 1189
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 500
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Titanium [CAS # 7440-32-6]
DLS Test Code: 1027
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 100
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

TNT [CAS # 118-96-7] – See 2,4,6-Trinitrotoluene, DLS Test Code: 013

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Toluene [CAS # 108-88-3]
DLS Test Code: 187
Reference Method: NIOSH 1501, 4th Edition
Statistical Parameters: B = -1.6%; sr = 0.052; A = +/-10.9%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	Equal to or Less Than 0.20
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	1 - 8
	400 mg/200 mg Tube Size:	5 - 40

Special Instructions: None

Toluene Diisocyanates (TDI) [CAS #Various]
DLS Test Code: 188
Reference Method: OSHA 42
Statistical Parameters: Standard Error of Estimate = 6.89%; Overall Precision = +/- 13.5%
Collection Media: Filter [ORBO 80 filter, or equivalent]

Sample Flow Rate: Minimum-Maximum (LPM):	1.0	(No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L)	15	(No Range Given in Reference Method)

Special Instructions: ***SAMPLING MEDIA MUST BE STORED IN REFRIGERATOR PRIOR TO USE.***

Total Dust, Nuisance – See Dust, Nuisance (Total), DLS Test Code: 1227

Total Weight – See, Weight, Total , DLS Test Code: 1125

Toxichlor [CAS # 57-74-9] – See Chlordane, DLS Test Code: 1126

1,1,1-Trichloroethane [CAS # 71-55-6] – See Methylchloroform, DLS Test Code: 133

1,1,2-Trichloroethane [CAS # 70-00-5]
DLS Test Code: 190
Reference Method: NIOSH 1003, 4th Edition
Statistical Parameters: B = -9.0%; sr = 0.057; A = +/-17.5%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	0.01 - 0.2
	400 mg/200 mg Tube Size:	0.05 - 0.2
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	0.1 - 8
	400 mg/200 mg Tube Size:	10 - 40

Special Instructions: ***SAMPLE STABILITY NOT DETERMINED.***

1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113, Refrigerant 113) [CAS #76-13-1]
DLS Test Code: 093
Reference Method: NIOSH 1020, 4th Edition
Statistical Parameters: B = -2.3%; sr = 0.07; A = +/-14.1%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal] 100 mg/50 mg Tube Size
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.05
Air Collection Volume: Minimum-Maximum (L): 0.1 - 3
Special Instructions: ***SHIP REFRIGERATED.***

IMPORTANT
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Trichloroethene [CAS # 79-01-6] -- See Trichloroethylene, DLS Test Code: 184

Trichloroethylene (TCE, Trichloroethene, Ethylene Trichloride, Triclene) [CAS # 79-01-6]

DLS Test Code: 184
Reference Method: NIOSH 1022, 4th Edition
Statistical Parameters: B = -7.19%; sr = 0.082; A = +/-19.78%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1 - 30
400 mg/200 mg Tube Size: 5 - 40
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

Trichlorofluoromethane (Freon 11, Monofluorotrichloromethane) [CAS # 75-69-4]

DLS Test Code: 996
Reference Method: NIOSH 1006, 4th Edition
Statistical Parameters: B = -2.66%; sr = 0.072; A = +/-16.08%
Collection Media: Solid Sorbent Tube [Coconut shell charcoal tube, 400/200 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.05
Air Collection Volume: Minimum-Maximum (L): 0.3 - 7
Special Instructions: *1. STORE AND SHIP REFRIGERATED.*
2. QUANTITATIVE RECOVERY AFTER 7 DAYS AT 25 DEGREES CENTIGRADE.

Triclene [CAS # 79-01-6] -- See Trichloroethylene, DLS Test Code: 184

2,4,6-Trinitrotoluene (TNT) [CAS # 118-96-7] **DLS-MAIN ONLY**

DLS Test Code: 013
Reference Method: CAD CAB 13.1 for Sample Analysis
OSHA 44 for Sampling Requirements
Statistical Parameters: Standard Error of Estimate = 8.2%; Overall Precision = +/- 16.1%
Collection Media: Solid Sorbent Tube [ORBO 79 or equivalent]
Sample Flow Rate (LPM): 1.0 (No Range Given in Reference Method)
Air Collection Volume (L): 60 (No Range Given in Reference Method)
Special Instructions: *1. THE AIR SAMPLING PUMP MUST BE CERTIFIED BY NIOSH OR MSHA AS INTRINSICALLY SAFE FOR USE IN COAL MINES.*
2. SAMPLES STABLE AT LEAST 19 DAYS AT AMBIENT TEMPERATURE.

Triorthocresylphosphate [CAS # 78-30-8]

DLS Test Code: 1037
Reference Method: NIOSH 5037, 4th Edition
Statistical Parameters: B = -1.0%; sr = 0.086; A = +/-16.9%
Collection Media: Filter [0.8 micron mixed cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 3.0
Air Collection Volume: Minimum-Maximum (L): 2 - 100
Special Instructions: *SAMPLE STABILITY NOT DETERMINED.*

FIELD BLANK SAMPLES MUST BE SUBMITTED WITH EACH SET OF SAMPLES FOR EVERY TYPE OF MEDIA.
- A Minimum of One Field Blank for Every 10 Samples or Fraction Thereof.
- The Field Blanks must Be from the Same Lot Number as the Samples.
- Some Analytes Require Extra Field Blanks. See Individual Analytes for Specifics.

Turpentine (Turpine) [CAS # 8006-64-2]
DLS Test Code: 1327
Reference Method: NIOSH 1551, 4th Edition
Statistical Parameters: B = -1.4%; sr = 0.055; A = +/-11.4%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal, 100 mg/50 mg]
Sample Flow Rate: Minimum-Maximum (LPM): 0.01 - 0.2
Air Collection Volume: Minimum-Maximum (L): 1 - 10
Special Instructions: *STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.*

Unknowns, Industrial Hygiene Organics, DLS Test Code: 116: Contact the IH Technical Consultant for Information

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Vanadium [CAS # 7440-62-2]
DLS Test Code: 194
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 2000
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*
Note: See Chapter 2 for a Discussion of the Analytical Limitations of the Test Method.

Vinyl Chloride (Chloroethylene, Chloroethene) [CAS # 75-01-4]
DLS Test Code: 993
Reference Method: NIOSH 1007, 4th Edition
Statistical Parameters: B = -6%; sr = 0.06; A = +/-17.8%
Collection Media: Solid Sorbent Tube [Two Tandem Tubes, Each with 150 mg Activated Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 0.05 (No Range Given in Reference Method)
Air Collection Volume: Minimum-Maximum (L): 0.7 - 5
Special Instructions:
1. *BEFORE SHIPMENT, SEPARATE THE PRIMARY AND THE BACK-UP TUBE AND SECURELY CAP EACH. CLEARLY INDICATE WHICH ONE IS THE PRIMARY TUBE.*
2. *STABLE 10 DAYS AT 25 DEGREES CENTIGRADE.*

VM&P Naphtha [CAS # 8032-32-4]
DLS Test Code: 196
Reference Method: NIOSH 1550, 4th Edition
Statistical Parameters: B = 5.99%; sr = 0.051; A = +/-15.0%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]
Sample Flow Rate: Minimum-Maximum (LPM): 100 mg/50 mg Tube Size: 0.01 - 0.2
400 mg/200 mg Tube Size: 0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L): 100 mg/50 mg Tube Size: 1.3 - 20
400 mg/200 mg Tube Size: 5 - 400
Special Instructions: *STABLE AT LEAST ONE WEEK AT 25 DEGREES CENTIGRADE.*

IMPORTANT
PLEASE SEND SAMPLES TO THE LABORATORY AS SOON AS POSSIBLE AFTER COLLECTION.

The last revision of the hard copy of this Procedure List was completed in September, 1997.
If an Analyte of Interest is not listed, please contact the DLS CHPPM-MAIN IH Technical Consultant at 584-2208 (DSN) or 410-671-2208 (Commercial). Some tests are not performed routinely, but are available upon Special Request .

Weight, (Total)

DLS Test Code: 1125
Reference Method: NIOSH 0500, 4th Edition
Statistical Parameters: B = 0.01%; sr = 0.056; A = +/- 11.04%
Collection Media: Filter [Tared, 37-mm, 5 micron PVC membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 25 - 133
Special Instructions: *1. EACH SET OF TEN SAMPLES SHOULD BE ACCOMPANIED BY 2 FIELD BLANKS.*
2. SAMPLE STABLE INDEFINITELY.

Welding fumes, Total

DLS Test Code: 197
Reference Method: Modified NIOSH 0500, 4th Edition
Statistical Parameters: Not Available
Collection Media: Filter [37 mm, tared PVC membrane, 5 micron]
Sample Flow Rate: Minimum-Maximum (LPM): 1 - 2
Air Collection Volume: Minimum-Maximum (L): 400 - 1000
Special Instructions: *SECURE SAMPLING CASSETTE INSIDE WELDER'S HELMET.*

Wood Alcohol [CAS # 67-56-1] – See Methanol, DLS Test Code: 128

Xylenes [CAS # 108-88-3]

DLS Test Code: 199
Reference Method: NIOSH 1501, 4th Edition
Statistical Parameters: B = -1.2%; sr = 0.060; A = +/-12.2%
Collection Media: Solid Sorbent Tube [Coconut Shell Charcoal]

Sample Flow Rate: Minimum-Maximum (LPM):	100 mg/50 mg Tube Size:	Equal to Less Than 0.20
	400 mg/200 mg Tube Size:	0.05 - 0.5
Air Collection Volume: Minimum-Maximum (L):	100 mg/50 mg Tube Size:	2 - 23
	400 mg/200 mg Tube Size:	5 - 40

Special Instructions: None

Zinc [CAS # 1314-13-2]

DLS Test Code: 200
Reference Method: NIOSH 7300, 4th Edition
Statistical Parameters: B = Not Identified; sr = Not Evaluated; A = Not Determined
Collection Media: Filter [0.8 micron cellulose ester membrane]
Sample Flow Rate: Minimum-Maximum (LPM): 1.0 - 4.0
Air Collection Volume: Minimum-Maximum (L): 5 - 200
Special Instructions: *EACH SET OF SAMPLES SHOULD BE ACCOMPANIED BY 2 TO 10 FIELD BLANKS.*

APPENDIX C

OCONUS SUPPORT SERVICES AND IH PROCEDURE LIST

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SECTION 1
USACHPPM OCONUS SUPPORT SERVICES

C-1. CUSTOMER SUPPORT SERVICES.

Good lines of communication with customers offer the USACHPPM Laboratories the ability to respond to customer needs. Communication and interaction with the USACHPPM Laboratories should begin in the earliest stages of project planning and continue throughout the entire life of the project.

C-2. PROJECT COORDINATION INFORMATION.

a. **USACHPPM-EUROPE:**

IH CUSTOMERS IN EUROPE, AFRICA, AND THE MIDDLE EAST should coordinate their sampling activities with the USACHPPM-EUROPE Laboratory at the addresses listed below:

APO ADDRESS

CDR, USACHPPM-EUROPE
Department of Laboratory Sciences
ATTN: MCHB-AE-LS
CMR 402
APO AE 09180-3619

COMMERCIAL OR CIVILIAN ADDRESS

USACHPPM-EUROPE
Department of Laboratory Sciences
Bldg. 3810, Room 307
Kirchberg Kaserne
66849 Landstuhl
Germany

POC: Customer Support Division or CSD

Telephone:	(DSN) 486-8381/7052 (Commercial or Civilian) 06371-86-8381 (From CONUS) 011-49-6371-86-8381
Fax:	486-7054 (DSN)
Email:	DLS-HOTLINE@chppm-eur-ccmail.army.mil

b. **USACHPPM-PACIFIC:**

IH Customers in Asia, Alaska and Hawaii should coordinate their sampling activities with the USACHPPM-PACIFIC Laboratory at the addresses listed below:

APO ADDRESS:

CDR, USACHPPM-PACIFIC
ATTN: MCHB-AJ-EL/Sample Coordinator
APO AP 96343-5006

COMMERCIAL OR CIVILIAN ADDRESS:

USACHPPM-PACIFIC
Beigun Jutaku No 715
Camp Zama
Zama-shi
Kanagawa-ken
Japan T228

POC: Customer Support Division or CSD

Telephone:	(DSN) 263-8418 Commercial within Japan: 0462-51-1520, Ext. 273-8418 Commercial from outside Japan: 011 81 3117 63 8418
Fax:	(DSN) 263-8430 Commercial within Japan: 0462-51-1520, Ext. 273-8430 Commercial from outside Japan: 011 81 3117 63 8430
E-Mail:	apaj-eh-el@zama-emh1.army.mil

SECTION 2

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD	SAMPLER	SAMPLE RATE LPM	SAMPLE VOLUME		PREP/ANALYSIS HOLDING TIME
	SAE or Sr (T)	MEDIA		MIN	MAX	
L ORGANICS						
Acetone	NIOSH 1300	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	0.5 L	3 L	ND
	Sr (T) 0.082					
Benzene	NIOSH 1501	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	5 L	30 L	ND
Bulk sample: 1 -10mL Vial, foil or PTFE lined cap	Sr (T) 0.059					
Benzene (*)	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
Bulk sample: 1 -10mL Vial, foil or PTFE lined cap	SAE ND					
Bromoform	NIOSH 1003	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	4 L	70 L	ND
	Sr (T) 0.071					
n-butyl acetate	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
	SAE ND					
Carbon Tetrachloride	NIOSH 1003	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	3 L	150 L	ND
(tetrachloromethane)	Sr (T)					
Chlorobenzene	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
	SAE ND					

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD SAE or Sr (T)	SAMPLER MEDIA	SAMPLE RATE LPM	SAMPLE VOLUME MIN	 MAX	PREP/ANALYSIS HOLDING TIME
Chloroform	NIOSH 1003	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	15 L	ND
(Trichloromethane)	Sr (T)					
Cyclohexane	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
	SAE ND					
Cyclohexanone	NIOSH 1300	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	10 L	ND
	Sr (T)					
Enflurane (ethrane)	3M	OVM		15 min minimum 8 hr recommended		ND
Ethyl amyl ketone	NIOSH 1301	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	251 L	ND
	Sr(T) 0.66					
Ethyl benzene	NIOSH 1501	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.1 LPM	1 L	24 L	ND
Bulk sample: 1 -10mL Vial, foil or PTFE lined cap	Sr (T)					
Ethyl benzene (*)	OSHA 07	Solid sorbent tube coconut.shell charcoal 100mg/50mg.	0.2 LPM	10L	10L	ND
Bulk sample: 1 -10mL Vial, foil or PTFE lined cap	SAE ND					
Ethylene Dichloride (1,2 Dichloroethane)	OSHA 07	Solid sorbent tube coconut. shell charcoal 100mg/50mg.	0.2 LPM	10L	10L	ND
	SAE ND					

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD	SAMPLER	SAMPLE RATE LPM	SAMPLE VOLUME		PREP/ANALYSIS HOLDING TIME
	SAE or Sr (T)	MEDIA		MIN	MAX	
Ethylene oxide (*)	3 M	OVM		15 min minimum 8 hr recommended		ND
Finger Print Compounds (Kerosene, JP-4, JP-8, Stoddard Solvent, Turpentine, VM&P naptha)	NIOSH 1550	Bulk	Vial, foil or PTFE lined cap	5 mL	10 mL	2 weeks
	OSHA 48	Bulk	Vial, foil or PTFE lined cap	5 mL	10	
	(Qualitative)					
Forane (Isoflurane)	3 M	OVM		15 min minimum 8 hr recommended		2 weeks
Formaldehyde	NIOSH 2541	Solid sorbent tube (10% on hydroxymethyl piperidine XAD-2) 120mg/60mg.	0.01 - 0.1 LPM	3 L	36 L	3 weeks @ 25 C
	Sr (T) ND					
	NIOSH 3500	Filter (1µm PTFE) + 2 1% Impingers (with 20 ml of sodium bisulfite)	0.2 - 1.0 LPM	1 L	100 L	30 days @ 25 C
	Sr (T) 0.03					
Glutaraldehyde	NIOSH 2532	Coated Silica Gel, 300/150 mg	0.05 - 0.5 LPM	1 L	30 L	3 weeks @ 25 C
Halothane	3 M	OVM		15 min minimum 8 hr recommended		ND
n-heptane	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	5 L	5 L	ND
	SAE ND					

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD	SAMPLER	SAMPLE RATE LPM	SAMPLE VOLUME		PREP/ANALYSIS HOLDING TIME
	SAE or Sr (T)	MEDIA		MIN	MAX	
n-hexane	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	5 L	5 L	ND
	SAE ND					
Mesityl Oxide	NIOSH 1301	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	25 L	ND
	Sr (T)					
Methylene Chloride (dichloromethane)	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	2 L	2 L	ND
	SAE ND					
Methyl (n-amyl) ketone (2-Heptanone)	NIOSH 1301	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	25 L	ND
	Sr (T)					
Methyl Ethyl Ketone (2-butanone)	NIOSH 1301	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	0.25 L	12 L	6 weeks @ 25 C
	Sr (T)					
Methyl isoamyl ketone (MIAK)	NIOSH 1301	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	25 L	ND
Methyl isobutyl ketone (MIAK or Hexone)	NIOSH 1300	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	10 L	ND
	Sr (T)					
Octane	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.1 LPM	5 L	5 L	ND
	SAE ND					
Pentane	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.05 LPM	1 L	10 L	ND
	SAE ND					

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD SAE or Sr (T)	SAMPLER MEDIA	SAMPLE RATE LPM	SAMPLE VOLUME MIN	 MAX	PREP/ANALYSIS HOLDING TIME
n-Pentanone (methyl propyl ketone)	NIOSH 1301	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	10 L	ND
Petroleum Distillates	NIOSH 1550	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1.3 L	20 L	ND
Bulk sample: 5 -10 mL Vial, foil or PTFE lined cap						
Stoddard Solvent	NIOSH 1550	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1.3 L	20 L	ND
Bulk sample: 5 -10 mL Vial, foil or PTFE lined cap						
Tetrachloroethylene (*) (perchloroethylene)	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
	SAE ND					
	NIOSH 1003	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	3 L	3 L	ND
	Sr (T)					
Toluene	NIOSH 1501	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1 L	8 L	ND
	Sr (T)					
Toluene (*)	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
Bulk sample: 1 - 10 mL Vial, foil or PTFE lined cap	SAE 0.12					
1,1,1 trichloroethane (*) (Methylchloroform)	NIOSH 1003	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	3 L	3 L	ND
	Sr (T)					

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD SAE or Sr (T)	SAMPLER MEDIA	SAMPLE RATE LPM	SAMPLE VOLUME MIN	 MAX	PREP/ANALYSIS HOLDING TIME
1,1,1 trichloroethane (Methylchloroform)	OSHA 07 SAE ND	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	0.1 L	8 L	ND
Trichloroethene	OSHA 07	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
VM & A Naptha Bulk sample: 5 -10 mL Vial, foil or PTFE lined cap	NIOSH 1550	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	1.3 L	20 L	ND
Xylene Bulk sample: 1 - 10 mL Vial, foil or PTFE lined cap	NIOSH 1501 Sr (T) 0.06	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.01 - 0.2 LPM	2 L	23 L	ND
Xylene (*) Bulk sample: 1 - 10 mL Vial, foil or PTFE lined cap	OSHA 07 SAE 0.11	Solid sorbent tube coconut shell charcoal 100mg/50mg.	0.2 LPM	10 L	10 L	ND
II. INORGANICS						
Aluminum (Al)	NIOSH 7300 Sr (T) 0.09	Filter, 0.8µm cellulose ester membrane (MCE)	1 - 4 LPM	5 L	100 L	stable

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD	SAMPLER	SAMPLE RATE LPM	SAMPLE VOLUME		PREP/ANALYSIS HOLDING TIME
	SAE or Sr (T)	MEDIA		MIN	MAX	
Asbestos	VDI, 3492	Filter, polcarbonate membrane capillary filter, gold plated 0.8 µm pore size.	8 - 30 LPM	3840 L	14400 L	Indefinite
bulk desired						
Asbestos	NIOSH 7400	Filter, 0.45 to 1.2µm cellulose	0.5 - 16 LPM	400 L	1300 L	Indefinite
bulk desired	Sr (T) 0.24 - 0.36*	ester membrane (MCE), 25 mm dia. conductive cassette		(reduce if 5mg of dust is exceeded)		
Asbestos (Bulk identification)	EPA 600-	Bulk	Large Mouthed Glass Jar	1 grams of mate-rial	10 grams of mate-rial	stable
	R93-116					
Beryllium (Be)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE)	1 - 4 LPM	1250 L	2000 L	stable
	Sr (T) 0.04					
Cadmium (Cd)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	13 L	2000 L	stable
	Sr (T) 0.032					
Cadmium (*) (Cd)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	stable
	SAE 0.11			80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Chromium (Cr)	NIOSH 7300	Filter, 0.8 µm cellulose estermembrane (MCE).	1 - 4 LPM	5 L	1000 L	Stable
	Sr (T) 0.053					
Chromium (Cr)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	Stable
	SAE 0.12			80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD SAE or Sr (T)	SAMPLER MEDIA	SAMPLE RATE LPM	SAMPLE VOLUME MIN	 MAX	PREP/ANALYSIS HOLDING TIME
Cobalt (Co)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	50 L	2000 L	Stable
	Sr (T) 0.04					
Cobalt (*) (Co)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	Stable
				80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Copper (Cu)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	50 L	1000 L	Stable
	Sr (T) 0.04					
Copper (*) (Cu)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480L	960 L	Stable
	SAE 0.11			80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Dust (PNOC)	NIOSH 0500	Filter, tared 37 mm 5 µm PVC PREWEIGHED	1.0 - 2.0 LPM	25 L	133 L	Stable
	Sr (T) 0.056			(reduce if 5 mg of dust is exceeded)		
Dust (Repirable)	NIOSH 0600	Cyclone + Filter, tared 37 mm 5 µm PVC PREWEIGHED	1.7 LPM	20 L	400 L	
	Sr (T) 0.068					
Iron (Fe)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	5 L	100 L	stable
	Sr (T) 0.068					
Iron (*)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	stable
	SAE 0.16			80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Lead (Pb)	NIOSH 7082	Filter, 0.8 µm cellulose ester membrane 37 mm	1 - 4 LPM	200 L	1200 L	stable
	Sr (T) 0.072			(60 L STEL)		

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD	SAMPLER	SAMPLE RATE LPM	SAMPLE VOLUME		PREP/ANALYSIS HOLDING TIME
	SAE or Sr (T)	MEDIA		MIN	MAX	
Lead Based Paint	EPA 7420	Bulk (Chips)	Rigid Container	1 gram	1 gram	stable
bulk sample						
Lead Wipes	EPA 7420	Disposable Wipe	Rigid Container	30 - 100 cm^2	30 - 100 cm^2	Stable
Manganese (Mn)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	5 L	200 L	Stable
	Sr (T) 0.062					
Manganese (*) (Mn)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	Stable
	SAE 0.11			80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Metal Screen on Wipes	OSHA 125	Smear Tabs (preferred) or Filter, Whatman 41	Rigid Container		30 - 30 cm^2	Stable
(Be, Cd, Co, Cr, Cu, Fe, Ni, Mn, Zn) Bulk sample						
Metal Screen on Wipes	OSHA 121	Smear Tabs (preferred) or Filter, Whatman 41	Rigid Container	100 cm^2	100 cm^2	Stable
(Cd, Co, Cu, Fe, Ni, Mn, Zn) Bulk sample						
Nickel (Ni)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	5 L	1000 L	Stable
	Sr (T) 0.027					
Nickel (*) (Ni)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	Stable
	SAE 0.12			80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Nitric Acid	NIOSH 7903	Solid sorbent tube, washed silical gel 400mg/200mg w/ glass fiber filter plug	02. - 0.5 LPM	3 L	100 L	Stable at least 21 days
	Sr (T) 0.085					

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD	SAMPLER	SAMPLE RATE LPM	SAMPLE VOLUME		PREP/ANALYSIS HOLDING TIME
	SAE or Sr (T)	MEDIA		MIN	MAX	
Oil Mist	NIOSH 0500	Filter, tared 37 mm 5 µm PVC PREWEIGHED	1.0 - 2.0 LPM	400 L	1000 L	Stable
	Sr (T) 0.056					
Potassium hydroxide (KOH)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM	480 L	960 L	Stable
				80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Sodium hydroxide (NaOH)	OSHA 121	Filter, 0.8 µm cellulose ester membrane (MCE)	2 LPM			
				480L	960 L	Stable
				80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		
Sulfuric Acid	NIOSH 7300	Solid sorbent tube, washed silical gel 400mg/200mg w/ glass fiber filter plug (ORBO 53).	0.2 - 0.5 LPM	3 L	100 L	Stable at least 21 days
	Sr (T) 0.027					
Welding Fume (NOC)	NIOSH 0500	Filter, tared 37 mm 5 µm PVC PREWEIGHED	105 - 2.0 LPM	25 L	133 L	Stable
	Sr (T) 0.056			(reduce if 5 mg of dust is		

USACHPPM-EUROPE IH PROCEDURE LIST

CONTAMINANT	METHOD SAE or Sr (T)	SAMPLER MEDIA	SAMPLE RATE LPM	SAMPLE VOLUME MIN	 MAX	PREP/ANALYSIS HOLDING TIME
Zinc (Zn)	NIOSH 7300	Filter, 0.8 µm cellulose ester membrane (MCE).	1 - 4 LPM	5 L	200 L	Stable
	Sr (T) 0.013					
Zinc (*) (Zn)	OSHA 121	Filter, 0.8 µm cellulose ester	2 LPM	480 L	960 L	Stable
	SAE 0.10	membrane (MCE)		80L @ 8hrs, 30 L 4 STEL, 10 L Ceiling		

(*) Preferred Method

* = the Sr(T) of asbestos on air filters is based on 1) the analysts CV and 2) the fiber range that is counted.

** = do not use untreated polystyrene foam in shipping container

ORGANIC ANALYTES THAT MUST BE COLLECTED SEPARATELY	METAL COMBINATIONS PER FILTER EACH ROW REPRESENTS ONE FILTER	
Formaldehyde	NIOSH 73 ICP	OSHA 121 AA
Potassium Hydroxide		
Sodium Hydroxide	Al, Be,Cd, Ni	Cd, Co, Cu, Fe, Ni, Mn, Zn
Sulfuric Acid	Cr	Cr
Methly Ethyl Ketone	Co, Mn, Zn	
Glutaradehyde	Cu, Fe	

ABBREVIATIONS

MCE = mixed cellulose ester

PVC = polyvinyl chloride

PTFE = polymer of tetrafluorethylene

OVM = organic vapor monitor

PNOC = particulates not otherwise specified

ND = not determined

SAE = sampling and analytical error (OSHA methods)

Sr(T) = estimate of overall precision including sampling error, replaced CV(T) (NIOSH methods)

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APPENDIX D

INFORMATION ABOUT IH MONITORING SUPPLIES

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SECTION 1
SUGGESTED SOURCES FOR IH MONITORING SUPPLIES

The following list of suggested sources for IH Monitoring Supplies does not imply endorsement by the U.S. Army for these vendors or manufacturers, but is intended only to offer assistance in finding appropriate sampling supplies.

Ace Glass Incorporated
P.O. Box 688
1430 Northwest Blvd.
Vineland, NJ 08360
(609) 692-3333

Advanced Chemical Sensor, Inc
3201 North Dixie Drive
Boca Raton, FL 33431
(561) 338-3116 or -5737

Burkard Manufacturing Co. Ltd.
Woodcock Hill Industrial Estate
Rickmansworth, Hertfordshire WD3 1PJ
England
0923-773134
(Note: Source for Impingers)

Costar Nucleopore
One Alewife Center
Cambridge, MA 02140
(800)-492-1110
(617)-868-6200

Fisher Scientific
Telephone: (800)-766-7000
Fax: (800)-926-1166

Fisher Scientific has multiple Regional Offices. Call the telephone number above to determine which Regional Office is best for you

Internet Address: http://www.fisher1.com

Gelman Sciences
600 South Wagner Road
Ann Arbor, MI 48106
(313) 665-0651
(800) 521-1520

Millipore Corporation
80 Ashby Road
Bedford, MA 01730
(800) 225-1380
(617) 275-9200

Internet Address: http://www.millipore.com

Minnesota Mining & Manufacturing Company (3M)
Occupational Health & Safety Products Division
3M Center, 220-7W-02
St. Paul, MN 55144
(612) 733-8465
(800) 328-1300

SKC, Inc.
RD 1, 395 Valley View Road
Eighty Four, PA 15330-9614
(412) 941-7701
(800) 752-8472

Supelco, Incorporated
Supelco Park
Bellefonte, PA 16823-9900
(800) 247-6628
(814) 359-3441

VWR Scientific Products
Telephone: Orders -- (800) - 932-5000
General -- (610) - 431-1700
Fax: (610)-429-9340

VWR Scientific Products has multiple Regional Offices. Call the telephone number above to determine which Regional Office is best for you

Internet Address: http://www.vwrsp.com

BUYER'S GUIDES FOR IH SUPPLIES

Industrial Hygiene News Buyer's Guide
Circulation Department
8650 Babcock Blvd.
Pittsburgh, PA 15237
(800)-245-3182
(412)-364-5366

American Chemical Society
Environmental Buyer's Guide
1155 16th Street, NW
Washington, DC 20036
(202)-872-4600

SECTION 2
EXAMPLES OF ACCEPTABLE IH MONITORING SUPPLIES

The following tables give examples of different types of monitoring supplies which are acceptable for use with the test methods used at USACHPPM Laboratories. The information in the tables, which gives product information and suggested sources does not imply endorsements by the U.S. Army for these products, but is intended only to offer assistance in finding appropriate sampling supplies.

Table D-1: FILTERS

SAMPLER TYPE	SIZE (MM)	POROSITY (MICRONS)	SUGGESTED SOURCE	CATALOG NUMBER
Cellulose Ester (CE) (Note: For Asbestos use a 25 mm monitor with 50 mm conductive extension cowl.)	25 25	0.8 0.8	Gelman Millipore®	64677 AWWP-025-0000
	37 37	0.8 0.8	Gelman Millipore®	64678 (GN-4) AAWP-037-0000
Glass Fiber (For PCBs)	13 37	– –	SKC Gelman	225-16 Type A/E
Polymer of Tetrafluoroethylene (PTFE) [Zefluor] – For PAH	37	2	Gelman	P5PJO37
Polyvinyl Chloride (PVC)	37	5	Gelman	66467
Swinnex Cassette (For PCBs)	13	–	Millipore®	SX 00-013-0000

®Millipore is a registered trademark of Millipore Filter Corp., Bedford, MA.
Use of trademarked names does not imply endorsements by the U.S. Army but it intended only to assist in identification of a specific product.

Table D-2: PASSIVE MONITORS

SAMPLER TYPE	SUGGESTED SOURCE	CATALOG NUMBER
Ethylene Oxide	3M® Advanced Sensors	3551 (Monitor Only) E-10
Organic Vapor Monitor (For Selected Solvents)	3M® 3M® Advanced Sensors	3500 3520 (With Backup Section) OV-OD

3M® is a registered trademark of Minnesota Mining and Manufacturing Co., St Paul, MN.
Use of trademarked names does not imply endorsements by the U.S. Army but it intended only to assist in identification of a specific product.

Table D-3: SOLID SORBENT TUBES

SAMPLER TYPE	SIZE (MM)	SUGGESTED SOURCE	CATALOG NUMBER
Alumina	1650/1650	SKC	ST 226-64
Ammonia	250/500	Supelco	ORBO®- 77
Charcoal (For solvents)	200/400 200/400 50/100 50/100	SKC Supelco SKC Supelco	ST 226-09 2-0228 ST 226-01 2-0267
Chromosorb® 102 (For pesticides)	50/100 50/100 33/66	SKC Supelco Supelco	ST 226-49-23-102 2-0264 2-0262
Chromosorb P for Acids (ORBO-70)	165/335	Supelco	ORBO-70
Ethylene Oxide	200/400	Supelco	ORBO-78
Florisil®	50/100	SKC	ST 226-39
Formaldehyde	50/100	SKC	ST 226-45
Hydrazine	200/200	SKC	ST 226-42
Inorganic Acids (High Purity Silica Gel)	200/400 200/400	Supelco SKC	ORBO-53 ST 226-10-03
Nitrogen Dioxide and Sulfur Dioxide (For NO_2 and SO_2)	400/600/400	Supelco	ORBO-76
PAH (Polyaromatic Hydrocarbons)	50/100	Supelco	ORBO-43
Silica Gel	260/520	SKC	ST 226-15
Silica Gel, High Purity	See Inorganic Acids		
Silica Gel, H_2SO_4 Treated	100/200	SKC	ST 226-10-06
Tenax®	50/100	SKC	ST 226-35-03
Tenax with Built-in Filter	50/100	Supelco	Custom ORBO-79
XAD-2®	200/400	SKC	ST 226-30-06

®ORBO is a registered trademark of Supelco, Inc., Supelco Park, Bellefonte, PA.
®Chromosorb is a registered trademark of Johns-Manville Products Corp., Denver, CO.
®Florisil is a registered trademark of Floridin Company, ITT System, Pittsburgh, PA.
®Tenax is a registered trademark of GC-Enka N.V., The Netherlands.
®XAD-2 is a registered trademark of Rohm and Haas, Philadelphia, PA.
Use of trademarked names does not imply endorsements by the U.S. Army but it intended only to assist in identification of a specific product.

APPENDIX E

USACHPPM FORMS

1. Examples of the USACHPPM Forms referenced in this TG are included in this Appendix. Reproducing these forms is permitted and encouraged.

2. The forms can also be accessed electronically on the DLS HomePage at:
http://chppm-www.apgea.army.mil/dls

   (a) In both WordPerfect and a Microsoft Word formats. Copies of the files on disc are also available upon request.
   (b) In a Delrina FormsFlow format.

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INDUSTRIAL HYGIENE BULK SAMPLE DATA
USACHPPM FORM 8-R-E

FOR DLS USE ONLY
LIMS Job #: _____
Date Received: _____
Processor's Initials: _____

IMPORTANT

Before the form is filled out electronically in a wordprocessing program, CHANGE THE KEYBOARD FUNCTION OVER TO "TYPEOVER" BY PRESSING THE "INSERT" KEY before typing in the characters which will replace the lines.

SECTION A: GENERAL INFORMATION

1. *IS THIS A DUPLICATE COPY FOR ADVANCED NOTICE OF INCOMING SAMPLES?* **Y (Yes) or N (No)**
2. *Is a MSDS Enclosed for Safety Information for Laboratory Personnel?* **Y (Yes) or N (No)**
3. ***PROJECT NUMBER*** *(15 Characters Maximum):* _____
4. ***IH Resource POC ID #*** *(20 Characters):* _____ 5. ***Primary Resource?:*** **Y or N**
6. ***LAST Name*** *(20 Characters Maximum):* _____
7. ***FIRST Name*** *(20 Characters Maximum):* _____
8. ***Phone Number*** *(20 Characters Maximum):* _____ 9. ***DSN:*** _____
10. ***Street*** *(25 Characters Maximum):* _____
11. ***City*** *(25 Characters Maximum):* _____
12. ***State*** *(2 Characters Maximum):* _____ 13. ***Zip Code + 4*** *(10 Characters Maximum):* _____
14. ***Country*** *(20 Characters Maximum):* _____
15. ***Name of Sampled Installation*** *(50 Characters Maximum):* _____
16. ***ARLOC*** *(10 Characters Maximum):* _____

(See SECTION E: LOCATION AND OPERATION INFORMATION for more codes and information)

17. ***Associated Complaints/Investigative/HHIM*** ***(Be Specific/State "NONE" if applicable)***

18. ***Sample Collector ID #*** *(20 Characters Maximum):* _____
19. ***LAST Name*** *(20 Characters Maximum):* _____
20. ***FIRST Name*** *(20 Characters Maximum):* _____
21. ***Associated Air Samples?:*** **Y (Yes) or N (No)**
22. ***Air Sample Field ID Numbers, If Applicable:*** _____

Note: Air Samples Must Be Shipped in a Separate Container from Bulk Samples.

23. ***Date Collected (mmddyyyy):*** _____ 24. ***Date Shipped (mmddyyyy):*** _____

Replaces AEHA Form 8-R, 1 Oct 84 which is obsolete.

SECTION B: ANALYSIS INFORMATION

NOTE: 1) *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN THIS SECTION.

2) IF AN ANALYTE INDICATES THE CAS# IS "VARIOUS", LEAVE THE SPACE FOR CAS# BLANK.

25a. Analysis #1 Hazard Name: _____

25b. DLS Test Code: _____ *25c. CAS #* _____

26a. Analysis #1 Hazard Name: _____

26b. DLS Test Code: _____ *26c. CAS #* _____

27a. Analysis #1 Hazard Name: _____

27b. DLS Test Code: _____ *27c. CAS #* _____

28a. Analysis #1 Hazard Name: _____

28b. DLS Test Code: _____ *28c. CAS #* _____

29a. Analysis #1 Hazard Name: _____

29b. DLS Test Code: _____ *29c. CAS #* _____

SECTION C: SAMPLE INFORMATION

NOTE: *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN SECTION B.

30. Field Sample ID Number (15 Characters Maximum)	*31. Laboratory Number (Leave Blank) (To Be Completed by the Laboratory)*	*32. Remarks*

33. COMMENTS TO LABORATORY

SECTION D: LABEL INFORMATION

34. ***Trade Name*** *(30 Characters Maximum):* _____

35. NSN (15 Characters): _____ ***36. MSDS Attached:*** **Y (Yes) or N (No)**

37. ***Manufacturer*** *(25 Characters Maximum):* _____

38. ***Street Address*** *(25 Characters Maximum):* _____

39. ***City*** *(25 Characters Maximum):* _____

40. ***State*** *(2 Characters):* _____ *41.* ***Zip Code*** *+ 4 (10 Characters Maximum)* _____

42. ***Country*** *(20 Characters Maximum):* _____

SECTION E: LOCATION AND OPERATION INFORMATION

43. ***Building/Area*** *(20 Characters Maximum):* _____

44. ***Location Name*** *(50 Characters Maximum):* _____

45. ***Operation Name*** *(50 Characters Maximum):* _____

46. ***Operation Employee(s) Perform***

47. ***# of Persons Exposed*** *(3 Characters Maximum):* _____

48. ***Exposure Duration and Frequency***

48a. ***Minutes*** *(4 Char.)* _____ *48b.* ***Time(s) per Day*** *(4 Char.)* _____ *48c.* ***Total Minutes/Day*** *(4 Char.)* _____

48d. ***Days/Week*** *(1 Char.)* ___ *48e.* ***Days/Month*** *(2 Char.)* _____ *48f.* ***Months/Year*** *(2 Char.)* _____

49. ***Source of Contaminant:***

SECTION F: FIELD NOTES/ADDITIONAL COMMENTS

50. HHIM Submitted ?: **Y (Yes) or N (No)**

51. Field Notes/Comments:

INDUSTRIAL HYGIENE AIR SAMPLE DATA
USACHPPM FORM 9-R-E

FOR DLS USE ONLY

LIMS Job #: _____

Date Received: _____

Processor's Initials: _____

IMPORTANT

Before the form is filled out electronically in a wordprocessing program, CHANGE THE KEYBOARD FUNCTION OVER TO "TYPEOVER" BY PRESSING THE "INSERT" KEY before typing in the characters which will replace the lines.

SECTION A: GENERAL INFORMATION

1. *IS THIS A DUPLICATE COPY FOR ADVANCED NOTICE OF INCOMING SAMPLES?* **Y (Yes) or N (No)**
2. ***Is a MSDS Enclosed for Safety Information for Laboratory Personnel?*** **Y (Yes) or N (No)**
3. ***PROJECT NUMBER*** *(15 Characters Maximum):* _____
4. ***IH Resource POC ID #*** *(20 Characters):* _____ 5. ***Primary Resource?:*** **Y or N**
6. ***LAST Name*** *(20 Characters Maximum):* _____
7. ***FIRST Name*** *(20 Characters Maximum):* _____
8. ***Phone Number*** *(20 Characters Maximum):* _____ 9. ***DSN:*** _____
10. ***Street*** *(25 Characters Maximum):* _____
11. ***City*** *(25 Characters Maximum):* _____
12. ***State*** *(2 Characters Maximum):* _____ 13. ***Zip Code + 4*** *(10 Characters Maximum):* _____
14. ***Country*** *(20 Characters Maximum):* _____

15. ***Name of Sampled Installation*** *(50 Characters Maximum):* _____
16. ***ARLOC*** *(10 Characters Maximum):* _____

(See SECTION E: LOCATION AND OPERATION INFORMATION for more codes and information)

17. ***Associated Complaints/Investigative/HHIM*** **(Be Specific/State "NONE" if applicable)**

18. ***Sample Collector ID #*** *(20 Characters Maximum):* _____
19. ***LAST Name*** *(20 Characters Maximum):* _____
20. ***FIRST Name*** *(20 Characters Maximum):* _____

21. ***Associated Bulk Samples?:*** **Y (Yes) or N (No)**
22. ***Bulk Sample Field ID Numbers, If Applicable:*** _____

Note: Bulk Samples Must Be Shipped in a Separate Container from Air Samples.

23. ***Collection Method/Media*** *(25 Characters Maximum):* _____

24. ***Date Collected (mmddyyyy):*** _____ 25. ***Date Shipped (mmddyyyy):*** _____

Replaces AEHA Form 9-R, 1 Oct 84 which is obsolete.

SECTION B: ANALYSIS INFORMATION

NOTE: 1) *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN THIS SECTION.
2) IF AN ANALYTE INDICATES THE CAS# IS "VARIOUS", LEAVE THE SPACE FOR CAS# BLANK.

26a. Analysis #2 Hazard Name: _____
26b. DLS Test Code: _____ *26c. CAS #:* _____
27a. Analysis #2 Hazard Name: _____
27b. DLS Test Code: _____ *27c. CAS #:* _____
28a. Analysis #2 Hazard Name: _____
28b. DLS Test Code: _____ *28c. CAS #:* _____
29a. Analysis #2 Hazard Name: _____
26b. DLS Test Code: _____ *29c. CAS #:* _____
30a. Analysis #2 Hazard Name: _____
30b. DLS Test Code: _____ *30c. CAS #:*

SECTION C: SAMPLE INFORMATION

NOTE: *ALL* SAMPLES WILL BE ANALYZED FOR *ALL* THE TESTS INDICATED IN SECTION B.

31. Field Sample ID # (15 Char. Max)						
32. Pump Serial # (10 Char. Max)	BLANK					
32a. Time On						
32b. Time Off						
32c. Total Time (Minutes)						
33. Flow Rate (LPM)						
34. Total Volume (L) [Flow Rate X Total Time]						
35. GA/BZ/S						
36. Employee ID						
37. Laboratory # (To Be Assigned By Lab)						

COLLECTION AND SAMPLING DATA - TABLE 2 (If Needed for Additonal Samples)

31. Field Sample ID # (15 Char. Max)						DO NOT USE
32. Pump Serial # (10 Char. Max)						
32a. Time On						
32b. Time Off						
32c. Total Time (Minutes)						
33. Flow Rate (L/Min)						
34. Total Volume (L) [Flow Rate X Total Time]						
35. GA/BZ/S						
36. Employee ID						
37. Laboratory # (To Be Assigned By Lab)						

38. *COMMENTS TO LABORATORY*

SECTION D: CALIBRATION INFORMATION

39. ***Pump Calibrator ID #*** *(20 Characters Maximum):* _____

40. ***LAST Name*** *(20 Characters Maximum):* _____

41. ***FIRST Name*** *(20 Characters Maximum):* _____

42. Pump Serial # (10 Characters Maximum)	43. Calibration Information Note: See TG 141, Chapter 2, Section 2-10f for Information on Sampling Pump Flow Rate Calibrations and Reporting				44. Unit Code (LPM)	45. Calibration Setting (30 Character Maximum)
	43a. Pre-Cal Result	43b. Pre-Cal Date	43c. Post-Use Result	43d. Post-UseDate		

SECTION E: LOCATION AND OPERATION INFORMATION

46. ***Building/Area*** *(20 Characters Maximum):* _____

47. ***Location Name*** *(50 Characters Maximum):* _____

48. ***Operation Name*** *(50 Characters Maximum):* _____

49. ***Operation Employee(s) Perform***

50. ***# of Persons Exposed*** *(3 Characters Maximum):* _____

51. ***Exposure Duration and Frequency***

51a. Minutes *(4 Char.)* _____ ***51b. Time(s) per Day*** *(4 Char.)* _____ ***51c. Total Minutes/Day*** *(4 Char.)* _____

51d. Days/Week *(1 Char.)* ____ ***51e. Days/Month*** *(2 Char.)* _____ ***51f. Months/Year*** *(2 Char.)* _____

52. Source of Contaminant:

SECTION F: FIELD NOTES/ADDITIONAL COMMENTS

53. HHIM Submitted ?: **Y (Yes) or N (No)**

54. Field Notes/Comments:

DIRECTORATE OF LABORATORY SCIENCES
CUSTOMER COMMENT FORM

Please provide comments (positive and negative) concerning DLS services on this form so the DLS can pursue the highest quality product possible. Your feedback enables us to identify strength and weakness in our current process and to appropriately direct resources for continuous quality improvement.

1. PERSON MAKING COMMENT | **2. DATE** | **3. ORGANIZATION ADDRESS**

4. PHONE #

Com: **DSN:** **FAX:**

5. E-Mail Address

6. COMMENT/COMPLAINT/PROBLEM (Who, What, When, Where, How):

7. SUGGESTED IMPROVEMENTS (if applicable):

8. Thank you for your comments/suggestions. Please send this form to Commander, USACHPPM, 5158 Blackhawk Road, ATTN: MCHB-DC-LLI, Customer Comment Coordinator, Laboratory Information and Sample Management Division (LISMD), APG, MD 21010-5422.

FOR DLS USE

Person Documenting Comment (If Other than Originator): _____ Date Documented: _____

CONTROL NUMBER ASSIGNED: _____

LISMD Receiver: _____ Date: _____

Action Officer Assigned: _____ Date: _____

Originator Notified By: _____ Date: _____

DUE DATE: _____

Date Completed: _____

Date Filed: _____

Date Copy to Action Officer: _____

PRIORITY ASSESSMENT

- ☐ Safety/Health (Immediate Action)
- ☐ Quality Improvement (High Priority)
- ☐ Process Improvement (Priority)
- ☐ Other (Routine)

Replaces AEHA Form 332-R, 1 Feb 93, which is obsolete.

9. FINDINGS

10. IMMEDIATE CORRECTIVE ACTION AND MEASUREMENT

11. LONG TERM RESOLUTION

CONTROL NUMBER

11. ACTION OFFICER

Signature: _____ Date: _____

12. DLS/LOM REVIEW

_____

_____

_____

13. APPROVAL

LOM Signature: _____ Date: _____

Action Officer Notified: _____

_____

GLOSSARY

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SECTION 1
ABBREVIATIONS

A2LA	American Association for Laboratory Accreditation
AIHA	American Industrial Hygiene Association
ACGIH	American Conference of Governmental Industrial Hygienists
APG	Aberdeen Proving Ground
ASTM	American Society for Testing and Materials
C	Ceiling
cc	Cubic Centimeter
CE	Cellulose Ester
CFR	Code of Federal Regulations
CONUS	Continental United States
Cr	Chromium
CT	Charcoal Tube
CV	Coefficient of Variation
DA	Department of the Army
DHEW	Department of Health, Education, and Welfare
DHHS	Department of Health and Human Services
DLS	Directorate of Laboratory Sciences
DoD	Department of Defense
DOHRS	Defense Occupational Health Readiness System
DOT	Department of Transportation
DSA	Direct Support Activity
DSN	Defense Switched Network
ELLAP	Environmental Laboratory Lead Accreditation Program
EPA	Environmental Protection Agency
ETO	Ethylene Oxide
f/cc	Fibers per Cubic Centimeter
f/mm^2	Fibers per Square Millimeter
GF	Glass Fiber
HHIM	Health Hazard Information Module
HMIS	Hazardous Materials Information System
ID	Identification
IH	Industrial Hygiene/Hygienist
ISO	International Standards Organization

L	Liters
LIMS	Laboratory Information Management System
LPM	Liters per minute
mg	Milligram
mm	Millimeters
mm^2	Millimeters squared
min	Minute
MSDS	Material Safety Data Sheets
NIOSH	National Institute for Occupational Safety and Health
NSN	National Stock Number
NVLAP	National Voluntary Laboratory Accreditation Program
OCONUS	Outside Continental United States
OHMIS	Occupational Health Management Information System
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
QC	Quality Control
P&CAM	Physical and Chemical Analytical Methods from *NIOSH Manual of Analytical Methods*, 4th Edition
PCB	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PEL-C	Permissible Exposure Limit-Ceiling
PEL-STEL	Permissible Exposure Limit-Short Term Exposure Limit
PEL-TWA	Permissible Exposure Limit-Time Weighted Average
PM	Passive Monitor
POC	Point of Contact
PTFE	Polymer of Tetrafluoroethylene
PVC	Polyvinyl Chloride
STEL	Short-Term Exposure Limit
TAT	Turnaround Time
TEM	Transmission Electron Microscope
TG	Technical Guide
TLV	Threshold Limit Value
TLV-C	Threshold Limit Value-Ceiling
TLV-STEL	Threshold Limit Value-Short-Term Exposure Limit
TLV-TWA	Threshold Limit Value-Time Weighted Average
UPS	United Parcel Service
USACHPPM	US Army Center for Health Promotion and Preventive Medicine

SECTION 2
TERMS

Air Collection Volume (in Liters)
The recommended volume of air in Liters (L) to be collected for each sample. The value is based on the reference method. In most cases a range for minimum and maximum accepted volumes are given.

Action Level
A substance-specific exposure level applicable to certain OSHA regulated substances whereby certain actions are required (e.g., air sampling, employee training, medical monitoring, and record keeping). Where there is a substance-specific OSHA standard, consult the appropriate standard for exact requirements.

analyte
The element or compound an analyst seeks to determine or measure; the compound of interest.

batch
A group of samples prepared at the same time in the same location using the same method.

chain-of-custody (COC)
Legal documentation of the possession and handling of a sample from the time of collection until final disposition.

Code of Federal Regulations (CFR)
A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government.

Collection Media
The filter, solid sorbent, tube, or liquid specified for sampling.

duplicate samples
Samples collected simultaneously from the same source, under identical conditions, into separate containers. They are analyzed independently.

field blanks
Quality control samples introduced into the sampling process to detect contamination that can occur during shipping and storage. Field blanks are required for every type of collection media. They must always be from the same lot number as the sample tubes, filters, or monitors used for sampling. If more than one lot numbers is used for sampling, then blanks from each lot number are required. Field blanks are created exactly like "normal" samples except they are only opened briefly in the field and they do not have air pumped through them.

hazardous material
Any substance having the potential to cause a physical or health hazard. This is based on its potential for burning, exploding, or otherwise causing an injury to workers or the likelihood that exposure will result in acute or chronic health effects among employees.

matrix
The predominant material of which the sample to be analyzed is composed. Matrix is not synonymous with phase (liquid or solid).

Material Safety Data Sheet (MSDS)
A concise, descriptive chemical data sheet that follows the guidelines established by OSHA. It serves as the basis for written hazard communication programs.

media blanks
Media blanks are quality control samples that are often necessary in addition to field blanks when adsorbent (or sorbent) collection media is used. They detect contaminants that may be in the sorbent and they may be needed as a reference in spectrophotometric methods. Media blanks must always be from the same lot number as the sample tubes or monitors used for sampling. If more than one lot number is used for sampling, then blanks from each lot number are required. . The media blank is never opened until it is received by the laboratory for analysis.

Permissible Exposure Limit-Ceiling (PEL-C)
The employee's exposure which shall not be exceeded during any part of the work day. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute TWA exposure which shall not be exceeded at any time over a working day.

Permissible Exposure Limit-Short-Term Exposure Limit (PEL-STEL)
The employee's 15-minute time weighted average exposure which shall not be exceeded at any time during a work day unless another time limit is specified in a parenthetical notation below the the limit. If another time period is specified, the TWA exposure over that time period shall not be exceeded at any time during the working day.

Permissible Exposure Limit-Time-Weighted Average (PEL-TWA)
The employee's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded.

preservation
Techniques which retard physical and/or chemical changes in a sample after it has been collected.

quality assurance (QA)
All planned and systematic actions necessary to ensure that the overall quality control program is being effectively implemented and that laboratory data are of the requisite accuracy.

quality control (QC)
A planned system of activities which provides a level of quality that meets the needs of users. It is also the process through which a laboratory measures its performance, compares its performance with standards, and acts on those differences.

quality system
The organizational structure, responsibilities, procedures, activities, capabilities, and resources that together aim to ensure that laboratory services satisfy data requirements.

Sample Flow Rate (Liter/minute; LPM)
The recommended range in Liters of air per minute (LPM) which can be used in collection of the sample. After selection of the sampling flow rate, the appropriate sampling time can be determined by dividing the recommended collection volume by the sampling rate.

sample set
One of more samples that are collected and submitted for analysis at the same time for the same contaminant(s). A sample set is also referred to as a sample batch.

Threshold Limit Value Excursion Limit
If the short-term exposure values in a given situation have a geometric standard deviation of 2.0, 5% of all values will exceed 3.13 times the geometric mean. If a process displays a variability greater than this, it is not under good control and efforts should be made to restore control. This concept is the basis for the following excursion limit recommendations which apply to those TLV-TWAs that do not have STELs.

> *Excursions in worker exposure levels may exceed three times the TLV-TWA for no more than a total of 30 minutes during a workday, and under no circumstances should they exceed five times the TLV-TWA, provided that the TLV-TWA is not exceeded.*

The approach is a considerable simplification of the idea of the log-normal concentration distribution, but it is considered to be more convenient to use by the practicing industrial hygienist. If exposure excursions are maintained within the recommended limits, the geometric standard deviation of the concentrations will be near 2.0 and the goal of the recommendations will be accomplished.

When the toxicological data for a specific substance are available to establish a STEL, this value takes precedence over the excursion limit, regardlessof whether it is more or less stringent.

Threshold Limit Value-Ceiling (TLV-C)
The concentration that should not be exceeded during any part of the working exposure.

In conventional industrial hygiene practice, if instantaneous monitoring is not feasible, then the TLV-C can be assessed by sampling over a 15-minute period except for those substances that may cause immediate irritation when exposures are short.

Threshold Limit Value-Short-Term Exposure Limit (TLV-STEL)
The concentration to which workers can be exposed continuously for a short period of time without suffering from 1) Irritation, 2) Chronic or irreversible tissue damage, or 3) Narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue, or materially reduce work efficiency, and provided that the daily TLV-TWA is not exceeded.

It is not a separate independent exposure limit; rather, it supplements the TWA limit where there are recognized acute effects from a substance whose toxic effects are primarily from a chronic nature. STELs are recommended only where toxic effects have been reported from high short-term exposures in either humans or animals.

A STEL is defined as a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposure above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day. There should be at least 60 minutes between successive exposure in this range. An averaging period other than 15 minutes may be recommended when this is warranted by observed biological effects.

Threshold Limit Value-Time-Weighted Average (TLV-TWA)
The time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

USACHPPM LABORATORY SCIENCES RESOURCES

	Telephone	Fax	E-Mail Address/Internet	Mailing Address
DLS-Main	410-671-2208 (Commercial) 584-2208 (DSN)	410-671-4108 (Commercial) 584-4108 (DSN)	1. *"Sampnews" Electronic Bulletin Board:* a. *Internal Customers:* Access cc:Mail on the USACHPPM Network; click on the PREPARE Button and type "*#SAM*" and "*#SAMPNEWS*" will automatically appear as the addressee b. *External Customers:* E-mail to: *#SAMPNEWS @chppm-ccmail.apgea.army.mil* 2. *DLS-Main Internet HomePage http://chppm-www/DLS/ or http://131.92.168.27/DLS/*	**For Sample Shipments-U.S. Mail** Commander USACHPPM ATTN: MCHB-TS-LSM (Sample Mgt Lab) 5158 Blackhawk Road APG, MD 21010-5422 **For Shipments by FedEx, UPS, or other Commercial Carriers:** CDR, USACHPPM ATTN: MCHB-TS-LSM (Sample Mgt Lab) Bldg E2100 APG, MD 21010-5422
DSA-South	404-464-3332 (Commercial) 367-3332 (DSN)	404-464-2126 (Commercial) 367-2126 (DSN)	cc-mail (Network): CPT Reginald Richards at CHPPM_FTMCPHRSN E-mail: *cpt_reginald_richards_at_chppm_ftmcphrsn@chppm-ccmail.apgea.army.mil*	Commander USACHPPM-DSS ATTN: MCHB-AS-L 1312 Cobb Street, S.W. Fort McPherson, GA 30330-1075
DSA-West (Scheduled to Close Jul 98)	303-361-8288 (Commercial) 943-8288 (DSN)	303-361-8143 (Commercial) No DSN Number	cc-mail (Network): Dave Morrow at CHPPM_FAMC E-Mail: *dave_morrow_at_chppm__famc @chppm-ccmail.apgea.army.mil*	Commander USACHPPM-DSW ATTN: MCHB-AW-L U.S. Army Garrison Fitzsimmons 12101 East Colfax Avenue Aurora, CO 80045-5001
CHPPM-Europe	06371-86-8381 (Commercial) 486-8381/7052 (DSN) 011-49-6371-86-8381 (From CONUS)	486-7054 (DSN)	E-Mail: *DLS-HOTLINE @chppm-eur-ccmail.army.mil*	*APO Address:* Commander USACHPPM-EUROPE Department of Laboratory Sciences ATTN: MCHB-AE-LS CMR 402 APO AE 09180-3619 *Commercial or Civilian Address:* USACHPPM-EUROPE Department of Laboratory Sciences Bldg. 3810, Room 307 Kirchberg Kaserne 66849 Landstuhl Germany
CHPPM-Pacific	011 81 3117 63 8418 (Commercial outside of Japan) 0462-51-1520, Ext. 273-8418 (Commercial within Japan) 268-8418 (DSN)	011 81 3117 63 8430 (Commercial outside of Japan) 0462-51-1520, Ext. 273-8430 (Commercial within Japan) 268-8430 (DSN)	E-Mail: *apaj-eh-el@zama-emhi.army.mil*	*APO Address:* Commander USACHPPM-PACIFIC ATTN: MCHB-AJ-L/ Sample Coordinator APO AP 96343-5006 *Commercial or Civilian Address:* USACHPPM-PAC Beign Jutaku No 715 Camp Zama Zama-shi Kanagawa-ken Japan T228

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November 1997

USACHPPM TG No. 1