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THE MEMPHIS DEPOT
TENNESSEE

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 581

TECHNICAL MEMORANDUM CH2MHILL

Amended Sampling and Analysis Plan: Soil Sampling from CWM Excavations 24-A, 24-B, and 1 for HTW – Dunn Field, Memphis Depot

TO: US Environmental Protection Agency, Region IV
Tennessee Department of Environment and Conservation
Defense Logistics Agency, Memphis
US Army Corps of Engineers, Huntsville

FROM: Stephen Offner/CH2M HILL

DATE: March 15, 2000

Introduction

This amended Sampling and Analysis Plan (SAP) describes the work required to determine the presence of hazardous and toxic waste (HTW), including dense non-aqueous phase liquids (DNAPL) and dissolved/sorbed phase chlorinated volatile organic compounds (CVOCs), within the proposed chemical warfare materiel (CWM) excavations planned for the Dunn Field portion of the Memphis Depot. Because of the potential for CWM, these disposal areas were not investigated during the Dunn Field Remedial Investigation (RI). A decision screening matrix is also included to provide definitive data quality objectives (DQOs) regarding the sampling results as they apply to the potential continuation of the HTW source removal.

During the February 17, 2000 BRAC Cleanup Team (BCT) meeting, the BCT members identified two issues concerning the CWM excavation activities (to be conducted by UXB International, Inc.), that are scheduled for Dunn Field in the second quarter of 2000. The issues discussed are as follows:

- If the CWM excavation removes all contamination, including HTW, then how will the information be included in the Dunn Field RI report?
- If the CWM excavation identifies a HTW source of significantly higher concentration or different waste type (e.g., DNAPL), then how does the project transition to the remedial action contractor (Sverdrup Environmental, Inc.) for possible interim remedial action (IRA)?

The information in this document will be used to: (1) better determine the nature and extent of HTW in the subsurface soil in the CWM disposal sites; (2) determine if a time-critical IRA is warranted for a source of HTW following the CWM removal; and (3) better evaluate the feasibility of remedial alternatives for Dunn Field. The results of the referenced sampling and field/laboratory analyses will be presented in a Technical Memorandum (TM) appended to the Dunn Field RI.

Proposed CWM Excavations

The Intrusive Excavation Plan in the Draft Final Work Plan for the CWM at Dunn Field, prepared by UXB International, Inc. (dated November 1999) identifies three excavation sites on the western half of Dunn Field (Operable Unit [OU] 1):

- Site 24-B is suspected of being a former pit with estimated dimensions of 30 feet long by 7 feet wide by 12 feet deep where 29 leaking mustard bombs were drained into the chlorate of lime slurry pit where the contents were neutralized. A grid square excavation of approximately 90 feet by 150 feet is planned for this site because the precise location of the chlorate of lime is unknown. In an attempt to locate the former pit, a series of trenches will be excavated throughout the grid square. Because of the size of Site 24-B, the 70-foot-diameter negative air containment structure will have to be moved, perhaps as many as six times.

- Site 24-A has estimated dimensions of 30 feet long by 6 feet wide by 6 feet deep, and is a suspected former pit that contains the remains of the 29 empty CWM bomb casings. After the bomb casings were emptied into Site 24-B, the casings were placed in a shallow trench (pit) and counter-charged with dynamite. Once detonations were complete, the remains of the bomb casings were buried. According to UXB, the typical placement of the containment structure should allow for excavation of the pit at Site 24-A without the need for moving the structure.

- Site 1 has estimated dimensions of 30 feet long by 30 feet wide by 10 feet deep, and is a suspected former pit that contains buried Chemical Agent Identification Sets (CAIS). The CAIS kits contain diluted "live agent" sealed in glass vials. Due to the fragile nature of the CAIS, mechanical excavation will have to be supplemented with hand excavation. According to UXB, the typical placement of the containment structure should allow for excavation of the pit at Site 1 without the need for moving the structure.

Purpose and Scope

This amended SAP outlines the required HTW testing of excavated soil and the floors/sidewalls of the finished excavations as part of the CWM remedial activities at Sites 24A & B and 1 at Dunn Field.

The scope of work is as follows:

- Field screening of soil during the excavation activities at each of the three sites.
- Collection and analysis of confirmation samples from the bottom of the completed excavations and from a biased location on one of the excavation sidewalls.
- Use of the decision screening matrix to determine if the continuation of HTW source removal beyond the CWM pit is warranted.
- Preparation and issuance of a TM as part of the Dunn Field RI report.

This amended SAP is to be considered an amendment to the Draft Final Work Plan submitted by UXB International, Inc., including Section 3.0 (Intrusive Excavation Plan), Section 8.0 (Chemical Data Quality Management Plan), and Section 12.0 (Sampling Program). CWM is the primary health and safety hazard associated with the planned excavations; however, unexploded ordnance (UXO) is also a concern. Only personnel trained in UXO and CWM handling will be involved in the actual excavation. Personnel not absolutely necessary to the excavation activities will be prohibited from being within the filtered-air containment structure during excavation activities. Therefore, UXB personnel will implement the field portion of this amended SAP.

Site 24-A

The amended scope of work applicable to this site includes:

- Visual and headspace soil screening during excavation to determine the presence/extent of possible HTW contamination (*field screening to be performed by representatives of UXB*);
- Collection of soil samples during the excavation; samples will be subjected to a shake test using a hydrophobic dye which turns bright red in the presence of DNAPL (*field testing to be performed by representatives of UXB*);
- Collection of confirmation samples. Site 24-A has estimated excavation dimensions of 30 feet long by 6 feet wide by 6 feet deep. A total number of 3 confirmation samples will be collected from the excavation; 2 from the floor and 1 from the sidewall at a location of highest screening-level FID reading (*confirmation sampling to be performed by representatives of UXB, analyses to be performed by CH2M HILL contracted lab*);
- Performance of data evaluation on the confirmation sample results (*to be performed by CH2M HILL*);
- Documentation of the findings in a TM(*to be performed by CH2M HILL*).

Site 24-B

The amended scope of work applicable to this site includes:

- Visual and headspace soil screening during trenching and excavation to determine the presence/extent of possible HTW contamination (*field screening to be performed by representatives of UXB*);
- Collection of soil samples during the trenching and excavation; samples will be subjected to a shake test using a hydrophobic dye which turns bright red in the presence of DNAPL (*field testing to be performed by representatives of UXB*);
- Collection of confirmation samples. The initial exploratory area of trenching and excavation at Site 24-B is estimated at 150 feet long by 90 feet wide, looking for a former pit with estimated dimensions of 30 feet long by 7 feet wide by 12 feet deep. It is assumed that the area of the finished excavation will be 90 feet long by 50 feet wide by 12 feet deep. A total number of 4 confirmation samples will be collected from the excavation; 3 from the floor and 1 from the sidewall at a location of highest screening-level FID reading (*confirmation*

sampling to be performed by representatives of UXB, analyses to be performed by CH2M HILL contracted lab);

- Performance of data evaluation on the confirmation sample results (*to be performed by CH2M HILL*);
- Documentation of the findings in a TM (*to be performed by CH2M HILL*).

Site 1

The amended scope of work applicable to this site includes:

- Visual and headspace soil screening during excavation to determine the presence/extent of possible HTW contamination (*field screening to be performed by representatives of UXB*);
- Collection of soil samples during the excavation; samples will be subjected to a shake test using a hydrophobic dye which turns bright red in the presence of DNAPL (*field testing to be performed by representatives of UXB*);
- Collection of confirmation samples. Site 1 has estimated excavation dimensions of 30 feet long by 30 feet wide by 10 feet deep. The total area of the floor of the finished excavation will be approximately 900 sq. ft. The total area of the sidewalls of the finished excavation will be approximately 1,200 sq. ft. A total of 3 confirmation samples will be collected from the excavation; 2 from the floor and 1 from the sidewall at a location of highest screening-level FID reading (*confirmation sampling to be performed by representatives of UXB, analyses to be performed by CH2M HILL contracted lab*);
- Performance of data evaluation on the confirmation sample results (*to be performed by CH2M HILL*);
- Documentation of the findings in a TM (*to be performed by CH2M HILL*).

Sampling Methods

All soil samples for field screening and for confirmation laboratory analyses will be collected in accordance with the: (1) Depot's Generic QAPP of 1995 (QAPP); (2) Draft Final Work Plan for the CWM at Dunn Field, dated November 1999; and (3) U.S. EPA Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), dated May 1996.

Headspace Sampling and Field Screening

Visual Monitoring

Section 3.16.1 of the Draft Final Work Plan submitted by UXB states that the excavator operator will deposit excavated material into a sifting device located adjacent to each excavation. Large drums and debris will be removed prior to this step. Prior to the placement of the excavated material into the sifting device, visual inspection of the excavated material and from the excavation will be conducted with respect to HTW issues. Stained soil, drums, and other suspected deleterious materials will be noted in the field notes.

Field Screening with an Organic Vapor Analyzer

A minimum of one sample will be collected for every 7 cubic yards of soil excavated from each of the 3 sites. Additional samples will be collected from areas of stained soil or from soil in contact with deleterious debris as determined by visual inspection. Upon completion of each excavation, a sample will be collected from each 50-linear-foot section of sidewall; a minimum of 1 sample will be collected from each sidewall. Each sample will be uniquely identified in the field notes and the location of each sample will be documented. An organic vapor analyzer (OVA) equipped with a flame ionization detector (FID) will be used in the survey mode to field screen the samples. A photo-ionization detector (PID) will not be used due to the fact that the CVOCs that have been identified as contaminants of potential concern (COPC) have ionization potentials (IPs) of 9.32 eV to 11.47 eV. This wide range of IPs would require the use of multiple lamps in the PID in order to survey for the list of COPCs.

Each soil sample will be obtained from the vadose zone, brought (if necessary) to a temperature of between 20°C (68°F) and 32°C (90°F), and the reading obtained 5 minutes thereafter. With the use of a FID, each soil sample will be split into two jars, and one of the readings must be obtained with the use of an activated charcoal filter unless the unfiltered reading is <1 ppm. The total corrected hydrocarbon measurement will be determined by subtracting the filtered reading from the unfiltered reading. Analytical instruments will be calibrated in accordance with the manufacturer's instructions.

Field Screening with a Hydrophobic Dye (Sudan IV Dye)

Soil samples collected for headspace screening will be subjected to a shake test using a hydrophobic dye (Sudan IV dye) which turns bright red in the presence of DNAPL. An aliquot of soil from the headspace samples exhibiting the highest FID reading(s) from each excavation and including all headspace samples with 100 ppm FID readings or greater, will be transferred to a 4-ounce glass or plastic jar or other appropriate receptacle. The amount of soil will be sufficient to fill approximately one-half of the container. The soil will also be manually dispersed to minimize clumping. Distilled water will be added to fill the remaining volume of the container. A very small amount (2 to 4 milligrams) of Sudan IV dye (in powder form) will be added to the container using extra care to avoid dermal exposure to the dye. After the dye has been added, the container will be sealed and the soil/distilled water/dye mixture will be shaken for approximately 30 seconds. The presence or absence of bright red staining indicative of DNAPL will be noted in the field notes. A material safety data sheet (MSDS) for the Sudan IV dye is included as Attachment 1.

Excavation Confirmation Sampling

Verifying that contaminated soil is remediated by means of excavation requires samples from the excavation bottom and sidewalls. A biased approach will be used for confirmation sampling. Using this biased sampling approach, samples are collected where they will most likely encounter contamination above cleanup criteria. Since professional judgement and site-specific knowledge will be used for selecting the confirmation sampling locations, the rationale used to select the locations will be documented. A minimum of 2 floor samples will be collected from each excavation. Based on the assumed length (90 feet) of the excavation at Site 24-B, 3 floor samples will be collected. One sidewall sample will also be collected from each excavation at the location of highest FID headspace reading.

Upon completion of an excavation, and if the floor and sidewalls are accessible for sampling (less than 4 feet deep), the samples will be obtained by the sampler entering the excavated area and collecting the samples using stainless steel spoons. If the excavated area is deeper than 4 feet, the samples will be obtained by an excavator bucket and presented to the sampler, who will collect the samples using stainless steel spoons.

Procedure for Collecting Volatile Soil Samples - An EnCore sampler will used to collect each discrete sample aliquot to be analyzed for VOCs.

1. From either the floor of the excavation or the sidewall or the excavator bucket, remove the top 6 inches of soil using a stainless steel spoon.
2. Open the EnCore reusable package and remove the core device and cap.
3. Place into the T-handle and core the sample.
4. Remove from the soil, brush off the sides, and place the cap seal onto the sampler.
5. Label and reseal in the original package.
6. Place into cooler for shipment.

Procedure for Collecting Non-Volatile Samples

1. Within the area where the VOC sample was collected, collect several spoonfuls of the soil into a stainless steel bowl.
2. Homogenize the sample by the quartering technique using the stainless steel spoon.
3. Fill the appropriate sample jars approximately full with the homogenized sample. Close the jar, label, and package the sample for shipment to the lab.

Data Quality Objectives for Analytical Data

The DQOs for each sampling task described above are listed in Table 1. The sampling and analytical requirements, field QC requirements, and the required level of quality and data packages, are listed in Table 2. The project-specific quality control objectives for those data are included in the QAPP. These include the quantitation, accuracy, precision, and completeness, representativeness, and comparability limits by which the data will be evaluated.

Validation of the laboratory data will be performed by a CH2M HILL project chemist. Data validation results will be provided in the TM.

Analytical Methods

Analytical requirements for this amended SAP are listed in Table 2. All samples will be analyzed according to USEPA SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods whenever possible. Each confirmation sample will be analyzed for TCL volatile organics by SW-846 Method 8260B, TCL semi-volatile organic compounds by SW-846 Method 8270C, organochlorine pesticides by SW-846 Method 8081A, PCBs by SW-846 Method 8082, and TAL Metals (by various SW-846 Methods).

Table 1

Data Quality Objectives

Sampling Activity	Data Quality Objective Category
Sites 24-A, 24-B and 1 Presence/absence of HTW contamination using headspace screening	Screening
Presence/absence of DNAPL using hydrophobic dye (Sudan IV)	Screening
Excavation confirmation samples to the laboratory	Definitive

Logistics

CH2M HILL will transfer all sample containers, coolers, and chain of custody forms and seals, needed for sampling to a selected representative of UXB. The Sudan IV hydrophobic dye will also be supplied by CH2M HILL.

All samples slated for laboratory analyses will be collected and packaged for shipment under chain of custody by representatives of UXB. CH2M HILL will provide all shipment coolers and overnight airbills.

The confirmation samples will be sent to Columbia Analytical Services, Inc., in Redding, California. CH2M HILL will conduct all laboratory coordination and subcontracting.

A coordination meeting will be held before beginning the field effort. Participants will include representatives of the Depot, the Corps of Engineers, CH2M HILL, and UXB. The meeting will include a discussion of responsibilities, communication, field procedures, field schedules, and establishment of points of contact. Currently the points of contact for CH2M HILL and UXB are as follows:

CH2M HILL
Stephen Offner, Project Manager
Atlanta, GA
770.604.9182 (x302)

UXB
Randy Reed, Project Manager
Ashburn, VA
703.724.3528

All decontamination of field sampling equipment will be performed in accordance with the procedures outlined in the Draft Final Work Plan for the CWM at Dunn Field, dated November 1999.

Decision Matrix for Continued Interim Remedial Actions

A decision screening matrix is presented in Figure 1. This matrix provides a decision flow based on the results of the confirmation samples collected from each of the three CWM excavations sites as they apply to the potential continuation of the HTW source removal. As presented below, the critical milestones in the decision process are:

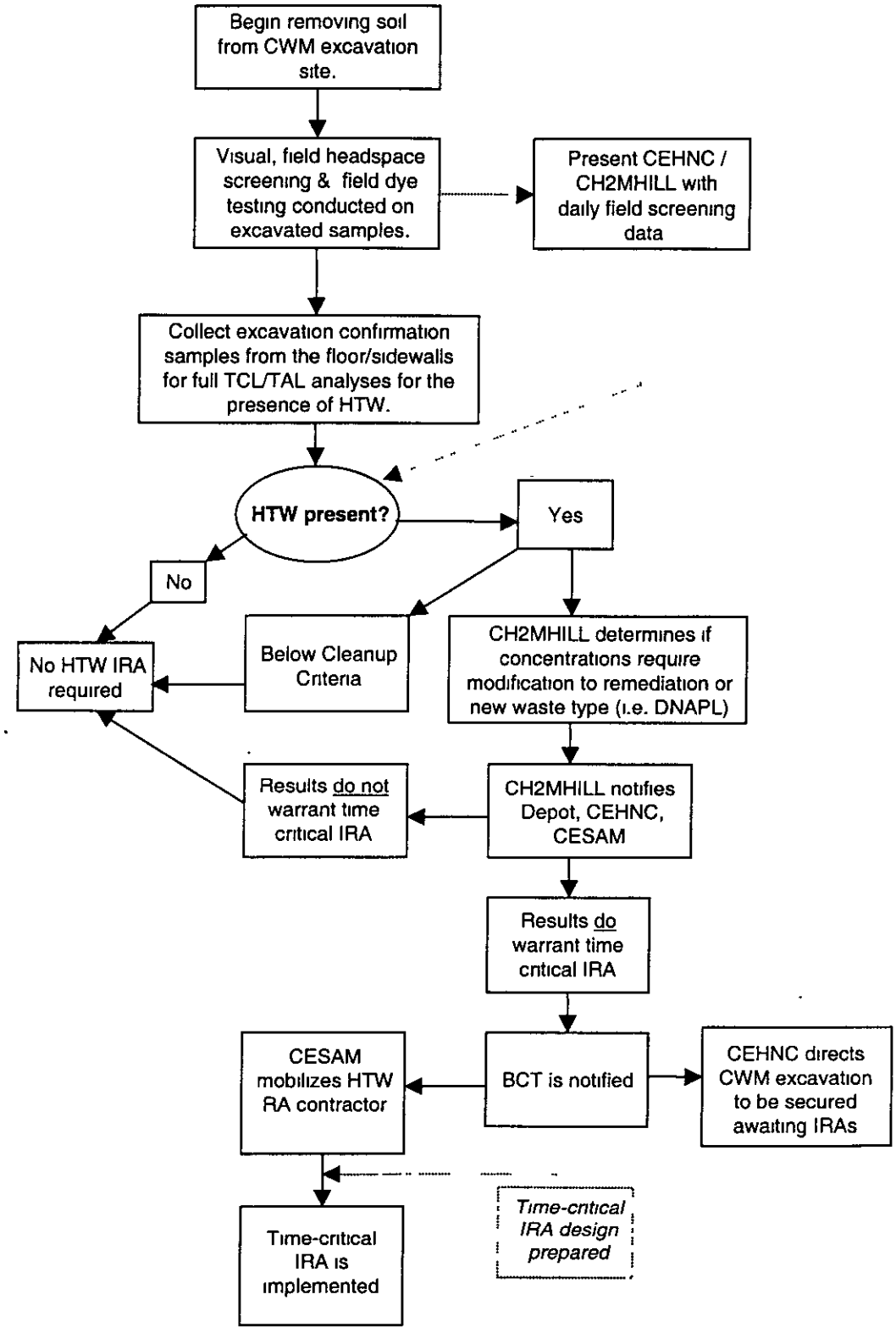
1. Daily download of field screening results in order to track the potential of HTW on a real-time basis;

2. Determination of HTW present in the excavation confirmation samples above cleanup criteria;
3. Determination whether the exceedances warrant a time-critical IRA;
4. If it is determined that a time-critical removal action is warranted – timely mobilization of the HTW remedial contractor.

TABLE 2
SAMPLING AND ANALYTICAL SUMMARY

Sample Task	Sample Point	Matrix	Sampling Frequency	Approx Sample No	Sampling Method	Sampling Equipment	TAT	DQO Level/ Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservtn	Containers
Sites 24-A, 24-B & 1													
Excavation Confirmation Sampling *Site 24-A*	Excavation floor	Soil	2 per excavation	2 + 1 Dup (10%) Total = 3	2 discrete samples from floor of excavation	SS spoon, SS bowl, Encore samplers	7 day	DQO Level III	TCL Volatiles	8260B	14 days	Cool to 4°C	(3) 5g Encore Samplers
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(2) 8 oz glass
									Pesticides	8081A	7 day extr 40 day analysis	"	"
									PCBs	8082	7 day extr 40 day analysis	"	"
									TAL Metals	6010A/7471	6 month, Hg 28 days	Cool to 4°C	(1) 8 oz glass
	Excavation sidewall w highest FID reading	Soil	1 per excavation	1	1 discrete sample from sidewall of excavation biased to worst case scenario	SS spoon, SS bowl, Encore samplers	7 days	DQO Level III	TCL Volatiles	8260B	14 days	Cool to 4°C	(3) 5g Encore Samplers
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(2) 8 oz glass
									Pesticides	8081A	7 day extr 40 day analysis	"	"
									PCBs	8082	7 day extr 40 day analysis	"	"
									TAL Metals	6010A/7471	6 month, Hg 28 days	Cool to 4°C	(1) 8 oz glass
Excavation Confirmation Sampling *Site 24-B*	Excavation floor	Soil	3 per excavation if >50 ft in length	3	3 discrete samples from floor of excavation	SS spoon, SS bowl, Encore samplers	7 day	DQO Level III	TCL Volatiles	8260B	14 days	Cool to 4°C	(3) 5g Encore Samplers
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(2) 8 oz glass
									Pesticides	8081A	7 day extr 40 day analysis	"	"
									PCBs	8082	7 day extr 40 day analysis	"	"
									TAL Metals	6010A/7471	6 month Hg 28 days	Cool to 4°C	(1) 8 oz glass
	Excavation sidewall w highest FID reading	Soil	1 per excavation	1	1 discrete sample from sidewall of excavation biased to worst case scenario	SS spoon, SS bowl, Encore samplers	7 days	DQO Level III	TCL Volatiles	8260B	14 days	Cool to 4°C	(3) 5g Encore Samplers
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(2) 8 oz glass
									Pesticides	8081A	7 day extr 40 day analysis	"	"
									PCBs	8082	7 day extr 40 day analysis	"	"
									TAL Metals	6010A/7471	6 month Hg 28 days	Cool to 4°C	(1) 8 oz glass
Excavation Confirmation Sampling *Site 1*	Excavation floor	Soil	2 per excavation	2	2 discrete samples from floor of excavation	SS spoon SS bowl, Encore samplers	7 day	DQO Level III	TCL Volatiles	8260B	14 days	Cool to 4°C	(3) 5g Encore Samplers
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(2) 8 oz glass
									Pesticides	8081A	7 day extr 40 day analysis	"	"
									PCBs	8082	7 day extr 40 day analysis	"	"
									TAL Metals	6010A/7471	6 month Hg 28 days	Cool to 4°C	(1) 8 oz glass
	Excavation sidewall w highest FID reading	Soil	1 per excavation	1 + 1 Dup (10%) Total = 2	1 discrete sample from sidewall of excavation biased to worst case scenario	SS spoon, SS bowl, Encore samplers	7 days	DQO Level III	TCL Volatiles	8260B	14 days	Cool to 4°C	(3) 5g Encore Samplers
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(2) 8 oz glass
									Pesticides	8081A	7 day extr 40 day analysis	"	"
									PCBs	8082	7 day extr 40 day analysis	"	"
									TAL Metals	6010A/7471	6 month Hg 28 days	Cool to 4°C	(1) 8 oz glass
	Pre-Equipment Rinsate Blank	Water	1 per set of pre-cleaned equipment	1	Prepared in Field	Analyte-free water SS funnel	7 days	DQO Level III	TCL Volatiles	8260B	14 days	HCl pH<2 Cool to 4°C	(2) 40 ml vial
									TCL Semi-Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(1) 1L amber glass
									Pesticides	8081A	7 day extr 40 day analysis	Cool to 4°C	(1) 1L amber glass
									PCBs	8082	7 day extr 40 day analysis	Cool to 4°C	(1) 1L amber glass
									TAL Metals	6010A/7471	180 days	HNO3 pH<2 Cool to 4°C	(1) 500ml HDPE
	Post-Equipment Rinsate Blank	Water	1 per set of pre-cleaned equipment	1	Prepared in Field	Analyte free water SS funnel	7 days	DQO Level III	TCL Volatiles	8260B	14 days	HCl pH<2 Cool to 4°C	(2) 40 ml vial
									TCL Semi Volatiles	8270C	7 day extr 40 day analysis	Cool to 4°C	(1) 1L amber glass
									Pesticides	8081A	7 day extr 40 day analysis	Cool to 4°C	(1) 1L amber glass
									PCBs	8082	7 day extr 40 day analysis	Cool to 4°C	(1) 1L amber glass
									TAL Metals	6010A/7471	180 days	HNO3 pH<2 Cool to 4°C	(1) 500ml HDPE
	Trip Blanks	Water	1 per shipment of VOCs	1 to 3	Prepared in Lab		7 days	DQO Level III	TCL Volatiles	8260B	14 days	HCl pH<2 Cool to 4°C	(2) 40 ml vial

Figure 1 - Decision Screening Matrix / Flow Diagram
HTW Investigation in CWM Excavation Sites
Dunn Field, Memphis Depot



Attachment 1

Back To Description / Pricing

Aldrich Product

Printed on 03/15/2000 02:58:29 PM

Product Number: 198102
Product Name: Sudan IV, certified
Synonyms: (C.I. 26105, Scarlet Red, Solvent Red 24)
Molecular Formula: $C_{24}H_{20}N_4O$
Molecular Weight: 380.45
CAS: 85-83-6
Quality/Application: certified
Comments: Melting Point (°C): 199
UV wavelength max. (nm): 520
Product Comments: Dye content ~80%
EC Number: 201-635-8
Merck Index: 12,8538
Beilstein Index: 16(4),148
Reference to Aldrich Library of *FT-IR* Spectra: 2(3),4110A
Literature References: Sigma-Aldrich Handbook of Stains, Dyes and Indicators: 658
Miscellaneous: *This chemical is in the EPA inventory under TSCA.*
Label Precautions: Possible mutagen
Irritant
Target organ. liver
Readily absorbed through skin
Avoid skin contact and inhalation

Back To Product

581 13

Valid 02/2000 - 04/2000

Aldrich Chemical Co., Inc.
1001 West St. Paul
Milwaukee, WI 53233 USA
Tel: 414-273-3850

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1. - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - -

CATALOG #: 198102
NAME: SUDAN IV, CERTIFIED

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -

CAS #: 85-83-6
MF: C24H20N4O
EC NO: 201-635-8

SYNONYMS

BIEBRICH SCARLET BPC * BIEBRICH SCARLET RED * BIEBRICH SCARLET R MEDICINAL * BRASILAZINA OIL RED B * CALCO OIL RED D * CANDLE SCARLET B * CANDLE SCARLET 2B * CANDLE SCARLET G * CERES RED BB * CEROTINE PONCEAU 3B * CERVEN ROZPOUSTEDLOVA 24 (CZECH) * C.I. 258 * C.I. 26105 * C.I. SOLVENT RED 24 * 2',3-DIMETHYL-4-(2-HYDROXYNAPHTHYLAZO) AZOBENZENE * DISPERSOL RED PP * ENIAL RED IV * FAST OIL RED B * FAST RED BB * FAT PONCEAU R * FAT RED B * FAT RED 2B * FAT RED BB * FAT RED BS * FAT RED TS * GRASAL BRILLIANT RED B * GRASAN BRILLIANT RED B * HIDACO OIL RED * LACQUER RED V * LACQUER RED VS * LIPID CRIMSON * 1-((2-METHYL-4-((2-METHYLPHENYL)AZO)PHENYL)AZO)-2-NAPHTHALENOL * OIL RED IV * OIL RED 3 * OIL RED 7 * OIL RED 47 * OIL RED 282 * OIL RED A * OIL RED APT * OIL RED 2B * OIL RED 3B * OIL RED BB * OIL RED 4B * OIL RED BS * OIL RED D * OIL RED ED * OIL RED F * OIL RED GO * OIL RED PEL * OIL RED RC * OIL RED RR * OIL RED S * OIL RED TAX * OIL RED ZD * OIL SCARLET * OIL SCARLET 48 * OLEAL RED BB * ORGANOL RED B * ORIENT OIL RED RR * PHENOPLASTE ORGANOL RED B * PLASTORESIN RED F * RED 3R SOLUBLE IN GREASE * RESINOL RED 2B * RUBRUM SCARLATINUM * RESOFORM RED G * SARLACH R (CZECH) * SCARLET RED * SCARLET RED, BIEBRICH * SCARLET R (MICHAELIS) * SCHARLACHROT * SCHULTZ NO. 541 * SILOTRAS RED T3B * SOMALIA RED IV * STEARIX RED 4B * STEARIX RED 4S * SUDAN IV * SUDAN P * SUDAN RED IV * SUDAN RED 4BA * SUDAN RED BB * SUDAN RED BBA * TERTROGRAS RED N * O-TOLUENEAZO-O-TOLUENEAZO-BETA-NAPHTHOL * O-TOLUENEAZO-O-TOLUENE-BETA-NAPHTHOL * O-TOLYLAZO-O-TOLYLAZO-BETA-NAPHTHOL * O-TOLYLAZO-O-TOLYLAZO-2-NAPHTHOL * 1-(4-O-TOLYLAZO-O-TOLYLAZO)-2-NAPHTHOL * TOYO OIL RED BB * WAXAKOL RED BL * WAXOLINE RED O * WAXOLINE RED OM * WAXOLINE RED OS *

SECTION 3. - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - - -

LABEL PRECAUTIONARY STATEMENTS

HARMFUL
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
IRRITATING TO EYES AND SKIN.
POSSIBLE RISK OF IRREVERSIBLE EFFECTS.
POSSIBLE MUTAGEN.
TARGET ORGAN(S):
LIVER
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING.
DO NOT BREATHE DUST.

SECTION 4. - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - -

IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.

CALL A PHYSICIAN.
IF INHALED, REMOVE TO FRESH AIR. IF BREATHING BECOMES DIFFICULT, CALL A PHYSICIAN.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IN CASE OF CONTACT WITH EYES, FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.

SECTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - -

EXTINGUISHING MEDIA

WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -

EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - -

REFER TO SECTION 8.

SECTION 8. - - - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - - -

NIOSH/MSHA-APPROVED RESPIRATOR.
COMPATIBLE CHEMICAL-RESISTANT GLOVES.
CHEMICAL SAFETY GOGGLES.
WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE DUST.
AVOID ALL CONTACT.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
DISCARD CONTAMINATED CLOTHING AND SHOES.
IRRITANT.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - - -

APPEARANCE AND ODOR

RED-BROWN POWDER

PHYSICAL PROPERTIES

MELTING POINT: 199 C (DEC)

SECTION 10. - - - - - - - - - -STABILITY AND REACTIVITY - - - - - - - - -

STABILITY

STABLE.

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

CARBON MONOXIDE, CARBON DIOXIDE
NITROGEN OXIDES

HAZARDOUS POLYMERIZATION

WILL NOT OCCUR.

SECTION 11. - - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - - -

ACUTE EFFECTS

CAUSES SKIN IRRITATION.
CAUSES EYE IRRITATION.
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.

581 15

CAUSES EYE AND SKIN IRRITATION.
EXPOSURE CAN CAUSE:
STOMACH PAINS, VOMITING, DIARRHEA.
CHRONIC EFFECTS
TARGET ORGAN(S):
LIVER
RTECS #: QL5775000
2-NAPHTHOL, 1-((4-(O-TOLYLAZO)-O-TOLYL)AZO)-
TARGET ORGAN DATA
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)
TUMORIGENIC (TUMORS AT SITE OF APPLICATION)
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

SECTION 12. - - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -
DATA NOT YET AVAILABLE.

SECTION 13. - - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - - -
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - - -
CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - -
EUROPEAN INFORMATION
HARMFUL
R 40
POSSIBLE RISK OF IRREVERSIBLE EFFECTS.
R 20/21/22
HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
R 36/37/38
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
S 26
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.
S 36
WEAR SUITABLE PROTECTIVE CLOTHING.
S 22
DO NOT BREATHE DUST.
REVIEWS, STANDARDS, AND REGULATIONS
OEL=MAK
IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE IMEMDT 8,217,1975
IARC CANCER REVIEW:HUMAN NO ADEQUATE DATA IMEMDT 8,217,1975
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,56,1987
NOHS 1974: HZD A1356; NIS 6; TNF 212; NOS 13; TNE 2432
NOES 1983: HZD A1356; NIS 15; TNF 1210; NOS 23; TNE 20219; TFE 10256
EPA GENETOX PROGRAM 1988, POSITIVE: CELL TRANSFORM.-SA7/SHE
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: HISTIDINE REVERSION-AMES TEST
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY

SECTION 16. - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - -
THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA, ALDRICH, FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE