



January 18, 1993

Mr. Allen Schiff
NCDEHNR
Mooresville Regional Office
919 N. Main Street
Mooresville, North Carolina 28115

N. C. DEPT. OF NATURAL
RESOURCES AND
COMMUNITY DEVELOPMENT

JAN 22 1993

DIVISION OF TERRITORIAL MANAGEMENT
MOORESVILLE REGIONAL OFFICE

Re: **Copes-Vulcan of Charlotte, Inc.**
601 West Summit Avenue
Charlotte, North Carolina

Dear Allen,

Enclosed please find one copy of the Investigation for Soil and Groundwater Cleanup for referenced facility. Should you have any questions regarding this report, please contact the undersigned.

Sincerely,

A handwritten signature in black ink that reads 'Ken Czoer'. To the right of the signature is a small, hand-drawn circle containing the initials 'KAP'.

Kenneth E. Czoer
Environmental Services Director

KC/alp

ENCLOSURES

CC: Gary Dawson
Jim Calhoun
File

INVESTIGATION FOR SOIL AND GROUNDWATER CLEANUP

**Copes Vulcan Incorporated
601 West Summit Avenue
Charlotte, North Carolina**

CBM Number 1529

**Prepared by: CBM Environmental Services
627 Minuet Lane, Suite E
Charlotte, North Carolina 28217**

**Kenneth E. Czoer, Project Manager
December 22, 1992**

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1.0 Introduction

The subject site: Copes Vulcan of Charlotte is located at 601 West Summit Avenue in Charlotte, North Carolina. Previous reports prepared by CBM Environmental Services have documented the presence of petroleum contaminated soil in the vicinity of a former 500 gallon underground storage tank. This soil was discovered in July, 1992 during tank removal. At that time, approximately 4 cubic yards of petroleum contaminated soil were excavated, stockpiled on plastic, bermed and covered pending disposal.

Field observations at the time the tank was removed indicated that petroleum contaminated soil was present in the bottom of the excavation. Contaminated soil was also present at the interface between the sub-paving and the native, clay rich soil. The discharge of petroleum was observed to have resulted from a vent line, cut off at ground level, following temporary abandonment of the tank. Product migration was expected to be largely vertical in the tank pit backfill and predominantly horizontal along the sub-paving/clay interface outside the tank pit.

The present report summarizes CBM Environmental's actions taken to date subsequent to tank removal to determine the extent of contamination.

1.1 Facility Geography

The Copes Vulcan facility is located within the city limits of Charlotte, North Carolina. The location of the UST excavation and immediate surroundings are illustrated in Figure 1, Appendix A. During facility operation, the tank was used to catch drippings

from drums of virgin cutting oil kept in the storage building adjacent to the tank as illustrated. This facility was closed and the tank contents removed in the mid-1980's.

The Copes Vulcan property slopes west toward Irwin Creek as illustrated in the topographic map of the facility (Figure 2, Appendix A). The immediate area surrounding the tank is flat and paved with concrete. No underground utilities which could serve as migration pathways were identified in this immediate area. No additional sources of contamination were identified in this area.

2.0 Regional Geology and Hydrogeology

The regional geology and hydrogeology of the Charlotte area was described by LeGrand and Mundorff, (1952). The Copes Vulcan site is located within the Charlotte Belt of the Piedmont Physiographic Province. LeGrand and Mundorff described the rocks in the Charlotte area as consisting of granite and diorite. Saprolite and soil developed on these rocks consists typically of micaceous clay with varying amounts of sand.

The water table is typically located in weathered soil and saprolite developed on top of the parent rock. Depth to the water table varies as a function of seasonal variation in precipitation and thickness of the soil layer. During periods of dry weather, the water table may fall below the soil and saprolite layer. As a result, wells developed in the water table aquifer will go dry during periods of drought.

Water wells for residential and commercial use are generally completed in the parent rock below the water table aquifer. These wells rely on fracture porosity developed in the parent rock as a source of ground water. Wells developed in these units vary in quality with depth and location.

The Copes Vulcan site is served by the City of Charlotte municipal water supply. A survey conducted within 1500 feet of the site failed to discover water wells present within this area.

3.0 Field Activities

To assess the extent of soil and groundwater contamination CBM Environmental installed a total of six soil borings in locations indicated in Figure 1, Appendix A. Sample logs from each of these borings, completed during installation, are included in Appendix B.

The borings were installed using a stainless steel hand auger. As described above, horizontal migration of the discharged oil and water was determined to be confined to the sub-paving/clay interface. As a consequence, to determine the horizontal extent of soil contamination, borings were confined to the upper three feet of the soil. Following boring, samples of the soil were obtained from the hand auger and placed in laboratory supplied containers, stored on ice, and transported to Prism Laboratories in Charlotte, North Carolina.

3.1 Analytical Results

Soil samples were relinquished directly to Prism Laboratory personnel. Each sample was analyzed by EPA method 9071 for total

oil and grease in soil. The results of these analyses are presented in Appendix C.

4.0 Additional Field Activities

Following receipt of the analytical results of the soil samples above, additional soil was excavated from the immediate area of the tank pit. This soil was added to the four yards excavated during tank removal and disposed of at Lee Brick and Tile Company in Sanford, North Carolina. This additional excavation permitted the removal of all accessible soil which indicated a total petroleum hydrocarbon reading in excess of 250 ppm.

5.0 Results

Figures 3 and 4, Appendix A present cross-sections of the Copes Vulcan site constructed from data collected during tank excavation, boring and soil removal. As indicated, the surface geology of the site consists of a stiff, dense clay from ground level to a depth of at least 10 feet below ground level.

Subsequent to soil excavation and disposal, NCDEHNR issued new Site Sensitivity Evaluation guidelines for sites with contaminated soil in the vadose zone. This document permits determination of soil cleanup levels required on a site-by-site basis. Appendix D contains a copy of the Site Sensitivity Evaluation for the Copes Vulcan site. As indicated, the cleanup level required for soil at this site is 3000 ppm. None of the soil samples analyzed reported levels in excess of the 3000 ppm clean-up level.

5.0 Conclusions

Discharge of an unknown quantity of virgin cutting oil has been documented in the tank pit and piping trench at this site. Investigation of the extent of this soil contamination has been completed together with completion of a Site Sensitivity Evaluation. As a result, no contaminated soil in excess of the 3000 ppm cleanup guidelines are present at this site.

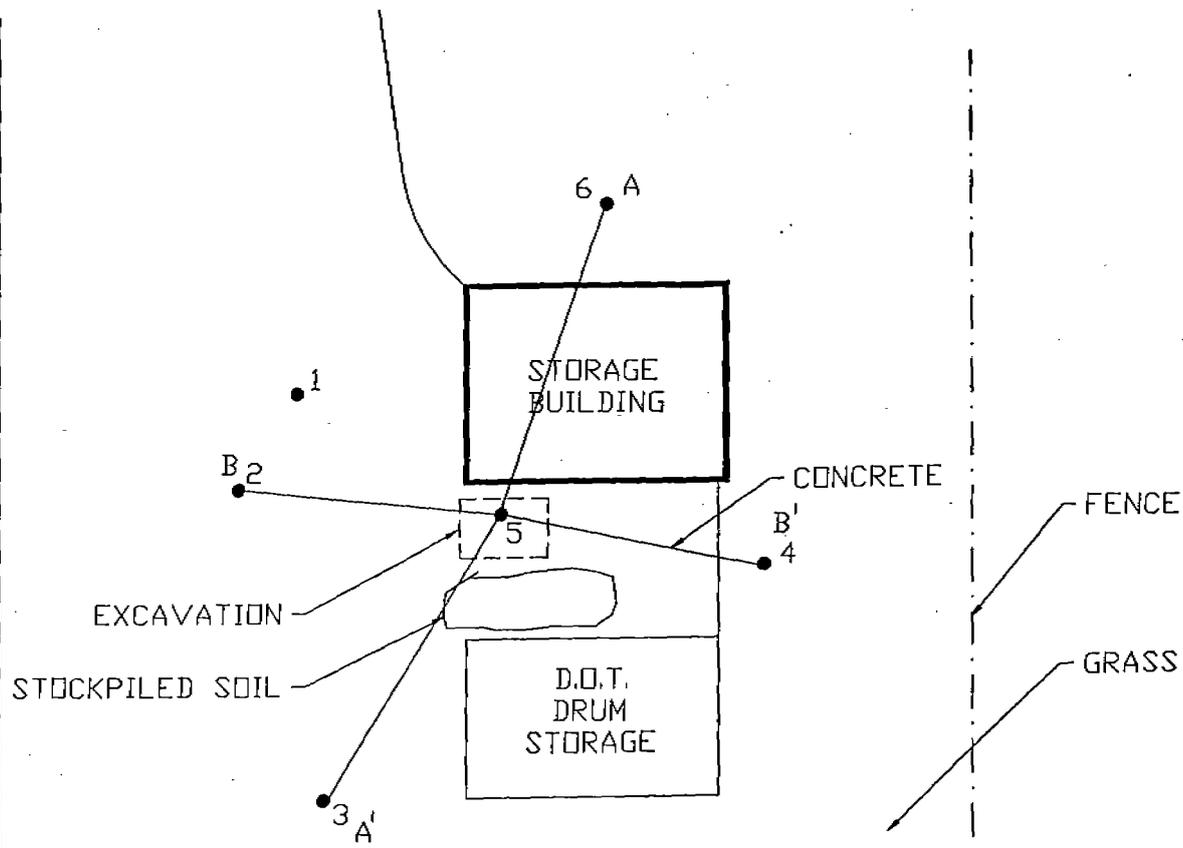
CBM Environmental Services therefore recommends no further action be required at this site.

REFERENCES

LeGrand, H.E., and Mundorff, 1952, Geology and Ground Water in the Charlotte Area, North Carolina. Dept. of Conservation and Development Division of Mineral Resources, Bulletin No. 63

Appendix A

MAIN BUILDING



EXCAVATION
STOCKPILED SOIL

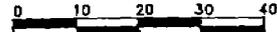
D.O.T.
DRUM
STORAGE

CONCRETE

FENCE

GRASS

● - BORING LOCATIONS



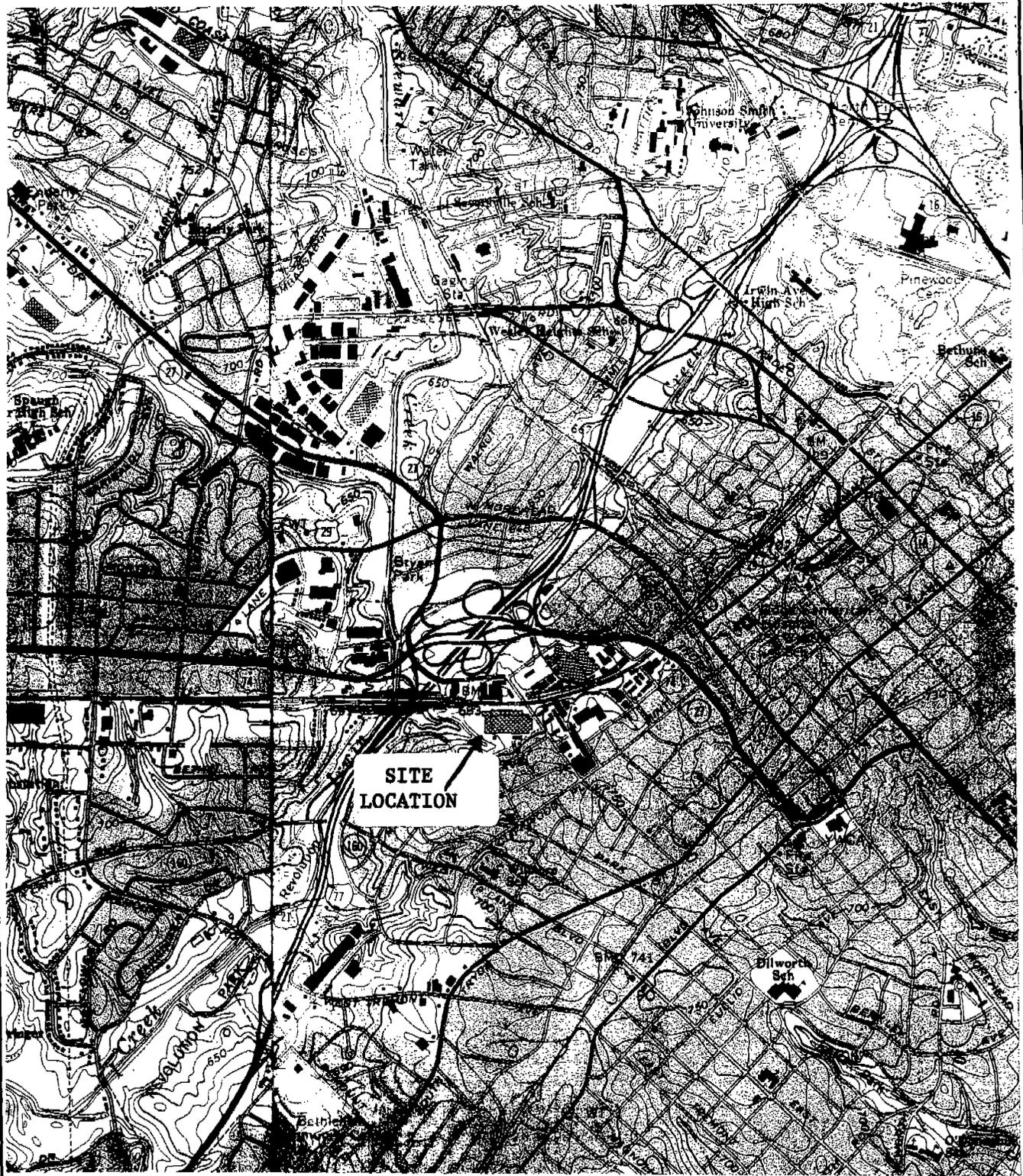
SCALE: 1" = 20'

● BORING AND ANALYSIS LOCATIONS.



ENVIRONMENTAL SERVICES
627 MINUET LN. SUITE E
CHARLOTTE, N.C. 28217
(704) 527-4391

FIGURE #1
COPES VULCAN
CHARLOTTE, N.C.

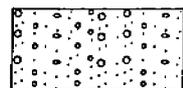
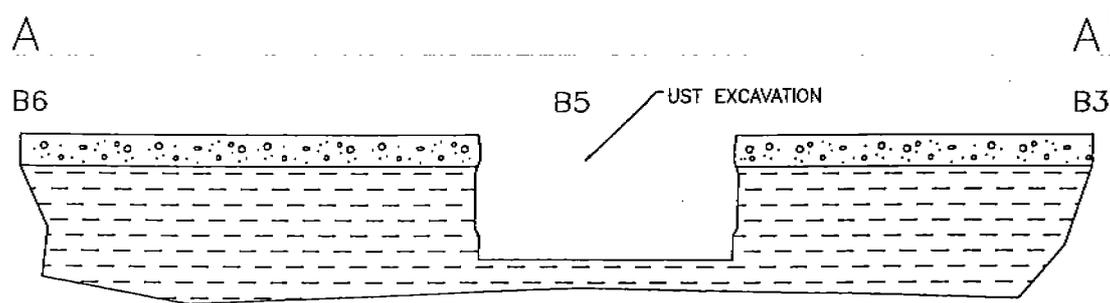


Facility Location: Copes-Vulcan, Inc.
 601 W. Summit Ave.
 Charlotte, NC

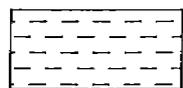


627 Minuet Lane - Suite E - Charlotte, NC 28217
 704-527-4391 800-743-1226

SCALE: SCALE 1:24000	DRAWN BY: K.C.	CHECKED BY: C.R.	DATE: 9/25/92	PROJECT NO. 1529	FIGURE NO. 2
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— SUBPAVING SAND AND GRAVEL



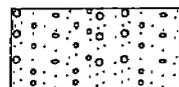
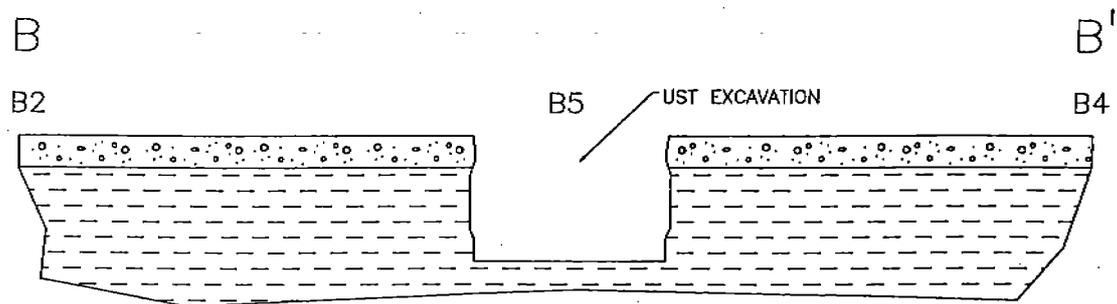
— CLAY—RED TO TAN, DENSE

VERTICAL SCALE: 1" = 5'
 HORIZONTAL SCALE: 1" = 20'

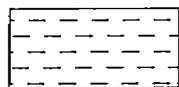


ENVIRONMENTAL SERVICES
 627 MINUET LN. SUITE E
 CHARLOTTE, N.C. 28217
 (704) 527-4391

FIGURE #3
 COPES VULCAN, INC.
 CROSS-SECTION A-A'



— SUBPAVING SAND AND GRAVEL



— CLAY-RED TO TAN, DENSE

VERTICAL SCALE: 1" = 5'
 HORIZONTAL SCALE: 1" = 20'



ENVIRONMENTAL SERVICES
 627 MINUET LN, SUITE E
 CHARLOTTE, N.C. 28217
 (704) 527-4391

FIGURE #4
 COPES VULCAN, INC.
 CROSS-SECTION B-B'

Appendix B

Appendix C

PRISM LABORATORIES, INC.
P.O. Box 240543
Charlotte, N.C. 28224-0543
(704)529-6364

August 31, 1992

CBM Environmental Services
Attn: Debbie LaFlamme
627 Minuet Lane, Suite E
Charlotte, NC 28217
Client: Copes Vulcan Proj#: 1307

Dear Ms. LaFlamme:

Below are results of analysis of 6 samples received for examination on August 20, 1992:

Customer Code: CBM Phone Number: (704)527-4391/FAX (704)527-0273
LAB I.D. AA12426 Prism ID Number 1402A6 Prism Customer Number 6645
Collection Date: 08/20/92 Collection Time: 12:00
Submittal Date: 08/20/92 Submittal Time: 15:25
Customer Sample I.D#: S-1

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
PETROLEUM HYDROCARBONS, #9071	mg/kg	< 10.	10.

Comments:
Client name: Copes Vulcan
PO# 1387

Customer Code: CBM Phone Number: (704)527-4391/FAX (704)527-0273
LAB I.D. AA12427 Prism ID Number 1402A6 Prism Customer Number 6645
Collection Date: 08/20/92 Collection Time: 12:30
Submittal Date: 08/20/92 Submittal Time: 15:25
Customer Sample I.D#: S-2

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
PETROLEUM HYDROCARBONS, #9071	mg/kg	78.	10.

Comments:
Client name: Copes Vulcan
PO# 1307

CBM Environmental Services

Page: 2

August 31, 1992

Customer Code: CBM Phone Number: (704)527-4391/FAX (704)527-0273
LAB I.D. AA12428 Prism ID Number 1402A6 Prism Customer Number 6645
Collection Date: 08/20/92 Collection Time: 11:15
Submittal Date: 08/20/92 Submittal Time: 15:25
Customer Sample I.D#: S-3

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
PETROLEUM HYDROCARBONS, #9071	mg/kg	64.	10.

Comments:

Client name: Copes Vulcan
PO# 1387

Customer Code: CBM Phone Number: (704)527-4391/FAX (704)527-0273
LAB I.D. AA12429 Prism ID Number 1402A6 Prism Customer Number 6645
Collection Date: 08/20/92 Collection Time: 11:30
Submittal Date: 08/20/92 Submittal Time: 15:25
Customer Sample I.D#: S-4

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
PETROLEUM HYDROCARBONS, #9071	mg/kg	92.	10.

Comments:

Client name: Copes Vulcan
PO# 1387

Customer Code: CBM Phone Number: (704)527-4391/FAX (704)527-0273
LAB I.D. AA12430 Prism ID Number 1402A6 Prism Customer Number 6645
Collection Date: 08/20/92 Collection Time: 12:45
Submittal Date: 08/20/92 Submittal Time: 15:25
Customer Sample I.D#: S-5

TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
PETROLEUM HYDROCARBONS, #9071	mg/kg	490.	10.

Comments:

Client name: Copes Vulcan
PO# 1387

CBM Environmental Services

Page: 3

August 31, 1992

Customer Code: CBM Phone Number: (704)527-4291/FAX (704)527-0273
LAB I.D. AA12431 Prism ID Number 140206 Prism Customer Number 6643
Collection Date: 08/20/92 Collection Time: 11:45
Submittal Date: 08/20/92 Submittal Time: 15:25
Customer Sample I.D#: G-6

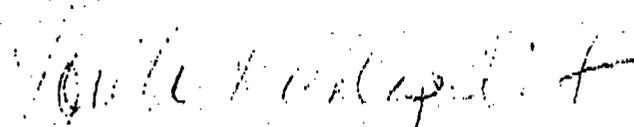
TEST PARAMETER	UNITS	TEST RESULT	DETECTION LIMIT
PETROLEUM HYDROCARBONS, #9071	mg/kg	160.	10.

Comments:

Client name: Copes Vulcan
PO# 1307

Please advise should you have questions concerning these data.

Respectfully submitted,


Lori A. Dunlap-Flint
Laboratory Supervisor

Appendix D

of ≤ 40 ppm TPFH (EPA method 3550), and O&G levels of ≤ 250 ppm (EPA Method 9071). However, in cases where groundwater have been contaminated or other special site conditions exist, a lower clean-up level and/or additional investigation may be required by the DEM..

In any case, whenever soil remediation is necessary, the treatment/disposal technologies that are utilized should be cost effective and provide adequate protection of human health and the environment.

SITE SENSITIVITY EVALUATION (SSE)

STEP 1: Site Characteristics Evaluation

The sensitivity of groundwater to contamination from petroleum contaminated soils is evaluated by assessing 5 specific site characteristic. These characteristics are rated in accordance with their potential for contributing to the contamination of groundwater; the greater the potential contribution, the higher the score. The overall sensitivity of a site is determined by a numerical value representing the sum of values for each site characteristic.

Complete the SSE score sheet (Table 1) and proceed to step 2

Explanation of Site Characteristics

Grain Size - The main objective of this analysis is to estimate soil permeability, potential for contaminant attenuation, and whether zone restrictions for contaminant transfer exist.

Sample Collection and Location: The sample collected for determination of grain size should be representative of the predominant soil type found in the area of the deepest contaminated soils located beneath the tank pit, or in proximity to the tank pit (in the apparent downgradient direction.) Retaining this soil sample for future reference is advisable.

Sample Classification: The soil sample collected as described above should be classified according to the Unified Soil Classification System (ASTM designation D-2487) or the U.S. Department of Agriculture's method of soil classification. (A visual and textural field inspection will suffice.)

NOTE: *Sample collection and classification should be performed by a qualified person, who through a combination of training and experience, is competent to evaluate the conditions existing at an underground storage tank (UST) system site, including the physical and chemical conditions of the subsurface. (A geologist, soils scientist, engineer or technician active in this field and with experience should be qualified).*

SITE SENSITIVITY EVALUATION FOR PETROLEUM CONTAMINATED SOIL

The purpose of the Site Sensitivity Evaluation (SSE) is to evaluate the sensitivity of groundwater to contamination by the release of petroleum related substances from the vadose zone. The "in-situ" soil clean-up levels, based on total petroleum fuel hydrocarbons (TPFH) and/or oil and grease (O&G), is determined by the SSE score; i.e., higher SSE scores require a lower TPFH or O&G soil clean-up level. The SSE is only applicable for petroleum contaminated sites.

If groundwater levels at the site are generally known, or can be determined from field observations, one boring may be sufficient to obtain information necessary to complete the SSE. Also, if a release is discovered during a tank excavation, field investigations such as test pits, soil borings, or deeper excavation into the tank pit itself, may provide the necessary information.

A Site Sensitivity Evaluation should be performed on all sites that meet the following criteria:

- 1). Contaminated soils are located 5 feet or more from the water table, top of bedrock or transmissive indurated sediments (shell limestone, fractured shale or sandstone, etc.) at sites in category A or B. The applicability of the separation distance on sites in category C, D, or E will be determined by DEM.
- 2). Contaminated soil does not create a human exposure pathway via ingestion, absorption, or inhalation.

NOTE: For sites where the criteria in 1 and 2 above are not met, the clean-up levels will be 10 ppm TPFH (EPA Method 5030), 40 ppm TPFH (EPA Method 3550), or 250 ppm TPFH (EPA Method 9071) (unless DEM specifies otherwise). The references to EPA methods 5030 and 3550 throughout this document include the use of the California GC-FID method for TPFH and are referred to only as 5030 and 3550 for brevity.

The Site Sensitivity Evaluation (SSE) will determine the soil clean-up levels that must be achieved for each site. Depending on the SSE scores, the final clean-up level for site soils may range between 10 to 300 ppm TPFH (for EPA Method 5030), 40 to 1200 ppm TPFH (for EPA Method 3550), and 250 to 3000 ppm O&G (for EPA Method 9071). Soils exhibiting contamination levels greater than (>) 300 ppm TPFH (for EPA Method 5030) or > 1200 ppm TPFH (for EPA Method 3550), or > 3000 ppm TPFH (for EPA Method 9071) must be remediated (unless otherwise directed by DEM).

"Contaminated soil" in this document refers to soils containing greater than 10 ppm TPFH for low boiling point fuels, greater than 40 ppm TPFH for medium boiling point fuels and greater than 250 ppm for oil and grease. Remedial activities will not be required on soil exhibiting TPFH levels of less than or equal to (\leq) 10 ppm TPFH (EPA Method 5030), levels

Relict structures, sedimentary structures, and/or textures present in the zone of contamination and underlying "soils"- Structures in soils that may significantly increase the permeability such as numerous quartz veins, fractures, coarse grained sandy bed in clays and silts, weathered coarse grained igneous intrusions, etc.

Distance from location of deepest contaminated soil to water table - The determination may be based upon water table wells in the immediate vicinity, mottling of the soil, an auger hole in the excavation or immediate vicinity, or specific knowledge of an area. If an auger hole is made in the excavation, it shall immediately be grouted with neat cement or bentonite.

Is the top of bedrock or transmissive indurated sediments located above the water table?
Is there evidence of a water table at the top of bedrock or top of transmissive indurated sediments (shell limestone, fractured shale or sandstone, etc.)?

Artificial conduits present within the zone of contamination - Are there water lines, sewer lines, telephone cables, product dispensing piping, etc., in contamination zone?

Complete the SSE score sheet (Table 1). Proceed to Step 2.

STEP 2: Initial Clean-up Level (See Table 2)

Once the SSE score has been obtained, select the corresponding initial clean-up level for the type of hydrocarbons (low boiling point, medium boiling point, or oil and grease) released on site. Proceed to Step 3.

STEP 3: Final Clean-up Level (See Table 2 and Site Category Descriptions)

Determine and document the site category (A, B, C, D, or E) based on field evaluations. Use Table 2 and the Site Category Descriptions to select the corresponding final clean-up level. Based on the final clean-up levels obtained, determine the quantity of soil that requires remediation.

Submit data and other evidence used in the determination of the final cleanup level to the appropriate Regional Office. Upon review of the information provided, the Regional Office will verify the site's final soil cleanup level. Upon completion of the SSE, the responsible party should immediately begin remediation of soils containing TPFH concentrations in excess of the final proposed cleanup level. The responsible party should maintain accurate records of the remediation process and be prepared to justify all remediation activities.

Table 1
Site Sensitivity Evaluation (SSE)
 Site Characteristics Evaluation (Step 1)

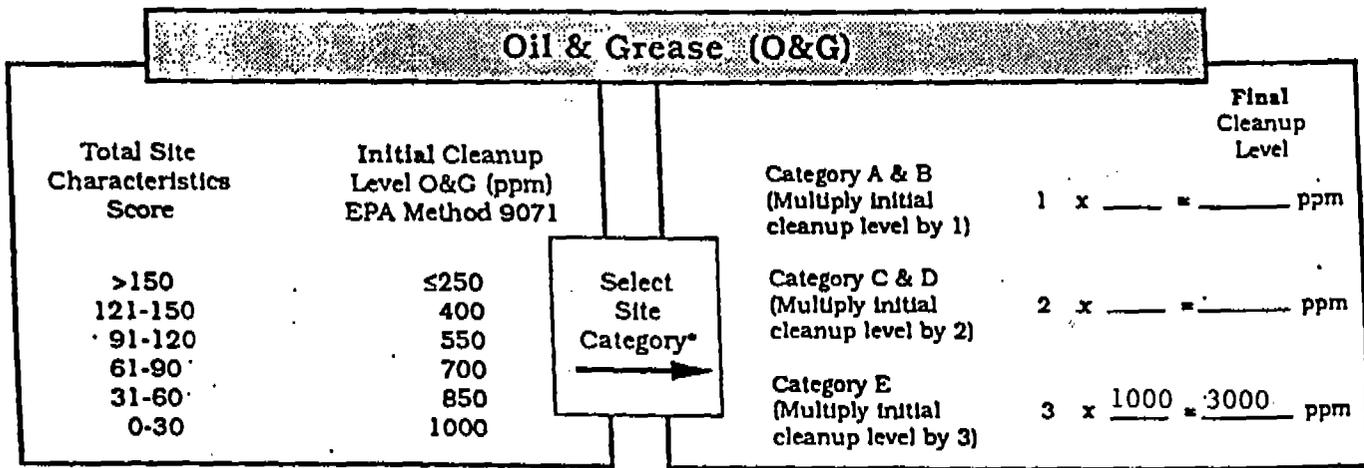
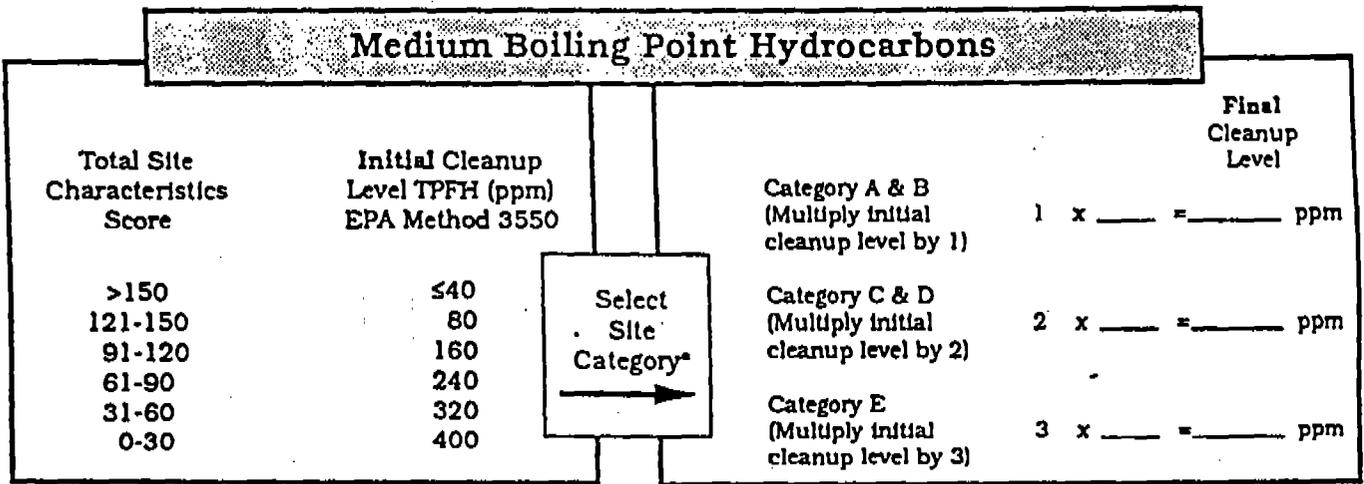
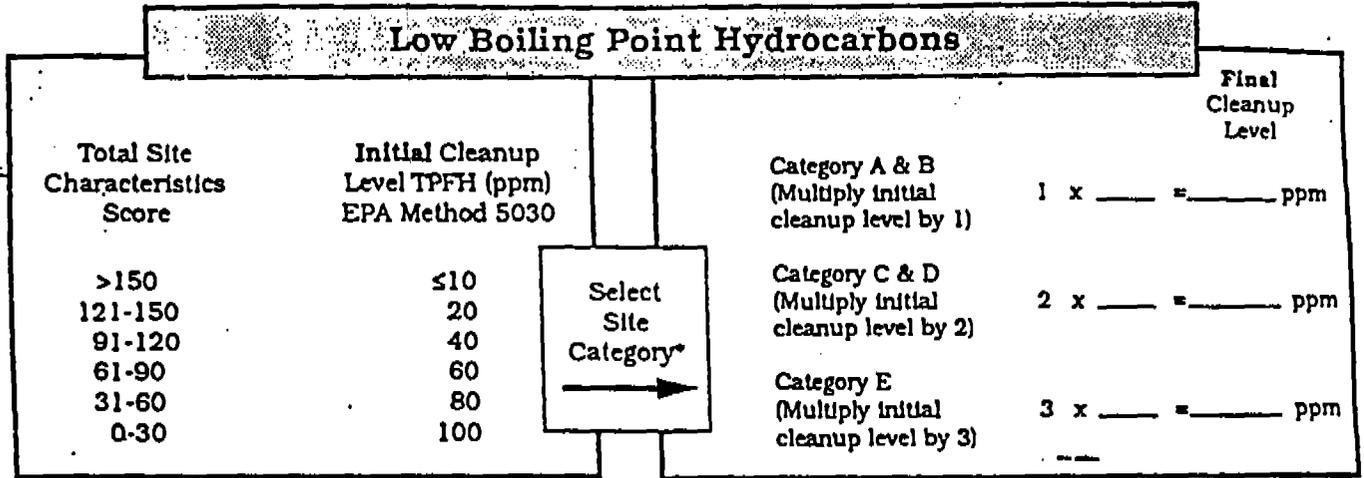
Characteristic	Condition	Rating	
Grain Size*	Gravel	150	
	Sand	100	
	Silt	50	
	Clay	0	
			0
Are relict structures, sedimentary structures, and/or textures present in the zone of contamination and underlying "soils".	Present and intersecting the water table.	10	
	Present but <u>not</u> intersecting the water table.	5	
	None present.	0	
			0
Distance from location of deepest contaminated soil** to water table.	5 - 10 feet	20	
	>10 - 40 feet	10	
	>40 feet	0	
			10
Is the top of bedrock or transmissive indurated sediments located above the water table?	Yes	20	
	No	0	
			0
Artificial conduits present within the zone of contamination.	Present and intersecting the water table.	10	
	Present but <u>not</u> intersecting the water table.	5	
	Not present.	0	
			5
Total Site Characteristics Score:			15

* Predominant grain size based on Unified Soil Classification System or U.S. Dept. of Agriculture's Soil Classification Method.

** (>10 ppm TPH by Method 5030; >40 ppm TPH by Method 3550; >250 ppm O&G by Method 9071)

Table 2

Site Sensitivity Evaluation (SSE)
 Initial Cleanup Level (Step 2) Final Cleanup Level (Step 3)



* See Site Category Descriptions

TABLE 3
SITE SENSITIVITY EVALUATION (SSE)

SITE CATEGORY DESCRIPTIONS

CATEGORY A (*Site meets any one of the criteria*)

1. Water Supply well(s) contaminated and not served by accessible public water supply.
2. Vapors present in confined areas at explosive or health concern levels.
3. Treated surface water supply in violation of the safe drinking water standards.

CATEGORY B (*Any One*)

1. Water supply well(s) contaminated, but served by accessible public water supply.
2. Water supply well(s) within 1500 feet of site, but not contaminated and not served by accessible public water supply.
3. Vapors present in confined areas but not at explosive or health concern levels.

CATEGORY C (*Both*)

1. No known water supply well(s) contaminated.
2. Water supply well(s) greater than 1500 feet from site but not served by accessible public water supply.

CATEGORY D (*Both*)

1. No known water supply well(s) contaminated.
2. Water supply well(s) within 1500 feet of site but served by accessible public water supply.

CATEGORY E (*Both*)

1. No known water supply well(s) contaminated or within 1500 feet of site.
2. Area served by accessible public water supply.