TRIAD
ENGINEERING
INCORPORATED

January 26, 1995

Mr. Ron Dilahunt
Wisconsin Department of Natural Resources
Southeast District Office
2300 North Dr. Martin Luther King, Jr. Drive
P.O. Box 12436
Milwaukee, WI 53212

RE: Air Emissions Calculations and Treatment Application Forms
for Soil and Groundwater Remediation Systems
Chrysler Corporation, Kenosha Main Plant
Triad Engineering Project Nos. W943324.2A, W943324.3A, W943324.4

Dear Mr. Dilahunt:

Enclosed please find calculations for actual air emissions to date from two existing groundwater treatment systems and Wisconsin Department of Natural Resources (WDNR) applications (Forms 4400-120) to operate two additional groundwater treatment and one additional soil and groundwater treatment system at the Chrysler Main Plant site in Kenosha, Wisconsin. The system locations, components, and estimated air emissions are presented in the following letter.

Estimated volatile organic compound (VOC) and benzene emissions from the two existing and three proposed treatment systems are summarized on Attachment 1. Attachment 2 provides air emissions details for the two existing air strippers based on detected concentrations in the groundwater influent and effluent. Attachment 3 summarizes the constituents detected in groundwater samples from each new groundwater recovery sump and Attachment 4 includes the WDNR Form 4400-120 applications with attached air emission calculations for the new Sump 9, Area 2, and Area 3 treatment systems.

I. EXISTING TREATMENT SYSTEMS

The existing treatment systems (two air strippers; one connected to Sumps 4 and 5 and one connected to Sump 6) are located in the North Area of the Chrysler Kenosha Main Plant site (Figure 1). Triad Engineering Inc. (Triad) submitted a performance monitoring letter report (dated December 20, 1994) to you in reference to these systems. Updated tables (Tables 1 and 2) showing emission calculations for the latest groundwater sampling event at these two systems are included in Attachment 2.

325 east chicago street
milwaukee, wisconsin 53202
414/291-8840
fax: 414/291-8841

II. NEW TREATMENT SYSTEMS

The three new treatment systems include the following: an air stripper and soil vapor extraction (SVE) unit connected to Sump 9 located in the North Area; the Area 3 air stripper connected to Sumps 10, 11, 12, and 13; and the Area 2 air stripper connected to Sumps 7, 8, 14, and 15. The Area 2 and Area 3 remediation systems are located in the Chrysler Main Plant South Area (Figure 1).

A. Sump 9.

Anticipated air emissions from the Sump 9 air stripper and SVE unit were calculated using groundwater data from a Sump 9 water sample and soil analytical data from a Sump 9 excavation, unsaturated soil sample. The groundwater analytical results are summarized in Attachment 3 and the soil sample analytical data is attached to the Sump 9 Form 4400-120 application. The Sump 9 application form including soil and groundwater treatment system emission calculations is included in Attachment 4.

B. Area 2.

Anticipated air emissions for the Area 2 air stripper were calculated using the highest detected benzene and total VOC concentrations detected in groundwater samples from Sumps 7, 8, 14, and 15. The highest benzene and total VOC concentrations from Area 2 sumps were detected in the Sump 8 groundwater sample (benzene 58 micrograms per liter [μg/L] and total VOCs 6697 μg/L). The groundwater results are summarized in Attachment 3. Estimated air emission calculations are attached to the Area 2 WDNR Form 4400 Treatment Application (Attachment 4) and summarized in Attachment 1.

C. Area 3.

Air emissions for the Area 3 air strippers were estimated using the highest benzene and total VOC concentrations detected in groundwater samples from Sumps 10, 11, 12, or 13. The sump groundwater sample results are presented in Attachment 3. The highest benzene concentration (3920 μg/L) from Area 3 sumps was detected in the Sump 11 groundwater sample and the highest total VOC concentration (9445.7 μg/L) was detected in the Sump 10 groundwater sample (conservatively assuming that undetected compounds were present at concentrations equal to the laboratory reporting limit). Area 3 estimated air emission calculations are attached to the Area 3 WDNR Form 4400 treatment application (Attachment 4) and are summarized in Attachment 1.

III. SCHEDULE, OPERATION AND START-UP

Based on the calculated emissions, operation of the existing treatment systems will continue. Air emissions for the existing systems will be calculated using groundwater influent and effluent data. Operation of the new treatment systems is anticipated to be initiated in early February, as assembly of the systems is completed. It is anticipated that the Sump 9 SVE and groundwater treatment system will be initiated first. The remaining two systems will be initiated following installation completion.

Preliminary remedial system monitoring will be completed during the first 24 hour period of system start-up and operation for each system. Remedial system sampling will include collecting one air sample from the SVE system discharge and one influent and effluent water sample from each of the air stripper systems (two samples per air stripper; six samples total). The treatment systems will be shutdown following sample collection pending receipt and review of the analytical results. The air and water samples will be submitted to a Wisconsin-certified laboratory for analysis of VOCs (EPA Method 8021) (for air, EPA Method 25A equivalent), gasoline range organics (GRO; WDNR Modified GRO Method), and diesel range organics (DRO; WDNR Modified DRO Method).

Upon receipt of the analytical results, the data will be reviewed to evaluate if the treatment systems are within WDNR air emissions requirements for the site. The WDNR will be notified of the results. Any required system modifications or additional sampling will be complete prior to resuming operation, if necessary based on the emissions calculations. Air emission reports for the five treatment systems discussed herein will be submitted to the WDNR on a quarterly basis.

If you have any questions or need additional information, please do not hesitate to contact either of the undersigned at (414) 291-8840.

Sincerely,

TRIAD ENGINEERING INC.

Jeanne M. Ramponi
Geologist

TRIAD ENGINEERING INC.

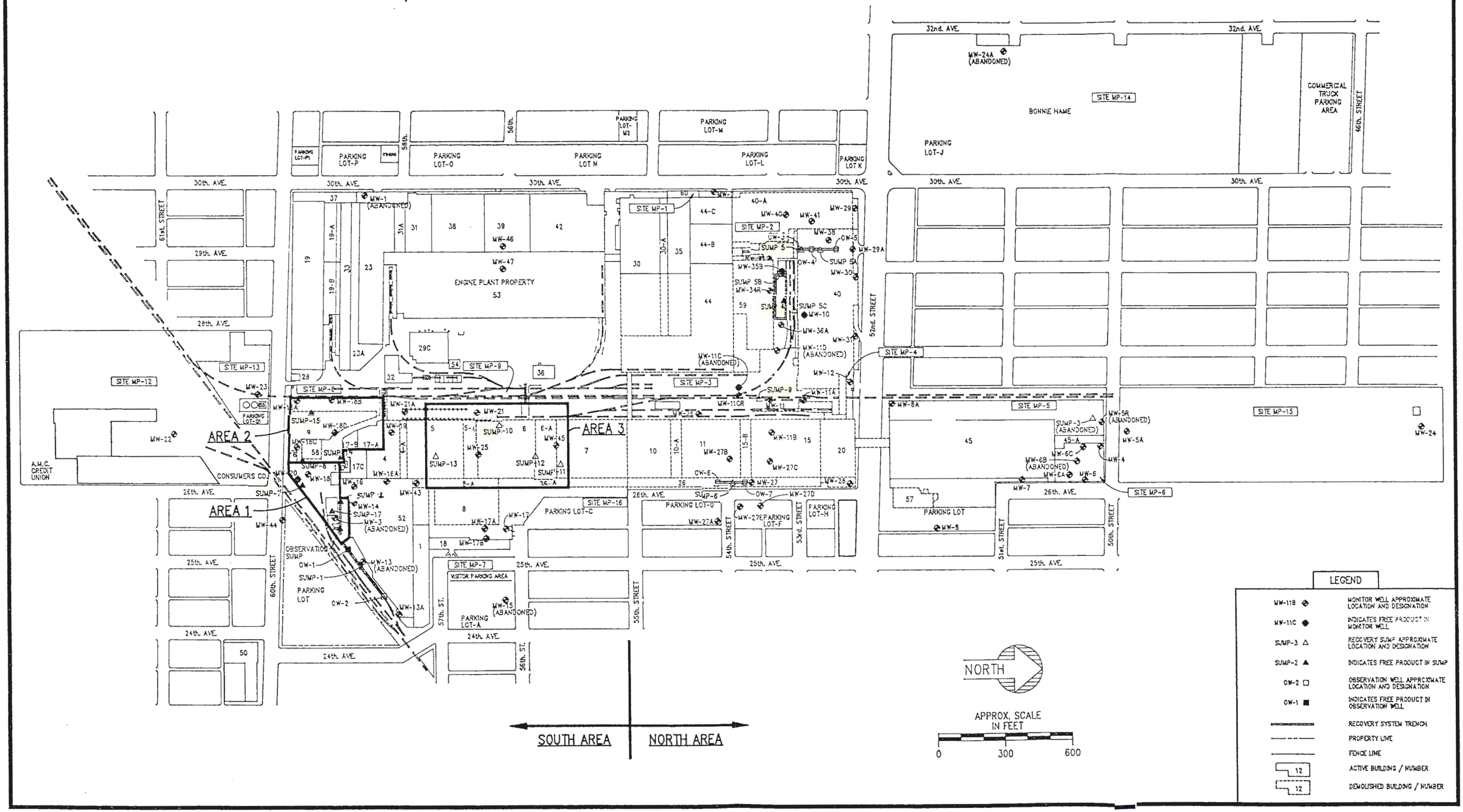
Ross M. Creighton
Hydrogeologist

RMC:klb
W943324\943324.2a\943324-C

Attachments

cc: Mr. Greg Rose/Chrysler Environmental and Energy Affairs
Mr. John Bugno/Chrysler Kenosha Main Plant
Ms. Pam Mylotta/WDNR
Ms. Lori Bowman/Triad
Mr. Richard Binder/Triad

32438-20
1-26-95



TRIAD ENGINEERING INCORPORATED

FIGURE 1
CHRYSLER KENOSHA MAIN PLANT
FACILITY LAYOUT

ATTACHMENT 1
SUMMARY OF
TOTAL ESTIMATED AIR EMISSIONS FOR CHRYSLER CORPORATION, KENOSHA MAIN PLANT

	VOC EMISSIONS lbs/hr	BENZENE EMISSIONS lbs/yr
Existing Groundwater Treatment Systems		
Sumps 4 & 5[1] Air Stripper	0.0283	35.88
Sump 6[1] Air Stripper	0.0075	0.003
New Groundwater/Soil Treatment Systems		
Sump 9[2] SVE/Air Stripper	1.468	79.92
Sumps 7, 8, 14, 15[2] Area 2 - Air Stripper	0.017	1.27
Sumps 10, 11, 12, 13[2] Area 3 - Air Stripper	0.024	85.9
TOTAL (for 5 Treatment Systems)	**1.54**	**202.97**
WDNR Discharge Limit	**5.7**	**300**

NOTE:

[1] Sumps 4 & 5 and Sump 6: The VOC emission in lbs/hr and benzene emission in lbs/yr are estimated values extrapolated from the system groundwater influent and effluent monitoring data collected during the last 7.5 months, since system start up.

[2] The Sump 9, Area 2 (Sumps 7, 8, 14, 15) and Area 3, (Sumps 10, 11, 12, 13) remediation system air emissions are estimated values based on soil and/or groundwater analytical data.

ATTACHMENT 2
Table 1
Chrysler Corporation
Kenosha Main Plant
Sumps 4 and 5 Groundwater Remediation System

Date	Sump 4					Sump 5					Sumps 4 and 5 Composite											
	Influent		Flow			Influent		Flow			Sump 4&5 Weighted Average		Flow			Effluent		Percent Removal		Benzene Emissions (lbs)		VOC Emiss
	Benzene mg/L	Total VOCs mg/L	Flow (Gallons)	Average Flow Rate (GPM)	Cumulative Flow (Gallons)	Benzene mg/L	Total VOCs mg/L	Flow (Gallons)	Average Flow Rate (GPM)	Cumulative Flow (Gallons)	Benzene mg/L	Total VOCs mg/L	Flow for the Period (Gallons)	Average Flow Rate (GPM)	Cumulative Flow (Gallons)	Benzene mg/L	Total VOCs mg/L	Benzene	Total VOCs	For Reporting Period	Cumulative	For Reporting Period (lbs/hr)
04/21/94	Started the System																					
04/22/94	7.300	16.650	9,081	6.31	9,081	0.006	1.600	34,973	24.29	34,973	1.5095	4.7023	44,054	30.59	44,054	0.150	0.460	90.06%	90.22%	0.499	0.499	0.065
06/07/94	5.700	15.860	82,656	1.25	91,737	5.400	14.920	78,799	1.19	113,772	5.5536	15.4012	161,455	2.44	205,509	0.017	0.087	99.69%	99.44%	7.455	7.955	0.019
08/24/94	3.940	11.230	166,298	1.48	258,035	0.035	17.360	154,158	1.37	267,930	2.0613	14.1789	320,456	2.85	525,965	0.069	0.403	96.65%	97.16%	5.325	13.279	0.020
12/08/94	3.180	7.455	228,826	1.50	486,861	2.550	7.326	171,096	1.12	439,026	2.9105	7.3998	399,922	2.62	925,887	0.159	0.528	94.54%	92.86%	9.177	22.456	0.009

Note: The system was down from 4/22/94 to 5/5/94, until the initial sampling results were received.
VOC = Volatile Organic Compounds

ATTACHMENT 2
Table 2
Chrysler Corporation
Kenosha Main Plant, North Area
Sump 6 Groundwater Remediation and Treatment System

Date	Influent		Flow			Effluent		Percent Removal		Benzene Emissions (lbs)		VOC Emiss
	Benzene mg/L	Total VOCs mg/L	Flow (Gallons)	Average Flow Rate (GPM)	Cumulative Flow (Gallons)	Benzene mg/L	Total VOCs mg/L	Benzene	Total VOCs	For Reporting Period	Cumulative	For Reporting Period (lbs/hr)
04/21/94	Started the System											
04/22/94	0.0005	2.28	21,213	14.73	21,213	0.0005	0.0952	0.00%	95.82%	0.000	0.000	0.016
06/07/94	0.0005	4.48	211,108	3.19	232,321	0.0015	0.1249	ERR	97.21%	ERR	0.000	0.007
08/24/94	0.0012	2.44	365,734	3.26	598,055	0.0006	0.0047	50.00%	99.81%	0.002	0.002	0.004
12/06/94	0.0005	1.25	672,113	4.49	1,270,168	0.0005	0.0127	0.00%	98.98%	0.000	0.002	0.003

Note: The system was down from 4/22/94 to 5/5/94, until the initial sampling results were received.
The percent removal of benzene for the sample collected 6/7/94 is shown as an error because the detected effluent benzene concentration was higher than the detected influent benzene concentration.
VOC = Volatile Organic Compounds

ATTACHMENT 3
SUMMARY OF CONSTITUENTS DETECTED
IN GROUNDWATER FROM SUMPS 7 THROUGH 15
CHRYSLER KENOSHA MAIN PLANT

Sample ID		Sump 7	Sump 8	Sump 9	Sump 10	Sump 11	Sump 12	Sump 13	Sump 14	Sump 15
Date Collected		9/22/94	9/22/94	9/22/94	9/22/94	9/22/94	9/22/94	9/22/94	9/22/94	9/22/94
Date Analyzed		9/28/94	9/27/94	9/27/94	9/26/94	9/27/94	9/28/94	9/26/94	9/26/94	9/28/94
Constituents	Units				Detected Concentrations					
GRO	mg/L	7.1 G	6.4	21	2.1	18	0.2	0.4	< 0.1	16G
DRO	mg/L	8.00 WB	1.2 WB	0.9 W1	< 0.1	1.4 W1	< 0.1	< 0.1	0.4 WB	36.9 WB
Benzene	µg/L	11	58	3560	14.4D	3920	3.1	1.1	< 0.5	< 5.0
n-Butylbenzene	µ/L	86	< 25	5.6DJ	< 0.5	22J	1.7	< 0.5	< 0.5	391
sec-Butylbenzene	µg/L	32	< 40	< 0.8	< 0.8	< 40	0.7J	< 0.8	< 0.8	3J
tert-Butylbenzene	µg/L	< 5.0	< 25	< 0.5	< 0.5	95	1.4	< 0.5	< 0.5	< 5.0
Chloroethane	µg/L	5	< 25	22.6	< 100	< 25	< 0.5	10.4	37.5	< 5.0
1,1-Dichloroethane	µg/L	7	518	< 0.6	< 120	< 30	0.6	5.4	44.7	< 6.0
1,2-Dichloroethane	µg/L	< 5.0	< 25	2.0	< 100	15J	< 0.5	914D	< 0.5	< 5.0
1,1-Dichloroethene	µg/L	< 5.0	50	< 0.5	< 100	< 25	< 0.5	97D	0.2J	< 5.0
1,2-Dichloroethene (cis)	µg/L	72	2200	2.6	620	< 30	3.3	< 0.6	2.9	< 6.0
1,2-Dichloroethene (trans)	µg/L	10	277	4.0	900	< 30	.05	< 0.7	0.4J	< 7.0
Ethylbenzene	µg/L	26	< 25	2180DE	< 0.5	930	4.8	< 0.5	< 0.5	67
Isopropylbenzene	µg/L	< 5.0	< 25	< 0.5	< 0.5	< 25	< 0.5	< 0.5	< 0.5	8
p-Isopropyltoluene	µg/L	8	< 25	110D	< 0.5	19J	< 0.5	< 0.5	< 0.5	80
Methylene Chloride	µg/L	(11BJ)	< 100	2.0	< 400	< 100	< 2.0	< 2.0	< 2.0	8BJ
Naphthalene	µg/L	82	< 35	80D	< 0.7	< 35	0.6J	< 0.7	< 0.7	164
n-Propylbenzene	µg/L	18	< 30	72D	< 0.6	60	2.0	< 0.6	< 0.6	124
Styrene	µg/L	< 6.0	< 30	< 0.6	< 0.6	< 30	< 0.6	< 0.6	< 0.6	38
Toluene	µg/L	24	69	2080DE	5.9D	1470	1.7	< 0.5	1.4	< 5.0
1,1,1-Tichloroethane	µg/L	< 5.0	< 25	< 0.5	< 100	< 25	< 0.5	< 0.5	5.9	< 5.0
Trichloroethene	µg/L	23	2920	24	6770	11J	2.1	466D	1.4	< 5.0
1,2,3-Trichloropropane	µg/L	< 5.0	< 25	< 0.5	< 100	< 25	< 0.5	< 0.5	< 5.0	< 5.0
1,2,4-Trimethylbenzene	µg/L	58	< 45	390D	< 0.9	< 45	< 0.9	< 0.9	< 0.9	< 9.0
1,3,5-Trimethylbenzene	µg/L	29	< 25	190D	2.2D	190	< 0.5	< 0.5	< 5.0	< 5.0
Vinyl Chloride	µg/L	28	< 25	< 0.5	< 100	< 25	< 0.5	17.8	< 5.0	< 5.0
o-Xylene	µg/L	14	< 25	480D	< 0.5	430	1.7	< 0.5	< 5.0	< 5.0
m&p-Xylene	µg/L	23	< 25	1900D	6.6D	1280	1.3	< 0.5	< 5.0	< 5.0
Total detected VOCs		567	6102	11,104.8	8319.1	8442	25.05	1511.7	94.4	883
Total Assumed VOCs*		603	6697	11,109	9445.7	8932	33.05	1524	128	976

<25 - compound was not detected above indicated concentration.
GRO - gasoline range organics
DRO - diesel range organics
B - Compound detected in method blank
G - Peaks outside GRO retention window
D - Compound quantitated in analysis at second dilution factor
E - Compound concentration more than 10% outside calibration range
J - Estimated value, compound detection below PQL
W1 - Peaks before DRO retention time window
W2 - Peaks after DRO retention time window
WB - Baseline rise at end of DRO retention time windows

*For the purpose of conservatively calculating air emissions, total assumed VOCs include values equal to the practical quantification limit for undetected compounds.

ATTACHMENT 4

WDNR FORM 4400-120
APPLICATIONS FOR SUMP 9,
AREA 2 AND AREA 3 TREATMENT SYSTEMS

APPLICATION TO TREAT OR DISPOSE OF PETROLEUM CONTAMINATED SOIL

Form 4400-120

This form is required by the Department of Natural Resources for leaking underground storage tank sites (Wis. Adm. Code NR 419). Failure to complete and submit this form may lead to violations of subchapters III and IV of ch. 144 Wis. Stats. and may result in forfeitures of not less than $10 or more than $25,000 for each violation, pursuant to ss. 144.426, 144.469, 144.74 (1), and 144.99, Wis. Stats., or fines of not less than $100 or more than $150,000 or imprisonment for not more than 10 years, or both, pursuant to s. 144.74 (2), Wis. Stats. Each day of a continuing violation constitutes a separate violation. Department approval of this form is required prior to site remediation, except for soils to be buried in landfills.

ALL SITES MUST COMPLETE PART I.

Part I. Source of Soil

Site/Facility Name
CHRYSLER CORPORATION - KENOSHA MAIN PLANT - Sump 9

Site I.D. # (for DNR use only)

Site Address
5555 30TH AVENUE

Contact Name
JACK BUGNO

City, State, Zip Code
KENOSHA, WISCONSIN 53144

1/4, 1/4, Section, Township, and Range
SW, SE, 36, 2, 22E

The information on this form is accurate to the best of my knowledge.
NOTE: Waste disposed of in landfills may incur future liability.

Signature
John P Bugno

Telephone Number (include area code)
414/658-6000

Consulting Firm	Contact	Telephone Number
TRIAD ENGINEERING INC.	RICHARD J. BINDER	414/291-8840

Estimated Volume Contaminated Soil

2400 (SOIL ONLY) Tons/(cubic yards) (circle one)

Type of Petroleum Contamination (Circle):

(Gasoline) (Diesel Fuel/#2 Fuel Oil)

Other BETX

Soil Type (USCS)

- X sand (SP, SW)
- X silty/clayey sands (SM, SC)
- ___ silt (ML, MH, OL)
- X clay (Cl, CH, OH)
- X gravel (GC, GM, GP, GW)
- ___ peat (PT)

Contaminant concentration:

One screened sample per 15 yds³ and one laboratory analysis per 300 yds³ of contaminated soil *when the PID registers contamination* OR one laboratory analysis per 100 yds³ when the PID *does not register contamination on soil shown to be contaminated during the site investigation/excavation or stockpiling.* PLEASE ATTACH A TABLE SHOWING THE RESULTS OF BOTH FIELD SCREENING AND ANALYSES, IN ADDITION TO PROVIDING THE FOLLOWING INFORMATION.

Total Benzene in soil to be remediated (attach calculations) <2.02 lbs

Total Petroleum Hydrocarbons in soil to be remediated (attach calculations) 4,335 lbs

Total TPH as GRO and DRO

Distance to Nearest Residence/Business 600'

ATTACH EMISSIONS CALCULATIONS

(a/1,000,000) x (2,800 lbs/yd³) x b = benzene emission in lbs., where

a = benzene concentration of soil sample in ppm or mg/kg dry weight basis

b = amount of contaminated soil in yds³

NOTE: This calculation can also be used to estimate TPH emissions by substituting TPH concentration (ppm or mg/kg) for "a." It may also be used to calculate VOCs.

3.91:1.2P

COMPLETE ONLY THOSE SECTIONS OF PART II THAT PERTAIN TO YOUR SITE

Part II: Proposed method of treatment

1. SOIL VENTING/VACUUM EXTRACTION

Note: This option may require an air pollution control permit. An activated carbon unit or similar treatment system to strip VOCs from the blower discharge will be required if emissions exceed limits established by Air Management. System design and monitoring information must be included.

Contact responsible for system maintenance JACK BUGNO

Telephone Number (include area code) 414/658-6000 Anticipated start date 1/27/95

Total VOC discharge rate from Pilot testing or calculations 1.44 lbs/hr at 90 scfm

Benzene Discharge Rate from Pilot testing or calculations $< 2.8 \times 10^{-3}$ lbs/hr at 90 scfm 1.17×10^{-2} lbs/hr Project Total (includes emissions from Air Stripper (Sump 9))

2. ANY METHOD OF REMEDIATION NOT LISTED IN PART II (NOTE: For thermal treatment, use Form 4400-121.)

Attach narrative and drawing(s) to describe the remediation method to be used. A final report is required. At a minimum, the information submitted should include the following applicable items:

a. proposed treatment method
b. location/size of remediation site
c. distance to nearest residence/business
d. field sampling methods
e. protective covering and curbing techniques
f. volume estimate and soil thickness needing remediation
g. method of turning/mixing soil
h. highest estimated hourly/daily VOC emissions
i. highest estimated daily/total benzene emissions
k. anticipated startup and completion dates
l. proposed verification method of contaminant content
m. project contact person
n. final destination of soil

LEAVE BLANK - DEPARTMENT OF NATURAL RESOURCES USE ONLY

Application Concurrence:

Air Management _____ Date _____

Project Manager _____ Date _____

Comments:

3. DISPOSAL OF CONTAMINATED SOILS AT A SANITARY LANDFILL-NR 500

NOTE: Landfill data must be within Solid Waste guidelines and must be submitted within 30 days of disposal.
PLEASE COMPLETE PART III BELOW AFTER LANDFILLING IS COMPLETED.

THIS SECTION TO BE COMPLETED BY DISPOSAL FACILITY ACCEPTING CONTAMINATED SOIL

Part III

Transporter Name

Transporter License Number

Name of landfill

License No.

Actual Volume of soil landfilled _____ Indicate yds^3 or tons

___ cover soil ___ buried

Date received at landfill

Accumulated Benzene emissions to date _____

Signature of facility representative

DIRECTIONS: 1) Complete part I. 2) Select the treatment option in part II. Pretreatment approval is required for any treatment other than landfilling. Submit this form to the DNR project manager for approval. 3) If your treatment option is landfilling, complete part III before submitting the ORIGINAL form to the project manager.

SUMP 9
SUMMARY OF ESTIMATED EMISSION RATES
CHRYSLER MAIN PLANT, KENOSHA, WI

	VOC Emissions in lbs/hr	Benzene Emissions in	
		lbs/hr	lbs/year
SVE system	1.44	$<2.8 \times 10^{-3}$	<2.02
Groundwater Remediation System	0.028	8.897×10^{-3}	77.9
Total Project	1.468	1.17×10^{-2}	79.92
WDNR Discharge Limit	5.7	---	300

SUMP 9
SVE EMISSION CALCULATION
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

Emission Calculations (Soils Only)

Benzene	= <0.300 mg/kg
VOCs (total)	= 154.6 mg/kg
DRO	= 125 mg/kg
GRO	= 520 mg/kg

Compound emissions in lbs = (compound concentration mg/kg) x 10^{-6} x 2,800 lbs/yd^3 x Amount of impacted soils in yd^3.

Amount of impacted soils = Amount of soils influenced by the SVE system.

Assuming a radius of influence of 50' and depth of impacts as 8'

Volume of right circulation cylinder = $\pi r^2 h$

$$\textit{Amount of impacted soil} = 3.14 \times (50\ ft)^2 \times 8\ ft \times \frac{1\ yd^3}{27\ ft^3}$$

= 2,325.9 yd^3
≈ 2,400 yd^3

Benzene Emissions = < 0.300 mg/kg x 10^{-6} x 2800 lbs/yd^3 x 2400 yd^3
< 2.02 lbs

GRO = 520 mg/kg x 10^{-6} x 2800 lbs/yd^3 x 2400 yd^3
3494.4 lbs

DRO = 125 mg/kg x 10^{-6} x 2800 lbs/yd^3 x 2400 yd^3
840.0 lbs

Total GRO and DRO = 4334.4 lbs
4335 lbs

VOC Emissions = 154.6 mg/kg x 10^{-6} x 2800 lbs/yd^3 x 2400 yd^3
1038.91 lbs

SUMP 9
EMISSIONS FROM SOIL VAPOR EXTRACTION SYSTEM
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

Number of extraction wells	=	1
Maximum flow rate	=	90 cfm
Estimated duration of remediation	=	30 days

Note: This estimate of the duration of remediation is for the purpose of calculations only. In reality the remediation takes more than 30 days. However, this conservative assumption will give an estimate of maximum emission rates.

$$Emission\ Rate = \frac{calculated\ emissions\ (lbs)}{(days \times 24\ hrs)}$$

$$\otimes\ VOC\ emission\ rate = \frac{1038.91\ lbsVOCs}{(30\ days \times 24\ hours)} = 1.44\ lbs/hr$$

$$\otimes\ Benzene\ Emission\ Rate = \frac{< 2.02\ lbs\ benzene}{(30\ days\ x\ 24\ hours)} = < 2.8 \times 10^{-3}\ lbs/hr$$

Estimated benzene project total < 2.02 lbs

Benzene emission rate per year < 2.02 lbs

SUMP 9
VOC AND BENZENE EMISSIONS FROM GROUNDWATER REMEDIATION SYSTEM
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

Benzene Concentration = 3,560 μg/L
= 3.56 mg/L

Total VOC Concentration = 11,109.8 μg/L
= 11.11 mg/L

Note: For compounds not detected, the concentration is assumed to be equal to the detection limit.

Maximum Flow Rate through the Air Stripper = 5 gpm

Assuming that the air stripper efficiency is 99.9% (conservative assumption for emission calculation), emission concentrations are as follows:

Benzene = 3.56 mg/L x 0.999 = 3.556 mg/L
Total VOC = 11.11 mg/L x 0.999 = 11.099 mg/L

Emission Rate Calculations (Groundwater Remediation System)

Benzene emission in lbs/hr

= 5 gpm x 60 min/hr x 8.34 lbs/gal x 3.556 mg/L x 10^{-6}

= 8.897×10^{-3} lbs/hr

Assuming that the groundwater remediation system is operating 24 hours a day and 365 days a year.

Total benzene emissions = 8.897×10^{-3} lbs/hr x 24 lbs/day x 365 day/year
= 77.9 lbs/yr

VOC emissions in lbs/hr

= 5 gpm x 60 min/hr x 8.34 lbs/gal x 11.099 mg/L x 10^{-6}
= 0.028 lbs/hr

SUMP 9
SUMMARY OF TOTAL ESTIMATED
EMISSION RATES
(Both Groundwater Remediation and Soil Vapor Extraction System)

Benzene Emissions:

From SVE System = $< 2.8 \times 10^{-3}$ lbs/hr
< 2.02 lbs/yr

From Groundwater Remediation System = 8.897×10^{-3} lbs/hr
= 77.9 lbs/yr

Sump 9 System Total = $(2.8 + 8.897) \times 10^{-3}$ lbs/hr
= 1.17×10^{-2} lbs/hr

= 2.02 + 77.9 lbs/yr
= 79.92 lbs/yr

*Less than the discharge limit of 300 lbs/yr of benzene

VOC Emissions:

From SVE system = 1.44 lbs/hr

From Groundwater Remediation System = 0.028 lbs/hr

Sump 9 System Total = 1.44 + 0.028 lbs/hr
= 1.468 lbs/hr

*Less than the discharge limit of 5.7 lbs/hr of total VOCs

SWANSON ENVIRONMENTAL INC.

ANALYTICAL REPORT

Date: 10/04/94

SEI Project Number: WL12119
Client Project: Chrysler Sump Installation
Project Number: 943324-8

Report For: Triad Engineering, Inc.
325 East Chicago Street
Milwaukee, WI 53202

Attn: Mr. Rick Binder

Certified By: _____

Clark J. Crosby
Laboratory Manager

3150 N. Brookfield Road, Brookfield, Wisconsin 53045
Telephone (414) 783-6111 Fax (414) 783-5752

SWANSON ENVIRONMENTAL INC.

ANALYTICAL REPORT

Report Date: 10/04/94
Project: Chrysler Sump Installation

To: Triad Engineering, Inc.
325 East Chicago Street
Milwaukee, WI 53202

Attn: Mr. Rick Binder

SEI Project: WL12119
Date Received: 09/16/94
Your Reference: 943324-8

Reference: AA08479 **Sample Point:** Sump #9 U **Date Collected:** 09/15/94

Analyte	Method	Units	Analyzed	PQL	Result
Volatile Organic Compounds					
Benzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Bromobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Bromochloromethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Bromodichloromethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Bromoform	SW846-8021	mg/Kg	09/28/94	0.300	ND
Bromomethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
n-Butylbenzene	SW846-8021	mg/Kg	09/28/94	0.300	19.6
sec-Butylbenzene	SW846-8021	mg/Kg	09/28/94	0.400	2.2
tert-Butylbenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Carbon tetrachloride	SW846-8021	mg/Kg	09/28/94	0.300	ND
Chlorobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Chlorodibromomethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Chloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Chloroform	SW846-8021	mg/Kg	09/28/94	0.300	ND
Chloromethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
2-Chlorotoluene	SW846-8021	mg/Kg	09/28/94	0.300	ND
4-Chlorotoluene	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2-Dibromo-3-chloropropane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2-Dibromomethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Dibromomethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2-Dichlorobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,3-Dichlorobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,4-Dichlorobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Dichlorodifluoromethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,1-Dichloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2-Dichloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,1-Dichloroethene	SW846-8021	mg/Kg	09/28/94	0.300	ND
cis-1,2-Dichloroethene	SW846-8021	mg/Kg	09/28/94	0.300	ND
trans-1,2-Dichloroethene	SW846-8021	mg/Kg	09/28/94	0.400	ND

SWANSON ENVIRONMENTAL INC.

ANALYTICAL REPORT

Reference: AA08479 Sample Point: Sump #9 U Date Collected: 09/15/94

Analyte	Method	Units	Analyzed	PQL	Result
1,2-Dichloropropane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,3-Dichloropropane	SW846-8021	mg/Kg	09/28/94	0.300	ND
2,2-Dichloropropane	SW846-8021	mg/Kg	09/28/94	0.400	ND
1,1-Dichloropropene	SW846-8021	mg/Kg	09/28/94	0.300	ND
cis-1,3-Dichloropropene	SW846-8021	mg/Kg	09/28/94	0.300	ND
trans-1,3-Dichloropropene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Ethylbenzene	SW846-8021	mg/Kg	09/28/94	0.300	14.9
Hexachlorobutadiene	SW846-8021	mg/Kg	09/28/94	0.400	ND
Isopropylbenzene	SW846-8021	mg/Kg	09/28/94	0.300	1.2
p-Isopropyltoluene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Methylene chloride	SW846-8021	mg/Kg	09/28/94	1.00	19.7 B
Naphthalene	SW846-8021	mg/Kg	09/28/94	0.400	12.9
n-Propylbenzene	SW846-8021	mg/Kg	09/28/94	0.300	1.4
Styrene	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,1,1,2-Tetrachloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,1,2,2-Tetrachloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Tetrachloroethene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Toluene	SW846-8021	mg/Kg	09/28/94	0.300	9.1
1,2,3-Trichlorobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2,4-Trichlorobenzene	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,1,1-Trichloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,1,2-Trichloroethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
Trichloroethene	SW846-8021	mg/Kg	09/28/94	0.300	ND
Trichlorofluoromethane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2,3-Trichloropropane	SW846-8021	mg/Kg	09/28/94	0.300	ND
1,2,4-Trimethylbenzene	SW846-8021	mg/Kg	09/28/94	0.500	20.8
1,3,5-Trimethylbenzene	SW846-8021	mg/Kg	09/28/94	0.300	7.2
Vinyl Chloride	SW846-8021	mg/Kg	09/28/94	0.300	ND
o-Xylenes	SW846-8021	mg/Kg	09/28/94	0.300	11.8
m & p Xylenes	SW846-8021	mg/Kg	09/28/94	0.300	33.8
					154.6 total detected VOCs
WDNR-LUST Organics					
WDNR-DRO	WDNR-DRO	mg/Kg	10/03/94	10	125 W1
DRO Extraction-Sonication		Date Extracted			09/16/94
WDNR Modified GRO	WDNR-GRO	mg/Kg	09/21/94	500	520

3150 North Brookfield Road, Brookfield, Wisconsin 53045 Telephone (414) 783-6111 Fax (414) 783-5752
Wisconsin DNR Laboratory Certification #268181760.

SWANSON ENVIRONMENTAL, INC.

DATA QUALIFIER FLAGS

B	-	Compound detected in method blank.
C	-	Result confirmed by GC/MS or second column.
D	-	Compound quantitated in analysis at second dilution factor.
E	-	Compound concentration more than 10% outside calibration range.
H	-	Headspace in sample container.
J	-	Estimated value: Compound detected below PQL.
P	-	Pesticide or Aroclor: Results from analytical and confirming column differ by >25%.
S	-	Sample analyzed past hold time at client's request.
NJ	-	Estimated value: Compound result confirmed but QC results outside acceptance limits.
K	-	Compound not detected on confirming column.
L	-	GRO or DRO sample weight < 20 grams.
Q	-	QC results outside acceptance limits for this compound.
G	-	Peaks outside GRO retention time window.
W1	-	Peaks before DRO retention time window.
W2	-	Peaks after DRO retention time window.
WB	-	Baseline rise at end of DRO retention time window.
ND	-	Not detected at specified detection level.
Z	-	Compounds Coelute
X	-	See comment page.

9/29/94

APPLICATION TO TREAT OR DISPOSE OF PETROLEUM CONTAMINATED SOIL

Form 4400-120

This form is required by the Department of Natural Resources for leaking underground storage tank sites (Wis. Adm. Code NR 419). Failure to complete and submit this form may lead to violations of subchapters III and IV of ch. 144 Wis. Stats. and may result in forfeitures of not less than $10 or more than $25,000 for each violation, pursuant to ss. 144.426, 144.469, 144.74 (1), and 144.99, Wis. Stats., or fines of not less than $100 or more than $150,000 or imprisonment for not more than 10 years, or both, pursuant to s. 144.74 (2), Wis. Stats. Each day of a continuing violation constitutes a separate violation. Department approval of this form is required prior to site remediation, except for soils to be buried in landfills.

ALL SITES MUST COMPLETE PART I.

Part I. Source of Soil

Site/Facility Name

CHRYSLER CORPORATION - KENOSHA MAIN PLANT

Site I.D. # (for DNR use only)

Site Address

Area 2 (Sumps 7, 8, 14 & 15)

5555 30TH AVENUE

Contact Name

JACK BUGNO

City, State, Zip Code

KENOSHA, WISCONSIN 53144

1/4, 1/4, Section, Township, and Range

SW, SE, 36, 2, 22E

The information on this form is accurate to the best of my knowledge.
NOTE: Waste disposed of in landfills may incur future liability.

Signature

John P Bugno

Telephone Number (include area code)

414/658-6000

Consulting Firm	Contact	Telephone Number
TRIAD ENGINEERING INC.	RICHARD J. BINDER	414/291-8840

Estimated Volume Contaminated Soil N/A

Tons/cubic yards (circle one)

Type of Petroleum Contamination (Circle):

Gasoline Diesel Fuel/#2 Fuel Oil

Other Chlorinated solvents, fuel-oil (groundwater)

Soil Type (USCS) N/A

___sand (SP, SW)
___silty/clayey sands (SM, SC)
___silt (ML, MH, OL)
___clay (Cl, CH, OH)
___gravel (GC, GM, GP, GW)
___peat (PT)

Contaminant concentration:

One screened sample per 15 yds^3 and one laboratory analysis per 300 yds^3 of contaminated soil *when the PID registers contamination* OR one laboratory analysis per 100 yds^3 when the PID *does not register contamination on soil shown to be contaminated during the site investigation/excavation or stockpiling.* PLEASE ATTACH A TABLE SHOWING THE RESULTS OF BOTH FIELD SCREENING AND ANALYSES, IN ADDITION TO PROVIDING THE FOLLOWING INFORMATION.

Total Benzene in soil to be remediated (attach calculations) _____ lbs

Total Petroleum Hydrocarbons in soil to be remediated (attach calculations) _____ lbs

Total TPH as _____

Distance to Nearest Residence/Business 250'

ATTACH EMISSIONS CALCULATIONS

(a/1,000,000) x (2,800 lbs/yd^3) x b = benzene emission in lbs., where

a = benzene concentration of soil sample in ppm or mg/kg dry weight basis
b = amount of contaminated soil in yds^3

NOTE: This calculation can also be used to estimate TPH emissions by substituting TPH concentration (ppm or mg/kg) for "a." It may also be used to calculate VOCs.

3.91:1.2P

COMPLETE ONLY THOSE SECTIONS OF PART II THAT PERTAIN TO YOUR SITE

Part II: Proposed method of treatment

1. SOIL VENTING/VACUUM EXTRACTION

Note: This option may require an air pollution control permit. An activated carbon unit or similar treatment system to strip VOCs from the blower discharge will be required if emissions exceed limits established by Air Management. System design and monitoring information must be included.

Contact responsible for system maintenance JACK BUGNO

Telephone Number (include area code) 414/658-6000 Anticipated start date 2/8/94

Total VOC discharge rate from Pilot testing or calculations 0.017 lbs/hr at .668 scfm

Benzene Discharge Rate from Pilot testing or calculations 1.45×10^{-4} lbs/hr at .668 scfm _____ Project Total (Air Stripper) (Sumps 7, 8, 14, 15)

2. ANY METHOD OF REMEDIATION NOT LISTED IN PART II (NOTE: For thermal treatment, use Form 4400-121.)

Attach narrative and drawing(s) to describe the remediation method to be used. A final report is required. At a minimum, the information submitted should include the following applicable items:

a. proposed treatment method
b. location/size of remediation site
c. distance to nearest residence/business
d. field sampling methods
e. protective covering and curbing techniques
f. volume estimate and soil thickness needing remediation
g. method of turning/mixing soil
h. highest estimated hourly/daily VOC emissions
i. highest estimated daily/total benzene emissions
k. anticipated startup and completion dates
l. proposed verification method of contaminant content
m. project contact person
n. final destination of soil

LEAVE BLANK - DEPARTMENT OF NATURAL RESOURCES USE ONLY

Application Concurrence:

Air Management _____ Date _____

Project Manager _____ Date _____

Comments:

3. DISPOSAL OF CONTAMINATED SOILS AT A SANITARY LANDFILL-NR 500
NOTE: Landfill data must be within Solid Waste guidelines and must be submitted within 30 days of disposal.
PLEASE COMPLETE PART III BELOW AFTER LANDFILLING IS COMPLETED.

THIS SECTION TO BE COMPLETED BY DISPOSAL FACILITY ACCEPTING CONTAMINATED SOIL

Part III

Transporter Name

Transporter License Number

Name of landfill

License No.

Actual Volume of soil landfilled _____ Indicate yds^3 or tons ___ cover soil ___ buried

Date received at landfill

Accumulated Benzene emissions to date _____

Signature of facility representative

DIRECTIONS: 1) Complete part I. 2) Select the treatment option in part II. Pretreatment approval is required for any treatment other than landfilling. Submit this form to the DNR project manager for approval. 3) If your treatment option is landfilling, complete part III before submitting the ORIGINAL form to the project manager.

3.91:2.2P

AREA 2
(SUMPS 7, 8, 14, 15)
SUMMARY OF ESTIMATED EMISSION RATES
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

	VOC Emissions in lbs/hr	Benzene Emissions in	
		lbs/hr	lbs/year
Groundwater Remediation System	0.017	1.45×10^{-4}	1.27
WDNR Discharge Limit	5.7	---	300

AREA 2
(SUMPS 7, 8, 14, 15)
VOC AND BENZENE EMISSIONS FROM GROUNDWATER REMEDIATION SYSTEM
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

Benzene Concentration = 58 μg/l
= 0.058 mg/L

Total VOC Concentration = 6697 μg/l
= 6.70 mg/L

Note: For compounds less than detection limit, its concentration is assumed to be equal to the detection limit.

Maximum Flow Rate through the Air Stripper = 5 gpm

Assuming that the air stripper efficiency is 99.9% (conservative assumption for emission calculation), emission concentrations are as follows:

Benzene = 0.058 x 0.999 = 0.058 mg/L
Total VOC = 6.70 x 0.999 = 6.69 mg/L

Emission Rate Calculations (Groundwater Remediation System)

Benzene emission in lbs/hr

= 5 gpm x 60 min/hr x 8.34 lbs/gal x 0.058 mg/L x 10^{-6}

= 1.45 x 10^{-4} lbs/hr

Assuming that the groundwater remediation system is operating 24 hours a day and 365 days a year.

Total benzene emissions = 1.45 lbs/hr x 10^{-4} x 24 hrs/day x 365 days/year
= 1.27 lbs/yr

VOC emissions in lbs/hr

= 5 gpm x 60 min/hr x 8.34 lbs/gal x 6.69 mg/L x 10^{-6}
= 0.017 lbs/hr

APPLICATION TO TREAT OR DISPOSE OF PETROLEUM CONTAMINATED SOIL

Form 4400-120

This form is required by the Department of Natural Resources for leaking underground storage tank sites (Wis. Adm. Code NR 419). Failure to complete and submit this form may lead to violations of subchapters III and IV of ch. 144 Wis. Stats. and may result in forfeitures of not less than $10 or more than $25,000 for each violation, pursuant to ss. 144.426, 144.469, 144.74 (1), and 144.99, Wis. Stats., or fines of not less than $100 or more than $150,000 or imprisonment for not more than 10 years, or both, pursuant to s. 144.74 (2), Wis. Stats. Each day of a continuing violation constitutes a separate violation. Department approval of this form is required prior to site remediation, except for soils to be buried in landfills.

ALL SITES MUST COMPLETE PART I.

Part I. Source of Soil

Site/Facility Name

CHRYSLER CORPORATION - KENOSHA MAIN PLANT

Site I.D. # (for DNR use only)

Site Address

5555 30TH AVENUE Area 3

Contact Name

JACK BUGNO

City, State, Zip Code

KENOSHA, WISCONSIN 53144

1/4, 1/4, Section, Township, and Range

SW, SE, 36, 2, 22E

The information on this form is accurate to the best of my knowledge.
NOTE: Waste disposed of in landfills may incur future liability.

Signature

John P Bugno

Telephone Number (include area code)

414/658-6000

Consulting Firm	Contact	Telephone Number
TRIAD ENGINEERING INC.	RICHARD J. BINDER	414/291-8840

Estimated Volume Contaminated Soil N/A

Tons/cubic yards (circle one)

Soil Type (USCS) N/A

___sand (SP, SW)
___silty/clayey sands (SM, SC)
___silt (ML, MH, OL)
___clay (Cl, CH, OH)
___gravel (GC, GM, GP, GW)
___peat (PT)

Type of Petroleum Contamination (Circle):

(Gasoline) (Diesel Fuel)/#2 Fuel Oil

Other chlorinated solvents (ground water)

Contaminant concentration:

One screened sample per 15 yds^3 and one laboratory analysis per 300 yds^3 of contaminated soil *when the PID registers contamination* OR one laboratory analysis per 100 yds^3 when the PID *does not register contamination on soil shown to be contaminated during the site investigation/excavation or stockpiling.* PLEASE ATTACH A TABLE SHOWING THE RESULTS OF BOTH FIELD SCREENING AND ANALYSES, IN ADDITION TO PROVIDING THE FOLLOWING INFORMATION.

Total Benzene in soil to be remediated (attach calculations) _____ lbs

Total Petroleum Hydrocarbons in soil to be remediated (attach calculations) _____ lbs

Total TPH as _____

Distance to Nearest Residence/Business 500'

ATTACH EMISSIONS CALCULATIONS

(a/1,000,000) x (2,800 lbs/yd^3) x b = benzene emission in lbs., where

a = benzene concentration of soil sample in ppm or mg/kg dry weight basis
b = amount of contaminated soil in yds^3

NOTE: This calculation can also be used to estimate TPH emissions by substituting TPH concentration (ppm or mg/kg) for "a." It may also be used to calculate VOCs.

3.91:1.2P

COMPLETE ONLY THOSE SECTIONS OF PART II THAT PERTAIN TO YOUR SITE

Part II: Proposed method of treatment

1. SOIL VENTING/VACUUM EXTRACTION

Note: This option may require an air pollution control permit. An activated carbon unit or similar treatment system to strip VOCs from the blower discharge will be required if emissions exceed limits established by Air Management. System design and monitoring information must be included.

Contact responsible for system maintenance JACK BUGNO

Telephone Number (include area code) 414/658-6000 Anticipated start date 1/27/95

Total VOC discharge rate from Pilot testing or calculations 0.024 lbs/hr at 0.668 scfm

Benzene Discharge Rate from Pilot testing or calculations $9.81 * 10^{-3}$ lbs/hr at .668 scfm _____ Project Total (Air Stripper) sumps 10, 11, 12, 13

2. ANY METHOD OF REMEDIATION NOT LISTED IN PART II (NOTE: For thermal treatment, use Form 4400-121.)

Attach narrative and drawing(s) to describe the remediation method to be used. A final report is required. At a minimum, the information submitted should include the following applicable items:

a. proposed treatment method
b. location/size of remediation site
c. distance to nearest residence/business
d. field sampling methods
e. protective covering and curbing techniques
f. volume estimate and soil thickness needing remediation
g. method of turning/mixing soil
h. highest estimated hourly/daily VOC emissions
i. highest estimated daily/total benzene emissions
k. anticipated startup and completion dates
l. proposed verification method of contaminant content
m. project contact person
n. final destination of soil

LEAVE BLANK - DEPARTMENT OF NATURAL RESOURCES USE ONLY

Application Concurrence:

Air Management _____ Date _____

Project Manager _____ Date _____

Comments:

3. DISPOSAL OF CONTAMINATED SOILS AT A SANITARY LANDFILL-NR 500
NOTE: Landfill data must be within Solid Waste guidelines and must be submitted within 30 days of disposal.
PLEASE COMPLETE PART III BELOW AFTER LANDFILLING IS COMPLETED.

THIS SECTION TO BE COMPLETED BY DISPOSAL FACILITY ACCEPTING CONTAMINATED SOIL

Part III

Transporter Name

Transporter License Number

Name of landfill

License No.

Actual Volume of soil landfilled _____ Indicate yds^3 or tons

___ cover soil ___ buried

Date received at landfill

Accumulated Benzene emissions to date _____

Signature of facility representative

DIRECTIONS: 1) Complete part I. 2) Select the treatment option in part II. Pretreatment approval is required for any treatment other than landfilling. Submit this form to the DNR project manager for approval. 3) If your treatment option is landfilling, complete part III before submitting the ORIGINAL form to the project manager.

3.91:22P

AREA 3
(SUMPS 10, 11, 12, 13)
SUMMARY OF ESTIMATED EMISSION RATES
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

	VOC Emissions in lbs/hr	Benzene Emissions in	
		lbs/hr	lbs/year
Groundwater Remediation System	0.024	9.81×10^{-3}	85.9
WDNR Discharge Limit	5.7	---	300

AREA 3
(SUMPS 10, 11, 12, 13)
VOC AND BENZENE EMISSIONS FROM GROUNDWATER REMEDIATION SYSTEM
CHRYSLER MAIN PLANT, KENOSHA, WISCONSIN

Benzene Concentration = 3,920 μg/l
= 3.92 mg/L

Total VOC Concentration = 9,445.7 μg/l
= 9.45 mg/L

Note: For compounds not detected, the concentration is assumed to be equal to the detection limit.

Maximum Flow Rate through the Air Stripper = 5 gpm

Assuming that the air stripper efficiency is 99.9% (conservative assumption for emission calculation), emission concentrations are as follows:

Benzene = 3.92 x 0.999 = 3.92 mg/L
Total VOC = 9.45 x 0.999 = 9.44 mg/L

Emission Rate Calculations (Groundwater Remediation System)

Benzene emission in lbs/hr

= 5 gpm x 60 min/hr x 8.34 lbs/gal x 3.92 mg/L x 10^{-6}

= 9.81×10^{-3} lbs/hr

Assuming that the groundwater remediation system is operating 24 hours a day and 365 days a year.

Total benzene emissions = 9.81×10^{-3} x 24 hours/day x 365 day/year
= 85.9 lbs/yr

VOC emissions in lbs/hr

= 5 gpm x 60 min/hr x 8.34 lbs/gal x 9.44 mg/L x 10^{-6}
= 0.024 lbs/hr