

Grauvogel & Associates

SBI-017

December 3, 2003

City of South Bend
Community and Economic Development
1200 County-City Building
South Bend, IN 46601

Attention: Mr. Andy Laurent
Subject: Oliver Plow Phase III – Heating Oil Spill

Dear Andy:

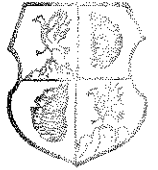
Enclosed are the laboratory results documenting the characteristics of the heating oil spill encountered near the center of the cul-de-sac of the Oliver Industrial Park access road. As reported in our earlier memorandum, the soil was found contaminated with heating oil absent of leachable toxic metals, organics and PCB's that would have rendered it an EPA hazardous waste. A total of 1,610 tons of contaminated, non-hazardous soil was removed from the spill area for disposal at Prairie View landfill. The wastestream profile paperwork has already been submitted to Waste Management and authorization to begin hauling should be forthcoming shortly. The results are summarized in Table 1, which is attached.

During the early excavation of the contamination we dug through a thin layer of gravel at the suspected center of the plume that did not look natural or extend beyond the excavation walls. In hindsight, we believe that this was the bedding for an underground storage tank that created the spill.

The contamination reached the groundwater at about 23' below grade and spread to the northeast. This is consistent with our information on the local groundwater flow direction. To eliminate the impacts of the contamination we excavated all the affected soil to the limits of the plume above the groundwater and then tracked the contamination in the water table to the northeast until it seemed to dissipate significantly. We over-excavated about 3' below the groundwater surface. We were unable to remove all traces of the heating oil in the groundwater plume, however, as it tailed off toward the northeast. But we were successful in removing the entire source spill, so that the remaining spilled material can begin to dissipate through natural biological degradation and dilution. We collected a series of sidewall and bottom samples to document the remaining residual contamination for future Brownfields and VRP reporting. These are listed in Tables 2 and 3.

The sidewall samples (Table 2) show evidence of the residual contamination remaining to the east and northeast. After the northwest sample was taken additional excavation to native-appearing soil was done, so the plume was eliminated in this direction.

The bottom samples (Table 3) show evidence of the TPH contamination remaining in the groundwater zone. Samples from the bottom were collected below the groundwater surface after



the cut was made and before the groundwater had a chance to infiltrate the area. After sampling, the additional 3' were removed from the bottom. The excavation was successful in retrieving nearly all of the contamination in this "wipe zone" at the top of the groundwater. No other contaminants beyond the heating oil hydrocarbons, measured as TPH, were found in significant concentrations, including toxic metals, volatiles, semi-volatiles and PCB's. Overall these results show that a low level of heating oil contamination that could be dissipated by natural process remains after the excavation. It was also clear that the contaminant plume in the groundwater had not traveled off the site.

Direct further questions to my attention. Thank you for this opportunity to serve you.

Sincerely,

Grauvogel & Associates

A handwritten signature in black ink, appearing to read "Lawrence W. Grauvogel", written over a horizontal line.

Lawrence W. Grauvogel PE, CIH, CSP, CHMM

cc: L. Turley/Hull, T. Baehr/Hull



Table 1: Summary of Waste Soil Characteristics
 EPA TCLP Parameters, TPH and PCB's
 Oliver Plow Phase III - Heating Oil Spill
 October 24, 2003

Analyte	1027-1	1027-2	1027-3	1027-4	EPA RCRA Limit
TCLP Metals (mg/L)					
arsenic	<0.1	<0.1	<0.1	<0.1	5.0
barium	0.54	0.22	0.44	0.12	100.0
cadmium	<0.02	<0.02	<0.02	<0.02	1.0
chromium	<0.02	<0.02	<0.02	<0.02	5.0
lead	0.6	<0.05	0.21	<0.05	5.0
mercury	<0.001	<0.001	<0.001	<0.001	0.2
selenium	<0.1	<0.1	<0.1	<0.1	1.0
silver	<0.005	<0.005	<0.005	<0.005	5.0
TCLP Volatiles (VOC) (mg/L)					
benzene	<0.02	<0.02	<0.02	<0.02	0.5
carbon tetrachloride	<0.02	<0.02	<0.02	<0.02	0.5
chlorobenzene	<0.02	<0.02	<0.02	<0.02	100.0
chloroform	<0.02	<0.02	<0.02	<0.02	6.0
1,4-dichlorobenzene	<0.02	<0.02	<0.02	<0.02	7.5
1,2-dichloroethane	<0.02	<0.02	<0.02	<0.02	0.5
1,1-dichloroethylene	<0.02	<0.02	<0.02	<0.02	0.7
methyl ethyl ketone	<0.2	<0.2	<0.2	<0.2	200.0
tetrachloroethylene	<0.02	<0.02	<0.02	<0.02	0.7
trichloroethylene	<0.02	<0.02	<0.02	<0.02	0.5
vinyl chloride	<0.1	<0.1	<0.1	<0.1	0.2
TCLP Semi-Volatile Organics (mg/L)					
cresol (o,m,p)	<0.2	<0.2	<0.2	<0.2	200.0
dinitrotoluene	<0.2	<0.2	<0.2	<0.2	0.13
hexachloro-1,3-butadiene	<0.2	<0.2	<0.2	<0.2	0.5
hexachlorobenzene	<0.2	<0.2	<0.2	<0.2	0.13
hexachloroethane	<0.2	<0.2	<0.2	<0.2	3.0
nitrobenzene	<0.2	<0.2	<0.2	<0.2	2.0
pentachlorophenol	<2	<2	<2	<2	100.0
pyridine	<0.2	<0.2	<0.2	<0.2	5.0
total cresols	<0.6	<0.6	<0.6	<0.6	200.0
2,4,5-trichlorophenol	<2	<2	<2	<2	400.0
2,4,6-trichlorophenol	<0.2	<0.2	<0.2	<0.2	2.0
TPH & Polychlorinated Biphenyls (mg/kg)					
Arochlor 1016	<1	<1	<1	<1	50
Arochlor 1221,32,42,	<1	<1	<1	<1	50
Arochlor 1248,54,60	<1	<1	<1	<1	50
TPH	8,740	10,800	1,210	13,700	n/a



Table 2: Summary of Remaining Contamination
 Excavation Sidewalls
 Oliver Plow Phase III - Heating Oil Spill
 October 24-27, 2003

Analyte	1024-S	1024-SW	1024-W	1024-NW	1024-N	1024-NE	1024-E	1027-SEW
Wall Location	south	southwest	west	northwest	north	northeast	east	southeast
Metals (mg/kg)								
arsenic	<10	<10	<10	<10	<10	<10	<10	<10
barium	6.4	5.0	6.0	7.0	8.4	4.1	8.7	3.8
cadmium	<1	<1	<1	<1	<1	<1	<1	<1
chromium	4.8	3.9	9.3	4.2	4.9	4.7	3.8	2.3
lead	<5	<5	5.4	<5	<5	<5	<5	<5
mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
selenium	<10	<10	<10	<10	<10	<10	<10	<10
silver	<1	<1	<1	<1	<1	<1	<1	<1
Volatiles (VOC) (mg/kg)								
benzene	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
toluene	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
ethylbenzene	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
xylenes (o,m,p)	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
56 others	nd	nd	nd	nd	nd	nd	nd	nd
Semi-Volatile Organics (mg/kg)								
phenanthrene	<5	<5	<5	10.0	<5	11.9	7.45	<5
69 others	nd	nd	nd	nd	nd	nd	nd	nd
Total Petroleum Hydrocarbons (TPH) (mg/kg)								
TPH	<100	<100	140	5,730	<100	12,800	7,640	190



**Table 3: Summary of Remaining Contamination
 Excavation Bottom**
 Oliver Plow Phase III - Heating Oil Spill
 October 24-27, 2003

Analyte	1024-BS	1024-BN	1027-SEB	1027-NEB
Bottom Location	south	north	southeast	northeast
Metals (mg/kg)				
arsenic	<10	<10	<10	<10
barium	5.1	4.1	4.2	4.2
cadmium	<1	<1	<1	<1
chromium	3.2	2.7	3.6	4.5
lead	<5	<5	<5	<5
mercury	<0.1	<0.1	<0.1	<0.1
selenium	<10	<10	<10	<10
silver	<1	<1	<1	<1
Volatiles (VOC) (mg/kg)				
benzene	<0.08	<0.08	<0.08	<0.08
toluene	<0.08	<0.08	<0.08	<0.08
ethyl benzene	<0.08	<0.08	<0.08	<0.08
xylenes (o,m,p)	<0.08	<0.08	<0.08	<0.08
56 others	nd	nd	nd	nd
Semi-Volatile Organics (mg/kg)				
phenanthrene	137	19.7	<5	<5
chrysene	53.6	<5	<5	<5
fluorene	25.4	5.90	<5	<5
67 others	nd	nd	nd	nd
Total Petroleum Hydrocarbons (TPH) (mg/kg)				
TPH	20,300	20,000	<20	<20

**Table 4: Summary of Remaining Contamination
 Groundwater Volatiles (mg/L)**
 Oliver Plow Phase III - Heating Oil Spill
 October 24-27, 2003

Analyte	1027-GW
benzene	<0.044
toluene	<0.044
ethyl benzene	<0.044
xylenes, total	<0.088
methyl tert-butyl ether	<0.088