

**D.M.D., Inc.****Environmental & Toxicological Services**

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MEMORANDUM

TO: Andy Nicholls (Ridolfi Engineers, Inc.)
FROM: Raleigh Farlow
DATE: February 24, 2003
SUBJECT: Characterization of TPH profiles; Project 470E - Poplar Point

Per your request, a review of selected TPH chromatographic profiles was performed for identification of petroleum hydrocarbon mixtures and to determine potential for contaminant source identification by chemical fingerprinting.

TPH chromatograms for twentyfive samples were selected for examination. Three principal patterns were identified, plus a combination of the three profiles were also observed. The three principal profiles resemble: **1)** light lube-type oil, possibly a vehicle for application of other organic chemicals; **2)** medium weight lube-type oil, possibly a motor oil and/or [hydraulic] pump fluid; and **3)** discrete organic chemicals exhibiting a characteristic pattern in the medium lube oil range. The following groupings are apparent due to similarities in TPH profiles and presence of one or more of the characterisitic profiles presented above.

1 - light weight lube-type oil (vapor pressure between diesel fuel #2 and motor oil)

470E-SB35-01	470E-SB42-02
470E-SB35-02	
470E-SB36-01	470E-MW35-01
470E-SB41-01	470E-MW39-01

2 - medium weight lube-type oil (possibly motor oil)

470E-SB30-01	470E-SB31-01
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Mixture of 1 and 2, above

470E-SB39-01	470E-SS-27
470E-SS-20s	470E-SS-35
470E-SS-20d	

2 with small amount of diesel fuel #2

470E-SB39-02

3 - discrete chemicals in medium weight lube oil range

470E-SB32-01	470E-SS-28s
470E-SB41-02	470E-SS-28d
470E-SS-01s	470E-SS-32
470E-SS-01d	

Mixture of **1 and 3**, above
470E-SB32-02

470E-SB42-01

Mixture of **1, 2 and 3**, above
470E-SB38-01

Characterization of TPH chromatographic profiles for fingerprinting of potential sources of petroleum contamination is possible with existing data. Specific or known source materials remain to be identified. Discrete chemicals present in the range of medium weight lube oil can be identified by GC/MS analysis of extracts. Existing GC/MS files that could be useful for identification of "discrete" chemicals summarized above are associated with 470E-SS-01s.

A summary of TPH results (mg/kg or mg/L) and characteristic profiles is as follows:

<u>Sample</u>	<u>Diesel-range HCs</u>	<u>Motor oil-range HCs</u>	<u>Profile</u>
470E-SB30-01	41	160	2
470E-SB31-01	31	110	2
470E-SB32-01	45	160	3
470E-SB32-02	81	150	1 & 3
470E-SB35-01	540	970	1
470E-SB35-02	110	220	1
470E-SB36-01	92	140	1
470E-SB38-01	48	120	1, 2 & 3
470E-SB39-01	520	1100	1 & 2
470E-SB39-02	540	520	2 & diesel fuel
470E-SB41-01	66	240	1
470E-SB41-02	42	140	3
470E-SB42-01	64	110	1 & 3
470E-SB42-02	51	100	1
470E-SS-01s	51	180	3
470E-SS-01d	16	64	3
470E-SS-20s	3500	1600	1 & 2
470E-SS-20d	2300	710	1 & 2
470E-SS-27	64	160	1 & 2
470E-SS-28s	76	190	3
470E-SS-28d	73	230	3
470E-SS-32	47	140	3
470E-SS-35	3600	1700	1 & 2
470E-MW35-01	1.8	0.75	1
470E-MW39-01	1.2	0.69	1