



DEPARTMENT OF ECOLOGY

July 15, 1996

TO: Thom Hooper, WDFW

FROM: Art Johnson  and Dave Serdar , EILS

SUBJECT: Chemical Analysis of Sediments Adjacent to the Canby Road Tire Fire
(Waterbody WA-CR-1010)

SUMMARY

Twenty-four sediment samples were analyzed for total petroleum hydrocarbons, with four of these being screened for 13 metals, cyanide, and 75 base/neutral/acid compounds. Detection of hydrocarbons matching oil leaking from the tire fire was limited to the three samples collected inside the inner containment boom (13.0 - 38.0 mg/Kg: parts per million) and one of four samples collected within the outer boom (2.0 mg/Kg).

Zinc, copper, chromium, nickel, lead, and arsenic concentrations were 2 - 7 times higher in the boomed sediments than in a control sample but did not exceed Puget Sound sediment standards. Cyanide was not detectable. Phenols, polyaromatic hydrocarbons, and several other organic compounds exceeded Puget Sound standards, but only within the boomed sediments. Substituted benzenes and naphthalenes, benzothiazoles, and nitriles were also tentatively identified in the heavily oiled sediment of the inner boom and are potentially toxic.

BACKGROUND

At your request, we collected a series of intertidal sediment samples from Baker Bay adjacent to the Canby Road tire fill fire on April 1, 1996. The sediments were analyzed for total petroleum hydrocarbons (TPH), with selected samples being analyzed for a range of metals and organic compounds. The objective of the survey was to determine the extent and significance of contamination caused by oil leaking onto the tideflats from the burning tire chips.

SURVEY DESCRIPTION

Sampling locations are shown in Figures 1 and 2. These sites were selected in consultation with you and Dick Logan, Natural Resource Damage Assessments, Ecology. Three sediment samples were collected from each of five areas in the vicinity of the fire: inside the inner containment boom; between the inner and outer containment booms; within the drainage channel leading seaward from the boomed area; in the salt marsh outside the booms; and in the mudflat beyond the salt marsh. Stakes with red flagging tape were driven to locate where sediments were collected, except for the inner boom which was not marked.

Three sediment samples were also collected from each of three control sites located 500 to 700 yards upstream and downstream of the fire. Control samples included the same sediment/habitat types - - drainage channels, salt marsh, and mudflat - - sampled near the tire fire. Control sites were not staked.

Table 1 shows the samples collected and their analysis. All samples were analyzed for TPH. Concentrations were determined from a calibration curve prepared by analyzing dilutions of tire oil. The sample used in the calibration was taken from a 55-gallon drum being used to recover oil flowing from the base of the tire fill.

One sample each from four sites - - inner boom, outer boom, outer drainage channel, and control #1 - - was analyzed for 13 metals, cyanide, 75 base/neutral/acid compounds (BNAs), and total organic carbon (TOC). These analyses were selected to include contaminants that had been identified in samples of drainage from the tire fire collected by Hart Crowser Inc. (e.g., zinc, cyanide, phenols) or would be expected to result from burning tires (e.g., polyaromatic hydrocarbons (PAH)). The BNA analysis included a computer search to tentatively identify the twenty largest unknown peaks. A number of volatile organic compounds had also been detected in Hart Crowser's samples but were not analyzed because of their low persistence in sediment.

SAMPLING AND ANALYTICAL METHODS

Each sediment sample was a composite of multiple grabs taken of the top 2 cm surface layer with stainless steel spoons and homogenized in stainless steel beakers. The area from which each sample was obtained was 1 - 2 m². The homogenate was split into glass jars with teflon-lined lids, cleaned to EPA QA/QC specifications (EPA, 1990). Each sample was placed in a polyethylene bag and stored on ice for transport to the Ecology Manchester Laboratory. The spoons and beakers were pre-cleaned by washing with Liquinox detergent, followed by sequential rinses with deionized water, dilute nitric acid, deionized water, and pesticide-grade acetone.

The samples were analyzed at Manchester Laboratory, except for TOC which was done by Sound Analytical Services in Tacoma. TPH was analyzed according to Ecology Method WTPH-Dx (extended diesel range hydrocarbons). Metals were analyzed by EPA Methods 200.7 (Sb, Be, Cd, Cr, Cu, Ni, Ag, Zn); 206.2 (As); 239.3 (Pb); 270.2 (Se); 279.2 (Tl); and 245.5 (Hg). Standard Methods #4500CN-C was used to analyze cyanide. The BNA analysis was by EPA Method 8270. TOC analysis followed the Puget Sound Estuary Program method.

QUALITY OF THE DATA

Manchester Laboratory prepared written quality assurance reviews of the chemical data. These reviews assess adherence to sample holding times, instrument calibration, results on procedural blanks, duplicate analyses, surrogate and matrix spike recoveries, and laboratory control sample analyses. The quality assurance reviews are attached as Appendix A. With the exceptions noted below, the quality of the data is good and the results considered accurate:

- 1) TPH: Surrogate recoveries for samples #14303 (inner boom) and #149320 (control #2) were high, indicating results may overestimate actual concentrations in these two samples. Duplicate analyses were run on #149304 (inner boom) and #149309 (drainage channel) and differed by more than 30%. This is most likely due to the difficulty in homogenizing the plant material present at these sites.
- 2) Metals: Results for antimony, silver, and thallium were qualified as estimates because of low recoveries in the laboratory control sample and/or matrix spike.
- 3) Base/Neutral/Acids: Due to loss of one channel of the GPC unit, surrogate recoveries were low for #149300, -304, and -315, although within acceptable limits. Re-analysis brought the recoveries in line with other samples, demonstrating the GPC malfunction was the problem. Because sample holding times were exceeded in the re-analysis, the initial results are reported here. Matrix spike recoveries were low for aniline, hexachloroethane, 1,2,4-trichlorobenzene, hexachlorocyclopentadiene, 3- and 4-nitroanilines, 5-chloroaniline, and 2,4-dinitrophenol. Of these compounds only aniline was detected in the sediment samples; the concentrations are qualified as estimates.

RESULTS AND DISCUSSION

Results of the TPH analysis are shown in Table 2. Detection of hydrocarbons matching the tire oil was limited to sediment collected inside the inner containment boom and one drainage channel sample collected within the outer boom. Concentrations for the inner boom were an order of magnitude above those measured in the drainage channel sample (13.2 - 38.0 mg/Kg vs. 2.0 mg/Kg; parts per million). Detection limits for TPH outside the boomed area ranged from 0.3 - 2.5 mg/Kg. Although the analyst reported seeing hydrocarbons in samples taken beyond the containment booms and at control sites, these did not match the tire oil and may have been naturally occurring or from other sources (Myrna McIntosh, personal communication).

Table 3 has the metals and cyanide results. As to be expected, all samples including the control had measurable concentrations of zinc, copper, chromium, nickel, lead, arsenic, beryllium, and mercury. Trace amounts of selenium, silver, and cadmium occurred in samples from inside the booms or in the drainage channel. Although elevated levels of cyanide had been detected in Hart Crowser samples of drainage from the tire fire, no cyanide was detectable in the sediments. Cyanide has been shown to be unstable in seawater and to have a low affinity for sediments (Crecelius, 1981; Callahan et al., 1979).

Metals concentrations generally decreased with distance from the tire fire. Several metals - - zinc, copper, chromium, nickel, lead, and arsenic - - were 2 - 7 times higher in the boomed sediments than in the control sample. Concentrations of the same metals in the outer drainage channel were only slightly higher (a factor of 2 or less) than the control.

Table 3 compares the metals concentrations to sediment quality standards developed for Puget Sound (WAC 173-204C). There were no instances where metals concentrations exceeded the numeric criteria. These standards have been determined to results in no acute or chronic adverse effects on biological resources. Although the standards apply to marine sediments within the Puget Sound basin, they have been found to be good predictors of toxicity in other environments, including brackish and freshwater sediments (Jim Cabbage, personal communication).

Twenty-nine BNA compounds were quantified in the sediment samples (Table 4). The most prevalent compounds were phenols and PAH. As with TPH and metals, concentrations were highest at the inner boom, with many compounds exceeding 1 mg/Kg. Levels in the outer boomed area and outer drainage channel were reduced by an order of magnitude compared to the inner boom. No BNA compounds were detectable in the control sample.

Table 5 compares the concentrations of BNAs to Puget Sound sediment standards. In this table, results for PAH, organonitrogen compounds, and phthalates are normalized to organic carbon for comparison to their TOC-based standard.

Sediment standards were exceeded for nine compounds in the inner boom sediments: phenol; 2-methylphenol; 4-methylphenol; 2,4-dimethylphenol; 2-methylnaphthalene, fluorene; nitrosodiphenylamine (in one duplicate only); bis(2-ethylhexyl)phthalate; and benzoic acid. Only two of these, 2-methylphenol and benzoic acid, continued to exceed standards in the outer boom. No compounds exceed or approached standards in the drainage channel or control samples. Retene and coprostanol were detected at high levels in the boomed sediments but have no standards.

An additional 47 compounds were tentatively identified through the BNA analysis (Table 6). A number of those identified in the inner boom - - the substituted benzenes and naphthalenes, benzothiazoles, and nitriles for example - - are potentially toxic. These or structurally similar compounds had also been previously identified in samples of the tire oil (Henry, 1996). Except for sitosterol, a plant sterol, chemicals tentatively identified in the heavily oiled sediments of the inner boom were not among the major peaks identified at other locations. Most of the compounds tentatively identified in sediments from the outer boom, drainage channel, and control site are naturally occurring.

CONCLUSIONS

Results of this survey indicate that contamination of Baker Bay sediments by oil from the Canby Road tire fire was limited to the area inside the containment booms, with some trace contamination in the channel draining the boomed area. A number of BNA compounds were found at levels potentially toxic to sediment-dwelling organisms inside the inner boom and to a much lesser extent in the outer boomed area. Metals and cyanide were not found in toxic concentrations.

REFERENCES

- Callahan, M.A. *et al.*, 1979. Water-related Environmental Fate of 129 priority Pollutants. EPA-440/4-79-029a.
- Crecelius, E.A., 1981. Letter to R. Tomlinson, Seattle METRO. Battelle Marine Research Laboratory, Sequim, WA.
- Cabbage, J., 1996. Personal communication. Freshwater Sediment Criteria Development Program, Washington State Dept. of Ecology, Olympia, WA.
- EPA, 1990. Specifications and Guidance for Obtaining Contaminant-Free Sample Containers. OSWER Directive #9240.0-05.

Henry, C.B., 1996. Interim Report #2: Baker Bay Tire Fire Samples. Memorandum to B. Petrae, NOAA. Institute for Environmental Studies, Louisiana State Univ., Baton Rouge, LA.

McIntosh, M., 1996. Personal communication. Manchester Laboratory, Washington State Dept. of Ecology, Manchester, WA.

AJ/DS:krc/jl

cc: Dick Logan, Dale Norton, Larry Goldstein, Rachel Friedman-Thomas, Melany Lee (DOT)

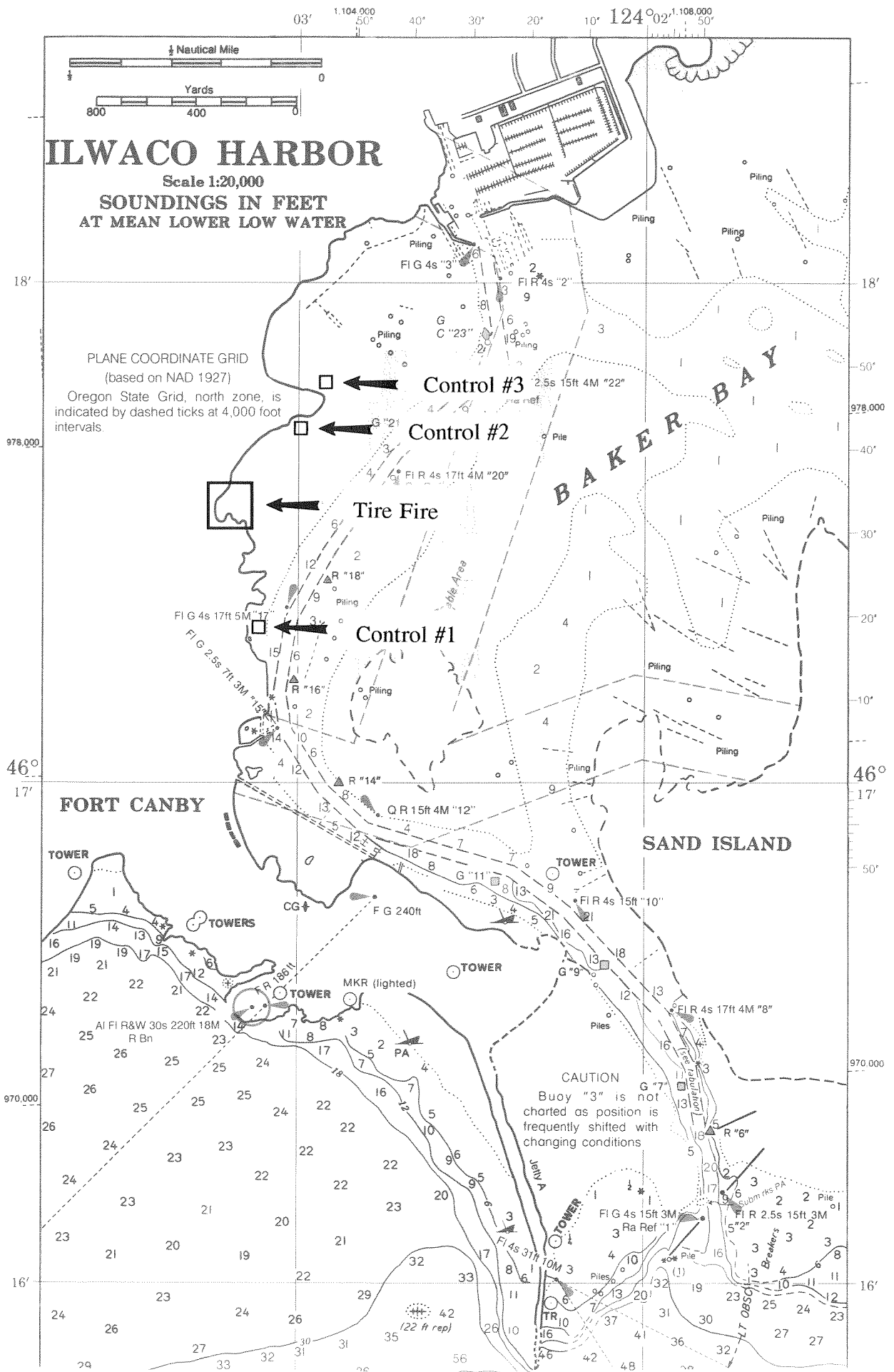


Figure 1. Sediment Sampling Areas in Vicinity of Canby Road Tire Fire

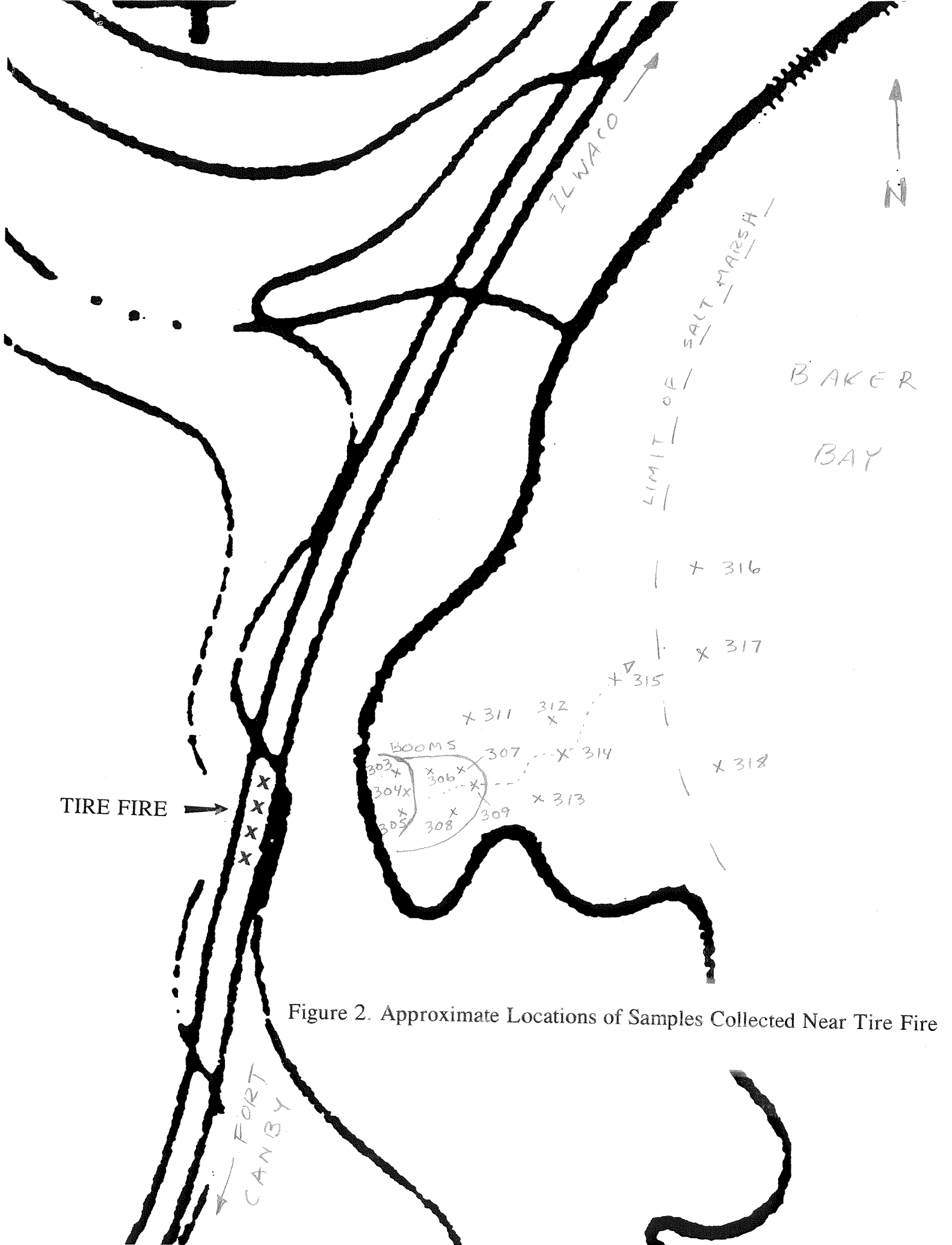


Figure 2. Approximate Locations of Samples Collected Near Tire Fire

Table 1. Analysis of Sediment Samples

Location	Sample Number	Analysis				
		TPH	Metals	Cyanide	BNA	TOC
Inside inner containment boom	149303	x				
	149304	x	x	x	x	x
	149305	x				
Inside outer containment boom	149306	x				
	149307	x				
	149308	x	x	x	x	x
Drainage channel from boomed area to mudflat	149309	x				
	149314	x				
	149315	x	x	x	x	x
Salt marsh outside boomed area	149311	x				
	149312	x				
	149313	x				
Mudflat beyond salt marsh	149316	x				
	149317	x				
	148318	x				
500 yards southeast of tire fire (control #1)	149300	x	x	x	x	x
	149301	x				
	149302	x				
500 yards northeast of tire fire (control #2)	149319	x				
	149320	x				
	149321	x				
700 yards northeast of tire fire (control #3)	149322	x				
	149323	x				
	149324	x				

Table 2. Results for Total Petroleum Hydrocarbons (mg/Kg, dry weight)

Location	Sample Number	Total Petroleum Hydrocarbons
Inside inner containment boom	149303	13.2
	149304	26.0
	149305	38.0
Inside outer containment boom	149306	4.2 U
	149307	1.7 U
	149308	3.6 U
Drainage channel from boomed area to mudflat	149309	2.0
	149314	1.5 U
	149315	0.77 U
Salt marsh outside boomed area	149311	2.5 U
	149312	1.9 U
	149313	2.2 U
Mudflat beyond salt marsh	149316	0.73 U
	149317	0.78 U
	148318	0.70 U
500 yards southeast of tire fire (control #1)	149300	0.35 U
	149301	0.30 U
	149302	1.2 U
500 yards northeast of tire fire (control #2)	149319	0.56 U
	149320	0.97 U
	149321	0.73 U
700 yards northeast of tire fire (control #3)	149322	0.58 U
	149323	1.1 U
	149324	0.49 U

Note: detected values in bold

U = not detected at or above reported value (i.e., less than)

Table 3. Results for Metals and Cyanide (mg/Kg, dry weight)

Location:	Inner Boom	Outer Boom	Drain Channel	Control #1	Puget Sound Standards ²
Sample No.:	149304 ¹	149308	149315	149300	
Zinc	111	91	47	29	410
Copper	45	44	12	5.5	390
Chromium	34	16	12	7.6	260
Nickel	26	14	11	7.3	--
Lead	14	15	7.0	3.2	450
Arsenic	6.8	8.8	4.5	1.6	57
Beryllium	0.75	0.61	0.34	0.21	--
Selenium	0.84	0.55	0.3 U	0.3 U	--
Silver	0.47 J	0.34 J	0.3 UJ	0.3 UJ	6.1
Cadmium	0.3 U	0.39	0.31	0.3 U	5.1
Mercury	0.021	0.022	0.027	0.009	0.41
Thallium	0.5 UJ	0.3 UJ	0.3 UJ	6.9 J	--
Antimony	3 UJ	3 UJ	3 UJ	3 UJ	--
Cyanide	0.5 U	0.25 U	0.25 U	0.25 U	--

Note: detected values in bold

U = not detected at or above reported value (i.e., less than)

J = value is an estimate

¹mean of duplicate analyses

²no adverse effect level

Table 4. Results for Acid/Base/Neutrals (ug/Kg, dry weight) and TOC (percent)

Location:	Inner Boom		Outer Boom		Drain Channel		Control #1	
Sample No.:	149304 ¹		149308		149315		149300	
<u>Phenols</u>								
phenol	17000		864	UJ	114	UJ	58	U
2-methylphenol	12600		588		43	J	58	U
4-methylphenol	7560		197	U	57	UJ	58	U
2,4-dimethylphenol	2800		197	U	55	U	58	U
<u>PAH</u>								
naphthalene	2750		106	J	8	J	58	U
1-methylnaphthalene	8500		324		19	J	58	U
2-methylnaphthalene	4820		242		15	J	58	U
acenaphthene	154	U	197	U	55	U	58	U
acenaphthylene	154	U	197	U	25	J	58	U
fluorene	2190		117	J	20	J	58	U
phenanthrene	7390		330		136		58	U
anthracene	2590²		162	J	41	J	58	U
fluoranthene	3600		188	J	164		58	UJ
pyrene	4290		312		239		58	UJ
benzo(a)anthracene	1080²		197	U	80	J	58	U
chrysene	1900		130	J	102		58	U
benzo(b)fluoranthene	860²		197	U	78		58	U
benzo(k)fluoranthene	154	U	197	U	40	J	58	U
benzo(a)pyrene	1830		329	J	75	J	116	U
indeno(1,2,3-cd)pyrene	141	J	393	U	45	J	58	U
benzo(g,h,i)perylene	372		197	U	54	J	58	U
<u>Organonitrogens</u>								
aniline	327²		197	U	55	UJ	58	U
N-nitrosodiphenylamine	16000²		197	U	55	U	291	U
<u>Phthalates</u>								
di-n-butylphthalate	154	U	393	UJ	31	J	58	UJ
di-n-octylphthalate	3120²	J	983	U	274	U	291	U
bis(2-ethylhexyl)phthalate	4610		393	UJ	55	UJ	58	UJ
<u>Miscellaneous</u>								
benzoic acid	72400	E	4950		547	U	583	U
retene	56400	E	2300		172		58	U
3B-coprostanol	2260²		1970	U	179	J	583	U
Total organic carbon	8		10		1.3		0.2	

Note: Detected values in bold

U = not detected at or above reported value (i.e., less than)

J = value is an estimate

E = concentration exceeds calibration range

¹mean of duplicate samples

²not detected in duplicate

Table 5. Base/Neutral/Acids Results Compared to Sediment Standards

Location:	Inner Boom	Outer Boom	Drain Channel	Control #1	Puget Sound Standards ²
Sample No.:	149304 ¹	149308	149315	149300	
<u>Phenols (ug/Kg, dry weight)</u>					
phenol	17000	nd	nd	nd	420
2-methylphenol	12600	588	43	nd	63
4-methylphenol	7560	nd	nd	nd	670
2,4-dimethylphenol	2800	nd	nd	nd	29
<u>PAH (mg/Kg TOC)</u>					
naphthalene	34	1	1	nd	99
1-methylnaphthalene	110	3	1	nd	-
2-methylnaphthalene	60	2	1	nd	38
acenaphthene	nd	nd	nd	nd	16
acenaphthylene	nd	nd	2	nd	66
fluorene	27	1	2	nd	23
phenanthrene	92	3	10	nd	100
anthracene	32³	2	3	nd	220
fluoranthene	45	2	12	nd	160
pyrene	54	3	18	nd	1000
benzo(a)anthracene	14³	nd	6	nd	110
chrysene	24	1	8	nd	110
benzo(b)fluoranthene	11³	nd	6	nd	230 ⁴
benzo(k)fluoranthene	nd	nd	3	nd	230 ⁴
benzo(a)pyrene	23	3	6	nd	99
indeno(1,2,3-cd)pyrene	2	nd	3	nd	34
benzo(g,h,i)perylene	5	nd	4	nd	31
<u>Organonitrogens (mg/Kg TOC)</u>					
aniline	4³	nd	nd	nd	-
N-nitrosodiphenylamine	200³	nd	nd	nd	11
<u>Phthalates (mg/Kg TOC)</u>					
di-n-butylphthalate	nd	nd	2	nd	220
di-n-octylphthalate	39³	nd	nd	nd	58
bis(2-ethylhexyl)phthalate	58	nd	nd	nd	47
<u>Miscellaneous (ug/Kg, dry weight)</u>					
benzoic acid	72400	4950	nd	nd	650
retene	56400	2300	172	nd	-
3B-coprostanol	2260³	nd	179	nd	-

Note 1: detected values in bold

Note 2: underlined values exceed standards

nd = not detected

¹ mean of duplicate analyses² no adverse effect level³ not detected in duplicate⁴ total benzofluoranthenes

Table 6. Tentatively Identified Compounds (see Appendix A for estimated concentrations)

Location:	Inner Boom	Outer Boom	Drain Channel	Control #1
Sample No.:	149304	149308	149315	149300
2-methyl-1-butenylbenzene	x			
cyclopentylbenzene	x			
hexylbenzene	x			
1-methyl-2-(1-methylethyl)benzene	x			
benzothiazole	x			
1,2-benzisothiazole	x			
2-methylbenzothiazole	x			
1,4,6-trimethylnaphthalene	x			
2-ethylnaphthalene	x			
pentadecanenitrile	x			
hexadecanenitrile	x			
octadecanenitrile	x			
benzo(b)naphtho(2,3-d)furan	x			
4-ethylquinoline	x			
7-ethyl-1,4-dimethylazulene	x			
2,3-dihydro-1-methylindene	x			
2,3-dihydro-1,6-dimethyl-1h-indene	x			
6,7-dihydroxy kaur-16-en-18-oic acid	x			
1-methyl-2-pentylcyclohexane	x			
1-phenylethanone	x			
gamma sitosterol	x	x	x	
4-methyl-3-penten-2-one		x	x	x
tetradecanoic acid		x	x	x
cholesterol		x	x	
hexadecanoic acid		x	x	
(E)-3-penten-2-one		x		x
unknown aldol condensate		x		
methyl-7-hexadecenoic acid		x		
stigmast-4-en-3-one		x		
1-hexadecenyl methylether		x		
(3.beta.,22E)-ergosta-5,22-dien-3-ol		x		
(Z)-9-hexadecanoic acid, methylester			x	x
2,4-dimethylquinoline			x	x
phytol			x	x
3-hexene-2,5-dione (8ci9ci)			x	
1-hexen-3-yne			x	

Table 6. (continued)

Location:	Inner Boom	Outer Boom	Drain Channel	Control #1
Sample No.:	149304	149308	149315	149300
9-hexadecenoic acid			X	
hexadecanoic acid, methyl ester			X	
phenylpropanedioic acid			X	
1,1-dimethoxyhexane			X	
bicyclo(3.1.1)heptane 2-carboxaldehyde			X	
(Z,Z)-1,4-cyclooctadiene			X	
(4. Alpha., 5. Alpha)-4,5-epoxycholestane			X	
1-ethyl-2-methyl-transcyclohexane				X
1,1,2,2-tetramethylcyclopropane				X
5-hexen-2-one				X
sulfur				X
unknown hydrocarbons	X	X	X	X

APPENDIX A

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard Washington 98366

CASE NARRATIVE

May 13, 1996

Subject: Ft. Canby Road Fire
Samples: 96149300 - 96149326
Case No. 122996
Officer: Art Johnson
By: Myrna McIntosh *M*
Organics Analysis Unit

WTPH-D ANALYSIS AS PYROLYTIC OIL

SUMMARY:

Samples 96149300 - 96149326 were analyzed on 4/9/96 through 5/1/96 for the presence of the oil produced from the pyrolysis of the Ft. Canby Road.

All sample results with a quantitated positive pattern match for the pyrolytic product were qualified as estimates because of the poor relative percent differences (RPD) between the duplicates. This is most likely due to the non-homogeneity of the samples.

There was difficulty maintaining analytical control of the continuing calibration as the pyrolytic oil in the samples caused degradation on the GC column. Samples 96149312 - 96149324 results are from the analysis run of 4/29/96 in which the continuing calibration controls gave low recoveries. Hydrocarbons were detected in most samples but only quantified in those samples which exhibit a pattern match for the pyrolytic product (sample 96149326).

ANALYTICAL METHODS:

The WTPH-Dx (extended diesel range hydrocarbons) method was used. The calibration curve was prepared by analyzing dilutions of sample number 96149326. Samples 96149300 - 96149324 were quantitated with this curve.

BLANKS:

No analytes were detected in the blanks.

SURROGATES:

Surrogate recoveries for samples 96149305 and 96149320 were high indicating a possible high bias. All other surrogates were within QC limits of 50 - 150% recovery.

HOLDING TIMES:

The samples were extracted and analyzed within thirty days of receipt.

DUPLICATE SAMPLES:

The RPDs of the duplicate samples are greater than 30%. This is most likely due to the non-homogeneity of the samples. There are no duplicate control limits established for this method but because the RPDs are greater than 20%, all sample results with quantitated positive pattern matches for the pyrolytic product are estimated.

DATA QUALIFIER CODES:

- U - The analyte was not detected at or above the reported value.
- J - The analyte was positively identified. The associated numerical value is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.
- bold** - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

May 6, 1996

To: Art Johnson
From: Randy Knox, ^{RSK}Metals Chemist
Subject: Fort Canby Road Tire Fire, Ilwaco Project Sediments

QUALITY ASSURANCE SUMMARY

Data quality for this project is generally good except the recovery of antimony and silver from the LCS sample is low. Also recovery of antimony and thallium from the spiked samples is low. Recovery of added silver from the spiked sample is low but not from the duplicate spiked sample. Precision on silver results is out of the allowed range. No other significant quality assurance issues are noted with the data.

SAMPLE INFORMATION

The samples from the Fort Canby Road Tire Fire, Ilwaco Project were received by the Manchester Laboratory on 4/02/96 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting CLP calibration requirements.

PROCEDURAL BLANKS

The procedural blanks associated with these samples show no analytically significant levels of analytes except zinc and lead. Sample levels of these elements are greater than ten times the blank data and sample data is not qualified.

SPIKED SAMPLES ANALYSIS

Spiked and duplicate spiked sample analysis were performed on this data set.. All spike recoveries except those for antimony, silver, and thallium are within the CLP acceptance limits of +/- 25%. Data for these elements, which show low recovery in spiked samples, are flagged with a J as estimated or a UJ as undetected at estimated detection level.

PRECISION DATA

The results of the spiked and duplicate spiked samples are used to evaluate precision on this sample set. The relative percent difference (RPD) for all analytes except silver and antimony is within the 20% CLP acceptance window for duplicate analysis. Silver and antimony data are qualified as noted in the section on spiked sample analysis.

SERIAL DILUTION

Serial dilution data for all elements is within control. Copper, nickel, chromium , and zinc on sample 96149304 and copper and zinc on sample 96149308 were reported from a ten times diluted sample due to their levels and the level of interfering elements, especially iron.

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

LCS analyses are within the windows established for each parameter..

Please call Bill Kammin at SCAN 360-871-8801 to further discuss this project.

RLK:rlk

Washington State Department of Ecology
Manchester Laboratory

April 18, 1996

TO: Art Johnson

FROM: Casey Maggart, Chemist *cm*

SUBJECT: General Chemistry Quality Assurance memo for the Ft. Canby Road Tire Fire, Ilwaco

SUMMARY

The data generated by the analysis of these samples can be used noting the data qualifications discussed in this memo. All analyses requested were evaluated using USEPA Contract Laboratory Program (CLP) quality assurance requirements.

Sample Information

These samples from the Ft. Canby Road Tire Fire, Ilwaco project were received by the Manchester Laboratory on 04/02/96 in good condition.

Holding Times

Analysis of all parameters was performed within USEPA established holding times.

ANALYSIS PERFORMANCE

Instrument Calibration

Where applicable, instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits. A correlation coefficient of 0.995 or greater was met as stated in CLP calibration requirements.

Procedural Blanks

The procedural blanks associated with these samples showed no analytically significant levels of analytes.

Precision Data

The Relative Percent Difference (RPD) for all parameters were within their acceptance windows.

Laboratory Control Sample Analyses

LCS analyses were within the windows established for each parameter.

Other Quality Assurance Measures and Issues

The samples were checked for both Sulfide and Chloride interference, and none was found.

The "U" qualifier for the Cyanide means that the sample was below the detection limit.

Please call Casey Maggart at SCAN 871-8824 to further discuss this project.


cc: Bill Kammin

MANCHESTER ENVIRONMENTAL LABORATORY

7411 Beach Drive E , Port Orchard Washington 98366

CASE NARRATIVE

June 6, 1996

Subject: Ft. Canby Road Tire Fire, Ilwaco
Samples: 96 - 149300, -149304, -149308, -149315
Case No. 1229-96
Officer: Art Johnson
By: Dickey D. Huntamer 
Organics Analysis Unit

SEMIVOLATILE ORGANICS

ANALYTICAL METHODS:

The semivolatile soil samples were extracted with acetone following the Manchester modification of the EPA CLP and SW 846 8270 procedure with capillary GC/MS analysis of the sample extracts. Normal QA/QC procedures were performed with the analyses.

HOLDING TIMES:

All sample and extraction holding times were within the recommended limits. Low surrogate recoveries on some of the samples resulted in repeating the GPC cleanup and re-analysis. This resulted in a delay and the re-analysis was done after the 40 day extract holding time had passed. All results from these analyses were given the "J" qualifier.

BLANKS:

Low levels of some target compounds were detected in the laboratory blanks. The EPA five times rule was applied to all target compounds which were found in the blank. Compounds that were found in the sample and in the blank were considered real and not the result of contamination if the levels in the sample are greater than or equal to five times the amount of compounds in the associated method blank.

SURROGATES:

The normal Manchester Laboratory surrogates were added to the sample prior to extraction. Most surrogate recoveries were within acceptable limits. Surrogate recoveries for samples, -149300, -149304 and -149315 as well as one matrix spike and blank were about one-half those of the remaining samples. This was due to sample loss on one channel of the GPC unit. While the surrogate recoveries were still within acceptable limits, the samples were rerun to see what effect there was on the analyte concentrations.. The surrogate recoveries in the reanalysis were about twice as high as in the initial analysis.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

Matrix spike recoveries were low for aniline, hexchloroethane, 1,2,4 trichlorobenzene, hexachlorocyclopentadiene, 3 and 4-nitroanilines, 4-chloroaniline, and 2,4-dinitrophenol. The "J" qualifier was added to the results for these compounds. Several other compounds had high recoveries but no qualifiers were added.

ANALYTICAL COMMENTS:

Some special analytical problems were encountered due to the problem with the GPC unit. Although the initial data was acceptable the lower than expected surrogate recoveries on half the samples resulted in reanalysis. The reanalysis demonstrated that the low surrogates were a result of a malfunction in the GPC unit. Data from both analysis is reported. The reanalyzed samples are indicated by the presence of (Dilution - DIL1) after the sample number. The exception is sample -149304 where it is indicated by (Dilution - DIL2). The data is acceptable for use as qualified.

DATA QUALIFIER CODES:

- U - The analyte was not detected at or above the reported value.
- J - The analyte was positively identified. The associated numerical value is an estimate.
- UJ - The analyte was not detected at or above the reported estimated result.
- REJ - The data are unusable for all purposes.
- EXP - The result is equal to the number before EXP times 10 to the power of the number after EXP. As an example 3EXP6 equals 3×10^6 .
- NAF - Not analyzed for.
- N - For organic analytes there is evidence the analyte is present in this sample.
- NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.
- E - This qualifier is used when the concentration of the associated value exceeds the known calibration range.
- bold** - The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)


State of Washington Department of Ecology
Manchester Environmental Laboratory
7411 Beach Dr. East Port Orchard WA. 98366

April 22, 1996

Project: Canby Road Tire Fire

Samples: 14-9300, 9304, 9308, 9315

Laboratory: Sound Analytical

By: Pam Covey 

Case Summary

These samples were received at the Manchester Environmental Laboratory (MEL) on April 2, 1996 and sent to Sound Analytical on the same day for TOC analysis using PSEP method.

The samples were analyzed within acceptable holding limits, and the method blank associated with these samples has shown the process is free from contamination.

One sample was analyzed in duplicate and was within acceptable limits for the Relative Percent Difference (RPD).

For consistency with MEL reporting protocol, all non-detect values have been qualified with a "U" (the analyte was not detected at or above the reported result).

The results are acceptable for use as amended.