



DEPARTMENT OF THE ARMY
 NORTH PACIFIC DIVISION MATERIALS LABORATORY
 CORPS OF ENGINEERS
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CENPD-EN-G-L (1110-1-8100c)

1 Dec 89

MEMORANDUM FOR: Commander, Alaska District, ATTN: CENPA-EN-G-M

SUBJECT: W.O.#89-HM-860, Results of Chemical Analyses

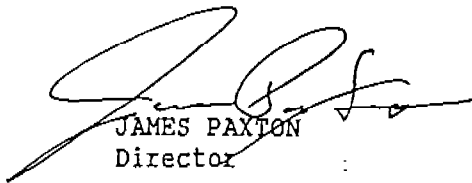
Project: FORT RICHARDSON LANDFILL, GROUNDWATER MONITORINGIntended Use: Evaluate siteSource of Material: Reference Chain of CustodySubmitted by: CENPA-EN-G-MDate Sampled: 20 Sep 89 Date Received: 21 & 22 Sep 89Method of Test or Specification: Reference Enclosures 1 through 7Reference: DD Form 448, MIPR No. E87-89-0077, dated 20 Sep 89.

1. Enclosed are results of analyses, diskettes, and Quality Assurance (QA) data for environmental samples collected from the above site. Included are:

- a. Enclosure 1, Quality Assurance Report.
- b. Enclosure 2, report dated 30 Oct 89 from AmTest, Inc.
- c. Enclosure 3, report with addendum dated 2 Nov 89 from Southwest Laboratory of Oklahoma, Inc.
- d. Enclosure 4, Report No. 892237 from Columbia Analytical Services, Inc.
- e. Enclosure 5, report from CENPD-EN-G-L.
- f. Enclosure 6, Cooler Receipt and Chain of Custody forms.
- g. Enclosure 7, diskettes with all reported data.

2. This completes all work requested.

Enclosure


 JAMES PAXTON
 Director

Copy Furnished: CENPD-EN-G
 CEMRD-EN-GC
 CENPA-EN-PM-A

CENPD-EN-G-L (89-HM-860)

QUALITY ASSURANCE REPORT

FORT RICHARDSON LANDFILL, GROUNDWATER MONITORING

1. SUMMARY:

a. Benzene was detected in sample -01WA at 32 ppb. Up to 69 ppm of alkaline/alkaline earth metals, 2.5 ppm heavy metals, 461 ppm total dissolved solids, alkalinity of 43 ppm and 23 ppm of other ions were found. No semi-volatiles (BNA's), pesticides, PCB's or eight of twenty-two metals screened were detected in any sample.

b. All project and QA data agree and are acceptable except benzene data of sample -01WA (see details in Item 7 b. and e).

2. BACKGROUND: The samples were collected on 20 Sep 89 and were received by the analytical laboratories on 21 and 22 Sep 89.

3. OBJECTIVES:

a. Four water samples, including one pair of blind duplicates, were collected from various locations around the site, to determine the extent of chemical contamination.

b. One quality assurance (QA) sample and one pair of trip blanks were submitted to evaluate the project laboratory's data. The project and QA data will be compared to determine the validity of the reported data.

4. PROJECT ORGANIZATION:

a. The samples were collected by North Pacific Division - Alaska District staff.

b. The project samples were analyzed by Southwest Laboratory of Oklahoma, Inc. and AmTest, Inc.

c. The QA samples were analyzed by Columbia Analytical Services, Inc. and CENPD-EN-G-L.

5. ANALYTICAL REFERENCES:

<u>Number</u>	<u>Title</u>	<u>Date</u>
a. SW-846, Third Edition	Test Methods for Evaluating Solid Waste	11/86
b. EPA-600/4-82-057	Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater	7/82
c. EPA-600/4-79-020	Methods for Chemical Analysis of Water and Wastes	3/79
d. Sixteenth Edition	Standard Methods for the Examination of Water and Wastewater	1986
e. CENPD-EN-G-L Proposed Modified 8015	Fuel Quantification and Identification	1989
1) Method D-3328-78	Annual Book of ASTM Standards, Part 31	1980
2) Method D-2600	Annual Book of ASTM Standards, Part 24	1980

6. PROJECT LABORATORY'S DATA:

a. Organics: Benzene was detected in sample -01WA at 32 ppb. No other volatile organic (VOC's), BNA's, pesticides or PCB's were found in any sample.

b. Fuel Identification and Quantitation: No fuels were detected in any sample.

c. Inorganics and Other Parameters: Up to 69 ppm alkaline/alkaline earth metals and 2.5 ppm other heavy metals were found. Up to 461 ppm total dissolved solids, 0.106 ppm nitrate, 0.48 ppm total kjeldahl nitrogen, 1.46 ppm total organic carbon (TOC), 1.4 ppm chloride and 23 ppm sulfate were reported. Alkalinity ranged from 22 to 43 ppm, turbidity from 0.21 to 0.65 NTU and Langelier's Index from -1.0 to -1.9. No chemical oxygen demand (COD), surfactants or ammonia nitrogen were detected.

7. EVALUATION OF THE PROJECT LABORATORY'S DATA:

a. Surrogates: Surrogate recoveries of VOC and pesticides/PCB's (Method 608) were within QC limits and acceptable. One out of twenty-four surrogates run with BNA's was slightly lower than QC limits but acceptable.

b. Matrix Spike (MS) and Matrix Spike Duplicates (MSD): All MS/MSD for VOC and BNA's were within QC limits and are acceptable except the relative percent difference (RPD) of the MS/MSD for benzene run with

samples -01WA and -02WA, which indicates variability in results. Three of six analytes were higher than QC limits in both MS and MSD of Method 608; data are not affected as no targeted analytes were reported. MS for fuels, metals, chloride, sulfate and TOC were all within allowable limits and acceptable. MS were below 95-percent confidence levels for ammonia, nitrate and surfactants.

c. Duplicates and Laboratory Blanks: Duplicates for all methods were within QC limits except manganese with a RPD of 22-percent; the manganese data are acceptable due to acceptable MS recoveries. No analytes of interest were found in any laboratory blanks for any method except metals, where aluminum, calcium, copper, iron, manganese, sodium and zinc were found at or near the detection levels.

d. Blind Duplicates: Blind duplicates are detailed in Table II. All data agree except the benzene data in Section 1, where differences are due to poor reproducibility of benzene data in the duplicate and laboratory control samples.

e. Overall Evaluation of the Project Data: All data are acceptable except the benzene data of -01WA, which did not agree with the blind duplicate or QA data (see details in Item 7.d).

8. EVALUATION OF THE QA LABORATORIES DATA: All surrogates were within QC limits except two of six in the two method blanks run with VOC samples, which were slightly high but acceptable. All MS and MSD for TOC, fuels and BNA's were within QC limits except six of twenty-four MS/MSD from the BNA analyses, which were slightly high but acceptable. Since no targeted compounds were detected, data are not affected. All laboratory blanks were free of analytes. All laboratory control results were within QC limits except Aroclor-1260 and magnesium, which were higher than the allowable limits. PCB data were not affected as no Aroclors were detected. Since magnesium data agree with the project laboratory's blind duplicate data, this was also accepted.

9. QA/QC COMPARISONS: All comparisons are shown in Table II. All data agree and are acceptable except benzene data for one of a pair of blind duplicates (see Item 7.e).

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COMPARISON OF PROJECT AND QA RESULTS

TABLE I

TRIP BLANKS

Project: Fort Richardson Landfill, Groundwater Monitoring Matrix: water
 Sample Prefix: 89 FRLF Units: ug/L (ppb)
 Method: Volatile Organics (EPA 8240)
 Project Laboratory: SW Laboratory of Oklahoma, Inc.
 QA Laboratory: Columbia Analytical Services, Inc.

<u>Analytes Detected</u>	<u>Project Lab -06WA</u>	<u>Detection Limits</u>	<u>QA Lab -07WA</u>	<u>Detection Limits</u>
Chloroform	ND	5.0	3.8	1.0

Tentatively Identified Compounds:

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ND

ND = None Detected
 -- = Not reported

SUMMARY: Chloroform reported by the QA laboratory was less than the detection limits used by the project laboratory, and is due to contaminated deionized water used to create the trip blank. The absence of other analytes of interest in both blanks indicates no cross-contamination occurred during shipment, storage or analysis of samples.

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COMPARISON OF PROJECT AND QA RESULTS

TABLE II

Project: Fort Richardson Landfill, Groundwater Monitoring
 Matrix: water Sample Prefix: B9 FRLF
 Project Laboratory: SW Lab of Oklahoma QA Laboratory: CAS

1. Method: Volatile Organics (EPA 8240) Units: ug/L (ppb)

<u>Analytes Detected</u>	<u>Project Lab</u>		<u>Detection Limits</u>	<u>QA Lab</u>	
	<u>01WA</u>	<u>02WA</u>		<u>03WA</u>	<u>Detection Limits</u>
Benzene	32	ND	5.0	2.3	1.0

Tentatively Identified Compounds:

-- -- ND

ND = None Detected

-- = Not reported

J = Estimated value, found at less than instrument detection limits

SUMMARY: Data agree for 34 of 35 analytes screened and are acceptable. Benzene data of sample -01WA are questionable due to the project laboratory's poor reproducibility in control and duplicate samples.

2. Method: Hydrocarbon Scan (Modified 8015) Units: ug/L (ppb)
 Project Laboratory: SW Lab of Oklahoma QA Laboratory: CAS

<u>Hydrocarbon Pattern Scanned</u>	<u>Project Lab</u>		<u>Detection Limits</u>	<u>QA Lab</u>	
	<u>01WA</u>	<u>02WA</u>		<u>03WA</u>	<u>Detection Limits</u>
Kerosene	ND	ND	100	ND	100
Gasoline	ND	ND	100	ND	100
Diesel Fuel	ND	ND	100	ND	100
Jet Fuel	--	--	--	MD	100
Bunker Oil	--	--	--	ND	100

SUMMARY: Data agree and are acceptable.

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Table II - Comparison of Project and QA Results

3. Method: Semi-Volatile Organics (EPA 8270) Units: ug/L (ppb)
 Project Laboratory: SW Lab of Oklahoma QA Laboratory: CAS

<u>Analytes Detected</u>	<u>Project Lab</u>		<u>Detection Limits</u>	<u>QA Lab</u>	<u>Detection Limits</u>
	<u>01WA</u>	<u>02WA</u>		<u>03WA</u>	
--	ND	ND		ND	

Tentatively Identified Compounds:

Unknowns, 13J	Unknowns, 40J	3, from 9-260
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SUMMARY: Data agree and are acceptable.

4. Method: Assorted Water Quality Conventional Units: mg/L (ppm)
 Project Laboratory: AmTest QA Laboratory: CENPD-EN-G-L

<u>Analytes Screened</u>	<u>Project Lab</u>		<u>QA Lab</u>
	<u>01WA</u>	<u>02WA</u>	<u>03WA</u>
Nitrate, as N	0.078 & 0.065*	0.089	0.7
Ammonia, as N	<0.005	<0.005	<0.1
Total Kjeldahl, as N	0.48	<0.20	0.22
Alkalinity, as calcium carbonate	22	43	39.3
Chloride	<1.0	1.4	3.0
Total Dissolved Solids	461	132	89
Sulfate	21 & 21*	23	21
Surfactants (MBAS)	<0.10	<0.10	<0.03
Corrosivity, Langelier's Index	-1.9	-1.8	-1.14

* = Nitrate and sulfate analyzed in duplicate in this sample

SUMMARY: Data agree and are acceptable. While differences in nitrate data between the project and QA laboratory are within a factor of eight, comparisons at these low levels are not significant.

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Table II - Comparison of Project and QA Results

5. Method: Metals, Total Units: mg/L (ppm)
 Project Laboratory: AmTest QA Laboratory: CENFD-EN-G-L

<u>Analytes Screened</u>	<u>Project Lab</u>		<u>Detection Limits</u>	<u>QA Lab</u>	<u>Detection Limits</u>
	<u>01WA</u>	<u>02WA</u>		<u>03WA</u>	
Arsenic	ND	ND	0.001	ND	0.01
Barium	0.008	0.008	.003	ND	0.01
Cadmium	ND	ND	0.002	0.0082	0.005
Calcium	19.5	19.4	0.01	34	0.005
Chromium	0.012	0.010	0.006	ND	0.01
Copper	0.034	0.035	0.002	0.032	0.025
Iron	0.27	0.31	0.01	0.29	0.10
Lead	0.009	0.010	0.001	0.0082	0.005
Magnesium	2.59	2.50	0.01	2.6	0.005
Manganese	0.005	0.006	0.002	ND	0.005
Mercury	ND	ND	0.0002	ND	0.0002
Potassium	ND	ND	1.0	0.39	0.005
Selenium	ND	ND	0.001	ND	0.005
Silver	ND	ND	0.010	ND	0.01
Sodium	2.6	2.4	0.02	2.5	0.005
Zinc	0.21	0.20	0.002	.150	0.02

SUMMARY: All data agree and are acceptable. The cadmium reported by the QA laboratory is close to the detection limits of the project laboratory and differences at these levels are not significant.

6. Method: Total Organic Carbon (EPA 9060) Units: mg/L (ppm)
 Project Laboratory: AmTest QA Laboratory: CAS

<u>Analytes Detected</u>	<u>Project Lab</u>		<u>Detection Limits</u>	<u>QA Lab</u>	<u>Detection Limits</u>
	<u>01WA</u>	<u>02WA</u>		<u>03WA</u>	
Total Organic Carbon	1.46	1.35	—	0.5	0.5

SUMMARY: The project blind duplicate data agree and are acceptable. The QA data are within a factor of three to the project data, which is acceptable for water samples.

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Table II - Comparisons of Project and QA Results

7. Method: Chemical Oxygen Demand Units: mg/L (ppm)
 Project Laboratory: AmTest QA Laboratory: CAS

	Project Lab		Detection Limits	QA Lab	Detection Limits
	O1WA	O2WA		O2WA	
COD	ND	ND	5	ND	5

SUMMARY: Data agree and are acceptable.