N00217.003922
HUNTERS POINT
SSIC NO. 5090.3

DO #0083 Hunters Point
Site IR-1/21 Industrial Landfill
Groundwater Extraction System
December 1999 Monthly Report

Prepared for:

Department of the Navy
Naval Facilities Engineering Command
Southwest Division
1230 Columbia Street
San Diego, California 92132-5190

Prepared by:

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4005 Port Chicago Highway
Concord, California 94520

January 2000

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1.0 Introduction

The objective of the groundwater extraction system (GES) under Delivery Order (DO) #0083 at Hunters Point Shipyard is to prevent mounding of the groundwater at a limited portion of the Site IR-1/21 Landfill. The GES collects groundwater from seven extraction wells and one extraction trench, and discharges the groundwater into the sanitary sewer for the City and County of San Francisco. The GES works in conjunction with a down-gradient sheet pile containment barrier to prevent groundwater mounding and subsequent flow around the containment barrier. The end result of this activity is to reduce the potential for migration of groundwater, which contains landfill constituents, into the bay.

The sheet pile barrier is protected from corrosion by a cathodic protection system that was commissioned in June 1999.

Operation of the GES and scheduled monitoring events are conducted in accordance with the Operation and Maintenance Manual (IT, 2000) and with the City and County of San Francisco Industrial Wastewater Discharger Class I Permit No. 98-0301 issued on December 14, 1998. This permit expires on December 14, 2001 and must be reapplied for by September 14, 2001.

This monthly report was prepared by IT Corporation (IT) on behalf of the U.S. Navy to document activities associated with operation and maintenance of the GES. This report includes a summary of activities from December 1, 1999 through December 31, 1999.

2.0 Summary of Field Activities

2.1 Operation and Maintenance (O&M)

Several operation and maintenance activities were performed at the GES during this reporting period. On December 3, 1999 Corrosion Engineering Associates, Inc. performed a semi-annual inspection of the cathodic protection system. The report on this inspection is included as Attachment 5.

On December 9, 1999, a corroded overload relay and a corroded contactor at EW-122 were replaced, allowing the pump to function. Also, on this date, the basket strainer at the collection and monitoring pad was cleaned.

On December 16, 1999 the pump, flowmeter, and strainer at EW-142 were cleaned of iron bacteria and reinstalled. The pump started, but it could not create enough pressure to pump against the back pressure of the system. The oxide deposits, which were still remaining within

the recesses of the pump impellers, were probably preventing adequate flow. A new pump end has been ordered and will soon be installed.

Upon inspection of EW-154 on December 16, 1999, it appeared that the pump was no longer able create sufficient flow. Most likely, the pump impellers are fouled with iron bacteria. A new pump end has been ordered and will soon be installed.

Also, on December 16, the pump at EW-122 was pulled for inspection due to frequent cycling. Iron bacteria fouling was discovered on the drop pipe and the attached level sensors. The bacteria coated the level sensors, preventing them from operating correctly. The drop pipe and level sensors were cleaned and reinstalled, eliminating the frequent cycling. The discovery of iron bacteria at this well was not anticipated since there was no fouling in the wellhead components. At the time the pump was pulled, the iron bacteria fouling remained above the water level, so neither the pump nor the wellhead components were fouled.

On December 16, the strainer at EW-134 was cleaned of slight iron bacteria fouling. The flowmeter at the pad was inspected and was found to be clean.

On December 30 at 8 a.m., the groundwater extraction system was turned off to prevent any Y2K problems from occurring during the millennium change. This action was in accordance with the Y2K Response Plan (IT, 1999) for DO 83, which can be found in IT's central filing system. The Y2K Response Plan was prepared under the direction of IT's upper management to ensure that no Y2K crisis would occur at this site.

2.2 Field Data

Data collected to support O&M of the GES and cathodic protection system includes groundwater levels taken at the extraction wells, at the monitoring wells, and at the piezometers; pressure and flow readings taken at the extraction wells and at the collection and monitoring pad; and voltage and amperage readings at the rectifiers. These readings are included as Attachments 1, 2 and 3. This data is used to monitor the performance of the system.

2.2.1 Groundwater Level Measurements

Water levels were taken at the extraction wells, monitoring wells and piezometers on December 9, 1999. Depth to groundwater measurements were obtained with a Solinst Model 101 electronic sounder, and measured to the nearest 0.01 ft. This data was used to create water level contours.

A summary table of the water levels and the associated groundwater elevations, along with a map of the potentiometric surface, are provided in Attachment 1 of this document.

2.2.2 GES Measurements

Pressure and flow readings were taken at the extraction wells on December 16, 1999. These measurements are provided in Attachment 2. The total flow for the 28-day discharge period from November 18 to December 16, 1999 was 193,848 gallons, with an average flowrate of 4.8 gpm. The total flow was calculated by adding the flows at each extraction well.

A flow reading was also taken at the collection and monitoring pad. The monthly flow recorded at the pad was 150,597 gallons. As explained in the November 1999 monthly report, Seametrics, the manufacturer of the flowmeter at the pad, was contacted on December 17, 1999 regarding the disparity in the flow readings at the wells and the flow reading at the pad. Seametrics advised that the flow reading at the pad was probably inaccurate due to the presence of a basket strainer not far upstream from the flowmeter. The basket strainer creates severely turbulent flow, which alters the flowmeter's K-factor, or the number of pulses per volume unit of flow. In addition, in a telephone conversation on January 13, 2000, Seametrics explained that the flowmeter has a factory-determined error of more than 2 gallons per minute (gpm). This error is significant, given the average system flowrate of less than 5 gpm.

Field calibrating the K-factor for the turbulent condition should allow the flowmeter to read more accurately. The flowmeter will be field calibrated in January 2000. However, if the factory-determined error still prevents accurate measurement, a new flowmeter may have to be installed.

2.2.3 Rectifier Inspection

An inspection of the rectifiers was performed on December 16, 1999. A record of this inspection is provided in Attachment 3. The output at Rectifier One was 11.5 volts and 46.1 amps. The output at Rectifier Two was 8.7 volts and 48.6 amps.

2.3 Sample Collection

The City and County of San Francisco Industrial Wastewater Discharger Class I Permit No. 98-0301 require a quarterly sample to be collected from the GES effluent. No sample was required in December 1999. The next quarterly sample will be collected in February 2000.

3.0 Analytical Data

The sample of the extraction system effluent that was collected on November 15, 1999 was analyzed for all permit-required analyses. However, since the holding times were exceeded for pH, chromium (VI), and asbestos, a second effluent sample was collected on November 18, 1999 to be analyzed for these three parameters. All detected compounds were either not regulated by the City and County of San Francisco's Industrial Wastewater Discharger Permit No. 98-0301, or were below the regulated permit concentrations. The following regulated analytes were detected at low concentrations: oil and grease and six (6) metals. The laboratory performed all internal quality control requirements. Laboratory quality control results were within method acceptable ranges for all parameters. The analytical data for this sample and a historical data table are included as Attachment 3.

4.0 References

IT Corporation, 2000, *Operation and Maintenance Manual, Groundwater Extraction System/Containment Barrier, Site IR-1/21 Industrial Landfill, Hunters Point Shipyard, San Francisco, California, Delivery Order #0083,* Revision 0, Concord, California.

IT Corporation, December 23, 1999, *Y2K Response Plan, Long Term Groundwater Extraction and Monitoring, Hunters Point Shipyard, San Francisco, California, Delivery Order #0083,* Concord, California.

ATTACHMENT 1

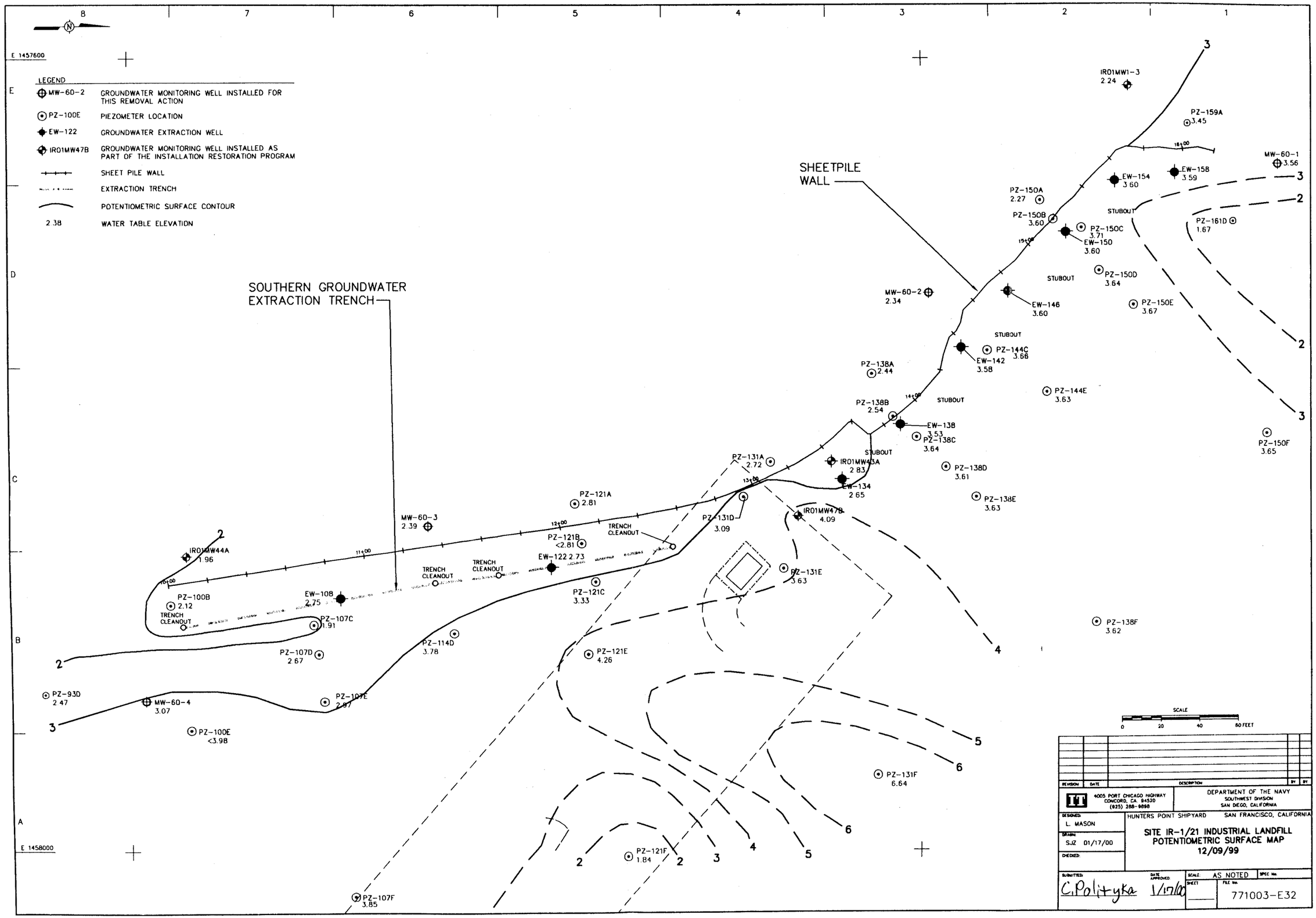
GROUNDWATER LEVEL MEASUREMENTS AND MAP OF THE POTENTIOMETRIC SURFACE

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151
Delivery Order #0083
Hunters Point Shipyard, Site IR-1/21 Industrial Landfill
Monthly Monitoring Well, Extraction Well, and Piezometer Water Levels

IT Corporation
Project No. 771003

Date Recorded: 12/09/99
Operators: Cathy Polityka and Brian Schoenneman

Location	Time	Water Level TOC (ft)	Groundwater Elevation (ft)
EW-108	1305	4.10	2.75
EW-122	1302	5.55	2.73
EW-134	1258	6.22	2.65
EW-138	1255	5.92	3.53
EW-142	1253	6.47	3.58
EW-146	1251	6.24	3.60
EW-150	1249	6.14	3.60
EW-154	1247	6.70	3.60
EW-158	1243	6.91	3.59
IR01MW1-3	1234	11.54	2.24
IR01MW43A	1101	9.39	2.83
IR01MW44A	1010	7.16	1.96
IR01MW47B	1057	8.19	4.09
MW-60-1	1230	11.13	3.56
MW-60-2	1103	11.25	2.34
MW-60-3	1029	7.61	2.39
MW-60-4	1015	6.31	3.07
PZ-93D	1008	7.90	2.47
PZ-100B	1012	7.75	2.12
PZ-100E	1018	dry at 7.61	< 3.98
PZ-107C	1021	7.99	1.91
PZ-107D	1023	7.57	2.67
PZ-107E	1024	7.85	2.94
PZ-107F	1026	7.74	3.85
PZ-114D	1028	6.60	3.78
PZ-121A	1030	8.36	2.81
PZ-121B	1031	dry at 8.81	< 2.81
PZ-121C	1033	9.30	3.33
PZ-121E	1035	7.43	4.26
PZ-121F	1038	11.76	1.84
PZ-131A	1100	10.50	2.72
PZ-131D	1059	8.97	3.09
PZ-131E	1055	10.50	3.63
PZ-131F	1005	6.86	6.64
PZ-138A	1047	11.15	2.44
PZ-138B	1046	11.50	2.54
PZ-138C	1045	10.71	3.64
PZ-138D	1044	11.16	3.61
PZ-138E	1043	10.76	3.63
PZ-138F	1041	12.14	3.62
PZ-144C	1104	11.09	3.66
PZ-144E	1106	11.45	3.63
PZ-150A	1108	13.24	2.27
PZ-150B	1110	11.07	3.60
PZ-150C	1112	11.12	3.71
PZ-150D	1223	11.51	3.64
PZ-150E	1225	11.63	3.67
PZ-150F	1227	13.44	3.65
PZ-159A	1232	10.64	3.45
PZ-161D	1229	11.61	1.67


E 1457600
E 1458000
LEGEND
MW-60-2 GROUNDWATER MONITORING WELL INSTALLED FOR THIS REMOVAL ACTION
PZ-100E PIEZOMETER LOCATION
EW-122 GROUNDWATER EXTRACTION WELL
IR01MW47B GROUNDWATER MONITORING WELL INSTALLED AS PART OF THE INSTALLATION RESTORATION PROGRAM
SHEET PILE WALL
EXTRACTION TRENCH
POTENTIOMETRIC SURFACE CONTOUR
2.38 WATER TABLE ELEVATION
SOUTHERN GROUNDWATER EXTRACTION TRENCH
SHEETPILE WALL
IR01MW1-3 2.24
PZ-159A 3.45
MW-60-1 3.56
EW-154 3.60
EW-158 3.59
PZ-150A 2.27
PZ-150B 3.60
PZ-150C 3.71
EW-150 3.60
PZ-161D 1.67
PZ-150D 3.64
PZ-150E 3.67
MW-60-2 2.34
EW-146 3.60
PZ-144C 3.66
EW-142 3.58
PZ-138A 2.44
PZ-144E 3.63
PZ-138B 2.54
EW-138 3.53
PZ-138C 3.64
PZ-150F 3.65
PZ-131A 2.72
IR01MW43A 2.83
EW-134 2.65
PZ-138D 3.61
PZ-138E 3.63
PZ-121A 2.81
PZ-131D 3.09
IR01MW47B 4.09
MW-60-3 2.39
PZ-121B <2.81
EW-122 2.73
TRENCH CLEANOUT
IR01MW44A 1.96
PZ-131E 3.63
PZ-100B 2.12
EW-108 2.75
PZ-107C 1.91
PZ-121C 3.33
PZ-138F 3.62
PZ-114D 3.78
PZ-121E 4.26
PZ-107D 2.67
PZ-93D 2.47
MW-60-4 3.07
PZ-107E 2.97
PZ-100E <3.98
PZ-131F 6.64
PZ-121F 1.84
PZ-107F 3.85
STUBOUT
SCALE
0 20 40 80 FEET
REVISION DATE DESCRIPTION BY BY
4005 PORT CHICAGO HIGHWAY CONCORD, CA 94520 (925) 288-9898
DEPARTMENT OF THE NAVY SOUTHWEST DIVISION SAN DIEGO, CALIFORNIA
DESIGNED: L. MASON
DRAWN: SJZ 01/17/00
CHECKED:
HUNTERS POINT SHIPYARD SAN FRANCISCO, CALIFORNIA
SITE IR-1/21 INDUSTRIAL LANDFILL POTENTIOMETRIC SURFACE MAP 12/09/99
SUBMITTED: C. Polityka
DATE APPROVED: 1/17/00
SCALE: AS NOTED
SPEC No.
SHEET
FILE No. 771003-E32

ATTACHMENT 2

EXTRACTION WELL READINGS

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151
Delivery Order #0083
Hunters Point Shipyard, Site IR-1/21 Industrial Landfill
Monthly Extraction Well and System Readings

IT Corporation
Project No. 771003

Date Recorded: 12/16/99
Operators: Cathy Polityka and Brian Schonneman

Location	Time	Pressure (psi)	Flowrate (gpm)	Total Flow (gal)	Monthly Flow (gal) (11/18/99-12/16/99)
Extraction Wells					
EW-108	1025	69	1.0	47,273	1,876
EW-122	1020	68	1.0	78,280	2,119
EW-134	1016	59	1.3	98,206	11,977
EW-138	1012	91	1.5	85,198	46,710
EW-142	1010	0	0	80,630	0
EW-146	1007	91	1.5	71,114	38,170
EW-150	1004	85	2.0	896,555	36,355
EW-154	0952	0	0	69,991	7,566
EW-158	0933	94	1.0	1,338,450	49,075
System Total	1030	8	6.6	2,765,697	**193,848**

ATTACHMENT 3

RECTIFIER INSPECTION RECORD

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151
Delivery Order #0083
Hunters Point Shipyard, Site IR-1/21 Industrial Landfill
Cathodic Protection System Monthly Inspection Record
Operator Checklist 4

IT Corporation
Project No. 771003

Rectifier Number: 1
Operator: Cathy Polityka

Date	Output		Checked By (Operator's Name)	Taps		Comments
	Volts	Amperes		C	F	
06/01/1999	10.5	41.4	JD/REC	1	3	
08/19/1999	10.8	44.0	CP	1	3	
09/09/1999	10.8	44.1	CP	1	3	
10/28/1999	10.6	47.4	CP	1	3	
11/18/1999	11.8	46.3	CP	1	3	
12/16/1999	11.5	46.1	CP	1	3	
01/13/2000	11.5	45.3	CP	1	3	

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151
Delivery Order #0083
Hunters Point Shipyard, Site IR-1/21 Industrial Landfill
Cathodic Protection System Monthly Inspection Record
Operator Checklist 4

IT Corporation
Project No. 771003

Rectifier Number: 2
Operator: Cathy Polityka

Date	Output		Checked By (Operator's Name)	Taps		Comments
	Volts	Amperes		C	F	
06/01/1999	10.3	44.8	JD/REC	1	3	
08/19/1999	10.2	48.2	CP	1	3	
09/09/1999	10.2	48.8	CP	1	3	
10/28/1999	10.0	> 50.0	CP	1	3	
11/18/1999	9.9	> 50.0	CP	1	3	
12/16/1999	8.7	48.6	CP	1	3	
01/13/2000	10.1	48.5	CP	1	3	

ATTACHMENT 4

NOVEMBER 1999 ANALYTICAL RESULTS AND HISTORICAL DATA TABLE

INTERNATIONAL
TECHNOLOGY
CORPORATION

Memorandum

To: Emma Popek

Date: January 21, 2000 EAH 1/21/00

IT Project No. 771003

From: Evonne Haik

Subject: DATA EVALUATION SUMMARY REPORT FOR HUNTERS POINT D.O.83, LABORATORY REPORTS 996933, 996869 and 996870

A cursory data review of the attached data packages was performed according to the guidance of the Functional Guidelines for Evaluating Organic Analyses (U.S. EPA 1994), and Functional Guidelines for Evaluating Inorganic Analyses (U.S. EPA 1994).

The data were reviewed for sample preservation and holding time, laboratory method blank, matrix spike (MS), matrix spike duplicate (MSD) recoveries and relative percent difference (RPD), surrogate recoveries, laboratory control sample (LCS), and laboratory duplicate sample (LCSD) recoveries and RPD.

The data of two ground water samples were included in three separate packages as follows:

- Sample 83-ES991118-57 in SDG 996933 was analyzed for chromium VI by EPA Method 7196, pH by EPA Method 9040, and asbestos by EPA Method 600R93/134.
- Sample 83-ES9911-56 in SDG 996869 was analyzed for chemical oxygen demand by EPA Method 410.4, cyanide by EPA Method 335.2, ignitability by EPA Method 1010, oil and grease by EPA method 413.2, pH by EPA Method 9040, phenolics by EPA Method 9065, total suspended solids by EPA Method 160.2, sulfide by EPA Method 376.2, anions by EPA Method 300.0, metals by EPA Method 6010/7470, organic lead by LUFT Method, total petroleum hydrocarbons by EPA Method 418.1, volatile organics by EPA Method 8260, semivolatile organics by EPA Method 8270, pesticides/PCBs by EPA Method 8081/8082, chlorinated herbicides by EPA Method 8150, and dioxins/furans by EPA Method 8290 in SDG 996870.

The quality of laboratory analysis was acceptable and all laboratory requirements were met with one exception: the MS/MSD recoveries were below the acceptance criteria for sulfide. The LCS recovery associated with the project sample analysis was acceptable. However, due to the MS/MSD deviation, associated sample result would be considered as estimated values qualified with "UJ."

Insufficient sample was available for MS/MSD for cyanide, chromium VI, total petroleum hydrocarbons, chloride, fluoride, gamma-BHC, heptachlor, and pesticide analyses. Accuracy and precision were evaluated based on the LCS/LCSD analysis. All recoveries and RPDs were within the acceptable limits for these analyses. The data were considered usable as reported by the laboratory.

If you have any questions or need further assistance, please contact me at extension 2219.

EH:jc

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Submitted to:
The IT Group
Attention: Cathy Polityka
4005 Port Chicago Highway
Concord CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-996869
Collected by: CP/BS
Collected on: 11/15/99

Received: 11/16/99
Extracted: 11/18-19/99
Tested: 11/16-30/99
Revised: 12/23/99

Sample Description: Water from DO 83
Project Description: 771003-004 771003 Hunters Point

Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES9911-56 99-06869-1
CHEMICAL OXYGEN DEMAND (COD)	410.4	mg-O_2/L	20	220
CYANIDE	335.2	mg/L	0.05	<0.05
IGNITABILITY (FLASHPOINT)	1010	°C	0.5 [a]	>100
OIL AND GREASE	413.2	mg/L	5	4.5J
PH	9040	pH unit	0.1	6.59
PHENOLICS	9065	mg/L	0.1	<0.1
SOLIDS, TOTAL SUSPENDED (TSS)	160.2	mg/L	10	600
SULFIDE	376.2	mg/L	0.1 [b]	<0.1
Dilution Factor				160
CHLORIDE	300.0	mg/L	0.2	610
FLUORIDE	300.0	mg/L	0.1	<16
TTLC 17 METALS				
ANTIMONY	6010	μg/L	10	<10
ARSENIC	6010	μg/L	5	4.4J
BARIUM	6010	μg/L	10	690
BERYLLIUM	6010	μg/L	2	<2
CADMIUM	6010	μg/L	2	<2
CHROMIUM	6010	μg/L	5	16
COBALT	6010	μg/L	5	2.0J
COPPER	6010	μg/L	10	19
LEAD	6010	μg/L	5	<5
MERCURY	7470	μg/L	0.5	0.34J
MOLYBDENUM	6010	μg/L	5	4.9J
NICKEL	6010	μg/L	5	23
SELENIUM	6010	μg/L	10	4.4J
SILVER	6010	μg/L	10	<10
THALLIUM	6010	μg/L	10	5.1J
VANADIUM	6010	μg/L	10	8.3J
ZINC	6010	μg/L	5	31
ORGANO LEAD	LUFT	μg/L	100	<100
TRPH	418.1	mg/L	5	0.90J

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Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES9911-56 99-06869-1
VOLATILE ORGANICS				
Dilution Factor				5
ACETONE	8260	µg/L	100	< 500
BENZENE	8260	µg/L	1	13
BROMOBENZENE	8260	µg/L	1	< 5
BROMOCHLOROMETHANE	8260	µg/L	1	< 5
BROMODICHLOROMETHANE	8260	µg/L	1	< 5
BROMOFORM	8260	µg/L	1	< 5
BROMOMETHANE	8260	µg/L	1	< 5
2-BUTANONE (MEK)	8260	µg/L	100	< 500
N-BUTYLBENZENE	8260	µg/L	1	< 5
SEC-BUTYLBENZENE	8260	µg/L	1	2.2J
TERT-BUTYLBENZENE	8260	µg/L	1	< 5
CARBON DISULFIDE	8260	µg/L	5	< 25
CARBON TETRACHLORIDE	8260	µg/L	1	< 5
CHLOROBENZENE	8260	µg/L	1	100
DIBROMOCHLOROMETHANE	8260	µg/L	1	< 5
CHLOROETHANE	8260	µg/L	1	< 5
CHLOROFORM	8260	µg/L	1	< 5
CHLOROMETHANE	8260	µg/L	1	< 5
2-CHLOROTOLUENE	8260	µg/L	1	< 5
4-CHLOROTOLUENE	8260	µg/L	1	< 5
1,2-DIBROMO-3-CHLOROPROPANE (DB	8260	µg/L	1	< 5
1,2-DIBROMOETHANE (EDB)	8260	µg/L	1	< 5
DIBROMOMETHANE	8260	µg/L	1	< 5
1,2-DICHLOROBENZENE	8260	µg/L	1	2.4J
1,3-DICHLOROBENZENE	8260	µg/L	1	2.5J
1,4-DICHLOROBENZENE	8260	µg/L	1	12
DICHLORODIFLUOROMETHANE	8260	µg/L	1	< 5
1,1-DICHLOROETHANE	8260	µg/L	1	< 5
1,2-DICHLOROETHANE	8260	µg/L	1	< 5
1,1-DICHLOROETHENE	8260	µg/L	1	< 5
CIS-1,2-DICHLOROETHENE	8260	µg/L	1	< 5
TRANS-1,2-DICHLOROETHENE	8260	µg/L	1	< 5
1,2-DICHLOROPROPANE	8260	µg/L	1	< 5
1,3-DICHLOROPROPANE	8260	µg/L	1	< 5
2,2-DICHLOROPROPANE	8260	µg/L	1	< 5
1,1-DICHLOROPROPENE	8260	µg/L	1	< 5
CIS-1,3-DICHLOROPROPENE	8260	µg/L	1	< 5
TRANS-1,3-DICHLOROPROPENE	8260	µg/L	1	< 5
ETHYLBENZENE	8260	µg/L	1	2.3J

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES9911-56 99-06869-1
HEXACHLOROBUTADIENE	8260	µg/L	1	< 5
ISOPROPYLBENZENE (CUMENE)	8260	µg/L	1	4.1J
P-ISOPROPYLTOLUENE	8260	µg/L	1	< 5
METHYLENE CHLORIDE	8260	µg/L	1	3.9J
4-METHYL-2-PENTANONE (MIBK)	8260	µg/L	50	< 250
METHYL-T-BUTYL ETHER (MTBE)	8260	µg/L	10	< 50
NAPHTHALENE	8260	µg/L	1	87
N-PROPYLBENZENE	8260	µg/L	1	3.4J
STYRENE	8260	µg/L	1	< 5
1,1,1,2-TETRACHLOROETHANE	8260	µg/L	1	< 5
1,1,2,2-TETRACHLOROETHANE	8260	µg/L	1	< 5
TETRACHLOROETHENE	8260	µg/L	1	< 5
TOLUENE	8260	µg/L	1	< 5
1,2,3-TRICHLOROBENZENE	8260	µg/L	1	< 5
1,2,4-TRICHLOROBENZENE	8260	µg/L	1	< 5
1,1,1-TRICHLOROETHANE	8260	µg/L	1	< 5
1,1,2-TRICHLOROETHANE	8260	µg/L	1	< 5
TRICHLOROETHENE	8260	µg/L	1	< 5
TRICHLOROFLUOROMETHANE	8260	µg/L	1	< 5
1,2,3-TRICHLOROPROPANE	8260	µg/L	1	< 5
1,2,4-TRIMETHYLBENZENE	8260	µg/L	1	3.3J
1,3,5-TRIMETHYLBENZENE	8260	µg/L	1	< 5
VINYL CHLORIDE	8260	µg/L	1	< 5
XYLENE (TOTAL)	8260	µg/L	1	11
SEMI-VOLATILE ORGANICS, ABN FRACTIONS				
Dilution Factor				1
ACENAPHTHENE	8270	µg/L	10	56
ACENAPHTHYLENE	8270	µg/L	10	< 10
ANTHRACENE	8270	µg/L	10	2.0J
BENZO(A)ANTHRACENE	8270	µg/L	10	< 10
BENZO(A)PYRENE	8270	µg/L	10	< 10
BENZO(B)FLUORANTHENE	8270	µg/L	10	< 10
BENZO(G,H,I)PERYLENE	8270	µg/L	10	< 10
BENZO(K)FLUORANTHENE	8270	µg/L	10	< 10
BIS(2-CHLOROETHOXY)METHANE	8270	µg/L	10	< 10
BIS(2-CHLOROETHYL)ETHER	8270	µg/L	10	< 10
2,2'-OXYBIS(1-CHLOROPROPANE)	8270	µg/L	10	< 10
BIS(2-ETHYLHEXYL)PHTHALATE	8270	µg/L	10	< 10
4-BROMOPHENYLPHENYLETHER	8270	µg/L	10	< 10
BUTYL BENZYLPHTHALATE	8270	µg/L	10	< 10
4-CHLORO-3-METHYLPHENOL	8270	µg/L	20	< 20
4-CHLOROANILINE	8270	µg/L	20	< 20
2-CHLORONAPHTHALENE	8270	µg/L	10	< 10
2-CHLOROPHENOL	8270	µg/L	10	< 10

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Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES9911-56 99-06869-1
4-CHLOROPHENYLPHENYLETHER	8270	µg/L	10	<10
CHRYSENE	8270	µg/L	10	<10
DI-N-BUTYLPHTHALATE	8270	µg/L	10	<10
DI-N-OCTYLPHTHALATE	8270	µg/L	10	<10
DIBENZ(A,H)ANTHRACENE	8270	µg/L	10	<10
DIBENZOFURAN	8270	µg/L	10	23
1,2-DICHLOROBENZENE	8270	µg/L	10	1.4J
1,3-DICHLOROBENZENE	8270	µg/L	10	1.3J
1,4-DICHLOROBENZENE	8270	µg/L	10	6.1J
3,3'-DICHLOROBENZIDINE	8270	µg/L	10	<10
2,4-DICHLOROPHENOL	8270	µg/L	10	<10
DIETHYLPHTHALATE	8270	µg/L	10	<10
DIMETHYLPHTHALATE	8270	µg/L	10	<10
2,4-DIMETHYLPHENOL	8270	µg/L	10	<10
4,6-DINITRO-2-METHYLPHENOL	8270	µg/L	50	<50
2,4-DINITROPHENOL	8270	µg/L	50	<50
2,4-DINITROTOLUENE	8270	µg/L	10	<10
2,6-DINITROTOLUENE	8270	µg/L	10	<10
FLUORANTHENE	8270	µg/L	10	2.5J
FLUORENE	8270	µg/L	10	23
HEXACHLOROBENZENE	8270	µg/L	10	<10
HEXACHLOROBUTADIENE	8270	µg/L	10	<10
HEXACHLOROCYCLOPENTADIENE	8270	µg/L	10	<10
HEXACHLOROETHANE	8270	µg/L	10	<10
INDENO(1,2,3-CD)PYRENE	8270	µg/L	10	<10
ISOPHORONE	8270	µg/L	10	<10
2-METHYLNAPHTHALENE	8270	µg/L	10	17
3/4-METHYLPHENOL (M/P-CRESOL)	8270	µg/L	10	<10
2-METHYLPHENOL	8270	µg/L	10	<10
NAPHTHALENE	8270	µg/L	10	44
2-NITROANILINE	8270	µg/L	50	<50
3-NITROANILINE	8270	µg/L	50	<50
4-NITROANILINE	8270	µg/L	50	<50
NITROBENZENE	8270	µg/L	10	<10
2-NITROPHENOL	8270	µg/L	10	<10
4-NITROPHENOL	8270	µg/L	50	<50
N-NITROSO-DI-N-PROPYLAMINE	8270	µg/L	10	<10
N-NITROSODIPHENYLAMINE (1)	8270	µg/L	10	<10
PENTACHLOROPHENOL	8270	µg/L	50	<50
PHENANTHRENE	8270	µg/L	10	22
PHENOL	8270	µg/L	10	7.1J
PYRENE	8270	µg/L	10	<10
1,2,4-TRICHLOROBENZENE	8270	µg/L	10	<10
2,4,5-TRICHLOROPHENOL	8270	µg/L	10	<10
2,4,6-TRICHLOROPHENOL	8270	µg/L	10	<10

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES9911-56 99-06869-1
ORGANOCHLORINE PESTICIDES				
Dilution Factor				1
ALDRIN	8081	µg/L	0.05	< 0.05
BETA-BHC	8081	µg/L	0.05	< 0.05
ALPHA-BHC	8081	µg/L	0.05	< 0.05
DELTA-BHC	8081	µg/L	0.05	< 0.05
GAMMA-BHC (LI NDANE)	8081	µg/L	0.05	< 0.05
CHLORDANE	8081	µg/L	2	< 2
4,4'-DDD	8081	µg/L	0.1	0.046J
4,4'-DDE	8081	µg/L	0.1	< 0.1
4,4'-DDT	8081	µg/L	0.1	< 0.1
DIELDRIN	8081	µg/L	0.1	< 0.1
ENDOSULFAN I	8081	µg/L	0.05	0.046J
ENDOSULFAN II	8081	µg/L	0.1	0.040J
ENDOSULFAN SULFATE	8081	µg/L	0.5	< 0.5
ENDRIN	8081	µg/L	0.1	< 0.1
ENDRIN ALDEHYDE	8081	µg/L	0.1	< 0.1
ENDRIN KETONE	8081	µg/L	0.1	< 0.1
HEPTACHLOR	8081	µg/L	0.05	< 0.05
HEPTACHLOR EPOXIDE	8081	µg/L	0.05	< 0.05
METHOXYCHLOR	8081	µg/L	2	< 2
TOXAPHENE	8081	µg/L	5	< 5
PCBS				
Dilution Factor				1
AROCLOR-1016 (PCB-1016)	8082	µg/L	2	< 2
AROCLOR-1221 (PCB-1221)	8082	µg/L	5	< 5
AROCLOR-1232 (PCB-1232)	8082	µg/L	2	< 2
AROCLOR-1242 (PCB-1242)	8082	µg/L	2	< 2
AROCLOR-1248 (PCB-1248)	8082	µg/L	2	< 2
AROCLOR-1254 (PCB-1254)	8082	µg/L	1	< 1
AROCLOR-1260 (PCB-1260)	8082	µg/L	1	< 1

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES9911-56 99-06869-1
CHLORINATED HERBICIDES				
Dilution Factor				1
2,4-D	8150B	μg/L	5	< 5
2,4-DB	8150B	μg/L	5	< 5
DALAPON	8150B	μg/L	5	< 5
DICAMBA	8150B	μg/L	5	< 5
DICHLORPROP	8150B	μg/L	5	< 5
DINOSEB	8150B	μg/L	5	< 5
MCPA	8150B	μg/L	250	< 250
MCPP	8150B	μg/L	250	< 250
2,4,5-T	8150B	μg/L	5	< 5
2,4,5-TP (SILVEX)	8150B	μg/L	5	< 5

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit

N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.

J: Reported between PQL and MDL.

Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0

(a) Corresponds to the minimum reading of the thermometer used.

(b) MDL Reported

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

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APCL QA/QC Report

Submitted to:
The IT Group
Attention: Cathy Polityka
4005 Port Chicago Highway
Concord, CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-996869
Collected by: CP/BS
Collected on: 11/15/99
Sample description:
Water from DO 83
Project: 771003 Hunters Point /771003-004

Received: 11/16/99
Tested: 11/16-30/99
Reported: 12/ 7/99

Analysis of Water

801-996869QC

Component Name	Analysis Batch #	CCV (mg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
WET Analysis in Water												
Chemical Oxygen Demand (COD)	99W7662	500	93	N.D.	mg/L	1000	92	95	96	2	75-125	10
Cyanide, Total	99W7528	0.800	100	N.D.	mg/L	0.500	91	91*	90*	1	80-120	20
Oil and Grease	99W7680	100	103	N.D.	mg/L	20.0	89	80	81	1	75-125	20
Phenolics,	99W7657	0.500	91	N.D.	mg/L	0.500	106	111	112	1	75-125	20
Sulfide, Total	99W7542	0.400	98	N.D.	mg/L	0.400	108	64@	67@	4	75-125	20
Chromium (VI)	99W7488	0.250	97	N.D.	mg/L	0.250	85	85*	84*	1	80-112	19
TRPH	99W7563	100	104	N.D.	mg/L	20.0	89	89*	89*	1	80-120	20
Chloride Cl^-, by IC	99W7527	2.00	91	N.D.	mg/L	160.0	93	93*	92*	1	75-125	20
Fluoride F^-, by IC	99W7527	1.00	104	N.D.	mg/L	320.0	109	109*	101*	3	75-125	20

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APCL QA/QC Report

Component Name	Analysis Batch #	ICV (mg/L)	ICV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
METAL Analysis in Water												
Mercury	99M2918	0.0075	100	N.D.	mg/L	0.0050	101	97	98	1	75-125	20
Antimony	99M2914	1.00	100	N.D.	mg/L	0.500	101	103	100	3	75-125	20
Arsenic	99M2914	1.00	102	N.D.	mg/L	0.500	113	118	117	0	75-125	20
Barium	99M2914	10.0	98	N.D.	mg/L	4.00	103	97	99	2	75-125	20
Beryllium	99M2914	1.00	100	N.D.	mg/L	0.200	99	95	98	2	75-125	20
Cadmium	99M2914	2.00	100	N.D.	mg/L	0.250	102	102	103	1	75-125	20
Chromium	99M2914	4.00	101	N.D.	mg/L	1.00	101	98	99	1	75-125	20
Cobalt	99M2914	4.00	99	N.D.	mg/L	1.00	103	95	95	1	75-125	20
Copper	99M2914	4.00	100	N.D.	mg/L	1.00	99	98	101	3	75-125	20
Lead	99M2914	1.00	98	N.D.	mg/L	3.00	105	99	100	1	75-125	20
Molybdenum	99M2914	4.00	99	N.D.	mg/L	2.00	103	98	99	1	75-125	20
Nickel	99M2914	4.00	100	N.D.	mg/L	1.00	103	95	96	1	75-125	20
Selenium	99M2914	1.00	101	N.D.	mg/L	0.500	106	109	111	1	75-125	20
Silver	99M2914	2.00	99	N.D.	mg/L	1.00	100	98	101	3	75-125	20
Thallium	99M2914	1.00	98	N.D.	mg/L	0.500	106	105	105	1	75-125	20
Vanadium	99M2914	4.00	101	N.D.	mg/L	2.00	101	96	99	3	75-125	20
Zinc	99M2914	4.00	99	N.D.	mg/L	0.500	109	100	101	1	75-125	20
Lead, organic	99M2934	2.50	103	N.D.	mg/L	2.00	89	98	99	1	75-125	20

Component Name	Analysis Batch #	CCV (μg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
Volatile organics												
Vinyl chloride	99G5310	20.0	110	N.D.	μg/L	-	-	-	-	-	-	-
1,1-Dichloroethene	99G5310	20.0	99	N.D.	μg/L	20.0	93	91	94	4	66-133	34
Chloroform	99G5310	20.0	110	N.D.	μg/L	-	-	-	-	-	-	-
Benzene	99G5310	20.0	106	N.D.	μg/L	20.0	100	99	106	7	72-126	27
1,2-Dichloropropane	99G5310	20.0	111	N.D.	μg/L	-	-	-	-	-	-	-
Trichloroethene	99G5310	20.0	78	N.D.	μg/L	20.0	75	74	81	9	65-134	35
Toluene	99G5310	20.0	94	N.D.	μg/L	20.0	89	87	96	10	70-129	30
Chlorobenzene	99G5310	20.0	97	N.D.	μg/L	20.0	90	88	99	12	69-131	31
Ethylbenzene	99G5310	20.0	89	N.D.	μg/L	-	-	-	-	-	-	-

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Component Name	Analysis Batch #	CCV (mg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
Semi-VOC, 64 Compounds												
Phenol	99G5233	60.0	83	N.D.	µg/L	100	60	33	32	3	10-126	58
1,4-Dichlorobenzene	99G5233	60.0	91	N.D.	µg/L	50.0	68	72	69	5	23-111	44
2-Nitrophenol	99G5233	60.0	95	N.D.	µg/L	-	-	-	-	-	-	-
2,4-Dichlorophenol	99G5233	60.0	97	N.D.	µg/L	-	-	-	-	-	-	-
Hexachlorobutadiene	99G5233	60.0	101	N.D.	µg/L	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	99G5233	60.0	97	N.D.	µg/L	100	59	64	60	5	13-130	58
2,4,6-Trichlorophenol	99G5233	60.0	100	N.D.	µg/L	-	-	-	-	-	-	-
Acenaphthene	99G5233	60.0	104	N.D.	µg/L	50.0	87	97	89	8	11-134	62
N-Nitrosodiphenylamine	99G5233	300	97	N.D.	µg/L	-	-	-	-	-	-	-
Pentachlorophenol (PCP)	99G5233	300	98	N.D.	µg/L	100	53	29	28	4	24-115	45
Fluoranthene	99G5233	60.0	103	N.D.	µg/L	-	-	-	-	-	-	-
Di-n-octyl phthalate (DOP)	99G5233	60.0	93	N.D.	µg/L	-	-	-	-	-	-	-
Benzo(a)pyrene	99G5233	60.0	95	N.D.	µg/L	-	-	-	-	-	-	-
2-Chlorophenol	99G5233			N.D.	µg/L	100	62	64	62	4	20-111	46
N-Nitroso-di-n-propylamine	99G5233			N.D.	µg/L	50.0	74	79	76	4	16-130	57
1,2,4-Trichlorobenzene	99G5233			N.D.	µg/L	50.0	66	69	67	2	27-112	43
2,4-Dinitrotoluene	99G5233			N.D.	µg/L	50.0	68	75	68	10	10-134	62
4-Nitrophenol	99G5233			N.D.	µg/L	100	65	35	32	8	20-138	50
Pyrene	99G5233			N.D.	µg/L	50.0	57	65	62	4	12-134	61

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APCL QA/QC Report

Component Name	Analysis Batch #	CCV (μg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
Organochlorine pesticides												
α-BHC	99G5237	50.0	98	N.D.	μg/L	-	-	-	-	-	-	-
γ-BHC (Lindane)	99G5237	50.0	98	N.D.	μg/L	0.500	83	83*	87*	5	38-134	48
β-BHC	99G5237	50.0	101	N.D.	μg/L	-	-	-	-	-	-	-
Heptachlor	99G5237	50.0	94	N.D.	μg/L	0.500	81	81*	84*	3	36-129	47
δ-BHC	99G5237	50.0	108	N.D.	μg/L	-	-	-	-	-	-	-
Aldrin	99G5237	50.0	94	N.D.	μg/L	0.500	80	80*	82*	2	37-131	47
Heptachlor epoxide	99G5237	50.0	93	N.D.	μg/L	-	-	-	-	-	-	-
Endosulfan I	99G5237	50.0	90	N.D.	μg/L	-	-	-	-	-	-	-
4,4'-DDE	99G5237	50.0	87	N.D.	μg/L	-	-	-	-	-	-	-
Dieldrin	99G5237	50.0	90	N.D.	μg/L	0.500	76	76*	77*	2	40-130	45
Endrin	99G5237	50.0	105	N.D.	μg/L	0.500	80	80*	82*	2	36-133	48
4,4'-DDD	99G5237	50.0	92	N.D.	μg/L	-	-	-	-	-	-	-
Endosulfan II	99G5237	50.0	96	N.D.	μg/L	-	-	-	-	-	-	-
4,4'-DDT	99G5237	50.0	109	N.D.	μg/L	0.500	98	98*	100*	2	35-134	50
Endrin aldehyde	99G5237	50.0	112	N.D.	μg/L	-	-	-	-	-	-	-
Endosulfan sulfate	99G5237	50.0	95	N.D.	μg/L	-	-	-	-	-	-	-
Methoxychlor	99G5237	50.0	115	N.D.	μg/L	-	-	-	-	-	-	-

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APCL QA/QC Report

Component Name	Analysis Batch #	CCV (μg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
Chlorinated herbicides												
Dalapon (dichloroacetic acid)	99G5265	250	96	N.D.	μg/L	-	-	-	-	-	-	-
3,5-Dichlorobenzoic	99G5265	250	106	N.D.	μg/L	-	-	-	-	-	-	-
4-Nitrophenol	99G5265	250	110	N.D.	μg/L	-	-	-	-	-	-	-
Dicamba	99G5265	250	97	N.D.	μg/L	-	-	-	-	-	-	-
MCPP	99G5265	25000	114	N.D.	mg/L	-	-	-	-	-	-	-
Dichloroprop	99G5265	250	95	N.D.	μg/L	-	-	-	-	-	-	-
MCPA	99G5265	25000	89	N.D.	mg/L	-	-	-	-	-	-	-
2,4-D	99G5265	250	101	N.D.	μg/L	2.50	117	93	93	0	41-131	45
Pentachlorophenol (PCP)	99G5265	250	103	N.D.	μg/L	-	-	-	-	-	-	-
2,4,5-TP (Silvex)	99G5265	250	100	N.D.	μg/L	2.50	104	103	103	0	35-133	49
2,4,5-T	99G5265	250	89	N.D.	μg/L	2.50	114	125	126	0	37-129	46
Dinoseb (DNBP)	99G5265	250	96	N.D.	μg/L	-	-	-	-	-	-	-
Chloramben	99G5265	250	88	N.D.	μg/L	-	-	-	-	-	-	-
2,4-DB	99G5265	250	112	N.D.	μg/L	-	-	-	-	-	-	-
Bentazon (Basagran)	99G5265	250	89	N.D.	μg/L	-	-	-	-	-	-	-
DCPA (Dacthal)	99G5265	250	99	N.D.	μg/L	-	-	-	-	-	-	-
Picloram	99G5265	250	101	N.D.	μg/L	-	-	-	-	-	-	-
Acifluorfen	99G5265	250	102	N.D.	μg/L	-	-	-	-	-	-	-

@: Out of Control Limits.

*: LCS/LCSD is used.

Notation:
ICV – Initial Calibration Verification
CCV – Continuation Calibration Verification
LCS – Lab Control Spike
MS – Matrix Spike
MSD – Matrix Spike Duplicate
ICS – Interference Check Standard
MD – Matrix Duplicate
N.D. – Not detected or less than PQL
CCB – Continuation Calibration Blank
M-blank – Method Blank
SP Level – Spike Level
%Rec – Recovery Percent
%RPD – Relative Percent Differences
%Diff – Control Limit for %RPD
ICP-SD – ICP Serial Dilution
N.A. – Not Applicable

Respectfully submitted,

Kevin Xie, Ph. D.,
QA Director
Applied P & Ch Laboratory

FORM-2C

Applied P & Ch Laboratory

Surrogate Recovery Summary for Method : Volatile Organics

Client Name:	The IT Group	Contract No:		Lab Code:	APCL
Case No:		SAS No:		SDG Number:	996869
Project ID:	771003 Hunters Point	Project No:	771003-004	Sample Matrix:	Water
		Batch No:	99G5310		

#	Client Sample No	Lab Sample ID	S1 % #	S2 % #	S3 % #	S4 % #	TOT OUT
1		99G5310-LCS-01	83	100	95	88	0
2	002-MW03-E4355MS	99-6969-4MS	80	104	110	88	0
3	002-MW03-E4355MSD	99-6969-4MSD	97	107	113	96	0
4		99G5310-MB-01	100	105	96	107	0
5	83-ES9911-56	99-6869-1	106	112	104	106	0
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

	QC Control Limit
S1 = 4-Bromo-fluorobenzene (BFB)	80-119
S2 = Dibromofluoromethane	79-120
S3 = 1,2-Dichloroethane-d4	81-119
S4 = Toluene-d8	81-118

Column to be used to flag recovery values:

* – Values outside of contract required QC Limits D – Surrogate diluted out I – Matrix Interference

FORM-2C

Applied P & Ch Laboratory

Surrogate Recovery Summary for Method : Semi-VOC

Client Name:	The IT Group	Contract No:		Lab Code:	APCL
Case No:		SAS No:		Service ID:	996869
Project ID:	771003 Hunters Point	Project No:	771003-004	Sample Matrix:	Water
		Batch No:	99G5233		

#	Client Sample No	Lab Sample ID	S1 %	#	S2 %	#	S3 %	#	S4 %	#	S5 %	#	S6 %	#	TOT OUT
1		99G5233-MB-01	68		60		61		40		51		49		0
2		99G5233-LCS-01	70		64		67		46		53		58		0
3		99G5233-LSD-01	76		71		73		51		57		63		0
4	99RC-MW01-W-1-27MS	99-6868-2MS	77		42		68		25		60		60		0
5	99RC-MW01-W-1-27MSD	99-6868-2MSD	70		39		66		18		58		57		0
6	83-ES9911-56	99-6869-1	67		40		61		19		50		70		0
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

	QC Control Limit
S1 = 2-Fluorobiphenyl	43-115
S2 = 2-Fluorophenol	21- 99
S3 = Nitrobenzene-d5	35-113
S4 = Phenol-d5	10- 93
S5 = Terphenyl-d14	33-140
S6 = 2,4,6-Tribromophenol	10-122

Column to be used to flag recovery values:

* – Values outside of contract required QC Limits D – Surrogate diluted out I – Matrix Interference

FORM-2C

Applied P & Ch Laboratory

Surrogate Recovery Summary for Method : Organochlorine Pesticides

Client Name:	The IT Group	Contract No:		Lab Code:	APCL
Case No:		SAS No:		Service ID:	996869
Project ID:	771003 Hunters Point	Project No:	771003-004	Sample Matrix:	Water
		Batch No:	99G5237		

#	Client Sample No	Lab Sample ID	S1 % #	S2 % #	TOT OUT
1		99G5237-MB-01	99	85	0
2		99G5237-LCS-01	101	88	0
3		99G5237-LSD-01	101	89	0
4	83-ES9911-56	99-6869-1	87	52	0
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

	QC Control Limit
S1 = Decachlorobiphenyl (DCB)	31-147
S2 = 2,4,5,6-Tetrachloro-m-xylene	33-146

Column to be used to flag recovery values:

* - Values outside of contract required QC Limits D - Surrogate diluted out I - Matrix Interference

FORM-2C

Applied P & Ch Laboratory

Surrogate Recovery Summary for Method Chlorinated Herbicides

Client Name:	The IT Group	Contract No:		Lab Code:	APCL
Case No:		SAS No:		Service ID:	996869
Project ID:	771003 Hunters Point	Project No:	771003-004	Sample Matrix:	Water
		Batch No:	99G5265		

#	Client Sample No	Lab Sample ID	S1 % #	TOT OUT
1		99G5265-MB-01	108	0
2		99G5265-LCS-01	60	0
3		99G5265-LSD-01	63	0
4	83-ES9911-56	99-6869-1	128	0
5	83-ES9911-56MS	99-6869-1MS	92	0
6	83-ES9911-56MSD	99-6869-1MSD	92	0
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

	QC Control Limit
S1 = 2,4-Di-Cl-phenylacetic acid, (DCAA	35-134

Column to be used to flag recovery values:

* – Values outside of contract required QC Limits D – Surrogate diluted out I – Matrix Interference

Applied P & CH Laboratory

TLI Project: 49971
Client Sample: 83-ES9911-56

Method 8290 PCDD/PCDF Analysis (b)
Analysis File: S996192

Client Project:	Hunters Point				
Sample Matrix:	WATER	Date Received:	11/20/1999	Spike File:	SPMIT22S
TLI ID:	250-80-1A	Date Extracted:	11/26/1999	ICal:	SF59149
		Date Analyzed:	12/13/1999	ConCal:	S996190
Sample Size:	1.000 L	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	S996191	% Lipid:	n/a
GC Column:	DB-5	Analyst:	BWL	% Solids:	n/a

Analytes	Conc. (ppq)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.9				—
1,2,3,7,8-PeCDD	ND	1.0				—
1,2,3,4,7,8-HxCDD	ND	0.9				—
1,2,3,6,7,8-HxCDD	ND	0.8				—
1,2,3,7,8,9-HxCDD	EMPC		0.62			J
1,2,3,4,6,7,8-HpCDD	10.2			0.97	37:23	J
1,2,3,4,6,7,8,9-OCDD	107			0.82	41:02	—
2,3,7,8-TCDF	ND	0.7				—
1,2,3,7,8-PeCDF	EMPC		1.1			JB
2,3,4,7,8-PeCDF	ND	0.7				—
1,2,3,4,7,8-HxCDF	EMPC		1.4			J
1,2,3,6,7,8-HxCDF	ND	0.5				—
2,3,4,6,7,8-HxCDF	ND	0.6				—
1,2,3,7,8,9-HxCDF	ND	0.6				—
1,2,3,4,6,7,8-HpCDF	EMPC		2.4			J
1,2,3,4,7,8,9-HpCDF	ND	1.0				—
1,2,3,4,6,7,8,9-OCDF	EMPC		5.6			JB

Totals	Conc. (ppq)	Number	DL	EMPC	Flags
Total TCDD	ND		0.9		—
Total PeCDD	ND		1.0		—
Total HxCDD	4.9	2		7.2	—
Total HpCDD	24.4	2			—
Total TCDF	ND		0.7		—
Total PeCDF	EMPC			1.1	—
Total HxCDF	3.3	1		5.5	—
Total HpCDF	4.6	1		7.0	—

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Applied P & CH Laboratory

TLI Project: **49971** Method 8290 PCDD/PCDF Analysis (b)
Client Sample: **83-ES9911-56** Analysis File: **S996192**

Internal Standards	Conc. (ppq)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	1120	55.8	40%-130%	0.74	26:01	___
$^{13}C_{12}$-2,3,7,8-TCDD	1110	55.4	40%-130%	0.80	26:43	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	1220	61.1	40%-130%	1.48	29:54	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	1320	65.9	40%-130%	1.50	30:56	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	1330	66.4	40%-130%	0.50	33:26	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	1390	69.5	40%-130%	1.21	34:07	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	1430	71.7	25%-130%	0.43	36:20	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	1330	66.5	25%-130%	1.00	37:22	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	2470	61.6	25%-130%	0.85	41:00	___

Surrogate Standards (Type B)	Conc. (ppq)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	1510	75.5	40%-130%	1.51	30:36	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	1500	75.2	40%-130%	0.50	33:20	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	1570	78.3	40%-130%	1.20	34:01	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	1680	84.0	25%-130%	0.41	37:53	___

Other Standard	Conc. (ppq)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	119	59.6	40%-130%	26:44	___

Alternate Standards (Type B)	Conc. (ppq)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	1410	70.5	40%-130%	0.50	34:42	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	1500	75.2	40%-130%	0.50	33:55	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.82	26:32	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.22	34:26	___

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Applied P & CH Laboratory

TLI Project: **49971** Method 8290 PCDD/PCDF Analysis (b)
Client Sample: **TLI Blank** Analysis File: **S996191**

Client Project:	**Hunters Point**				
Sample Matrix:	**WATER**	Date Received:	**/ /**	Spike File:	**SPMIT22S**
TLI ID:	**TLI Blank**	Date Extracted:	**11/26/1999**	ICal:	**SF59149**
		Date Analyzed:	**12/13/1999**	ConCal:	**S996190**
Sample Size:	**1.000 L**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**S996191**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**BWL**	% Solids:	**n/a**

Analytes	Conc. (ppq)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	1.1				—
1,2,3,7,8-PeCDD	ND	1.0				—
1,2,3,4,7,8-HxCDD	ND	0.8				—
1,2,3,6,7,8-HxCDD	ND	0.8				—
1,2,3,7,8,9-HxCDD	ND	0.8				—
1,2,3,4,6,7,8-HpCDD	ND	1.2				—
1,2,3,4,6,7,8,9-OCDD	EMPC		2.2			J
2,3,7,8-TCDF	ND	0.9				—
1,2,3,7,8-PeCDF	EMPC		0.80			J
2,3,4,7,8-PeCDF	ND	0.8				—
1,2,3,4,7,8-HxCDF	ND	0.5				—
1,2,3,6,7,8-HxCDF	ND	0.5				—
2,3,4,6,7,8-HxCDF	ND	0.5				—
1,2,3,7,8,9-HxCDF	ND	0.6				—
1,2,3,4,6,7,8-HpCDF	ND	0.7				—
1,2,3,4,7,8,9-HpCDF	ND	0.9				—
1,2,3,4,6,7,8,9-OCDF	EMPC		1.2			J

Totals	Conc. (ppq)	Number	DL	EMPC	Flags
Total TCDD	ND		1.1		—
Total PeCDD	ND		1.0		—
Total HxCDD	EMPC			1.7	—
Total HpCDD	ND		1.2		—
Total TCDF	ND		0.9		—
Total PeCDF	EMPC			0.80	—
Total HxCDF	ND		0.6		—
Total HpCDF	ND		0.8		—

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Applied P & CH Laboratory

TLI Project: **49971** Method 8290 PCDD/PCDF Analysis (b)
Client Sample: **TLI Blank** Analysis File: **S996191**

Internal Standards	Conc. (ppq)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	799	39.9	40%-130%	0.73	26:03	V___
$^{13}C_{12}$-2,3,7,8-TCDD	883	44.1	40%-130%	0.78	26:44	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	1150	57.5	40%-130%	1.49	29:56	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	1320	66.2	40%-130%	1.50	30:57	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	1390	69.5	40%-130%	0.50	33:27	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	1480	73.8	40%-130%	1.22	34:08	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	1490	74.4	25%-130%	0.42	36:20	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	1420	71.2	25%-130%	1.00	37:23	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	2250	56.2	25%-130%	0.87	41:01	___

Surrogate Standards (Type B)	Conc. (ppq)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	1480	73.9	40%-130%	1.51	30:38	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	1540	76.9	40%-130%	0.50	33:21	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	1620	81.1	40%-130%	1.21	34:03	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	1900	95.1	25%-130%	0.42	37:53	___

Other Standard	Conc. (ppq)	% Recovery	QC Limits	RT	Flags
CL_4-2,3,7,8-TCDD	95.6	47.8	40%-130%	26:45	___

Alternate Standards (Type B)	Conc. (ppq)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	1500	75.0	40%-130%	0.50	34:43	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	1570	78.7	40%-130%	0.50	33:56	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	26:34	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.21	34:27	___

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Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Submitted to:
The IT Group
Attention: Cathy Polityka
4005 Port Chicago Highway
Concord CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-996933
Collected by: CP/BS
Collected on: 11/18/99

Received: 11/19/99
Extracted: N/A
Tested: 11/19/99
Reported: 12/13/99

Sample Description: Ground Water from Hunter's Point
Project Description: 771003/0083

Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result 83-ES991118-57 99-06933-1
ASBESTOS,TEM	600R93/134	MFL	5.6	ND [a]
PH	9040	pH unit	0.1	6.6
CHROMIUM (VI)	7196	mg/L	0.01	ND

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit
N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.
J: Reported between PQL and MDL.
Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0
[a] Subcontracted to EMSL. See attached.
MFL: Million Fibre per Liter.

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL QA/QC Report

Submitted to:
The IT Group
Attention: Cathy Polityka
4005 Port Chicago Highway
Concord, CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-996933
Collected by: CP/BS
Collected on: 11/18/99
Received: 11/19/99
Tested: 11/19/99
Reported: 1/ 7/ 00
Sample description:
Ground Water from Hunter's Point
Project: /771003/0083

Analysis of Water

801-996933QC

Component Name	Analysis Batch #	CCV (mg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
WET Analysis in Water												
Chromium (VI)	99W7544	0.250	103	N.D.	mg/L	0.250	105	98	98	0	75-113	19

*: LCS/LCSD is used.

Notation:
ICV – Initial Calibration Verification
CCV – Continuation Calibration Verification
LCS – Lab Control Spike
MS – Matrix Spike
MSD – Matrix Spike Duplicate
ICS – Interference Check Standard
MD – Matrix Duplicate
N.D. – Not detected or less than PQL
CCB – Continuation Calibration Blank
M-blank – Method Blank
SP Level – Spike Level
%Rec – Recovery Percent
%RPD – Relative Percent Differences
%Diff – Control Limit for %RPD
ICP-SD – ICP Serial Dilution
N.A. – Not Applicable

Respectfully submitted,

Kevin Xie, Ph. D.,
QA Director
Applied P & Ch Laboratory

DATE: December 20, 1999

CLIENT: APCL
13760 E. Magnolia Ave.
Chino, CA 91710

ATTENTION: FRANK MONTEITH

REFERENCE: 99-6933

DATE COLLECTED: 11-18-99

DATE RECEIVED: 11-19-99, 1230pm

REPORT NO: **62329**

SUBJECT: ANALYSIS OF WATER SAMPLE BY TRANSMISSION ELECTRON MICROSCOPY

ACCREDITED: National Institute of Standards and Technology through NVLAP (101218)
California Department of Health Services (ELAP 1119)

The sample was identified as: 99-6933

The date and time of collection and filtration are as follows:

Sample #	Date/Time of Collection	Date/Time of Filtration
99-6933	11-18-99/1308	11-19-99/1:30pm
83-ES 99118-57		

The sample was analyzed for fibers >10 µm in length to conform with the drinking water document, EPA 600 R 94 134. This regulation calls for an MCL (maximum contaminant level) of 7 MFL and an analytical sensitivity level of ≤0.2 MFL.

No asbestos structures were detected; the analytical sensitivity reached is 5.6 MFL due to the turbidity of the sample.

The results of the analysis and the detection limit are summarized on the following pages.

Respectfully submitted,
EMS LABORATORIES, INC.

B M Kolk

B. M. Kolk
Laboratory Director

Note: The results of the analysis are based upon the samples submitted to the laboratory. No representation is made regarding the sampling area other than that implied by the analytical results for the immediate vicinity of the samples analyzed as calculated from the data presented with those samples.

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ANALYSIS OF WATER BY TEM (EPA-600 R 94 134)

EMS NO: 62329
CLIENT: Applied P & CH Lab
DATE: 12/16/99

Laboratory I.D.	Client	FILTER MEDIA DATA			No. of G.O.	Analyzed Area, mm^2	Sample Volume (ml)
		Type	Diameter mm	Effective Area mm^2			
62329-33	99-6933*	PC	47	1017	10	0.091	2

* FOR FIBERS > 10um ONLY

INDIVIDUAL ANALYTICAL RESULTS

Laboratory I.D.	Client I.D.	No. of Asbestos			Detection Limit (MFL)	CONCENTRATION (MFL)		
		Str	Str >5um	Str >10um		Str	Str >5um	Str >10um
62329-33	99-6933*	-	-	N.D.	5.6	-	-	N.D.

* FOR FIBERS > 10um ONLY

The analysis was carried out to the approved TEM method. This laboratory is in compliance with the quality specified by the method.

Authorized Signature

Analysis of Water by Transmission Electron Microscopy
(EPA-600 R 94 134)

EMS No.	62329	**Client**	**Applied P & CH Lab.**
Sample No.	99-6933	**Date Analyzed**	12/16/99

Fibers > 10 µm in length (chrysotile)	BDL*	MFL
Mass (chrysotile)	0	ug/L
More/Less than 5 Fibers in Sample (chrysotile)	LESS	
Poisson 95% Confidence Interval	0 to 21	MFL
Detection Limit	5.6	MFL

* BDL : Below Detection Limit; MFL: Million Fibers per Liter

Particle Size Distribution (Chrysotile)

Particle Length - Microns

O -0.49	0.50 - 0.99	1.00 - 1.49	1.50 - 1.99	2.00 - 2.49	2.5 - 4.99	5.00 - 9.99	10 & UP
0	0	0	0	0	0	0	0

Particle Width - Microns

O - .04	.05 - .09	.1 - .14	.15 - .19	.2 - .24	.25 - .49	.50 - .99	1 & UP
0	0	0	0	0	0	0	0

Aspect Ratio L/W

0 - 9.9	10 - 19.9	20 - 29.9	30 - 39.9	40 - 49.9	50 - 99	100 - 199	200 & UP
0	0	0	0	0	0	0	0

TEM ASBESTOS ANALYSIS

Client _____ EMS Lab No. _____
Sample No. _____ Page _____ of _____

RECEIVING

TYPE OF SAMPLE
Air ☐ Water ☐
Soil ☐ Bulk ☐
Other _____

METHOD OF ANALYSIS
EPA 600/4-83-043 ☐ ISO ☐

LEVEL OF ANALYSIS
Chrysotile _____
Amphibole _____

ASPECT RATIO
3:1 ☐ 5:1 ☐

LENGTHS
All Sizes (EPA) ☐
(μm) ≥0.5 ☐
≥1.0 ☐
≥5.0 ☐
≥10.0 ☐
PCM Range* ☐
*(≥0.25 μm width
≥5.0 μm length)

FILTER TYPE / AREA (mm±)
MCE ☐ 385 ☐
PC ☐ 314 ☐
MCN ☐ 1017 ☐
Other _____

PORE SIZE
0.45 μm ☐ 0.8 μm ☐
0.1 μm ☐ 0.22 μm ☐
Other _____

G.O. Area (mm²) 0.0 _____
No. of G.O. to Analyze _____
Filter Lot No. _____

Approved By _____ Date _____

PREP

DIRECT PREP ☐
INDIRECT PREP ☐

Volume _____ liters
Working Volume _____ ml
Weight _____ grams
Ashed Area _____ %

Prepared By _____
Date _____

ANALYSIS

MICROSCOPE
Serial No. 542-05-06 H600A ☐
Serial No. 542-05-13 H600B ☐

Grid Address _____
Screen Magnification _____ X
Camera Constant _____
Accelerating Voltage 100 KV
Beam Current _____ μm
K-Factor _____

Analyst _____ Date _____

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification														EDS Analysis					Comments
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	Na	Mg	Si	Ca	Fe	

TEM -1A 9/94

OBSERVATIONS:

Clean ☐ Other _____
Debris ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

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TEM ASBESTOS ANALYSIS

Client _____
Sample No. _____

EMS Lab No. _____
Page _____

RECEIVING

ANALYSIS

MICROSCOPE
Serial No. 542-05-06 H600A ☐
Serial No. 542-05-13 H600B ☐

Grid Address _____
Screen Magnification _____ X
Camera Constant _____
Accelerating Voltage 100 KV
Beam Current _____ μm
K-Factor _____

Analyst _____ Date _____

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification														EDS Analysis					Comments
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	Na	Mg	Si	Ca	Fe	

TEM - 1 B 9/94

OBSERVATIONS:

Clean ☐ Other _____
Debris ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

EMS LABORATORIES 117 West Bellevue Drive ☐ Pasadena, California 91105-2503 ☐ (818) 568-4065

TEM ASBESTOS ANALYSIS

Client _____
Sample No. _____

EMS Lab No. _____
Page _____

RECEIVING

ANALYSIS

MICROSCOPE
Serial No. 542-05-06 H600A ☐
Serial No. 542-05-13 H600B ☐

Grid Address _____
Screen Magnification _____ X
Camera Constant _____
Accelerating Voltage 100 KV
Beam Current _____ μm
K-Factor _____

Analyst _____ Date _____

Grid Opening	Structure Number	Structure	Dimensions (mm)		Fiber Classification															EDS Analysis					Comments
			Width	Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	Na	Mg	Si	Ca	Fe	

TEM-1B 9/94

OBSERVATIONS: Clean ☐ Other _____
Debris ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

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Analysis of Water by Transmission Electron Microscopy
(EPA-600/4-83-043)

EMS No. 62329 **Date Analyzed** 12/16/99

Client Applied P & CH Lab.

Sample No. EMS Blank

Fibers (chrysotile)	ND	MFL
> 5 Micron length (chrysotile)	ND	MFL
Mass (chrysotile)	0	ug/L
More/Less than 5 Fibers in Sample (chrysotile)	LESS	
Sensitivity Level	0.01	MFL

Particle Size Distribution (Chrysotile)

Particle Length - Microns

O -0.49	0.50 - 0.99	1.00 - 1.49	1.50 - 1.99	2.00 - 2.49	2.5 & UP
0	0	0	0	0	0

Particle Width - Microns

O - .04	.05 - .09	.1 - .14	.15 - .19	.2 - .24	.25 & UP
0	0	0	0	0	0

Aspect Ratio L/W

0 - 9.9	10 - 19.9	20 - 29.9	30 - 39.9	40 - 49.9	50 & UP
0	0	0	0	0	0

TEM ASBESTOS ANALYSIS

Client: EMS B/K
Sample No.:
EMS Lab No.:
Page:

RECEIVING

TYPE OF SAMPLE
Air [ ] Water [✓]
Soil [ ] Bulk [ ]
Other

METHOD OF ANALYSIS
EPA 600/4-83-043 [✓] ISO [ ]

LEVEL OF ANALYSIS
Chrysotile CU-CU4
Amphibole AM4

ASPECT RATIO
3:1 [✓] 5:1 [ ]

LENGTHS
All Sizes (EPA) [ ]
(µm) ≥0.5 [✓]
≥1.0 [ ]
≥5.0 [ ]
≥10.0 [ ]
PCM Range* [ ]
*(≥0.25 µm width ≥5.0 µm length)

FILTER TYPE / AREA (mm ±)
MCE [ ] 385 [ ]
PC [✓] 314 [ ]
MCN [ ] 1017 [✓]
Other

PORE SIZE
0.45 µm [ ] 0.8 µm [ ]
0.1 µm [✓] 0.22 µm [ ]
Other

G.O. Area (mm²) 0.0 0091
No. of G.O. to Analyze 20
Filter Lot No.

Approved By SA Date 12/16/99

PREP

DIRECT PREP [ ]
INDIRECT PREP [ ]

Volume liters
Working Volume 500 ml
Weight grams
Ashed Area %

Prepared By SA
Date 12/16/99

ANALYSIS

MICROSCOPE
Serial No. 542-05-06 H600A [✓]
Serial No. 542-05-13 H600B [ ]

Grid Address A
Screen Magnification 1400 X
Camera Constant 3.2
Accelerating Voltage 100 KV
Beam Current 10 µm
K-Factor 1.5

Analyst Linda Date

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	Na	Mg	Si	Ca	Fe	Comments
1	NS12																								
2	NS12																								
3	NS12																								
4	NS12																								
5	NS12																								
6	NS12																								
7	NS12																								
8	NS12																								
9	NS12																								
10	NS																								

TEM - IP 9/94

OBSERVATIONS:
Clean [ ] Other
Debris [ ] Very Light [✓] Light [ ] Moderate [ ] Heavy [ ] Very Heavy [ ]
Gypsum [ ] Very Light [ ] Light [ ] Moderate [ ] Heavy [ ] Very Heavy [ ]

TEM ASBESTOS ANALYSIS

Client EMS B/K
Sample No.

EMS Lab No.
Page

MICROSCOPE
Serial No. 542-05-06 H600A ☐
Serial No. 542-05-13 H600B ☐

RECEIVING

ANALYSIS

Grid Address B
Screen Magnification 19200 X
Camera Constant 28.7
Accelerating Voltage 100 KV
Beam Current 10 μm
K-Factor 1.7
Analyst S. Ahmad Date 12/16/99

Grid Opening	Structure Number	Structure	Dimensions (mm) Width	Dimensions (mm) Length	NAM	TM	CM	CD	CQ	CMQ	CDQ	UF	AD	AX	ADX	AQ	ADQ	AZQ	AZZ	EDS Na	EDS Mg	EDS Si	EDS Ca	EDS Fe	Comments
1	NSD																								
2	NSD																								
3	NSD																								
4	NSD																								
5	NSD																								
6	NSD																								
7	NSD																								
8	NSD																								
9	NSD																								
10	NSD																								

OBSERVATIONS:

Clean ☐ Other
Debris ☑ Very Light ☐ Light ☑ Moderate ☐ Heavy ☐ Very Heavy ☐
Gypsum ☐ Very Light ☐ Light ☐ Moderate ☐ Heavy ☐ Very Heavy ☐

SUBMITTAL FORM/*Laboratory Services*

PAGE ____ OF ____

TURNAROUND TIME ____
<8hr. ____ 24hr. ____ 48hr. ____

- RELINQUISHED BY ____
- TIME / DATE ____
- CLIENT ____
- ADDRESS ____
- DATE OF SHIPMENT ____ CARRIER ____
- CLIENT P.O. NO. ____
- CLIENT JOB/PROJECT ID NO(S). ____
- TELEPHONE ____
- CONTACT ____
- PACKAGE SHIPPED FROM ____
- RESULTS REQUESTED VIA VERBAL ☐ FAX ☐
- CLIENT FAX NO. ____

(NOTE: Complete written reports will follow all analyses, in addition to any prior transmitted verbal or fax results.)

- DATE/TIME OF SAMPLE COLLECTION ____
- SAMPLE PRESERVATIVES ____ HOLDING TIMES ____
- NO. OF SAMPLES SENT ____ SAMPLER'S NAME ____ / ____ (SIGNATURE / PRINTED)
- TYPE: ☐ WATER ☐ WASTE WATER ☐ SOIL ☐ FILTER ☐ SORBENT TUBE ☐ IMPINGER ☐ OTHER ____

(FOR EMS ONLY) EMS Sample No.	CLIENT SAMPLE NO.	DESCRIPTION/LOCATION/ANALYSIS	VOLUME, TIME/WEIGHT *(IF APPLICABLE)*

15 lines

(SF 2/99)

FOR EMS ONLY

- Laboratory No. ____
- Received By ____
- Time ____
- Date of Package Delivery ____
- Shipping Bill Retained: YES ☐ NONE ☐
- Condition of Package on Receipt ____
- Condition of Custody Seal ____

(NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact the project manager and the shipper.)

- No. of Samples ____
- Chain-of-Custody Signature ____
- Date of Acceptance into Sample Bank ____
- Misc. Info. ____
- Disposition of Samples ____

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Hunters Point Naval Shipyard
Site IR-1/21 Industrial Landfill
Analytical Data for Groundwater Extraction System Discharge

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151

Delivery Order #0083
IT Corporation Project No. 771003

Sample ID	Date	COD	Ignitability	pH	TSS	Sulfide	TEMP	CN	Phenol	Oil and Grease	TRPH	Chloride	Fluoride	Organolead
		mg-O_2/L	°C	units	mg/L	mg/L	°C	mg/L	mg/L	mg/l	mg/l	mg/l	mg/l	ug/l
PERMIT REQUIREMENTS				6.0 - 9.5		0.5	52 °C 125 °F	1.0	23.0	100				
83-IR121	03/11/1999	180	> 100	6.9	**510**	< 0.1	NA	< 0.05	< 0.1	**3.0**	**0.77**	**690**	< 0.1	< 3
83-ES415-27/53	04/15/1999	210	> 100	6.7	**47**	**0.15**	NA	< 0.05	< 0.1	**3.3**	**0.75**	**670**	**11**	NA
83-ES513-54	05/13/1999	230	> 100	6.7	**26**	< 0.1	NA	< 0.05	< 0.1	**3.6**	**0.98**	**640**	< 20	NA
83-ES990811-55	08/11/1999	150	> 100	6.5	**45**	< 0.1	NA	< 0.05	**0.58**	**9.5**	**3.4**	**920**	< 20	< 100
83-ES9911-56	11/15/1999	220	> 100	--	**600**	< 0.1	19.6 °C	< 0.05	< 0.1	**4.5**	**0.90**	**610**	< 16	< 100
83-ES991118-57	11/18/1999	--	--	6.6	--	--	--	--	--	--	--	--	--	--

Hunters Point Naval Shipyard
Site IR-1/21 Industrial Landfill
Analytical Data for Groundwater Extraction System Discharge

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151

Delivery Order #0083
IT Corporation Project No. 771003

Sample ID	Date	Metals																	
		Sb	As	Ba	Be	Cd	Cr (total)	Cr (VI)	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
		ug/l																	
PERMIT REQUIREMENTS			4000			500	5000			4000	1500	50		2000		600			7000
83-IR121	03/11/1999	2.9	< 5	560	< 2	< 2	19	< 10	2.2	28	6.7	< 0.5	2.8	25	< 10	0.83	< 10	8.4	41
83-ES415-27/53	04/15/1999	8.4	6.2	910	< 2	1.9	19	< 10	3.5	550	44	< 0.5	1.2	30	5.3	< 10	< 10	12	120
83-ES513-54	05/13/1999	< 10	< 5	650	< 2	< 2	17	< 10	1.6	9.4	3.9	< 0.5	< 5	23	< 10	< 10	< 10	6.8	8.9
83-ES990811-55	08/11/1999	5.2	< 5	530	< 2	< 2	17	< 10	2.7	13	1.1	0.33	< 5	25	< 10	< 10	< 10	10	72
83-ES9911-56	11/15/1999	< 10	4.4	690	< 2	< 2	16	--	2.0	19	< 5	0.34	4.9	23	4.4	< 10	5.1	8.3	31
83-ES991118-57	11/18/1999	--	--	--	--	--	--	< 10	--	--	--	--	--	--	--	--	--	--	--

Hunters Point Naval Shipyard
Site IR-1/21 Industrial Landfill
Analytical Data for Groundwater Extraction System Discharge

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151

Delivery Order #0083
IT Corporation Project No. 771003

Sample ID	Date	VOCs																		
		Benzene	sec-Butylbenzene	Chlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	Ethylbenzene	Isopropylbenzene	p-Isopropyltoluene	Methylene Chloride	4-Methyl-2-Pentanone	Naphthalene	n-Propylbenzene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Vinyl Chloride	Xylene
		ug/l																		
PERMIT REQUIREMENTS																				
83-IR121	03/11/1999	8.7	<10	74	7.6	< 10	8.3	< 10	5.4	< 10	< 10	19	< 500	140	< 10	< 10	4.8	< 10	< 10	17
83-ES415-27/53	04/15/1999	17	< 1	130	2.0	2.6	12	< 1	< 1	< 1	< 1	< 1	< 50	73	< 1	1.4	< 1	< 1	< 1	< 1
83-ES513-54	05/13/1999	11	1.6	88	1.9	2.4	11	< 1	0.84	2.7	0.94	< 1	< 50	62	2.1	0.80	1.6	0.60	< 1	5.0
83-ES990811-55	08/11/1999	35	< 20	89	620	19	96	160	12	< 20	< 20	970	6.9	15	< 20	20	4.8	< 20	16	29
83-ES9911-56	11/15/1999	13	2.2	100	2.4	2.5	12	< 5	2.3	4.1	< 5	3.9	< 250	87	3.4	< 5	3.3	< 5	< 5	11
83-ES991118-57	11/18/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Hunters Point Naval Shipyard
Site IR-1/21 Industrial Landfill
Analytical Data for Groundwater Extraction System Discharge

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151

Delivery Order #0083
IT Corporation Project No. 771003

Sample ID	Date	SVOCs															
		Acenaphthene	Anthracene	bis(2-Ethylhexyl)phthalate	Di-n-Butylphthalate	Dibenzofuran	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Fluoranthene	Fluorene	2-Methylnaphthalene	2-Methylphenol	Naphthalene	Phenanthrene	Phenol	Pyrene
		ug/l															
PERMIT REQUIREMENTS																	
83-IR121	03/11/1999	**35**	**1.5**	< 10	< 10	**16**	**4.0**	**1.5**	**7.5**	**1.7**	**19**	**11**	< 10	**14**	**17**	**8.6**	< 10
83-ES415-27/53	04/15/1999	**38**	**1.8**	< 10	**1.5**	**18**	< 10	**1.2**	**6.1**	**2.3**	**21**	**16**	< 10	**31**	**20**	**6.7**	**1.2**
83-ES513-54	05/13/1999	**37**	**1.9**	**1.1**	**1.5**	**17**	< 10	**1.6**	**7.4**	**2.2**	**19**	**14**	< 10	**29**	**20**	< 10	< 10
83-ES990811-55	08/11/1999	**22**	< 80	< 80	< 80	< 80	**300**	< 80	**39**	< 80	< 80	< 80	**17**	< 80	< 80	**19**	< 80
83-ES9911-56	11/15/1999	**56**	**2.0**	< 10	< 10	**23**	**1.4**	**1.3**	**6.1**	**2.5**	**23**	**17**	< 10	**44**	**22**	**7.1**	< 10
83-ES991118-57	11/18/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Hunters Point Naval Shipyard
Site IR-1/21 Industrial Landfill
Analytical Data for Groundwater Extraction System Discharge

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151

Delivery Order #0083
IT Corporation Project No. 771003

Sample ID	Date	Pesticides						PCBs	Herbicides
		Delta-BHC	4,4'-DDD	4,4'-DDE	Endosulfan I	Endosulfan II	Heptachlor		
		ug/l						ug/l	ug/l
PERMIT REQUIREMENTS									
83-IR121	03/11/1999	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.05	< 5	< 250
83-ES415-27/53	04/15/1999	**0.043**	< 0.1	< 0.1	< 0.05	< 0.1	**0.049**	< 5	< 250
83-ES513-54	05/13/1999	< 0.05	< 0.1	**0.061**	**0.046**	< 0.1	< 0.05	< 5	< 250
83-ES990811-55	08/11/1999	< 0.05	< 0.1	< 0.1	**0.025**	**0.069**	< 0.05	< 5	< 250
83-ES9911-56	11/15/1999	< 0.05	**0.046**	< 0.1	**0.046**	**0.040**	< 0.05	< 5	< 250
83-ES991118-57	11/18/1999	--	--	--	--	--	--	--	--

Hunters Point Naval Shipyard
Site IR-1/21 Industrial Landfill
Analytical Data for Groundwater Extraction System Discharge

U.S. Navy, Southwest Division
Contract No. N62474-93-D-2151

Delivery Order #0083
IT Corporation Project No. 771003

Sample ID	Date	Asbestos	Dioxin							
			TCDD	PeCDD	HxCDD	HpCDD	TCDF	PeCDF	HxCDF	HpCDF
		MFL	ng/l							
PERMIT REQUIREMENTS										
83-IR121	03/11/1999	< 6.8	< 4.0	< 5.7	**17.3**	**78.5**	**14.9**	**15.1**	**36.1**	**39.8**
83-ES415-27/53	04/15/1999	< 2.2	< 1.4	< 1.3	**4.3**	**23.3**	**9.8**	**7.6**	**6.9**	**5.3**
83-ES513-54	05/13/1999	< 2.2	< 4.3	< 4.9	< 5.6	**38.1**	< 2.3	< 3.8	**5.2**	< 5.9
83-ES990811-55	08/11/1999	< 0.5	< 1.0	< 1.5	**4.2**	**24.9**	**2.7**	< 1.0	**EMPC 3.0**	**11.2**
83-ES9911-56	11/15/1999	--	< 0.9	< 1.0	**4.9**	**24.4**	< 0.7	**EMPC 1.1**	**3.3**	**4.6**
83-ES991118-57	11/18/1999	< 5.6	--	--	--	--	--	--	--	--

EMPC = Estimated Maximum Possible Concentration

ATTACHMENT 5

CATHODIC PROTECTION SYSTEM SEMI-ANNUAL INSPECTION SUBMITTAL

Corrosion Engineering
Associates, Inc.

CATHODIC PROTECTION SYSTEM SEMI-ANNUAL INSPECTION SUBMITTAL

NAVY PRIME CONTRACT #N62474-93-D-2151

SITE IR-I/21 SHEETPILE CONTAINMENT WALL
HUNTERS POINT NAVAL SHIPYARD
SAN FRANCISCO, CALIFORNIA

FOR:

INTERNATIONAL TECHNOLOGY CORPORATION
4585 PACHECO BOULEVARD
MARTINEZ, CALIFORNIA 94553-2233

BY:

CORROSION ENGINEERING ASSOCIATES, INC.

DECEMBER 1999

4287 Quail Run Place • Danville, CA 94506 • ~~510~~ 925/648-1015 • FAX ~~510~~ 925-648-1415

CATHODIC PROTECTION SYSTEM SEMI-ANNUAL INSPECTION SUBMITTAL
HUNTERS POINT NAVAL SHIPYARD
SITE IR-I/21 SHEETPILE CONTAINMENT WALL
SAN FRANCISCO, CALIFORNIA
DECEMBER 1999

1.0 INTRODUCTION

During December 1999, Corrosion Engineering Associates, Inc. performed the Semi-Annual Inspection of the Hunters Point Site IR-I/21 containment wall cathodic protection system. This represents the second phase of maintenance of the design and build cathodic protection system project. The commissioning of this system was conducted jointly with ConCeCo Engineering, Inc. (oversite subcontractor to ITC) and Ballard Construction, Inc. (prime contractor) during June 1999. This report presents an analysis of the site data, conclusions and recommendations. All work was performed in accordance with Navy Prime Contract #N62474-93-02151.

2.0 STRUCTURE

The structure considered for this project consists of a 600-foot long type PZ27 bare steel sheet pile containment wall. Cathodic protection for the containment wall is provided by the following:

- Two (2) 70 volt/50 amp DC air-cooled rectifiers
- Each rectifier energizes twelve (12) 4-inch diameter by 80-long graphite anodes installed in a distributed ground bed.
- Monitoring of the cathodic protection system is facilitated through three (3) test stations installed at the ends and midpoint of the containment wall.

3.0 ANALYSIS

The following analysis is based on the field data obtained during the December 1999 Semi-Annual Inspection.

3.1 ELECTRICAL CONTINUITY

Multiple test methods were used to determine the electrical continuity between individual sheets of the containment wall. All tests and re-tests are indicative of an electrically continuous containment wall.

3.2 CATHODIC PROTECTION SYSTEM OPERATION

The field procedures for testing of the cathodic protection systems consisted of rectifier inspection and adjustment, above-grade hardware inspection, structure-to-soil (electrolyte) potential measurements and electrical continuity tests. All measurements were obtained with a high impedance electronic voltmeter.

3.2.1 Criteria for Cathodic Protection

The following criteria have been established by the National Association of Corrosion Engineers (NACE) for determining the effectiveness of a cathodic protection system on steel structures. These criteria are set forth in NACE Standard RP01-69 (1993 revision).

- A negative (cathodic) voltage of at least 850 millivolts as measured between the structure surface and a saturated copper-copper sulfate reference electrode contacting the electrolyte (soil). Determination of this voltage is to be made with the protective current applied and consideration is given to voltage drops (IR drop error).

- A minimum negative (cathodic) polarization voltage shift of 100 millivolts measured between the structure surface and the stable reference electrode contacting the electrolyte (soil). This polarization voltage shift is to be determined by interrupting the protective current and measuring the polarization decay. When the current is initially interrupted, an immediate voltage shift will occur. The voltage reading after the immediate shift shall be used as the base reading from which to measure polarization decay.

3.2.2 Structure-to-Soil Potential Measurements

The structure-to-soil potential data (see Appendix A) indicates that both of the NACE criteria for cathodic protection are being met at all test locations with the exception of the following:

- Containment Wall Sta 14+20

The above noted location is receiving adequate cathodic protection, but to date do not meet the –850 mV criterion for cathodic protection. The history of providing cathodic protection on a bare steel structure (steel sheet pile) indicates that the level of corrosion control will continue to polarize to a higher level of cathodic protection.

3.2.3 Cathodic Protection System Rectifier and Anodes

3.2.3.1 Rectifiers

Both of the cathodic protection system rectifiers are operating at a circuit resistance of less than 0.4 ohms. This operating resistance is ideal for long-term cathodic protection. As the anode material is depleted resulting in an increased rectifier circuit resistance, there is sufficient rectifier voltage capacity to maintain the desired cathodic protection current.

3.2.3.2 Anodes

Based on design calculations (see January 1999 Design Submittal) at the present rectifier current output, the calculated anode life is in excess of 14 years. As the containment wall structure continues to polarize the rectifier's current output will be reduced. The reduction of the rectifier current output will increase the life of the anode beds. Based on the original design calculations, the anode life will exceed 15 years.

4.0 CONCLUSIONS

- The criteria for cathodic protection are being met at all test locations.
  - The ongoing polarization of the containment wall steel surfaces will continue to increase the level of cathodic protection at all test locations to an acceptable level.

- As the structure polarizes, it will be necessary to reduce the rectifier current outputs. This reduction will result in extending of the present anode(s) life.

APPENDIX A

SITE EVALUATION DATA

APPENDIX A
TABLE 1.0

STRUCTURE-TO-SOIL POTENTIAL MEASUREMENTS
HUNTERS POINT IR 1/21 #DO 60
SEMI-ANNUAL CATHODIC PROTECTION SYSTEM INSPECTION

DATE: 12/3/99

NO.	LOCATION/REFERENCE CELL		STRUCTURE-TO-SOIL POTENTIAL (mV) NATIVE 4/28/99	"OFF"	"ON"	ΔE*
ETS#1	STA 10+20	ZINC	+417	+141	+76	-276
		PORT.	-627	-1169	-1232	-542
	STA 11+20	PORT.	——	-840	-971	N/A
	STA 12+20	PORT.	——	-1080	-1328	N/A
	STA 13+20		-610	-812	-889	-202
ETS#2	STA 13+80	ZINC	+384	+100	+75	-284
	STA 14+20	PORT.	-659	-774	-813	-115
	STA 15+20			-1081	-1286	N/A
ETS#3	STA 16+15	ZINC	+474	-138	-256	-336
		PORT.	-695	-1040	-1166	-345

*ΔE = The numerical value of cathodic protection polarization (rectifier cycled "off" potential minus the structure native potential.

APPENDIX A
TABLE 2.0

RECTIFIER INSPECTION AND MAINTENANCE REPORT
HUNTERS POINT IR 1/21 #DO 60– NORTH RECTIFIER

Rectifier Identification and Location: SN #990679 NORTH CONTAINMENT WALL

Rectifier Mfg. And Model: UNIVERSAL RECTIFIER COMPANY, INC. MODEL ASAI

Rectifier Type: AIR-COOLED SILICON

Rectifier Rating: INPUT: 43.2/21.6 AMPS 115/230 V/1 PH/60 HZ
OUTPUT: 70 V/50 ADC

Anode Description: TWELVE (12) 4- INCH DIAMETER X 80-INCH LONG, 70 LB. GRAPHITE CENTER CONNECTED ANODES IN A DISTRIBUTED SURFACE GROUNDBED

Groundbed Description: DISTRIBUTED SURFACE BED 200' EAST OF STRUCTURE

Year Activated: APRIL 28, 1999

RECTIFIER OPERATING DATA

RECTIFIER SETTING COARSE/FINE	DC OUTPUT VOLTS	AMPS	BY	DATE	REMARKS
COARSE 1 FINE 1	3.3	13.5	JD/REC	4/28/99	
COARSE 1 FINE 2	7.9	33.4	JD/REC	4/28/99	
COARSE 1 FINE 3	12.0	47.1	JD/REC	4/28/99	REDUNDANT LEG OFF
COARSE 1 FINE 2	6.9	23.8	JD/REC	6/1/99	REDUNDANT LEG ON/AS FOUND
COARSE 1 FINE 3	10.5	41.4	JD/REC	6/1/99	ADJUSTED FOUND/LEFT
COARSE 1 FINE 3	10.4	45.0	JD	12/3/99	FOUND/LEFT

APPENDIX A
TABLE 3.0

RECTIFIER INSPECTION AND MAINTENANCE REPORT
HUNTERS POINT IR 1/21 #DO 60- SOUTH RECTIFIER

Rectifier Identification and Location: SN #990678 SOUTH CONTAINMENT WALL

Rectifier Mfg. And Model: UNIVERSAL RECTIFIER COMPANY, INC. MODEL ASAI

Rectifier Type: AIR-COOLED SILICON

Rectifier Rating: INPUT: 43.2/21.6 AMPS 115/230 V/1 PH/60 HZ
OUTPUT: 70 V/50 ADC

Anode Description: TWELVE (12) 4- INCH DIAMETER X 80-INCH LONG, 70 LB. GRAPHITE CENTER CONNECTED ANODES IN A DISTRIBUTED SURFACE GROUNDBED

Groundbed Description: DISTRIBUTED SURFACE BED 200' EAST OF STRUCTURE

Year Activated: APRIL 28, 1999

RECTIFIER OPERATING DATA

RECTIFIER SETTING COARSE/FINE	DC OUTPUT VOLTS	AMPS	BY	DATE	REMARKS
COARSE 1 FINE 1	3.3	13.5	JD/REC	4/28/99	
COARSE 1 FINE 2	7.9	33.4	JD/REC	4/28/99	
COARSE 1 FINE 3	12.0	47.1	JD/REC	4/28/99	REDUNDANT LEG OFF
COARSE 1 FINE 2	6.9	23.8	JD/REC	6/1/99	REDUNDANT LEG ON/AS FOUND
COARSE 1 FINE 3	10.5	41.4	JD/REC	6/1/99	ADJUSTED
COARSE 1 FINE 3	10.2	50.0	JD	12/3/99	FOUND/LEFT