

N00204.AR.004950
NAS PENSACOLA
5090.3a

CONTAMINATION ASSESSMENT REPORT ADDENDUM WITH TRANSMITTAL FOR SITE
1122 OUTLYING LANDING FIELD BRONSON NAS PENSACOLA FL
04/23/1999
NAVY PUBLIC WORKS CENTER

**CONTAMINATION ASSESSMENT REPORT ADDENDUM
SITE 1122, U.S. NAVY OUTLYING LANDING FIELD (OLF)
BRONSON FIELD**

**NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA**

FDEP 179300938

APRIL 1999

Prepared By:

**Navy Public Works Center
NAS Environmental, Building 1754
Pensacola, Florida 32508-6500**

Author:

Gregory Allen Campbell, P. E.

Prepared for:

**Southern Division Naval Facilities Engineering Command
2155 Eagle Dr., P.O. Box 190010
North Charleston, South Carolina 29418**

Byas Glover, Code 18410, Engineer-In-Charge



DEPARTMENT OF THE NAVY
NAVY PUBLIC WORKS CENTER
310 JOHN TOWER ROAD
PENSACOLA, FLORIDA 32508-5303

5090

IN REPLY REFER TO:

Ser 00500/0086

23 APR 1999

Mr. Joe Fuggit, Remedial Project Manager
Florida Department of Environmental Protection
Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: CONTAMINATION ASSESSMENT REPORT ADDENDUM (CARA),
U.S. NAVY OUTLYING FIELD (OLF) BRONSON, SITE 1122, PENSACOLA,
FLORIDA

Dear Mr. Fuggit:

This letter is in reference to your November 17, 1997, letter addressing comments to the Contamination Assessment Report (CAR) and Monitoring Only Plan (MOP), dated October 1997, for the U.S. Navy Outlying Field (OLF), Bronson, Site 1122, Pensacola, Florida. Per your request, enclosed are two copies of the CAR Addendum (CARA) for your action.

If you have any questions concerning this CARA, please contact Mr. Greg Campbell, of my staff, at (850) 452-4611, ext. 113.

Sincerely,

A handwritten signature in black ink that reads "David Colon".

DAVID COLON
ENS, CEC, USNR

By direction of
the Commanding Officer

Enclosure: (2 copies)

Copy to:
SOUTHNAVFACENGCOM
(Code 18410, Byas Glover)

**CONTAMINATION ASSESSMENT REPORT ADDENDUM
SITE 1122, U.S. NAVY OUTLYING LANDING FIELD (OLF)
BRONSON FIELD**

**NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA**

FDEP 179300938

APRIL 1999

Prepared By:

**Navy Public Works Center
NAS Environmental, Building 1754
Pensacola, Florida 32508-6500**

Author:

Gregory Allen Campbell, P. E.

Prepared for:

**Southern Division Naval Facilities Engineering Command
2155 Eagle Dr., P.O. Box 190010
North Charleston, South Carolina 29418**

Byas Glover, Code 18410, Engineer-In-Charge

TABLE OF CONTENTS

**Contamination Assessment Report Addendum
Site 1122, U.S. Navy Outlying Landing Field (OLF) Bronson Field
Naval Air Station Pensacola
Pensacola, Florida**

Section	Title	Page No.
1.0	PURPOSE	1-1
2.0	RESPONSE TO FDEP MEMO COMMENTS	
2.1	Response to Comments (1)(a) thru (1)(j)	
	(1)(a) Portion of USGS Map that Identifies the Site	2-1
	(1)(b) Tetrachloroethene (PCE) detected in DMW-12	2-1
	(1)(c) Site Maps showing All Pertinent Features	2-1
	(1)(d) Details of Closure	2-2
	(1)(e) Water Table Elevations Obtained at Least Twice	2-3
	(1)(f) Determination of Tidal Influence on Groundwater Flow	2-3
	(1)(g) Location of Water Supply Wells	2-4
	(1)(h) Slug Tests	2-4
	(1)(i) Cross Section of Stratigraphy	2-4
	(1)(j) Soil Boring Locations in Relation to Former Tanks	2-4
2.2	Response to Comment (2)	
	(2) Abandoned Wells	2-4
2.3	Response to Comments (3)(a) and (3)(b)	
	(3)(a) Sampling Representative Monitoring Wells	2-5
	(3)(b) TRPH Concentrations in MW-8	2-6
2.4	Response to Comment (4)	
	(4) Surface Water Quality	2-6
3.0	CONCLUSIONS AND RECOMMENDATIONS	
3.1	Conclusions	3-1
3.2	Recommendations	3-2
4.0	PROFESSIONAL REVIEW CERTIFICATION	4-1

LIST OF FIGURES

**Contamination Assessment Report Addendum
Site 1122, U.S. Navy Outlying Landing Field (OLF) Bronson Field
Naval Air Station Pensacola
Pensacola, Florida**

Figure	Title	Page No.
1	USGS Topographic Map.....	B-1
2	Vicinity Map of Site 1122.....	C-1
3	1944 Site Map of Site 1122	D-1
4	1997 Site Map of Site 1122	D-2
5	Site Map of OLF Bronson Open Drainage Ditch	D-3
6	Site Location Map..... Location of Groundwater Sampling In Relation to Former UST 1122-A and 1122-B	F-1
7	Groundwater Flow Direction Map for August 18, 1998	I-2
8	Groundwater Flow Direction Map for October 21, 1998	I-4
9	Groundwater Flow Direction Map for Site 1140-NW (Similar Site)	J-1
	for Tidal Influence Study	
10	Vicinity Map of ECUA Water Supply Well #1 and #2	K-1
	in Relation to Site 1122	
11	Cross Section of the Site Specific Stratigraphy	M-1
	and Approximate Concentrations of Applicable Petroleum Products' Chemicals of Concern	
12	Site Map of Former Tanks, Lines, Dispensors	N-1
	and Excavated Areas in Relation to Soil Sampling Locations SB-1 thru SB-13	
13	Site Map of Former Tanks, Lines, Dispensors	N-2
	and Excavated Areas in Relation to Soil Sampling Locations MW-1 thru MW-14	

LIST OF TABLES

**Contamination Assessment Report Addendum
Site 1122, U.S. Navy Outlying Landing Field (OLF) Bronson Field
Naval Air Station Pensacola
Pensacola, Florida**

Table	Title	Page No.
I	Summary of VOA, TPH, & EDB Analytical Results for Groundwater Collected from DMW-12	G-1
II	Summary of TPH and EDB Analytical Results for Groundwater Collected from MW-2, MW-5, MW-8, MW-10, DMW-12, and MW-13	G-2
III	Water Table Elevations on August 18, 1998	I-1
IV	Water Table Elevations on October 21, 1998	I-3

LIST OF APPENDICES

**Contamination Assessment Report Addendum
Site 1122, U.S. Navy Outlying Landing Field (OLF) Bronson Field
Naval Air Station Pensacola
Pensacola, Florida**

Appendices	Title
APPENDIX A:	FDEP LETTER DATED NOV 17, 1997 AND ATTACHED MEMO DATED NOV 14, 1997
APPENDIX B:	USGS TOPOGRAPHIC MAP
APPENDIX C:	VICINITY MAP OF SITE 1122
APPENDIX D:	SITE MAPS OF SITE 1122
APPENDIX E:	DISCHARGE REPORTING FORM CLOSURE ASSESSMENT
APPENDIX F:	SITE MAP OF GROUNDWATER SAMPLING LOCATIONS IN RELATION TO USTs 1122-A and 1122-B
APPENDIX G:	SUMMARY TABLES OF ANALYTICAL RESULTS
APPENDIX H:	ANALYTICAL RESULTS OF GROUNDWATER SAMPLING
APPENDIX I:	WATER TABLE ELEVATIONS - 2 SAMPLING EVENTS GROUNDWATER FLOW DIRECTION MAPS - 2 SAMPLING EVENTS
APPENDIX J:	TIDAL INFLUENCE STUDY
APPENDIX K:	SITE MAP OF ECUA WATER SUPPLY WELLS #1 AND #2 IN RELATION TO SITE 1122
APPENDIX L:	SLUG TEST PERFORMED AT SITE 1122 MONITORING WELL NO. 5
APPENDIX M:	CROSS SECTION OF THE SITE SPECIFIC STRATIGRAPHY AND APPROXIMATE CONCENTRATIONS OF APPLICABLE PETROLEUM PRODUCTS' CHEMICAL OF CONCERN

LIST OF APPENDICES (Cont.)

Appendices	Title
APPENDIX N:	SITE MAPS OF FORMER TANKS, LINES, DISPENSORS AND EXCAVATED AREAS AT SITE 1122 IN RELATION TO SOIL BORINGS COLLECTED AT SITE

1.0 PURPOSE

The Navy Public Works Center (PWC), Naval Air Station, Pensacola, Florida, submitted a Contamination Assessment Report on October 22, 1997, for Site 1122, U.S. Navy Outlying Field (OLF) Bronson, Naval Air Station Pensacola. In response to the CAR, FDEP requested Southern Division Navy Facilities Engineering Command (SOUTHNAVFACENGCOM) complete a Contamination Assessment Report Addendum (CARA) for the site. PWC was retained by SOUTHNAVFACENGCOM to prepare a CARA for Site 1122 in accordance with FDEP letter dated November 17, 1997, and attached Memo dated November 14, 1997, (Appendix A).

The CARA for Site 1122 addresses all comments listed in the FDEP Memorandum dated November 14, 1997, and is prepared per the September 23, 1997, revision to Chapter 62-770, F.A.C.

2.0 RESPONSE TO COMMENTS ON FDEP MEMO DATED NOVEMBER 14, 1997

2.1 Response to Comment (1)(a) thru (1)(j)

(1)(a) A copy of the portion of the USGS topographic map, including quadrangle name and scale, that clearly identifies Site 1122, Bronson Field in relation to the surrounding area is shown in Appendix B, Figure 1. Site 1122, Bronson Field is located in Section 4 and 5, Township 2S, Range 32W, as referenced on the Lillian, ALA.-FLA. U.S. Geological Survey (USGS) Topographic Quadrangle Map.

(1)(b) A vicinity map showing potential sources of petroleum and non-petroleum products in relation to Site 1122, Bronson Field is included in Appendix C, Figure 2. The vicinity map shows approximately ½ square miles of area bounding Site 1122. The map includes the former location of buildings and underground storage tanks. Public Works Center personnel removed thirty-six USTs from 16 sites at Bronson Field during 1994 and 1995. PWC personnel detected petroleum contamination at eight of the sites and PWC prepared Contamination Assessments Reports (CARs) for nine (9) sites (Site 1140 was divided into two sites, Site 1140-NE and Site 1140-NW). Only one of those nine sites, Site 1162, had detectable levels of tetrachloroethene. Site 1162 was the location of a 500-gallon underground storage tank used to store gasoline. The UST was located approximately 8 feet west of potable water well #2. PWC removed the tank from the site on July 27, 1994. Because of the close proximity of potable water well #2 to the UST, a drinking water sample was collected from Well #2 on August 5, 1994, and analyzed for volatiles by EPA Method 524.2. Tetrachloroethene was detected at levels of 0.8 ppb. All other volatiles in the drinking water sample were found to be below detection limits.

There is only one base map of OLF Bronson Field on file at NAS Pensacola. This map is not specific enough to determine where any sources of PCE were located in the 1940's. As mentioned previously in the CAR, the base was closed in 1950. Therefore, no PCE sources could be identified from the information available on OLF Bronson Field.

In conclusion, the detection of tetrachloroethene (PCE) in deep monitoring well DMW-12, at Site 1122, appears to be an isolated event at the U.S. Navy Outlying Landing Field (OLF) Bronson. Previous activities at Site 1122, a former boat shed and pier, and prior operations at facilities located within a ½ radius of DMW-12, are not activities or operations suspect to causing or contributing to tetrachloroethene levels occurring in DMW-12.

(1)(c) Site maps showing all pertinent features of Site 1122 are included in Appendix D, Figures 3, 4 and 5. Figure 3 is a map of Bronson Field as it looked in 1944. Figure 3 shows the site of previous USTs, underground piping and buildings. Figure 4, a site specific map of Site 1122, was drawn by PWC in 1997. Figure 4 shows the current layout of Site 1122, including the location of monitoring wells MW-1 thru MW-14. Figure 5 shows the stormwater drainage structure (open drainage ditch) existing at

Bronson Field.

(1)(d) The water/fuel sample collected on July 25, 1994, was groundwater collected from the excavation site of UST 1122-B; however, PWC reported “no visible free product” in the vicinity of USTs 1122-A or 1122-B. A map showing the groundwater sampling location in relation to UST 1122B is provided in Appendix F, Figure 6. PWC personnel who removed USTs 1122-A and 1122-B reported heavy soil contamination at the site of UST 1122-B (used to store gasoline), and light soil contamination at the site of UST 1122-A (used to store fuel oil). PWC submitted a DRF on July 25, 1994, (Appendix E) for Sites 1122-A & B. The Closure Assessment Form (Appendix E), dated 28 November 1995, reported no free product was present in the monitoring wells or within the excavation. The Closure Assessment Form also reported that analytical laboratory results of the groundwater sample collected from the site were greater than the allowable FDEP cleanup target levels.

Monitoring well MW-10 (installed May 24, 1995) was constructed at the site of UST 1122-A (Appendix F, Figure 6). Groundwater samples were collected and analyzed from monitoring well MW-10 on May 30, 1995. The groundwater samples were analyzed for Volatile Aromatics (EPA Method 8260) and PAHs (EPA Method 8270A). No volatile aromatics or PAHs were detected in the groundwater samples collected from MW-10.

No monitoring well was constructed at the site of UST 1122-B during the closure assessment because analytical results of soil and groundwater samples collected at the site indicated contamination levels were well above FDEP target levels. Monitoring wells MW-8 and DMW-12 were constructed on March 13, 1996, and May 15, 1996, respectively, near the excavation site of UST 1122-B (Appendix F, Figure 6).

Groundwater samples were collected from monitoring well MW-8 on March 21, 1996, and analyzed for VOAs (EPA Method 8260), PAHs (EPA Method 8270A), TPHs (EPA Method 418.1) and EDBs (EPA Method 504). No VOAs, PAHs, or EDBs were detected in the groundwater sample; however TPH contamination levels of 6400 ppb were detected. On August 18, 1998, monitoring well MW-8 was resampled for TPHs (EPA Method FLPRO) and EDBs (EPA Method 508); TPH and EDB contamination levels were below detection limits.

Groundwater from deep monitoring well DMW-12 was collected and sampled for VOAs (EPA Method 8260), TPHs (EPA Method 8270), and EDBs (EPA Method 504) on June 4, 1996; for TPHs (EPA Method FLPRO) and EDBs (EPA Method 508) on August 18, 1998; and for VOAs (EPA Method 8260) on October 21, 1998. Tetrachloroethene (3 ppb) was detected in the groundwater sample collected on June 4, 1996; no TPHs or EDBs were detected in the groundwater samples collected on June 4, 1996 or August 18, 1998; and 1,1,1,2-tetrachloroethane (2 ppb) and tetrachloroethene (2 ppb) were detected in the groundwater sample collected on October 21, 1998. Contamination levels of tetrachloroethene (3 ppb) detected in DMW-12 on June 4, 1996 equaled FDEP groundwater cleanup target levels, however,

groundwater samples collected from DMW-12 on October 21, 1998, indicated levels of tetrachloroethene (2 ppb) had decreased to contamination levels below the FDEP groundwater cleanup target level of 3 ppb for tetrachloroethene. The October 21, 1998, sampling event also detected contamination levels of 1,1,1,2-tetrachloroethane (2 ppb) which exceeded the FDEP groundwater cleanup target level of 1 ppb for 1,1,1,2-tetrachloroethane. Summary tables of the groundwater analytical results are included in Appendix G, Table I and Table II. The analytical laboratory results are found in Appendix H.

In summary, the water/fuel sample collected on July 25, 1994, was groundwater collected from the excavation site of UST 1122-B. In a site summary of Site 1122, PWC stated the following: "Heavy soil contamination found with no visible free product noticed during tank excavation." Groundwater collected from monitoring well MW-10 (constructed on May 24, 1995) at the site of UST 1122-A showed no contamination of volatile aromatics or PAHs. Monitoring wells MW-8 (constructed March 13, 1996) and DMW-12 (constructed on May 15, 1996) were installed near the former site of UST 1122-B. Natural attenuation decreased contamination levels of TRPH from 64000 ppb (March 21, 1996) to BDL (August 18, 1998) in monitoring well MW-8. Also tetrachloroethene levels decreased from 3 ppb (June 4, 1996) to 2 ppb (October 21, 1998) in DMW-12. On October 21, 1998, groundwater samples collected from DMW-12 detected contamination levels of 1,1,1,2-tetrachloroethane (2 ppb) which exceeded the FDEP groundwater cleanup target level of 1 ppb for 1,1,1,2-tetrachloroethane.

(1)(e) Water table elevations recorded at Site 1122 from monitoring well MW-1 thru MW-14 on August 18, 1998, and October 21, 1998, are found in Appendix I, Table III and Table IV, respectively. Groundwater Flow Direction Maps prepared from groundwater elevations recorded on August 18, 1998, and October 21, 1998, are shown in Appendix I, Figure 7 and Figure 8, respectively. The Groundwater Flow Direction Maps indicate that the groundwater flow direction at the site to be toward the west-northwest.

(1)(f) PWC did not prepare a tidal influence study for Site 1122. However, a tidal influence study was prepared for Site 1140-NW which is approximately 1200 feet southeast of the site 1122 and approximately 300 feet east of Perdido Bay Shoreline. The results of that study are considered comparable to results that would have occurred at Site 1122 due to their close proximity to Perdido Bay. Appendix J, Figure 9, is a site location map of 1140-NW. The map shows the close proximity of Site 1140-NW to Site 1122 and Perdido Bay. Results of the tidal influence study prepared by PWC Laboratory personnel on March 6, 1997, is included in Appendix J. Water level measurements were taken at monitoring wells MW-1 thru MW-9 at 20 minute time intervals for two hours prior to low and high tide; and two hours after low and high tide on March 6, 1997, to determine if the groundwater is influenced by tidal fluctuations. The maximum groundwater elevation difference observed during the high tide readings was 0.04 feet at monitoring wells MW-1 and MW-6; while the minimum groundwater elevation difference observed during the high tide readings was 0.01 feet at monitoring well MW-13. No groundwater elevation difference was observed during the low tide readings at monitoring wells MW-1

thru MW-13.

(1)(g) A map showing the location of water supply well #1 and water supply well #2 in relation to Site 1122 is included in Appendix K, Figure 10. Both wells are located within a one mile radius of the site, but are not located within a 1/4 mile radius of the site.

(1)(h) A rising head slug test was performed at Site 1122 by W.E.S., Inc. to assess the hydraulic conductivity of the surficial zone of the sand-and-gravel aquifer. Procedures for conducting the slug test, slug test data graph, and calculations are attached in Appendix L. The slug test results indicate the estimated horizontal hydraulic (k) at site 1122 to be 0.1771 ft/day. The calculated linear groundwater flow velocity at site 1122 was estimated to be 0.0043 ft/day (1.5514 ft/yr). The subject slug test was performed in September 1996, prior to the slug test requiring a minimum of 3 monitoring wells. At the time of the slug test, regulations did not require a minimum of 3 monitoring wells. It is our opinion that the slug test was performed properly and within the regulations at the time of the test. Therefore, it is our opinion that a slug test with a minimum of 3 monitoring wells is unwarranted and should not be required.

(1)(i) A cross section of the site specific stratigraphy is included in Appendix M, Figure 11. The cross section shows the approximate location of monitoring wells MW-1 thru MW-14, the depth of well, the general lithology of the site and the location of chemicals of concern as they were detected in the June 4, 1996, and August 23, 1996, sampling events. No VOCs were detected in the soil samples collected from boreholes SB-1 thru SB-13 or the boreholes from monitoring wells MW-1 thru MW-14.

(1)(j) Site specific maps showing all soil sampling locations in relation to former tanks, lines, and excavations is shown in Appendix N, Figure 12 and Figure 13. Figures 12 and 13 reveal soil borings collected from SB-1 thru SB-13 and monitoring wells MW-1 thru MW-14 were appropriately located in the vicinity of former USTs 1122-A and 1122-B.

2.2 Response to Comment (2)

(2) Monitoring well MW-10, installed May 24, 1995, was installed at the site of former UST 1122-A. There is no record of the well being closed by the contractor. The area where monitoring well MW-10 was located is a shell/clay roadway frequented by cars, trucks, and heavy road clearing equipment. In addition, monitoring well MW-5 was constructed near the site of MW-10 (see Appendix F, Figure 6) and well drilling equipment may have damaged or destroyed MW-10. PWC personnel have made several attempts to locate monitoring well MW-10 (i.e. digging and metal detector by survey crew); MW-10 cannot be located and is presumed destroyed and the remains covered by the hard shell/clay roadway. The location of monitoring well MW-6, installed May 24, 1995, was located by PWC Survey prior to the August 18, 1998, sampling event. The analytical laboratory results are found in Appendix H.

2.3 Response to Comment (3)(a) and (3)(b)

(3)(a) Representative monitoring wells were resampled and analyzed, on August 18, 1998, and October 21, 1998, for chemicals of concern detected in the previous sampling event (TRPH, EDB, and tetrachloroethene [DMW-12 only]). Water table elevations from monitoring wells MW-1 through MW-13 were taken before groundwater sampling occurred on August 18, 1998, and on October 21, 1998, to determine horizontal and vertical groundwater flow directions and gradients. Groundwater table elevations taken on August 18, 1998, from monitoring wells MW-1 thru MW-13 are shown in Appendix I, Table III. A Groundwater Flow Direction Map, using groundwater elevations measured in the August 18, 1998, sampling event, is included in Appendix I, Figure 7. Groundwater table elevations taken on October 21, 1998, from monitoring wells MW-1 thru MW-14 are shown in Appendix I, Table IV. A Groundwater Flow Direction Map, using groundwater elevations measured in the October 21, 1998, sampling event, is included in Appendix I, Figure 8.

Groundwater samples were collected from monitoring wells MW-2, MW-5, MW-8, MW-10, DMW-12, and MW-13 on August 18, 1998. The groundwater samples were analyzed for TPHs and EDBs using EPA Methods FLPRO and 508, respectively. Laboratory analyses of the groundwater samples from monitoring wells MW-2, MW-5, MW-8, and DMW-12 indicated contamination levels of TPH and EDBs were below detection limits. TPH (280 ppb) was reported in monitoring well MW-13. TPH levels detected in monitoring well MW-13 (280 ppb) are well below the FDEP groundwater cleanup target level of 5000 ppb for TPH. Summary tables of the analytical results are included in Appendix G, Table I and Table II. The analytical laboratory results are found in Appendix H.

A groundwater sample was collected from deep monitoring well DMW-12 on October 21, 1998. The groundwater sample was analyzed for VOAs using EPA Method 8260. Contamination levels of 1,1,1,2-tetrachloroethane (2 ppb) which exceeded the FDEP groundwater cleanup target levels of 1 ppb were detected in the groundwater collected from DMW-12; and tetrachloroethene (2 ppb) was detected at levels below the FDEP groundwater cleanup target level of 3 ppb. A summary table of the analytical results is included in Appendix G, Table II. The analytical laboratory results are found in Appendix H.

In summary, water table elevations were measured before the August 18, 1998, and October 21, 1998, sampling events. TRPH and EDB detected in monitoring wells MW-2, MW-5, MW-8, MW-10, DMW-12 and MW-13 during the August 18, 1998, sampling event did not exceed the FDEP groundwater cleanup target levels. Contamination levels of VOAs, TRPHs, and EDBs detected in monitoring wells MW-2, MW-5, MW-8, MW-10 and DMW-12 during the August 18, 1998, and October 21, 1998, sampling events decreased from levels reported in the prior sampling events of March 21, 1996, June 4, 1996, and August 23, 1996. Contaminate levels of TRPH in monitoring well MW-13 increased from BDL reported in the August 23, 1996, sampling event to 280 ppb

detected in the August 18, 1998, sampling event. However, TRPH levels of 280 ppb are well below the FDEP groundwater cleanup target level of 5000 ppb for TRPH. As requested, groundwater elevations and representative sampling and analyses of monitoring wells at Site 1122 have been completed. Results of the groundwater analyses conclude that a "Monitoring Only Plan (MOP)" is justified.

(3)(b) A groundwater sample was collected from monitoring well MW-8 on August 18, 1998, and analyzed for TRPHs using EPA Method FLPRO. Contamination levels of TRPH detected in monitoring well MW-8 were below detection limits. The significant decrease of TRPH in MW-8, from 64000 ppb recorded on March 21, 1996, to a level below detection limits on August 18, 1998, indicates current concentrations of TRPH in monitoring well MW-8, located directly adjacent to Perdido Bay, meet the surface water quality criteria and the Natural Attenuation Default Source Concentration criteria of Chapter 62-770, F.A.C. A summary table of the analytical results is included in Appendix G, Table II. The analytical laboratory results are found in Appendix H.

2.4 Response to Comment (4)

(4) Groundwater sampling performed as requested on monitoring well MW-8 indicated contaminant levels are not in excess of surface water quality criteria as outlined in FDEP Rule 62-770. Therefore, no surface water and sediment assessment was prepared for Site 1122. Summary tables of the analytical results are located in Appendix G, Table I and Table II. The analytical laboratory results are found in Appendix H.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

- The source of tetrachloroethene (PCE) detected in DMW-12 was not determined and appears to be an isolated event.
- The water/fuel sample collected on July 25, 1994, was groundwater collected from the excavation site of UST 1122-B.
- Groundwater table elevations obtained August 18, 1998, and October 21, 1998, determined the groundwater flow direction to be toward the west-northwest.
- A Tidal Influence Study conducted at a similar site, Site 1140-NW, concluded there was no tidal influence on Site 1140-NW. Results of that study are considered comparable to results that would have been achieved at Site 1122.
- ECUA Water Supply Wells #1 and #2 are located within a half mile radius of the site but further than a quarter mile radius of the site.
- No further Slug Tests were conducted at the site.
- Soil sampling locations reveal soil borings were appropriately located in the vicinity of the former tanks.
- The remains of monitoring well MW-10, installed May 24, 1995, can not be located. Monitoring well MW-6 has been located and will be abandoned in accordance with Water Management District rules and regulations.
- Groundwater sampling and analyses of representative monitoring wells (MW-2, MW-5, MW-8, MW-10, DMW-12, and MW-13) indicate TRPH, EDB and tetrachloroethene are below FDEP groundwater cleanup target levels but 1,1,1,2-tetrachloroethane exceeds FDEP groundwater cleanup target levels in deep monitoring well DMW-12.
- No visible free product was reported at Site 1122.
- Groundwater sampling performed as requested on monitoring well MW-8 indicated contaminant levels are not in excess of surface water quality criteria as outlined in FDEP Rule 62-770, therefore, a surface water and sediment assessment for Perdido Bay was not conducted.

3.2 Recommendations

PWC Pensacola recommends, based upon the findings and conclusions contained in the Contamination Assessment Report dated October 1997 and this Contamination Assessment Report Addendum, that "No Further Action" be required for the soil and that a groundwater "Monitoring Only Plan" be implemented for the groundwater at Site 1122 located at U.S. Navy Outlying Landing Field (OLF) Bronson as follows:

- (1) Monitoring wells MW-5, MW-8, MW-10, and MW-13 be sampled and analyzed for TPH and EDB using EPA Methods FLPRO and 504, respectively, quarterly for a one year period.
- (2) Monitoring wells MW-5 and MW-8 which had the highest petroleum contamination are considered the source monitoring wells. Monitoring wells MW-10 and MW-11 are considered the upgradient monitoring wells. No downgradient monitoring wells are possible since the groundwater flow direction is toward Perdido Bay and MW-8 is located directly adjacent to the Bay.

4.0 PROFESSIONAL REVIEW CERTIFICATION

The Contamination Assessment Report Addendum contained in this report was prepared using sound, hydrogeologic principles and judgement. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned engineer should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report Addendum was developed for the U.S. Navy Outlying Landing Field (OLF) Bronson, Site 1122, Pensacola, Florida, and should not be construed to apply to any other site.


Gregory Allen Campbell
Professional Engineer
P.E. No. 38572

4/23/99
Date

APPENDIX

APPENDIX A

**FDEP LETTER DATED NOVEMBER 17, 1997
AND ATTACHED MEMO DATED NOVEMBER 14, 1997**

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

November 17, 1997

Mr. Byas Glover
Code 18410
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29419-9010

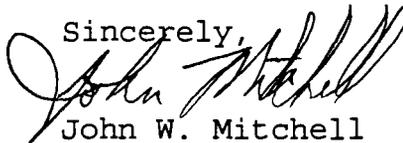
RE: U.S. Navy Outlying Field (OLF) Bronson Site 1122
Pensacola, Florida
FDEP #179300938

Dear Mr. Glover:

I have completed the technical review of the Contamination Assessment Report (CAR) and Monitoring Only Proposal (MOP) dated October 1997 (received October 28, 1997), submitted for this site 1122 OLF Bronson. Please submit a Site Assessment Report Addendum as per the September 23, 1997 revision to Chapter 62-770, F.A.C. which addresses the comments in the attached memorandum from David Grabka.

If I can be of any further assistance with this matter, please contact me at (904) 921-9989.

Sincerely,



John W. Mitchell
Remedial Project Manager

cc: ~~Dean Spencer~~, NAS Pensacola
Greg Campbell, NAS Pensacola
Tom Moody, FDEP Northwest District

TJB



JJC



ESN



(850) 488-3693

TO: John Mitchell, E.S. III, Remedial Project Manager
THROUGH: Tim Bahr, P.G. Supervisor, Technical Review Section ³
FROM: David P. Grabka, E.S. I, Technical Review Section ^{DPG}
DATE: November 14, 1997
SUBJECT: Contamination Assessment Report, Site 1122, U.S. Navy Outlying Landing Field (OLF) Bronson, Pensacola, FL, October 22, 1997

I have completed my review of the Contamination Assessment Report (CAR) and Monitoring Only Plan (MOP) proposal submitted by Navy Public Works Center for the above-referenced site. The report cannot be approved based on the information provided. A Site Assessment Report Addendum should be prepared and should address the following comments:

(1) The following requirements of Chapter 62-770, Florida Administrative Code (F.A.C.), for Site Assessment Reports were found to be missing or lacking:

- (a) Copy of portion of most recent USGS topographic map, including quadrangle name and scale, that clearly identifies the site in relation to the surrounding area. (62-770.600(7)(a)2.)
- (b) Because tetrachloroethene (PCE) was detected in deep monitoring well DMW-12, a vicinity map showing potential sources of petroleum and non-petroleum products in relation to the site. (62-770.600(7)(a)3.)
- (c) One or more site maps showing all pertinent features (tanks, integral piping, dispensers, monitoring wells, buildings, land cover, utilities and subsurface stormwater drainage structures). (62-770.600(7)(a)4.)
- (d) Details of closure assessment and source removal activities. (62-770.600(7)(a)6.)
Was the water/fuel sample collected on July 25, 1994 a groundwater sample, or was it a sample of fuel/sludge from the B1122B tank undergoing closure for disposal purposes? If the sample was of groundwater, was there free product in the vicinity of the tank? If the sample was of groundwater, a map should be provided showing the groundwater sampling location in relation to the tank. It may be necessary to install a permanent monitoring well at this location.

MEMORANDUM
OLF Bronson - Site 1122
Page Two
November 14, 1997

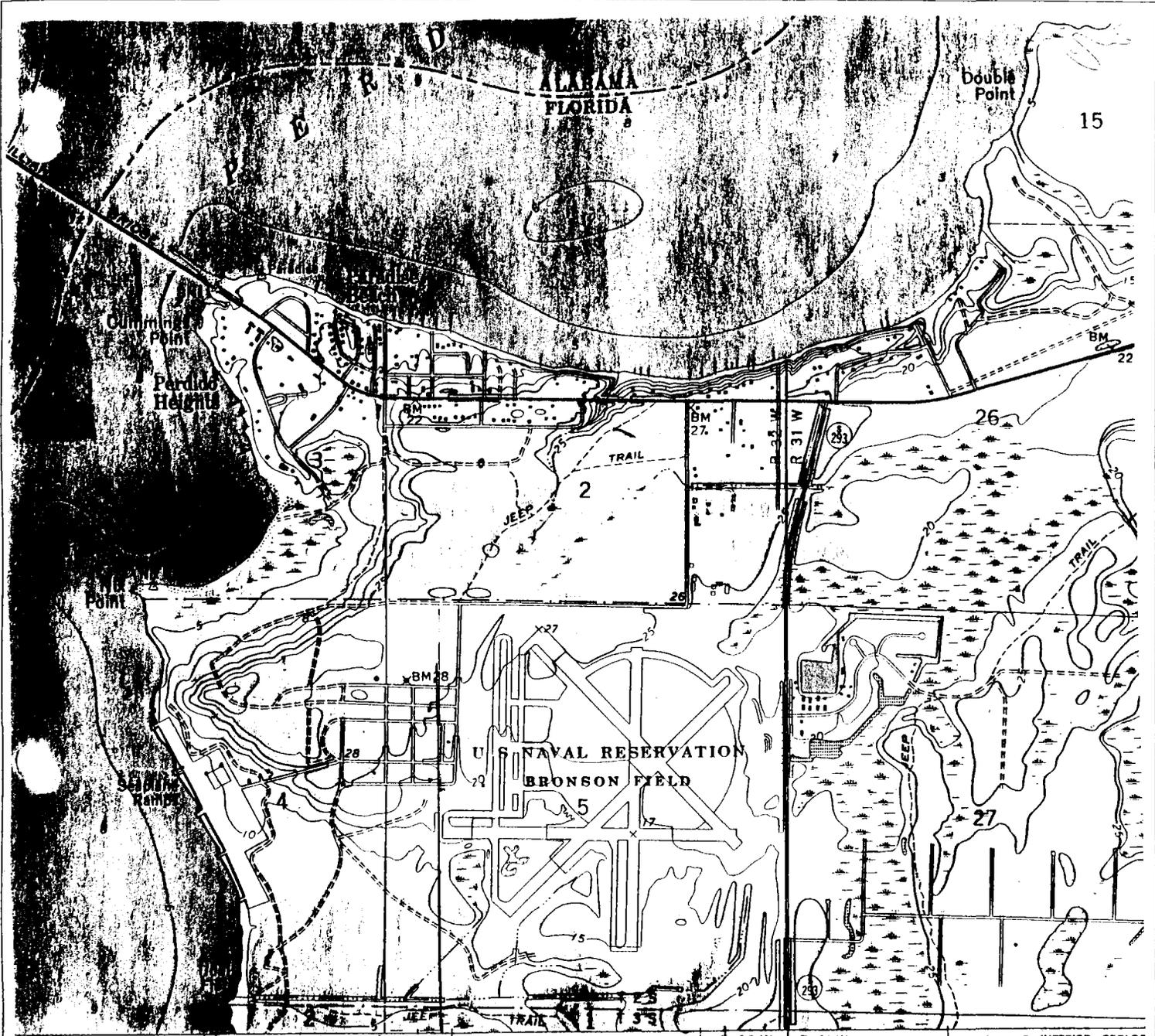
- (e) Water table elevations obtained at least twice and at least one month apart. (62-770.600(7)(a)8.)
 - (f) Determination of tidal influence on groundwater flow. (62-770.600(7)(a)9.)
 - (g) A figure showing water supply wells in relation to the site. (62-770.600(7)(a)11.) (Figure 1-6 does not locate Site 1122 on the map in relation to the water supply wells)
 - (h) Slug tests performed on a minimum of three monitoring wells for sites not meeting the criteria for "no further action" or Monitoring Only for Natural Attenuation. (62-770.600(7)(a)12.)
 - (i) A cross section of the site specific stratigraphy. (62-770.600(7)(a)16.)
 - (j) Site map showing all soil sampling locations in relation to former tanks, lines, dispensers and excavated areas. (62-770.600(7)(a)19.) This should reveal whether soil borings were appropriately located in the vicinity of the former tanks.
- (2) The report states that a MW-10, installed May 24, 1995, was presumed damaged and closed by the contractor. The report states that a MW-6, installed March 13, 1996, was believed covered up and could not be located on September 11, 1997. These wells must be properly abandoned in accordance with Water Management District rules and regulations and documentation provided in the Site Assessment Report Addendum.
- (3) The Site Assessment Report recommends "no further action" be required for soil and that Monitoring Only for Natural Attenuation for groundwater at the site be implemented. While there does not appear to be soil contamination that needs to be addressed, monitoring only for groundwater cannot be approved at this time for the following reasons:
- (a) Groundwater sampling and analyses of representative monitoring wells should have occurred within 270 days of Site Assessment Report submittal. Most of the groundwater analytical data for this site is greater than one year old. Representative monitoring wells should be resampled and analyzed for chemicals of concern detected in the previous sampling event (TRPH, EDB, and tetrachloroethene (DMW-12 only)). Before groundwater sampling occurs, water table elevations in all monitoring wells should be taken to determine horizontal and vertical groundwater flow directions and gradients.
 - (b) Concentrations of TRPH in monitoring well MW-8, located directly adjacent to Perdido Bay, exceed surface water quality criteria and the Natural Attenuation Default Source Concentration criteria of Chapter 62-770, F.A.C.

MEMORANDUM
OLF Bronson - Site 1122
Page Three
November 14, 1997

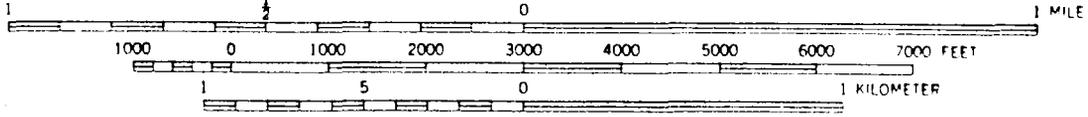
(4) Based on the results of the groundwater sampling event requested above, surface water and sediment assessment will be necessary if contaminant levels remain in excess of surface water quality criteria in monitoring well(s) adjacent to Perdido Bay.

APPENDIX B

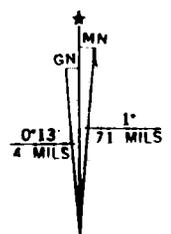
FIGURE 1: USGS TOPOGRAPHIC MAP



SCALE 1 24 000



CONTOUR INTERVAL 5 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929
 DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOWER LOW WATER
 THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
 SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
 THE PERIODIC TIDES IN THIS AREA ARE NEGLIGIBLE



LILLIAN, ALA. - FLA.
 30087-D4-TF-024
 1970
 PHOTOREVISED 1987
 DMA 3544 IV NW - SERIES V844

NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 1	DRAWN BY: DWG. NO.: REVISED BY:
USGS TOPOGRAPHIC MAP SITE 1122, BRONSON FIELD		
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA		

APPENDIX C

FIGURE 2: VICINITY MAP OF SITE 1122

APPENDIX D

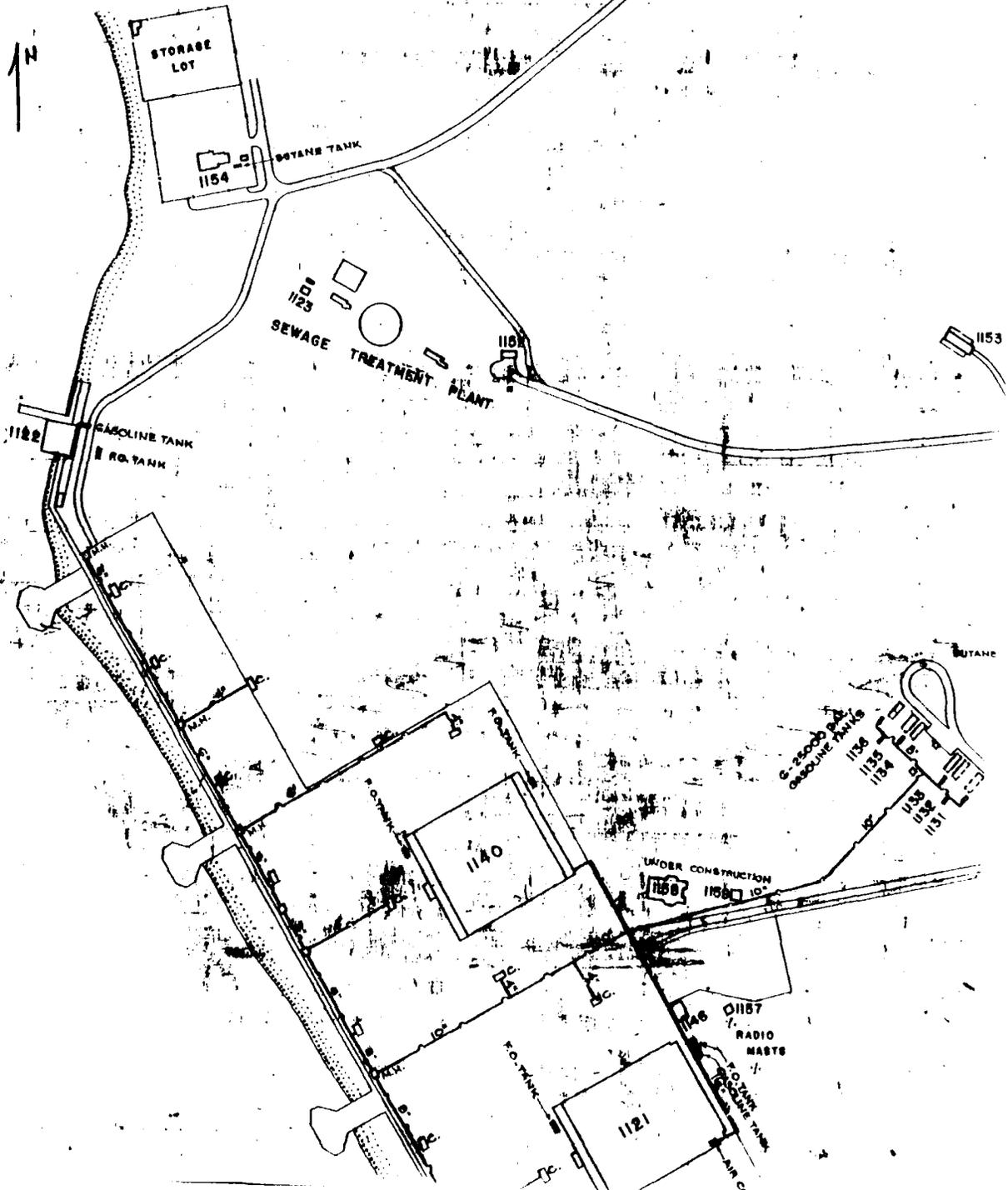
FIGURE 3: 1944 SITE MAP OF SITE 1122

FIGURE 4: 1997 SITE MAP OF SITE 1122

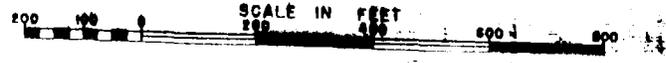
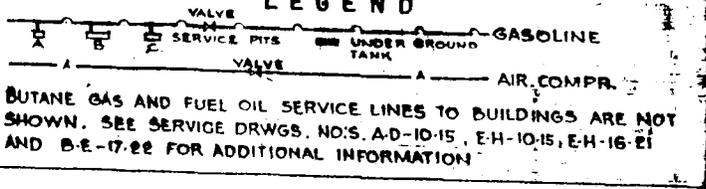
**FIGURE 5: SITE MAP OF OLF BRONSON OPEN
DRAINAGE DITCH**



PERDIDO BAY



LEGEND

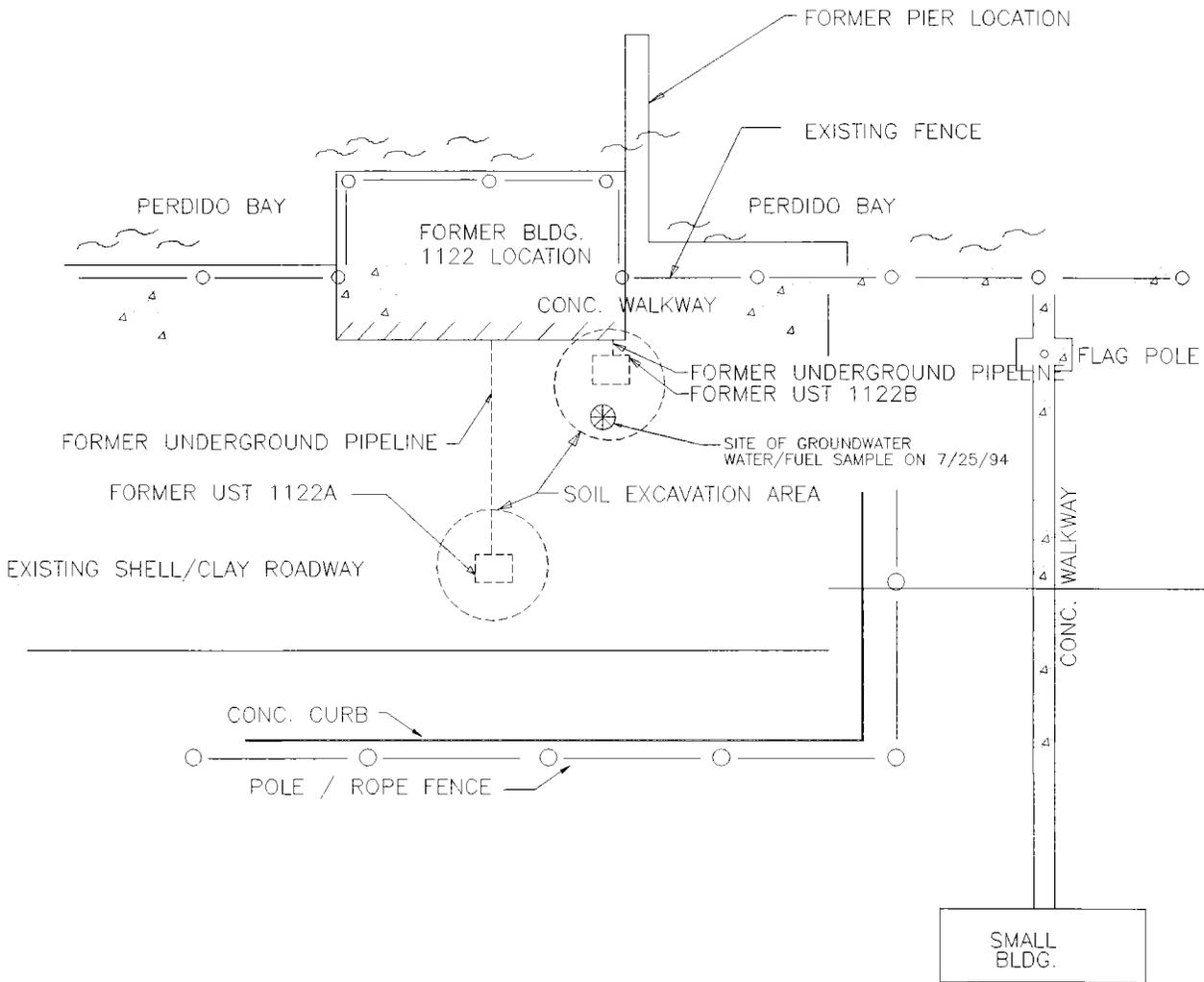


NAVAL AIR TRAINING CENTER, PENSACOLA, FLA.
 N.A.A.S. BRONSON FIELD
COMP. AIR, BUTANE, GASOLINE & OILS
 SERVICE DRAWING - NOT MAP
 APPROVED: 24 JUNE, 1944
 CAPT. J. W. ...
 D-1

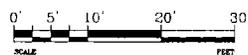
NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA	
SCALE:	FIGURE 3
DRAWN BY: DWG. NO. REVISED BY:	
1944 SITE MAP OF SITE 1122 SITE 1122, BRONSON FIELD	
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS, PENSACOLA	



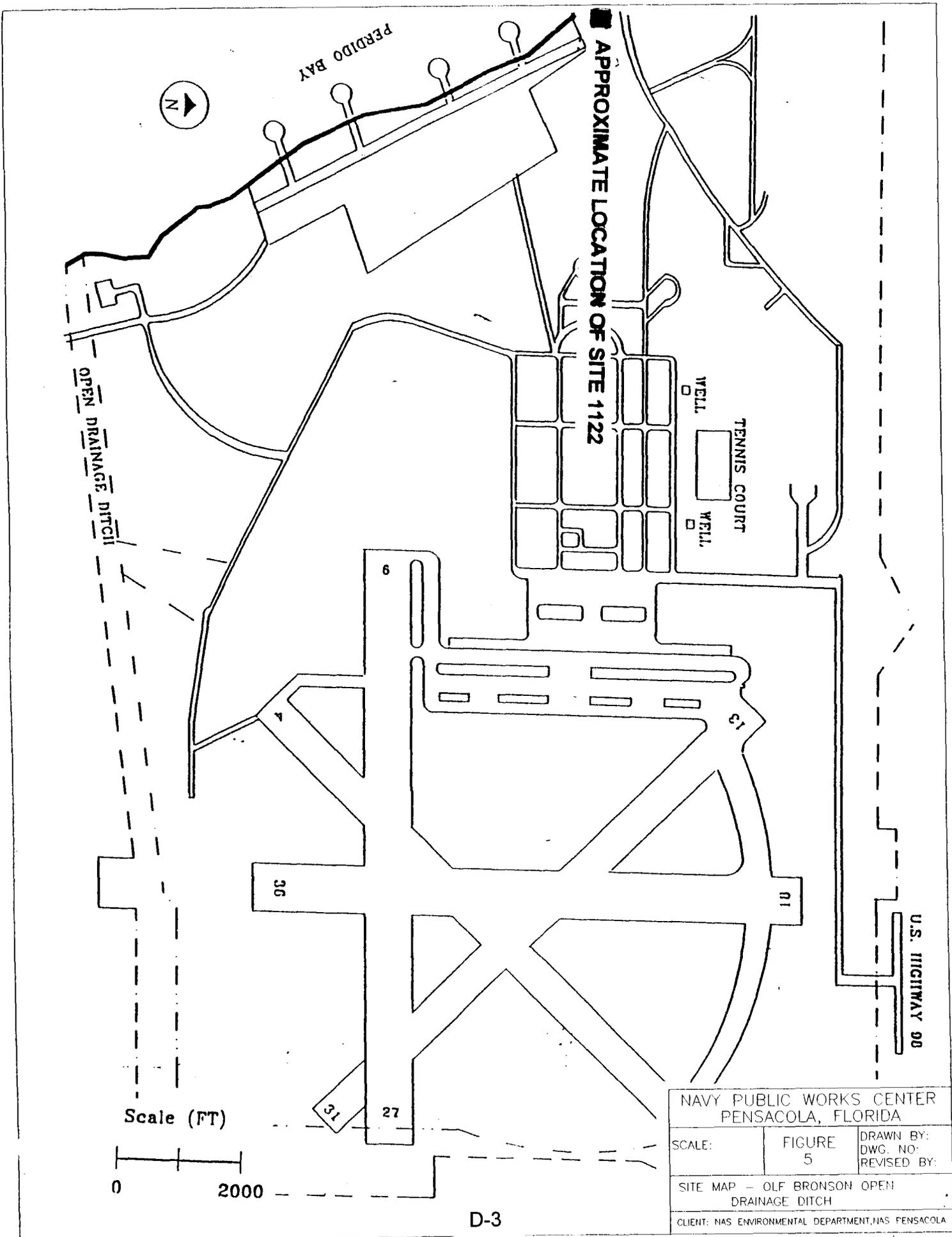
PERDIDO BAY



LEGEND	
	FENCE
	BUILDING



NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 4	DRAWN BY: DWG. NO: REVISED BY:
1997 SITE MAP SITE 1122, BRONSON FIELD		
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA		



APPENDIX E

DISCHARGE REPORT FORM

CLOSURE ASSESSMENT



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form #	17-761.900(1)
Form Title	Discharge Reporting Form
Effective Date	December 10, 1990
DER Application No.	(Filed in by DER)

Discharge Reporting Form

Use this form to notify the Department of Environmental Regulation of:

1. Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
2. Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-761.460 F.A.C. within one working day of discovery.
3. Hazardous substance (CERCLA regulated), discharges exceeding applicable reportable quantities established in 17-761.460(2) F.A.C., within one working day of the discovery.
4. Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discovered in the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection method or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 gallons or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE
Complete all applicable blanks

1. DER Facility ID Number: 17/9300938 2. Tank Number: 1122-A & B 3. Date: 25 JULY 1994

4. Facility Name: US Navy - Bronson Field

Facility Owner or Operator: Commanding Officer, Naval Air Station

Facility Address: Building 1122, Bronson Field

Telephone Number: (904) 452-3900 County: Escambia

Mailing Address: 190 Radford Boulevard, Pensacola, Florida 32508-5217

5. Date of receipt of test results or discovery: 25 July 1994 month/day/year

6. Method of initial discovery. (circle one **only**)
- | | | |
|---|-----------------------------|---|
| A. Liquid detector (automatic or manual) | D. Emptying and Inspection. | F. Vapor or visible signs of a discharge in the vicinity. |
| B. Vapor detector (automatic or manual) | E. Inventory control. | G. Closure: <u>OVA</u> (explain) |
| C. Tightness test (underground tanks only). | | H. Other: _____ |

7. Estimated number of gallons discharged: Unknown

8. What part of storage system has leaked? (circle all that apply) A. Dispenser B. Pipe C. Fitting D. Tank **E.** Unknown

9. Type of regulated substance discharged. (circle one)
- | | | | |
|----------------------|---------------------|-------------------|---|
| A. leaded gasoline | D. vehicular diesel | L. used/waste oil | V. hazardous substance includes pesticides, ammonia, chlorine and derivatives (write in name or Chemical Abstract Service CAS number) |
| B. unleaded gasoline | F. aviation gas | M. diesel | Z. other (write in name) <u>Heating Fuel Oil,</u> |
| C. gasohol | G. jet fuel | O. new/lube oil | <u>Gasoline</u> |

10. Cause of leak. (circle all that apply)

A. Unknown	C. Loose connection	E. Puncture	G. Spill _____	I. Other (specify) _____
B. Split	D. Corrosion	F. Installation failure	H. Overfill	

11. Type of financial responsibility. (circle one)

A. Third party insurance provided by the state insurance contractor	C. Not applicable
B. Self-insurance pursuant to Chapter 17-769.500 F.A.C.	D. None

To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.

William H. Taylor, Jr.

Printed Name of Owner, Operator or Authorized Representative

William H. Taylor, Jr. 7/25/94
Signature of Owner, Operator or Authorized Representative

E-1





Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form # 17-761.900(6)
Form Title <u>Closure Assessment Form</u>
Effective Date <u>December 10, 1990</u>
DER Application No. _____ (Filed in by DER)

Closure Assessment Form

Owners of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a storage system closure assessment was performed in accordance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection Incentive (EDI) and Reimbursement Program sites do not have to perform a closure assessment.

Please Print or Type
Complete All Applicable Blanks

- Date: 28 November 1995
- DER Facility ID Number: 17/9300938
- County: Escambia
- Facility Name: U.S. Navy, Bronson Field
- Facility Owner: Commanding Officer, Naval Air Station
- Facility Address: Building 1122
- Mailing Address: 190 Radford Boulevard, Pensacola, Florida 32508-5217
- Telephone Number: (904) 452-3900
- Facility Operator: Mr. Dean Spencer, PE
- Are the Storage Tank(s): (Circle one or both) A. Aboveground or **(B)** Underground
Type of Product(s) Stored: Heating Fuel Oil, Gasoline
- Were the Tank(s): (Circle one) A. Replaced **(B)** Removed C. Closed in Place D. Upgraded (aboveground tanks only)
- Number of Tanks Closed: 2
- Age of Tanks: 50

Facility Assessment Information

- | Yes | No | Not Applicable | |
|-------------------------------------|-------------------------------------|-------------------------------------|--|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | | 1. Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 2. Was a Discharge Reporting Form submitted to the Department?
If yes, When: <u>25 July 1994</u> Where: <u>ECHD</u> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 3. Is the depth to ground water less than 20 feet? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Are monitoring wells present around the storage system?
If yes, specify type: <input type="checkbox"/> Water monitoring <input type="checkbox"/> Vapor monitoring |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5. Is there free product present in the monitoring wells or within the excavation? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Were the petroleum hydrocarbon vapor levels in the soils greater than 500 parts per million for gasoline?
Specify sample type: <input type="checkbox"/> Vapor Monitoring wells <input type="checkbox"/> Soil sample(s) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 7. Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene?
Specify sample type: <input type="checkbox"/> Vapor Monitoring wells <input type="checkbox"/> Soil sample(s) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Were the analytical laboratory results of the ground water sample(s) greater than the allowable state target level?
(See target levels on reverse side of this form and supply laboratory data sheets) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 9. If a used oil storage system, did a visual inspection detect any discolored soil indicating a release? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | | 10. Are any potable wells located within 1/2 of a mile radius of the facility? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 11. Is there a surface water body within 1/4 mile radius of the site? If yes, indicate distance: <u>10'</u> |



DER Form	17-761.900(6)
Form Title	Closure Assessment Form
Effective Date	December 10, 1990
DER Application No.	(Filed in by DER)

12. A detailed drawing or sketch of the facility that includes the storage system location, monitoring wells, buildings, storm drains, sample locations, and dispenser locations must accompany this form.
13. If a facility has a pollutant storage tank system that has both gasoline and kerosene/diesel stored on site, both EPA Method 602 and EPA Method 610 must be performed on the ground water samples obtained.
14. Amount of soils removed and receipt of proper disposal.
15. If yes is answered to any one of questions 5-9, a Discharge Reporting Form 17-761.900(1) indicating a suspected release shall be submitted to the Department within one working day.
16. A copy of this form and any attachments must be submitted to the Department's district office in your area and to the locally administered program office under contract with the Department within 60 days of completion of tank removal or filling a tank with an inert material.

William H. Taylor Jr.
 William H. Taylor, Jr.

Signature of Owner

01/12/96
 Date

Paul R. Semmes, PE
 Signature of Person Performing Assessment

28 November 1995
 Date

Environmental Engineer
 Title of Person Performing Assessment

State Ground Water Target Levels That Affect A Pollutant Storage Tank System Closure Assessment

State ground water target levels are as follows:

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. For gasoline (EPA Method 602): <ol style="list-style-type: none"> a. Benzene 1 ug/l b. Total VOA 50 ug/l <ul style="list-style-type: none"> - Benzene - Toluene - Total Xylenes - Ethylbenzene c. Methyl Test-Butyl Ether (MTBE) 50 ug/l | <ol style="list-style-type: none"> 2. For kerosene/diesel (EPA Method 610): <ol style="list-style-type: none"> a. Polynuclear Aromatic Hydrocarbons (PAHS)
 (Best achievable detection limit, 10 ug/l maximum) |
|--|---|

APPENDIX F

FIGURE 6: SITE LOCATION MAP:

**LOCATION OF GROUNDWATER SAMPLE “WATER/FUEL”
COLLECTED AT EXCAVATION SITE OF B1122B**



PERDIDO BAY

FORMER PIER LOCATION

EXISTING FENCE

PERDIDO BAY

FORMER BLDG.
1122 LOCATION

PERDIDO BAY

CONC. WALKWAY

FLAG POLE

FORMER UNDERGROUND PIPELINE
FORMER UST 1122B

MW-7
FORMER UNDERGROUND PIPELINE

SITE OF GROUNDWATER
WATER/FUEL SAMPLE ON 7/25/94

FORMER UST 1122A

SOIL EXCAVATION AREA

EXISTING SHELL/CLAY ROADWAY

MW-10

MW-6

MW-9

MW-11

CONC. CURB

MW-4

MW-3

POLE / ROPE FENCE

CONC. WALKWAY

MW-2

MW-10

SMALL
BLDG.

MW-13

MW-14

LEGEND

○—○ FENCE

MW-3 ● MONITORING WELL LOCATION/NUMBER

////// BUILDING

NAVY PUBLIC WORKS CENTER
PENSACOLA, FLORIDA

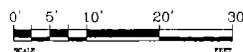
SCALE:

FIGURE
6

DRAWN BY:
DWG. NO:
REVISED BY:

GROUNDWATER SAMPLING LOCATION MAP
SITE 1122, BRONSON FIELD

CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA



APPENDIX G

**TABLE I: Summary of VOA, TPH, & EDB
Analytical Results for Groundwater Collected
from MW-12**

**TABLE II: Summary of TPH and EDB
Analytical Results for Groundwater
Collected from MW-2, MW-5, MW-8,
MW-10, DMW-12, and MW-13**

TABLE I

**SUMMARY OF VOAs, TPHs, & EDBs
ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELL DMW-12
U.S. NAVY OUTLYING LANDING FIELD BRONSON, SITE 1122**

PARAMETER	MONITORING WELL NUMBER		
	DMW-12 6/4/96	DMW-12 8/18/98	DMW-12 10/21/98
VOAs:			
Tetrachloroethene	3	NS	2
1,1,1,2-Tetrachloroethane	BDL	NS	2
TPH	BDL	BDL	NS
EDBs	BDL	BDL	NS

NOTES: BDL = Below detection limits
All results reported in parts per billion (ppb) unless otherwise noted.
Groundwater samples collected from DMW-12 on dates indicated above.

TABLE II
SUMMARY OF TPH AND EDB
ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES
COLLECTED FROM MONITORING WELLS MW-2, MW-5, MW-8, MW-10,
DMW-12, and MW-13
U.S. NAVY OUTLYING LANDING FIELD BRONSON, SITE 1122

PARAMETER	MONITORING WELL NUMBERS					
	MW-2	MW-5	MW-8	MW-10	DMW-12	MW-13
TPH 8/18/98	BDL	BDL	BDL	BDL	BDL	280
TPH 8/23/96	-	-	-	-	-	BDL
TPH 6/4/96	-	-	-	BDL	BDL	-
TPH 3/21/96	12000	40000	64000	-	-	-
EDB 8/18/98	BDL	BDL	BDL	BDL	BDL	BDL
EDB 8/23/96	-	-	-	-	-	0.46
EDB 6/4/96	-	-	-	0.03	BDL	-
EDB 3/21/96	BDL	BDL	BDL	-	-	-

NOTES: All results reported in parts per billion (ppb) unless otherwise noted.
Groundwater monitoring analyses performed on monitoring wells on dates indicated above.
BDL = Below detection limits
- Not sampled
TRPH = Total Recoverable Petroleum Hydrocarbons
EDB = 1,2 Dibromoethane

APPENDIX H

Groundwater Analytical Results

**Navy Public Works Center
Environmental Laboratory**

Bldg. 3887, Code 920
NAS Pensacola, FL 32508 - 6500
Phone (904) 452-4728/3642
DSN 922-4728/3642

Client: NPWC Environmental
Address: Bldg 3887
NAS Pensacola, FL 32508
Phone #: 452-4728
Contact: Greg Campbell

**Analytical Report
601/602 Volatiles by Method 8260**

Lab Report Number: 62522
Sample Date: 06/4/96
Received Date: 06/5/96
Sample Site: Bronson Field
Job Order No.: 130 5001

LAB Sample ID#	1- 62522			
Sample Name / Location	DMW-12 BF-1122			
Collector's Name	PJB			
Date & Time Collected	6/4/96 @ 1445			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	06/6/96 / JM			
Date of Analysis	06/6/96			
Sample Matrix	GW			
Dilution	X 1			
Compound Name	1- 62522	units	Det. Limit	Flags
Benzene	BDL	ug/L	1	
Bromodichloromethane	BDL	ug/L	1	
Bromoform	BDL	ug/L	2	
Bromomethane	BDL	ug/L	3	
Carbon Tetrachloride	BDL	ug/L	1	
Chlorobenzene	BDL	ug/L	1	
Chloroethane	BDL	ug/L	1	
2-Chloroethylvinyl ether	BDL	ug/L	5	
Chloroform	BDL	ug/L	1	
Chloromethane	BDL	ug/L	1	
Dibromochloromethane	BDL	ug/L	1	
1,2-Dichlorobenzene	BDL	ug/L	1	
1,3-Dichlorobenzene	BDL	ug/L	1	
1,4-Dichlorobenzene	BDL	ug/L	1	
Dichlorodifluoromethane	BDL	ug/L	1	
1,1-Dichloroethane	BDL	ug/L	1	
1,2-Dichloroethane	BDL	ug/L	1	
1,1-Dichloroethene	BDL	ug/L	1	
trans-1,2-Dichloroethene	BDL	ug/L	1	
1,2-Dichloropropane	BDL	ug/L	1	
cis-1,3-Dichloropropene	BDL	ug/L	1	
trans-1,3-Dichloropropene	BDL	ug/L	1	
Ethylbenzene	BDL	ug/L	1	
Methylene Chloride	BDL	ug/L	5	
Methyl-tert-butyl ether (MTBE) *	BDL	ug/l	5	
1,1,2,2-Tetrachloroethane	BDL	ug/L	1	
Tetrachloroethene	3	ug/L	1	
Toluene	BDL	ug/L	1	
1,1,1-Trichloroethane	BDL	ug/L	1	
1,1,2-Trichloroethane	BDL	ug/L	1	
Trichloroethene	BDL	ug/L	1	
Trichlorofluoromethane	BDL	ug/L	1	
Vinyl Chloride	BDL	ug/L	1	
Xylenes (Total)	BDL	ug/L	1	

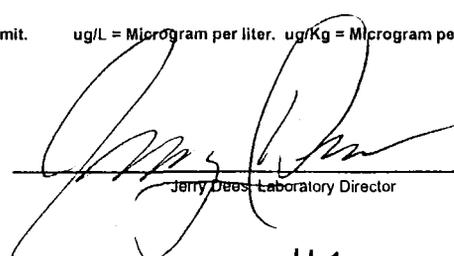
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	
1,2-Dichloroethane-d4	75-133	113
Toluene-d8	86-119	104
Bromofluorobenzene	85-116	103

COMMENTS :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram. * = FL HRS certification pending.

Approved by :



Jerry Dees, Laboratory Director

Date: 6/25/96

Report Generated
Page 1 of 1 End of Report

Environmental Laboratory

Bldg. 3887, Code 920
 NAS Pensacola, FL 32508 - 6500
 Phone (904) 452-4728/3642
 DSN 922-4728/3642

Client: NPWC Environmental
 Address Bldg 3887
 NAS Pensacola, FL 32508
 Phone 452-4728
 Contact Greg Campbell

610 PAH's by Method 8270
 Lab Report Number: 62522
 Sample Date: 06/4/96
 Received Date: 06/5/96
 Sample Site: Bronson Field
 Job Order No.: 130 5001

LAB Sample ID#	1- 62522		
Sample Name / Location	DMW-12 BF-1122		
Collector's Name	PJB		
Date & Time Collected	6/4/96 @ 1445		
Sample Type (composite or grab)	Grab		
Analyst	M. Chambers		
Date of Extraction / Initials	6/10/96; JJ		
Date of Analysis	6/12/96		
Sample Matrix	GW		
Dilution	X 1		
COMPOUND NAME	1- 62522	units	Det. Limit
Acenaphthene	BDL	UG/L	5
Acenaphthylene	BDL	UG/L	5
Anthracene	BDL	UG/L	2
Benzo(a)anthracene	BDL	UG/L	3
Benzo(a)pyrene	BDL	UG/L	2
Benzo(b)fluoranthene	BDL	UG/L	4
Benzo(g,h,i)perylene	BDL	UG/L	3
Benzo(k)fluoranthene	BDL	UG/L	4
Chrysene	BDL	UG/L	3
Dibenz(a,h)anthracene	BDL	UG/L	3
Fluoranthene	BDL	UG/L	2
Fluorene	BDL	UG/L	4
Indeno(1,2,3-cd)pyrene	BDL	UG/L	2
1-Methylnaphthalene *	BDL	UG/L	5
2-Methylnaphthalene	BDL	UG/L	7
Naphthalene	BDL	UG/L	7
Phenanthrene	BDL	UG/L	3
Pyrene	BDL	UG/L	3

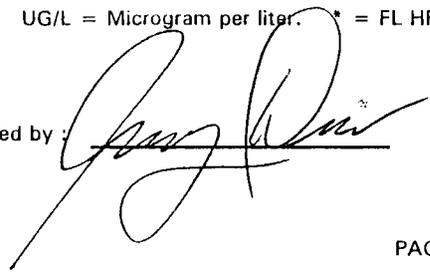
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	
Nitrobenzene- d5	35-114	53
2-Fluorobiphenyl	43-116	55
Terphenyl -d14	33-141	77

COMMENTS :

BDL = Below detection limit. UG/L = Microgram per liter. * = FL HRS certification pending

Approved by :



Date/Time :

6/25/96 1600

Navy Public Works Center
 Environmental Laboratory
 Bldg. 3887, Code 920
 NAS Pensacola, FL 32508 - 6500
 Phone (904) 452-4728/3642
 DSN 922-4728/3642

Client: NPWC Environmental
 Address: Bldg 3887
 NAS Pensacola, FL 32508
 Phone #: 452-4728
 Contact: Greg Campbell

Analytical Report
Ethylene Dibromide by Method 504

Lab Report Number: 62522 A
 Sample Date: 06/4/96
 Received Date: 06/5/96
 Sample Site: Bronson Field
 Job Order No.: 130 5001

LAB Sample ID#	1- 62522			
Sample Name / Location	DMW-12 BF-1122			
Collector's Name	PJB			
Date & Time Collected	6/4/96 @ 1445			
Sample Type (composite or grab)	Grab			
Analyst	B. Jacquart			
Date of Extraction / Initials	06/12/96 -BJ			
Date of Analysis	06/12/96			
Sample Matrix	GW			
Dilution	X		1	
Compound Name	1-	62522	units	Det. Limit
Ethylene Dibromide (EDB)		BDL	ug/L	0.02
			Flags	

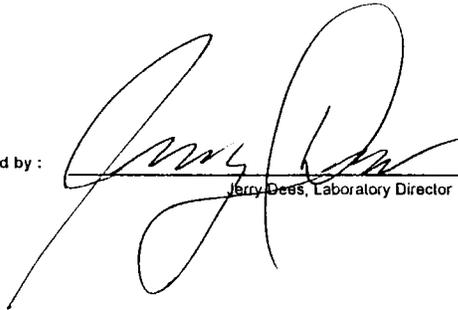
SURROGATE SPIKE RECOVERIES

	Acceptance Limits		Percent Recovery
Tetra-Chloro-m-Xylene	54-140	108 %	

COMMENTS :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 6/25/96

Report Generated

Page 1 of 1 End of Report

**Navy Public Works Center
Environmental Laboratory**

Bldg. 3887, Code 920
NAS Pensacola, FL 32508 - 6500
Phone (904) 452-4728/3642
FAX 922-4728/3642

Client: NPWC Environmental
Address: Bldg 3887
NAS Pensacola, FL 32508
Phone #: 452-4728
Contact: Greg Campbell

**Analytical Report
TPH by Method EPA 418.1**

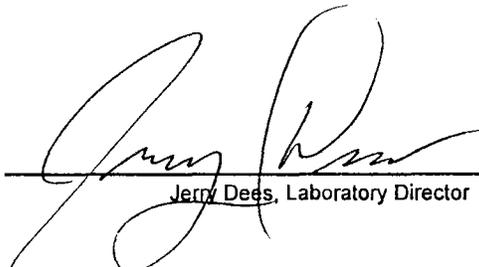
Lab Report Number: 62522
Sample Date: 06/4/96
Received Date: 06/5/96
Sample Site: Bronson Field
Job Order No.: 130 5001

LAB Sample ID#	1- 62522		
Sample Name / Location	DMW-12 BF-1122		
Collector's Name	PJB		
Date & Time Collected	6/4/96 @ 1445		
Sample Type (composite or grab)	Grab		
Analyst	B.Jacquart		
Date of Extraction / Initials	6/21/96 / BJ		
Date of Analysis	6/21/96		
Sample Matrix	GW		
Dilution	X 1		
COMPOUND NAME	62522	units	Det. Limit
Total Petroleum Hydrocarbons (TPH)	BDL	mg/L	7

COMMENTS : _____

BDL = Below Detection Limit. mg/L = Milligram per liter. ug/Kg = Microgram per kilogram. * = FL HRS certification pending.

Approved by :



Jerry Dees, Laboratory Director

Date: 6/24/96
Report Generated

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg.458, Code 400
 NAS Pensacola, Fl 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Ethylene Dibromide by Method 508

Lab Report Number: 83219
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83219			
Sample Name / Location	Bronson Site 1122 MW #5			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1230			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83219	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

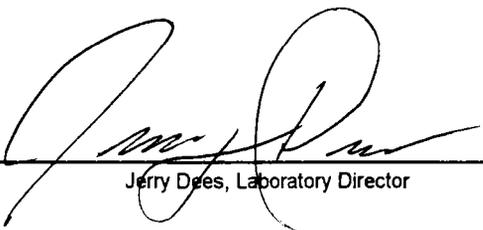
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	108

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NPWC Engineering
Address: Bldg. 458, Code 400
NAS Pensacola, FL 32508
Phone #: (850) 452-4315
Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83219
Sample Date: 18 Aug 98
Received Date: 18 Aug 98
Sample Site: Bronson Field
Job Order No.: 130 6271

LAB Sample ID#	1- 83219			
Sample Name / Location	Bronson Site 1122 MW #5			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1230			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83219	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

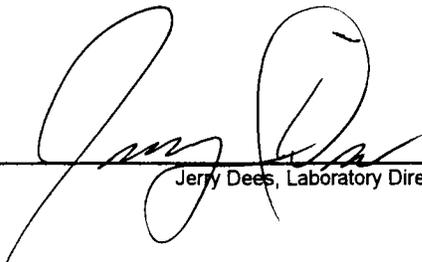
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	107
Nonatriacontane (C-39)	42-193	98

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Navy Public Works Center Environmental Laboratory

Analytical Report

Ethylene Dibromide by Method 508

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg.458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Lab Report Number: 83220
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83220			
Sample Name / Location	Bronson Site 1122 MW #8			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1245			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83220	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

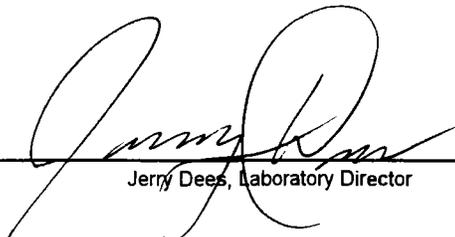
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	93

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :


 Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated

End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NPWC Engineering
Address: Bldg. 458, Code 400
NAS Pensacola, FL 32508
Phone #: (850) 452-4315
Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83220
Sample Date: 18 Aug 98
Received Date: 18 Aug 98
Sample Site: Bronson Field
Job Order No.: 130 6271

LAB Sample ID#	1- 83220			
Sample Name / Location	Bronson Site 1122 MW #8			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1245			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83220	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

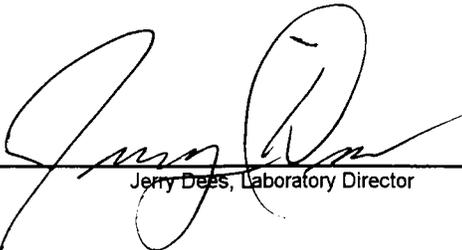
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	109
Monatriacontane (C-39)	42-193	106

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Navy Public Works Center Environmental Laboratory

Analytical Report

Ethylene Dibromide by Method 508

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg.458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Lab Report Number: 83221
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83221			
Sample Name / Location	Bronson Site 1122 DMW #12			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1255			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83221	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

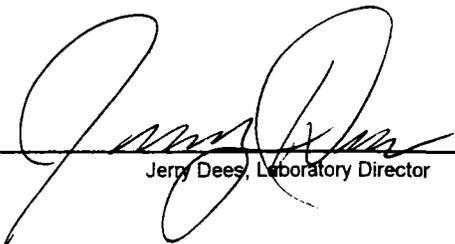
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	99

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83221
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	1- 83221			
Sample Name / Location	Bronson Site 1122 DMW #12			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1255			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	3 Aug 98 JJ			
Date of Analysis	20 Aug 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83221	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

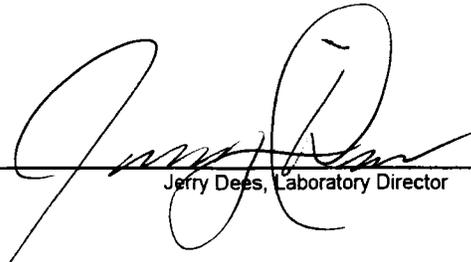
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	97
Nonatriacontane (C-39)	42-193	82

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :



 Jerry Dees, Laboratory Director

Date: 9/22/98

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg.458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Ethylene Dibromide by Method 508

Lab Report Number: 83222
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83222			
Sample Name / Location	Bronson Site 1122 MW #2			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1310			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83222	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

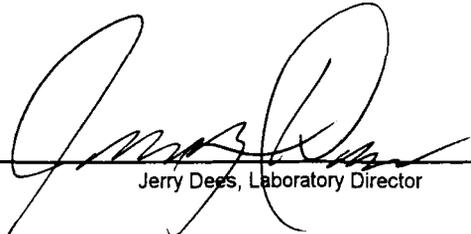
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	98

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



 Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
 End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83222
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	1- 83222			
Sample Name / Location	Bronson Site 1122 MW #2			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1310			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83222	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

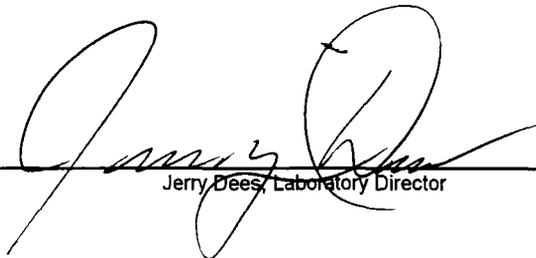
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	109
Nonatriacontane (C-39)	42-193	72

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Navy Public Works Center Environmental Laboratory

Analytical Report

Ethylene Dibromide by Method 508

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg.458, Code 400
 NAS Pensacola, FI 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Lab Report Number: 83223
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83223			
Sample Name / Location	Bronson Site 1122 Equipment Blank			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1320			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	DI Water			
Dilution	X 1			
Compound Name	83223	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

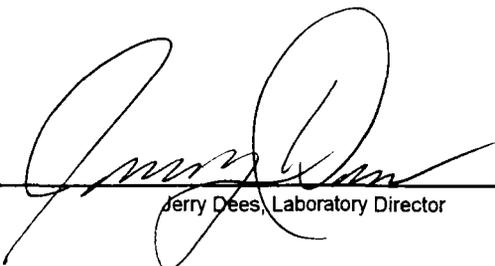
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	93

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83223
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	1- 83223			
Sample Name / Location	Bronson Site 1122 Equipment Blank			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1320			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	DI Water			
Dilution	x 1			
Parameter	1- 83223	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

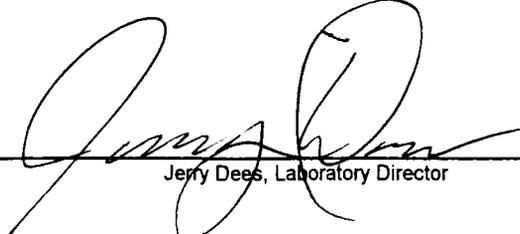
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	116
Nonatriacontane (C-39)	42-193	125

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :



 Jerry Dees, Laboratory Director

Date: 9/22/98

Navy Public Works Center Environmental Laboratory

Analytical Report

Ethylene Dibromide by Method 508

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg.458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Lab Report Number: 83224
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83224			
Sample Name / Location	Bronson Site 1122 MW #10			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1325			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83224	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

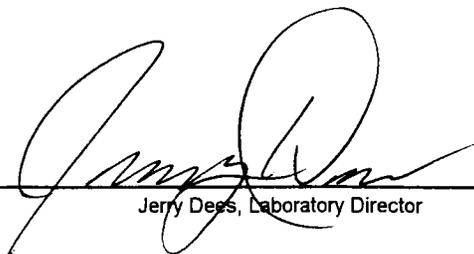
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	89

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83224
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	1- 83224			
Sample Name / Location	Bronson Site 1122 MW #10			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1325			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83224	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

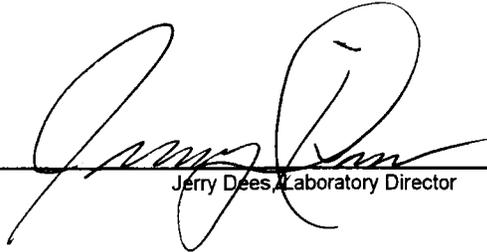
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	105
Nonatriacontane (C-39)	42-193	100

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :


 Jerry Dees, Laboratory Director

Date: 9/22/98

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Ethylene Dibromide by Method 508

Lab Report Number: 83225
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83225			
Sample Name / Location	Bronson Site 1122 MW #13			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1345			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83225	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

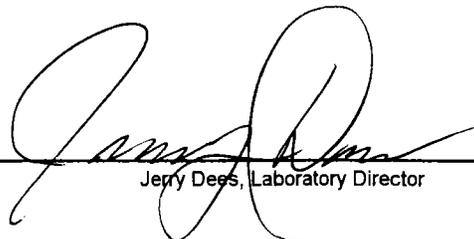
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	92

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
 End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83225
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	1- 83225			
Sample Name / Location	Bronson 1122 MW #13			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ 1345			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83225	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	0.28	mg/L	0.25	

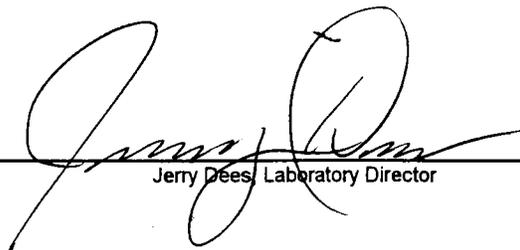
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	111
Nonatriacontane (C-39)	42-193	70

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :


 Jerry Dees, Laboratory Director

Date: 9/24/98

Navy Public Works Center Environmental Laboratory

Analytical Report

Ethylene Dibromide by Method 508

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Lab Report Number: 83226
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	83226			
Sample Name / Location	Bronson Site 1122 Duplicate			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ NS			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	9 Sep 98 JM			
Date of Analysis	9 Sep 98			
Sample Matrix	Groundwater			
Dilution	X 1			
Compound Name	83226	units	Det. Limit	Flags
Ethylene Dibromide (EDB)	BDL	ug/L	0.02	

SURROGATE SPIKE RECOVERY

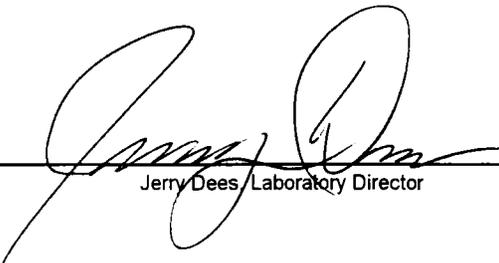
	Acceptance Limits	Percent Recovery
Tetra-chloro-m-xylene	54 - 140	95

Explanation of Flags :

Comments :

BDL = Below Detection Limit. ug/L = Microgram per liter. ug/Kg = Microgram per kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date: 9/22/98

Report Generated
End of Report

Navy Public Works Center Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Greg Campbell

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 83226
 Sample Date: 18 Aug 98
 Received Date: 18 Aug 98
 Sample Site: Bronson Field
 Job Order No.: 130 6271

LAB Sample ID#	1- 83226			
Sample Name / Location	Bronson Site 1122 Duplicate			
Collector's Name	BH/PK			
Date & Time Collected	18 Aug 98 @ NS			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	21 Aug 98 JJ			
Date of Analysis	14 Sep 98			
Sample Matrix	Groundwater			
Dilution	x 1			
Parameter	1- 83226	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	BDL	mg/L	0.25	

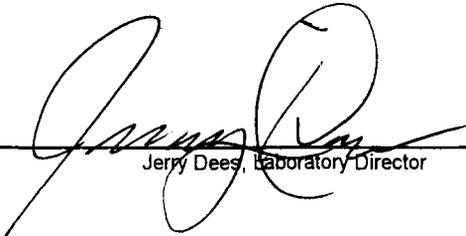
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142	113
Monatriacontane (C-39)	42-193	84

COMMENTS :

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :


 Jerry Dees, Laboratory Director

Date: 9/22/98

142

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS (UST Projects)

NPWC Environmental Laboratory
 Bldg. 3887, Code 920
 NAS Pensacola, FL 32508
 Phone - (904) 452-4728/3642
 DSN 922-4728/3642
 FAX (904) 452-2799/2387

Requester: NPWC ENGINEERING
 Address: BLDG. 458 CODE 400
NAS PENSACOLA, FL 32508
 Phone #: 452-4315
 Contact: GREG CAMPBELL
 Job Order #: 130 6271

Report Required? Yes No QC Required? Yes No
 Lab ID Number: _____
 Sample Date: 8-18-98
 Received Date: 8-18-98
 Sample Site: BRONSON - Site 1122
 Lab Due Date: _____

Sample ID #	Lab	018-3219	028-3220	038-3221	048-3222	Notes:						
Sample Name		MW#5	MW#8	DMW#12	MW#2	Site 1122 Bronson Field MW#8-QC						
or Location		Bronson										
Sampled by		BH/PK										
Composite	Begin											
Date/Time	Frequency											
Collected	End											
Grab Time		1230	1245	1255	1310							
Sample Matrix		GW										
PARAMETER by Method Name	METHOD #	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used
Ethylene Dibromide (EDB)	EPA 504	X	2 Btl's	X	2 Btl's	X	2 Btl's	X	2 Btl's	3	120ml A VOA/4 oz.	None/4° C
Purg. Halocarbons/GC	EPA 601									4	40 ml VOA Vial x 2	HCl/4° C
Purg. Aromatics/GC	EPA 602									3	40 ml VOA Vial x 2	HCl/4° C
Purg. Halo. & Ars./GC	EPA 601/602									6	40 ml VOA Vial x 2	HCl/4° C
Polynuclear Aromatics/HPLC	EPA 610									7	1L Amber x 2	4° C
Purgeables/GCMS	EPA 624									6	40 ml VOA Vial x 2	HCl/4° C
Base/Neutrals & Acids/GCMS	EPA 625									15	1L Amber x 2	4° C
Gas Chromatography	EPA SW 8000									5	40ml 2/1Lx2/4 oz.	HCl/4° C/None
Halo. Vol. Org./GC	EPA SW 8010									4	40ml VOA/2/4 oz.	HCl/4° C/None
Non-Halo. Vol. Org./GC	EPA SW 8015(MOO)									4	40ml 2/1Lx2/4 oz.	HCl/4° C/None
Arom. Vol. Org./GC	EPA SW 8020									3	40ml VOA/2/4 oz.	HCl/4° C/None
Halo./Arom. Vol. Org./GC	EPA SW 8010/8020									6	40ml VOA/2/4 oz.	HCl/4° C/None
Polynuclear Aromatics/GC	EPA SW 8100									6	1Lx2/4 oz.	4° C/None
VOC/GCMS	EPA SW 8240A									8	40ml VOA/2/4 oz.	HCl/4° C/None
VOC/GCMS -Cap.	EPA SW 8280									8	40ml VOA/2/4 oz.	HCl/4° C/None
Semivol. Org./GCMS -Cap.	EPA SW 8270A									16	1Lx3/4 oz.	4° C/None
Polynuclear Aromatics (PAH's)	EPA SW 8310									9	1Lx3/4 oz.	4° C/None
PARAMETER by Group Name	METHOD SOURCE	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used
Gasoline Analytical Group	EPA SW-846									47	Consult Lab	Consult Lab
Kerosene Analytical Group	EPA SW-846									39	Consult Lab	Consult Lab
Mixed Product Analytical Group	EPA SW-846									24	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	EPA 418.1									2	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	FL-PRO	X	2 Btl's	X	3 Btl's	X	2 Btl's	X	2 Btl's	7	Consult Lab	Consult Lab
PCRA Metals (6)	EPA Various									8	Consult Lab	Consult Lab
TCLP Metals (6) w/extraction	EPA SW-846									10	Consult Lab	Consult Lab
Lead (Pb) only	EPA 238.2									1	250ml/4 oz.	HNO ₃ /None
Other:												

Comments:

Relinquished by: _____
 Date/Time: 8/18/98

Received by: _____
 Date/Time: 8/18/98 1445

242

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS (UST Projects)

NPWC Environmental Laboratory
 Jg. 3887, Code 020
 NAS Pensacola, Fl. 32508
 Phone - (904) 452-4728/3642
 DSN 922-4728/3642
 FAX (904) 452-2799/2367

Requester: NPWC ENGINEERING
 Address: BLDG. 458 CODE 400
NAS PENSACOLA, FL 32508
 Phone #: 452-4315
 Contact: GREG CAMPBELL
 Job Order #: 130 6271

Report Required? Yes No QC Required? Yes No
 Lab ID Number: _____
 Sample Date: 8-18-98
 Received Date: 8-18-98
 Sample Site: Bronson
 Lab Due Date: _____

Sample ID #	Lab	01-8-3223	02-8-3224	03-8-3225	04-8-3226	Notes:						
Sample Name or Location		Equipment Blank	mW 10	mW 13	Duplicate	Bronson Field Site 1122						
Sampled by		PK	BH/PK	BH/PK	PK/PK							
Composite	Begin											
Date/Time	Frequency											
Collected	End											
Grab Time		1320	1325	1345								
Sample Matrix		DT	BW	BW	BW							
PARAMETER by Method Name	METHOD #	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used
Ethylene Dibromide (EDB)	EPA 504	X	2 B+13	X	2 B+15	X	2 B+15	X		3	120ml A VOA/4 oz.	None/4° C
Purg. Halocarbons/GC	EPA 601									4	40 ml VOA Vial x 2	HCl/4° C
Purg. Aromatics/GC	EPA 602									3	40 ml VOA Vial x 2	HCl/4° C
Purg. Halo. & Aro./GC	EPA 601/602									6	40 ml VOA Vial x 2	HCl/4° C
Polynuclear Aromatics/HPLC	EPA 610									7	1L Amber x 2	4° C
Purgeables/GCMS	EPA 624									8	40 ml VOA Vial x 2	HCl/4° C
Bases/Neutrals & Acids/GCMS	EPA 625									15	1L Amber x 2	4° C
Gas Chromatography	EPA SW 8000									5	40ml/2/1Lx2/4 oz.	HCl/4° C/None
Halo. Vol. Org./GC	EPA SW 8010									4	40ml VOAx2/4 oz.	HCl/4° C/None
Non-Halo. Vol. Org./GC	EPA SW 8015(MOD)									4	40ml/2/1Lx2/4 oz.	HCl/4° C/None
Arom. Vol. Org./GC	EPA SW 8020									3	40ml VOAx2/4 oz.	HCl/4° C/None
Halo./Arom. Vol. Org./GC	EPA SW 8010/8020									6	40ml VOAx2/4 oz.	HCl/4° C/None
Polynuclear Aromatics/GC	EPA SW 8100									6	1Lx2/4 oz.	4° C/None
VOC/GCMS	EPA SW 8240A									8	40ml VOAx2/4 oz.	HCl/4° C/None
VOC/GCMS-Cap.	EPA SW 8280									8	40ml VOAx2/4 oz.	HCl/4° C/None
Semivol. Org./GCMS-Cap.	EPA SW 8270A									16	1Lx2/4 oz.	4° C/None
Polynuclear Aromatics (PAHs)	EPA SW 8310									9	1Lx2/4 oz.	4° C/None
PARAMETER by Group Name	METHOD SOURCE	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used
Gasoline Analytical Group	EPA SW-846			X	2 B+15			X		47	Consult Lab	Consult Lab
Kerosene Analytical Group	EPA SW-846									39	Consult Lab	Consult Lab
Mixed Product Analytical Group	EPA SW-846									24	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	EPA 418.1									2	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	FL-PRO	X	2 B+15	X	2 B+15	X	2 B+15	X	2 B+15	7	Consult Lab	Consult Lab
RCRA Metals (6)	EPA Various									8	Consult Lab	Consult Lab
TCLP Metals (6) w/extraction	EPA SW-846									10	Consult Lab	Consult Lab
Lead (Pb) only	EPA 239.2									1	250ml/4 oz.	HNO ₃ /None
Other:												

Comments:

Relinquished by: [Signature]
 Date/Time: 8/18/98 1410

Received by: [Signature]
 Date/Time: 8/18/98 1445

Mreg

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS (UST Projects)

NPWC Environmental Laboratory

Report Required? Yes No QC Required? Yes No

Bldg. 3887, Code 920
NAS Pensacola, FL 32508
Phone - (904) 452-4728/3642
DSN 922-4728/3642
FAX (904) 452-2799/2387

Requester: NPWC ENGINEERING
Address: BLDG. 458 CODE 400
NAS PENSACOLA, FL 32508
Phone #: 452-4315
Contact: GREG CAMPBELL
Job Order #: ~~1305001~~ 1305001

Lab ID Number: _____
Sample Date: 10/21/98
Received Date: 10/21/98
Sample Site: BROWNSON FIELD
Lab Due Date: _____

Sample ID #	Lab	#1-	#2-	#3-	#4-	Notes
Sample Name	08-3900					STE 1122
or Location	BROWNSON FIELD					
Sampled by	DMW 12					
Composite	PK					
Date/Time						
Collected						
Grab Time	1425					
Sample Matrix	GW					

PARAMETER by Method Name	METHOD #	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used						
Ethylene Dibromide (EDB)	EPA 504									3	120ml A VOA/4 oz.	None/4° C
Purg. Halocarbons/GC	EPA 601									4	40 ml VOA Vial x 2	HCl/4° C
Purg. Aromatics/GC	EPA 602									3	40 ml VOA Vial x 2	HCl/4° C
Purg. Halo. & Ars./GC	EPA 601/602									6	40 ml VOA Vial x 2	HCl/4° C
Polynuclear Aromatics/HPLC	EPA 610									7	1L Amber x 2	4° C
Purgeables/GCMS	EPA 624									6	40 ml VOA Vial x 2	HCl/4° C
Base/Neutrals & Acids/GCMS	EPA 625									15	1L Amber x 2	4° C
Gas Chromatography	EPA SW 8000									5	40mb2/1Lx2/4 oz.	HCl/4° C/None
Halo. Vol. Org./GC	EPA SW 8010									4	40ml VOAx2/4 oz.	HCl/4° C/None
Non-Halo. Vol. Org./GC	EPA SW 8015(MOD)									4	40mb2/1Lx2/4 oz.	HCl/4° C/None
Arom. Vol. Org./GC	EPA SW 8020									3	40ml VOAx2/4 oz.	HCl/4° C/None
Halo/Arom. Vol. Org./GC	EPA SW 8010/8020									6	40ml VOAx2/4 oz.	HCl/4° C/None
Polynuclear Aromatics/GC	EPA SW 8100									6	1Lx2/4 oz.	4° C/None
VOC/GCMS	EPA SW 8240A									8	40ml VOAx2/4 oz.	HCl/4° C/None
VOC/GCMS - Cap.	EPA SW 8280	X	Vols 4EA							8	40ml VOAx2/4 oz.	HCl/4° C/None
Semivol. Org./GCMS - Cap.	EPA SW 8270A									16	1Lx3/4 oz.	4° C/None
Polynuclear Aromatics (PAHs)	EPA SW 8310									9	1Lx3/4 oz.	4° C/None

PARAMETER by Group Name	METHOD SOURCE	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used						
Gasoline Analytical Group	EPA SW-846									47	Consult Lab	Consult Lab
Kerosene Analytical Group	EPA SW-846									39	Consult Lab	Consult Lab
Mixed Product Analytical Group	EPA SW-846									24	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	EPA 418.1									2	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	FL-PRO									7	Consult Lab	Consult Lab
RCRA Metals (6)	EPA Various									6	Consult Lab	Consult Lab
TCLP Metals (6) extraction	EPA SW-846									10	Consult Lab	Consult Lab
Lead (Pb) only	EPA 239.2									1	250ml/4 oz.	HNO ₃ /None
Other												

Comments

Revised by _____
Date/Time _____

PK
10/21/98 1530

Received by _____
Date/Time _____

PK
10/21/98 1530

Groundwater Sampling Log

MW# DMW12

NPWC Env. Lab., Bldg 3691, Code 920, NAS Pensacola, FL 32508, CompQAP #920121G

Sampling Event Information:

Location or name of groundwater well: NAS BRUNSON FIELD SITE 1122
 Contact person and phone number: CREC CAMPBELL 432-4315
 Date of sampling event: 21 OCTOBER 1998
 Ambient conditions: OVERCAST, WITH SOME SUNNY SKIES, 70° SLIGHT N/E WIND
 Person responsible for sampling: P. M. KEANE

Initial Assessment:

How is the well labeled? MW# DMW# 12 Is the well cover intact? Yes No
 Is the well cover locked? Yes No Is the well cap in place? Yes No
 Is the well cap locked? Yes No Is the well casing intact? Yes No
 Is there an odor when cap removed? Yes No Describe: _____
 Description of any discrepancies: NONE

Well Volume Information:

What is the diameter of the well? 2" 4" 6" 8" 12" other: _____
 What is the distance to the water table? (in feet): 3.45
 What is the distance to the bottom of the well casing? (in feet): 23.15
 What is the water column height? (in feet): 19.7
 Well volume in gallons is equal to the height of the water column multiplied by the following factors: 2" = H x 0.17, 4" = H x 0.66, 6" = H x 1.48, 8" = H x 2.62, 12" = H x 5.90
 What is the well volume? (show calculation): 19.7 x 0.17 = 3.349

Well Purging Information:

Purging equipment used: PERISTALTIC Material: TYGON
 Cleaning protocol: NEW Date cleaned: NEW Cleaned by: NEW
 If bailer used, what is volume? N/A
 If submersible pump used, what is flow rate? 3.35 GAL PER 14 MIN
 What time did purging begin? (Date/Time 24 hr): 10/21/98 1255 End?: 1307
 Describe appearance of water on initial purging: CLEAR / NO ODOR

Meter calibration record:

pH meter: Time calib.: 1245 Standards: 40710 Analyst: Keane
 Temperature: Correction factor: _____ Analyst: _____
 Conductivity meter: Standard used: 100 Analyst: Keane

Record stabilization criteria in table below:

Vol Evacuated in Gal	Time Analyzed	pH	Temperature	Conductivity
<u>3.35</u>	<u>1259</u>	<u>5.2</u>	<u>24.3</u>	<u>40</u>
<u>3.35</u>	<u>1303</u>	<u>5.2</u>	<u>24.1</u>	<u>40</u>
<u>3.35</u>	<u>1307</u>	<u>5.2</u>	<u>23.8</u>	<u>40</u>

Total volume purged from well: 10.05 How many well volumes: 3
 Did well go dry? Yes No Did criteria stabilize? Yes No
 Describe appearance of water after purging complete: Milky Color Slightly
 Are there any odor not previously described? If so, what: Unpleasant odor (plastic like)
 Describe any problems or discrepancies: NONE

Navy Public Works Center Environmental Laboratory

Analytical Report

Total Volatiles by Method 8260

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
 Phone (850) 452-3180/3642
 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NAS Environmental
 Address: Bldg. 1754
 NAS Pensacola, FL 32508
 Phone #: 452-3100
 Contact: Greg Campbell

Lab Report Number: 83900
 Sample Date: 21 Oct 98
 Received Date: 21 Oct 98
 Sample Site: Bronson Field, Site 1122
 Job Order No.: 130 5001

LAB Sample ID#	1- 83900				
Sample Name / Location	Bronson Field, Site 1122 DMW 12				
Collector's Name	P. Keane				
Date & Time Collected	21 Oct 98 @ 1425				
Sample Type (composite or grab)	Grab				
Analyst	M. Chambers				
Date of Extraction / Initials	23 Oct 98 MC				
Date of Analysis	23 Oct 98				
Sample Matrix	Groundwater				
Dilution	X 1				
Compound Name	1- 83900	units	Det. Limit	Flags	
Benzene	BDL	ug/L		1	
Bromobenzene	BDL	ug/L		1	
Bromochloromethane	BDL	ug/L		1	
Bromodichloromethane	BDL	ug/L		1	
Bromoform	BDL	ug/L		2	
Bromomethane	BDL	ug/L		3	
n-Butylbenzene	BDL	ug/L		1	
sec-Butylbenzene	BDL	ug/L		1	
tert-Butylbenzene	BDL	ug/L		2	
Carbon Tetrachloride	BDL	ug/L		1	
Chlorobenzene	BDL	ug/L		1	
Chloroethane	BDL	ug/L		1	
Chloroform	BDL	ug/L		1	
Chloromethane	BDL	ug/L		1	
2-Chlorotoluene *	BDL	ug/L		1	
4-Chlorotoluene *	BDL	ug/L		1	
Dibromochloromethane	BDL	ug/L		1	
1,2-Dibromo-3-chloropropane *	BDL	ug/L		5	
1,2-Dibromoethane	BDL	ug/L		1	
Dibromomethane	BDL	ug/L		1	
1,2-Dichlorobenzene	BDL	ug/L		1	
1,3-Dichlorobenzene	BDL	ug/L		1	
1,4-Dichlorobenzene	BDL	ug/L		1	
Dichlorodifluoromethane	BDL	ug/L		1	
1,1-Dichloroethane	BDL	ug/L		1	
1,2-Dichloroethane	BDL	ug/L		1	
1,1-Dichloroethene	BDL	ug/L		1	
cis-1,2-Dichloroethene	BDL	ug/L		1	
trans-1,2-Dichloroethene	BDL	ug/L		1	
1,2-Dichloropropane	BDL	ug/L		1	
1,3-Dichloropropane	BDL	ug/L		1	
2,2-Dichloropropane	BDL	ug/L		1	
1,1-Dichloropropene	BDL	ug/L		1	
Ethylbenzene	BDL	ug/L		1	
Ethyl ether *	BDL	ug/L		1	
Hexachlorobutadiene	BDL	ug/L		2	
2-Hexanone *	BDL	ug/L		1	
Isopropylbenzene	BDL	ug/L		1	
p-Isopropyltoluene	BDL	ug/L		1	

Navy Public Works Center Environmental Laboratory

Analytical Report

Total Volatiles by Method 8260

Bldg. 3887, Code 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NAS Environmental
Address: Bldg. 1754
NAS Pensacola, FL 32508
Phone #: 452-3100
Contact: Greg Campbell

Lab Report Number: 83900
Sample Date: 21 Oct 98
Received Date: 21 Oct 98
Sample Site: Bronson Field, Site 1122
Job Order No.: 130 5001

Compound Name	1- 83900	units	Det. Limit	Flags
Methylene Chloride	BDL	ug/L		1
Methyl ethyl ketone (MEK) *	BDL	ug/L		2
Methyl isobutyl ketone (MIBK) *	BDL	ug/L		1
Methyl-tert-butyl ether (MTBE)	BDL	ug/L		1
Naphthalene	BDL	ug/L		1
n-Propylbenzene	BDL	ug/L		1
Styrene	BDL	ug/L		1
1,1,1,2-Tetrachloroethane	2	ug/L		1
1,1,2,2-Tetrachloroethane	BDL	ug/L		1
Tetrachloroethene	2	ug/L		1
Toluene	BDL	ug/L		1
1,2,3-Trichlorobenzene	BDL	ug/L		1
1,2,4-Trichlorobenzene	BDL	ug/L		1
1,1,1-Trichloroethane	BDL	ug/L		1
1,1,2-Trichloroethane	BDL	ug/L		1
Trichloroethene	BDL	ug/L		1
Trichlorofluoromethane	BDL	ug/L		1
1,1,2-Trichloro-1,2,2-Trifluoroethane *	BDL	ug/L		1
1,2,3-Trichloropropane	BDL	ug/L		1
1,2,4-Trimethylbenzene	BDL	ug/L		1
1,3,5-Trimethylbenzene	BDL	ug/L		1
Vinyl Chloride	BDL	ug/L		1
m,p-Xylene	BDL	ug/L		1
o-Xylene	BDL	ug/L		1

SURROGATE SPIKE RECOVERIES

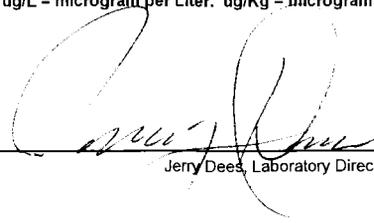
	Acceptance Limits	Percent Recovery
1,2-Dichloroethane-d4	75-133	100
Toluene-d8	86-119	103
Bromofluorobenzene	85-116	104

Explanation of Flags:

COMMENTS :

BDL = Below Detection Limit. ug/L = microgram per Liter. ug/Kg = microgram per Kilogram. * = FL HRS certification pending.

Approved by:



Jerry Dees, Laboratory Director

Date: 3/10/99

Report Generated

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS (UST Projects)

NPWC Environmental Laboratory

Report Required? Yes No QC Required? Yes No

Bldg. 3887, Code 920
 NAS Pensacola, Fl. 32508
 Phone - (904) 452-4728/3642
 DSN 922-4728/3642
 FAX (904) 452-2799/2387

Requester: NPWC ENGINEERING
 Address: BLDG. 458 CODE 400
NAS PENSACOLA, FL 32508
 Phone #: 452-4315
 Contact: GREG CAMPBELL
 Job Order #: ~~130500~~ 1305001

Lab ID Number: _____
 Sample Date: 10/21/98
 Received Date: 10/21/98
 Sample Site: BROWNSON FIELD
 Lab Due Date: _____

Sample ID #	Lab	#1- <u>83900</u>	#2-	#3-	#4-	Notes <u>Site 1122</u>
Sample Name	-----	<u>BROWNSON FIELD</u>				
or Location	-----	<u>DMW 12</u>				
Sampled by	-----	<u>P. Klear</u>				
Composite	Begin	<u>/</u>				
Date/Time	Frequency					
Collected	End					
Grab Time	-----	<u>1425</u>				
Sample Matrix	-----	<u>GW</u>				

PARAMETER by Method Name	METHOD #	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used						
Ethylene Dibromide (EDB)	EPA 504									3	120ml A VOA/4 oz.	None/4° C
Purg. Halocarbons/GC	EPA 601									4	40 ml VOA Vial x 2	HCl/4° C
Purg. Aromatics/GC	EPA 602									3	40 ml VOA Vial x 2	HCl/4° C
Purg. Halo. & Aro./GC	EPA 601/602									6	40 ml VOA Vial x 2	HCl/4° C
Polynuclear Aromatics/HPLC	EPA 610									7	1L Amber x 2	4° C
Purgeables/GCMS	EPA 624									6	40 ml VOA Vial x 2	HCl/4° C
Base/Neutrals & Acids/GCMS	EPA 625									15	1L Amber x 2	4° C
Gas Chromatography	EPA SW 6000									5	40ml/2/1Lx2/4 oz.	HCl/4° C/None
Halo. Vol. Org./GC	EPA SW 6010									4	40ml VOAx2/4 oz.	HCl/4° C/None
Non-Halo. Vol. Org./GC	EPA SW 6015(MOD)									4	40ml/2/1Lx2/4 oz.	HCl/4° C/None
Arom. Vol. Org./GC	EPA SW 6020									3	40ml VOAx2/4 oz.	HCl/4° C/None
Halo./Arom. Vol. Org./GC	EPA SW 6010/6020									6	40ml VOAx2/4 oz.	HCl/4° C/None
Polynuclear Aromatics/GC	EPA SW 6100									6	1Lx2/4 oz.	4° C/None
VOC/GCMS	EPA SW 6240A									6	40ml VOAx2/4 oz.	HCl/4° C/None
VOC/GCMS-Cap.	EPA SW 6260									6	40ml VOAx2/4 oz.	HCl/4° C/None
Semivol. Org./GCMS-Cap.	EPA SW 6270A									16	1Lx3/4 oz.	4° C/None
Polynuclear Aromatics (PAHs)	EPA SW 6310									9	1Lx3/4 oz.	4° C/None
PARAMETER by Group Name	METHOD SOURCE	X	Bottle ID #'s	Billing Units	Containers Required	Preservative(s) Used						
Gasoline Analytical Group	EPA SW-846									47	Consult Lab	Consult Lab
Kerosene Analytical Group	EPA SW-846									39	Consult Lab	Consult Lab
Mixed Product Analytical Group	EPA SW-846									24	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	EPA 418.1									2	Consult Lab	Consult Lab
Total Petroleum Hydrocarbons	FL-PRO									7	Consult Lab	Consult Lab
RCRA Metals (6)	EPA Various									6	Consult Lab	Consult Lab
TCLP Metals (6) extraction	EPA SW-846									10	Consult Lab	Consult Lab
Lead (Pb) only	EPA 239.2									1	250ml/4 oz.	HNO ₃ /None
Other:												

Comments: _____

Reinforced by
Date/Time

P. Klear
10/21/98 1530

Received by
Date/Time

P. Klear
10/21/98 1530

APPENDIX I

TABLE III: WATER TABLE ELEVATIONS AUGUST 18, 1998
FIGURE 7: GROUNDWATER FLOW DIRECTION MAP

TABLE IV: WATER TABLE ELEVATIONS OCT 21, 1998
FIGURE 8: GROUNDWATER FLOW DIRECTION MAP

TABLE III

**TOP OF CASING AND GROUNDWATER ELEVATIONS
FOR AUGUST 18, 1998 SAMPLING EVENT**

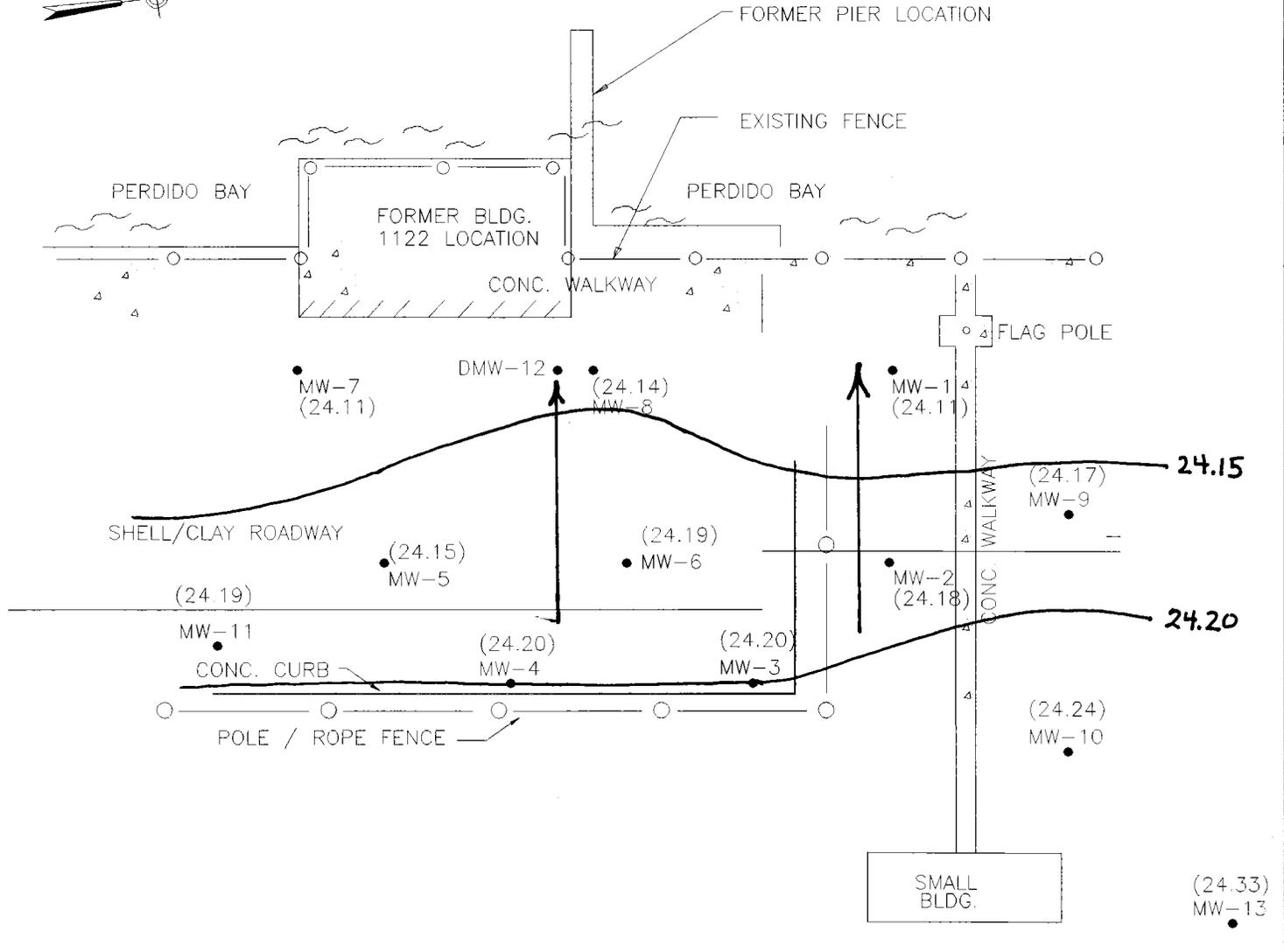
WELL NUMBER	TOC (FT. M.S.L.)	DTW (FT)	GROUNDWATER ELEVATION (FT. M.S.L.)
MW-1	27.86	3.75	24.11
MW-2	27.74	3.56	24.18
MW-3	28.12	3.92	24.20
MW-4	28.26	4.06	24.20
MW-5	27.73	3.58	24.15
MW-6	27.61	3.42	24.19
MW-7	27.60	3.49	24.11
MW-8	27.62	3.48	24.14
MW-9	28.22	4.05	24.17
MW-10	28.71	4.47	24.24
MW-11	28.15	3.96	24.19
DMW-12	27.67	3.57	24.10
MW-13	30.54	6.21	24.33
MW-14	32.73	NS	-

NOTES: TOC = TOP OF CASING

DTW = DEPTH TO WATER

NS = Not measured

Benchmark assumes elevation of 50 ft. M.S.L. at northeast corner of existing concrete slab of former Building 1122, Bronson Field, Florida.



LEGEND

- — ○ FENCE
- ////// BUILDING
- (24.24) GROUNDWATER ELEVATION (8/18/98)
- (NM) NOT MEASURED
- 24.24 — GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION



1-2

NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 7	DRAWN BY: DWG. NO. REVISED BY:
GROUNDWATER FLOW DIRECTION MAP (8/18/99), ITE 1122, BRONSON FIELD		
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA		

(NM)
MW-14

TABLE IV

TOP OF CASING AND GROUNDWATER ELEVATIONS
FOR OCTOBER 21, 1998 SAMPLING EVENT

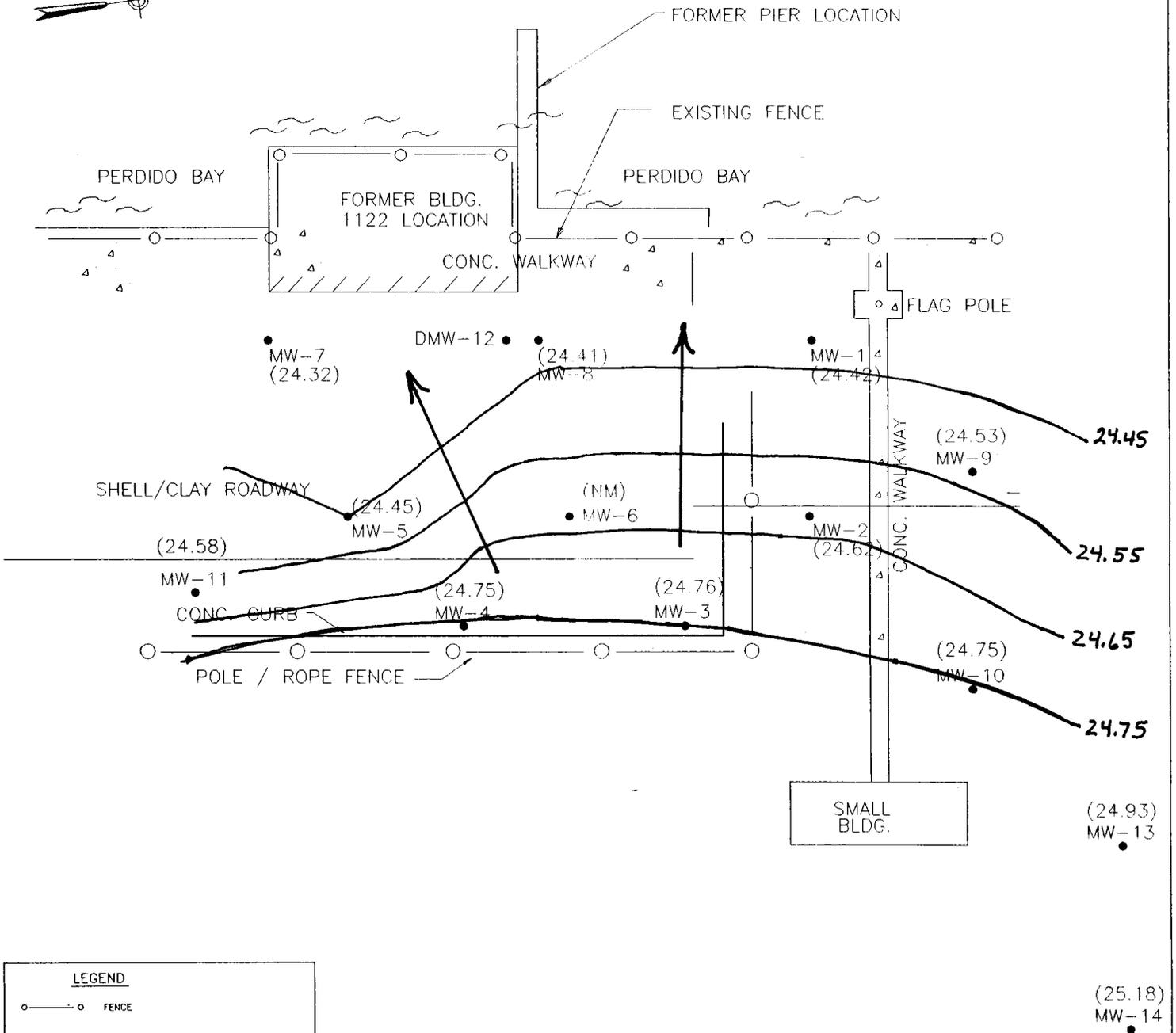
WELL NUMBER	TOC (FT. M.S.L.)	DTW (FT)	GROUNDWATER ELEVATION (FT. M.S.L.)
MW-1	27.86	3.44	24.42
MW-2	27.74	3.12	24.62
MW-3	28.12	3.36	24.76
MW-4	28.26	3.51	24.75
MW-5	27.73	3.28	24.45
MW-6	27.61	NS	NS
MW-7	27.60	3.28	24.32
MW-8	27.62	3.21	24.41
MW-9	28.22	3.69	24.53
MW-10	28.71	3.96	24.75
MW-11	28.15	3.57	24.58
DMW-12	27.67	3.45	24.22
MW-13	30.54	5.61	24.93
MW-14	32.73	7.55	25.18

NOTES: TOC = TOP OF CASING

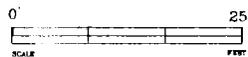
DTW = DEPTH TO WATER

NS = Not measured

Benchmark assumes elevation of 50 ft. M.S.L. at northeast corner of existing concrete slab of former Building 1122, Bronson Field, Florida.



LEGEND	
○ — ○	FENCE
////	BUILDING
(24.24)	GROUNDWATER ELEVATION (8/18/98)
(NM)	NOT MEASURED
— 24.24 —	GROUNDWATER ELEVATION CONTOUR
→	GROUNDWATER FLOW DIRECTION



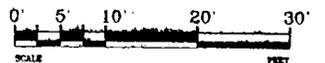
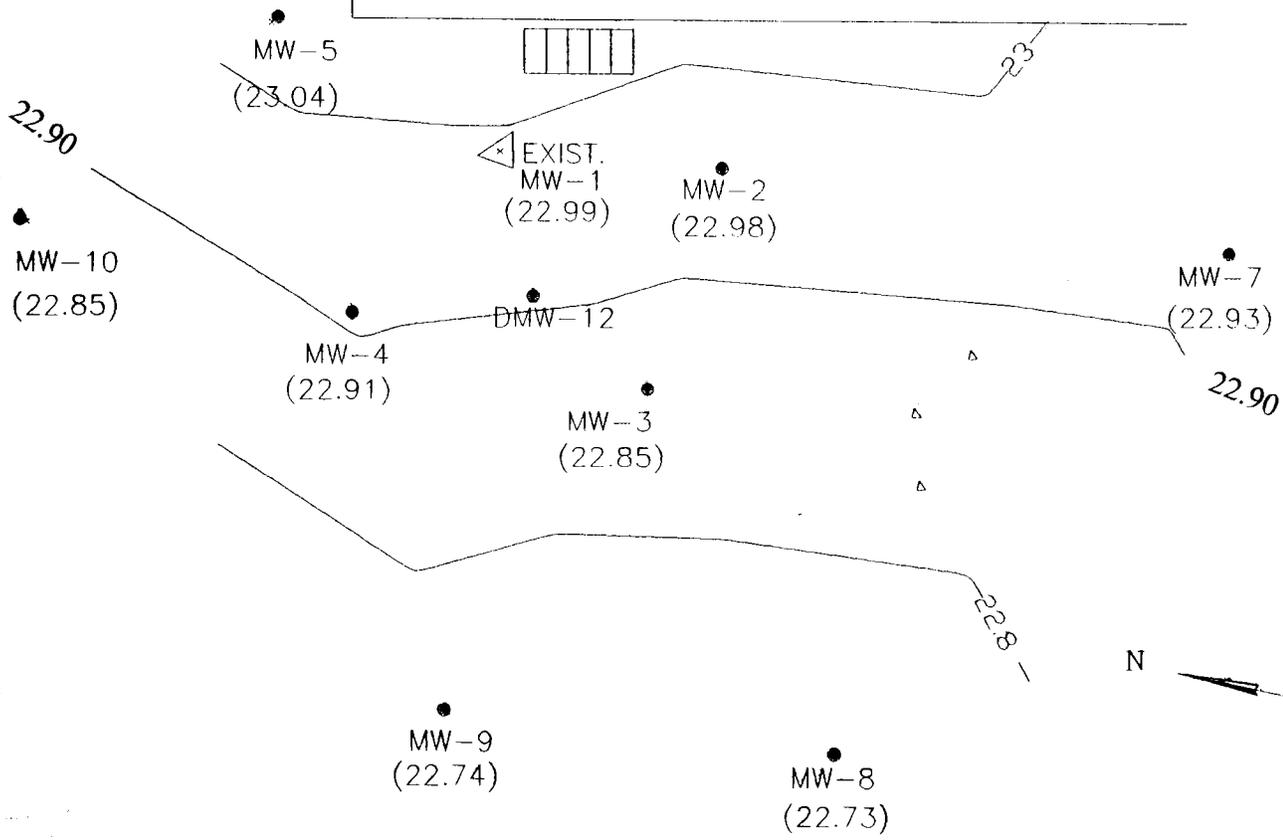
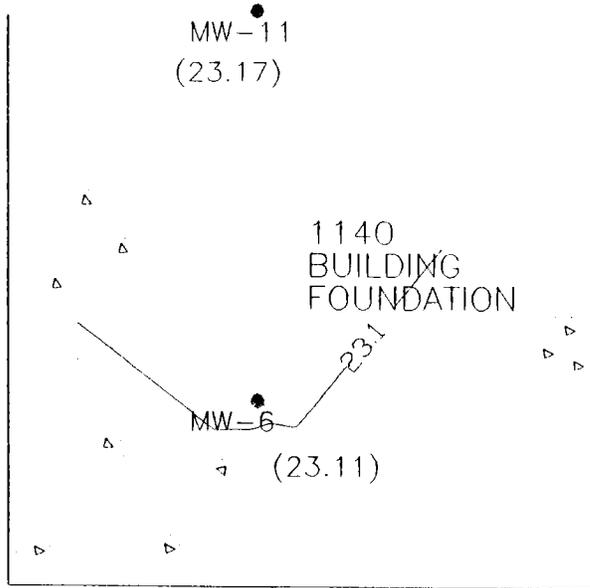
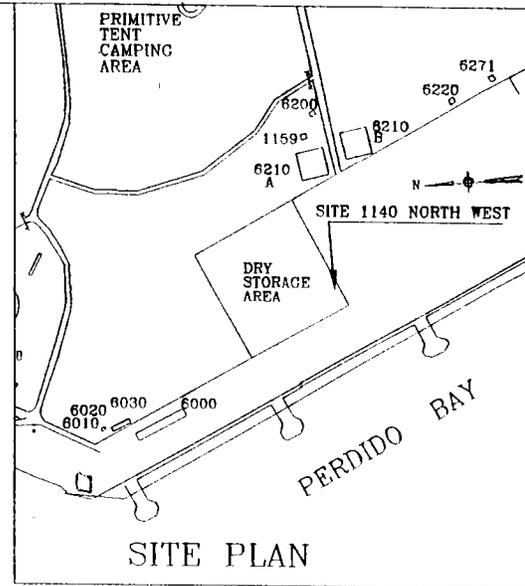
I-4

NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 8	DRAWN BY: DWG. NO:
		REVISED BY:
GROUNDWATER FLOW DIRECTION MAP (10/21/98), ITE 1122, BRONSON FIELD		
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA		

APPENDIX J

**FIGURE 9: GROUNDWATER FLOW DIRECTION MAP OF
1140-NW (SIMILAR SITE)**

TIDAL INFLUENCE STUDY



LEGEND

HOT CUTTINGS STORED ON PLASTIC SHEETING

MW-6 MONITORING WELL
 (22.98) GROUNDWATER ELEVATION

23.00 GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

NAVY PUBLIC WORKS CENTER
 PENSACOLA, FLORIDA

SCALE:	FIGURE 9	DRAWN BY: DWG. NO: REVISED BY:
GROUNDWATER FLOW DIRECTION MAP SITE 1140-NW, BRONSON FIELD		
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA		

J-1

MEMORANDUM

March 7, 1997

From: Phil Keane (Code 923)
To: Greg Campbell (Code 911.4)

Subj: MONITORING WELL LOW/HIGH TIDAL ELEVATIONS

1. The attached tidal elevations were taken at Bronson Field, Site 1140 NW on 6 Mar 97.
2. If you need any more information, please call me at 2-3642/4758.


PHIL KEANE

1 of 2

Water Level Readings Taken on 3/6/97
For Tidal Evaluation

BRONSON FIELD
SITE 1140 N.W.

SO# 1305001

2 HRS BEFORE / → High Tides : 2107 : =
AFTER ← Low Tides : = : =

WELL I.D. NUMBER									
TIME	#1	#2	#3	#4	#5	#6	#7	#8	#9
1907	7.11	7.26	7.24	7.26	7.08	7.22	7.22	7.26	7.22
1932	7.11	7.26	7.25	7.26	7.09	7.22	7.22	7.27	7.23
1957	7.12	7.27	7.26	7.27	7.10	7.22	7.22	7.28	7.24
2022	7.12	7.27	7.26	7.27	7.10	7.22	7.23	7.28	7.24
2047	7.13	7.27	7.26	7.27	7.10	7.23	7.24	7.28	7.25
2107	7.14	7.28	7.26	7.28	7.10	7.24	7.25	7.28	7.25
2132	7.14	7.28	7.26	7.28	7.11	7.25	7.25	7.28	7.25
2157	7.14	7.28	7.26	7.28	7.11	7.25	7.25	7.28	7.25
2222	7.15	7.28	7.26	7.28	7.11	7.26	7.25	7.28	7.25
2247	7.15	7.28	7.26	7.28	7.11	7.26	7.25	7.28	7.25
2307	7.15	7.28	7.26	7.28	7.11	7.26	7.25	7.28	7.25

* Data suspect, not included in maximum variance.

Water Level Readings Taken on 3/6/97
For Tidal Evaluation

1 of 2

BRENSEN FIELD
SITE 1140 NW

50# 135001

2 HRS BEFORE → High Tides → Low Tides → 0643 : =

WELL I.D. NUMBER									
TIME	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9
0443	7.00'	7.12	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0508	7.00'	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0533	7.00'	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0558	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0623	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0643	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0708	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0733	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0758	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0823	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06
0843	7.00	7.11	7.09	7.12	6.97	7.12	7.08	7.07	7.06

* Did NOT HAVE ACCESS TO MW 11, COMBINATION LOCK WAS CHANGED ~~REPAIR~~
UNTIL 0733 REPAIRING
Data suspect, not included in maximum variance.

* VERY HEAVY NORTH WIND APPROX: 35 KNOTS

Water Level Readings Taken on _____
For Tidal Evaluation

BROOKFIELD
SITE 1140 NW

2 HR BEFORE / AFTER → High Tides : 0643 : ==
Low Tides : ==

WELL I.D. NUMBER									
TIME	# 10	# 11	# 12	# 13					
0443	7.00	—	7.07	7.16					
0508	7.00	—	7.07	7.16					
0533	7.00	—	7.07	7.16					
0558	7.00	—	7.07	7.16					
0623	7.00	—	7.07	7.16					
0643	7.00	—	7.07	7.16					
0708	7.00	7.00	7.07	7.16					
0733	7.00	7.00	7.07	7.16					
0758	7.00	7.00	7.07	7.16					
0823	7.00	7.00	7.07	7.16					
0843	7.00	7.00	7.07	7.16					

Data suspect, not included in maximum variance.

Pensacola, Florida T.M. 90 W.

2650

Tide Predictions (High and Low Waters) March, 1997

Reference station is: 1 Pensacola, Florida T.M. 90 W.

HWTIME = +0 HWHT = +0.00

LWTIME = +0 LWHT = +0.00

NOAA, National Ocean Service

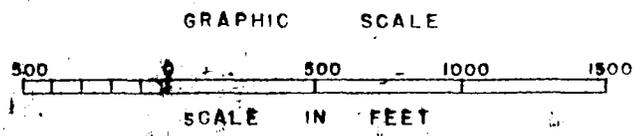
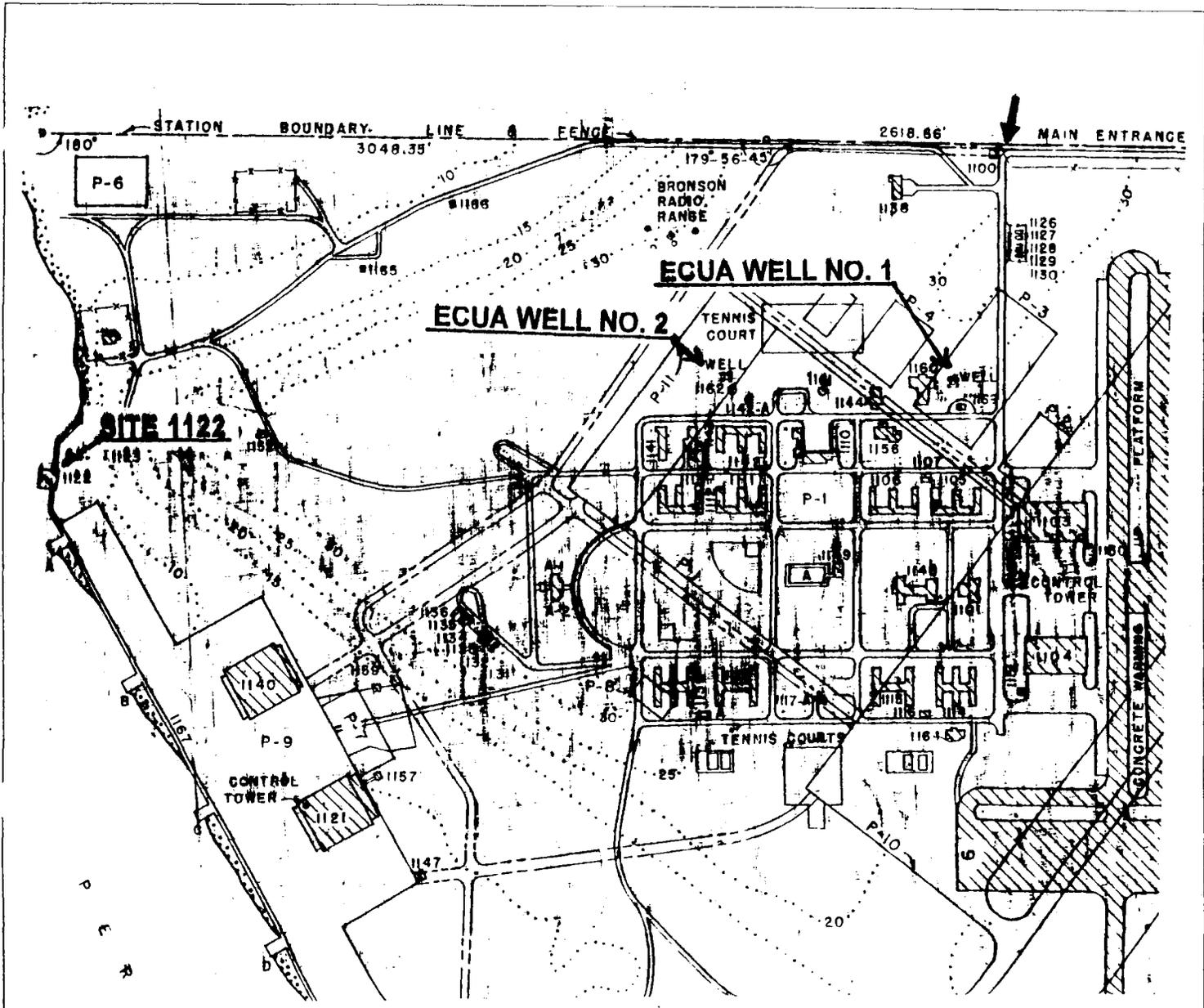
Standard Time

Day	Time	Ht.	Time	Ht.	Time	Ht.	Time	Ht.
1 Sa	204 L	-0.1	1556 H	0.9				
2 Su	307 L	-0.2	1652 H	1.0				
3 M	405 L	-0.3	1752 H	1.1				
4 Tu	500 L	-0.4	1856 H	1.2				
5 W	553 L	-0.4	2001 H	1.2				
6 Th	643 L	-0.3	2107 H	1.1				
7 F	726 L	-0.2	2215 H	1.0				
8 Sa	756 L	0.0	2329 H	0.8				
9 Su	757 L	0.2	1247 H	0.3	1712 L	0.2		
10 M	58 H	0.6	708 L	0.4	1220 H	0.5	1954 L	0.2
11 Tu	1243 H	0.7	2205 L	0.1				
12 W	1323 H	0.9	2355 L	-0.1				
13 Th	1411 H	1.0						
14 F	121 L	-0.1	1504 H	1.1				
15 Sa	232 L	-0.2	1602 H	1.1				
16 Su	334 L	-0.2	1704 H	1.1				
17 M	429 L	-0.2	1808 H	1.0				
18 Tu	519 L	-0.1	1912 H	1.0				
19 W	602 L	0.0	2014 H	0.9				
20 Th	638 L	0.1	2114 H	0.8				
21 F	702 L	0.2	2212 H	0.8				
22 Sa	707 L	0.3	2314 H	0.7				
23 Su	648 L	0.3	1117 H	0.4	1703 L	0.3		
24 M	28 H	0.6	605 L	0.5	1114 H	0.6	1843 L	0.3
25 Tu	1130 H	0.7	2010 L	0.2				
26 W	1157 H	0.8	2130 L	0.1				
27 Th	1231 H	0.9	2247 L	0.0				
28 F	1311 H	1.0	2359 L	-0.1				
29 Sa	1359 H	1.1						
30 Su	108 L	-0.2	1454 H	1.2				
31 M	212 L	-0.2	1555 H	1.2				



APPENDIX K

**FIGURE 10: MAP OF WATER SUPPLY WELLS
AT BRONSON FIELD**



K-1

NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 10	DRAWN BY: DWG. NO: REVISED BY:
POTABLE WATER SUPPLY WELLS BRONSON FIELD		
CLIENT: HAS ENVIRONMENTAL DEPARTMENT, HAS PENSACOLA		

APPENDIX L

**SLUG TEST/AQUIFER PARAMETER EVALUATION
PERFORMED AT SITE 1122, BRONSON FIELD
ON MONITORING WELL NO. 5
SEPTEMBER 11, 1996**



October 31, 1996

Slug Test/Aquifer Parameter Evaluation

Bronson Field, Site 1122

as performed on September 11, 1996.

Contract No. N65114-95-D-2126

Delivery Order No. 0027

A single well recovery test (slug test) was performed on Monitor Well No. 5 of Site 1122, located at Bronson Field, in Pensacola, Florida. Single well recovery tests involve the displacement of a known volume of water in a well and measuring the resulting change in hydraulic head over time until the water stabilized to its initial level. The water level measurements were made with a pressure transducer and recorded on a Thor Environmental Data Logger.

The calculation of hydraulic conductivity was based on the assumptions presented by Bouwer and Rice (1976). The well is assumed to be partially penetrating (That is, the saturated aquifer thickness is greater than the saturated monitor well screen length).

The movement of contaminants in a groundwater system depends, in part, on the flow characteristics of the aquifer beneath the site. In order to evaluate the flow characteristics, the following parameters were calculated: 1) hydraulic conductivity, 2) average linear flow velocity, and 3) transmissivity (effective soil porosity).

The relative ability of a porous medium to transmit fluid is measured by the hydraulic conductivity, a function of both the aquifer material and the fluid (Freeze and Cheery, 1979). Hydraulic Conductivity (K) values for the shallow saturated deposits were estimated from the single well recovery test (slug test) conducted on MW-5. The hydraulic conductivity calculations and field data from the single well slug test are presented following the text portion of this report. The hydraulic conductivity (K) in MW-5 at Bronson Field's Site No. 1122 Well No. 5 is calculated at 0.000123 ft/min., or 0.1771 ft/day.

The average hydraulic gradient for this site was calculated at 0.0060 ft/ft. This value was derived utilizing existing groundwater elevation data from the site.

Therefore, using a hydraulic gradient of 0.0060, the hydraulic conductivity value obtained from the single well slug test (0.1771 ft/day) and an assumed effective porosity of 0.25, the average linear groundwater flow velocity was estimated to be 0.0043 ft/day (1.5514 ft per year), using the following formula:

$$V = \frac{Ki}{n}$$

where:

V = average linear flow velocity

K = hydraulic conductivity

i = gradient

n = effective soil porosity

These values should be viewed as an approximation only. The slug tests provide hydraulic conductivity values only for the materials immediately adjacent to the tested well screen. Although the calculated

• Corporate Headquarters •
6389 Tower Lane • Sarasota, Florida 34240 • (941) 371-7617 • Fax (941) 378-5218
• Web Site: <http://www.wesinc.com/water>

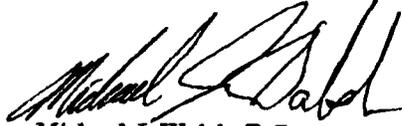
groundwater flow velocity may be used as an approximation of the rate of contaminant migration in water, the method does not account for hydrodynamic dispersion, chemical sorption, or degradation, which are factors affecting contaminant velocity.

Sincerely,

W.E.S., Inc.
Environmental Division



Patrick J. Brown
Staff Geologist

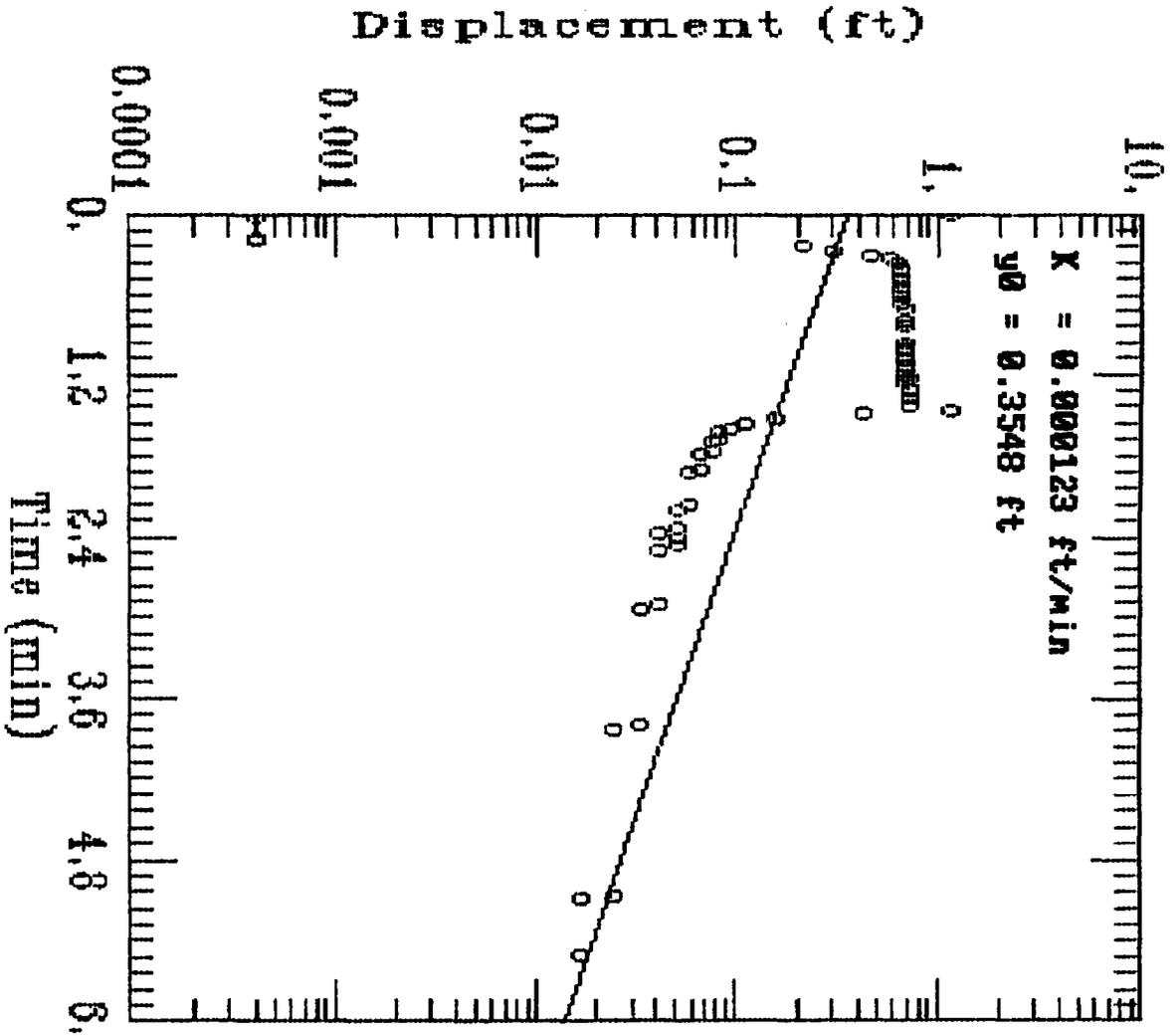


Michael J. Walsh, P.G.
Project Administrator

cc: File

g:\clients\nas-pen\slgtst\ty150.doc

Bronson Field, Site 1122



Time	Chnl 1						
S/N SDEE-03A-SN-3098 Block 1							
Program: STEP TEST							
Readings: 166							
Start Time: 15:43:04							
Start Date: 09/11							
Range: 0015 PSI							
Channels: 1							
Units: Ft-H2O							
Step 1							
Interval 00:00:02							
Readings 300							
Time	Chnl 1						
0.00	+7.1481	1.13	+6.4637	2.27	+7.0974	3.40	+7.1143
0.03	+7.1481	1.17	+6.4552	2.30	+7.0974	3.43	+7.1143
0.07	+7.1481	1.20	+6.4552	2.33	+7.0974	3.47	+7.1143
0.10	+7.1481	1.23	+6.4468	2.37	+7.1058	3.50	+7.1143
0.13	+7.1481	1.27	+6.4552	2.40	+7.0974	3.53	+7.1143
0.17	+7.1481	1.30	+6.4468	2.43	+7.0974	3.57	+7.1143
0.20	+7.1565	1.33	+6.4468	2.47	+7.0974	3.60	+7.1143
0.23	+6.9369	1.37	+6.4383	2.50	+7.1058	3.63	+7.1143
0.27	+6.8524	1.40	+6.4383	2.53	+7.1058	3.67	+7.1143
0.30	+6.8834	1.43	+6.4383	2.57	+7.1058	3.70	+7.1143
0.33	+6.5735	1.47	+6.0074	2.60	+7.1058	3.73	+7.1143
0.37	+6.5228	1.50	+6.7256	2.63	+7.1058	3.77	+7.1143
0.40	+6.5059	1.53	+6.9875	2.67	+7.1058	3.80	+7.1143
0.43	+6.4975	1.57	+7.0382	2.70	+7.1058	3.83	+7.1227
0.47	+6.4975	1.60	+7.0551	2.73	+7.1058	3.87	+7.1227
0.50	+6.4890	1.63	+7.0636	2.77	+7.1058	3.90	+7.1227
0.53	+6.4890	1.67	+7.0636	2.80	+7.1058	3.93	+7.1227
0.57	+6.4890	1.70	+7.0720	2.83	+7.1058	3.97	+7.1227
0.60	+6.4806	1.73	+7.0720	2.87	+7.1058	4.00	+7.1227
0.63	+6.4806	1.77	+7.0720	2.90	+7.1058	4.03	+7.1227
0.67	+6.4806	1.80	+7.0805	2.93	+7.1143	4.07	+7.1227
0.70	+6.4721	1.83	+7.0805	2.97	+7.1143	4.10	+7.1227
0.73	+6.4721	1.87	+7.0805	3.00	+7.1143	4.13	+7.1227
0.77	+6.4721	1.90	+7.0805	3.03	+7.1143	4.17	+7.1227
0.80	+6.4721	1.93	+7.0889	3.07	+7.1143	4.20	+7.1227
0.83	+6.4637	1.97	+7.0889	3.10	+7.1143	4.23	+7.1227
0.87	+6.4637	2.00	+7.0889	3.13	+7.1143	4.27	+7.1227
0.90	+6.4637	2.03	+7.0889	3.17	+7.1143	4.30	+7.1227
0.93	+6.4637	2.07	+7.0889	3.20	+7.1143	4.33	+7.1227
0.97	+6.4637	2.10	+7.0889	3.23	+7.1143	4.37	+7.1227
1.00	+6.4552	2.13	+7.0889	3.27	+7.1143	4.40	+7.1227
1.03	+6.4552	2.17	+7.0889	3.30	+7.1143	4.43	+7.1227
1.07	+6.4637	2.20	+7.0974	3.33	+7.1143	4.47	+7.1227
1.10	+6.4637	2.23	+7.0974	3.37	+7.1143	4.50	+7.1227

S/N SDEE-03A-SN-3098 Block 1							

Program: STEP TEST							
Readings: 188							
Start Time: 15:43:04							
Start Date: 09/11							
Range: 0015 PSI							
Channels: 1							
Units: Ft-H2O							

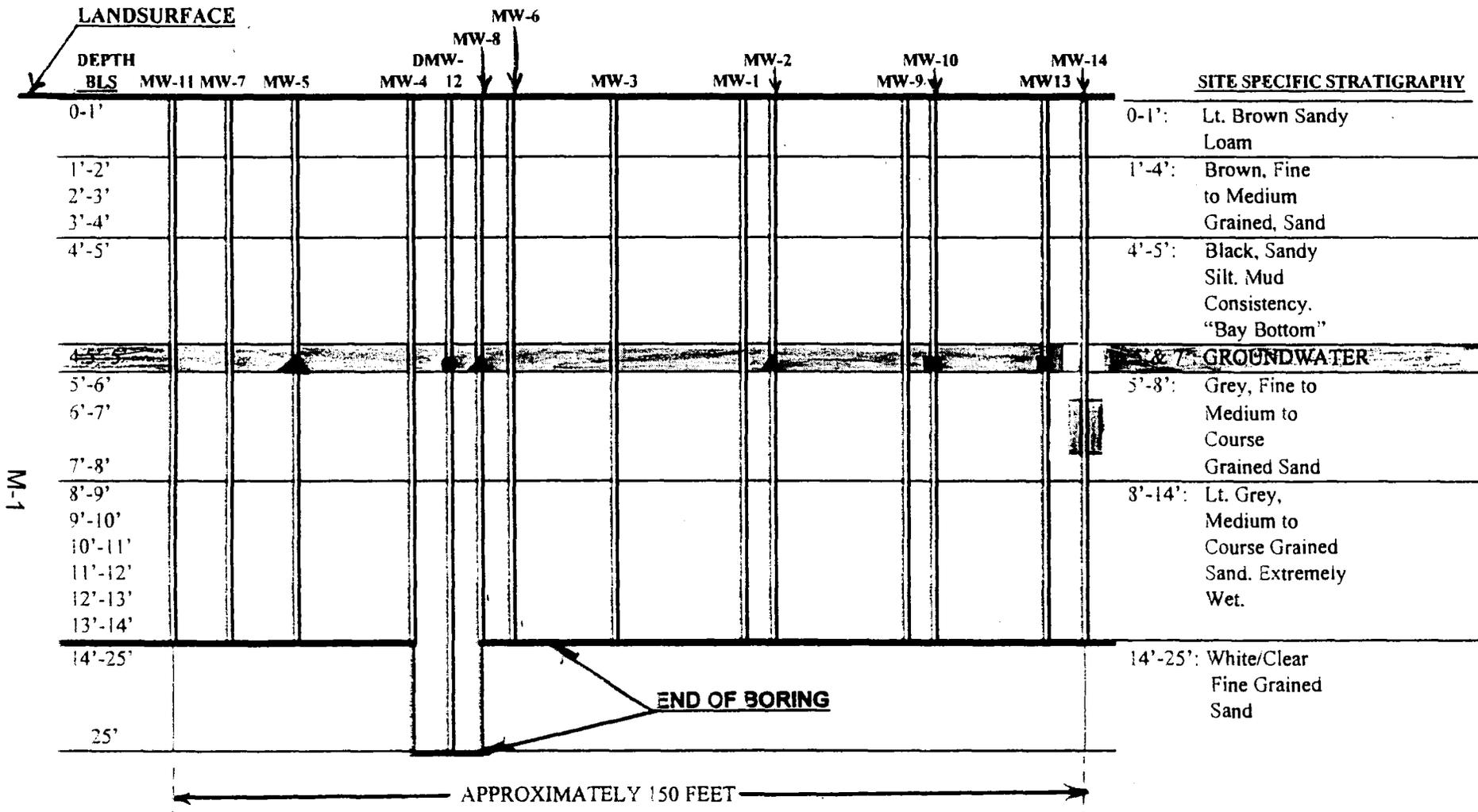
Step 1							
Interval 00:00:02							
Readings 300							

Time	Chnl	1					
4.53	+7.1227						
4.57	+7.1227						
4.60	+7.1227						
4.63	+7.1227						
4.67	+7.1227						
4.70	+7.1227						
4.73	+7.1227						
4.77	+7.1227						
4.80	+7.1227						
4.83	+7.1227						
4.87	+7.1227						
4.90	+7.1227						
4.93	+7.1227						
4.97	+7.1227						
5.00	+7.1227						
5.03	+7.1227						
5.07	+7.1227						
5.10	+7.1312						
5.13	+7.1312						
5.17	+7.1312						
5.20	+7.1312						
5.23	+7.1312						
5.27	+7.1312						
5.30	+7.1312						
5.33	+7.1312						
5.37	+7.1312						
5.40	+7.1312						
5.43	+7.1312						
5.47	+7.1312						
5.50	+7.1312						
Test 1 aborted at Step 1							

APPENDIX M

**FIGURE 11: CROSS SECTION OF THE SITE SPECIFIC
STRATIGRAPHY**

CROSS SECTION OF SITE SHOWING SPECIFIC STRATIGRAPHY AND APPROXIMATE CONCENTRATIONS OF APPLICABLE PETROLEUM PRODUCTS' CHEMICALS OF CONCERN, SITE 1122, BRONSON FIELD



SITE SPECIFIC STRATIGRAPHY	
0-1'	Lt. Brown Sandy Loam
1'-4'	Brown, Fine to Medium Grained, Sand
4'-5'	Black, Sandy Silt. Mud Consistency. "Bay Bottom"
4'-5' to 5'-6'	GROUNDWATER
5'-8'	Grey, Fine to Medium to Course Grained Sand
8'-14'	Lt. Grey, Medium to Course Grained Sand. Extremely Wet.
14'-25'	White/Clear Fine Grained Sand

NOTE: No Petroleum Contamination Found in Soil Samples Collected and Tested for Volatile Organics with an OVA.

Key: Groundwater Contamination Found in Monitoring Wells as Follows: ▲TRPH ■EDB ●TETRACHLOROETHENE (PCE)

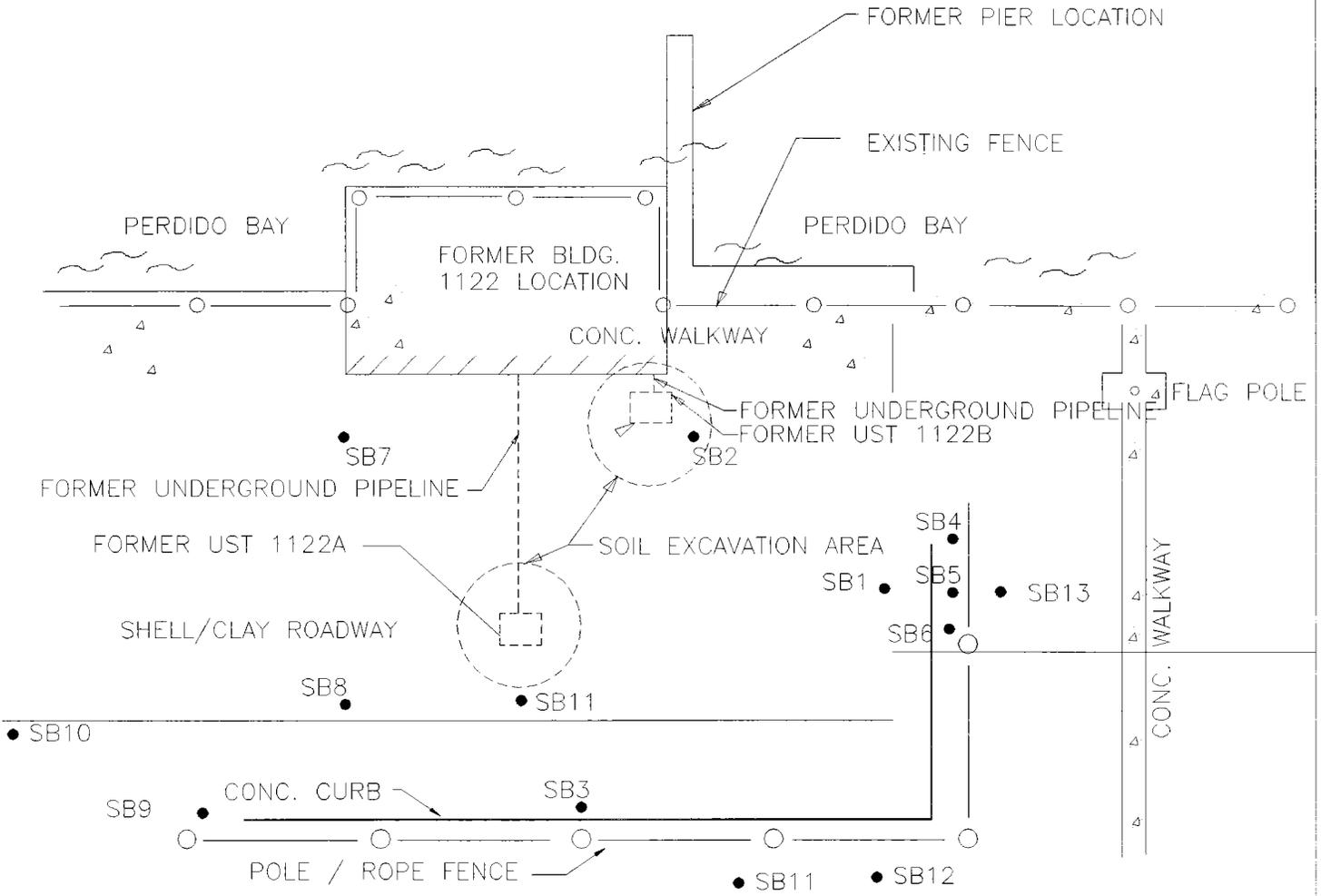
MONITORING WELL #	CHEMICAL OF CONCERN	CONCENTRATION
MW-5	TRPH	40000 ppb
DMW-12	TETRACHLOROETHENE (PCE)	3 ppb
MW-8	TRPH	64000 ppb
MW-2	TRPH	12000 ppb
MW-10	EDB	0.03 ppb
MW-13	EDB	0.46 ppb

NAVY PUBLIC WORKS CENTER		
SCALE: 1" = 40'	FIGURE 11	DRAWN BY: GAC
02/25/99		DWG. NO: 929MW
REVISED BY:		
CROSS-SECTION OF SITE SPECIFIC STRATIGRAPHY OF BRONSON FIELD		
CLIENT: NAC ENVIRONMENTAL		

APPENDIX N

FIGURE 12: SITE MAP OF FORMER TANKS, LINES, DISPENSORS AND EXCAVATED AREAS AT SITE 1122 IN RELATION TO SOIL BORINGS SB-1 THRU SB-13

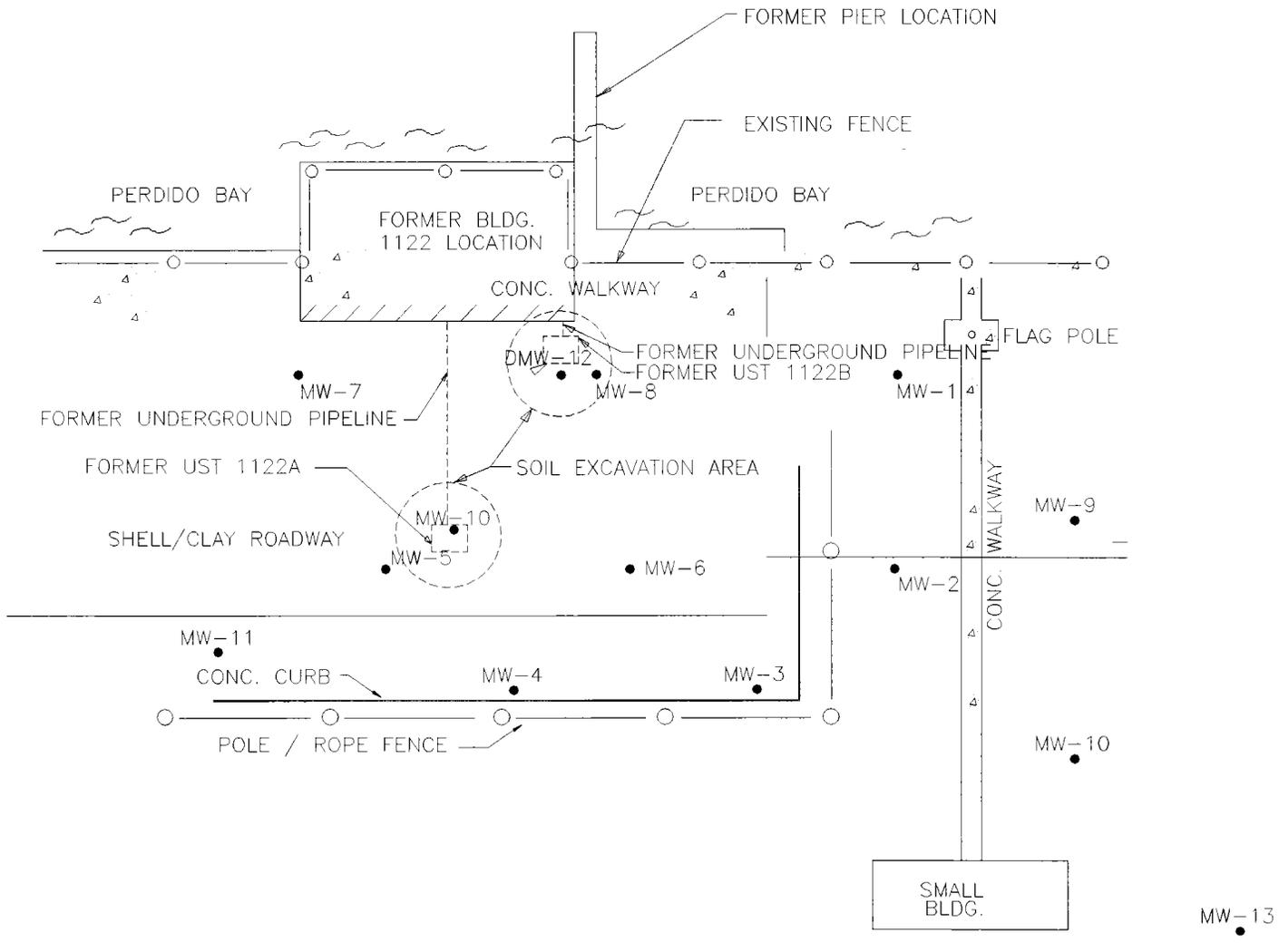
FIGURE 13: SITE MAP OF FORMER TANKS, LINES, DISPENSORS AND EXCAVATED AREAS AT SITE 1122 IN RELATION TO MONITORING WELLS MW-1 THRU MW-14



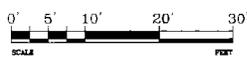
LEGEND	
○—○	FENCE
SB3 ●	SOIL BORING LOCATION/NUMBER
////	BUILDING



NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 12	DRAWN BY: DWG. NO: REVISED BY:
SOIL BORING LOCATION MAP SITE 1122, BRONSON FIELD		
CLIENT: NAS ENVIRONMENTAL DEPARTMENT, NAS PENSACOLA		



LEGEND	
○ — ○	FENCE
MW-3 ●	MONITORING WELL LOCATION/NUMBER
////	BUILDING



NAVY PUBLIC WORKS CENTER PENSACOLA, FLORIDA		
SCALE:	FIGURE 13	DRAWN BY: DWG. NO: REVISED BY:
MONITORING WELL LOCATION MAP SITE 1122, BRONSON FIELD		
CLIENT: IAS ENVIRONMENTAL DEPARTMENT, IAS PENSACOLA		