



3 February 1997

Mr. Brian Helland
Department of the Navy
Northern Division, Naval Facilities Engineering Command
Attn: Code 1812 (BJH)
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113

RE: Well Installation/Abandonment Program, Old Fuel Farm, Naval Air Station,
Brunswick, Maine
Contract No.62472-92-D-1296; Contract Task Order No. 0035
EA Project No. 29600.35

Dear Mr. Helland:

EA Engineering, Science, and Technology is pleased to provide the enclosed field data in support of the well installation and abandonment activities performed at the Old Fuel Farm, Naval Air Station, Brunswick, Maine (Figure 1). Deliverables forwarded within this submission include boring logs/well construction diagrams (Attachment A) and well development logs (Attachment B).

The purpose of the well installation and abandonment program was to restore the integrity of the monitoring well network at the Old Fuel Farm. Old Fuel Farm wells MW-56 and MW-61 required replacement due to irreparable damage incurred during construction of the *in situ* remediation system and subsequent site grading. The remainder of this submittal details the methods for well abandonment and replacement well installation.

1. WELL INSTALLATION PROGRAM

The well installation program was completed from 20 to 23 December 1996. The program included the installation of 2 ground-water monitoring wells (MW-56R and MW-61R) and the abandonment of 2 monitoring wells (MW-56 and MW-61) at the Old Fuel Farm. Wells were installed by Northeast Diamond Drilling Company, Inc., of Brunswick, Maine, using the hollow-stem auger drilling method (MW-56R and MW-61R) and HW joint casing method (MW-56R). The HW joint casing method involves using a 4-in. steel joint casing pushed to the appropriate depth. This method was used due to running sand in the borehole of MW-56R. Wells were installed under the direct supervision of an EA geologist. Completion depths of the wells were 9.5 ft (MW-61R) and 11.5 ft (MW-56R). Attachment A provides the boring logs for each of the wells; Figure 1 provides a site map showing the location of the newly installed wells.

1.1 SOIL SAMPLING

During the drilling program, soil samples were collected continuously from surface grade to depths of 12 ft (MW-61R) and 14 ft (MW-56R) below ground surface and visually identified by the geologist using Unified Soils Classification System terminology. Following classification, soil was retained in 500-mL sample glassware (approximately two-thirds full), covered, and permitted to equilibrate with headspace air for a minimum of 15 minutes. Measurement of jar headspace volatile organic compound (VOC) concentrations was then accomplished by piercing the aluminum foil covering on the jar with the tip of the RAE Systems MiniRAE® photoionization detector. Headspace VOC sampling soil data are listed on the boring logs provided in Attachment A.

1.2 MONITORING WELL INSTALLATION

Monitoring wells MW-56R and MW-61R were constructed of new, clean, 2-in. inner diameter threaded, flush-joint Schedule 40 polyvinyl chloride (PVC) well casing with machine slotted (slot size = 0.010 in.) well screen and 2-in. inner diameter PVC riser pipe. The screened interval was to be set so that approximately 8 ft of screen extended below and 2 ft of screen extended above the ground-water interface. However, due to the shallow water table and shallow depth to clay, this was not possible. At monitoring well MW-56R, the depth to ground water was approximately 2 ft below ground surface. At monitoring well MW-61R, the depth to ground water was approximately 1 ft below ground surface. In order to have sufficient room for placement of the bentonite seal and grout, no screen was placed above the water table interface at either monitoring well. Monitoring well MW-56R was completed with an 8.5-ft screened interval, and monitoring well MW-61R was completed with a 6.5-ft screened interval, each with the top of the screened interval set at 3 ft below ground surface.

The annular space between the borehole and PVC screen piping at the monitoring wells was packed with clean No. 1 silica filter sand from the base of the well screen to 1 ft above the screened interval. The augers/steel casing were raised continuously while the filter pack was added to ensure that no air pockets formed. The augers/steel casing were raised to approximately 1 ft above the filter pack and a minimum 1-ft layer of bentonite pellets was added and allowed to hydrate using potable water. Atop each bentonite seal, borings were grouted to land surface with a mixture of potable water, cement, and bentonite. Well completion details are provided on the well construction diagrams contained in the boring logs presented in Attachment A.

Surface completion of monitoring wells MW-56R and MW-61R was in 4-in. (nominal) diameter protective steel casings with 4 ft × 4 ft × 2-in. concrete pads. The wells were provided with brass locks, keyed alike to the wells currently onsite, and lockable well caps.

1.3 WELL DEVELOPMENT

Well development was conducted following the completion of the well installation program on 7-8 January 1997. Monitoring wells were developed by pumping out a minimum of 12 well volumes using a 2-in. Grundfos Redi-Flo2 submersible pump. During development, a Hydrolab Model H20®G multi-parameter water quality meter was used to record temperature, conductivity, dissolved oxygen, Eh, and pH. A HACH Model 2100P turbidimeter was used to record turbidity. Monitoring well MW-56R yielded turbid-free water after development was completed. Monitoring well MW-61R did not yield turbid-free water, therefore, it was developed for the maximum time period of 4 hours. Water quality indicator parameters, with the exception of turbidity, stabilized to within 10 percent in monitoring well MW-61R. The field records of well development forms are provided in Attachment B.

2. WELL ABANDONMENT

Monitoring wells MW-56 and MW-61 were abandoned-in-place on 20 and 23 December 1996, respectively. Monitoring well MW-56 had a 4-in. above grade protective steel casing, which was removed by the Northeast Diamond Drilling Co. Inc., along with the 2-in. PVC well screen and casing. The borehole was filled to surface grade with a mixture of potable water, cement, and bentonite. Monitoring well MW-61 was a flush-mount 2-in. PVC well which was filled to surface grade with a mixture of potable water, cement, and bentonite.

3. LOCATION SURVEYING

On 29 January 1997, representatives of Cornerstone Professional Land Surveying, Inc., under contract to EA, conducted location surveying at the Old Fuel Farm. The services for the survey included the establishment of horizontal and vertical control using existing survey control points, including monitoring wells, benchmarks, or other onsite controls. Horizontal control was tied to the Maine State Plane Grid Coordinate System and referenced to the North American Datum of 1983, while vertical control was referenced to the National Geodetic Vertical Datum of 1988.

Newly installed monitoring wells were located utilizing conventional surveying techniques. At monitoring well locations, ground and PVC riser pipe elevations were surveyed. New survey data were added to the site survey map completed during the previous site investigation. Pertinent survey data are summarized below:

| Well No. | Elevation Top of PVC Riser (ft MSL) | Northing | Easting |
|-------------------------------------------------------|-------------------------------------|-------------|-------------|
| MW-56R | 75.28 | 388957.3190 | 563495.9359 |
| MW-61R | 75.52 | 389085.3402 | 563172.5007 |
| NOTE: MSL = Mean sea level; PVC = Polyvinyl chloride. | | | |

4. MANAGEMENT OF INVESTIGATION-DERIVED WASTE

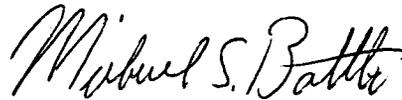
Waste material generated during well installation and abandonment at the Old Fuel Farm included:

- Drill cuttings (soil) derived from monitoring well installation
- Decontamination fluids
- Well development water derived from monitoring well development.

Based on previously obtained site data, and since no evidence of grossly impacted soil or ground water was noted, drill cuttings, decontamination fluids, and development water were disposed of onsite.

It has been our pleasure providing these data. If there are any questions, please do not hesitate to call.

Respectfully,



Michael S. Battle, P.G.
Project Manager

MSB/mkp
Attachments

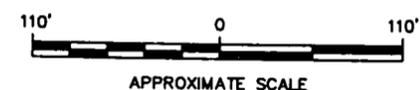
cc: J. Caruthers (NAS)
S. Morekas (EA)

LEGEND

-  MONITORING WELL LOCATION
-  CHAIN LINK FENCE
-  SOIL VAPOR EXTRACTION LINE
-  AIR SPARGING LINE

| MONITORING WELL | WELL RISER ELEVATION (FT. MSL.) |
|-----------------|---------------------------------|
| MW-044 | 73.18 |
| MW-049 | 66.97 |
| MW-051 | 73.20 |
| MW-054 | 75.49 |
| MW-056 | 75.28 |
| MW-058 | 69.80 |
| MW-061R | 75.52 |
| MW-062 | 80.78 |
| MW-A | 71.39 |
| MW-B | 59.01 |
| MW-C | 66.22 |
| MW-D | 74.70 |
| MW-E | 75.29 |
| MW-F | 77.55 |
| MW-I | 75.55 |
| MW-J | 76.81 |

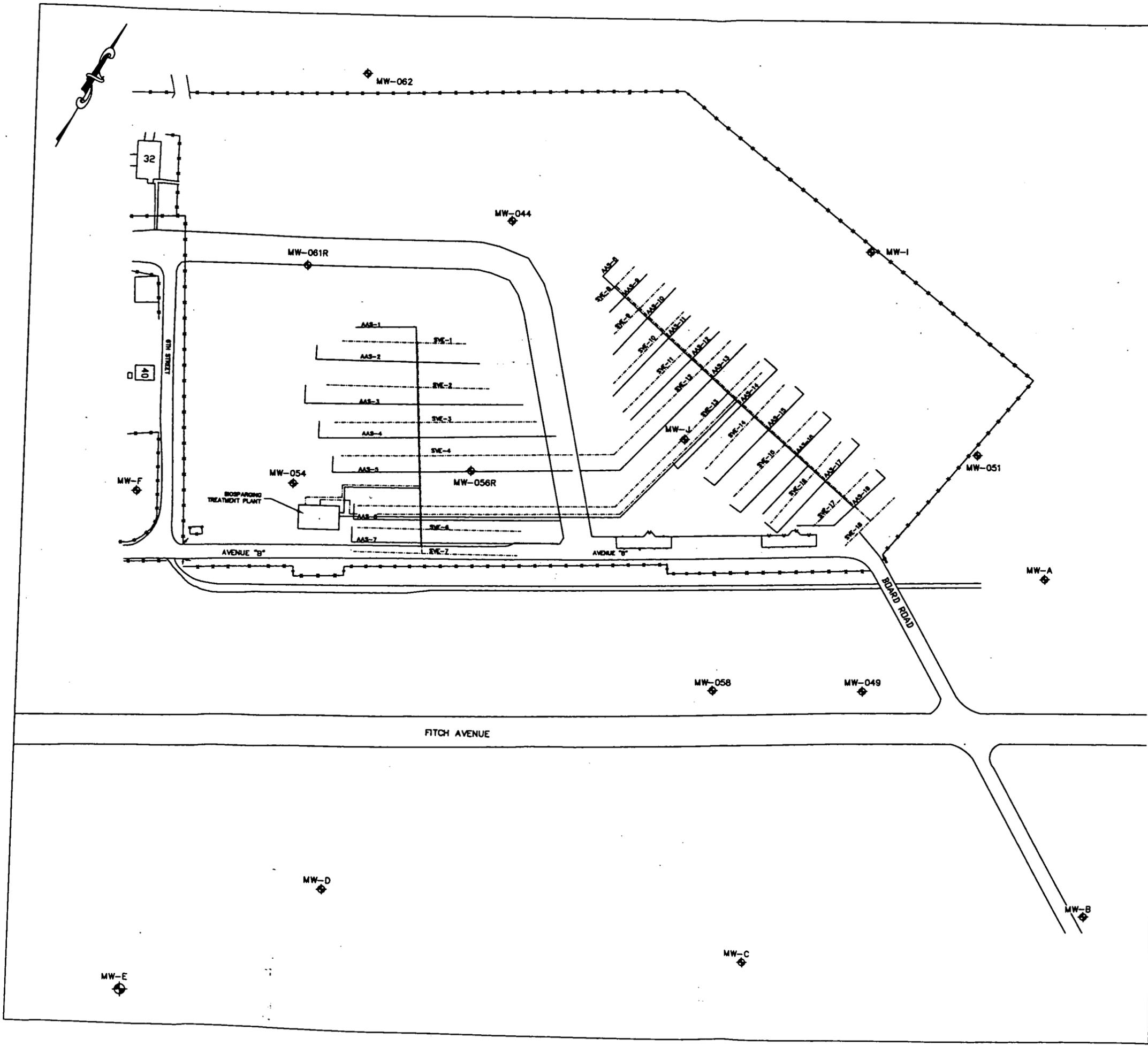
NOTE:
 1. WELL ELEVATIONS CORRESPOND TO THE NOTCH ON TOP OF PVC RISER UNDER PVC CAP.



**SITE PLAN
 FUEL FARM BIOSPARING SYSTEM
 NAVAL AIR STATION, BRUNSWICK, MAINE**

FIGURE 1

| | | |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| DATE 3 FEBRUARY 1997 |  <p>EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.</p> <p>London Center 18 Loveton Circle Sparks, Maryland 21152 (301) 771-6000</p> <p>BELLEVILLE CHICAGO LINCOLN NEW YORK NEW JERSEY ALBUQUERQUE LOS ANGELES SAN FRANCISCO</p> | PROJECT NUMBER 29600.35 |
| DESIGNED BY SY | | SCALE AS SHOWN |
| DRAWN BY SY | | FILE NAME FFARMS |
| CHECKED BY MSB | | DRAWING NUMBER - |
| PROJECT MANAGER MSB | | SHEET NUMBER 1 OF 1 |



Attachment A

Boring Logs/Well Construction Diagrams

| | | | | |
|---------|---------------------------------------------------------|---------------------------------|--------------------------------------|--|
| PROJECT | Name: Brunswick Naval Air Station | | Client: U.S. Navy, Northern Division | |
| | Location: Fuel Farm | | Number: 29600.35.3220 | |
| BORING | Logged By: Suzanne Chase | | Date: 12/20/96 | |
| | Surface Elevation: 72.3 ft. MSL | Total Depth (ft): 14.0 | Dia. (in): 4.25 in. | |
| DRILL | Company: Northeast Diamond Drilling | | Rig/Type: Auger B-50 | |
| | Method: Hollow Stem Auger / Split-barrel - 140 lb. ham. | | Permit No.: NA | |
| | Driller: Tim Whitman | | License No.: NA | |
| WELL | TOC Elev. (ft): 75.28 | Water Level Initial (ft): 2.0 | Static (ft): 5.30 | |
| | Screen Dia. (in): 2 | Type/Size: 0.01 in. slotted PVC | Length (ft): 8.5 | |
| | Casing Dia. (in): 2 | Type: PVC | Length (ft): 6 | |

Page 1 of 1

| Description (Color, Texture, Structure) | USCS Class. | Graphic Log | Depth (feet) | Well Completion | Sample ID Depth Range (feet) | PID (ppm) | Blows / 6 in. | Recovery in. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|--------------|-----------------|---------------------------------|-----------|--------------------|--------------|
| Trace <10%, Little 10% to 20%, Some 20% to 30%, And 30% to 50% | | | | | | | | |
| Top 6 in. medium SAND grading to brown medium SAND (dry to moist, loose) | SW | | 0-2 | | 0-2 | 0.7 | 1 1 1 3 | 12 |
| Top 4 in. black SILTS (organics) grading to dark brown SAND at 12 in. grading to orange brown SAND (wet, medium dense) | | | 2-4 | | 2-4 | 3.5 | 1 2 3 11 | 18 |
| Top 6 in. black SILT (organics) grading to fine brown SAND changing to orange brown SAND at 14 in. and grading to dark brown SAND (wet, medium dense) | | | 4-6 | | 4-6 | 89 | 3 8 12 14 | 20 |
| Brown fine to medium SAND some silt (wet, medium dense) | SP | | 6-8 | | 6-8 | 1.1 | 8 7 12 14 | 18 |
| Light gray to light brown fine to medium SAND / SILTY SAND (wet, medium dense) | | | 8-10 | | 8-10 | 1.0 | 2 5 10 15 | 21 |
| Brown fine SILTY SAND with gray clay in the barrel tip (wet, medium dense) | | | 10-12 | | 10-12 | 4.4 | 3 4 5 6 | 12 |
| Blue gray CLAY (wet, stiff) | CL | | 12-14 | | 12-14 | 1.0 | 2 3 5 6 | 24 |
| Bottom of boring at 14.0 feet. | | | 14 | | | | | |
| | | | 16 | | | | | |
| | | | 18 | | | | | |
| | | | 20 | | | | | |
| | | | 22 | | | | | |
| | | | 24 | | | | | |

LEGEND

| | | | | |
|------------------|--------------|-----------|---------------------|--------------------|
| Land Fill | Silt | Bentonite | Screened Interval | Bulk Sample |
| Metamorphic Rock | Silty Sand | Grout | Riser | Lab Sample |
| Sandy Clay | Sandy Gravel | Concrete | Initial Water Level | Static Water Level |

| | | | | |
|----------------|---------------------------------------------------------|---------------------------------|--------------------------------------|--|
| PROJECT | Name: Brunswick Naval Air Station | | Client: U.S. Navy, Northern Division | |
| | Location: Fuel Farm | | Number: 29600.35.3220 | |
| BORING | Logged By: Suzanne Chase | | Date: 12/23/96 | |
| | Surface Elevation: 72.2 ft. MSL | Total Depth (ft): 12.0 | Dia. (in): 4.25 in. | |
| DRILL | Company: Northeast Diamond Drilling | | Rig/Type: Auger B-50 | |
| | Method: Hollow Stem Auger / Split-barrel - 140 lb. ham. | | Permit No.: NA | |
| | Driller: Chris Palmer | | License No.: NA | |
| WELL | TOC Elev. (ft): 75.52 | Water Level Initial (ft): 3.55 | Static (ft): 3.55 | |
| | Screen Dia. (in): 2 | Type/Size: 0.01 in. slotted PVC | Length (ft): 6.5 | |
| | Casing Dia. (in): 2 | Type: PVC | Length (ft): 6 | |

Page 1 of 1

| Description (Color, Texture, Structure) | USCS Class. | Graphic Log | Depth (feet) | Well Completion | Sample ID Depth Range (feet) | PID (ppm) | Blows / 6 in. | Recovery in. |
|------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|--------------|-----------------|---------------------------------|-----------|-------------------|--------------|
| Trace <10%, Little 10% to 20%, Some 20% to 30%, And 30% to 50% | | | | | | | | |
| Top 6 in. medium to coarse SAND some gravel grading to brown medium to coarse SAND, slightly orange at tip of barrel (wet, medium dense) | SW | | 2 | | 0-2 | 338 | 4 10 8 9 | 14 |
| Brown medium to coarse SAND, some gravel grading to brown medium to fine SAND, some orange staining (wet, medium dense) | | | 4 | | 2-4 | 550 | 6 5 6 5 | 18 |
| Brown medium to fine brown SAND some organics (wet, very loose) | | | 6 | | 4-6 | 1,200 | 4 2 1 3 | 18 |
| Brown fine SAND, some silt and mica (wet, medium dense) odor of swamp gas from the barrel | SP | | 8 | | 6-8 | 1,000 | 5 5 7 8 | 24 |
| Same as above grading gray fine to medium SAND and SILT composed mainly of mica. Bottom of barrel blue gray clay (wet, loose) | | | 10 | | 8-10 | 600 | 3 4 2 13 | 19 |
| Blue CLAY with 1/2 in. silty sand lense at 11 ft (wet, stiff) | CL | | 12 | | 10-12 | 480 | 3 4 6 10 | 14 |
| Bottom of boring at 12.0 feet. | | | 12 | | | | | |
| | | | 14 | | | | | |
| | | | 16 | | | | | |
| | | | 18 | | | | | |
| | | | 20 | | | | | |
| | | | 22 | | | | | |
| | | | 24 | | | | | |

LEGEND

| | | | | |
|------------------|--------------|-----------|---------------------|--------------------|
| Land Fill | Silt | Bentonite | Screened Interval | Bulk Sample |
| Metamorphic Rock | Silty Sand | Grout | Riser | Lab Sample |
| Sandy Clay | Sandy Gravel | Concrete | Initial Water Level | Static Water Level |

Attachment B
Well Development Logs



FIELD RECORD OF WELL DEVELOPMENT

WELL DESIGNATION/LOCATION: MW-56A
 WELL CONDITION: Good
 WELL INSTALLATION DATE: 4/20/96
 GAUGE DATE: 1/8/97
 SOUNDING METHOD: interFace probe
 STICK UP/DOWN (ft): 2.91
 DEVELOPMENT DATE: 1/8/97
 DEVELOPMENT METHOD: 2" Grundfos

PROJECT NAME: Brunswick
 PROJECT LOCATION: Fuel Farm
 WEATHER: cold, windy, etc
 WELL INSTALLATION TIME: _____
 GAUGE TIME: 845
 MEASUREMENT REF: TCC
 WELL DIAMETER (in.): 2
 SCREEN LENGTH (ft): 8.5
 DEVELOPMENT TIME: _____
 STATIC WATER LEVEL: 0815

WELL VOLUME

SANDPACK VOLUME

A. WELL DEPTH (ft): 14.47
 B. DEPTH TO WATER (ft): 7.49
 C. LIQUID DEPTH (ft) (A-B): 6.98
 D. WELL VOL/FT: 0.16
 E. WELL VOL (ft) (C*D): 1.12
 F. LIQUID SCREEN LENGTH (ft): 7.49

G. BOREHOLE VOL/FT: _____
 H. BOREHOLE VOL (gal) (F*G): 0.65
 I. SAND VOL (gal) (H-[D*F]): 4.87
 J. LIQUID SAND VOL (gal) (I*porosity): 3.67
 K. ONE WELL VOL (gal) (E+J): 1.1
 L. FIVE WELL VOL (gal) (L*5): 2.2
11

FLUID LOST DURING DRILLING: 0
 FLUID REMOVED PRIOR TO WELL INSTALLATION: 0
 WATER ADDED DURING WELL INSTALLATION: 0

| | BEGINNING | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|-----------|-------|------|------|------|------|
| TIME (min) | 850 | 854 | 858 | 902 | 906 | 910 |
| WATER LEVEL (ft) | 7.49 | - | - | - | - | - |
| AVERAGE PUMPING RATE (gpm) | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| VOLUME PURGED (gal) | - | 3 | 6 | 9 | 12 | 15 |
| pH | 5.90 | 5.52 | 5.34 | 5.38 | 5.44 | 5.34 |
| Eh | 384 | 390 | 393 | 392 | 391 | 392 |
| TEMPERATURE (C) | 6.18 | 7.16 | 8.37 | 8.65 | 8.75 | 8.88 |
| CONDUCTIVITY (μ mhos/cm) | 177 | 180 | 176 | 176 | 176 | 175 |
| Dissolved Oxygen (mg/L) | 10.66 | 10.13 | 8.76 | 9.15 | 9.15 | 9.30 |
| TURBIDITY | >200 | >200 | >200 | >200 | >200 | >200 |

DEPTH TO SEDIMENT IN WELL (ft) BEFORE: 14.47
 DEPTH TO SEDIMENT IN WELL (ft) AFTER: 14.47
 TOTAL QUANTITY OF WATER REMOVED (gal): 39
 ESTIMATE RECHARGE RATE: 1gpm

DEVELOPMENT DESCRIPTION: well actively sparging. Had to turn system off to allow well to recharge.
pump overloaded at 914 Had to get new pump

**FIELD RECORD OF WELL DEVELOPMENT (OVERFLOW PAGE)**

| | | |
|----------------------|--------------------------|--------------|
| Site Name: Fuel Farm | Project No.: 2960035 | Date: 1/7/97 |
| Well ID: mw-56A | Field Personnel: SYC BOA | |

| | 6 | 7 | 8 | 9 | 10 | 11 |
|-------------------------------|-------|------|-------|------|------|------|
| TIME (min) | 934 | 946 | 958 | 1004 | 1007 | 1010 |
| WATER LEVEL (ft) | — | — | — | — | — | — |
| AVERAGE PUMPING RATE (gpm) | 0.75 | 0.25 | 0.25 | 1 | 1 | 1 |
| VOLUME PURGED (gal) | 18 | 21 | 24 | 30 | 33 | 36 |
| pH | 5.15 | 5.27 | 5.36 | 5.23 | 5.26 | 5.28 |
| Eh | 390 | 386 | 388 | 386 | 387 | 387 |
| TEMPERATURE (C) | 6.53 | 8.40 | 8.66 | 8.24 | 8.68 | 8.86 |
| CONDUCTIVITY (μ mhos/cm) | 172 | 179 | 175 | 176 | 177 | 176 |
| Dissolved Oxygen (mg/L) | 11.84 | 9.43 | 10.10 | 9.01 | 9.26 | 9.42 |
| TURBIDITY | >200 | 14 | 59 | 11.4 | 4.5 | 3.8 |

| | 12 | 13 | 14 | 15 | 16 | 17 |
|-------------------------------|------|----|----|----|----|----|
| TIME (min) | 1013 | | | | | |
| WATER LEVEL (ft) | — | | | | | |
| AVERAGE PUMPING RATE (gpm) | 1 | | | | | |
| VOLUME PURGED (gal) | 39 | | | | | |
| pH | 5.24 | | | | | |
| Eh | 387 | | | | | |
| TEMPERATURE (C) | 8.98 | | | | | |
| CONDUCTIVITY (μ mhos/cm) | 178 | | | | | |
| Dissolved Oxygen (mg/L) | 9.28 | | | | | |
| TURBIDITY | 2.9 | | | | | |

COMMENTS: _____



FIELD RECORD OF WELL DEVELOPMENT

WELL DESIGNATION/LOCATION: mw-61A
 WELL CONDITION: Good
 WELL INSTALLATION DATE: 12/23/96
 GAUGE DATE: 1/7/97
 SOUNDING METHOD: interface probe
 STICK UP/DOWN (ft): 3.12
 DEVELOPMENT DATE: 1/7/97
 DEVELOPMENT METHOD: 2" Grundfos pump

PROJECT NAME: Brunswick
 PROJECT LOCATION: Fuel Farm
 WEATHER: cold, windy, 200
 WELL INSTALLATION TIME: 1600
 GAUGE TIME: 858
 MEASUREMENT REF: TOC
 WELL DIAMETER (in.): 2
 SCREEN LENGTH (ft): 6.5
 DEVELOPMENT TIME: 920
 STATIC WATER LEVEL:

WELL VOLUME

SANDPACK VOLUME

A. WELL DEPTH (ft): 13.71
 B. DEPTH TO WATER (ft): 4.04
 C. LIQUID DEPTH (ft) (A-B): 9.67
 D. WELL VOL/FT: 0.16
 E. WELL VOL (ft) (C*D): 1.6
 F. LIQUID SCREEN LENGTH (ft): 9.6

G. BOREHOLE VOL/FT: 0.65
 H. BOREHOLE VOL (gal) (F*G): 6.2
 I. SAND VOL (gal) (H-[D*F]): 4.7
 J. LIQUID SAND VOL (gal) (I*porosity): 1.4
 K. ONE WELL VOL (gal) (E+J): 3
 L. FIVE WELL VOL (gal) (L*5): 15

FLUID LOST DURING DRILLING: 0
 FLUID REMOVED PRIOR TO WELL INSTALLATION: 0
 WATER ADDED DURING WELL INSTALLATION: 0

| | BEGINNING | 1 | 2 | 3 | 4 | 5 |
|----------------------------|-----------|------|------|------|------|------|
| TIME (min) | 923 | 925 | 928 | 930 | 932 | 936 |
| WATER LEVEL (ft) | 4.04 | - | - | - | - | - |
| AVERAGE PUMPING RATE (gpm) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1 |
| VOLUME PURGED (gal) | - | 3 | 6 | 9 | 12 | 15 |
| pH | 6.17 | 6.40 | 6.51 | 6.53 | 6.55 | 6.60 |
| Eh | 203 | 102 | 77 | 67 | 54 | 50 |
| TEMPERATURE (C) | 4.09 | 5.02 | 5.23 | 5.42 | 6.03 | 6.12 |
| CONDUCTIVITY (μmhos/cm) | 177 | 169 | 173 | 175 | 176 | 174 |
| Dissolved Oxygen (mg/L) | 4.91 | 5.37 | 3.35 | 3.42 | 3.57 | 3.48 |
| TURBIDITY | >200 | >200 | >200 | >200 | >200 | >200 |

DEPTH TO SEDIMENT IN WELL (ft) BEFORE: 13.71
 DEPTH TO SEDIMENT IN WELL (ft) AFTER: _____
 TOTAL QUANTITY OF WATER REMOVED (gal): 135
 ESTIMATE RECHARGE RATE: 0.5gpm

DEVELOPMENT DESCRIPTION: water 3 Ft above screen.
adjusted rate to 1.5gpm. sampled after each well volume

**FIELD RECORD OF WELL DEVELOPMENT (OVERFLOW PAGE)**

| | | |
|-----------------------------|---------------------------------|---------------------|
| Site Name: <u>Fuel Farm</u> | Project No.: <u>2960035</u> | Date: <u>1/9/97</u> |
| Well ID: <u>WU-61A</u> | Field Personnel: <u>SYC BDA</u> | |

| | 6 | 7 | 8 | 9 | 10 | 11 |
|-------------------------------|------|------|------|------|------|------|
| TIME (min) | 946 | 956 | 1009 | 1019 | 1029 | 1039 |
| WATER LEVEL (ft) | - | - | - | - | - | - |
| AVERAGE PUMPING RATE (gpm) | 1 | 1 | 0.5 | 0.5 | 0.5 | 0.5 |
| VOLUME PURGED (gal) | 26 | 36 | 40 | 45 | 50 | 55 |
| pH | 6.65 | 6.70 | 6.58 | 6.53 | 6.55 | 6.73 |
| Eh | 60 | 67 | 44 | 133 | 63 | 100 |
| TEMPERATURE (C) | 6.08 | 5.29 | 5.09 | 4.25 | 4.40 | 4.49 |
| CONDUCTIVITY (μ mhos/cm) | 168 | 163 | 170 | 159 | 158 | 156 |
| Dissolved Oxygen (mg/L) | 3.08 | 4.12 | 4.02 | 3.89 | 3.78 | 4.01 |
| TURBIDITY | 7200 | 123 | 146 | 100 | 68 | 61 |

| | 12 | 13 | 14 | 15 | 16 | 17 |
|-------------------------------|------|------|------|------|------|------|
| TIME (min) | 1049 | 1103 | 1119 | 1135 | 1153 | 1209 |
| WATER LEVEL (ft) | - | - | - | - | - | - |
| AVERAGE PUMPING RATE (gpm) | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| VOLUME PURGED (gal) | 60 | 67 | 75 | 83 | 92 | 99 |
| pH | 6.70 | 6.61 | 6.54 | 6.60 | 6.67 | 6.67 |
| Eh | 63 | 70 | 69 | 62 | 66 | 69 |
| TEMPERATURE (C) | 4.80 | 4.77 | 4.86 | 4.89 | 5.15 | 5.04 |
| CONDUCTIVITY (μ mhos/cm) | 150 | 156 | 157 | 156 | 154 | 154 |
| Dissolved Oxygen (mg/L) | 2.73 | 3.01 | 3.21 | 3.40 | 3.10 | 3.15 |
| TURBIDITY | 58 | 54 | 40 | 38 | 33 | 32 |

COMMENTS: 1003 went dry. Allowed to recharge setgpm at 0.5

**FIELD RECORD OF WELL DEVELOPMENT (OVERFLOW PAGE)**

| | | |
|-----------------------------|---------------------------------|---------------------|
| Site Name: <u>Fuel Farm</u> | Project No.: <u>2960035</u> | Date: <u>1/7/97</u> |
| Well ID: <u>MW-61A</u> | Field Personnel: <u>SYC BDA</u> | |

| | 6 | 7 | 8 | 9 | 10 | 11 |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|----|
| TIME (min) | <u>1227</u> | <u>1241</u> | <u>1255</u> | <u>1305</u> | <u>1323</u> | |
| WATER LEVEL (ft) | <u>-</u> | <u>-</u> | <u>-</u> | <u>-</u> | <u>-</u> | |
| AVERAGE PUMPING RATE (gpm) | <u>0.5</u> | <u>0.5</u> | <u>0.5</u> | <u>0.5</u> | <u>0.5</u> | |
| VOLUME PURGED (gal) | <u>107</u> | <u>114</u> | <u>121</u> | <u>126</u> | <u>135</u> | |
| pH | <u>6.70</u> | <u>6.63</u> | <u>6.65</u> | <u>6.63</u> | <u>6.68</u> | |
| Eh | <u>66</u> | <u>73</u> | <u>59</u> | <u>60</u> | <u>62</u> | |
| TEMPERATURE (C) | <u>4.90</u> | <u>4.99</u> | <u>5.12</u> | <u>5.40</u> | <u>5.58</u> | |
| CONDUCTIVITY (μ mhos/cm) | <u>154</u> | <u>157</u> | <u>154</u> | <u>154</u> | <u>153</u> | |
| Dissolved Oxygen (mg/L) | <u>3.20</u> | <u>3.18</u> | <u>2.33</u> | <u>2.43</u> | <u>2.51</u> | |
| TURBIDITY | <u>35</u> | <u>45</u> | <u>36</u> | <u>31</u> | <u>30</u> | |

| | 12 | 13 | 14 | 15 | 16 | 17 |
|-------------------------------|----|----|----|----|----|----|
| TIME (min) | | | | | | |
| WATER LEVEL (ft) | | | | | | |
| AVERAGE PUMPING RATE (gpm) | | | | | | |
| VOLUME PURGED (gal) | | | | | | |
| pH | | | | | | |
| Eh | | | | | | |
| TEMPERATURE (C) | | | | | | |
| CONDUCTIVITY (μ mhos/cm) | | | | | | |
| Dissolved Oxygen (mg/L) | | | | | | |
| TURBIDITY | | | | | | |

COMMENTS: Sulfur smell in water appears yellow in bucket