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C-NAVY-3-98-1130W

Project Number 0288

March 12, 1998

Mr. Brian Helland
Remedial Project Manager
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113

Reference: Contract No. N62472-90-D-1298, Navy (CLEAN), Contract Task Order No. 143,
Tank Farms 4 and 5, NETC, Newport, Rhode Island

Subject: Transmittal of Tank Farm 4 Groundwater Monitoring Well Inventory

Dear Mr. Helland:

Enclosed for submittal is the Tank Farm 4 Groundwater Monitoring Well Inventory. This report presents the results of a monitoring well inventory conducted by Brown & Root Environmental at Tank Farm 4 at the Naval Education and Training Center (NETC) - Newport, Rhode Island. The inventory was performed on February 19 and 20, 1998 in accordance with a Technical Direction memorandum dated December 15, 1997. The inventory was conducted to determine the condition of monitoring wells known to be located within the Tank Farm 4 site boundary following the completion of tank demolition activities by the RAC contractor.

If you have any comments or questions on this transmittal, please contact me.

Very truly yours,


James R. Forrelli, P.E.
Project Manager

JRF/rt

Enclosures

c: R. Roberge, NETC-Newport, Code 40E (w/enc. - 2)
J. Trepanowski/G. Glenn, B&R Environmental (w/enc.)
File 0288-3.2 w/o enc./0288-8.0 (w/enc.)

Brown & Root Environmental



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**GROUNDWATER MONITORING WELL INVENTORY
TANK FARM 4
NETC - NEWPORT, RHODE ISLAND
CTO 143
MARCH 1998**

1.0 INTRODUCTION

This report presents the results of a monitoring well inventory conducted by Brown & Root Environmental (B&R Environmental) at Tank Farm 4, located at Naval Education and Training Center (NETC) - Newport, Rhode Island. This work was performed under CTO143 in accordance with a Technical Direction memorandum dated December 15, 1997. The inventory was conducted to determine the condition of monitoring wells known to be located within the Tank Farm 4 site boundary following the completion of tank demolition activities by the Response Action Contract (RAC) contractor. Background information, well inventory activities, observations, and conclusions/recommendations are presented below.

2.0 BACKGROUND

Tank Farm 4 was constructed during World War Two to store virgin fuel oil (No. 6 bunker oil) to supply war ships until the 1970s. Tank Farm 4 occupies 90 acres and contained 12 underground storage tanks (USTs) numbered 37 through 48. Each tank was constructed of reinforced concrete and had a capacity of approximately 2.52 million gallons. Some tanks were reportedly used for No. 2 fuel oil storage in the mid-1970s.

The tanks were demolished by the Navy's RAC contractor, Foster Wheeler Environmental Corporation, from late 1997 through early 1998 as part of UST closure activities conducted by the Navy under Rhode Island regulations. Demolition activities consist of removing ballast water, imploding the tank top, and backfilling with earth. Demolition activities involving disturbing and regrading soils located in areas surrounding the tanks resulted in damaging and destroying several wells.

Based on available information, a total of 40 monitoring wells existed at Tank Farm 4 before the demolition activity began. The wells were installed as follows: 1) two monitoring wells during the Confirmation Study (CS) conducted between 1982 and 1986; 2) eight wells installed by TRC in

1990 during the Phase I Remedial Investigation (RI) conducted under the Installation Restoration Program; and 3) thirty wells installed by B&R Environmental between 1994 and 1995 during the Preliminary Closure Assessment (PCA) and Site Investigation (SI). The CS and RI investigations focused on the reported disposal of tank bottoms at the site and the wells installed under those programs are not associated with a specific tank. PCA and SI wells were installed to evaluate the impact of past site activities on groundwater in the immediate vicinity of the 12 USTs.

3.0 WELL INVENTORY ACTIVITIES

The field phase of the Tank Farm 4 well inventory was conducted on February 19-20, 1998, prior to final grading of the site. Before conducting the field phase, available data (installation logs and location data) were compiled (see Appendix A; Boring/well construction logs for the CS wells could not be located). During the field phase, each monitoring well's condition was determined by field inspection in accordance with the basic guidelines provided in B&R Environmental SOP GH-1.2 - Evaluation of Existing Wells and Water Level Measurement. The purpose of this procedure is to determine a well's serviceability, and includes observing and noting each well's general physical condition, measuring the well depth and water level with a Solinst oil/water interface probe, and checking for obstructions. In addition, each well was checked for the presence of floating product, also using the Solinst oil/water interface probe. Observations for each well were recorded on a separate "Well Inspection and Groundwater Level Measurement Sheet" (see Appendix B).

All field activities were conducted in accordance with health and safety procedures established in the Site-Specific Health and Safety Plan (HASP), which is included in the CTO 143 Tank Farms 4 and 5 Final Work Plan. The work was performed in respiratory protection level D. No sampling was performed during these activities and no investigation derived waste (IDW) other than personal protective equipment (PPE) was generated. No subcontractors were used to perform these activities.

4.0 INVENTORY OBSERVATIONS

The Tank Farm 4 well inventory observations are presented in Table 1.0. Overall, sixteen wells were located and found serviceable with repairs. The other twenty-four wells have been destroyed. A discussion by program follows:

PCA/SI Wells - Of thirty PCA/SI wells, only seven are serviceable with repair. Only three of the other twenty-three wells were located. One was heavily damaged and not serviceable; the other two were destroyed. The balance of twenty wells are presumed to have been destroyed.

RI Wells - All eight RI wells were located and found to be potentially serviceable with repair.

CS Wells - One of the two CS wells was found to be potentially serviceable.

All sixteen potentially serviceable wells are unsecured. Many are missing caps or covers and are exposed to the environment. Where possible, the wells were secured using temporary cable ties.

5.0 CONCLUSIONS/RECOMMENDATION

Conclusions

The well inventory revealed that twenty-three of the thirty PCA/SI wells were destroyed, while only one of the ten RI and CS wells were destroyed by tank demolition activities. The PCA/SI wells were installed to monitor groundwater in the vicinity of specific tanks and were placed in close proximity to the tank's exterior wall, and thus were more likely impacted by the tank demolition activities. Although most of the RI and CS wells are serviceable, these wells were not installed to investigate specific USTs or used in recent UST investigations. Therefore, this conclusions and recommendations section focuses on the PCA/SI wells.

All of the potentially serviceable PCA/SI wells are not secure and may contain foreign material that may have fallen or been dropped into the wells. In addition, silt has settled in some of the wells,

reducing the amount of useable screen area and possibly increasing the turbidity of any future samples.

All of the potentially serviceable PCA/SI wells require some repair or maintenance to correct various problems observed, including damaged protective casings, separated and cracked surface seals, and surface seal, covered by fill.

The 24 destroyed monitoring wells are subject to RIDEM well abandonment procedures, Rules and Regulations for Groundwater Quality, Section 13.0.

Based on data presented in the Tank Farm 4 PCA and SI reports, additional monitoring and/or investigation is proposed at Tanks 38, 42, 45, and 48. The proposed installation of the Tank 38 monitoring well, required under the Corrective Action Plan, has not been affected by the demolition activities. In the CTO142 Work Plan Addendum 4 for the Tank Farm 4 Supplemental Site Investigation (SSI) (B&R Environmental 1996), groundwater sampling is planned at six monitoring wells listed below:

<u>Tank 42</u>	<u>Tank 45</u>	<u>Tank 48</u>
MW-123	MW-122	MW-119
	MW-330	MW-424
		MW-425

Three of these wells (MW-123, MW-122, and MW-119) could not be located and are presumed destroyed during tank closure activities. Replacement wells must be installed for these wells to collect the required groundwater samples. In addition, the other three wells should be repaired before they are sampled to ensure the wells are serviceable.

Additional investigation may be required at the remaining eight USTs based on a comparison of previously collected data against RIDEM GA groundwater standards.

Recommendations

All remaining wells that will be used for future sampling should be re-developed to remove any foreign material that may have fallen or been dropped into the wells. This redevelopment will also be used to remove any silt that has settled inside the wells, reducing the amount of useable screen area and possibly increasing the turbidity of any future samples.

All potentially serviceable wells should receive new keyed-alike locks and appropriate repairs in order to secure the wells properly. All of the potentially serviceable wells that will be used for future sampling should have the surficial seal replaced as needed.

To complete the Tank Farm 4 Supplemental Site Investigation three wells, replacing destroyed wells (Tank 42: MW-123; Tank 45: MW-122; and Tank 48: MW-119), should be installed. The Tank Farm 4 SSI calls for subsurface soil sampling at five soil boring and monitoring well locations (Tank 42: MW-123; Tank 45: MW-122, MW-330, and SB-225; and Tank 48: MW-119). As soil borings are advanced to collect the required soil samples, three should be completed as replacement monitoring wells. In addition, the other wells at Tank 48 (MW-330, MW-424, and MW-425) should be repaired and redeveloped before samples are collected.

A complete survey should be conducted once the new wells have been constructed. This survey should include the remaining existing wells to ensure that accurate elevation data is available for use in interpreting of water level data.

The 24 destroyed monitoring wells should be abandoned in accordance with RIDEM well abandonment procedures, Rules and Regulations for Groundwater Quality, Section 13.0. To fulfill this requirement, the location of the wells will have to be established using optical survey methods and a test pit excavated at the location of the monitoring well. Once the well casing is found, it will have to be sealed with a bentonite slurry in accordance with RIDEM regulations. After the well casing is sealed, the PVC shall be cut a minimum of 4 feet below existing grade and the test pit backfilled.

TABLE 1
GROUNDWATER MONITORING WELL INVENTORY OBSERVATIONS
TANK FARM 4
CTO 143
NETC NEWPORT, RHODE ISLAND
FEBRUARY 19-20, 1998

	PCA/SI Well (Tank No.)	Well	Type	Observed Depth bgs (ft.)	Original Depth bgs (ft.)	Free Product Observ. (ft.)	Well Condition	Comments
1.	37	MW-124	OB	na	40.74	na	destroyed	No evidence of well location found; presumed destroyed.
2.	38	MW-125	OB	na	40.67	na	destroyed	No evidence of well location found; presumed destroyed.
3.		MW-416	OB	na	39.86	na	destroyed	No evidence of well location found; presumed destroyed.
4.		MW-417	OB	na	41.80	na	destroyed	Protective casing and top 7-8 feet of the PVC well found on surface. No remaining evidence of the well location found.
5.		MW-418	OB	na	44.57	na	destroyed	No evidence of well location found; presumed destroyed.
6.	39	MW-115	OB	na	41.87	na	destroyed	No evidence of well location found; presumed destroyed.
7.	40	MW-114	OB	na	41.50	na	destroyed	No evidence of the well location found; presumed destroyed.
8.	41	MW-116	OB	na	39.66	na	destroyed	No evidence of the well location found; presumed destroyed.
9.	42	MW-123	OB	na	39.95	na	destroyed	No evidence of the well location found; presumed destroyed.
10.		MW-407	OB	na	40.38	na	destroyed	No evidence of the well location found; presumed destroyed.

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	PCA/SI Well (Tank No.)	Well	Type	Observed Depth bgs (ft.)	Original Depth bgs (ft.)	Free Product Observ. (ft.)	Well Condition	Comments
11.	42	MW-411	OB	na	40.25	na	destroyed	No evidence of the well location found; presumed destroyed.
12.		MW-413	OB	na	38.12	na	destroyed	No evidence of the well location found; presumed destroyed.
13.	43	MW-120	OB	na	39.57	na	destroyed	Top broken off; PVC riser located and marked. Well destroyed; can be located for abandonment.
14.	44	MW-117	OB	na	39.55	na	destroyed	No evidence of the well location found; presumed destroyed.
15.	45	MW-122	OB	na	40.41	na	destroyed	No evidence of the well location found; presumed destroyed.
16.		MW-330	OB	38.00	39.88	trace	located; serviceable, needs minor repairs ✓	Not secure; protective casing cap broken. Surface seal covered by fill. No LNAPL indicated by probe but trace oil observed on probe
17.		MW-331	OB	37.51	39.15	<0.01	located but not serviceable without repair ✗	Protective casing bent and cap missing. Surface seal covered by fill. Well bottom soft.
18.		MW-332	OB	38.73	39.46	not observed	located; serviceable, needs minor repair ✗	Not secure. Surface seal covered by fill. Hard bottom.
19.	46	MW-121	OB	na	39.30	na	destroyed	Surf. seal & bailer rope found.
20.	47	MW-118	OB	na	39.37	na	destroyed	No evidence of the well location found; presumed destroyed.
21.	48	MW-119	OB	na	40.15	na	destroyed	No evidence of the well location found; presumed destroyed.

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	PCA/SI Well (Tank No.)	Well	Type	Observed Depth bgs (ft.)	Original Depth bgs (ft.)	Free Product Observ. (ft.)	Well Condition	Comments
22.	48	MW-401	OB	na	38.86	na	destroyed	No evidence of the well location found; presumed destroyed.
23.		MW-404	OB	blocked	42.65	na	XX located; not serviceable	Severely damaged, obstructed.
24.		MW-408	OB	na	43.79	na	destroyed	No evidence of the well location found; presumed destroyed.
25.		MW-409	OB	22.02	24.56	not observed	X located but not serviceable without repair	Not secure; protective casing damaged. Well cap missing; rock found inside well. Well bottom soft.
26.		MW-412	OB	na	21.72	na	destroyed	
27.		MW-421	OB	16.12	17.88	not observed	X located but not serviceable without repair	Not secure; protective casing damaged. Surface seal covered by fill.
28.		MW-422	OB	na	26.00	na	destroyed	
29.		MW-424	BR	38.90	43.22	0.08-0.10	✓ located but not serviceable without repair	Not secure. Protective casing and cap missing. Surface seal covered by fill. Observed depth indicates well screen offset.
30.		MW-425	BR	41.13	43.41	not observed	✓ located; serviceable needs minor repair	Not secure. Protective casing cover missing. Well cap missing. Surface seal covered by fill.
31.		RI Wells	MW-1S	OB	12.26	14.0	not observed	located; serviceable X needs minor repair

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	PCA/SI Well (Tank No.)	Well	Type	Observed Depth bgs (ft.)	Original Depth bgs (ft.)	Free Product Observ. (ft.)	Well Condition	Comments
32.	RI Wells	MW-1D	BR	47.61	54.0	not observed	located; serviceable needs minor repair X	Lock cut to gain access. Surface seal cracked and separated from protective casing.
33.		MW-2	BR	28.39	30.7	not observed	located; serviceable	Lock cut to gain access. Surface buried under silt. Surface seal slightly separated from protective casing. Located in drainage area.
34.		MW-3S	OB	26.94	27	not observed	located; serviceable, needs minor repair X	Lock cut to gain access. Surface seal cracked and separated from protective casing.
35.		MW-3D	BR	53.92	54	not observed	located; serviceable, needs minor repair Y	Lock cut to gain access. Surface seal cracked and separated from protective casing.
36.		MW-4	OB	14.89	15	not observed	located; serviceable, X with repair	Not secure. Frost-heave damage to surface seal.
37.		MW-5S	BR	25.45	26	possible sheen	located; serviceable, needs minor repair X	Lock cut to gain access. Surface seal cracked and separated from protective casing. Intermittent LNAPL signal <0.01'.
38.		MW-5D	BR	41.38	42	not observed	located; serviceable, needs minor repair X	Lock cut to gain access. Surface seal cracked and separated from protective casing.

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	PCA/SI Well (Tank No.)	Well	Type	Observed Depth bgs (ft.)	Original Depth bgs (ft.)	Free Product Observ. (ft.)	Well Condition	Comments
39.	CS Wells	MW-10	na	26.64	na	not observed	located; serviceable, needs minor repair	Lock cut to gain access. Surface seal slightly frost heaved. Located in drainage area.
40.		MW-11	na	na	na	na	destroyed	No evidence of the well location found; presumed destroyed.

Notes:

bgs - below ground surface

OB - overburden

BR - bedrock

na - indicates data not available or not applicable