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SECOND QUARTER GROUNDWATER MONITORING PLAN LETTER REPORT FOR
SEPTEMBER THROUGH NOVEMBER 1998 FOR BUILDING 189 TRUMAN ANNEX NAS KEY
WEST FL
1/18/1999
TETRA TECH NUS

TtNUS/TAL-99-005/7846-7.2.3

January 18, 1999

Project Number 7846

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Q A Record

Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0059

Subject: Second Quarter Groundwater Monitoring Plan Letter Report
For The Period from September through November 1998
Building 189, Truman Annex, Naval Air Station,
Key West, Florida

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Groundwater Monitoring Report for the referenced Contract Task Order (CTO). This report has been prepared for the U.S. Navy Southern Division Naval Facilities Engineering Command under CTO-059, for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-94-D-0888.

Monitoring Objectives. The objective of the quarterly groundwater monitoring program at Site 189 is to evaluate the contaminant plume stability and monitor product recovery efforts until cleanup levels are achieved. The monitoring program, contaminants of concern, and target concentrations are presented in the Remedial Action Plan (RAP) for Berthing Wharf Building 189 (ABB-ES, 1994). In 1997, however, the Florida Department of Environmental Protection (FDEP) updated Chapter 62-770 of the Florida Administrative Code (FAC). As a result, new chemicals of concern (CoCs) and updated groundwater cleanup target levels (GCTLs) need to be established for Site 189.

The groundwater at the site is classified as a G-III aquifer (McKenzie, 1990). Based on this classification, the GCTLs for groundwater of low yield/poor quality, as prescribed by Chapter 62-770, are the appropriate GCTLs. Based on the first three sampling events at Site 189, Tetra Tech NUS, Inc. recommends the following list of CoCs and GCTLs:

<u>CoC</u>	<u>GCTL</u>
Benzo(a)anthracene	2 µg/L
Benzo(a)pyrene	2 µg/L
Benzo(b)fluoranthene	2 µg/L
Indeno(123cd)pyrene	2 µg/L
Total Recoverable Petroleum Hydrocarbons	50 mg/L

Baseline Groundwater Sampling. Activities and results from the baseline groundwater sampling event and first quarter of free product monitoring at NAS Key West, Site 189, are detailed in the first quarter monitoring report submitted to the FDEP on November 2, 1998.

First Quarter Monitoring. Activities and results from the first quarter of free product monitoring and first quarter groundwater sampling event at NAS Key West, Site 189, are detailed in the first quarter monitoring report submitted to the FDEP on November 2, 1998.

SECOND QUARTER MONITORING

Free Product Monitoring. TtNUS personnel visited the site on October 2, October 23, and December 2, 1998 to perform monthly free product monitoring and recovery. During each of these site visits, monitoring wells B189-MW01, B189-MW02, B189-MW03, B189-MW10 and B189-MW11 (see Figure 1, Attachment A) were gauged using an oil/water interface probe. No reportable quantities (>0.01 feet) of free product were detected in any of these monitoring wells during the October 2, 1998 visit. During the October 23 site visit, globules of free product were observed in monitoring well B189-MW02, however, the thickness was insufficient to be recorded with the oil/water interface probe. TtNUS attempted to bail the product from the well but the viscous nature of the product prevented it from entering the bailer. During the December 2, 1998 visit, approximately 0.03 feet of free product was detected in monitoring well B189-MW02. TtNUS attempted to bail the product from the well but the viscous nature of the product again prevented it from entering the bailer. Findings for all free product monitoring events are summarized in Table 1, Attachment B.

Groundwater Monitoring. On December 2, 1998, Tetra Tech NUS, Inc. personnel collected groundwater samples from nine Site 189 monitoring wells (B189-MW01, B189-MW02, B189-MW03, B189-MW04, B189-MW06R, B189-MW07, B189-MW10, B189-MW12, and B189-MW13D). All sampling activities were conducted in accordance with Tetra Tech NUS, Inc., FDEP approved, Comp QAP #980038.

Prior to collecting groundwater samples, water level and product measurements were recorded from each site monitoring well. The water level data was used to determine purge volumes. In addition, depth-to-water measurements, along with top of casing elevations, were used to calculate groundwater elevations. Based on these elevations, the groundwater was flowing primarily to the west at the time of the sampling. Figure 2, Attachment A, depicts the groundwater elevations recorded on December 2, 1998. Depth to water measurements, top of casing elevations, and groundwater elevation data are provided in Table 2, Attachment B.

All monitoring wells were purged prior to collecting groundwater samples. Purging and sampling were performed with a peristaltic pump using the low flow quiescent method. Water sampling logs, which detail the purge process, are provided in Attachment C.

Following collection of the groundwater samples, the sample bottles were packed on ice and shipped via overnight transport to PC&B Environmental Laboratories in Oviedo, Florida. The groundwater samples were analyzed for compounds specified in U.S. Environmental Protection Agency (USEPA) Methods 8021 (volatile organic aromatics [VOAs]), 504 (ethylene dibromide [EDB]), 8310 (polynuclear aromatic hydrocarbons [PAHs]), 6010 (lead), and by Florida Petroleum Range Organics (FLPRO). The analytical results are summarized in Table 3, Attachment B. A copy of the laboratory report is provided in Attachment D.

EDB was not detected in any groundwater sample collected from Site 189 during the December 1998 sampling event. Methylene chloride was the only VOA detected in the groundwater samples collected during the second quarterly sampling event, and was also detected in the laboratory method blanks.

PAHs were detected in groundwater samples collected from monitoring wells B189-MW01, B189-MW02, B189-MW03, B189-MW04, B189-MW06R, B189-MW10, and B189-MW12. The detected PAHs were benzo(a)pyrene, benzo(g,h,i)perylene, benzo(b)fluoranthene, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene. PAH concentrations ranged from 17.00 µg/L to 0.1 µg/L. PAHs were below method detection limits in all other groundwater samples collected during the second quarterly sampling event.

Total recoverable petroleum hydrocarbons (TRPH) were detected in groundwater samples collected from monitoring wells B189-MW01, B189-MW02, B189-MW03, B189-MW10 and B189-MW13D. TRPH concentrations ranged from 0.1 milligrams per liter (mg/L) to 6.1 mg/L. TRPH concentrations were below the method detection limit in all other groundwater samples collected during the second quarterly sampling event.

Conclusions. During the second quarter of free product monitoring, a reportable thickness of free phase product was detected once at a thickness of 0.03 feet in monitoring well MW02.

During the second quarter groundwater sampling event, methylene chloride, various PAHs, and TRPH were the only chemicals detected in Site 189 groundwater samples. PAH concentrations slightly exceeded GCTLs for low yield/poor quality in samples collected from monitoring wells B189-MW01 and B189-MW10. TRPH concentrations did not exceed GCTLs. The CoCs and concentrations detected during the second quarterly sampling event did not vary significantly from the those detected during the baseline and first quarterly sampling event.

Although methylene chloride was detected in groundwater samples, it was also detected in laboratory QA/QC blanks. Additionally, methylene chloride was not detected in the baseline-sampling event, nor was it previously identified as a CoC by ABB-ES. Based on this, the methylene chloride detection's can be dismissed as laboratory artifacts and have not been included in Table 3.

Recommendations. Based on the results of the second quarter of free product monitoring and quarterly groundwater sampling event, TtNUS recommends that monthly free product monitoring and quarterly groundwater sampling continue.

Section 3.1 of the approved RAP submitted by ABB-ES in 1994 states that a constituent not appearing in two consecutive sampling events will be removed from the required analyses. Based on the approved RAP, results of the baseline sampling, and results from the first two quarterly sampling events, Tetra Tech NUS, Inc. recommends that future monitoring at Site 189 include only the following analyses:

USEPA Method 8310 for PAHs
Florida Petroleum Range Organics for TRPH

Sampling for VOAs, EDB, and lead will be discontinued since these compounds have not been detected in three consecutive sampling events.

The next quarterly sampling event is scheduled for February. If you have any questions with regard to this submittal, please contact me at (850) 656-5458.

Very truly yours,

Paul E. Calligan, P.G.
Task Order Manager
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PC/bs

Enclosures

c: B. Glover, SDIV
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TABLE 1
FREE PHASE PETROLEUM MEASUREMENTS
Site 189, Truman Annex
Naval Air Station, Key West, Florida

Field Data	B189-MW02				
	June 27, 1998	July 25, 1998	August 15, 1998	August 24, 1998	September 1, 1998
Depth to Product	Unobtainable	5.65 feet	ND	ND	ND
Depth to Groundwater	5.62 feet	5.67 feet	6.02 feet	5.87 feet	5.98 feet
Appearance	sticky globules	dark and sticky	sheen	sheen	Sheen
Apparent Thickness ⁽¹⁾	0.10 feet	0.02 feet	<0.01 feet	<0.01 feet	<0.01 feet
Removal Amount ⁽²⁾	5 gallons	8 gallons	0 gallons	0 gallons	0 gallons

Field Data	B189-MW03				
	June 27, 1998	July 25, 1998	August 15, 1998	August 24, 1998	September 1, 1998
Depth to Product	Unobtainable	ND	ND	ND	ND
Depth to Groundwater	5.85 feet	5.43 feet	6.15 feet	5.63 feet	5.75 feet
Appearance	sticky globules	Sheen	NA	sheen	Sheen
Apparent Thickness ⁽¹⁾	0.10 feet	<0.01 feet	NA	<0.01 feet	<0.01 feet
Amount Recovered ⁽²⁾	5 gallons	0 gallons	0 gallons	0 gallons	0 gallons

NOTES:

⁽¹⁾ Apparent thickness (if measured) or estimated thickness of free product.

⁽²⁾ Amount recovered is the approximate amount of free product and groundwater mixture removed from a monitoring well during free product recovery.

ND = not detected

NA = not applicable

TABLE 1 (Continued)
FREE PHASE PETROLEUM MEASUREMENTS
Site 189, Truman Annex
Naval Air Station, Key West, Florida

Field Data	B189-MW02		
	October 2, 1998	October 23, 1998	December 2, 1998
Depth to Product	Unobtainable	5.66 feet	6.26 feet
Depth to Groundwater	5.87 feet	5.66 feet	6.29 feet
Appearance	NA	Viscous Globules	Viscous Globules
Apparent Thickness ⁽¹⁾	<0.01 feet	<0.01 feet	0.03 feet
Amount Recovered ⁽²⁾	0 gallons	0 gallons	0 gallons

Field Data	B189-MW03		
	October 2, 1998	October 23, 1998	December 2, 1998
Depth to Product	ND	ND	ND
Depth to Groundwater	5.95 feet	5.55 feet	6.11 feet
Appearance	NA	NA	NA
Apparent Thickness ⁽¹⁾	<0.01 feet	<0.01 feet	<0.01 feet
Removal Amount ⁽²⁾	0 gallons	0 gallons	0 gallons

NOTES:

⁽¹⁾ Apparent thickness (if measured) or estimated thickness of free product.

⁽²⁾ Amount recovered is the approximate amount of free product and groundwater mixture removed from a monitoring well during free product recovery.

ND = not detected

NA = not applicable

TABLE 2
TOP OF CASING ELEVATIONS, WATER TABLE ELEVATIONS, AND TOTAL DEPTHS
Site 189, Truman Annex
Naval Air Station, Key West, Florida

Well ID	Total Depth	Top of Casing Elevation ⁽¹⁾	June 27, 1998		October 2, 1998		December 2, 1998	
			Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
B189-MW01	12.88	10.00	5.34	4.66	4.95	5.05	5.48	4.52
B189-MW02 ⁽²⁾	13.00	10.74	5.62	5.12	5.87	4.87	6.29	4.45
B189-MW03 ⁽²⁾	12.45	10.52	5.85	4.67	5.95	4.57	6.11	4.41
B189-MW04	12.97	10.91	6.15	4.76	4.39	6.52	6.11	4.80
B189-MW05	12.47	11.04	NM	NM	4.12	6.92	6.06	4.98
B189-MW06R	12.52	9.38	NM	NM	4.79	4.59	4.91	4.47
B189-MW07	12.61	9.08	4.41	4.67	4.08	5.00	4.48	4.60
B189-MW08	NM	10.62	NM	NM	5.72	4.90	NM	NM
B189-MW09	12.88	10.86	NM	NM	5.02	5.84	6.44	4.42
B189-MW10	12.95	10.22	5.21	5.01	5.73	4.49	5.49	4.73
B189-MW11	NM	10.45	NM	NM	5.95	4.50	6.03	4.42
B189-MW12	12.95	10.57	5.88	4.69	6.09	4.48	6.12	4.45
B189-MW13D	36.00	10.52	5.81	4.71	5.35	5.17	6.07	4.45

NOTES:

⁽¹⁾ Top of casing and groundwater elevations are relative to an arbitrary site reference elevation of 10 feet.

⁽²⁾ Free phase petroleum product was present in both B189-MW02 and B189-MW03 during October and June 1998, and only in B189-MW02 in December 1998.

All measurements reported in feet.

NM – not measured. B189-MW06R had not yet been installed and the original well could not be found.

TABLE 3: GROUNDWATER MONITORING WELL ANALYTICAL SUMMARY

Facility Name: Building 189, Truman Annex, NAS Key West

Facility ID#:

Sample Location	Date	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total BTEX	MTBE	EDB	Total Lead	TRPHs	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Indeno (123cd) pyrene	Naphthalene
Cleanup Target Level(1)		10	400	300	200	None	350	0.20	150	50	2	2	2	2	200
B189-GW-MW1	6/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	1.3	1.2	3.10	<0.1	3.40	<0.05
	9/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	0.9	<0.2	<0.25	2.1	<0.10	<0.05
B189-GW-MW2	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	6.1	<0.2	<0.25	<0.2	<0.10	<0.05
B189-GW-MW3	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/1/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	4.0	<0.2	<0.25	<0.2	<0.10	<0.05
B189-GW-MW4	6/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	0.1	<1.0	<0.25	<0.1	<0.05	<0.05
	9/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
B189-GW-MW6R	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/1/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	0.30
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	4	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
B189-GW-MW7	6/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	<0.1	<1.0	<0.25	<0.1	<0.05	<0.05
	9/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
B189-GW-MW10	6/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	1.3	<1.0	<0.25	<0.1	<0.05	<0.05
	9/1/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	1.3	<0.2	3.60	<0.2	<0.10	<0.05
B189-GW-MW12	6/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	<0.1	<1.0	<0.25	<0.1	<0.05	<0.05
	9/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	4	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
B189-GW-MW13D	6/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	<0.1	<1.0	<0.25	<0.1	<0.05	<0.05
	9/1/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.02	<3	<0.1	<0.2	<0.25	<0.2	<0.10	<0.05
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.02	<3	0.1	<0.2	<0.25	<0.2	<0.10	<0.05

NOTES:

(1)Groundwater cleanup target levels as specified in Table VIII of Chapter 62-770, Florida Administrative Code.

NA = not analyzed.

TRPH = total recoverable petroleum hydrocarbons.

Concentrations reported in micrograms per liter for all chemicals except TRPH. TRPH is reported in milligrams per liter.

ATTACHMENT C

WATER SAMPLING LOGS

ATTACHMENT D

LABORATORY REPORTS