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THIRD GROUNDWATER MONITORING REPORT FOR POINCIANA HOUSING BASE
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TETRA TECH NUS



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Project Number HK 7593

Mr. Dudley Patrick - Code 1858
Southern Division
NAVFACENGCOM
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 032

Subject: Third Groundwater Monitoring Report for Poinciana Housing BRAC Property
Naval Air Station Key West, Florida, Rev. 1

Dear Mr. Patrick:

Tetra Tech NUS, Inc. is pleased to submit for your review Rev. 1 of the Third Groundwater Monitoring Report for Poinciana Housing BRAC Property.

Please call me at (803) 649-7963, extension 345, if you have any questions regarding the enclosed document.

Sincerely,

C. M. Bryan
Task Order Manager

Enclosure

c: Ms. D. Evans-Ripley, SouthDiv (w/o encl.)
Ms. M. Berry, EPA
Mr. J. Caspary, FDEP
Mr. R. Demes, NAS Key West
Mr. P. Williams, NAS Key West
Mr. R. Hoekstra, Bechtel Environmental, Inc.
Mr. M. Perry, TtNUS Technical Coordinator
File: 7593-7.5.3.1

POINCIANA HOUSING GROUNDWATER MONITORING REPORT NO. 3

Sample Description and Results

On November 23, 1998, filtered and unfiltered groundwater samples were collected from monitoring well MW-01 at Poinciana and analyzed by SW846 Method 6010A for arsenic. Each sample was collected in accordance with the draft monitoring plan for Poinciana Housing (reference the August 17, 1998 email to the Partnering Team). The filtered sample used a 0.45 micron filter to remove, if present, suspended particles. It is believed that suspended particles in groundwater may contribute to the elevated arsenic readings previously registered at MW-01. Both samples were duplicated to ensure sampling and laboratory accuracy.

The correlation of the results for the samples and their duplicates was good, within a relative percent difference of 6 percent and 11 percent. The averaged results for samples MW-01 and MW-01F (filtered) indicate the presence of arsenic at 573 $\mu\text{g/L}$ and 609 $\mu\text{g/L}$, respectively. Based on the results using the filtered and unfiltered sampling techniques no suspended particles are contributing to the elevated arsenic readings. The following figure presents arsenic results for MW-01 from sampling events on February 25, June 30, September 14, October 10, and November 23, 1998. Arsenic was detected in excess of its 50 $\mu\text{g/L}$ action level during each of these sampling events.

Groundwater Modeling

Included in this report is the groundwater modeling performed for BRAC Parcel G, Poinciana Housing. The modeling objectives, general approach, and site-specific assumptions are described and a table summarizing the results is provided.

Recommendation

It is recommended that the Navy include access restrictions to groundwater in any property transfer documents for the Poinciana Housing BRAC property.

GROUNDWATER MODELING AT POINCIANA HOUSING

OBJECTIVES

Potential impacts of an arsenic groundwater plume identified at Poinciana Housing (BRAC Parcel G) were evaluated using a simple groundwater model. Quantitative estimates of the maximum arsenic groundwater concentration at the nearest potential groundwater exposure points (receptors) are required for this evaluation. The BioScreen Model was used to provide the necessary estimates.

GENERAL APPROACH

Site-specific groundwater flow and contaminant transport models were developed following a general modeling approach. The following steps are included in the general approach.

Define the existing groundwater plume – Uncertainties exist in the determination of plume size because of only one groundwater sampling location. Therefore, two simulations were conducted based on the different plume sizes. Plume sizes of 100-ft by 100-ft and 200-ft by 200-ft were assumed for the model. Different plume concentrations were then modeled based on two sampling efforts at MW-01 (102 µg/L and 625 µg/L).

Conceptualized the hydrogeological conditions – Groundwater flow velocity was defined based on values calculated from previous studies at SWMU 9 (ABB, 1994).

Identify the nearest potential exposure point – The nearest surface-water body into which groundwater from the vicinity of sample MW-01 could potentially migrate is a pond approximately 480 ft to the northwest.

Estimate the maximum groundwater concentration at the exposure point – The BioScreen model concentrations were calculated to determine the maximum groundwater concentrations at the receptor within 1000 years.

SITE-SPECIFIC ASSUMPTIONS

The site-specific assumptions in the modeling task are summarized below:

Plume Size	100ft x 100ft and 200ft x 200ft
Exposure Point (Receptor)	480ft
Hydraulic Conductivity	8.2E-06 ft/s (ABB, 1994)
Hydraulic Gradient	1.6E-03 ft/ft (ABB, 1994)
Effective Porosity	0.3 (Assumed, default value for model)
Plume thickness	6.1ft (for 100ft x 100ft)
Plume thickness	9.2ft (for 200ft x 200ft)
Initial Arsenic Groundwater concentrations	102 µg/L, 624 µg/L
Additional point	GS-03, 280 ft down centerline
Arsenic concentration =	3.9 µg/L

Note:

Default adsorption factors (soil bulk density, partition coefficient, fraction organic carbon) for modeling since no field data was available.

Koc, foc, and half-life values were not relevant. The no degradation scenario was used for modeling (vs the 1st order decay or instantaneous decay model scenario).

REFERENCES

ABB Environmental Services, Inc., 1994, Contamination Assessment Report, Jet Engine Test Cell, Building A969, Boca Chica Field, Naval Air Station, Key West, Florida, prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, Tallahassee, Florida, June.

Arsenic Groundwater Concentration Simulation

Poinciana Housing – BRAC Parcel G

NAS Key West, Florida

Initial GW Concentration (µg/L)	GW Plume Size (ftxft)	Distance from GW Plume to Receptor (ft)	Time of Action Level (50 µg/L) Exceedance at Receptor (yr)	Simulated Maximum GW Concentration at Receptor (µg/L)	Time of Maximum Concentration (yr)
102	100 x 100	480	360	89.5	540
102	200 x 200	480	360	81.9	480
625	100 x 100	480	280	312.6	400
625	200 x 200	480	270	247.6	360

