CATLIN
Engineers and Scientists

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September 24, 2009

ORIGINAL

NAVFAC Mid-Atlantic
Marine Corps North Carolina IPT
Environmental Business Line
Code: OPCEV3MA
Attn: Mr. David E. Borton
6506 Hampton Boulevard
Building C, Room 314
Norfolk, VA 23508-1278

Re: **HPFF - Building 1114 Area**
Incident Numbers:
3671 - USMC Camp Lejeune, Bldg 1002
10615 - USMC MCAS Veh. Ready Fuel Storage
22788 - USMC Camp Lejeune, Bldg. 1115
Marine Corps Base, Camp Lejeune, North Carolina
CATLIN Project No. 209-034

Dear Mr. Borton:

CATLIN Engineers and Scientists (CATLIN) has reviewed the correspondence dated August 25, 2009 from Mr. Bruce Reed of the North Carolina Department of Environment and Natural Resources (NCDENR) requesting additional assessment and remedial activities near groundwater monitoring well USTHPFFC-MW72 (MW-72) in the Hadnot Point Fuel Farm (HPFF) area of Marine Corps Base (MCB), Camp Lejeune. As clarified in the Camp Lejeune Quarterly Update Meeting conducted on September 10, 2009, Mr. Reed requested additional investigation activities to further define and refine the free-phase product plume in the vicinity of groundwater monitoring well USTHPFFC-MW72 in addition to taking immediate additional actions at well MW-72.

Based on a review of data generated during previous investigations, it has been determined that free-phase product (FP) appears to be "trapped" in a thin zone of higher permeability soils between approximately 17ft. to roughly 30ft. below land surface (BLS). This zone has typically been identified during drilling investigations as consisting of fine to medium grained poorly sorted sand with a "strong" hydrocarbon odor (HCO) occasionally exhibiting FP staining and reported in some cases with visible FP in the split-spoon samples. Groundwater monitoring well boring logs, as-builts, and gauging data have been reviewed by CATLIN in order to establish the approximate FP plume geometry and magnitude within the zone. As presented on the attached figure, approximately 12 existing groundwater monitoring wells were identified in the vicinity with screened intervals (screen extends from less than 17ft. to 25ft. or more BLS) that

potentially intersect the zone; the estimated horizontal extent of the FP plume is additionally presented on the attached figure.

In order to refine and delineate this zone of FP by "filling in" data gaps, CATLIN has proposed the installation of four additional groundwater monitoring wells (USTHPFFC-MW82 through USTHPFFC-MW85) at the locations presented on the attached figure. During proposed groundwater monitoring well installation, borings will be advanced to a depth of approximately 15ft. BLS using conventional hollow-stem augering (HSA) techniques with split-spoon samples collect at intervals of every five feet then collected continuously to a depth of approximately 30ft. BLS. If the zone of potential FP is identified, a Type I groundwater monitoring well will be installed in the boring and screened from approximately two (2) feet above the zone to approximately two (2) feet below the zone. If the zone of potential FP is not identified, the boring will be backfilled with bentonite pellets to approximately 10ft. BLS and the remainder of the boring backfilled with drill cuttings to the land surface. The borings in which the zone is not identified will be used as points of delineation. The installation of the proposed soil borings/groundwater monitoring wells may generate the additional data necessary to begin development of an appropriate remedial strategy that focuses on the recovery of FP thus reducing the source of dissolved phase contamination. Additional pilot testing and/or assessment may be necessary.

Mr. Reed also requested that additional remedial measures could be taken with respect to FP recovery in existing groundwater monitoring well MW-72. In the previously referenced Quarterly Update Meeting it was suggested that Camp Lejeune consider the discontinuation of groundwater withdrawal from well USTHPFFC-MW75 (MW-75). A total fluid recovery system would then be installed in MW-72 with the produced fluids disposed and treated at the HPFF treatment system. Well MW-75 is currently pumped at a rate of 30 gallons per minute (gpm) with the generated groundwater disposed and treated at the HPFF groundwater treatment system which has a designed capacity of 30 gpm. It was noted that discontinuing the pumping to MW-75 would allow for disposal and treatment of fluids generated from the fluid recovery system proposed to be emplaced in MW-72.

It was suggested that the pumping of MW-75 was thought to have been conducted with the primary purpose of minimizing the potential for contaminant impact on nearby potable production well HPFF-642. Production well HPFF-642 was recently abandoned thereby eliminating the perceived need for groundwater withdrawal from MW-75. While protection of potential contaminant impact to well HPFF-642 was one of the benefits for pumping MW-75, it was not a primary motive as stated in the June 13, 2003 Revised Correction Plan for Hadnot Point Fuel Farm. The principal purpose for pumping from MW-75 was to contain the contaminant plume in the 50 to 80 feet deep high permeability zone and to prevent further down gradient movement. Numerous additional benefits of groundwater withdrawal were associated with the pumping including, but not limited to the following:

- Maintaining the contaminant plume within the influenced areas of current treatment activities;
- Withdrawal and treatment of dissolved phase contamination from both the "shallow" and "deep" aquifers;
- Reduction of the contaminant plume magnitude;

As a result of pumping MW-75 and in conjunction with the existing air sparging system, trends associated with recent monitoring data revealed:

- relatively stable overall contaminant plume geometry;
- reduction in the estimated extent of portions of dissolved phase contamination;
- reduction in dissolved phase contamination in portions of the contaminant plume;
- continued "elevated" dissolved contaminant levels (see table below) within influent groundwater samples collected from MW-75;

SAMPLE DATE	BENZENE CONCENTRATION (µg/L)
June 2007	2,280
September 2007	2,260
December 2007	2,230
March 2008	2,560
June 2008	1,500
September 2008	3,490
December 2008	2,130
March 2009	2,260
June 2009	2,290
August 2009	2,130

These factors indicate that pumping of MW-75 in addition to the ongoing remedial efforts continues to be of benefit. Therefore, CATLIN recommends the continued pumping and treatment of groundwater from MW-75.

As discussed in previous documents, there appears to be a correlation between the bio-pulse events and FP accumulation in MW-72 whereas a substantial increase in FP thickness in MW-72 was observed immediately following the initial pulse events. Gauging of groundwater and potential FP accumulation is currently conducted on a weekly basis on wells (including MW-72) in the vicinity of the FP plume with AFVR events conducted on an "as-needed" basis where FP is identified. This gauging is recommended to continue while the installation of the proposed additional wells is performed. Subsequent to installation and gauging of the proposed wells, accumulated data will be reviewed in order to determine the location of the FP "hot-spot". Hydrogeologic testing with respect to FP recovery may then be conducted in the area identified as the FP "hot spot" which along with the gauging data will assist in determining an appropriate means for remediation of the FP zone.

As requested by Mr. Reed, a Report of Findings detailing the investigation will be provided by March 1, 2010 to include proposed remedial alternatives and recommendations for remediation of the FP plume.

CATLIN Engineers and Scientists appreciate the opportunity to continue to provide services to NAVFAC Mid-Atlantic and the MCB on your environmental projects.

Sincerely,

Steven V. Hudson, P.G.
Project Manager

Michael E. Mason, P.E.
Program Manager

Enclosure

cc: Ms. Susan Tsimpinos – NAVFAC Contracts (correspondence only)
Commanding Officer, Attn: Director I&E/EMD/EQB (2 copies)
Ms. Erica Delattre - Rhēa Engineers & Consultants, Incorporated

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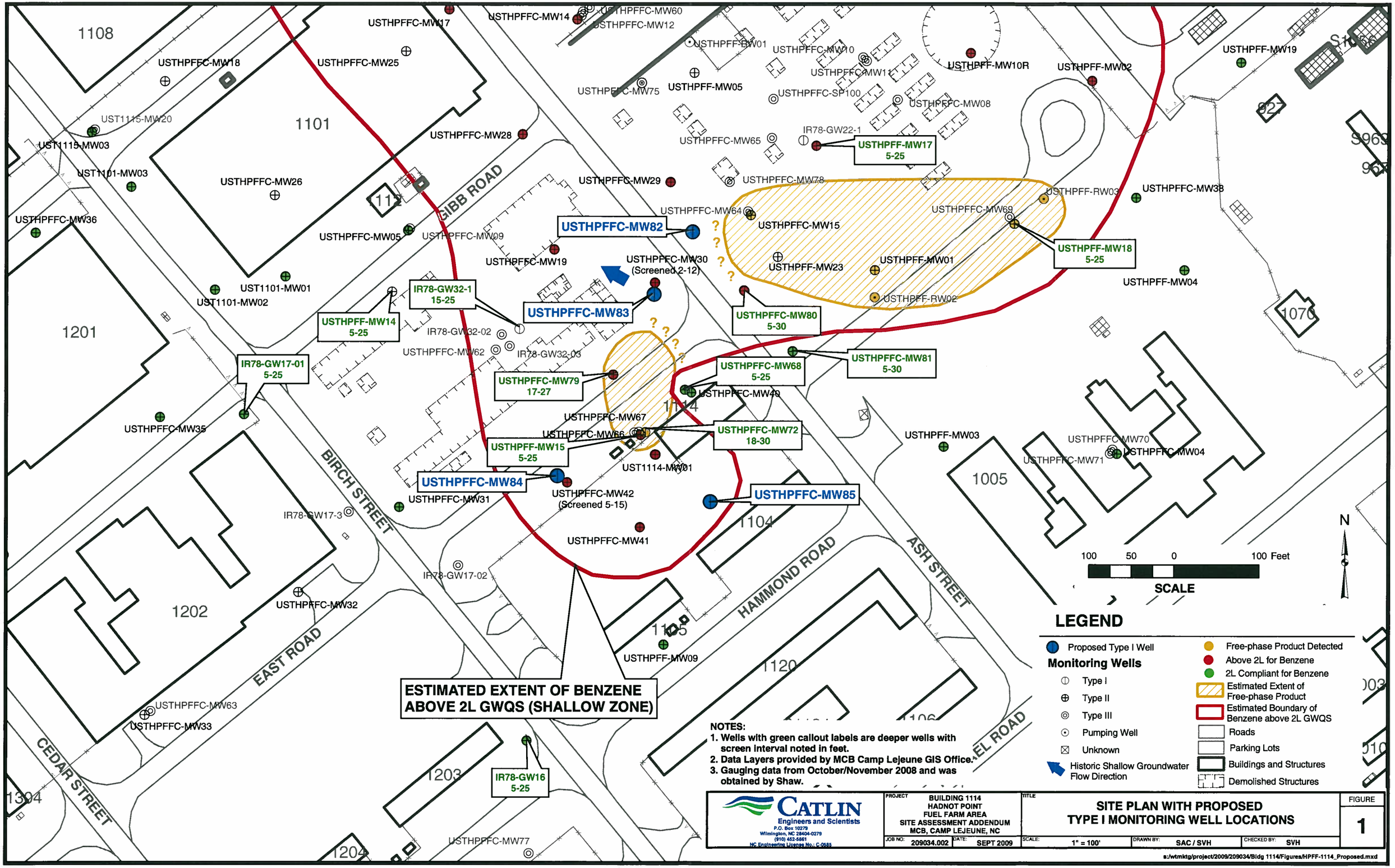
1108
1101
1112
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1120
1005
1070
1203
1204
1304
GIBB ROAD
BIRCH STREET
EAST ROAD
CEDAR STREET
HAMMOND ROAD
ASH STREET
USTHPFFC-MW17
USTHPFFC-MW14
USTHPFFC-MW60
USTHPFFC-MW12
USTHPFF-RW01
USTHPFFC-MW10
USTHPFFC-MW11
USTHPFF-MW10R
USTHPFF-MW02
USTHPFF-MW19
USTHPFFC-MW18
USTHPFFC-MW25
USTHPFFC-MW75
USTHPFF-MW05
USTHPFFC-SP100
USTHPFFC-MW08
UST1115-MW20
UST1115-MW03
USTHPFFC-MW28
USTHPFFC-MW65
IR78-GW22-1
USTHPFF-MW17
5-25
UST1101-MW03
USTHPFFC-MW26
USTHPFFC-MW29
USTHPFFC-MW78
USTHPFF-RW03
USTHPFFC-MW38
USTHPFFC-MW36
USTHPFFC-MW64
USTHPFFC-MW69
USTHPFFC-MW82
USTHPFFC-MW15
USTHPFFC-MW05
USTHPFFC-MW09
USTHPFFC-MW19
USTHPFFC-MW30
(Screened 2-12)
USTHPFF-MW23
USTHPFF-MW01
USTHPFF-MW18
5-25
USTHPFF-MW04
UST1101-MW01
UST1101-MW02
IR78-GW32-1
15-25
USTHPFF-MW14
5-25
USTHPFFC-MW83
USTHPFFC-MW80
5-30
USTHPFF-RW02
IR78-GW32-02
USTHPFFC-MW62
IR78-GW32-03
IR78-GW17-01
5-25
USTHPFFC-MW79
17-27
USTHPFFC-MW68
5-25
USTHPFFC-MW81
5-30
USTHPFFC-MW40
USTHPFFC-MW67
USTHPFFC-MW66
USTHPFFC-MW72
18-30
USTHPFF-MW15
5-25
UST1114-MW01
USTHPFFC-MW35
USTHPFF-MW03
USTHPFFC-MW70
USTHPFFC-MW71
USTHPFFC-MW04
USTHPFFC-MW84
USTHPFFC-MW31
USTHPFFC-MW42
(Screened 5-15)
USTHPFFC-MW85
IR78-GW17-3
USTHPFFC-MW41
IR78-GW17-02
USTHPFFC-MW32
USTHPFF-MW09
USTHPFFC-MW63
USTHPFFC-MW33
IR78-GW16
5-25
USTHPFFC-MW77
ESTIMATED EXTENT OF BENZENE
ABOVE 2L GWQS (SHALLOW ZONE)
N
100 50 0 100 Feet
SCALE
LEGEND
Proposed Type I Well
Monitoring Wells
Type I
Type II
Type III
Pumping Well
Unknown
Historic Shallow Groundwater Flow Direction
Free-phase Product Detected
Above 2L for Benzene
2L Compliant for Benzene
Estimated Extent of Free-phase Product
Estimated Boundary of Benzene above 2L GWQS
Roads
Parking Lots
Buildings and Structures
Demolished Structures
NOTES:
1. Wells with green callout labels are deeper wells with screen interval noted in feet.
2. Data Layers provided by MCB Camp Lejeune GIS Office.
3. Gauging data from October/November 2008 and was obtained by Shaw.
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NC Engineering Licence No.: C-0585
PROJECT
BUILDING 1114
HADNOT POINT
FUEL FARM AREA
SITE ASSESSMENT ADDENDUM
MCB, CAMP LEJEUNE, NC
JOB NO: 209034.002
DATE: SEPT 2009
TITLE
SITE PLAN WITH PROPOSED
TYPE I MONITORING WELL LOCATIONS
SCALE: 1" = 100'
DRAWN BY: SAC / SVH
CHECKED BY: SVH
FIGURE
1
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