



UNITED STATES MARINE CORPS

MARINE CORPS BASE  
PSC BOX 20004  
CAMP LEJEUNE, NC 28542-0004

IN REPLY REFER TO

5090.10

BEMD

FEB 02 2010

Mr. Bruce Reed  
North Carolina Department of Environment  
and Natural Resources  
Division of Waste Management  
Underground Storage Tank Section  
127 Cardinal Drive  
Wilmington, North Carolina 28405-3845

Dear Mr. Reed:

The enclosed report was completed to address changes observed in the deep zone contamination at the Aboveground Storage Tank Remediation Site 645 located aboard Marine Corps Base, Camp Lejeune, North Carolina. The report recommends a change in the implementation of the previously approved Corrective Action Plan Supplement Report, dated September 8, 2008. Since contamination has shifted, the design of the proposed supplemental biosparge wells will be modified to center around monitoring well USY645-MW27, instead of monitoring well UST645-MW26.

If you have any questions or require further information, please contact Mr. Nick Schultz, Environmental Quality Branch, Environmental Management Division, Installations and Environment Department, at (910) 451-9114.

Sincerely,

JOHN R. TOWNSON  
Director, Environmental Management  
By direction of  
the Commanding Officer

Enclosure: 1. Building 645 Deep Zone Delineation Report of Findings, January 28, 2010.

Copy to: (w/o encl)  
NAVFACENCOM (Mr. Dave Borton Code OPCEV4)  
Rhea (Ms. Erica DeLattre)  
CATLIN (Mr. Mike E. Mason)

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**BUILDING 645  
DEEP ZONE DELINEATION  
REPORT OF FINDINGS**

**MARINE CORPS BASE  
CAMP LEJEUNE, NORTH CAROLINA**

**JANUARY 28, 2010**

**NCDENR INCIDENT NO. 87556  
CATLIN PROJECT NO. 209-094**



**PREPARED BY:**



**220 Old Dairy Road  
Wilmington, North Carolina 28405  
(910) 452-5861**

**Corporate Licensure No. For Engineering Services C-0585  
Corporate Licensure No. for Geology Services C-118**

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North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor  
William G. Ross Jr., Secretary

Division of Waste Management  
Underground Storage Tank Section

Dexter R. Matthews, Director

October 29, 2008

Commanding Officer  
Attn: I&E/EMD/EQB, Dr. Johanna Arnold-  
UST Program Manager- Bldg. 12  
PSC Box 20004  
MCB Camp Lejeune, NC 28542-0004

Re: Notice of Regulatory Requirements  
15A NCAC 2L .0106(c) and (h)  
Corrective Action

USMC-Camp Lejeune, Bldg. 645  
Brewster Boulevard  
Camp Lejeune, Onslow County  
Risk Ranking: I75R  
Incident No. 87556

Dear Dr. Arnold:

The Corrective Action Plan (CAP) Supplement received on September 15, 2008 has been reviewed by the Underground Storage Tank (UST) Section, Wilmington Regional Office. The plan and the schedule are hereby approved, with the following modifications:

- Maintenance visits shall be no less than monthly.
- Supplemental system start-up shall be no later than July 31, 2009.

Failure to implement the plan and schedule in the manner and time specified may result in the assessment of civil penalties and/or the use of other enforcement mechanisms.

If you have any questions regarding the actions that must be taken or the rules mentioned in this letter, please contact me at the address or telephone number listed below.

Sincerely,

Bruce Reed  
Hydrogeologist II  
Wilmington Regional Office

cc: George O'Daniel, Onslow County Health Department

UST Regional Offices

**Asheville (ARO)** – 2090 US Highway 70, Swannanoa, NC 28778 **(828) 296-4500**

**Fayetteville (FAY)** – 225 Green Street, Suite 714, Systel Building, Fayetteville, NC 28301 **(910) 433-3300**

**Mooreville (MOR)** – 610 East Center Avenue, Suite 301, Mooreville, NC 28115 **(704) 663-1699**

**Raleigh (RRO)** – 1628 Mail Service Center, Raleigh, NC 27699 **(919) 791-4200**

**Washington (WAS)** – 943 Washington Square Mall, Washington, NC 27889 **(252) 946-6481**

**Wilmington (WIL)** – 127 Cardinal Drive Extension, Wilmington, NC 28405 **(910) 796-7215**

**Winston-Salem (WS)** – 585 Waughtown Street, Winston-Salem, NC 27107 **(336) 771-5000**

**Guilford County Environmental Health**, 1203 Maple Street, Greensboro, NC 27405, **(336) 641-3771**

S:\bruce\arnold645.cap

Marine Corps Base Camp Lejeune  
EMD Document Routing Slip

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FROM: DIRECTOR

TO: EQB

RETURN:

COPY:

SUBJECT: NOTICE OF REGULATORY REQUIREMENTS, *corrective action plan, Bldg 645*

COMMENTS:

*Brynn / Johnson - take for action, ensure we meet July 31 '09 deadline.*

*JMT*

ROUTING: Originator: J LEDFORD Initials: JCL Date: 11/3/2008

1. J TOWNSON Initials: *JMT* Date: 11/3/08

2. Initials: Date:

3. Initials: Date:

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State of North Carolina  
Department of Environment  
and Natural Resources  
Wilmington Regional Office  
Division of Waste Management  
UST Section



Michael F. Easley, Governor  
William G. Ross Jr., Secretary  
Dexter R. Matthews, Director

July 24, 2008

Commanding Officer  
Attn: I&E/EMD/EQB, Dr. Johanna Arnold-  
UST Program Mgr., Bldg. 12  
PSC Box 20004  
MCB Camp Lejeune, NC 28542-0004


Subject: Review of Annual Monitoring  
Report and Additional Site  
Assessment Report  
USMC Camp Lejeune Bldg. 645  
Brewster Boulevard  
Camp Lejeune, Onslow County  
Incident No. 87556, Risk: Int.

Dear Dr. Arnold:

Thank you for submitting the subject reports to this office on July 23, 2008 and June 30, 2008, respectively. The UST Section has reviewed the reports and offers the following comments:

- Please submit the Corrective Action Plan Supplement by September 24, 2008.
- EPA Method 602 plus xylenes, mtbe, and ipe, will suffice for indicator sampling at this time. If your budget allows, you may check for -1, and -2 naphthalene at any time via test Methods 610 or 625. Testing for these compounds will be needed prior to incident closure. Your lab may be able to include reporting of naphthalenes, non-specific, under Method 602.

If you have any questions concerning this letter, please contact me at (910) 796-7400.

Sincerely,  
  
Bruce Reed  
Hydrogeologist II

Cc: WIRO-UST

127 Cardinal Drive, Wilmington, North Carolina 28405  
Phone: 910-796-7215 / Fax: 910-350-2004 / Internet: [www.enr.state.nc.us](http://www.enr.state.nc.us)

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FROM: DIRECTOR

TO: EQB

RETURN:

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SUBJECT: REVIEW OF ANNUAL MONITORING REPORT AND ADDITIONAL SITE ASSESSMENT REPORT

Cof Bldg 645

COMMENTS:

*Byrner / Scott / Johanna  
please ensure timely + complete response - CAP by  
Sept 17 for Bldg 645  
ST*

ROUTING: Originator: J LEDFORD Initials: JCL Date: 7/29/2008

1. J TOWNSON Initials: *JTW* Date: 7/29/08

2. Initials: Date:

3. Initials: Date:

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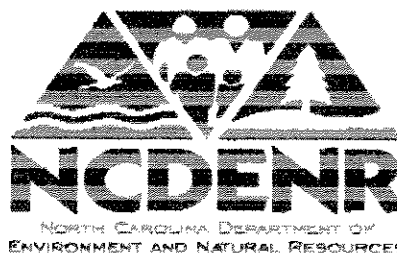
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**State of North Carolina  
 Department of Environment  
 and Natural Resources  
 Wilmington Regional Office  
 Division of Waste Management  
 UST Section**



**Michael F. Easley, Governor  
 William G. Ross Jr., Secretary  
 Dexter R. Matthews, Director**

November 1, 2007

Commanding Officer  
 Attn: I&E/EMD/EQB, Dr. Johanna Arnold-  
 UST Program Mgr., Bldg. 12  
 PSC Box 20004  
 MCB Camp Lejeune, NC 28542-0004

**Subject: Review of Report Entitled Soil and  
 Groundwater Investigation  
 Summary Report 2006-2007  
 USMC Camp Lejeune Bldg. 645  
 Brewster Boulevard  
 Camp Lejeune, Onslow County  
 Incident No. 87556  
 Risk: High**

Dear Dr. Arnold:

Thank you for submitting the subject report to this office on October 30, 2007. The UST Section has reviewed this report and offers the following comments:

- Table 2 reports that Diesel Range Organics were detected in boring number SB02. The laboratory analytical results show that Gasoline Range Organics were detected in this sample.
- Recommendations within the report were to use the current sparge/vent system to address the soil contamination. This system has been operational since 1998. Also, the vent system was reportedly installed at a depth of 4 ft. The soil contamination was discovered in clay at 11.5 ft. Due to these facts, it is highly unlikely that the vent system will address this soil contamination. The Division recommends that the Base consider another method of soil treatment in this area.

127 Cardinal Drive, Wilmington, North Carolina, 28405

Phone: 910-796-7215 / Fax: 910-350-2004 /

Post-it® Fax Note	7671	Date	11-21-07	# of pages	2
To	JOHANNA	From	Brue Reel		
Co./Dept	EMD	Co.			
Phone #		Phone #	910-796-7400		
Fax #	910-551-5997	Fax #			

- The recommendation to continue air sparging on the north side of Brewster Boulevard is acceptable, even though contaminant concentrations are rather low. There was no recommendation to treat the higher concentrations found on the south side of Brewster Boulevard. The Base needs to implement active corrective action on the south side of Brewster Boulevard.
- If the direction of groundwater flow across Brewster Boulevard is the same as on the north side of Brewster Boulevard, see Figure 4 of the report, the plume is undefined to the south, both vertically and horizontally.

Please continue assessment and provide cleanup as referenced above. Please provide a detailed response to this letter by December 15, 2007, which states what the Base intends to do at this incident, and when these actions will be accomplished.

If you have any questions concerning this letter, please contact me at (910) 796-7400.

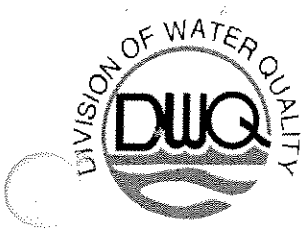
Sincerely,



Bruce Reed  
Hydrogeologist II

Cc: WIRO-UST

s:\bruce\arnold6#5.od



Michael F. Easley, Governor

William G. Ross Jr., Secretary  
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director  
Division of Water Quality

February 3, 2006

Commanding General  
Attn: I&E/EMD/EQB  
Mr. Andrew Smith  
Building 12  
PSC Box 20004  
MCB Camp Lejeune, North Carolina 28542-0004

Subject: Review of Annual Groundwater Monitoring Report 2003-2005  
Camp Lejeune-Building 645  
Onslow County  
Incident No. 87556

Dear Mr. Smith:

The Division of Water Quality (DWQ), Aquifer Protection Section is in receipt of the subject report, dated January 17, 2006. This report was submitted by Engineering and Environment, Inc. on behalf of the Department of the Navy, Atlantic Division, Naval Facilities Engineering Command and received in this office on January 30, 2006. Thank you for this report.

The Aquifer Protection Section has reviewed the report. The consultant recommended that the air sparging/soil vapor extraction system continue to be operated at the site, the site continue to be monitored with annual reporting of results, and that the deep plume in the vicinity of MW-18 be defined. DWQ agrees with these recommendations. The plume in the area of MW-18 does not appear to be originating from the Building 645 incident, given the groundwater flow direction and contaminant concentrations. Additional investigation is warranted to clarify this issue and define the extent of contamination in the deep zone.

DWQ would like to offer the following suggestions for future monitoring reports:

- The Summary of Laboratory Analyses table would be more useful if all historical and recent laboratory results for each, individual well were contiguous. This would allow for easy comparison of concentrations versus time in each well. Graphs depicting this information would also be useful.
- DWQ also suggests that the water table contours for the deeper zone might have better resolution if only data from wells of similar depths were used to create the contour maps (i.e., using only data from the monitoring wells that are 80 feet deep instead of using data from 50 and 80-foot depth wells).
- It should be noted that there is an April 2005 version of the 15A NCAC 2L rules that includes updated standards for a number of compounds (i.e., the standard for ethylbenzene is now 0.550 mg/L). This document is available on the DWQ website.

Please proceed with proposed delineation activities and continue monitoring and system operation at the site. Should you have questions, please contact Ginny Henderson at (910) 796-7215.

Yours very truly,

Charles F. Stehman, Ph.D., P.G.  
Environmental Supervisor II

CFS/GMH

cc: WiRO-APS  
William C. Morris, P.G., Engineering and Environment, Inc.

\\GWS\GINNY\Incidents\Building 645 87556\Annual Monitoring Report 2003-2005.feb2006.doc

One  
North Carolina  
Naturally

North Carolina Division of Water Quality  
Internet: h2o.enr.state.nc.us

127 Cardinal Drive Ext.

Wilmington, NC 28405-3845

Phone (910) 796-7215  
FAX (910) 350-2004

Customer Service  
1-877-623-6748



Michael F. Easley  
Governor  
Williams G. Ross Jr., Secretary  
Department of Environment and Natural Resources  
Kerr T. Stevens  
Division of Water Quality

July 22, 2005

Mr. Scott A. Brewer, PE  
Director, Environmental Management  
By Direction of the Commanding General  
United States Marine Corps  
Marine Corps Base  
PCS Box 20004  
Camp Lejeune, North Carolina 28405

Subject: Review of Remedial Action Optimization  
And Revised Corrective Action Plan  
Building 645  
Marine Corps Base Camp Lejeune  
Onslow County

Dear Mr. Brewer:

On May 16, 2005, the Division of Water Quality, Aquifer Protection Section, received the subject report for building 645. The Aquifer Protection Section has reviewed the report and does not object to the proposed additional work. Please proceed with additional assessment and delineation of the contaminant plume. We understand that based on the additional work, modification of the current remediation approach may be proposed.

If you have any questions, please call me at 910-796-7215.

Yours very truly,

Charles F. Stehman, Ph.D., P.G.  
Environmental Supervisor I

CFS/CDA

cc: WIRO-APS

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Customer Service  
1 800 623-7748

Division of Water Quality / Groundwater Section  
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Phone: (919) 733-3221 Fax: (919) 715-0588 Internet: <http://gw.ehnr.state.nc.us>