

APPENDIX IV

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UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

IN REPLY REFER TO

628619

FAC

19 JUL 1985

N. C. Department of Natural Resources
and Community Development
Division of Environmental Management
Attn: Mr. Charles Wakild
Wilmington Regional Office
7225 Wrightsville Ave.
Wilmington, NC 28403-3696

RECEIVED

JUL 25 1985

WILMINGTON REGIONAL OFFICE

Re: Notice of Violation **DEM**
Groundwater Classification
and Standards

Dear Mr. Wakild:

As stated in our letter of 5 June 1984, the plan of action to address groundwater contamination is provided in Enclosure (1). The plan implements the Navy Assessment and Control of Installation Pollutants (NACIP) program at Camp Lejeune.

The plan of action includes the verification step, characterization step, and feasibility study efforts. A brief description of these phases of the NACIP study is provided in Enclosure (2).

Contract negotiations continue for the detailed program of onsite groundwater monitoring and development of engineering reports. Upon completion of these negotiations, we anticipate the onsite study to begin in mid-September. Prior to starting field work, a coordination meeting with your office will be conducted.

The plan recommends a characterization effort for the contaminated wells, including two wells of the Tarawa Terrace system. This effort includes an investigation for potential VOC sources within a one-mile radius of each contaminated well. The study will assess potential sources outside the Camp Lejeune property boundary. Thus, your assistance in coordinating these efforts with the City of Jacksonville will be appreciated.

Enclosure (3) provides a milestone chart for the plan of action. From the anticipated start date in September, 1985, the projected completion dates for the characterization step and feasibility study are September and December, 1986, respectively. Of course, the final schedule as established during the contract negotiations will be provided to your office.

This Command appreciates the continued technical assistance provided by Mr. Shiver as well as the laboratory support. We believe the enclosed plan will provide clear answers to complex groundwater questions. We solicit your views and mutual support in implementing the plan.

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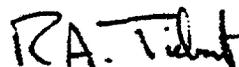
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For additional information on this matter, please feel free to contact Mr. Bob Alexander, MCB Environmental Engineer at 519-451-3034.

Sincerely,



R. A. TIEBOUT

Colonel, U. S. Marine Corps.
Assistant Chief of Staff, Facilities
By direction of the Commanding General

Encl:

- (1) Plan of Action
- (2) NACIP Info
- (3) Milestone Chart

Copy to:

- CMC (LFL) (w/o maps to Encl (2))
- LANTNAVFACENCOM (Code 114) (w/o Encl)
- CO, NavHosp (PMU) (w/o maps to Encl (2))
- N.C. Div of Health and Svcs, Greenville (w/o maps to Encl (2))

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APPENDIX IVNAVY ASSESSMENT AND CONTROL OF INSTALLATION
POLLUTANTS (NACIP) PROGRAMMarine Corps Base
Camp Lejeune, North CarolinaSCOPE OF WORK FOR ROUND TWO SAMPLING
AND CHARACTERIZATION/FEASIBILITY, N62470-83-C-6106

1. Verification Step Efforts

a. Site 1, French Creek Liquids Disposal Area: Sample and test surface water and sediments in two locations on Cogdels Creek; sample and test the six shallow wells. Add o,m,p-xylene, MEK, MIBK, EDB, and hexavalent Cr to the analytical parameters for round one.

b. Site 2, Former Nursery/Day Care Center: Sample and test Well 2GW1. Sample soil at four locations in the vicinity of sample 2S4; sample surface water and sediment from the drainage ditch in two locations; install four shallow two-inch wells in locations directed by the EIC. Sample new wells twice at an interval of 60 days. Analyze each sample for OCP, OCH, dioxin, and VOA.

c. Site 6, Storage lots 201 and 203: Install eight shallow two-inch wells in locations directed by the EIC. Sample wells twice at a 60-day interval. Sample surface water and sediment from Bearhead and Wallace Creeks adjacent to the site. Analyze all samples for DDT-R and VOA.

d. Site 9, Fire Fighting Training Pit: Resample and test the two shallow wells. Install a third well in a location directed by the EIC and sample twice at a 60-day interval. Analyze all samples for o,m,p-xylene, MEK, MIBK, EDB and hexavalent Cr in addition to round one parameters.

e. Site 21, Transformer Storage Lot 140: Sample soil at eight locations around perimeter of site, including two samples from drainage ditch. Sample four depths at each location (0-1', 1-3', 3-5', and at 5') and analyze for OCP, OCH, PCB, dioxin. Resample well GW21-1 and analyze for VOA, OCP, OCH, PCB, dioxin, xylene, MEK, MIBK, EDB, and oil and grease.

f. Site 24, Industrial Area Fly Ash Dump: Install two downgradient wells in locations directed by the EIC. Sample new wells twice at a 60-day interval. Sample five shallow wells, existing surface water locations and two new surface water/sediment locations on tributaries to Cogdels Creek and analyze all samples for metals A, VOA, and hexavalent Cr.

g. Site 28, Hadnot Point Burn Dump: Install new upgradient well and sample twice at a 60 day interval. Sample three existing shallow wells, New River surface water and sediments in four locations, and one new surface water/sediment location in Cogdels Creek near new upgradient well. Analyze all samples for round one parameters, dioxin, o,m,p-xylene, MIBK, MEK, and hexavalent Cr.

h. Site 30, Combat Town Training Area: Install another well upgradient and sample twice at a 60-day interval. Sample shallow well, surface water/sediment in French Creek and analyze all samples for same parameters as listed for round one plus xylene, MEK, MIBK, and EDB.

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Enclosure (1)

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i. Site 35, Camp Geiger Area Fuel Farm: Install three shallow two-inch wells in locations directed by the EIC. Sample twice at a 60-day interval. Sample surface water and sediments from Brinson Creek in two locations; analyze all samples for Pb, VOA, EDB, xylene, and O&G.

j. Site 36, Camp Geiger Area Dump: Install new upgradient well; sample twice at a 60-day interval. Resample four shallow wells; sample surface water and sediments from Brinson Creek and unnamed creek south of site in two locations. Analyze all samples for parameters listed in round one, o,m,p-xylene, MEK, MIBK, EDB, and hexavalent Cr.

k. Site 41, Camp Geiger Dump: Resample four shallow wells. Add new upgradient wells and sample twice at a 60-day interval. Sample surface water and sediment from Tank Creek in two locations and unnamed creek in two locations and analyze all samples for parameters listed in round one plus dioxin, o,m,p-xylene, MEK, MIBK, and hexavalent Cr.

l. Site 45, Campbell Street Underground Fuel Storage Area: Install new well south of fuel farm; sample twice at 60-day interval. Resample three shallow wells and surface water/sediment from the drainage ditch in two locations. Analyze water samples for Pb, O&G, VOA, EDB, and xylene. Sample soil in six locations along perimeter of fuel farm and avgas storage. Composite 5' borings into 3 samples, 0-1', 1-3', and 3-5', analyze soil and sediment samples for Pb, O&G.

m. Site 54, Crash Crew Fire Training Burn Pit: Install one upgradient and one downgradient well at site and sample twice at a 60-day interval. Resample Well 54GWL, drainage ditch surface water and sediments in three locations and analyze for round one parameters, o,m,p-xylene, MEK, MIBK, EDB, and hexavalent Cr.

n. Site 68, Rifle Range Dump: Resample three shallow wells and analyze for round one constituents plus o,m,p-xylene, MEK, MIBK, and EDB.

o. Site 69, Rifle Range Chemical Dump: Resample eight shallow wells and three surface water locations. Sample surface water and sediments from two unnamed guts southeast of site. Analyze all samples for parameters listed in round one plus dioxin, o,m,p-xylene, MEK, MIBK, and EDB.

p. Site 73, Courthouse Bay Liquid Disposal Area: Relocate Well 73GW4 closer to Courthouse Bay to allow for construction activities in that area. Install new upgradient well and sample twice at a 60-day interval. Resample four shallow wells and sample Courthouse Bay surface water and sediments in three locations. Analyze all samples for parameters listed in round one, o,m,p-xylene, MEK, MIBK, EDB, and hexavalent Cr.

q. Site 74, Grease Pit and Pest Control Area: Install a third well west of site; sample twice at a 60-day interval. Resample two shallow wells and analyze all samples for OCP, OCH, PCBs, dioxin, and VOA.

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r. Site 75, MCAS Basketball Court: Resample three shallow wells and analyze for VOA, chloropicrin, and dioxin.

s. Site 76, MCAS Curtis Road: Resample two shallow wells and analyze for VOA, chloropicrin, and dioxin.

t. Site A, MCAS (H) Officers Housing Area: Install three shallow wells along the perimeter of the site described in Attachment A. Sample wells twice at a 60-day interval; analyze for VOA, O&G, and free chlorine. Sample surface water and sediment and analyze for free chlorine (SW only), O&G, and VOA.

u. For all existing wells: Install two additional protective bollards and fill with concrete. Pour 5' x 5' concrete pad around well and bollards; paint well bollards day-glo orange. Use monitoring well construction specifications, Attachment B, for installation of new wells.

v. Sample all potable wells on MCB Camp Lejeune and MCAS New River (approx. 100). Composite samples from a maximum of ten wells serving the same water treatment plant (except for "contaminated" wells listed below) and analyze for priority pollutants, all the Safe Drinking Water Act (SDWA) parameters and xylene, MEK, MIBK, and EDB. If any parameter(s) from the composite exceed(s) regulatory limits or suggested guidelines for potable water, analyze samples for only that (those) parameters from the individual wells in the composite to pinpoint the source of contamination. For cost estimating purposes, include VOA analysis on only 20 individual wells. Scope and analysis to be adjusted as needed by the EIC pending composite sample results. These "contaminated" wells have been shut down by MCB Camp Lejeune: 601, 602, 608, 634, 637, 651, 652, 653, TT26, and TT New. Sample these wells individually and analyze for priority pollutants, SDWA parameters, xylene, MEK, and MIBK.

w. For the contaminated wells TT26, TTNew, 651, 652, and 653, conduct an extensive physical survey and document review to identify potential sources of contamination. Perform a soil gas investigation within a one-mile radius of each well to delineate potential contamination source areas; install additional shallow wells (up to six per potable well for cost estimating purposes) to verify findings. Perform two rounds of sampling at these wells; analyze samples for volatile organics, xylene, MEK, and MIBK.

x. Close out contaminated wells at Sites 36, 41, and 68 in accordance with state regulations (15 NCAC 2C). Submit an abandonment report including round one data and evaluation for these wells, to MCB Camp Lejeune for forwarding to the appropriate state agency.

y. Within 80 days of initiation of the on-site verification investigations, evaluate all data generated with the two sampling events and discuss quantitatively whether contamination has the potential to or is presently affecting the environment or human health. Present the findings as part of the monthly progress reports. Furnish the EIC with two copies and the activity with three copies of the progress report with the study results. The report should include: a description of all sampling and chemical analytical methods used; a presentation and evaluation of the analytical data; an assessment of actual/potential contamination and migration; ground level

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elevations and water levels (0.01 ft. accuracy) in all wells; boring logs; a detailed surveyed site plan showing the location of suspected contaminant sources, wells, etc.; known toxicity information on contaminants found; current standards/criteria for acceptable levels of contaminants found, including those issued/published by EPA, CDC, NIOSH, OSHA, State and local regulatory/health agencies and/or any other established regulatory/advisory agencies as approved by the EIC; and recommendations for immediate site clean up or third round monitoring. Government comments and recommendations will be made via the EIC within 30 calendar days after receipt of the progress report.

2. Characterization/Feasibility Step Efforts

a. In accordance with the original scope of work, conduct Step IB, Characterization, for the Hadnot Point industrial area (bounded by Sneads Ferry Road, Codgels Creek, the New River, and Wallace Creek) and for the deep potable water aquifer influenced by wells serving the Hadnot Point treatment plant. The pump houses for these wells are numbered:

601	613	633	642
602	614	634	650
603	615	635	651
606	616	636	652
608	620	637	653
609	621	638	654
610	626	639(2)	655
611	627	640	LCH-4006
612	632	641	LCH-4007

The objectives of the characterization step are as follows:

1. Locate source of VOCs detected in deep water supply wells 601, 602, 608, 634, 637, and 642.
2. Determine concentration of detected parameters in source area(s).
3. Determine aquifer characteristics: transmissivity, hydraulic conductivity, permeability, storage coefficients and degree of confinement for both deep and shallow aquifers.
4. Determine rate and direction of groundwater and contaminant flow for the deep potable water supply aquifer influenced by wells listed above, and for the shallow aquifer in the Hadnot Point industrial area.

Conduct an extensive physical survey and document review for activities within the industrial area to identify potential sources of contamination. Perform a soil gas investigation to delineate the source areas; install additional wells to verify findings. We estimate fourteen additional shallow wells may be required in this area, including seven which will form pairs with potable wells 601, 602, 603, 608, 634, 637, and 642. Perform an estimated three rounds of sampling at the seventeen Site 22 shallow wells at 60-day intervals; add xylene, MEK, MIBK, and EDB to the round one verification step parameters.

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Perform aquifer testing to determine aquifer characteristics and rate and direction of ground water and contaminant flow. Potable water wells shall be evaluated for various well pumping combinations. Access holes will be drilled, threaded and removable plugs installed in the tops of all potable wells to provide a means of logging the depths of the water levels in the wells. The elevations of these plug holes above mean-sea-level shall be accurately determined by surveying. The method described in Attachment C or another commonly used method/model, as approved by the EIC, shall be used to determine the flow characteristics and contaminant profiles of the aquifers under study.

Within 30 days of completion of the Characterization Step on-site investigation, submit the Step IB preliminary report of the study results. The report should include: a description of all sampling and chemical analytical methods used; a presentation and evaluation of the analytical and geotechnical data; an assessment of actual/potential migration; detailed surveyed-site plan with surface elevations, well locations (horizontal and vertical) and water levels (0.01 ft. accuracy) in all wells; the location and levels of suspected contaminant plumes and/or contaminant sources; known toxicological information on contaminants found, and current standards/criteria for acceptable levels of contaminants found, including those issued/published by EPA, CDC, NIOSH, OSHA, State and local regulatory/health agencies, and/or any other established regulatory/advisory agencies as approved by the EIC. Requirements for preliminary and draft report submissions for Step IB are outlined in Section 3.

b. Conduct Step II Feasibility for the Hadnot Point industrial area. Specify and evaluate five each interim and long-term feasible alternatives for cleanup of contaminated aquifers; include projected effectiveness and cost estimate for each alternative in your evaluation.

Within 30 days of submission of the characterization step draft report, submit a preliminary report of the feasibility study. Preliminary and draft report submission requirements for Step II are outlined in Section 3.

3. Preliminary and Draft Confirmation Study Reports

In accordance with the completion dates established for each step, furnish the EIC with five copies and the activity with five copies of the preliminary report. Within 30 days, the Government will review and provide comments to the contractor via the EIC. Present EIC/Activity debriefing at the activity during the Government review period. Address the comments, and within 30 days provide five copies of the draft report to the EIC and five copies of the draft report to the activity for issuance to the regulatory agencies for their review.

Present the findings of the draft report for each study step to EPA Region IV and to the North Carolina Division of Environmental Management. These briefings shall be held at each agency's office as arranged by the EIC and in consort with the activity representative.

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APPENDIX IVSCOPE OF WORK FOR ADDITIONAL SOIL BORINGS,
MCAS (H) NEW RIVER FUEL PIPELINE INVESTIGATION

1. Perform 23 soil borings to depths of 10' at the locations shown in Attachment A. (The attached sketch is from a 1983 Soil and Materials Engineering Study which was forwarded to you on 8 February 1984). A drill rig will be required for this effort, since previous attempts at hand augering have been unsuccessful. Note the presence or absence of fuel by visual inspection during the drilling. After a period of 24 hours, measure and record the depth to water or fuel in each borehole; sample the liquid and note the presence or absence of fuel and the thickness of the fuel lens.
2. Prepare a separate report on this investigation, to include boring logs and sketches, and submit three copies to this Command and three copies to MCB Camp Lejeune.
3. This investigation should be completed within ninety days of contract award.

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Enclosure (1)