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Final

Five-Year Review

Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

Contract Task Order 171

August 2010

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Prepared by

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FIVE-YEAR REVIEW REPORT

MARINE CORPS BASE CAMP LEJEUNE
JACKSONVILLE, NORTH CAROLINA

NAVFAC CLEAN III PROGRAM
CONTRACT N62470-02-D-3052
CONTRACT TASK ORDER 0171

AUGUST 2010

This report documents completion of the Five-Year Review of Marine Corps Base Camp Lejeune, specifically Operable Units 01, 02, 04, 05, 06, 07, 08, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, and 21, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in accordance with CERCLA §121(c), as amended, and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR).

Approved by:

D J Lecce — 22 OCT 10

D. J. LECCE — Date
Colonel, United States Marine Corps
Commanding Officer
Marine Corps Base Camp Lejeune

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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SEP 30 2010

Commanding Officer
EMD, EQB
Marine Corps Base
PSC Box 20004
Camp Lejeune, North Carolina 28542

SUBJ: Five Year Review - 2010
MCB Camp Lejeune NPL Site
Jacksonville, North Carolina

Dear Sir:

The U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the above subject decision document and concurs that the remedies selected for the fifteen operable units, which comprises twenty four sites, remain protective of human health and the environment. The remedies are supported by the previously completed Remedial Investigation, Feasibility Study and Baseline Risk Assessment Reports. They are also supported by the review of the current applicable or relevant and appropriate requirements (ARARs).

This document also provides a summary of Camp Lejeune's Operable Unit 15, Former Base Dry Cleaning Facility. Discussions and recommendations are included in the text concerning the pending and ongoing remedial actions concerning this area. These recommendations will undergo further review by my staff and will be documented by other reporting mechanisms.

EPA appreciates the coordination efforts of MCB Camp Lejeune and the level of effort that was put forth in developing this report. EPA looks forward to continuing the exemplary working relationship with MCB Camp Lejeune and Atlantic Division Naval Facilities Engineering Command as we move toward a final cleanup of the NPL site. If you have any questions, please contact Gena Townsend, of my staff, at (404) 562-8538.

Sincerely,

Franklin E. Hill, Director
Superfund Division

cc: Robert Lowder, Camp Lejeune
Dave Cleland, NAVFAC Atlantic
Randy McElveen, NCDENR

Executive Summary

The Department of Navy (Navy), the lead agency, and Marine Corps Base Camp Lejeune (MCB CamLej), Jacksonville, North Carolina conducted this Five-Year Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Review with regulatory oversight from the United States Environmental Protection Agency (USEPA) Region 4 and the North Carolina Department of Environmental and Natural Resources (NCDENR). The Five-Year Review was prepared in accordance with the USEPA *Comprehensive Five-Year Review Guidance* (USEPA, 2001). This document addresses remedies and Remedial Actions (RAs) that have been implemented within all operable units (OUs) for which there is a Record of Decision (ROD) or Action Memorandum in-place. Sixteen OUs have been identified at MCB CamLej for review: OUs 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 19, and 21.

The objective of this Five-Year Review is to evaluate current remedies at MCB CamLej and to determine whether the remedies remain protective of human health and the environment in accordance with the requirements outlined in the ROD or Action Memorandum. The protectiveness of the remedies was evaluated through review of reports, site visits and inspections, and community involvement. In addition, the Five-Year Review Report identifies any issues that may be preventing a particular remedy from functioning as designed or as appropriate, and that could endanger the protection of human health and the environment.

A summary table of the OUs, associated sites, documents reviewed, RODs/Remedial Actions and Non-time-critical Removal Actions (NTCRAs)/Removal Actions since the last Five-Year Review, RAOs, and Remedy Components is provided as **Table ES-1**. This table also summarizes the protectiveness statements, recommendations with the associated milestones for completion, and date for the next Five-Year Review.

Table ES-1
Five-Year Review Summary Table
Five-Year Review
MCB CamLej

OU	Site	Site Description	Documents Reviewed	RODs/Remedial Actions and NTCRAs/Removal Actions Since Last Five-Year Review	RAOs	Remedy Components	Protectiveness	Recommendations (Milestones)	Next Review
1	21	Transformer Storage Lot 140	ROD-1994 ESD-1995 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	1994 - ROD signed for soil removal and LUCs 1995 - ESD for PCB cleanup levels 1995 - Soil Removal Action 2001/2002 - LUCs	Address pesticides and PCBs in soil	-Soil removal to industrial levels -Non-Industrial Use Control - Soil	The remedies are protective of human health and the environment because exposure pathways that could result in unacceptable risk are being controlled and LUCs preventing exposure are in place. The remedies for VOCs in groundwater at OU 1 are protective of human health and the environment in the short-term because LUCs are in place and Base Master Planning maintains current groundwater plume data in GIS and therefore there is no current or potential exposure. However, in order for the remedy to be protective in the long-term, the treatment plants and systems should be optimized to increase their efficiencies in removing contaminated mass.	-None, LUCs will be maintained	2015
	24	Industrial Area Fly Ash Dump	ROD-1994 Final LTM Report-2001 Five-Year Review-2005 Site Visit-2008	1994 - ROD signed for LTM 1996-1998 - LTM 2001 - NFA	Address pesticides in groundwater	-LTM for groundwater		-None, the cleanup levels for pesticides and metals were achieved and LTM discontinued	2015
	78	Hadnot Point Industrial Area	ROD-1994 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 O&M Data-2005-2009 LTM Reports-2006-2009 Site Visit-2008 Base Master Planning GIS-2009 Vapor Intrusion Report - 2009	1994 - ROD signed for Soil Removal, Groundwater Extraction and Treatment, LTM, and LUCs 1995 - Soil Removal Action 1995-present - Groundwater Treatment and LTM 2001/2002 - LUCs	Address pesticides in soil and VOCs in groundwater	-Soil removal to industrial levels -Groundwater Extraction and Treatment System -LTM for groundwater -Non-Industrial Use Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)		-Revise the LUC boundary to encompass extent of contaminated groundwater (2013) -Collect groundwater metals data for comparison to determine if site-related or attributable to background. If determined site-related, evaluate risks, add metals as COCs to LTM Program, evaluate LUCs, and prepare an ESD (2013) -Conduct LTM for potential downgradient migration at Site 78 South and north of Holcomb Boulevard; assess vertical extent of benzene at IR78-GW04-2 (2012) -Update COCs and cleanup levels to reflect recent standards (2012) -Evaluate recovery well efficiency and groundwater capture zones and make repairs or changes to groundwater treatment system to optimize mass removal (2011) -Evaluate alternative groundwater treatment technologies (2015) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015
2	6	Storage Lots 201 and 203	ROD-1993 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 O&M Data-2005-2009 LTM Reports-2006-2009 Site Visit-2008 Base Master Planning GIS-2009 Vapor Intrusion Report - 2009	1993 - ROD signed for Soil Removal, Groundwater Extraction and Treatment, LTM, and LUCs 1994-1995 - Soil Removal Action 1996-present - Groundwater Treatment and LTM 2001/2002 - LUCs	Address pesticides and PCBs in soil and VOCs in groundwater	-Soil removal to industrial levels -Groundwater Extraction and Treatment System -LTM for groundwater -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	The remedies for soil are protective of human health and the environment because exposure pathways that could result in unacceptable risk are being controlled and LUCs preventing exposure are in place. The remedies for groundwater are protective of human health and the environment in the short-term because LUCs are in place and therefore there is no current or potential exposure. However, in order for the remedy to be protective in the long-term, supplemental site investigations should be completed that will identify the potential additional source areas that are contributing to the groundwater contamination. Groundwater LTM for metals was discontinued because there was no historical evidence of metal disposal at OU 2 and the cleanup levels were consistent with natural background concentrations; however, the cleanup levels for several metals have been updated to more conservative values and historical data indicates the presence of metals above current standards. An evaluation is recommended to determine if the metals should be added as COCs to the LTM Program and additional LUCs are needed.	-Collect groundwater metals data for comparison to determine if site-related or attributable to background. If determined site-related, evaluate risks, add metals as COCs to LTM Program, evaluate LUCs, and prepare an ESD (2013) -Update COCs and cleanup levels to reflect recent standards (2012) -Complete source area investigation and make repairs or changes to optimize mass removal (2015) -Evaluate alternative treatment technologies (2015) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015
	82	Piney Green Road VOC Area	ROD-1993 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 O&M Data-2005-2009 LTM Reports-2006-2009 Site Visit-2008 Base Master Planning GIS-2009 Vapor Intrusion Report - 2009	1993 - ROD signed for Soil Removal, Groundwater Extraction and Treatment, LTM, and LUCs 1996 - SVE 1996-present - Groundwater Treatment and LTM 2001/2002 - LUCs	Address VOCs and metals in soil and VOCs in groundwater	-Soil removal to industrial levels -SVE System -Groundwater Extraction and Treatment System -LTM for groundwater and surface water -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)			2015
4	41	Camp Geiger Dump near Former Trailer Park	ROD-1995 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 IRACR-2006 Site Visit-2008 Base Master Planning GIS-2009	1995 - ROD signed for LTM and LUCs 1997-2005 - LTM 2001/2002 - LUCs 2006 - NFA 2008 - Fence Installed	Address VOCs and metals in groundwater and prevent exposure to waste	-LTM for groundwater -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (500 feet) -Site Access Control	Perimeter fencing restricts access to the waste areas. The LUCs to prohibit soil intrusive activities and prohibit non-industrial use at the sites are protective of human health and the environment because exposure to waste that could result in unacceptable risks are being controlled. Groundwater LTM is determined complete and this remains protective because the detected concentrations were below the current standards and there is no current or potential future exposure.	-Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015
	74	Mess Hall Grease Dump Area	ROD-1995 Final LTM Report-2001 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	1995 - ROD signed for LTM and LUCs 1997-1998 - LTM 2001/2002 - LUCs Fence Installed 2006 - NFA	Address metals in groundwater and prevent exposure to waste	-LTM for groundwater -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (500 feet) -Site Access Control			2015

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Five-Year Review
MCB CamLej

OU	Site	Site Description	Documents Reviewed	RODs/Remedial Actions and NTCRAs/Removal Actions Since Last Five-Year Review	RAOs	Remedy Components	Protectiveness	Recommendations (Milestones)	Next Review
5	2	Former Nursery/Day Care Center	ROD-1994 LUCIP-2001/2002/2009 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Final LTM Report-2008 Base Master Planning GIS-2009	1994 - ROD signed for LTM and LUCs 1997-2007 - LTM 2001/2002/2009 - LUCs	Address pesticides in soil and VOCs in groundwater	-LTM for groundwater -Non-Industrial Use Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	LUCs are in-place to prohibit non-industrial use within the extent of the former soil removal action areas where pesticides remain in soil above levels that allow for UU/UE. The LUCs for soil at are protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled.	-Issue a correction to the Closeout Report (CH2M HILL, 2008f) to include and explain the Notice of Non-Significant Change (USMC, 1997) and document recent data and findings (2012)	2015
6	36	Camp Geiger Dump Area Near Sewage Treatment Plant	ROD-2005 LUCIP-2005 Five-Year Review-2005 LUC Inspections-2005-2009 LTM Reports-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	2005 - ROD signed for LTM and LUCs 1998-present - LTM 2005 - LUCs	Address VOCs in groundwater and prevent exposure to waste, lead soil contamination, and former soil removal action areas	-LTM for groundwater -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	At Site 36, LTM for MNA is ongoing to monitor the VOC plume and migration and LUCs are in-place to prohibit groundwater intrusive activities and aquifer use until cleanup levels are achieved. Although the cleanup levels have been updated, LTM is ongoing and is still protective. LUCs are in-place to prohibit non-industrial use within the extent of the former soil removal action areas at Sites 36 and 43 where PAHs, PCBs, and/or lead remain in soil above levels that allow for UU/UE. Based on the former dumping/burning activities, LUCs are also in-place at Sites 43, 44, and 54 to prohibit intrusive activities. These remedies for soil and groundwater at OU 6 are protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled and LUCs preventing exposure to waste, soil, and groundwater are in-place.	-Update groundwater COCs and cleanup levels to reflect recent standards (2012) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015
	43	Agan Street Dump	ROD-2005 LUCIP-2005 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	2005 - ROD signed for LUCs 2005 - LUCs	Prevent exposure to waste and former soil removal action areas	-Non-Industrial Use Control -Intrusive Activities Control - Soil		-Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015
	44	Jones Street Dump	ROD-2005 LUCIP-2005 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	2005 - ROD signed for LUCs 2005 - LUCs	Prevent exposure to waste	-Intrusive Activities Control - Soil		-Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015
	54	Crash Crew Fire Training Burn Pit	ROD-2005 LUCIP-2005 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	2005 - ROD signed for LUCs 2005 - LUCs	Prevent exposure to waste	-Non-Industrial Use Control -Intrusive Activities Control - Soil		-Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015
7	1	French Creek Liquids Disposal Area	ROD-1996 LUCIP-2001/2002 RACR-2002 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	1996 - ROD signed for LTM and LUCs 1996-2001 - LTM 2001/2002 - LUCs	Address VOCs in groundwater	-LTM for groundwater -Non-Industrial Use Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	The LUC in-place to prohibit non-industrial use within the extent of waste is protective; however, LUCs to restrict intrusive activities are also recommended to prevent exposure to waste.	-Update LUCs to include intrusive restrictions for soil to prevent potential exposure to waste (2012) -Update LUCs to remove groundwater intrusive and use restrictions (2012) -Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015
	28	Hadnot Point Burn Dump	ROD-1996 LUCIP-2001/2002 RACR-2002 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	1996 - ROD signed for LTM and LUCs 1996-2001 - LTM 2001/2002 - LUCs	Address metals in groundwater	-LTM for groundwater -Non-Industrial Use Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)			2015
8	16	Former Montford Point Burn Dump	ROD-1996 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	1996 - ROD signed for NFA 2001/2002 - LUCs implemented based on former dump	Prevent exposure to waste	-Non-Industrial Use Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	The LUC in-place to prohibit non-industrial use within the extent of waste is protective; however, LUCs to restrict intrusive activities are also recommended to prevent exposure to waste.	-Update LUCs to include intrusive restrictions for soil to prevent potential exposure to waste (2012) -Submit an ESD to identify LUCs as the remedy (2013)	2015
10	35	Camp Geiger Fuel Farm	Five-Year Review-2005 NTCRA Report-2008 Site Visit-2008 RI-2009 FS-2009 ROD-2009 Vapor Intrusion Report-2009 Draft RD-2009 Base Master Planning GIS-2009	1994 - Interim ROD signed for soil removal 1995-1996 - Soil Removal Action 1995 - Interim ROD signed for in-situ air sparging trench 1998-2009 - In-situ air sparging trench 1999-2004 - LTM 2009 - ROD signed for horizontal air sparging, LTM, and LUCs	Address VOCs in groundwater	-Air sparging using a horizontal well -LTM for groundwater -Aquifer Use Control (1000 feet)	The remedies for groundwater will be protective of human health and the environment. The horizontal air sparging system is intended to treat the highest VOC concentrations in groundwater. LTM and MNA will be conducted to evaluate the effectiveness of the system and monitor plume migration. LUCs will be implemented to prohibit aquifer use until cleanup levels for UU/UE are achieved.	-Implement remedial action (2010-2015) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015
11	80	Paradise Point Golf Course Maintenance Area	ROD-1997 LUCIP-2007 Five-Year Review-2005 LUC Inspections-2007-2009 Site Visit-2008 Base Master Planning GIS-2009	1997 - ROD signed for NFA 2007 - LUCs implemented based on former soil removal to industrial levels	Prevent exposure to pesticides in soil	-Non-Industrial Use and Intrusive Activities Control - Soil	LUCs are in-place to prohibit soil intrusive activities and prohibit non-industrial use within the extent of the former soil removal action areas where pesticides remain in soil above levels that allow for UU/UE. The LUCs for soil are protective of human health and the environment.	-Submit an ESD to identify LUCs as the remedy (2013) -Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015

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Five-Year Review
MCB CamLej

OU	Site	Site Description	Documents Reviewed	RODs/Remedial Actions and NTCRAs/Removal Actions Since Last Five-Year Review	RAOs	Remedy Components	Protectiveness	Recommendations (Milestones)	Next Review
12	3	Old Creosote Plant	ROD-1997 ROD Amendment-2000 LUCIP-2001/2002 LTM Reports-2005-2009 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009 Vapor Intrusion Report-2009	1997 - ROD signed for source removal and biological treatment, LTM, LUCs 1997-present - LTM 2000 - ROD Amendment for soil removal, LTM, LUCs 2001/2002 - LUCs	Address soil source area and VOCs and SVOCs in groundwater	-Soil removal to industrial levels -LTM for groundwater -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	The remedy is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. LUCs are in-place to prohibit soil intrusive activities and prohibit non-industrial use within the extent of the former soil removal action areas where PAHs remain in soil above levels that allow for UU/UE. LTM is ongoing to monitor the concentrations of VOCs and SVOCs in groundwater and LUCs are in-place to prohibit groundwater intrusive activities and aquifer use until cleanup levels are achieved. Although the cleanup levels have been updated, LTM is ongoing and is still protective.	-Update groundwater COCs and cleanup levels to reflect recent standards (2012) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015
13	63	Verona Loop Dump	ROD-1997 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 Site Visit-2008 Base Master Planning GIS-2009	1997 - ROD signed for NFA 2001/2002 - LUCs implemented based on former dump	Prevent exposure to waste	-Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	LUCs are in-place to restrict groundwater intrusive activities and aquifer use; however, LUCs to prohibit non-industrial use and restrict soil intrusive activities are recommended to prevent exposure to remaining waste in-place.	-Abandon existing monitoring wells in accordance with NC Regulations (2012) -Update LUCs to include restrictions for soil to prevent potential exposure to waste (2012) -Submit an ESD to identify LUCs as the remedy (2013)	2015
14	69	Rifle Range Chemical Dump	Interim ROD-2000 LUCIP-2001/2002 Five-Year Review-2005 LUC Inspections-2005-2009 RASO Survey - 2007 Site Visit-2008 Supplemental Investigation Work Plan - 2008 Applicability Determination-2009 UXO-02 PA/SI Work Plan - 2009 Base Master Planning GIS-2009	2000 - Interim ROD signed for LTM and LUCs 1998-2005 - LTM 2001/2002 - LUCs	Address VOCs in groundwater and prevent exposure to groundwater and waste	-LTM -Non-Industrial Use and Intrusive Activities Control - Soil -Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet) -Site Access Control	The remedy is protective of human health and the environment, because exposure pathways that could result in unacceptable risks are being controlled. Perimeter fencing restricts access to the waste area at Site 69. The LUCs to restrict soil and groundwater intrusive activities and prohibit non-industrial and aquifer use is protective of human health and the environment because exposure to waste, soil, and groundwater that could result in unacceptable risks is being controlled.	-LTM should be reinstituted upon completion of the supplemental investigation to monitor for potential downgradient migration (2014)	2015
15	88	Base Dry Cleaners	Five-Year Review-2005 NTCRA Report-2005 RI-2008 Draft FS-2008 Site Visit-2008 Vapor Intrusion Report-2009 Treatability Study Work Plan-2009 Base Master Planning GIS-2009	1999-2002 - LTM 2005 - NTCRA for Soil Mixing with ZVI	-Address VOCs in source area -ROD planned to address VOCs in groundwater	-Soil mixing with ZVI	Because there is potential human health risk from exposure to VOCs in groundwater and a ROD is not yet in-place, Base EMD ensures protectiveness of onsite workers and evaluates property use through the Base Master Planning process by maintaining up to-date GIS layers depicting groundwater contamination boundaries.	-Complete FS, PRAP, ROD (2011-2014) -Evaluate and mitigate vapor intrusion pathway as part of the FS and during construction planning (ongoing)	2015
16	89	Former DRMO	Five-Year Review-2005 RI-2008 Treatability Study Report-2008 Site Visit-2008 BERA-2008 NTCRA Data-2009 Fate and Transport Data-2009 Eco EE/CA-2009 Vapor Intrusion Report-2009 Base Master Planning GIS-2009	1999-2005 - LTM 2008 - NTCRA for Soil Mixing with ZVI	-Address VOCs in source area -ROD planned to address VOCs in groundwater	-Soil mixing with ZVI	-Through the implementation of several pilot studies and NTCRAs, the overall VOC contamination at Site 89 has been significantly reduced. However, there is potential human health risk from exposure to VOCs in groundwater and ecological risk from PAHs and pesticides in the western wetland area. To ensure protectiveness until the ROD is signed, the following preventative measures have been instituted: • Base EMD ensures protectiveness of onsite workers and evaluates property use through the Base Master Planning process by maintaining up to-date GIS layers depicting groundwater contamination boundaries • A fence was installed around the site boundary to restrict access • An aeration system, installed in Edwards Creek, is currently operational to promote reduction of VOC concentrations • An NTCRA was completed in 2010 to mitigate potential risks to ecological receptors in the western wetland area • Fate and transport sampling is ongoing to monitor groundwater quality between the soil mixing treatment area and Edwards Creek	-Complete FS, PRAP, ROD (2011-2014) -Evaluate and mitigate vapor intrusion pathway as part of the FS and during construction planning (ongoing)	2015
16	93	Building TC-942	Five-Year Review-2005 FS-2005 ROD-2006 RDs-2006 Site Visit-2008 CCR-2008 LTM Reports-2008-2009 LUCIP-2009 IRACR-2009 Base Master Planning GIS-2009 Vapor Intrusion Report - 2009	1999-2005 - LTM 2006 - ROD signed for ISCO, LTM, LUCs 2006-2008 - ISCO to treat VOCs in groundwater 2008-present - LTM 2009 - LUCs	Address VOCs in groundwater	-Intrusive Activities Control - Groundwater -Aquifer Use Control (1000 feet)	LTM is ongoing to monitor MNA of VOCs in groundwater and potential migration. LUCs are in-place to prohibit groundwater intrusive activities and aquifer use until cleanup levels are achieved. These remedies for groundwater are protective of human health and the environment in the short-term because exposure pathways that could result in unacceptable risks are being controlled and LUCs preventing exposure to groundwater are in-place. However, the remedy will be protective in the long-term once the cleanup levels have been achieved by the natural attenuation process.	-Update groundwater COCs and cleanup levels for Site 93 to reflect recent standards (2012) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015
19	84	Building 45	Five-Year Review-2005 Supplemental Investigation-2005 Phase III NTCRA-2006 CCR-2007 Amended FS-2008 Site Visit-2008 ROD-2009 RD-2009 Base Master Planning GIS-2009	2002-2006 - Soil Removal Actions 2009 - ROD signed for soil removal and LUCs 2009 - LUCs	Address PCBs in soil and prevent exposure to soil	-Soil removal and/or soil cover to industrial levels -Non-Industrial Use Control - Soil -Intrusive Activities Control - Soil -Site Access Control	LUCs are in-place to prohibit soil intrusive activities and prohibit non-industrial use within the extent of the former soil removal action areas where PCBs remain in soil above levels that allow for UU/UE. A fence and signs were also installed to restrict access. The LUCs for soil are protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled.	-Abandon existing monitoring wells in accordance with NC Regulations (2012)	2015

Table ES-1
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OU	Site	Site Description	Documents Reviewed	RODs/Remedial Actions and NTCRAs/Removal Actions Since Last Five-Year Review	RAOs	Remedy Components	Protectiveness	Recommendations (Milestones)	Next Review
21	73	Amphibious Vehicle Maintenance Facility	Five-Year Review-2005 Pilot Study Report-2008 Site Visit-2008 RI-2009 FS-2009 ROD-2009 Vapor Intrusion Report-2009 Draft RD-2009 Base Master Planning GIS-2009	2000-2005 - LTM 2009 - ROD signed for horizontal air sparging and downgradient ERD injections, LTM, and LUCs	Address VOCs in groundwater and prevent exposure to petroleum-impacted soil	-Air sparging using a horizontal well -Downgradient ERD injections -LTM for groundwater -Aquifer Use Control (1000 feet) -Non-Industrial Use Control - Soil	The remedies for groundwater and soil are expected to be protective of human health and the environment upon completion. The horizontal air sparging system is intended to treat the highest VOC concentrations in groundwater and the ERD injections will be conducted to ensure VOC concentrations are not impacting the adjacent surface water body. LTM and MNA will be conducted to evaluate the effectiveness of the system and monitor plume migration. LUCs will be implemented to prohibit aquifer use and exposure to soil until cleanup levels for UU/UE are achieved.	-Implement remedial action (2010-2015) -Evaluate and mitigate vapor intrusion pathway during building and construction planning (ongoing)	2015

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from CERCLIS)*: Marine Corp Base Camp Lejeune		
EPA ID *(from CERCLIS)*: NC6170022580		
Region: 4	**State: NC**	**City/County: Onslow County**

SITE STATUS	
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☒ Under Construction ☒ Operating ☐ Complete	
Multiple OUs?* ☒ YES ☐ NO	**Construction completion date:** OU 1: Pump and treat system – 1995 OU 2: Pump and treat system – 1996 OU 16, Site 93: ISCO injections – 2008
Has site been put into reuse? ☐ YES ☒ NO	

REVIEW STATUS
Lead agency: ☐ EPA ☐ State ☐ Tribe ☒ Other Federal Agency: Department of the Navy
Author name: Naval Facilities Engineering Command, Mid-Atlantic Division with support from the CLEAN III contractor CH2M HILL
Review period: 03/24/2005 to 03/24/2010
Date(s) of site inspection: 09/03/2008, 09/04/2008, and 10/21/2008
Type of review: ☒Post-SARA ☐Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion
Review number: ☐ 1 (first) ☐ 2 (second) ☒ 3 (third) ☐ Other (specify) _____
Triggering action: ☐ Actual RA Onsite Construction ☒ Actual RA Start at OU 1 ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)
Triggering action date *(from CERCLIS)*: 03/24/2005
Due date *(five years after triggering action date)*: 03/24/2010
Issues: The issues for each OU are included in Sections 3 through 18. **Recommendations and Follow-Up Actions:** The recommendations and follow-up actions for each OU are included in Sections 3 through 18 and summarized in Table ES-1. **Protectiveness Statements:** The protectiveness statements for each OU are included in Sections 3 through 18 and summarized in Table ES-1. **Other Comments:** None

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Acronyms and Abbreviations

AR	Administrative Record
ARAR	Applicable or Relevant and Appropriate Requirement
AST	aboveground storage tank
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
CCR	Construction Closeout Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIP	Community Involvement Plan
CLEAN	Comprehensive Long-term Environmental Action—Navy
COC	chemical of concern
CS	Confirmation Study
CSS	Chemical Safety Submission
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
DRMO	Defense Reutilization and Marketing Office
EE/CA	Engineering Evaluation/Cost Analysis
EMD	Environmental Management Division
ERA	Ecological Risk Assessment
ERD	enhanced reductive dechlorination
ERH	Electrical Resistance Heating
ESD	Explanation of Significant Differences
ESS	Explosives Safety Submission
EVO	emulsified vegetable oil
FFA	Federal Facilities Agreement
ft^2	square feet
FS	Feasibility Study
GIS	geographical information system
HPFF	Hadnot Point Fuel Farm
HPIA	Hadnot Point Industrial Area
HRC	Hydrogen Release Compound®
IAS	Initial Assessment Study
IRA	Interim Remedial Action

IRACR	Interim Remedial Action Completion Report
IRP	Installation Restoration Program
ISCO	*in situ* chemical oxidation
LNAPL	light non-aqueous phase liquid
LTM	long-term monitoring
LTTD	low temperature thermal desorption
LUC	land use control
LUCIP	Land Use Control Implementation Plan
µg/L	micrograms per liter
MCAS	Marine Corps Air Station
MCB CamLej	Marine Corps Base Camp Lejeune
MCL	Maximum Contaminant Level
MD	munitions debris
mg/kg	milligrams per kilogram
mg/L	milligrams per Liter
MILCON	military construction
MIP	membrane interface probe
MMRP	Military Munitions Response Program
MNA	monitored natural attenuation
mV	millivolts
NACIP	Navy Assessment and Control of Installation Pollutants
NAE	Natural Attenuation Evaluation
NAIP	natural attenuation indicator parameter
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NC HWS SSL	North Carolina Hazardous Waste Section Soil Screening Level
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCGWQS	North Carolina Groundwater Quality Standards
NCP	National Contingency Plan
NFA	no further action
NPL	National Priorities List
NTCRA	Non-time-critical Removal Action
O&G	oil and grease
O&M	operation and maintenance
ORC	Oxygen Release Compound®
ORP	oxidation-reduction potential
OU	operable unit
OWS	oil-water separator
PA/SI	Preliminary Assessment/Site Inspection
PAH	polynuclear aromatic hydrocarbon
PCA	tetrachloroethane
PCB	polychlorinated biphenyl
PCE	tetrachloroethene

POL	petroleum, oil, and lubricants
ppm	parts per million
PRAP	Proposed Remedial Action Plan
PRB	permeable reactive barrier
RA	remedial action
RAB	Restoration Advisory Board
RABITT	Reductive Anaerobic Bioremediation *In Situ* Treatment Technology
RAO	remedial action objective
RBC	risk-based concentration
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RSL	risk-based screening level
SARA	Superfund Amendments and Reauthorization Act
SEAR	surfactant enhanced aquifer remediation
SI	Site Investigation
SMP	Site Management Plan
SSI	Supplemental Site Investigation
STP	sewage treatment plant
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCE	trichloroethene
TCL	Target Compound List
TCRA	Time-critical Removal Action
TDS	total dissolved solids
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
UST	underground storage tank
UU/UE	unrestricted use and unlimited exposure
UXO	unexploded ordnance
VC	vinyl chloride
VOC	volatile organic compound
yd^3	cubic yard
ZVI	zero valent iron

SECTION 1

Introduction

The Department of Navy (Navy), the lead agency, and Marine Corps Base Camp Lejeune (MCB CamLej), Jacksonville, North Carolina conducted this Five-Year Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Review with regulatory oversight from United States Environmental Protection Agency (USEPA) Region 4 and North Carolina Department of Environmental and Natural Resources (NCDENR). The Five-Year Review was prepared in accordance with the USEPA *Comprehensive Five-Year Review Guidance* (USEPA, 2001). This document addresses remedies and Remedial Actions (RAs) that have been implemented within all operable units (OUs) for which there is a Record of Decision (ROD) or Action Memorandum in-place. Sixteen OUs have been identified at MCB CamLej for review: OUs 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 19, and 21.

The objective of this Five-Year Review is to evaluate current remedies at MCB CamLej and to determine whether the remedies remain protective of human health and the environment in accordance with the requirements outlined in the ROD or Action Memorandum. The protectiveness of the remedies was evaluated through review of reports, site visits and inspections, and community involvement. In addition, the Five-Year Review Report identifies any issues that may be preventing a particular remedy from functioning as designed or as appropriate, and that could endanger the protection of human health and the environment.

The Navy prepared this Five-Year Review Report pursuant to CERCLA 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The USEPA interpreted this requirement further in the NCP as stated in 40 Code of Federal Regulations (CFR) 300.430 (f)(4)(ii):

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site

> above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The statutory review process was initiated based on the RA at OU 1 in September 1993. The first two Five-Year Reviews were completed in 1999 (Baker, 1999) and 2005 (Baker, 2005a). The current Five-Year Review is required because hazardous contaminants remain at concentrations exceeding criteria that allow for unlimited use and unrestricted exposure (UU/UE) at each of the 16 OUs addressed in this document.

1.1 Facility Background

MCB CamLej was commissioned in 1942 as a training area to prepare Marines for combat. To help prepare warfighters for combat and humanitarian missions abroad, MCB CamLej takes advantage of 236 square miles 156,000 acres including, 11 miles of beach capable of supporting amphibious operations, 34 gun positions, 50 tactical landing zones, three state-of-the-art training facilities for Military Operations in Urban Terrain and 80 live fire ranges. MCB CamLej provides housing, training facilities, and logistical support for Fleet Marine Force Units and other assigned units.

MCB CamLej is located in Jacksonville, North Carolina within Onslow County (**Figure 1-1**). The community is home to an active duty, dependent, retiree and civilian employee population of nearly 150,000 people. The Base is a major economic presence for these surrounding communities and maintains a close relationship to ensure quality living for both military and civilians throughout the area. The Base consists of six geographical locations: Camp Geiger, Montford Point, Courthouse Bay, Mainside, the Greater Sandy Run Area, and the Rifle Range Area. The land use is diverse and encompasses 26,000 acres of water, 29,000 acres of forested wetlands, 20,000 acres of non-forested wetlands, 72,000 acres of upland forests, and 7,500 acres of urban/developed land.

Potable water to MCB CamLej and the surrounding residential area is provided by water supply wells that pump groundwater from the Castle Hayne aquifer. There are currently 68 active water supply wells on Base, which rely entirely on groundwater as the supply source. The supply wells are included in the Base's annual wellhead monitoring program to ensure compliance with drinking water standards.

1.2 Operable Units and Sites

MCB CamLej has been actively engaged in environmental investigations and remediation programs since 1983, beginning with the Navy Assessment and Control of Installation Pollutants (NACIP) Program. An Initial Assessment Study (IAS) was the first investigation of potentially hazardous sites (Water and Air Research, 1983). In 1986, the Navy's Installation Restoration Program (IRP) was initiated following enactment of the Superfund Amendments and Reauthorization Act (SARA). MCB CamLej was placed on the CERCLA National Priorities List (NPL) on October 4, 1989. Following that listing, a Federal Facilities Agreement (FFA) between USEPA Region 4, NCDENR, and the Navy was signed in February 1991.

A total of 22 OUs have been identified under the IRP (**Table 1-1**). The annual Site Management Plan (SMP) outlines the current OU and site status and schedules (CH2M HILL, 2009a). Sixteen OUs are included in this Five-Year Review; 13 have RODs in-place (OUs 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 19, and 21), one has an Interim ROD in-place (OU 14), one has an Action Memorandum in-place (OU 15), and one has an OU Interim ROD and Action Memorandum in-place (OU 16). The 16 OUs and associated sites grouped into each OU are depicted on **Figure 1-2**. Four OUs (OUs 3, 9, 17, and 18) have been identified as requiring no further action (NFA) and two OUs (OUs 20 and 22) are currently undergoing Remedial Investigation (RI) and are not included in this Five-Year Review based on the *Comprehensive Five-Year Review Guidance* (USEPA, 2001).

1.3 Report Organization

The Five-Year Review for MCB CamLej consists of 19 sections, organized as follows:

- **Executive Summary—**Summarizes the Five-Year Review process conducted at MCB CamLej and findings. A summary table of the OUs, associated sites, documents reviewed, RODs/Remedial Actions and Non-time-critical Removal Actions (NTCRAs)/ Removal Actions since the last Five-Year Review, RAOs, and Remedy Components is provided as **Table ES-1**. This table also summarizes the protectiveness statements, recommendations with the associated milestones for completion, and date for the next Five-Year Review.
- **Section 1—**Introduction and purpose of Five-Year Review and background of MCB CamLej and OUs
- **Section 2—**Description of the Five-Year Review process
- **Sections 3 through 18—**Descriptions of each OU included in this Five-Year Review including the site history and background; site chronology; site characterization; description of remedial actions (remedy implementation, remedy operation and maintenance [O&M], and progress since the last Five-Year Review); technical assessment; issues, recommendations, and follow-up actions; and statement of protectiveness. Figures of each OU, the associated sites, and actions; and tables with the cleanup levels identified for each OU are provided within each section, as applicable.
- **Section 19—**References

Appendices are provided at the end of the document.

Table 1-1
Summary of Sites By Operable Unit
Five-Year Review
MCB CamLej

OU	SITE	SITE DESCRIPTION	PRIMARY REASON FOR OU SELECTION
1	21	Transformer Storage Lot 140	Geographic location of sites.
	24	Industrial Area Fly Ash Dump	
	78	Hadnot Point Industrial Area	
2	6	Storage Lots 201 and 203	Geographic location of sites.
	9	Fire Fighting Training Pit at Piney Green Road	
	82	Piney Green Road VOC Area	
3	48	MCAS Mercury Dump	Unique characteristic of suspected waste (mercury).
4	41	Camp Geiger Dump near Former Trailer Park	Unique characteristic of suspected waste (chemical warfare materials).
	74	Mess Hall Grease Dump Area	
5	2	Former Nursery/Day Care Center	Unique characteristics of material handled at site (pesticides).
6	36	Camp Geiger Dump Area Near Sewage Treatment Plant	Similar characteristics of material disposed (POL, waste oils, solvents) and contaminants detected (metals, VOCs, O&G). Geographic location of sites.
	43	Agan Street Dump	
	44	Jones Street Dump	
	54	Crash Crew Fire Training Burn Pit	
7	1	French Creek Liquids Disposal Area	Geographic location of sites. Unique characteristics of suspected waste (O&G, POL, and metals).
	28	Hadnot Point Burn Dump	
	30	Sneads Ferry Road Fuel Tank Sludge Area	
8	16	Former Montford Point Burn Dump	Geographic location of site.
9	65	Engineer Area Dump	Geographic location of site.
10	35	Camp Geiger Fuel Farm	Accelerated cleanup necessary to abate impacts to Brinson Creek.
11	7	Tarrawa Terrace Dump	Geographic location of sites.
	80	Paradise Point Golf Course Maintenance Area	
12	3	Old Creosote Plant	Isolated site with unique waste source.
13	63	Verona Loop Dump	Isolated site with unique waste source.
14	69	Rifle Range Chemical Dump	Isolated site with unique waste source.
15	88	Base Dry Cleaners	Unique characteristic of suspected waste (dry cleaning solvent).
16	89	Former DRMO	Geographic location of sites and adjacent surface water body. Unique characteristic of suspected waste (solvents).
	93	Building TC-942	
17	90	Building BB-9	Former UST sites with similar contamination detected in groundwater.
	91	Building BB-51	
	92	Building BB-46	
18	94	PCX Service Station	Geographic location of site, within Site 78, and similar contaminants adjacent shallow groundwater plume. Former UST site.
19	84	Building 45	Isolated site with unique waste (PCBs, POL).
20	86	Tank Area AS419-AS421 at MCAS	Operable Unit created for Site 86 due to increasing levels of VOCs. Site 86 was originally included under OU 6.
21	73	Amphibious Vehicle Maintenance Facility	Unique characteristic of suspected wastes (POL, solvents).
22	96	Building 1817 UST	Former SWMU 360 transferred from RCRA program based on presence of CVOC contamination in groundwater.

\\aphrodite\proj\USNavFacEngCom\CampLejeune\MapFiles\Five_Year_Review\Figure_1_1_Base_Location_Map.mxd

Legend

Highways

Installation Boundary

N

0 7,500 15,000 30,000 Feet

1 inch = 15,000 feet

Figure 1-1
Base Location Map
Five Year Review
MCB CamLej
North Carolina

CH2MHILL

\\aphrodite\proj\USNavFaceNGCom\CampLejeune\MapFiles\Five_Year_Review\Figure_1_2_OU_and_Sites_Loc_Map.mxd

Legend

- Installation Boundary
- Operable Units
- Sites 2009

N

0 2,500 5,000 10,000 Feet

1 inch = 2,500 feet

Figure 1-2
OU and Site Location Map
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 2

Five-Year Review Process

The Five-Year Review for MCB CamLej was conducted in accordance with the *Comprehensive Five-Year Review Guidance* (USEPA, 2001). Remedy protectiveness for the 16 OUs at MCB CamLej was evaluated through document reviews, site inspections, and community involvement activities as described in the subsections below.

2.1 Document Review

The Five-Year Review consisted of a review of site-specific documentation for each OU. First, the ROD for each OU was reviewed to identify the potential risks to human health and the environment, remedial action objectives (RAOs), selected remedy, and applicable or relevant and appropriate requirements (ARARs). The Remedial Design (RD) was then reviewed to evaluate the design components for the remedy, monitoring requirements, and land use control (LUC) boundaries. To confirm that the remedies were operational and functional in accordance with the RAOs and RD, any Interim Remedial Action Completion Reports (IRACRs) were reviewed. Follow-up monitoring reports; including Land Use Control Implementation Plans (LUCIPs), Long-term Monitoring (LTM) Reports, and O&M Reports; were also reviewed to assess remedy performance and continued protection of human health and the environment. For OUs with Action Memorandums, the associated Work Plan or RD was reviewed followed by the Construction Closeout Report (CCR). If data or information gaps were identified during the action and post-action document review process, previous Administrative Record (AR) documentation were referenced. **Table ES-1** summarizes the data and documents reviewed for each OU.

2.2 Site Inspections

MCB CamLej conducts quarterly site inspections to verify that LUCs such as fencing and signs are still in-place and ensure there are no issues with the Base planning process. The most recent LUC inspection form is included in **Appendix A**.

CH2M HILL conducted an inspection of the Five-Year Review sites on September 3 and 4, 2008 (**Appendix B)**. On October 21, 2008, representatives of the Navy, MCB CamLej, USEPA, and NCDENR conducted an inspection of the Five-Year Review sites. No issues concerning the protectiveness of remedies in-place were noted during the site inspections.

2.3 Community Involvement

The Base has taken a proactive approach to site cleanup by reaching out to the local community through the Restoration Advisory Board (RAB). The RAB was created in 1995 and is made up of members of the community, civic and business organizations, and civilian employees. The RAB meets quarterly, and provides tours, onsite demonstrations of new technologies, and informative talks. The IRP hosts a public web site where information

is posted to enhance information exchange between the Base and community: http://public.lantops-ir.org/sites/public/lejeune/. Access to the website is available at the Onslow County Library. Community relations activities are documented in the AR, maintained by a Naval Facilities Engineering Command (NAVFAC) Public Affairs Officer, at NAVFAC Atlantic, 6506 Hampton Boulevard, Norfolk, Virginia 23508-1278, (757) 322-8005.

Activities to involve the community in the Five-Year Review process were initiated with a notification published in early October 2008 in three local newspapers (*Roto Vue, The Globe,* and *The Jacksonville Daily News*) that announced that the Five-Year Review process was occurring at MCB CamLej. The community was also informed of the initiation of the Five-Year Review at a RAB meeting on October 21, 2008. When the Five-Year Review Report has been finalized, a notice will be sent to these newspapers indicating the results of the review and that the report is available to the public.

As MCB CamLej's mission grew, the Base identified the need to encourage community input and solicited requests for new members. As a result, five new members have joined the RAB. The Base also planned a site tour with the RAB and is updating the Community Involvement Plan (CIP) that includes interviews and requests for new members.

2.4 Interviews

Concurrent with the Five-Year Review, an update to the Community Involvement Plan was initiated. Questionnaires were mailed to the RAB for input and available at the site tour in October 2009. The questionnaires are presented in **Appendix C**. Specific questions related to the Five-Year Review were included in the questionnaire. In-person interviews were conducted with community members in December 2009 and the results will be documented in the Community Involvement Plan in 2010. In general, the overall impression of IRP and remedial actions at MCB CamLej is positive.

SECTION 3

Operable Unit No. 1 (Sites 21, 24, and 78)

3.1 Site History and Background

OU 1 is located within the Hadnot Point Industrial Area (HPIA) on the Mainside of the Base (**Figure 1-2**). OU 1 covers approximately 700 acres and consists of three sites (Sites 21, 24, and 78) that have been grouped together into one OU because of their proximity to one another.

- **Site 21—Transformer Storage Lot 140** covers approximately 10 acres in the northern portion of the HPIA (**Figure 3-1**). From 1950 to 1951, a pit located in the northern portion of Site 21 was used as a drainage receptor for oil from transformers. Surface discharge of transformer oils was also reported. The quantity of oil disposal is unknown. The pit reportedly measured 25 to 30 feet long by 6 feet wide and 8 feet deep. In 1958, a pest control shop was moved from Building 712 (Site 2) to Building 1105, located in the southern portion of Site 21. From 1958 to 1977, Building 1105 was used for pesticide mixing and as a cleaning area for pesticide application equipment. Overland discharge of wastewater generated during cleaning operations was documented. The estimated quantity of wastewater discharged was approximately 350 gallons per week in 1977.
- **Site 24—Industrial Area Fly Ash Dump** encompasses approximately 100 acres in the southeastern portion of the HPIA (**Figure 3-1**). Site 24 was used for the disposal of fly ash, cinders, solvents, used paint stripping compounds, sewage sludge, and water treatment sludge from the late 1940s to 1980s. Sludge from the wastewater treatment plant (WWTP) and sewage treatment plant (STP) were reportedly disposed at this site since the late 1940s. Construction debris was reportedly disposed at the site in the 1960s. During 1972 to 1979, fly ash cinders and used cleaning solvents were dumped on the ground surface. An estimated 31,500 tons of fly ash was disposed at the site and an estimated 45,000 gallons of stripping compounds was disposed over a 7-year period.
- **Site 78—Hadnot Point Industrial Area** covers 590 acres and is divided into Site 78 North and Site 78 South (**Figure 3-1**). The HPIA, constructed in the late 1930's, was the first developed area at MCB CamLej. The HPIA consists of maintenance shops, warehouses, painting shops, printing shops, auto body shops, and other small industrial facilities. Due to the industrial nature of the site, many spills and leaks have occurred over the years. Most of these spills and leaks have consisted of petroleum-related products and solvents from underground storage tanks (USTs) and drums.

3.2 Site Chronology

A site chronology of key events and documents for OU 1 is presented below.

Date	Event
1930s	HPIA developed
1940s-1980s	Disposal of fly ash, cinders, solvents, used paint stripping compounds, sewage sludge, and water treatment sludge at Site 24
1950-1951	Oil from electric transformers was drained into a disposal pit in the northern portion of Site 21
1958-1977	Pesticide mixing and wash down area for equipment at Site 21
Late 1960s	Disposal of construction debris at Site 24
1983	IAS
1984-1987	Confirmation Study (CS)
1990-1991	Supplemental Characterization Study
1992	Interim RI/Interim Feasibility Study (FS)/Interim Proposed Remedial Action Plan (PRAP)/Interim ROD for surficial aquifer
1993-1994	RI/FS
1994	Construction of interim extraction/groundwater treatment system (Site 78 North and Site 78 South)
1994	Final PRAP/ROD for soil and groundwater
1995	Explanation of Significant Differences (ESD)
1995	Excavation of pesticide and polychlorinated biphenyl (PCB)-contaminated soil at Sites 21 and 78
1995	Operation of expanded groundwater treatment system at Site 78 North and South
1995-present	LTM of groundwater at Site 78
1996-1997	LTM of groundwater at Site 24
1997	Notice of Non-significant Changes at Site 78
1999	Optimization Study of Site 78 Treatment Plant
2000	Site 78 South Treatment Plant Shutdown
2001-2002	Natural Attenuation Evaluation (NAE)
2001	LUCs prepared
2002	LUCs updated
2002	Site 78 South Treatment Plant resumes operation
2002	Supplemental Investigation at Site 78
2002	Technology evaluation at Site 78
2003-2005	Oxygen Release Compound® (ORC) and Hydrogen Release Compound® (HRC) Pilot Studies conducted at Site 78
2005	LTM optimization
2007-2009	Basewide Vapor Intrusion Study
2009	HPIA technical evaluation

3.3 Site Characterization

Findings from the investigations conducted at OU 1 are summarized below:

- Organic and inorganic compounds were identified in soil and groundwater at OU 1, specifically:
  - Pesticides and PCBs were detected in soil at Site 21
  - Metals were detected in shallow groundwater at Sites 21 and 24
  - Pesticides were detected in shallow groundwater at Site 24
  - Volatile organic compounds (VOCs) were detected in shallow groundwater at Site 21
  - Fuel and chlorinated VOC shallow groundwater plumes were identified in the vicinity of Building 903 in the northern portion of Site 78 and Building 1601 in the southern portion of Site 78
- Groundwater generally flows to the south-southwest toward Codgels Creek and the New River (**Figure 3-1**)
- Potential ecological risks were identified based on exposure to pesticides and PCBs in soil at Sites 21 and 78
- Potential human health risks were identified for future child and adult residents due to exposure to pesticides in groundwater at Site 24 and VOCs in groundwater at Site 78

3.4 Description of Remedial Actions

An Interim ROD to address shallow groundwater VOC contamination at Site 78 was signed on September 23, 1992 (Baker, 1992). The major components of the interim RA included:

- Two groundwater extraction and treatment systems to prevent migration of the VOC plumes in the shallow groundwater at Site 78 North and Site 78 South
- LUCs to prevent exposure to groundwater

The Final ROD for addressing soil and groundwater OU 1 (Sites 21, 24, and 78) was signed September 15, 1994 (Baker, 1994b). The RAOs were to:

- Prevent current and future exposure to contaminated soil and groundwater
- Prevent further migration of contaminants and remediate groundwater for future use of the aquifer
- Remove contaminated soils at Sites 21 and 78

An ESD was issued in 1995 to revise the cleanup level for PCBs to the Federal PCB action level for industrial sites due to the industrial nature of site activities (Baker, 1995b).

The Selected Remedy includes the following major components:

- Excavation and offsite disposal of pesticide and PCB-contaminated soil at Sites 21 and 78 to achieve industrial cleanup levels.
- Continuation and expansion of the groundwater extraction/treatment systems at Site 78 North and Site 78 South.
- LTM to monitor plume migration at Sites 24 and 78 and evaluate the effectiveness of the treatment system at Site 78. Groundwater contamination at Site 21 was determined to be related to Site 78 due to its location within Site 78; therefore, groundwater at Site 21 is addressed through LTM for Site 78.
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base geographical information system (GIS) and with Base Master Planning, and inspections). The LUC objectives are to:
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, from the aquifers (surficial and Castle Hayne) within 1,000 feet of the estimated impacted groundwater extent.
  - Prohibit use of water supply wells in the vicinity of OU 1 as well as the installation of new supply wells.
  - Prohibit intrusive activities within the vicinity of the estimated impacted groundwater extent.
  - Prohibit non-industrial land use within the extent of the former soil removal at Sites 21 and 78 which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities.

The cleanup levels for soil and groundwater are summarized in **Table 3-1**.

3.4.1 Remedy Implementation

Construction of the extraction and treatment system was completed in December 1994 and the expansion of the treatment systems was completed in 1995. The soil excavation to remove pesticide and PCB-contaminated soils at Sites 21 and 78 was completed in 1995 (OHM, 1996a). LTM began in 1995 at Site 78 and in 1996 at Site 24. In July 1997, a Notice of Non-significant Changes was submitted, which identified ROD changes including removal of heptachlor epoxide, metals, total suspended solids (TSS), total dissolved solids (TDS), and oil and grease (O&G) from the LTM Program (USMC, 1997). LTM at Site 24 was discontinued in December 1997 after evaluating the analytical results collected over four consecutive quarters that indicated no pesticides or metals concentrations in groundwater exceeded the cleanup levels. In 2001, the LTM Report documented the completion of LTM at Site 24. LUCs for OU 1 were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

3.4.2 Remedy Operation and Maintenance

The groundwater extraction and treatment systems at Site 78 North and South have been in operation since 1995 (**Figure 3-1**). The systems were originally designed to include 15 shallow recovery wells. Several recovery wells have been taken offline based on low concentrations and for pilot testing. Currently, the Site 78 South groundwater extraction and treatment system consists of eight recovery wells, five of which are operational (IR78-RW5, IR78-RW6, IR78-RW8, IR78-RW13, and IR78-RW14) and the Site 78 North groundwater extraction and treatment system consists of seven recovery wells, three of which are operational (IR78-RW10, IR78-RW11, and IR78-RW12). Groundwater recovery wells are constructed with 6-inch-diameter stainless steel and installed to a depth of roughly 35 feet below ground surface (bgs), and screened from 10 to 35 feet bgs. Rhea has operated and maintained both treatment systems since 2007. The treatment system discharges effluent into the sanitary sewer which is connected to the Hadnot Point STP. Over the past 10 years, the mass removal for the Site 78 North plant has been less than approximately 120 pounds total and the Site 78 South plant has been less than approximately 80 pounds total.

LTM at Site 78 was implemented in 1995. Thirty-nine monitoring wells and 10 recovery wells are sampled and analyzed for VOCs (**Figure 3-1**). Water quality parameters (temperature, pH, conductivity, dissolved oxygen [DO], oxidation-reduction potential [ORP], and turbidity) and groundwater elevations are measured prior to LTM. The results of LTM at OU 1 as well as recommendations have been documented in annual LTM Reports (AGVIQ-CH2M HILL, 2009).

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 3-1**. A visual inspection of OU 1 was conducted in September 2008 to evaluate the treatment system, LUCs, and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

3.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. Since the last Five-Year Review, LTM and LUCs have continued, a Pilot Study was conducted (Baker, 2005b), an LTM Optimization Evaluation and a Basewide Vapor Intrusion Evaluation were conducted, and a technical evaluation of the HPIA was completed.

A Pilot Study was initiated in 2003 that included injection of ORC into groundwater at locations with vinyl chloride (VC) concentrations higher than 1,000 micrograms per liter (µg/L) at Site 78 North and the injection of HRC, into groundwater at locations with trichloroethene (TCE) concentrations greater than 1,000 µg/L at Site 78 South (**Figure 3-1**). As a result of the Pilot Study (Baker, 2005), concentrations of VC in groundwater at Site 78 North were reduced by 25 to 50 percent and concentrations of TCE in groundwater at Site 78 South were reduced by an order of magnitude in the majority of wells.

Initial LTM at Site 78 consisted of 54 monitoring wells and 11 recovery wells sampled for VOCs and natural attenuation indicator parameters (NAIPs) collected twice a year. In September 2005, an LTM Optimization Report (CH2M HILL, 2005) was completed to

identify potential efficiencies for the LTM Program. The recommendations included the following:

- Site 78 North
  - Reduce the sampling locations from 21 to 15 wells
  - Analyze samples for Target Compound List (TCL) VOCs only
  - Reduce the sampling frequency to an annual basis for 14 of the 15 groundwater monitoring wells
  - Increase the sampling frequency to a quarterly basis at monitoring well IR78-GW23
- Site 78 South
  - Reduce the sampling locations from 44 to 34 wells
  - Analyze samples for TCL VOCs only
  - Reduce the sampling frequency to an annual basis for 30 of the 34 wells sampled
  - Increase the sampling frequency to a quarterly basis for four wells (IR78-GW42, IR78-GW53, IR78-GW60, and IR78-GW78)

Four VOCs (benzene, TCE, cis-1,2-dichloroethene [cis-1,2-DCE], and VC) at Site 78 North and eight VOCs (tetrachloroethene [PCE], TCE, cis-1-2-DCE, benzene, toluene, ethylbenzene, xylene, and VC) at Site 78 South have been consistently detected in groundwater above their respective North Carolina Groundwater Quality Standards (NCGWQS). Overall, VOC concentrations are stable or slightly decreasing as shown in **Figures 3-2 through 3-4** (AGVIQ/CH2M HILL, 2009) for Site 78 North and similar trends are occurring at Site 78 South. The highest levels of VOCs continue to be found in shallow groundwater and no vertical migration is apparent.

A Basewide Vapor Intrusion Study was conducted from 2007 through 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings (CH2M HILL, 2009k). Multiple locations across the Base were selected for evaluation, including HPIA. The investigation within HPIA included buildings at Site 78 North and Site 78 South and groundwater grab samples, soil gas samples, and subslab soil gas samples were collected for VOC analysis. No risks were identified from indoor air related to vapor intrusion; therefore, it was concluded that vapor intrusion is not a current significant pathway of concern for any of the buildings located in the vicinity of Site 78. Mitigation measures are currently in-place at Building 1101 based on UST-related contamination. The Report (CH2M HILL, 2009k) recommended additional sampling for temporal and spatial variability and/or evaluation of preferential pathways at Buildings 901, 902, and 903 at Site 78 North and Buildings 1502, 1601, 1606, 1611, 1613, 1603, 1707, 1817, and 1819 at Site 78 South. The follow-up sampling was conducted and the report will be completed in 2010.

An extensive Groundwater Investigation was conducted across the HPIA in 2009 through 2010 to assess the current chlorinated VOC and petroleum hydrocarbon impacts and identify any data gaps. Results indicate chlorinated VOCs detected in the vicinity of the Hadnot Point Fuel Farm (HPFF), outside of the current LUC boundaries for groundwater.

Further evaluation of the LUC extent within OU 1 is recommended. A report of findings is planned for submittal in 2010.

Evaluation of the Site 78 North and South groundwater extraction and treatment systems indicate historical contaminant concentration trends that have asymptotically leveled over time. Rhea is currently preparing a report for submittal in 2010 to further evaluate the treatment plant and systems to provide recommendations to increase efficiency.

3.5 Technical Assessment

Is the remedy functioning as designed?

Evaluations are ongoing in 2010 to confirm that the remedy is functioning as designed. Recent data indicates potential groundwater VOC migration outside of the current LUC boundaries and inefficiencies in the groundwater extraction and treatment systems resulting in limited recovery of contaminant mass.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels for groundwater were identified as the more conservative of the Federal Maximum Contaminant Levels (MCLs) or NCGWQS at the time the ROD was signed. Since that time, the standards for one pesticide (heptachlor epoxide) and one VOC (toluene) have been updated and are more conservative as listed in **Table 3-1**. LTM for pesticides was discontinued previously based on the cleanup levels identified in the ROD and LTM for metals was discontinued based on the Notice of Non-Significant Change (USMC, 1997). In addition, several VOC constituents (**Table 3-1**), including daughter products, that were not included in the ROD have exceeded current cleanup levels and several VOCs now have higher cleanup levels.

The cleanup levels for pesticides in soil were identified as the USEPA Region III risk-based concentrations (RBCs) for industrial soil. The confirmation soil sample results documenting the removal of the pesticide and PCB-contaminated soil indicate that the cleanup levels identified in the ROD were met (OHM, 1996a). Although the recent USEPA risk-based screening levels (RSLs) for industrial soil for DDD and DDT are more conservative (**Table 3-1**), the area was restored with clean fill following the removal action, and LUCs for non-industrial use remain in-place and are protective.

Has any other information come to light that could question the protectiveness of the remedy?

Recent data indicates potential groundwater VOC migration outside of the current LUC boundaries.

3.6 Issues, Recommendations, and Follow-up Actions

Cleanup Levels

LTM for pesticides was discontinued previously based on the cleanup levels identified in the ROD. When comparing the historical groundwater LTM data to the current cleanup levels in **Table 3-1**, there were no exceedances.

LTM for metals was discontinued previously and documented in the Notice of Non-Significant Change (USMC, 1997). The cleanup levels for metals have changed since 1997 and an expanded background study is currently being conducted to provide more representative, seasonal metals data for comparison. Groundwater monitoring for metals at OU 1 is recommended and the results should be compared to background concentrations to evaluate whether the metals are site-related or attributable to background. If the metals concentrations in groundwater are determined to be site-related, an evaluation of potential risks should be conducted. If needed, COCs should be added to the LTM Program, additional LUCs evaluated, and an ESD prepared.

Long-term Monitoring

Currently, LTM data is compared to the cleanup levels identified in the ROD, NCGWQS, and Federal MCLs. It is recommended that the cleanup levels be amended to reflect the most current and conservative of either the NCGWQS or Federal MCLs as shown in **Table 3-1**. In addition, eight VOC constituents (**Table 3-1**), including daughter products, that were not included in the ROD have exceeded NCGWQS during the previous four sampling rounds. It is recommended that these constituents continue to be monitored during LTM events until four consecutive sampling events indicate the concentrations are below their respective cleanup levels.

An analysis of the LTM Program was conducted in 2009 (**Appendix D**) to provide optimization recommendations based on the current data. The recommendations for Site 78 are:

- Site 78 North
  - Sample all monitoring locations on an annual basis using PDBs
  - Remove monitoring wells IR78-GW23, IR78-GW24-3, IR78-GW25, IR78-GW40, and IR78-GW45 from the LTM Program
  - Install four new monitoring wells: two shallow- and two intermediate-depth wells
- Site 78 South
  - Sample all monitoring locations on an annual basis using PDBs
  - Remove monitoring wells IR78-GW01, IR78-GW05, IR78-GW08, IR78-GW09-1, IR78-GW39, IR78-GW51, IR78-GW58, and IR78-GW78 from the LTM Program
  - Confirm downgradient delineation of VC at IR78-GW64

Additionally, because LTM is ongoing and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey in 2010. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

Land Use Controls

Results for the HPIA technical evaluation indicted chlorinated VOCs detected in the vicinity of the HPFF, outside of the current LUC boundaries for groundwater. Further evaluation of the LUC extent within OU 1 is recommended.

Military construction (MILCON) is planned and ongoing in HPIA, including areas within the Site 78 South LUC boundary for groundwater intrusive activities. When intrusive activities are planned that will encounter groundwater, the USEPA and NCDENR will be notified of the activity per the LUCIP (Baker, 2002a) and prior concurrence will be obtained.

Groundwater Extraction and Treatment Systems

As part of the HPIA technical evaluation, evaluation of the Site 78 North and South groundwater extraction and treatment systems indicate historical contaminant concentration trends that have asymptotically leveled over time. Asymptotic leveling demonstrates a decreasing effectiveness to remove contaminant mass from the impacted groundwater. Rhea is currently preparing a report for submittal in 2010 to further evaluate the treatment plant and systems to provide recommendations to increase efficiency.

Vapor Intrusion

Although no current significant pathway of concern for vapor intrusion was identified based on the results of the Basewide Vapor Intrusion Evaluation (CH2M HILL, 2009k), additional evaluation to assess temporal and spatial variability and preferential pathways was conducted and will be reported in 2010. If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Cleanup levels have changed since the ROD	Y	Y	Collect groundwater metals data for comparison to determine if site-related or attributable to background. If determined site-related, evaluate risks, add metals as COCs to LTM Program, evaluate LUCs, and prepare an ESD. Update groundwater COCs and cleanup levels to reflect recent standards.	Navy	EPA/State	2013 2012	Y	Y
LUCs do not encompass extent of contamination	Y	Y	Revise the LUC boundary for Site 78 to encompass extent of contaminated groundwater.	Navy	EPA/State	2013	Y	Y

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
LTM program does not encompass extent of contaminated groundwater	N	Y	Monitor for potential downgradient migration at Site 78 South and north of Holcomb Boulevard. Assess vertical extent of benzene at IR78-GW04-2.	Navy	EPA/State	2012	Y	Y
Groundwater extraction and treatment system is asymptotic	N	Y	Evaluate recovery well efficiency and groundwater capture zones and make repairs or changes to optimize mass removal. Evaluate alternative treatment technologies.	Navy	EPA/State	2011 2015	Y	Y
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

3.7 Statement of Protectiveness

The remedies for soil at OU 1 are protective of human health and the environment because exposure pathways that could result in unacceptable risk are being controlled and LUCs preventing exposure are in place.

The remedies for VOCs in groundwater at OU 1 are protective of human health and the environment in the short-term because LUCs are in place and Base Master Planning maintains current groundwater plume data in GIS and therefore there is no current or potential exposure. However, in order for the remedy to be protective in the long-term, the treatment plants and systems should be optimized to increase their efficiencies in removing contaminated mass.

Table 3-1
Cleanup Levels for OU 1 (Sites 21, 24, and 78)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1994)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Benzene	1	1	NCGWQS
	1,2-Dibromoethane	--	0.02	NCGWQS
	1,1-Dichloroethane	--	6	NCGWQS
	1,2-Dichloroethane	--	0.4	NCGWQS
	1,1-Dichloroethene	--	7	NCGWQS/MCL
	1,2-Dichloroethene	70	70	MCL
	cis-1,2-Dichloroethene	--	70	NCGWQS/MCL
	trans-1,2-Dichloroethene	--	100	NCGWQS/MCL
	Ethylbenzene	29	600	NCGWQS
	Isopropylbenzene	--	70	NCGWQS
	1,1,2,2-Tetrachloroethane	--	0.2	NCGWQS
	Tetrachloroethene	0.7	0.7	NCGWQS
	Toluene	1,000	600	NCGWQS
	Trichloroethene	2.8	3	NCGWQS
	Vinyl chloride	0.015	0.03	NCGWQS
	Xylenes (total)	400	500	NCGWQS
	Pesticides			
	Heptachlor epoxide	0.2	0.004	NCGWQS
	Metals[1]			
	Arsenic	50	10	NCGWQS/MCL
	Barium	1,000	700	NCGWQS
	Beryllium	4	4	MCL
	Chromium	50	10	NCGWQS
	Manganese	50	50	NCGWQS
	Vanadium	110	18	RSL-Tapwater
Soil (μg/kg)	**PCBs**	10,000	10,000	Action Level for Low Occupancy Land Use (USEPA, 1990)
	Pesticides			
	4,4-DDD	12,000	7,200	RSL-Industrial Soil
	4,4-DDT	8,400	7,000	RSL-Industrial Soil
	Chlordane (total)	2,200	6,500	RSL-Industrial Soil

Notes:
[1]Metals, TDS, and TSS were removed as COCs from the ROD and LTM Program (USMC, 1997)
-- COC identified post-ROD based on exceedances of current cleanup levels during LTM
Cleanup levels achieved/remain protective

\\APHRODITE\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\FIVE_YEAR_REVIEW\Figure_3_1_OU_1_Sites_21_24_and_78.mxd

Legend

- LTM Monitoring Wells
- Direction of Groundwater Flow
- IR 78 Extraction Treatment System
- Operable Unit 1
- Aquifer Use Control Boundary (1000 ft)
- Non-Industrial Use Control Boundary
- Intrusive Activites Control Boundary (Groundwater)
- ORC and HRC Pilot Study (2003)

N

0 600 1,200 2,400 Feet

1 inch = 1,200 feet

Figure 3-1
OU 1 (Sites 21, 24, and 78)
Five-Year Review
MCB CamLej

CH2MHILL

Figure 3-2
Northern Site 78 - TCE vs. Time
2008 Long-Term Monitoring Report
MCBCamLej, North Carolina

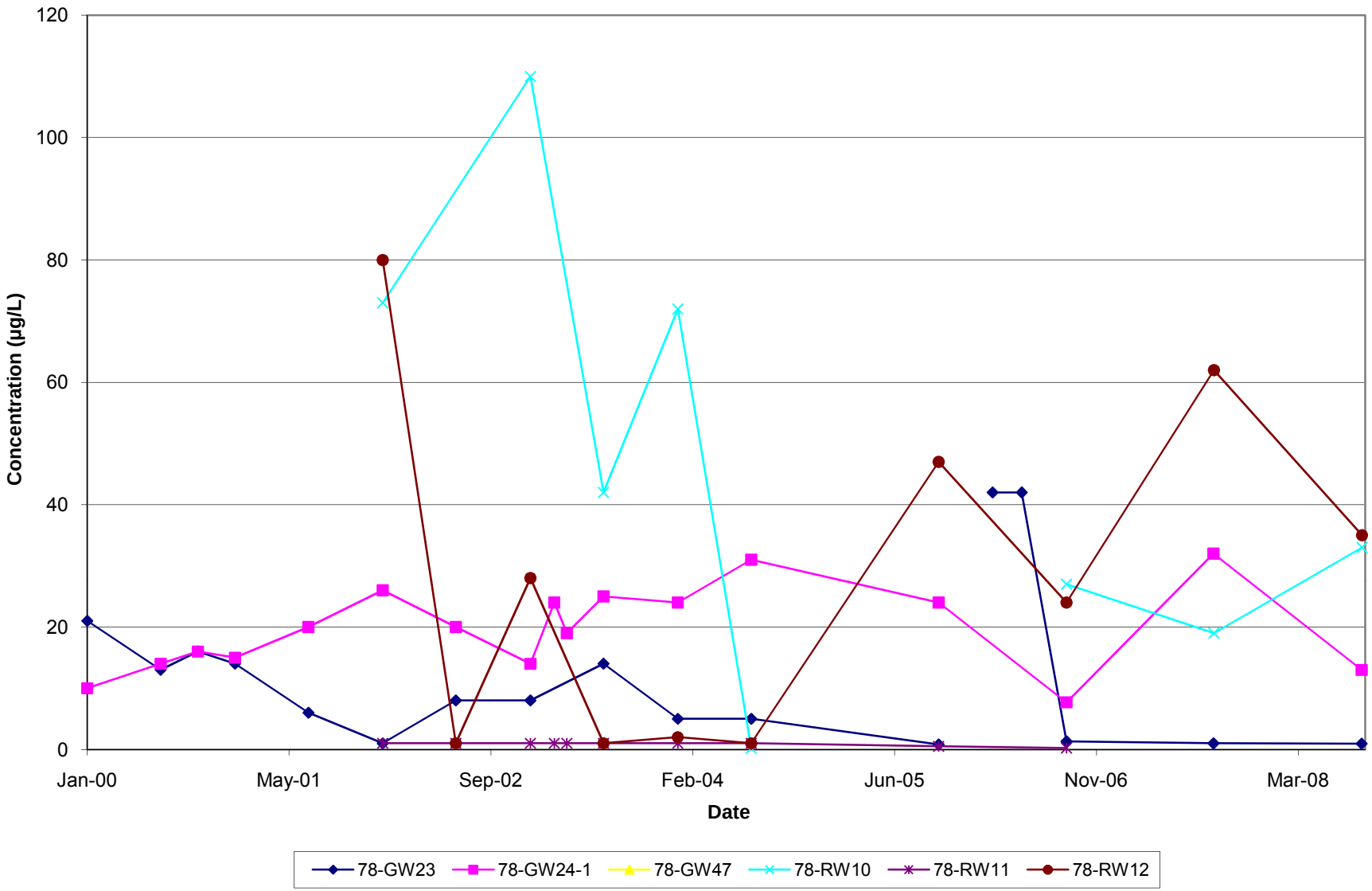


Figure 3-3
Northern Site 78 - cis-1,2-DCE vs. Time
2008 Long-Term Monitoring Report
MCB CamLej, North Carolina

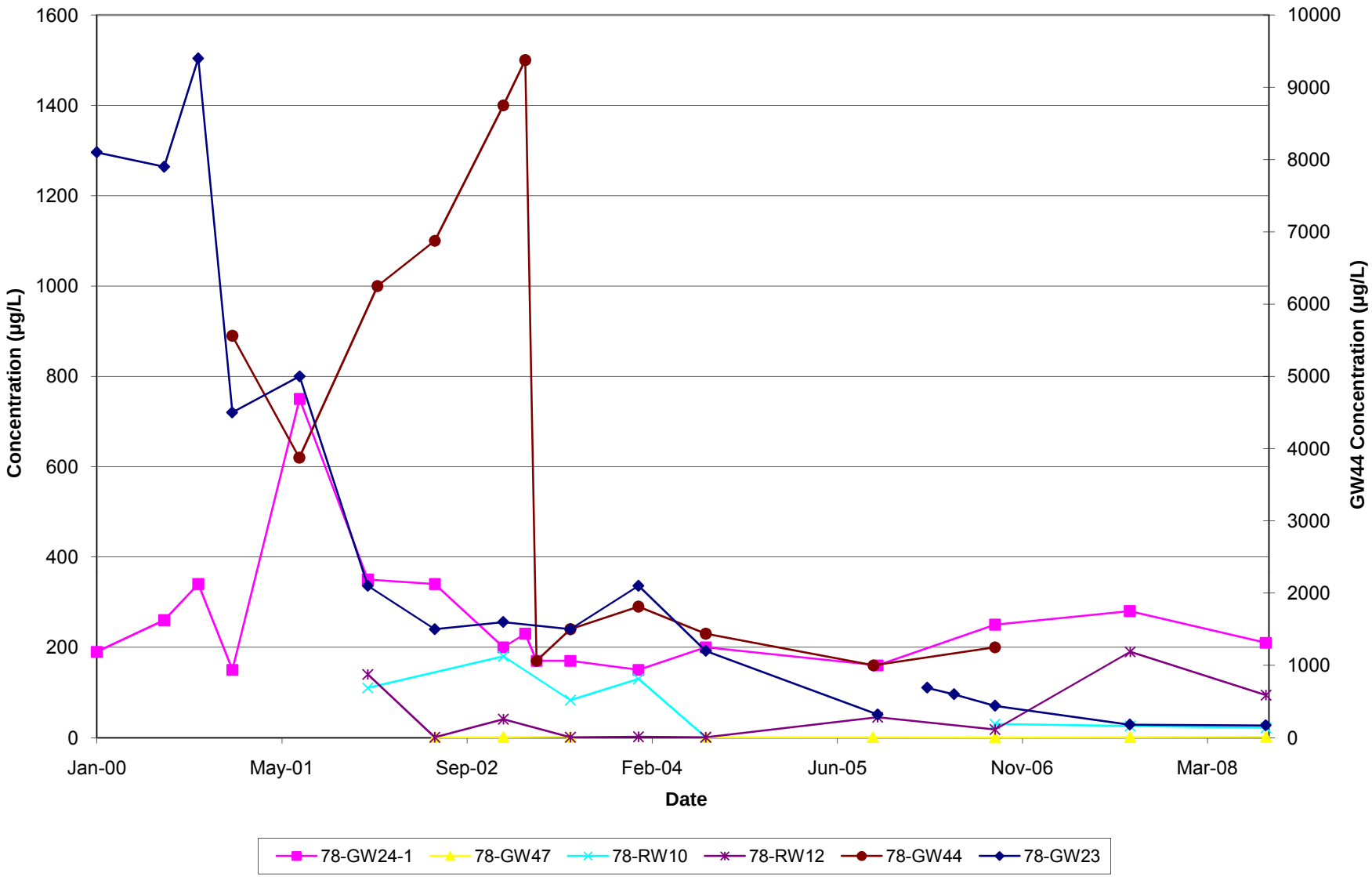
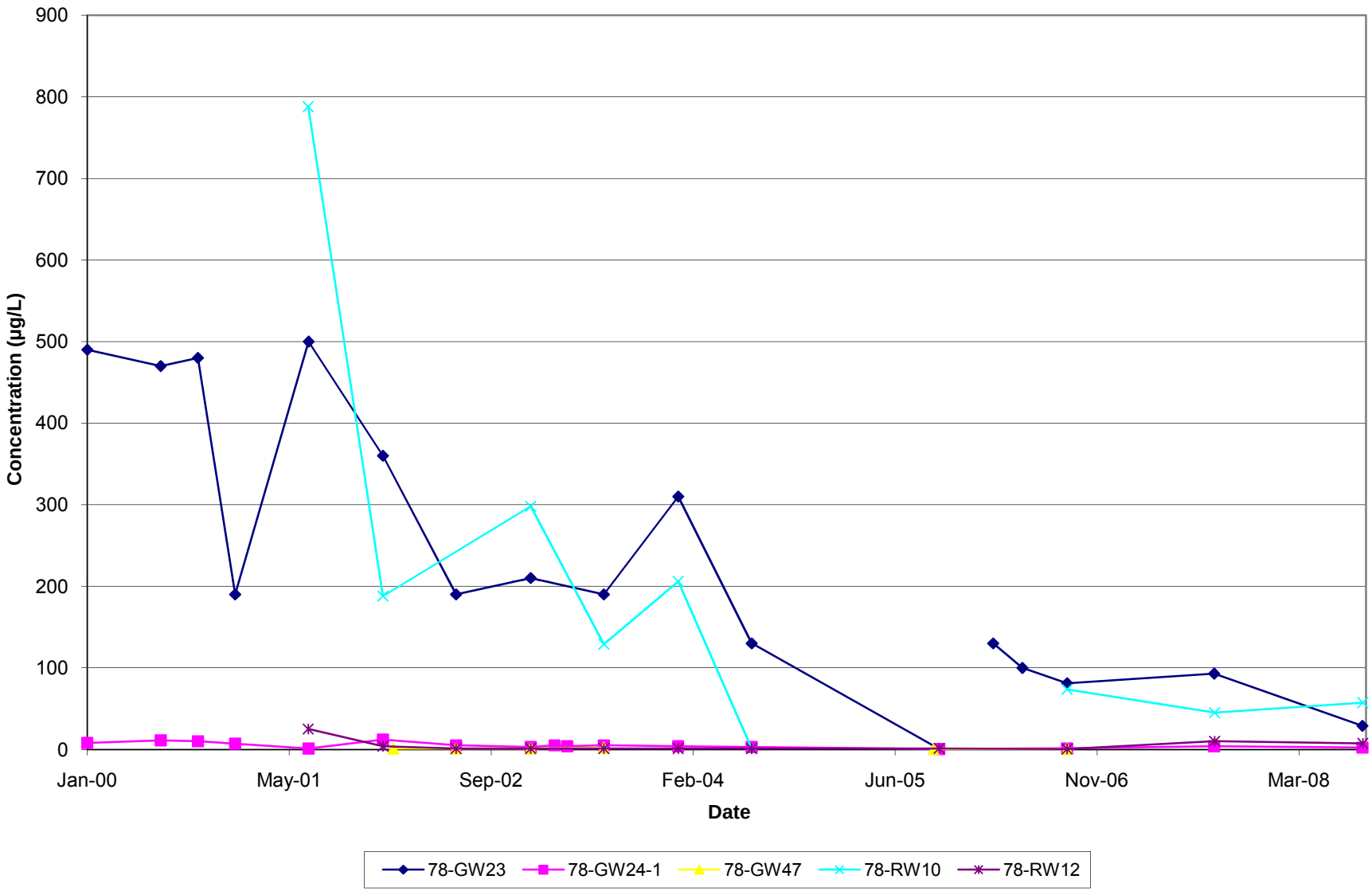


Figure 3-4
Northern Site 78 - VC vs. Time
2008 Long-Term Monitoring Report
MCB CamLej, North Carolina



SECTION 4

Operable Unit No. 2 (Sites 6, 9, and 82)

4.1 Site History and Background

OU 2 is located along Piney Green Road on the Mainside of the Base (**Figure 1-2**). OU 2 covers approximately 210 acres and consists of three sites (Sites 6, 9, and 82) that have been grouped together because of their proximity to one another:

- **Site 6—Lots 201 and 203** covers an area of approximately 177 acres, including a wooded area between the storage lots, and a ravine. From the 1940s to the late 1980s, Site 6 (**Figure 4-1**) was used for disposal and storage of wastes and supplies, including pesticides, transformers containing PCBs, solvents, electrolytes, and waste oils. Currently, Lot 201 is used to store military equipment, vehicles, hydraulic oils, and other "non-hazardous" supplies. Most of Lot 203 remains an open field; 21 acres are temporarily being used by the Defense Reutilization and Marketing Office (DRMO) for metal staging operations.

- **Site 9—Fire Fighting Training Pit at Piney Green Road** encompasses 2.6 acres (**Figure 4-1**). From the early 1960s to 1981, training exercises were conducted in an 800 square foot (ft^2) unlined fire training pit, located in the southern area of the site. In 1981 the pit was lined with asphalt and an oil-water separator (OWS) was installed next to the pit; and in 2002 the pit was lined with concrete. Flammable liquids including solvents, used oil, and contaminated fuels were used as accelerants during the training exercises. In addition, approximately 30,000 to 40,000 gallons of JP-4 and JP-5 fuels were burned in the training pit. Four 500-gallon aboveground storage tanks (ASTs) were located near the training area but are no longer present. The site is still currently used as a fire training facility with a concrete-lined pit.

- **Site 82—Piney Green VOC Area** encompasses approximately 30 acres and is predominantly covered by woodlands (**Figure 4-1**). Before the late 1980s, much of the site was reportedly used for storage, disposal, and handling of potentially hazardous waste and material. Site 82 was identified during the CS at Site 6 in 1986, when Site 82 was randomly littered with debris including spent ammunition casings, and empty or rusted drums. Some of the drums were marked as "lubrication oil" and "anti-freeze."

4.2 Site Chronology

A site chronology of key events and documents for OU 2 is presented below.

Date	Event
1940s-1980s	Pesticides, transformers containing PCBs, and various chemicals were stored at Site 6
1960s–present	Firefighting exercises conducted at Site 9
1983	IAS
1984-1987	CS at Sites 6 and 9, Site 82 was identified
1989	Soil gas survey at Site 6, Lot 203
1991	SI conducted at Site 82
1992-1993	RI/FS
1993	FS, PRAP, and ROD
1994	Time-critical Removal Action (TCRA) to remove 20 drums of 4,4'-dichlorodiphenyl-trichloroethane (4,4'-DDT) and excavate contaminated soil at Sites 6 and 82
1995	TCRA conducted to remove empty drums, batteries, debris, and petroleum, oil, and lubricant (POL)-contaminated soil at Site 6
1996	Soil vapor extraction (SVE) conducted at Site 82
1996-present	Groundwater extraction and treatment system in operation at Site 82
1997-present	LTM for groundwater, surface water, and sediment performed at Sites 6 and 82
2000	POL-contaminated soil removed from Site 9 during construction of a new Fire Training Pit
2001	LUCs prepared for Sites 6 and 82
2002	LUCs updated for Sites 6 and 82
2004-present	Focused Groundwater Investigation of chlorobenzene at Site 6
2007	Groundwater Pilot Study at Site 82
2008-present	Supplemental Source Investigation at Sites 6 and 82

4.3 Site Characterization

Findings from the OU 2 investigations are summarized below:

- Organic and inorganic compounds were identified in soil, groundwater, surface water, and sediment at OU 2, specifically:
  - Pesticides, PCBs, and metals were detected in soil from Sites 6 and 82
  - VOCs and metals were detected in shallow groundwater at Site 6
  - VOCs were detected in shallow and deep groundwater at Site 82

  - Chlorinated VOCs in groundwater have been detected as deep as 240 feet bgs
  - VOCs were detected in surface water collected from Wallace Creek
  - Polynuclear aromatic hydrocarbons (PAHs) were detected in sediment at Wallace Creek and pesticides were detected in sediment from Bear Head Creek
- Generally, groundwater flow in both the surficial aquifer and Castle Hayne Aquifer has been to the northwest toward Wallace Creek. On the north side of Wallace Creek, groundwater flow in the Castle Hayne Aquifer has been to the southeast toward the creek (**Figure 4-1**)
- Soil and groundwater samples collected during the RI did not reveal extensive contamination at Site 9 and no potential sources of contamination were identified.
- Potential adverse ecological impacts were identified for Wallace Creek and Bear Head Creek.
- Potential human health risks were identified for current base personnel and future site construction workers and residents due to exposure to contaminated soil and groundwater at Sites 6 and 82.

4.4 Description of Remedial Actions

The ROD for addressing soil and groundwater at OU 2 (Sites 6 and 82) was signed in September 1993 (Baker, 1993). The RAOs were:

- Prevent current and future exposure to contaminated soil and groundwater.
- Remediate groundwater for future use of the aquifer.
- Treat and remove contaminated soil.

The Selected Remedy includes the following major components:

- Excavation and offsite disposal of PCB- and pesticide-contaminated soil at Site 6 and portions of Site 82 to achieve industrial cleanup levels.
- SVE system to address vadose zone VOC contamination at Site 82.
- Groundwater extraction and treatment system to address VOC contamination in the surficial and Castle Hayne Aquifers at Sites 6 and 82.
- LTM to evaluate the effectiveness of the treatment system at Sites 6 and 82 and to monitor plume migration.
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The objectives of the LUCs are to:
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, from the aquifers (surficial and Castle Hayne) within 1,000 feet of the estimated impacted groundwater extent.

- Prohibit use of water supply wells in the vicinity of OU 2 as well as the installation of new supply wells.
- Prohibit intrusive activities within the vicinity of the estimated impacted groundwater extent.
- Prohibit soil intrusive activities and non-industrial land use within the extent of the former soil removal which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities.

No unacceptable risks were identified at Site 9; therefore, no remedial actions were required in the ROD. The cleanup levels for soil and groundwater at Sites 6 and 82 are summarized in **Table 4-1**.

4.4.1 Remedy Implementation

The soil excavation to remove pesticide- and PCB-contaminated soil at Sites 6 and 82 was completed in 1994 and 1995. The SVE system at Site 82 operated for 6 months in 1996 to remediate residual VOC contamination in the vadose zone. The groundwater extraction and treatment system began full-scale operation in July 1996. LTM at Sites 6 and 82 began in 1997. Initial LTM included analysis of metals in groundwater. Early LTM Reports recommended removing metals from the program because there was no historical evidence of metal disposal at OU 2 and the cleanup levels were consistent with natural background concentrations. LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

4.4.2 Remedy Operation and Maintenance

The groundwater extraction and treatment system at OU 2 began operation in 1996 (**Figure 4-1**). The system consists of six shallow (SRW-1 through SRW-6) and four deep (DRW-1 through DRW-4) recovery wells. Groundwater is piped to an onsite treatment plant and discharged to Wallace Creek. Rhea has operated and maintained the treatment system since 2007.

LTM at OU 2 was implemented in 1997. Five shallow and three deep monitoring wells are sampled at Site 6 (**Figure 4-1**). Nine shallow and 10 deep monitoring wells and nine recovery wells are sampled at Site 82 (**Figure 4-1**). Although the ROD did not specify remedial actions for surface water or sediment, for conservativeness, three surface water and sediment samples are collected from Wallace Creek. All samples are analyzed for VOCs. Water quality parameters for groundwater and surface water (temperature, pH, conductivity, DO, ORP, and turbidity) are measured prior to the start of sampling activities. Groundwater elevations are measured prior to LTM. The results of LTM at OU 2 as well as recommendations are documented in Annual LTM Reports. Initial LTM included analysis of metals in groundwater. Early LTM Reports recommended removing metals from the program because there was no historical evidence of metal disposal at OU 2 and the cleanup levels were consistent with natural background concentrations.

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 4-1**. A visual inspection of OU 2 was conducted in

September 2008 to evaluate the treatment system, LUCs, and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

4.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. Since the last Five-Year Review, LTM and LUCs have continued, an LTM Optimization Evaluation, a Pilot Study, and a Basewide Vapor Intrusion Evaluation were conducted, and a Supplemental Source Investigation was initiated.

Initial LTM at OU 2 consisted of 30 monitoring wells and 10 recovery wells for VOCs and NAIPs analysis twice a year. In September 2005, an LTM Optimization Report (CH2M HILL, 2005) was completed to identify potential efficiencies for the LTM Program. The recommendations included the following:

- Reduce sample locations from nine to eight wells at Site 6
- Reduce sampling frequency from twice a year to annually at Site 6
- Reduce sample locations from 21 to 20 wells at Site 82
- Reduce the sampling frequency for 28 wells at Site 82 to annual sampling and continue quarterly sampling of two of the wells (IR06-GW33 and IR06-GW28DW)
- Analyze samples for TCL VOCs only

One VOC (chlorobenzene) at Site 6 and eight VOCs (1,1,2,2-tetrachloroethane [1,1,2,2-PCA], PCE, TCE, 1,1-DCE, benzene, cis-1,2-DCE, trans-1,2-DCE, and VC) at Site 82 have consistently been detected above their respective NCGWQS. At Site 6, chlorobenzene has been detected in one shallow monitoring well and the concentration has been variable. At Site 82, the highest concentrations are consistently found in the deep zone of the Castle Hayne Aquifer in wells screened between 90 and 110 feet bgs. The VOC concentrations in the shallow groundwater at Site 82 have been stable as shown in **Figure 4-2** (AGVIQ/ CH2M HILL, 2009). The overall trends indicate the groundwater treatment system is effectively decreasing VOC concentrations in the deep aquifer as shown in **Figures 4-3 through 4-5** (AGVIQ/CH2M HILL, 2009). No VOCs have been detected in surface water or sediment above screening criteria.

In February 2007, a Groundwater Pilot Study was initiated at Site 82 to evaluate the performance of enhanced reductive dechlorination (ERD) via emulsified vegetable oil (EVO) and lactate injection to determine whether it is a viable alternative to supplement, enhance, or replace the current groundwater extraction and treatment system. The location of the Pilot Study was based on historical data representing a source area (**Figure 4-1**); however, after the treatment system was turned off to implement the study, higher concentrations were identified elsewhere. Although the location of the Pilot Study was not optimal, the study demonstrated that ERD is a viable remedial technology for contaminant mass removal at Site 82 (CH2M HILL, 2008g).

A Basewide Vapor Intrusion Study was conducted from 2007 through 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings. At OU 2, no buildings were identified within 100 feet of a monitoring well containing VOC concentrations above NCGWQS.

In 2008, Supplemental Site Investigations (SSIs) were initiated at Sites 6 and 82. The purpose of the investigations was to identify the potential source of chlorobenzene contamination and delineate the extent in groundwater at Site 6 and to identify additional potential sources of chlorinated VOC contamination in groundwater at Site 82. During vegetation clearing activities, munitions debris (MD) was discovered and an Explosives Safety Submission (ESS) was submitted to remove and dispose of the MD. An ESS Amendment was also submitted for OU 2 to complete the SSI. A geophysical survey, monitoring well installation, groundwater sampling, and test pitting will be completed in 2010. During recent IRP Partnering Team discussions for Site 82, it was noted that metals analysis is not currently included in the LTM program but metals are monitored at the plant effluent per the ROD.

4.5 Technical Assessment

Is the remedy functioning as designed?

Yes. Based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 2 remedy is functioning as designed. The results from the 2008 Annual LTM Report (AGVIQ/CH2M HILL, 2009) indicate that, overall, the VOC concentrations appear to be stable or decreasing and offsite migration has not occurred. LUCs remain in-place to restrict non-industrial land use, prohibit intrusive activities for soil and groundwater, and restrict aquifer use.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels for groundwater were identified as the more conservative of the Federal MCLs or NCGWQS at the time the ROD was signed. Since that time, the standards for metals have been updated and are more conservative as listed in **Table 4-1**. LTM for metals was discontinued previously because there was no historical evidence of metal disposal at OU 2 and the cleanup levels were consistent with natural background concentrations. In addition, several VOC constituents (**Table 4-1**), including daughter products, that were not included in the ROD have exceeded current cleanup levels during the previous four sampling rounds and several VOCs now have higher cleanup levels.

The cleanup levels for VOCs, pesticides, and metals in soil were identified as risk-based levels calculated in the ROD. The confirmation soil sample results documenting the removal of contaminated soil indicate that the cleanup levels identified in the ROD were met (OHM, 1996). Although the recent USEPA RSLs for industrial soil for DDT and arsenic are more conservative (**Table 4-1**), the area was restored with clean fill following the removal action, and LUCs for non-industrial use remain in-place and are protective.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

4.6 Issues, Recommendations, and Follow-up Actions

Supplemental Investigation

Chlorobenzene concentrations at Site 6 continue to fluctuate in monitoring well IR06-MW16 and the source area has not been identified. In addition, data indicates the source areas of PCA and TCE contamination at Site 82 have not been defined. The supplemental source area investigations will be completed in 2010. Because MD was discovered and remains on-site, the OU 2 area will also be investigated under the Military Munitions Response Program (MMRP) as UXO-22.

Cleanup Levels

LTM for metals was discontinued previously but not documented in an ESD. The cleanup levels for metals have changed since the ROD and a supplemental investigation and expanded background study is currently being conducted to provide more representative, seasonal metals data for comparison. Groundwater monitoring for metals at OU 2 is recommended and the results should be compared to background concentrations to evaluate whether the metals are site-related or attributable to background. If the metals concentrations in groundwater are determined to be site-related, an evaluation of potential risks should be conducted. If needed, COCs should be added to the LTM Program, additional LUCs evaluated, and an ESD prepared.

LTM

Currently, LTM data is compared to the cleanup levels identified in the ROD, NCGWQS, and Federal MCLs. It is recommended that the cleanup levels be amended to reflect the most current and conservative of either the NCGWQS or Federal MCLs as shown in **Table 4-1**. In addition, seven VOC constituents (**Table 4-1**), including daughter products, that were not included in the ROD have exceeded NCGWQS during the previous four sampling rounds. It is recommended that these constituents continue to be monitored during LTM events until four consecutive sampling events indicate the concentrations are below their respective cleanup level. An analysis of the LTM Program was conducted in 2009 (**Appendix D**) to provide optimization recommendations based on the current data. The recommendations for OU 2 are:

- Sample all monitoring locations on an annual basis using PDBs
- Install two nested wells clusters north of IR06-GW32 and a third nested well cluster north of IR06-GW37D
- Re-evaluate the LTM Program when results and recommendations from the supplemental investigations at Sites 6 and 82 are finalized

The IRP Partnering Team discussed the recommendations at the February 2010 meeting and decided to await implementing recommendations until the SSI is complete.

Additionally, because LTM is ongoing and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

Groundwater Extraction and Treatment Systems

Based on existing data, it is unclear if the current groundwater extraction system is cost effective in reducing contaminant mass over time. The extraction and treatment system should be evaluated to determine if it is still the most cost effective means of reducing contaminant mass.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Cleanup levels have changed since the ROD	Y	Y	Collect groundwater metals data for comparison to determine if site-related or attributable to background. If determined site-related, evaluate risks, add metals as COCs to LTM Program, evaluate LUCs, and prepare an ESD. Update COCs and cleanup levels to reflect recent standards.	Navy	EPA/State	2013 2012	Y	Y
Groundwater extraction and treatment system is asymptotic	N	Y	Complete source area investigation and make repairs or changes to optimize mass removal. Evaluate alternative treatment technologies.	Navy	EPA/State	2015	Y	Y
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

4.7 Statement of Protectiveness

The remedies for soil at OU 2 are protective of human health and the environment because exposure pathways that could result in unacceptable risk are being controlled and LUCs preventing exposure are in place. The remedies for groundwater at OU 2 are protective of human health and the environment in the short-term because LUCs are in place and

therefore there is no current or potential exposure. However, in order for the remedy to be protective in the long-term, supplemental site investigations should be completed that will identify the potential additional source areas that are contributing to the groundwater contamination. This information will then be used to optimize the treatment plants and systems to increase their efficiencies in removing contaminated mass.

Groundwater LTM for metals was discontinued because there was no historical evidence of metal disposal at OU 2 and the cleanup levels were consistent with natural background concentrations; however, the cleanup levels for several metals have been updated to more conservative values and historical data indicates the presence of metals above current standards. An evaluation is recommended to determine if the metals should be added as COCs to the LTM Program and additional LUCs are needed.

Table 4-1
Cleanup Levels for OU 2 (Sites 6 and 82)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1993)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Benzene	--	1	NCGWQS
	Chlorobenzene	--	50	NCGWQS
	1,4-Dichlorobenzene	--	6	NCGWQS
	1,2-Dichloroethane	0.38	0.4	NCGWQS
	1,1-Dichloroethene	--	7	NCGWQS/MCL
	cis-1,2-Dichloroethene	--	70	NCGWQS/MCL
	trans-1,2-Dichloroethene	70	100	NCGWQS/MCL
	1,2-Dichloropropane	--	0.6	NCGWQS
	Ethylbenzene	29	600	NCGWQS
	1,1,2,2-Tetrachloroethane	--	0.2	NCGWQS
	Tetrachloroethene	0.7	0.7	NCGWQS
	Trichloroethene	2.8	3	NCGWQS
	Vinyl chloride	0.015	0.03	NCGWQS
	Metals			
	Arsenic	50	10	NCGWQS/MCL
	Barium	1,000	700	NCGWQS
	Beryllium	4	4	MCL
	Chromium	50	10	NCGWQS
	Lead	15	15	NCGWQS/MCL
	Manganese	50	50	NCGWQS
	Mercury	1.1	1	NCGWQS
	Vanadium	80	18	RSL-Tapwater
Soil (μg/kg)	**PCBs**	10,000	10,000	Action Level for Low Occupancy Land Use (USEPA, 1990)
	Pesticides			
	4,4-DDT	60,000	7,000	RSL-Industrial Soil
	VOCs			
	Benzene	5.4	5,400	RSL-Industrial Soil
	Trichloroethene	32.2	14,000	RSL-Industrial Soil
	Tetrachloroethene	10.5	2,600	RSL-Industrial Soil
	Metals			
	Arsenic	23,000	1,600	RSL-Industrial Soil
	Cadmium	39,000	80,000	RSL-Industrial Soil
	Manganese	390,000	2,300,000	RSL-Industrial Soil

Notes:
-- COC identified post-ROD based on exceedances of current cleanup levels during LTM
Cleanup levels achieved/remain protective

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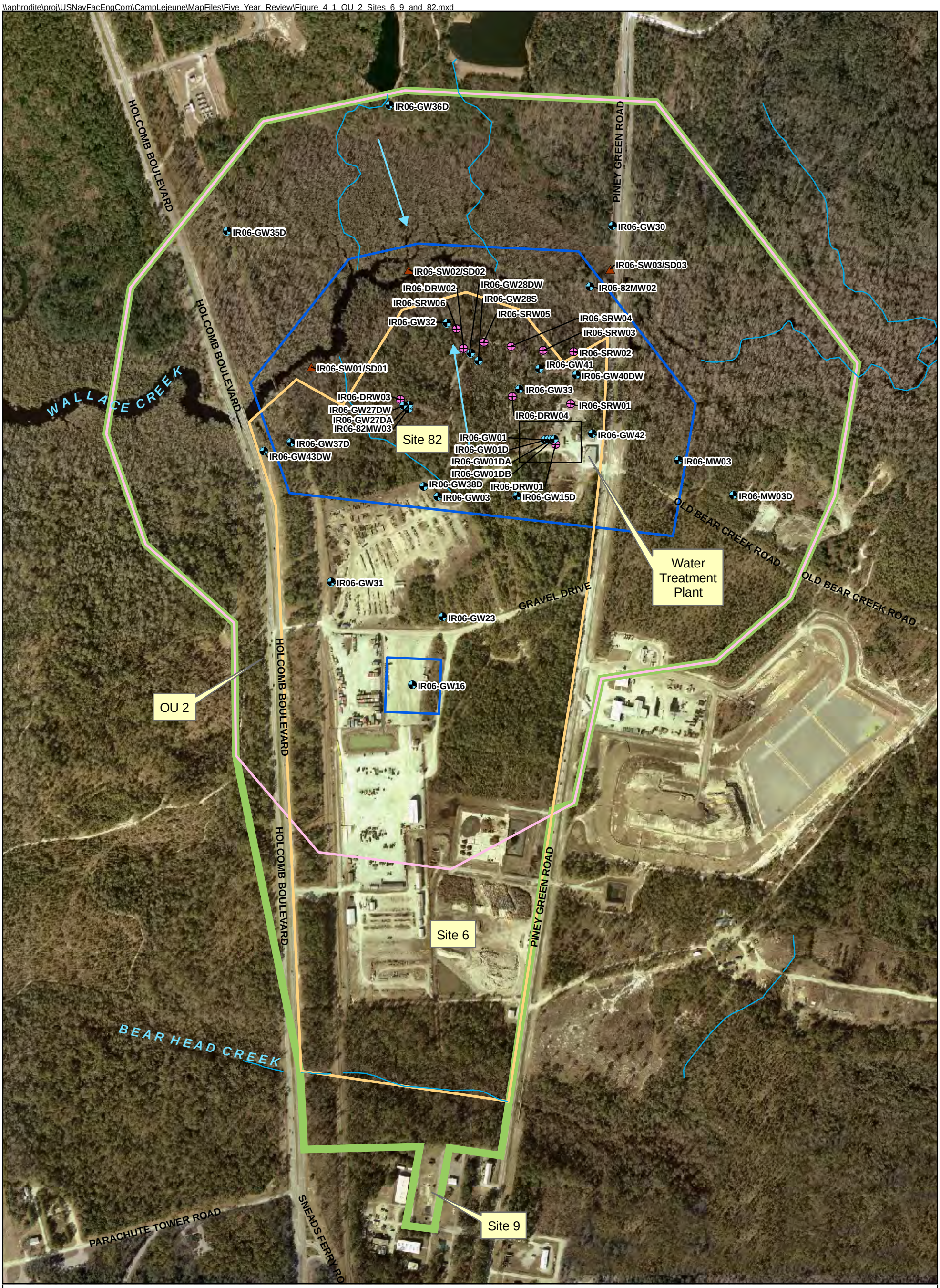


Legend

- LTM Monitoring Wells
- Recovery Wells
- LTM Surface Water and Sediment Samples
- Surface Water Centerline
- Direction of Groundwater Flow
- Operable Unit 2
- ERD Pilot Study (2007)
- Aquifer Use Control Boundary (1000 ft)
- Non-Industrial Use and Intrusive Activites (Soil) Control Boundary
- Intrusive Activites Control Boundary (Groundwater)

N

0 300 600 1,200 Feet

1 inch = 600 feet

Figure 4-1
OU 2 (Sites 6, 9, and 82)
Five-Year Review
MCB CamLej

CH2MHILL

Figure 4-2
Site 82 PCE Shallow Wells
2008 Long Term Monitoring Report
MCB CamLej, North Carolina

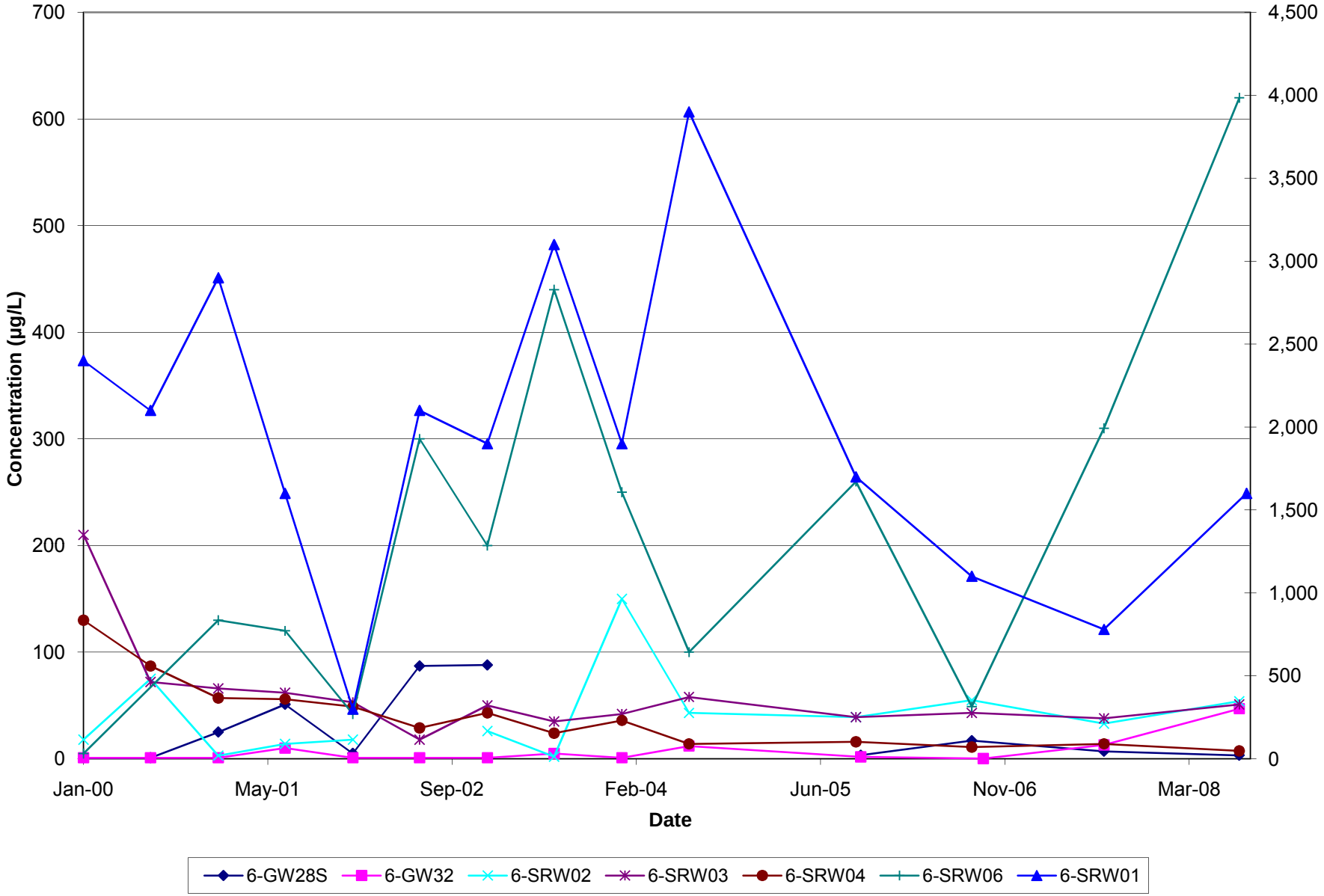


Figure 4-3
Site 82 PCE Deep Wells
2008 Long Term Monitoring Report
MCB CamLej, North Carolina

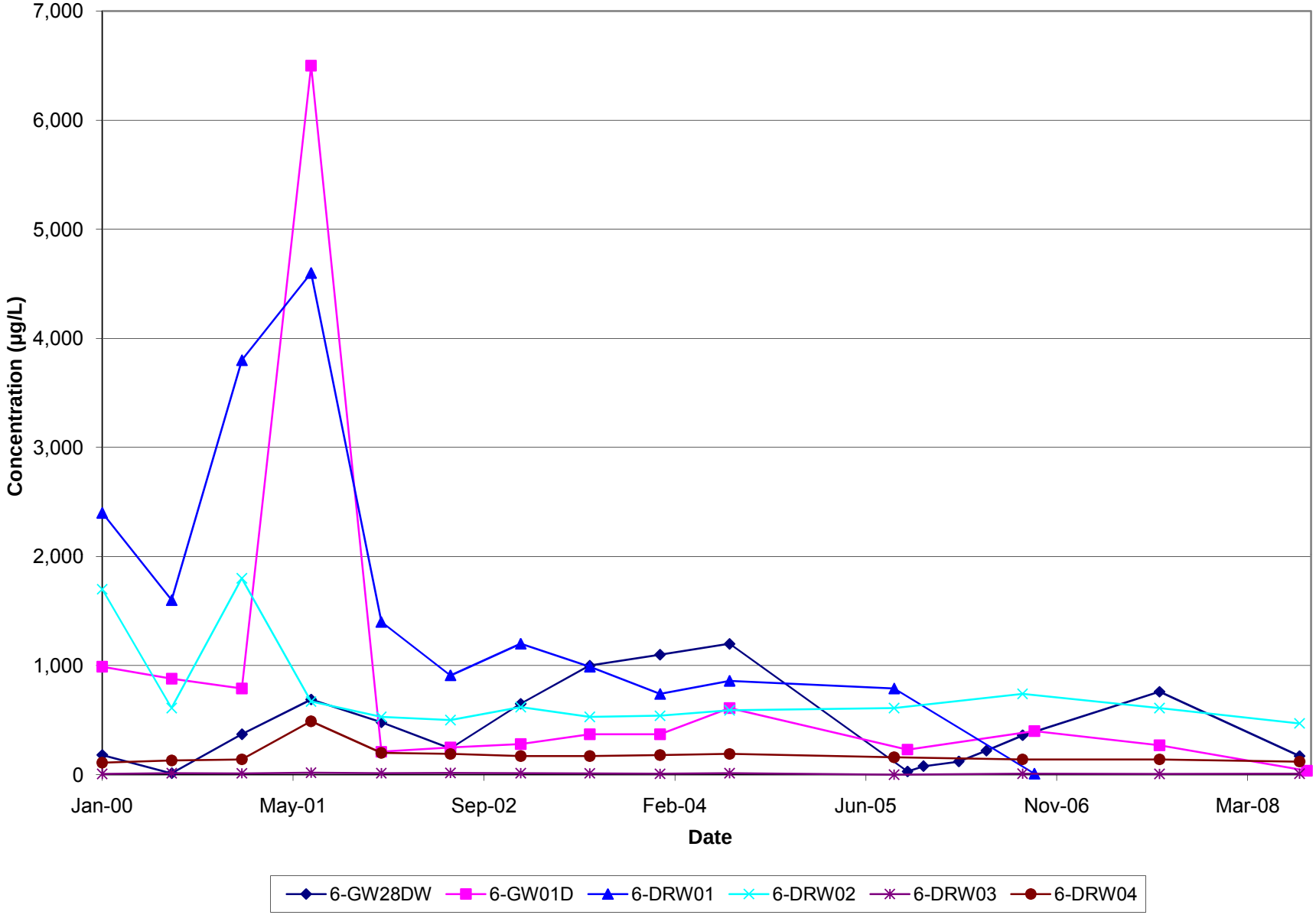


Figure 4-4
Site 82 TCE Deep Wells
2008 Long Term Monitoring Report
MCB CamLej, North Carolina

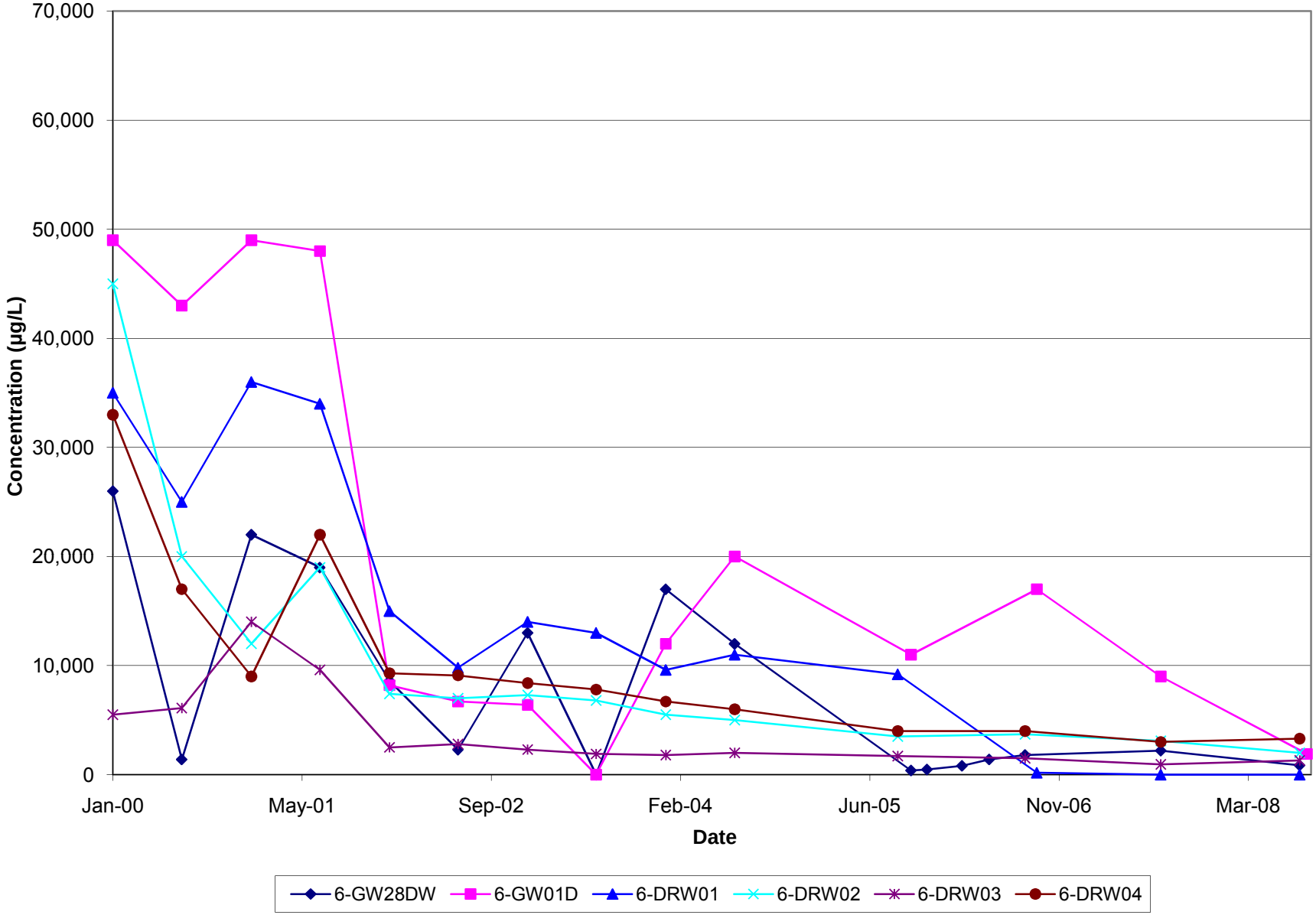
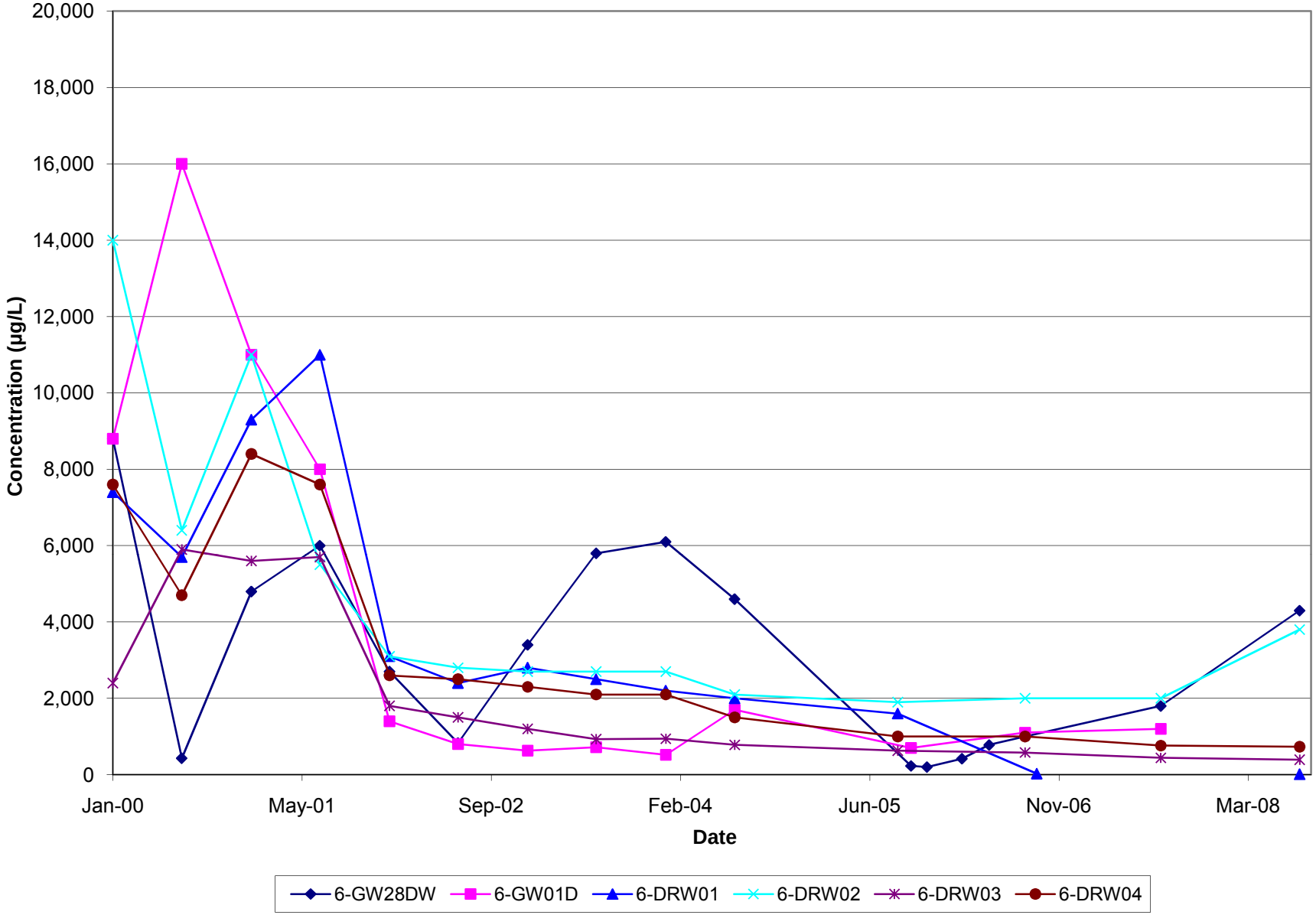


Figure 4-5
Site 82 cis-1,2-DCE Deep Wells
2008 Long Term Monitoring Report
MCB CamLej, North Carolina



SECTION 5

Operable Unit No. 4 (Sites 41 and 74)

5.1 Site History and Background

OU 4 is located within the Mainside of the Base and the Marine Corps Air Station (MCAS) New River (**Figure 1-2**). OU 4 covers approximately 60 acres and consists of two sites (Sites 41 and 74) that have been grouped together based on the unique characteristic of suspected waste (chemical agents):

- **Site 41—Camp Geiger Dump near Former Trailer Park** was used from 1946 to 1970 and covers approximately 37 acres (**Figure 5-1**). Construction debris, POL compounds, solvents, batteries, ordnance, chemical training agents, and, in 1964, mirex (a pesticide), was reportedly disposed at Site 41. The debris was reportedly burned and graded over with soil. The dump area contains an estimated 110,000 cubic yards (yd^3) of waste. The amount of solvents and oil disposed was estimated to be between 10,000 and 15,000 gallons; and the quantity of mirex was estimated at several tons.
- **Site 74—Mess Hall Grease Dump** was used from the early 1950s through the early 1960s and covers approximately 24 acres (**Figure 5-2**). Grease from the mess hall at Site 74 was reportedly disposed of in trenches. It was also reported that drums containing PCBs and pesticide-soaked bags were buried near the grease pit. Estimates of quantities include 1,100 gallons of PCB oil, 50 to 500 gallons of DDT, and 2,200 gallons of drummed pesticides. One internal memorandum reports chemical training agents in the form of test kits were reportedly disposed at Site 74. A former Pest Control Area was also reportedly located in the southeastern portion of the Site.

5.2 Site Chronology

A site chronology of key events and documents for OU 4 is presented below.

Date	Event
1946-1970	Open burn pit at Site 41
1950s - 1960s	Grease, pesticide, and reported chemical agent disposal at Site 74
1983	IAS
1984-1987	CS
1995	RI/FS
1995	PRAP/ROD
1997-1998	LTM at Site 74
1997-2004	LTM at Site 41
2001	LUCs implemented
2002	LUCs updated
2006	RACR

5.3 Site Characterization

Findings from the OU 4 investigations are summarized below:

- Organic and inorganic compounds were identified in soil, groundwater, surface water, and sediment at OU 4, specifically:
  - O&G and phenols were detected in groundwater, surface water, and sediment samples at Site 41
  - VOCs and metals were detected in shallow groundwater at Site 41
  - PAH compounds were detected in surface soils at Site 41
  - Pesticides were detected in soil and groundwater at Site 74
- Shallow groundwater flow at Site 41 is to the south-southeast
- Shallow groundwater flow at Site 74 is to the east-northeast
- Reported history of chemical agent disposal at Sites 41 and 74, no chemical surety degradation compounds were detected in soil
- Potential ecological risks were identified based on exposure to surface water
- Potential human health risks were identified for future child and adults residents due to exposure to metals in groundwater (Sites 41 and 74) and seep surface water (Site 41)

5.4 Description of Remedial Actions

The ROD for addressing soil and groundwater at OU 4 was signed in December 1995 (Baker, 1995c). The RAOs were:

- Prevent future exposure to buried contaminated soil and waste and contaminated groundwater
- Protect ecological receptors from potential exposure to contaminated surface water at Site 41
- Prevent future potential use of shallow groundwater

NCDENR acceptance of the ROD was contingent on completion of a groundwater reclassification and surface water variance due to the nature of potential contamination that could not feasibly be remediated. In August 1997, a letter from NCDENR Wilmington Regional Office informed the Base that based on limited site contamination, the groundwater reclassification and surface water variance were no longer required.

The Selected Remedy includes the following major components:

- LTM to monitor groundwater contaminant migration at Sites 41 and 74
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and

maintained in the Base GIS and with Base Master Planning, perimeter fencing, signs, and inspections). The LUC objectives are to:

- Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, within 500 feet of the estimated impacted groundwater extent.
- Prohibit intrusive activities within the vicinity of the estimated impacted groundwater, soil, and waste extent.
- Prohibit non-industrial land use which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities
- Prohibit site access

The cleanup levels for soil and groundwater are summarized in **Table 5-1**.

5.4.1 Remedy Implementation

LTM at OU 4 was initiated in 1997. LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning. Fences were installed around the perimeter of Sites 41 and 74 to restrict access.

5.4.2 Remedy Operation and Maintenance

The LTM Program at Site 41 included sampling of five monitoring wells and eight surface water and sediment locations twice a year for analysis of TCL VOCs, Target Analyte List (TAL) metals, TDS, and TSS. In 2004, groundwater samples were collected for explosives and chemical agent constituents and breakdown products and there were no detections. In 2005, the groundwater cleanup levels (**Table 5-1**) were achieved at Site 41 and LTM was discontinued.

The LTM Program at Site 74 included sampling of four monitoring wells twice a year for TAL metals. In 1998, LTM at Site 74 was discontinued because detected metal concentrations were determined to be indicative of naturally occurring metals in the presence of acidic soils (CH2M HILL/Baker, 2001).

Monitoring of the LUCs is routinely performed by the Base. The LUC boundaries are shown on **Figures 5-1** and **5-2**. LUCs shall be maintained based on the presence of waste and potential for chemical agent. Inspection sheets from the previous 5 years are included in **Appendix A**. No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions at OU 4. Site inspection sheets are included in **Appendix B.**

5.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. LTM at Site 41 was completed in 2005 and an IRACR was prepared (CH2M HILL, 2006b). The LUCs

have remained in-place since the last review and a perimeter fence was installed at Site 41 in 2008 to further restrict access.

5.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes. Based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 4 remedy is functioning as designed. Groundwater cleanup levels have been achieved and LTM discontinued. LUCs remain in-place to restrict non-industrial land use, prohibit intrusive activities in waste, groundwater, and soil, and restrict aquifer use.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels for groundwater were identified as the more conservative of the Federal MCLs or NCGWQS at the time the ROD was signed. Since that time, the standards for arsenic and chromium have been updated and are more conservative as listed in **Table 5-1**. LTM was discontinued previously based on the cleanup levels identified in the ROD. However, when comparing the historical groundwater LTM data to the current cleanup levels (**Table 5-1**), there were no exceedances for arsenic and chromium.

Has any other information come to light that could question the protectiveness of the remedy?

Construction of Base housing has been initiated within a quarter mile from the Site 41 boundary. Prior to construction, the Base provided notification to EPA and NCDENR. The EPA and NCDENR agreed that the remedy remains protective of human health and the environment in that there is no off-site migration of chemicals of concern (COCs) in soil or groundwater, no COCs identified in surface soil, LUCs are in-place to prevent exposure to waste, and Site 41 is located upgradient of the proposed housing area. NCDENR recommended that if a fence was not already in-place that one be installed around the Site 41 boundary for additional protection. A fence was installed around the Site 41 perimeter.

Construction of a Military Police facility and Skeet Range are also being planned in the vicinity of Site 74. The remedy will remain protective of human health and the environment in that there is no off-site migration of COCs in soil or groundwater, LUCs are in-place to prevent exposure to waste, and a fence is present around the Site 74 perimeter to restrict access. Notification will be provided to EPA and NCDENR.

5.6 Issues, Recommendations, and Follow-up Actions

Monitoring wells remain in-place and are recommended for abandonment. Because the waste remains in-place and there is potential for chemical agents at Sites 41 and 74, the LUCs restricting aquifer use, intrusive activities for soil and groundwater, and non-industrial land use will remain in-place.

During LUC inspections (**Appendix A**), it was noted that several trees had fallen on the fence at Site 41. The trees were removed and repairs to the fence were conducted in April 2010.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Monitoring wells remain in-place	Y	Y	Abandon existing monitoring wells in accordance with NC Regulations	Navy	EPA/State	2012	Y	Y

5.7 Statement of Protectiveness

Perimeter fencing restricts access to the waste areas at Sites 41 and 74. The LUCs to prohibit intrusive activities, aquifer use, and non-industrial use at the sites are protective of human health and the environment because exposure to waste that could result in unacceptable risks are being controlled. Groundwater LTM is determined complete and this remains protective because the detected concentrations were below the current standards (**Table 5-1**) and there is no current or potential future exposure.

Table 5-1
Cleanup Levels for OU 4 (Sites 41 and 74)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1995)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**Metals**			
	Arsenic	50	10	NCGWQS/MCL
	Beryllium	4	4	MCL
	Cadmium	5	2	NCGWQS
	Chromium	50	10	NCGWQS
	Lead	15	15	NCGWQS/MCL
	Nickel	100	100	NCGWQS

Notes:
Cleanup levels achieved/remain protective

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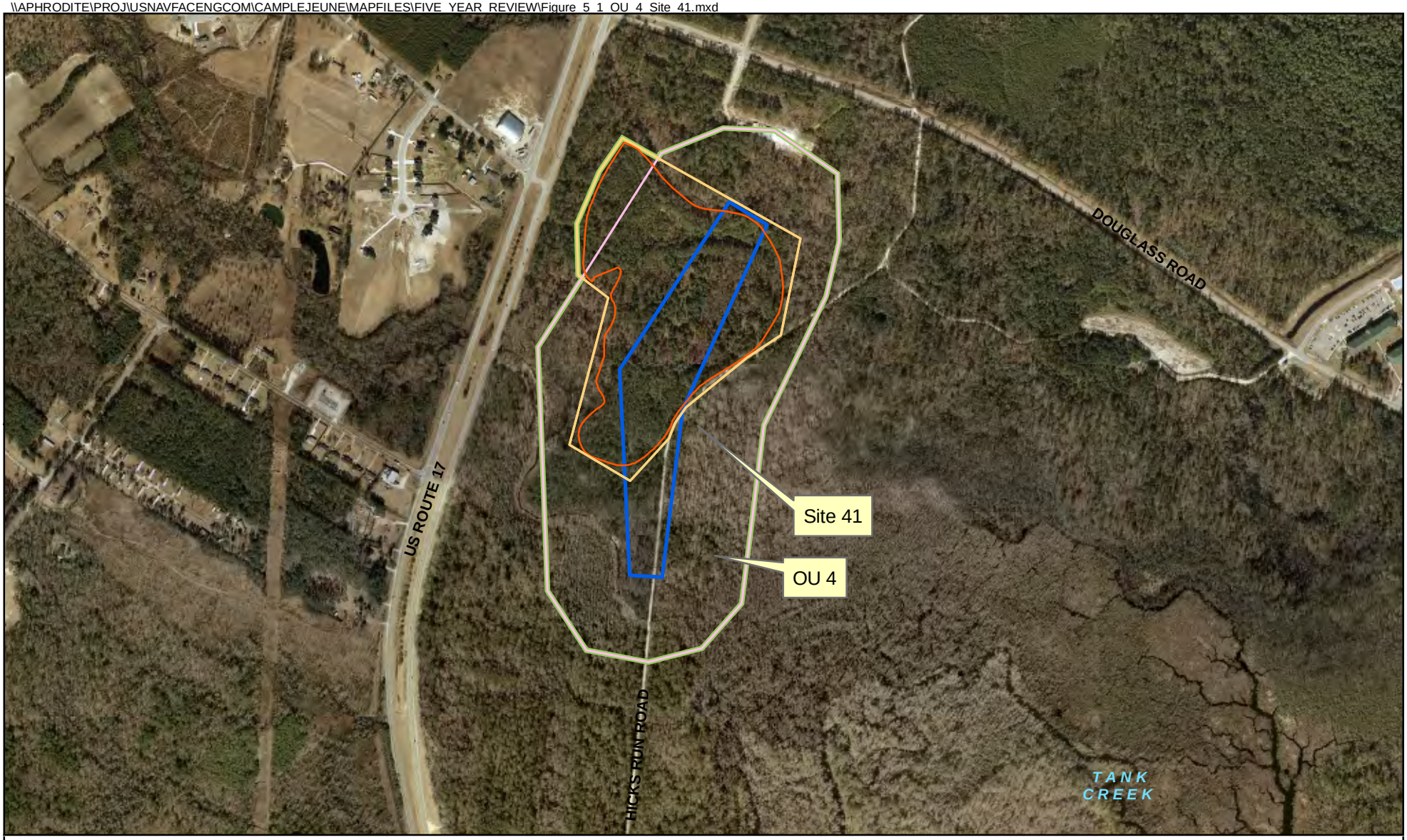

Legend

- Operable Unit 4
- Aquifer Use Control Boundary (500 ft)
- Non-Industrial Use and Intrusive Activites (Soil) Control Boundary
- Intrusive Activites Control Boundary (Groundwater)
- Access Control Boundary

N

0 400 800 1,600 Feet

1 inch = 800 feet

Figure 5-1
OU 4 (Site 41)
Five-Year Review
MCB CamLej

CH2MHILL

\\APHRODITE\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\FIVE_YEAR_REVIEW\Figure_5_2_OU_4_Site_74.mxd

Legend

- Operable Unit 4
- Aquifer Use Control Boundary (500 ft)
- Non-Industrial Use and Intrusive Activites (Soil) Control Boundary
- Intrusive Activites Control Boundary (Groundwater)
- Access Control Boundary

N

0 400 800 1,600 Feet

1 inch = 800 feet

Figure 5-2
OU 4 (Site 74)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 6

Operable Unit No. 5 (Site 2)

6.1 Site History and Background

OU 5 is located within the Mainside of the Base (**Figure 1-2**) and consists of one site:

- **Site 2—the Former Nursery/Day Care Center** encompasses approximately 5 acres just inside the Main Gate in the northeast portion of the Base (**Figure 6-1**). From 1945 to 1958 an onsite building (Building 712) was used for the storing, handling, and dispensing of pesticides and was later used as a day care center for children. Chemicals known to have been used at Site 2 include chlordane, DDT, diazinon, and 4,4'- dichlorodiphenyldichloro-ethane (4,4'-DDD), dieldrin, lindane, malathion, and silvex. A preliminary soil sampling investigation, conducted in 1982 indicated the presence of pesticides, resulting in the transfer of the day care center to another location. Building 712 is currently being used as office space.

6.2 Site Chronology

A site chronology of key events and documents for OU 5 is presented below.

Date	Event
1945-1958	Storage, handling, and dispensing of pesticides at Building 712 and storage of bulk materials and vehicles at the former storage area
1982	Soil Investigation
1983	IAS
1984-1987	CS
July 1992	Geophysical Investigation
1992	Limited groundwater sampling program
1993-1994	RI/FS
1994	Additional Geophysical Investigation
1994	TCRA to remove pesticide-contaminated soil
1994	PRAP/ROD
1995-2007	LTM
1997	Notice of Non-Significant Change
2001	LUCs prepared
2002	LUCs updated
2008	Closeout Report

6.3 Site Characterization

Findings for OU 5 are summarized below:

- Organic compounds were identified in soil and groundwater at OU 5, specifically:
  - Pesticides were detected in soil near the former mixing pads
  - VOCs were identified in shallow groundwater
- No anomalies that could serve as sources (i.e., tanks or drums) of groundwater contamination were identified during the geophysical investigations.
- Groundwater flow is generally toward the northwest.
- Potential ecological risks were identified for aquatic and terrestrial receptors due to the presence of pesticides in sediment and soil.
- Potential human health risks were identified for current construction workers and base personnel due to pesticides in soil. Potential risks were identified for future child and adult residents due to exposure to VOCs in groundwater.

6.4 Description of Remedial Actions

The ROD addressing groundwater at OU 5 was signed in September 1994 (Baker, 1994c). Prior to completion, a TCRA was completed to remove pesticide-contaminated soils to achieve industrial land use (OHM, 1995a). The RAOs were:

- Prevent future exposure to contaminated groundwater
- Ensure no human or environmental exposure due to plume migration

The Selected Remedy includes these major components:

- LTM to monitor groundwater contaminant concentrations and potential migration
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The LUCs objectives are to:
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, from the surficial aquifer within 1,000 feet of the estimated impacted groundwater extent
  - Prohibit the installation of new groundwater supply wells within the vicinity of OU 5
  - Prohibit intrusive activities within the vicinity of the estimated impacted groundwater extent
  - Prohibit non-industrial land use within the extent of the former soil removal which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities

The cleanup levels for soil and groundwater are summarized in **Table 6-1**.

In July 1997, a Notice of Non-Significant Change was submitted, which identified ROD changes, including removal of metals, TDS, and TSS analyses from the groundwater LTM program (USMC, 1997). There is no history or evidence of metals disposal at the site and the metals concentrations were determined not to be site-related because the COCs at the site were related to VOCs in groundwater.

6.4.1 Remedy Implementation

A TCRA to remove pesticide-contaminated soil above industrial cleanup levels was completed in 1994 (OHM, 1995a). Groundwater LTM began in 1995 and discontinued in 2007. LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

6.4.2 Remedy Operation and Maintenance

LTM at OU 5 was initiated in 1995 and included annual sampling of six shallow monitoring wells for VOC analysis. Water quality parameters (temperature, pH, conductivity, DO, ORP, and turbidity) were measured during sampling and groundwater elevations were measured prior to LTM. The results of monitoring activities at OU 5 as well as recommendations have been documented in Annual LTM Reports.

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 6-1**. A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

6.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. Since the last Five-Year Review, LTM was completed.

The May 2007 groundwater LTM event concluded fourth consecutive events in which no VOCs were detected above their respective NCGWQS. As a result, the LTM Program was discontinued and a Closeout Report was submitted (CH2M HILL, 2008f). The monitoring wells were abandoned in March 2009. Because LTM was completed and the cleanup levels in groundwater have been achieved, there is no risk to human health and the environment from exposure to groundwater at Site 2. Therefore, the LUCs restricting groundwater intrusive activities and aquifer use were removed. LUCs remain in-place to prohibit non-industrial use within the extent of the former soil removal actions.

6.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes. Based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 5 remedy is functioning as designed. Cleanup levels for

groundwater have been achieved and LTM has been completed. LUCs remain in-place to restrict non-industrial land use.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels for groundwater were identified as the more conservative of the Federal MCLs or NCGWQSs at the time the ROD was signed. Since that time, the standards for SVOCs and metals have been updated and several are more conservative as listed in **Table 6-1**. LTM for SVOCs was discontinued previously based on the cleanup levels identified in the ROD. When comparing the historical groundwater SVOC data to the current cleanup levels in **Table 6-1**, the concentrations were similar to or below the standards. LTM for metals was discontinued based on the Notice of Non-Significant Change (USMC, 1997). There is no history or evidence of metals disposal at the site and the metals concentrations were determined not to be site-related because the COCs were identified as VOCs in groundwater and the cleanup levels for VOCs have been achieved.

Soil and sediment removal actions were completed in 1994 to remove pesticide-contamination above Federal health advisory levels and LUCs are in-place to prohibit non-industrial use. The recent USEPA RSLs for industrial soil are less conservative (**Table 6-1**).

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

6.6 Issues, Recommendations, and Follow-up Actions

LTM for metals was discontinued previously and documented in the Notice of Non-Significant Change (USMC, 1997). A correction to the Closeout Report (CH2M HILL, 2008f) is recommended to include and explain the Notice of Non-Significant Change (USMC, 1997) for removing metals as COCs in the ROD and LTM Program.

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Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Closeout Report does not identify that metals were removed as COCs	N	N	Issue a correction to the Closeout Report (CH2M HILL, 2008f) to include and explain the Notice of Non-Significant Change (USMC, 1997).	Navy	EPA/State	2012	N	N

6.7 Statement of Protectiveness

LUCs are in-place to prohibit non-industrial use within the extent of the former soil removal action areas where pesticides remain in soil above levels that allow for UU/UE. The LUCs for soil at OU 5 are protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled.

Table 6-1
Cleanup Levels for OU 5 (Site 2)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1994)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Ethylbenzene	29	600	NCGWQS
	Trichloroethene	2.8	3	NCGWQS
	Xylene (total)	530	500	NCGWQS
	SVOCs			
	Acenaphthene	80	80	NCGWQS
	2,4-Dimethyphenol	140	100	NCGWQS
	2-Methylnaphthalene	14	30	NCGWQS
	Naphthalene	21	6	NCGWQS
	Phenol	300	30	NCGWQS
	Pesticides			
	4,4'-DDD	0.14	0.1	NCGWQS
	4,4'-DDT	0.14	0.1	NCGWQS
	Metals[1]			
	Arsenic	50	10	NCGWQS/MCL
	Barium	2,000	700	NCGWQS
	Beryllium	4	4	MCL
	Lead	15	15	NCGWQS/MCL
	Vanadium	None	18	RSL-Tapwater
Soil (μg/kg)	**Pesticides**			
	4,4-DDT	3,000	7,000	RSL-Industrial Soil
	4,4-DDE	3,000	5,100	RSL-Industrial Soil
	4,4-DDD	4,000	7,200	RSL-Industrial Soil
	Dieldrin	50	110	RSL-Industrial Soil
	Heptachlor	179	380	RSL-Industrial Soil
	Chlordane (total)	621	6,500	RSL-Industrial Soil
Sediment (μg/kg)	**Pesticides**			
	4,4-DDT	15,000	70,000	RSL-Industrial Soil x 10 for Sediment
	4,4-DDE	15,000	51,000	RSL-Industrial Soil x 10 for Sediment
	4,4-DDD	21,000	72,000	RSL-Industrial Soil x 10 for Sediment
	Dieldrin	None	1,100	RSL-Industrial Soil x 10 for Sediment
	Heptachlor	None	3,800	RSL-Industrial Soil x 10 for Sediment
	Chlordane (total)	4,000	65,000	RSL-Industrial Soil x 10 for Sediment

Notes:
[1]Metals, TDS, and TSS were removed as COCs from the ROD and LTM Program. Metals (USMC, 199
Cleanup levels achieved/remain protective

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Legend

- Installation Boundary
- Operable Unit 5
- Non-Industrial Use Control Boundary

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 6-1
OU 5 (Site 2)
Five-Year Review
MCB CamLej

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SECTION 7

Operable Unit No. 6 (Sites 36, 43, 44, and 54)

7.1 Site History and Background

OU 6 is located in the Camp Geiger and MCAS New River portions of the Base as depicted on **Figure 1-2**. OU 6 covers approximately 26 acres and consists of four sites (Sites 36, 43, 44, and 54) that have been grouped together into one OU because of the similar characteristics of material disposed and geographic location.

- **Site 36—Camp Geiger Area Dump** is reported to have been used for the disposal of municipal wastes and mixed industrial wastes including trash, waste oils, solvents, and hydraulic fluids that were generated at MCAS New River (**Figure 7-1**). The dump was active from the late 1940s to the late 1950s and covers approximately 5 acres. Most of the material was burned and buried.

- **Site 43—Agan Street Dump** covers approximately 14 acres and reportedly received inert material such as construction debris and trash (**Figure 7-1**). Sludge from the former STP was also reportedly dumped onto the ground surface; however, it is not clear when disposal operations took place.

- **Site 44—Jones Street Dump** covers approximately 6 acres was reportedly in operation during the 1950s (**Figure 7-1**). Although the quantity of waste is not known, debris, cloth, lumber, and paint cans were reportedly disposed of at the site.

- **Site 54—Crash Crew Fire Training Burn Pit** covers approximately 1 acre near the southwest end of Runway 5-23 within the MCAS New River operations area. The site has served as the fire training burn pit since the mid-1950s. The former Crash Crew Fire Training Burn Pit was 90 feet in diameter and situated at the center of this site. Originally, fire training was conducted on the ground surface within a bermed area using JP-type fuel, which was stored in an 8,000-gallon UST stored northwest of the burn pit. An OWS, located approximately 100 feet southeast of the burn pit, was used for temporary storage and collection of the spent fuel. In 1975, a lined burn pit was constructed and was used until 1999. Beginning in August 2000, the burn pit was converted to a training area that employs clean-burning fuels with operational and engineering controls. It is estimated that nearly 500,000 gallons of POL may have been used at Site 54.

7.2 Site Chronology

A site chronology of key events and documents for OU 6 is presented below.

Date	Event
Late 1940s – Late 1950s	Active disposal area for municipal and mixed industrial wastes at Site 36
Unknown timeframe	Active disposal area for construction debris and inert trash at Site 43
1950s	Active disposal area reportedly containing debris such as cloths, lumber, and paint cans at Site 44
Mid 1950s- present	Fire training facility at Site 54
Mid 1950s – 1975	JP-type fuel used for fire training activities performed on the ground surface at Site 54
1975-1999	A concrete lined burn pit in use at Site 54
1983	IAS
1984-1987	CS
1991	SI at Sites 43 and 44
1992-1998	RI at Site 36 and 54
1994	Geophysical Investigation at Site 36
1995	TCRA to remove metallic debris at Site 43
1997	Removal of PCB-contaminated soil at Site 36
1998	FS at Site 36
1998-present	Post-RI Groundwater Monitoring/LTM at Site 36
1998-2002	LTM at Site 54
2000	Additional groundwater sampling across Brinson Creek at Site 36
2000	New training area constructed for clean-burning fuels, the old fire training pit and contaminated soils were removed at Site 54
2002	Revised FS and Final PRAP
2002	Engineer Evaluation/Cost Analysis (EE/CA) and Final Action Memorandum
2003	Removal of PAH-contaminated soil at Site 43 and PAH- and PCB-contaminated soil at Site 36
2005	ROD
2007	IRACR

7.3 Site Characterization

Findings for the OU 6 investigations are summarized below:

- Organic and inorganic compounds were identified in soil, groundwater, surface water, and sediment at OU 6, specifically:
  - Pesticides, PCBs, and metals were detected in soil at Site 36
  - VOCs were detected in shallow groundwater at Site 36
  - Miscellaneous debris was identified at Site 43
  - PAHs, pesticides, and metals were detected in soil at Site 43
  - Pesticides and metals were detected in surface water and sediment at Sites 43 and 44; however, the detected levels were considered indicative of historical pest control operations
  - Low levels of semivolatile organic compounds (SVOCs) (primarily PAHs) were detected in soil and VOCs were detected in groundwater and surface water at Site 44
  - SVOCs were identified in soil at Site 54
- Minimal potential ecological risks were identified for terrestrial receptors at Sites 43, 44, and 54 and for aquatic receptors at Site 36
- Potential human health risks were identified for future child and adult residents due to exposure to metals in groundwater across OU 6; however, the metals were determined to be naturally occurring
- Potential human health risks were identified for current and future receptors at Site 36 and 43 due to exposure to soils and potential human health risks were identified for future residents at Site 36 due to exposure to VOCs in groundwater
- Groundwater flow at Site 36 is to the northeast toward Brinson Creek for the shallow and Castle Hayne Aquifers (**Figure 7-1**)

7.4 Description of Remedial Actions

Prior to submitting the ROD, Interim Remedial Actions (IRAs) were conducted to remove surficial metallic debris and PAH-contaminated soil at Site 43 and remove PCB-contaminated soil at Site 36.

The ROD addressing soil and groundwater at OU 6 was signed in July 2005 (CH2M HILL/Baker, 2005). No unacceptable human health or ecological risks were identified for Sites 43, 44, or 54; therefore, no RAOs were established for these sites. The RAOs identified for Site 36 are:

- Prevent exposure to subsurface and surface soil in the following areas: lead-contaminated areas, unknown disposal materials within the former dump, previous soil removal areas.

- Prevent exposure to VOC-contaminated groundwater and assess natural attenuation.
- Protect groundwater for future potential use.

The Selected Remedy includes these major components:

- LTM for monitored natural attenuation (MNA) of VOCs in groundwater at Site 36 and to monitor potential migration
- Surface water monitoring at Site 36
- Annual groundwater modeling at Site 36
- LUCs were recommended for Sites 36, 43, 44, and 54. LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The objectives of the LUCs are to:
  - Prohibit non-industrial land use, which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities.
  - Prohibit intrusive activities within the site boundaries.
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, from the aquifers (surficial and Castle Hayne) within 1,000 feet of the estimated impacted groundwater extent.

The ROD designated cleanup levels for OU 6 as presented in **Table 7-1**.

7.4.1 Remedy Implementation

Excavations to remove metallic debris and PAH-contaminated soil at Site 43 were completed in 1995 and 2003. Soil excavation to remove PCB-contaminated soil at Site 36 was conducted in 1997. LTM for MNA at Site 36 was implemented in 1998. LUCs for OU 6 were implemented in 2005. The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

7.4.2 Remedy Operation and Maintenance

LTM for MNA at Site 36 was implemented in 1998 and includes annual sampling of three shallow, six intermediate, and one deep monitoring well for VOCs and NAIPs and twice a year sampling at four surface water locations for VOCs. Water quality parameters (temperature, pH, conductivity, DO, ORP, and turbidity) are measured during sampling activities and groundwater elevations are measured prior to LTM. The results of LTM at OU 6 as well as recommendations are documented in annual reports.

Monitoring of the LUCs is routinely performed by the Base and the most recent inspection forms are provided in **Appendix A**. The LUC boundaries are shown on **Figure 7-1**. A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

7.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005a) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. Since that time, LTM for MNA, an IRACR, groundwater modeling, and LUCs have continued and an LTM Optimization Evaluation was conducted.

Initial LTM at Site 36 consisted of 12 monitoring wells and four surface water samples collected twice a year for analysis of VOCs and NAIPs. In September 2005, an LTM Optimization Report (CH2M HILL, 2005) was completed to identify potential efficiencies for the LTM Program. The recommendations included the following:

- Removal of two monitoring wells from the program.
- Reduce sampling frequency to an annual basis.

Three VOCs, (1,1,2,2-PCA, TCE, and VC) have consistently been detected above their respective NCGWQS in wells screened between 30 and 36 feet bgs. Overall, detected VOC concentrations have remained consistent and have not been detected in the deep groundwater samples.

An IRACR was prepared in 2007 to document the remedy in-place at OU 6 (CH2M HILL, 2007a).

The OU 6 ROD requires annual predictive groundwater modeling at Site 36 document the likelihood the groundwater plume impacting Brinson Creek. In order to estimate the concentrations likely to enter Brinson Creek, an analytical model, BIOCHLOR (Aziz et al., 2002) is used as a tool for this prediction. The 2008 BIOCHLOR modeling effort indicates that MNA remains protective of Brinson Creek and that contamination at the site will have naturally attenuated by 2087.

7.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes, based on the review of documents, MNA results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 6 remedy is functioning as designed. The results from the 2008 Annual LTM Report (AGVIQ/CH2M HILL, 2009) indicate that VOC concentrations appear to be stable and offsite or vertical migration has not occurred.

The MNA data suggest that site groundwater is characterized by reducing conditions that are suitable for anaerobic biodegradation of organic contaminants:

Intermediate Aquifer Zone NAIP	Range of Results (August 2008)	Condition Needed for Reductive Dechlorination	Favorable / Unfavorable
ORP	-167 mV to 34 mV	Less than +50 mV (favorable) Less than -100 mV (ideal)	Ideal to Favorable
DO	0.00 mg/L to 1.29 mg/L	Less than 1.0 mg/L	Favorable
Nitrate	< 0.05 mg/L	Less than 1.0 mg/L	Favorable
Fe2+	0.31 mg/L to 2.75 mg/L	Measurable Levels	Favorable
Sulfate	20.9 mg/L to 140 mg/L	Less than 20 mg/L	Unfavorable

Analytical data showing that both parent and daughter compounds (1,1,2,2-PCA, TCE, and VC) are present at the site at concentrations that have been steady for the past several LTM events support this conclusion (AGVIQ/CH2M HILL, 2009). LUCs remain in-place to restrict non-industrial land use, prohibit intrusive activities below the water table, and restrict aquifer use.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No, the cleanup levels were identified as the more conservative of the Federal MCLs or NCGWQS at the time the ROD was signed. Since that time, the standards have been updated as listed in **Table 7-1**. In addition, several VOC constituents (**Table 7-1**) that were not included in the ROD have exceeded current cleanup levels during the previous four sampling rounds.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

7.6 Issues, Recommendations, and Follow-up Actions

Currently, LTM and MNA data is compared to the cleanup levels identified in the ROD, NCGWQS, and Federal MCLs as shown in **Table 7-1**. In addition, seven VOC constituents, including daughter products that were not included in the ROD have exceeded NCGWQS during the previous four sampling rounds (**Table 7-1**). It is recommended that these constituents continue to be monitored during LTM events until four consecutive sampling events indicate the concentrations are below their respective NCGWQS. An analysis of the LTM Program was conducted in 2009 (**Appendix D**) to provide optimization recommendations based on the current data. The recommendations for Site 36 are:

- Sample all locations on an annual basis
- Use PDBs for collection of groundwater samples
- Sample NAIPs utilizing low-flow groundwater sampling every other year

The IRP Partnering Team discussed the recommendations at the February 2010 meeting. Because the sampling to-date has been conducted at the same time of year, the Team decided to conduct quarterly evaluation for seasonal fluctuation using PDBs for VOCs for one year.

Because there was no unacceptable risk identified based on exposure to groundwater at Sites 43, 44, and 54, the monitoring wells remaining in-place are recommended for abandonment.

Additionally, because LTM for MNA is ongoing at Site 36 and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Cleanup levels have changed since the ROD	Y	Y	Update Site 36 groundwater COCs and cleanup levels to reflect recent standards.	Navy	EPA/State	2012	Y	Y
Monitoring wells remain in-place at Sites 43, 44, and 54	Y	Y	Abandon existing monitoring wells in accordance with NC Regulations.	Navy	EPA/State	2012	Y	Y
Potential for vapor intrusion pathway at Site 36	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	N	Y

7.7 Statement of Protectiveness

At Site 36, LTM for MNA is ongoing to monitor the VOC plume and migration and LUCs are in-place to prohibit groundwater intrusive activities and aquifer use until cleanup levels are achieved. Although the cleanup levels have been updated, LTM is ongoing and is still protective. LUCs are in-place to prohibit non-industrial use within the extent of the former soil removal action areas at Sites 36 and 43 where PAHs, PCBs, and/or lead remain in soil above levels that allow for UU/UE. Based on the former dumping/burning activities, LUCs are also in-place at Sites 43, 44, and 54 to prohibit intrusive activities. These remedies for soil and groundwater at OU 6 are protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled and LUCs preventing exposure to waste, soil, and groundwater are in-place.

Table 7-1
Cleanup Levels for OU 6 (Site 36)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1994)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Benzene	--	1	NCGWQS
	1,1-Dichloroethane	--	6	NCGWQS
	1,2-Dichloroethane	--	0.4	NCGWQS
	1,1-Dichloroethene	--	7	NCGWQS/MCL
	cis-1,2-Dichloroethene	--	70	NCGWQS/MCL
	trans-1,2-Dichloroethene	--	100	NCGWQS/MCL
	Trichloroethene	2.8	3	NCGWQS
	1,1,2,2-Tetrachloroethane	0.17	0.2	NCGWQS
	Tetrachloroethene	--	0.7	NCGWQS
	Vinyl Chloride	0.015	0.03	NCGWQS

Notes:
-- COC identified post-ROD based on exceedances of current cleanup levels during LTM

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Legend

- LTM Monitoring Wells
- LTM Surface Water Samples
- Surface Water Body
- Direction of Groundwater Flow
- Installation Boundary
- Operable Unit 6
- Aquifer Use Control Boundary (500 ft)
- Non-Industrial Use Control Boundary
- Intrusive Activites Control Boundary (Soil)
- Intrusive Activites Control Boundary (Groundwater)

N

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Figure 7-1
OU 6 (Sites 36, 43, 44, and 54)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 8

Operable Unit No. 7 (Sites 1, 28, and 30)

8.1 Site History and Background

OU 7 covers approximately 35 acres located south of HPIA, on the Mainside of the Base (**Figure 1-2)**. OU 7 consists of three sites (Sites 1, 28, and 30) that have been grouped together into one OU because of their unique characteristics of suspected waste (POL) and geographic location.

- **Site 1—French Creek Liquids Disposal Area** covers approximately 17 acres and has been used by several different mechanized, armored, and artillery units since the 1940s. Liquid wastes generated from vehicle maintenance were reportedly routinely poured onto the ground surface. The wastes were reported to be primarily POL; however, battery acid was also reportedly disposed of. The suspected POL and battery acid disposal areas lie in the northern and southern portions of the Site. The estimated quantity of POL waste disposed at the areas is between 5,000 and 20,000 gallons; and the quantity of battery acid waste is between 1,000 and 10,000 gallons. Currently, Site 1 continues to serve as a vehicle and equipment maintenance/staging area.

- **Site 28—Hadnot Point Burn Dump** operated from 1946 to 1971 as a burn area for a variety of solid wastes generated on the Base and covers approximately 17 acres. Industrial waste, trash, oil-based paint, and construction debris were reportedly burned and then covered with soil. In 1971, the burn dump ceased operations and was graded and seeded with grass. The total volume of fill within the dump is estimated to be between 185,000 and 375,000 yd^3. Currently, most of Site 28 is used for recreation and physical training exercises

- **Site 30—Sneads Ferry Road Fuel Tank Sludge Area** covers approximately 1 acre and was reportedly used by a private contractor in 1970 to clean out two 12,000-gallon emptied fuel storage tanks when the contents of the tanks were converted from leaded gasoline to unleaded gasoline. Sludge and/or washout was reportedly drained from the tanks and disposed of along a tank trail which intersects Sneads Ferry Road. The composition of the waste is unknown, but it may have contained cleansing compounds and possibly diluted tetraethyl lead. An estimated minimum of 600 gallons was reportedly disposed.

8.2 Site Chronology

A site chronology of key events and documents for OU 7 is presented below.

Date	Event
1940s	Various artillery units reportedly dispose of liquid wastes to ground surface at Site 1
1946-1971	Burn area for various soil wastes at Site 28
1983	IAS
1984-1987	CS
1991	Soil assessment at Site 1
1993	Groundwater Sampling Study at Site 1
1995	RI/FS
1995	Confirmatory Soil Sampling at Site 28
1996	ROD
1996-2001	LTM
2001	LUCs prepared
2002	LUCs updated
2002	Final Closeout Report

8.3 Site Characterization

Findings from the investigations conducted at OU 7 are summarized below.

- Organic and inorganic compounds were identified in soil, groundwater, surface water, and sediment at OU 7, specifically:
  - Chlorinated VOCs, metals, and O&G were detected in shallow groundwater at Site 1
  - Metals were detected in surface and subsurface soil at Site 1 at concentrations generally consistent with background concentrations
  - Metals were detected in groundwater at Site 28
  - Low levels of VOCs were detected in the surface soil and subsurface soil at Site 28
- Minimal ecological risks were identified for terrestrial receptors due to exposure from metals at Site 1
- Potential human health risks were identified for future child and adult residents at Site 1 due to exposure to metals in groundwater

- Potential human health risks were identified for current and future recreational children due to the presence of metals in soil and sediment, and the presence of metals and VOC in groundwater at Site 28. The concentrations of metals in soil were just above the screening criteria; therefore, the risks associated with exposure to soils were deemed low
- No unacceptable human health or ecological risks were identified at Site 30

8.4 Description of Remedial Actions

The ROD for OU 7 was signed in 1996 (Baker, 1996b). The RAOs were:

- Prevent current and future exposure to contaminated groundwater
- Protect uncontaminated water for future potential use

The Selected Remedy includes these major components:

- LTM for VOCs (Site 1) and metals (Site 28) in groundwater
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The LUC objectives are to:
  - Prohibit non-industrial land use, which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities.
  - Prohibit intrusive activities below the water table within the vicinity of the estimated impacted groundwater extent
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, from the aquifers (surficial and Castle Hayne) within 1,000 feet of the estimated impacted groundwater extent
  - Prohibit the installation of any well, except for the purpose of monitoring, within the site boundaries

The cleanup levels identified in the ROD for OU 7 are summarized in **Table 8-1**.

8.4.1 Remedy Implementation

LTM at OU 7 was implemented in July 1996. LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

8.4.2 Remedy Operation and Maintenance

The LTM Program at Site 1 included sampling of eight monitoring wells twice a year for VOCs analysis. The LTM Program at Site 28 included sampling of seven monitoring wells twice a year for VOCs and metals analysis. In January 2001, the concentrations of COCs were below the cleanup levels (**Table 8-1**) for at least four consecutive quarters. A RACR was prepared to document the completion of LTM.

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 8-1**. A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

8.4.3 Progress Since Last Five-Year Review

The previous Five-Year Review (Baker, 2005a) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. LTM at Sites 1 and 28 was completed in 2001 and a RACR was prepared (Baker, 2002b). LUCs have remained in-place since the last review.

8.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes, based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 7 remedy is functioning as designed. Groundwater cleanup levels have been achieved and LTM discontinued. LUCs remain in-place to restrict non-industrial land use, prohibit intrusive activities in waste, groundwater, and soil, and restrict aquifer use. Because the waste remains in-place at Site 28, LUCs to restrict soil intrusive activities are also recommended within the extent of waste.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels for groundwater were identified as the more conservative of the Federal MCLs or NCGWQS at the time the ROD was signed. LTM was discontinued previously based on the cleanup levels identified in the ROD. Since that time, the standard for TCE has been updated and is more conservative as listed in **Table 8-1**. When comparing the historical groundwater LTM data to the current cleanup level, the concentrations were below the standard.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

8.6 Issues, Recommendations, and Follow-up Actions

Because LTM was conducted and the cleanup levels in groundwater have been achieved, there is no risk to human health and the environment from exposure to groundwater at Sites 1 and 28 (Baker, 2002). Therefore, it is recommended that the LUCs restricting groundwater intrusive activities and aquifer use (**Figure 8-1**) be removed. Monitoring wells remain in-place and are recommended for abandonment.

LUCs restricting non-industrial land use will remain in-place at Sites 1 and 28. Because the waste remains in-place at Site 28, LUCs to restrict soil intrusive activities are also recommended within the extent of waste.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Groundwater LUCs remain in-place and are not needed	N	N	Update LUCs to remove groundwater intrusive and use restrictions.	Navy	EPA/State	2012	N	N
Current LUCs do not prevent soil intrusive activities	Y	Y	Update LUCs to include intrusive restrictions for soil to prevent potential exposure to waste.	Navy	EPA/State	2012	Y	Y
Monitoring wells remain in-place	Y	Y	Abandon existing monitoring wells in accordance with NC Regulations.	Navy	EPA/State	2012	Y	Y

8.7 Statement of Protectiveness

The LUC in-place to prohibit non-industrial use within the extent of waste is protective; however, LUCs to restrict intrusive activities are also recommended to prevent exposure to waste.

Table 8-1
Cleanup Levels for OU 7 (Sites 1 and 28)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1996)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Trichloroethene	5	3	NCGWQS
	Metals			
	Lead	15	15	NCGWQS/MCL
	Manganese	50	50	NCGWQS

Notes:

Cleanup levels achieved

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Legend

- Surface Water Body
- Operable Unit 7
- Aquifer Use Control Boundary (1000 ft)
- Non-Industrial Use Boundary
- Intrusive Activites Control Boundary (Groundwater)

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 8-1
OU 7 (Sites 1, 28, and 30)
Five-Year Review
MCB CamLej

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SECTION 9

Operable Unit No. 8 (Site 16)

9.1 Site History and Background

OU 8 is located adjacent to the New River in the Camp Johnson portion of the Base (**Figure 1-2**).

- **Site 16—Former Montford Point Burn Dump** encompasses approximately 2 acres in the Montford Point area of the Base (**Figure 9-1**). The dump was open from 1958 to 1972, and subsequent unauthorized dumping occurred. Trash from the surrounding housing area and buildings is suspected to have been burned and then covered with soil. Records indicate building debris, garbage, tires, and small amounts of waste oils were disposed at the site. Materials, including asbestos insulating material for pipes, were also dumped on the surface. The quantity of asbestos material was estimated at less than 1 yd^3, and mitigation was completed. Currently, Site 16 is vacant.

9.2 Site Chronology

A site chronology of key events and documents for OU 8 is presented below.

Date	Event
Suspected 1958-1972	Suspected burn dump
1983	IAS
1995	Groundwater and Soil Investigation
1996	RI/FS
1996	PRAP/ROD
June 2001	LUCs prepared
July 2002	LUCs updated

9.3 Site Characterization

The findings for the OU 8 investigations are summarized below:

- Organic compounds were detected in soil, sediment, and groundwater, specifically:
  - Several pesticides were detected in soil and sediment; however, the detected levels were considered indicative of historical pest control operations
  - PCBs and SVOCs (primarily PAHs) were detected in surface soil

  - Benzene and ethylbenzene were detected in one groundwater sample collected during the first round of groundwater sampling; however, VOCs were absent in subsequent sampling

- No unacceptable ecological risks were identified for terrestrial or aquatic receptors
- Minimal potential human health risks were identified for future residents due to the presence of PCBs in the soil. However, the maximum detected PCB concentration (2.1 parts per million [ppm]) was below the recommended cleanup level for PCBs of 10 to 25 ppm for industrial areas

9.4 Description of Remedial Actions

The ROD for OU 8 was signed on September 30, 1996 (Baker, 1996c). Minimal risks were identified in the Human Health Risk Assessment (HHRA) or Ecological Risk Assessment (ERA); therefore, no remedial actions were required in the ROD. However, for institutional controls were implemented by the Base in 2001 for base planning purposes due to the sites past use as a dump. LUCs were implemented for soil and groundwater to eliminate potential exposure to waste (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The LUC objectives are to:

- Prohibit the withdrawal and any use of groundwater, except for environmental monitoring, from the aquifers (surficial and Castle Hayne) within 1,000 feet of the Site
- Prohibit intrusive activities below the shallow groundwater table
- Prohibit non-industrial land use within the site boundary, which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities

9.4.1 Remedy Implementation

LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

9.4.2 Remedy Operation and Maintenance

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 9-1**. A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

9.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. LUCs have remained in-place since the last review.

9.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes, based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 8 remedy is functioning as designed. No remedial action was required; however, LUCs were implemented for conservativeness and remain in-place to restrict non-industrial land use, prohibit intrusive activities below the water table, and restrict aquifer use. LUCs to restrict intrusive activities are also recommended within the extent of waste to prevent exposure.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Yes, the exposure assumptions and toxicity data are still valid. No ecological or human health risks were identified for OU 8; therefore, no RAOs were established.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that questions the protectiveness of the remedy.

9.6 Issues, Recommendations, and Follow-up Actions

Because the waste remains in-place, the LUCs prohibiting aquifer use, intrusive activities for groundwater, and non-industrial land use will remain. LUCs to restrict intrusive activities are also recommended within the extent of waste to prevent exposure. An ESD is recommended to document the LUCs.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Current LUCs do not prevent soil intrusive activities	Y	Y	Update LUCs to include intrusive restrictions for soil to prevent potential exposure to waste.	Navy	EPA/State	2012	Y	Y
NFA was the selected remedy in the ROD	Y	Y	Submit an ESD to identify LUCs as the remedy	Navy	EPA/State	2013	Y	Y

9.7 Statement of Protectiveness

The LUC in-place to prohibit non-industrial use within the extent of waste is protective; however, LUCs to restrict intrusive activities are also recommended to prevent exposure to waste.

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Legend

- Operable Unit 8
- Aquifer Use Control Boundary (1000 ft)
- Non-Industrial Use Boundary
- Intrusive Activites Control Boundary (Groundwater)

N

0 350 700 1,400 Feet

1 inch = 700 feet

Figure 9-1
OU 8 (Site 16) Location Map
Five-Year Review
MCB CamLej

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SECTION 10

Operable Unit No. 10 (Site 35)

10.1 Site History and Background

OU 10 is located within the Camp Geiger operations area of MCAS New River (**Figure 1-2**). OU 10 consists of one site:

- **Site 35—Former Camp Geiger Fuel Farm** covers approximately 45 acres and was in use from 1945 to 1995 (**Figure 10-1**). The fuel farm was composed of five 15,000-gallon ASTs, underground fuel transmission lines, a pump house, a fuel unloading pad, an OWS, and a distribution island, situated north of the intersection of Fourth Street and 'G' Street. Fuels stored at the Camp Geiger fuel farm included No. 6 fuel oil, kerosene, diesel, and gasoline. Several releases were reported during the active life of the fuel farm. A vehicle maintenance garage (former Building TC474, north of Building TC470) and weapons cleaning area (south of Building G560) were also present at Site 35. Currently, an armory occupies Building G480 with additional armory operations in Buildings TC341 and TC342. Several warehouses, general storage buildings, and troop barracks also occupy the area.

10.2 Site Chronology

A site chronology of key events and documents for OU 10 is presented below.

Date	Event
1945-1995	Fuel farm operations
1983	IAS
1984-1987	CS
1990	Focused FS
1991-1992	Comprehensive Site Assessment
1993-1994	Interim Remedial Action RI/FS to address soils
1994	Interim PRAP and Interim ROD to address soils
1994-1995	Comprehensive RI
1995	Structures associated with fuel farm dismantled and Interim FS to address groundwater
1995-1996	Soil removal conducted in association with Interim ROD
1995	Interim PRAP and Interim ROD to address shallow groundwater via *in situ* air sparging
1996-1997	Limited Groundwater Investigation to determine optimal location for air sparging trench
1997	Supplemental Groundwater Investigation
1998-present	*In Situ* Air Sparge Treatability Study

Date	Event
1998-2002	NAE Report
1999-2004	LTM
2000	Emergency soil removal action completed in association with a release of POL from an existing pipeline that was severed during construction
2003	TCE Hot Spot Characterization
2003	Technology Evaluation Report recommending *in situ* chemical reduction
2003-2005	*In situ* Chemical Reduction Pilot Study
2004	EE/CA for Light Non-aqueous Phase Liquid (LNAPL)
2005	POL site associated with Building G480 transferred to NAVFAC UST program
2005-2008	Supplemental RI
2006-2008	NTCRA for source area treatment
2007-2009	Basewide Vapor Intrusion Study
2009	FS/PRAP/ROD

10.3 Site Characterization

Findings for the OU 10 investigations are summarized below:

- Levels of organic and inorganic compounds have been identified in shallow and intermediate groundwater, specifically:
  - Chlorinated VOCs (PCE, 1,1,2,2-PCA, TCE, cis-1,2-DCE, and VC) and benzene were detected in groundwater
- The source of the chlorinated VOC contamination in the northern area of Site 35 is likely from the former vehicle maintenance garage and the former weapons cleaning area east of Building G533. The source of the smaller dissociated southern plume is unknown but is also likely related to the historic use of solvents for maintenance and equipment cleaning. The former Camp Geiger Fuel Farm is the likely source of the benzene contamination (**Figure 10-1**)
- Groundwater flow is to the northeast toward Brinson Creek (**Figure 10-1**)
- Shallow groundwater discharges into Brinson Creek, which ultimately discharges into the New River; however, analytical results indicate that there have not been any impacts above NCSWQS in Brinson Creek
- No unacceptable ecological risks were identified
- Potential human health risks were identified for future adult and child residents due to exposure to VOCs in groundwater

10.4 Description of Remedial Actions

Two Interim RODs for Site 35, one for contaminated soil and one for the northeast portion of the shallow groundwater plume near the former fuel farm, were executed in 1994 (Baker, 1994a) and 1995 (Baker, 1995a), respectively. The major components of the Interim Selected Remedies included:

- Excavation and offsite disposal of VOC-contaminated soils
- *In situ* air sparging using a vertical trench to address VOCs in shallow groundwater

The cleanup levels identified in the Interim ROD for soil and groundwater are summarized in **Table 10-1**.

The Final ROD for OU 10 was signed in November 2009 (CH2M HILL, 2009l). The RAOs were:

- Restore groundwater quality at Site 35 to NCGWQS and Federal MCLs based on the classification of the aquifer as a potential source of drinking water (Class GA or Class GSA) under 15A North Carolina Administrative Code [NCAC] 02L.0201, and to prevent human ingestion of water containing COCs (benzene, 1,1,2,2-PCA, PCE, TCE, cis-1,2-DCE, and VC) at concentrations exceeding NCGWQS or MCL standards, whichever is more stringent, until the cleanup levels have been obtained
- Minimize migration of COCs in groundwater to surface water

The Selected Remedy includes these major components:

- Air sparging using a horizontal well to address VOCs
- LTM for MNA of VOCs in groundwater and to monitor potential migration
- LUC implementation for groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The objectives of the LUCs are to:
  - To prohibit human consumption of groundwater from the surficial and Castle Hayne aquifers underlying Site 35
  - To maintain the integrity of any existing or future monitoring or remediation system at the site such as the monitoring wells and horizontal air sparge system

The cleanup levels identified in the ROD are summarized in **Table 10-1**.

10.4.1 Remedy Implementation

Soil excavation to remove VOC-contaminated soil was conducted from September 1995 to May 1996. An air sparge trench was installed in 1998 to address the northeast portion of the shallow groundwater plume near the former fuel farm.

10.4.2 Remedy Operation and Maintenance

The air sparging system was operational until 2009, when the Final ROD (CH2M HILL, 2009l) was issued, for the entire shallow and intermediate groundwater plume.

A visual inspection of the site was conducted in September 2008 to evaluate the air sparge system and general site conditions (**Appendix B**). No issues were noted during the site inspection.

10.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the interim remedy was functioning as intended and was protective of human health and the environment. Since the previous Five-Year Review, a Pilot Study, NTCRA, Supplemental RI, FS, PRAP, Final ROD, and Basewide Vapor Intrusion Investigation were completed.

A Pilot Study was conducted from 2003 to 2005 to address TCE "hot spots" identified during a 2002 Hot Spot Characterization (Baker, 2003) (**Figure 10-1**). The Pilot Study included the injection of approximately 26,000 gallons of modified Fenton's Reagent (*in situ* chemical oxidation [ISCO]) followed by the injection of approximately 19,400 gallons of potassium permanganate solution. The Pilot Study concluded that TCE concentrations were reduced between 80 and 98 percent and total VOC concentrations were reduced between 72 percent and 85 percent (CH2M HILL, 2006a).

In 2007, an NTCRA was conducted to evaluate ERD via EVO and lactate to address chlorinated VOCs in groundwater east of Building G533 (**Figure 10-1**). Approximately 5,930 gallons of EVO, 1,900 gallons of lactate, and 34,000 gallons of water were injected into 28 borings. The results indicated minimal contaminant reduction based on limited distribution of substrate and limited microbial bioavailability (CH2M HILL, 2008i).

The Supplemental RI was completed in 2009 to delineate the extent of contamination. Benzene and chlorinated VOCs were detected in groundwater exceeding screening criteria and potential risks to human health were identified based on future residential use (CH2M HILL, 2009e). The FS (CH2M HILL, 2009g) evaluated the following remedial alternatives for VOC-impacted groundwater: no action, MNA, ERD with bioaugmentation, ISCO, and *in situ* air sparging using a horizontal well (CH2M HILL, 2009b). A PRAP was issued in April 2009 (CH2M HILL, 2009h) to solicit public input on the preferred alternative (*in situ* air sparging using a horizontal well) and a public meeting was held. Questions received during the public meeting were general inquiries and no comments were received during the public comment period. The Final ROD was issued and signed in November 2009 (CH2M HILL, 2009l). The RD for *in situ* air sparging by a horizontal well, LTM and MNA, and LUCs was submitted in 2010.

A Basewide Vapor Intrusion Study was conducted from 2007 to 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings. Multiple locations across the Base were selected for evaluation, including the Camp Geiger area of the Air Station. The investigation within Camp Geiger included buildings at Site 35 and groundwater grab samples, soil gas samples, and subslab soil gas samples were collected for VOC analysis. No risks were identified from indoor air related to vapor intrusion; therefore, it was concluded that vapor intrusion is not a current significant pathway of concern for any

of the buildings located in the vicinity of Site 35. The Report (CH2M HILL, 2009k) recommended additional sampling at Buildings G480, G531, G532, and G533 to confirm temporal and spatial variability. The follow-up sampling is planned to be conducted in 2010. The results and potential impacts of the horizontal air sparge will be considered in the Site 35 RD.

10.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

The RA for *in situ* air sparging by a horizontal well, LTM and MNA, and LUCs will be completed in 2010 (**Figure 10-1**).

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

The Final ROD (CH2M HILL, 2009l) identified the cleanup levels for groundwater as the more conservative of the Federal MCLs or NCGWQS which are still valid.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the planned remedy.

10.6 Issues, Recommendations, and Follow-up Actions

The RA for *in situ* air sparging by a horizontal well, LTM and MNA, and LUCs is planned in 2010. Because LTM is planned and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

No current significant pathway of concern for vapor intrusion was identified based on the results of the Basewide Vapor Intrusion Evaluation (CH2M HILL, 2009k) and additional evaluation to assess temporal and spatial variability and preferential pathways is planned for 2010. If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

10.7 Statement of Protectiveness

The remedies for groundwater at OU 10 will be protective of human health and the environment. The horizontal air sparging system is intended to treat the highest VOC concentrations in groundwater. LTM and MNA will be conducted to evaluate the effectiveness of the system and monitor plume migration. LUCs will be implemented to prohibit aquifer use until cleanup levels for UU/UE are achieved.

Table 10-1
Cleanup Levels for OU 10 (Site 35)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (NCGWQS/MCL) (CH2M HILL, 2009)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Benzene	1	1	NCGWQS
	cis-1,2-Dichloroethene	70	70	NCGWQS/MCL
	Trichloroethene	2.8	3	NCGWQS
	Tetrachloroethene	0.7	0.7	NCGWQS
	1,1,2,2-Tetrachloroethane	0.17	0.2	NCGWQS
	Vinyl chloride	0.015	0.03	NCGWQS

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Legend

- Proposed LTM Monitoring Wells
- Direction of Groundwater Flow
- Estimated Horizontal Well Screening Portion
- Estimated Horizontal Well
- Installation Boundary
- Operable Unit 10
- Site 35 Boundary
- Former Air Sparge Trench
- Former Camp Geiger Fuel Farm
- ERD NTCRA (2007)
- ISCO Pilot Study (2003)
- Estimated Aquifer Use Control Boundary (1000 ft)

N

0 125 250 500 Feet

1 inch = 300 feet

Figure 10-1
OU 10 (Site 35)
Five-Year Review
MCB CamLej

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SECTION 11

Operable Unit No. 11 (Sites 7 and 80)

11.1 Site History and Background

OU 11 is located in the northeast portion of the Base, adjacent to the Northeast Creek (**Figure 1-2**). OU 11 covers approximately 8 acres and consists of two sites (Sites 7 and 80) that have been grouped together into one OU because of their similar disposal history and proximity to one another.

- **Site 7—Tarawa Terrance Dump** encompasses approximately 5 acres and is a former dump that was used during the construction of the Base housing located in Tarawa Terrace (**Figure 11-1**). Precise years of operation are unknown, but the dump was reportedly closed in 1972. Only construction debris, water treatment plant filter media, and household trash were reportedly disposed of. No site-related contamination and no unacceptable risks were identified to human health and the environment; therefore, Site 7 was closed and NFA is required (Baker, 1997).
- **Site 80—Paradise Point Golf Course Maintenance Area** encompasses approximately 3 acres northwest of Brewster Boulevard within the Paradise Point Golf Course **(Figure 11-1)**. The site has been used as the golf course maintenance facility since the 1940s. The past maintenance procedures and types of wastes disposed of is unknown. The facility is currently in operation as a maintenance facility for the Base golf course.

11.2 Site Chronology

A site chronology of key events and documents for OU 11 is presented below.

Date	Event
Unknown-1972	Waste disposal at Site 7
Unknown-present	Golf maintenance at Site 80
1991	SI
1996	RI
1996	TCRA to remove pesticide-contaminated soil at Site 80
1997	ROD
2007	LUCs for Site 80

11.3 Site Characterization

Findings for the OU 11 investigations are summarized below.

- Organic and inorganic compounds were identified in soil and groundwater at Site 80, specifically:
  - Pesticides were detected in soil in the west/northwest portion of the site
  - Low levels of pesticides, SVOCs, and metals were detected in groundwater
- No unacceptable risks were identified to ecological receptors
- Potential human health risks were identified for current and future receptors due to the presence of pesticides in soil

11.4 Description of Remedial Actions

A TCRA to remove pesticide-contaminated soil above industrial levels was conducted in 1996, minimizing the potential risks to human health. The ROD for OU 11 was signed on August 21, 1997 (Baker, 1997b). The ROD indicated no remedial actions were required at Sites 7 and 80. However, based on the recommendation from the last Five-Year Review, LUCs were implemented at Site 80 in 2007 (Section 11.4.3) (CH2M HILL, 2007). LUCs were implemented for soil and groundwater to eliminate potential exposure to waste (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The LUC objectives are to:

- Prohibit the development and use of property for residential housing, elementary and secondary schools, day care facilities, and recreational areas within the site boundary
- Prohibit intrusive activities within the site boundary

11.4.1 Remedy Implementation

LUCs were implemented at Site 80 in 2007. The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning. The LUC boundaries are shown on **Figure 11-1**. The LUCs shall be maintained until the concentrations of hazardous substances in the soil are at such levels as to allow for UU/UE.

11.4.2 Remedy Operation and Maintenance

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 11-1**. A visual inspection of the site was conducted in September 2008 to evaluate the LUCs and general site conditions (**Appendix B)**. No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

11.4.3 Progress since Last Five-Year Review

The TCRA conducted in 1996 removed pesticide-contaminated soils to reach cleanup levels established for industrial soils (**Table 11-1**) at Site 80. As a result, pesticides concentrations

remain in soil above levels that allow for UU/UE. Therefore, during the last Five-Year Review, LUCs were recommended and implemented in 2007.

11.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes. LUCs have been implemented to restrict non-industrial land use and intrusive activities.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels for pesticides in soil were identified as the USEPA Region III RBCs for industrial soil in the TCRA. The confirmation soil sample results documenting the removal of the pesticide contaminated soil indicate that the cleanup levels identified in the ROD were met (OHM, 1996b). Although the recent USEPA RSLs for industrial soil for aldrin and dieldrin are more conservative (Table 11-1), the area was restored with clean fill following the removal action, and LUCs for non-industrial use remain in-place and are protective.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that questions the protectiveness of the remedy.

11.6 Issues, Recommendations, and Follow-Up Actions

An ESD is recommended to document the LUCs as the remedy for Site 80. Because there was no unacceptable risk identified based on exposure to groundwater at Site 80, the monitoring wells are recommended for abandonment. LUCs restricting non-industrial land use and intrusive activities should remain in-place at Site 80 to prevent exposure to contaminated soil.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
NFA was the selected remedy in the ROD	Y	Y	Submit an ESD to identify LUCs as the remedy.	Navy	EPA/State	2013	Y	Y
Monitoring wells remain in-place	Y	Y	Abandon existing monitoring wells in accordance with NC Regulations.	Navy	EPA/State	2012	Y	Y

11.7 Statement of Protectiveness

LUCs are in-place to prohibit soil intrusive activities and prohibit non-industrial use within the extent of the former soil removal action areas where pesticides remain in soil above levels that allow for UU/UE. The LUCs for soil at Site 80 are protective of human health and the environment.

Table 11-1
Cleanup Levels for OU 11 (Site 80)
Five-Year Review
MCB CamLej

Media	COCs	TCRA Cleanup Levels (Baker, 1996)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Soil (μg/kg)	**Pesticides**			
	Aldrin	340	100	RSL-Industrial Soil
	Alpha-Chlordane	4,400	6,500	RSL-Industrial Soil
	Dieldrin	360	110	RSL-Industrial Soil
	4,4-DDD	2,400	7,200	RSL-Industrial Soil
	4,4-DDT	1,700	7,000	RSL-Industrial Soil
	Gamma-Chlordane	4,400	6,500	RSL-Industrial Soil

Notes:
Cleanup levels achieved/remain protective

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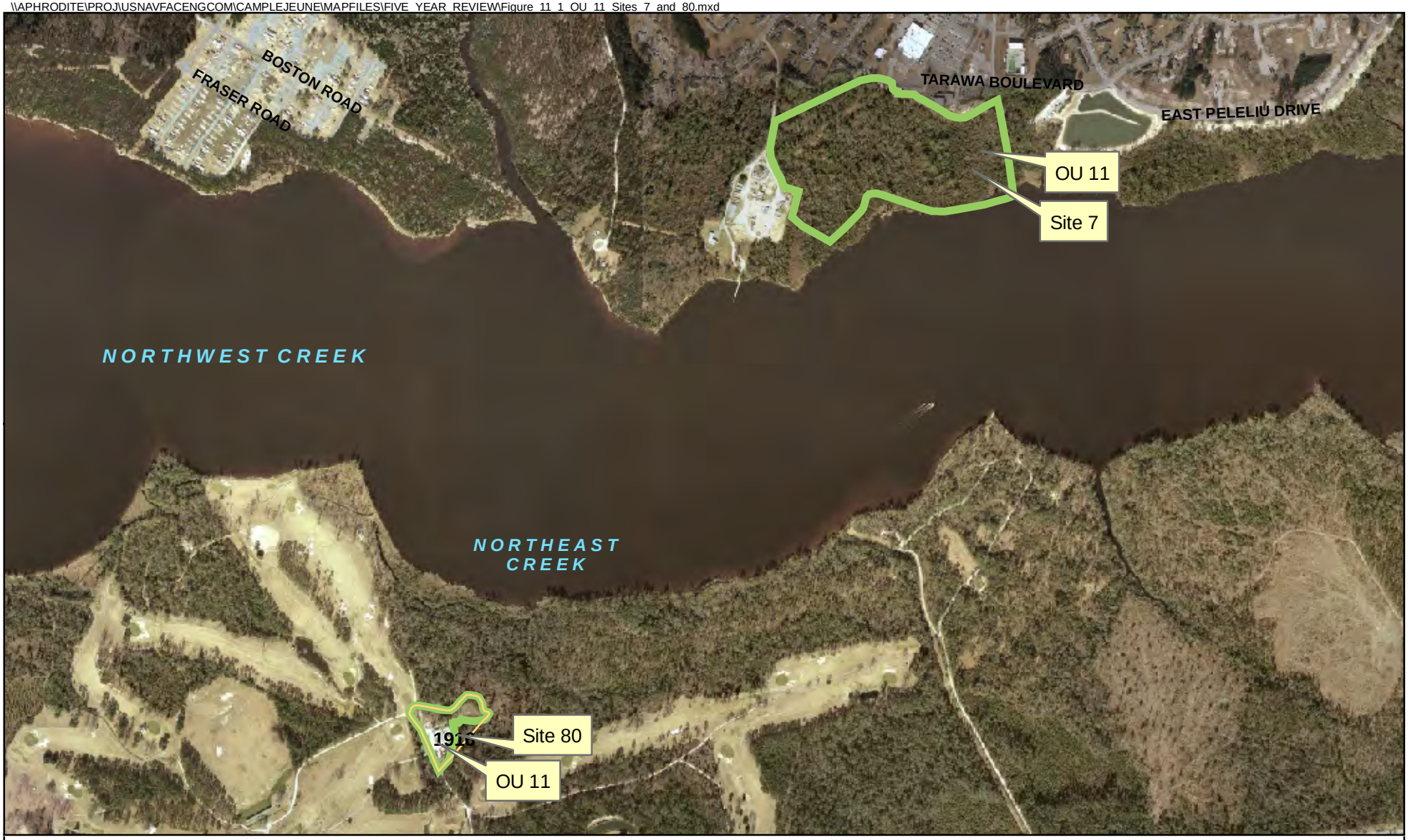

Legend

- Non-Industrial Use and Intrusive Activites (Soil) Control Boundary
- Operable Unit 11

N

0 500 1,000 2,000 Feet

1 inch = 1,000 feet

Figure 11-1
OU 11 (Sites 7 and 80)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 12

Operable Unit No. 12 (Site 3)

12.1 Site History and Background

OU 12 is located on the Mainside of the Base (**Figure 1-2**) and consists of one site:

- **Site 3—the Old Creosote Plant** encompasses approximately 5 acres (**Figure 12-1**). The site reportedly operated from 1951 to 1952 to supply treated lumber during construction of the Base Railroad. An onsite sawmill, which supplied cut timbers for the creosote treatment, was reportedly located in the northern portion of the Site.

12.2 Site Chronology

A site chronology of key events and documents for OU 12 is presented below.

Date	Event
1951-1952	Creosote Plant
1983	IAS
1991	SI
1996	RI/FS
1997	ROD
1998-present	LTM
2000	NTCRA
2000	Amended ROD
2001	LUCs prepared
2002	LUCs updated

12.3 Site Characterization

Findings for the OU 12 investigations are summarized below:

- Organic compounds were detected in soil and groundwater at Site 3, specifically:
  - PAHs were identified in surface and subsurface soil
  - PAHs and fuel constituents were identified in groundwater
- Groundwater flow in the shallow aquifer is to the southwest (**Figure 12-1**)
- No unacceptable ecological risks were identified

- Potential human health risks were identified for current base personnel and future residents due to exposure to PAHs in soil and for future residents due to potential exposure to PAHs and VOCs in groundwater

12.4 Description of Remedial Actions

The ROD for OU 12 was signed on April 3, 1997 (Baker, 1997a). The RAOs were:

- Prevent leaching of PAH contaminants from subsurface soil to the groundwater
- Remediate subsurface soil and shallow groundwater
- Prevent exposure to contaminated groundwater

The Selected Remedy includes these major components:

- Source removal with onsite biological treatment of PAH-contaminated soil
- LTM to monitor VOC and SVOC concentrations and plume migration
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The LUC objectives are to:
  - Prohibit non-industrial land use and intrusive activities in the vicinity of impacted soil
  - Prohibit intrusive activities within the vicinity of the estimated impacted groundwater extent
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, for the aquifers within 1,000 feet of the estimated impacted groundwater extent.

A Pilot Scale Treatability Study was conducted in 1998 and indicated that biological treatment of soils was not effective. As a result, an Amended ROD was signed on June 20, 2000 (Baker, 2000a), identifying soil excavation with offsite disposal as the most effective remedial action for PAH-contaminated soils.

The cleanup levels identified in the ROD for soil and groundwater are summarized in **Table 11-1**.

12.4.1 Remedy Implementation

An NTCRA to remove PAH-contaminated soil above industrial cleanup levels was completed in 2000. LTM at Site 3 was implemented in 1997 and LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

12.4.2 Remedy Operation and Maintenance

LTM at Site 3 was implemented in 1997. Three shallow and one intermediate well (**Figure 12-1**) are analyzed annually for VOCs and SVOCs. Water quality parameters

(temperature, pH, conductivity, DO, ORP, and turbidity) and groundwater elevations are measured prior to LTM activities. The results of LTM at OU 12 as well as recommendations are documented in annual reports.

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 12-1**. A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

12.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the ROD and was protective of human health and the environment. Since the last Five-Year Review, LTM and LUCs have continued and a LTM optimization evaluation was conducted.

Initial LTM at Site 3 consisted of four monitoring wells sampled for VOCs and SVOCs twice a year. In September 2005, an LTM Optimization Report (CH2M HILL, 2005) was completed to identify potential efficiencies for the LTM Program and recommended reducing the sampling frequency at Site 3 to an annual basis. One VOC (VC) and five SVOCs (2-methylnaphthalene, acenaphthene, dibenzofuran, naphthalene, and bis[2-ethylhexyl]-phthalate) have been detected in groundwater above their respective NCGWQS. Vinyl chloride has been detected at IR03-MW02IW and the concentrations are only slightly above the NCGWQS. Overall, the SVOC concentrations in groundwater have decreased and appear to be contained within the area of IR03-MW02.

12.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes. Based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the OU 12 remedy is functioning as designed. The results from the 2008 Annual LTM Report (AGVIQ/CH2M HILL, 2009) indicate that SVOC concentrations are decreasing and offsite and vertical migration has not occurred. LUCs remain in-place to restrict non-industrial land use, prohibit intrusive activities below the water table, and restrict aquifer use.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. The cleanup levels were identified as the more conservative of the Federal MCLs or NCGWQS at the time the ROD was signed. Since that time, the standards have been updated as listed in **Table 12-1**. In addition, some constituents (**Table 12-1**) that were not included in the ROD have exceeded current cleanup levels.

The cleanup levels for SVOCs in soil were identified as the USEPA Region III soil screening levels. The recent USEPA RSL for industrial soil for naphthalene is more conservative (**Table 12-1**). When comparing the historical remedial action confirmation soil data (OHM, 2000) to the current cleanup level for naphthalene, there were no exceedances.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

12.6 Issues, Recommendations, and Follow-up Actions

Currently, LTM data is compared to the cleanup levels identified in the ROD, NCGWQS, and Federal MCLs. It is recommended that the cleanup levels be amended to reflect the most current and conservative of either the NCGWQS or Federal MCLs as shown in **Table 12-1**. In addition, one VOC and two SVOCs that were not included in the ROD have exceeded NCGWQS during the previous four sampling rounds (**Table 12-1**). It is recommended that these constituents continue to be monitored during LTM events until four consecutive sampling events indicate the concentrations are below their respective cleanup levels.

An analysis of the LTM Program was conducted in 2009 (**Appendix D**) to provide optimization recommendations based on the current data. The LTM Program at Site 3 was determined to be sufficient and therefore, there are no optimization recommendations.

The IRP Partnering Team discussed the recommendations at the February 2010 meeting and because the concentrations have been below or equal to the cleanup levels for the previous two years that quarterly monitoring will be initiated to evaluate seasonal fluctuation and the data reviewed after each quarter to evaluate the results.

Because LTM is ongoing and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Cleanup levels have changed since the ROD	Y	Y	Update groundwater COCs and cleanup levels to reflect recent standards.	Navy	EPA/State	2012	Y	Y
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

12.7 Statement of Protectiveness

The remedy at OU 12 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. LUCs are in-place to prohibit soil intrusive activities and prohibit non-industrial use within the extent of the former soil removal action areas where PAHs remain in soil above levels that allow for UU/UE. LTM is ongoing to monitor the concentrations of VOCs and SVOCs in groundwater and LUCs are in-place to prohibit groundwater intrusive activities and aquifer use until cleanup levels are achieved. Although the cleanup levels have been updated, LTM is ongoing and is still protective.

Table 12-1
Cleanup Levels for OU 12 (Site 3)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (Baker, 1997)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Benzene	1	1	NCGWQS
	Chloroform	0.19	70	NCGWQS
	Vinyl chloride	--	0.03	NCGWQS
	SVOCs			
	Acenaphthene	--	80	NCGWQS
	Benzo(a)anthracene	0.05	0.05	NCGWQS
	Benzo(a)pyrene	2	0.005	NCGWQS
	Benzo(b)flouranthene	0.12	0.05	NCGWQS
	Benzo(k)flouranthene	1	0.5	NCGWQS
	Bis(2-ethylheyxl)phthalate	None	3	NCGWQS
	Carbazole	4	None	None
	Chrysene	5	5	NCGWQS
	Dibenzofuran	6	28	NCGWQS
	2,4-Dimethylphenol	31	100	NCGWQS
	2-Methylnaphthalene	63	30	NCGWQS
	2-Methylphenol	78	180	RSL-Tapwater
	Naphthalene	21	6	NCGWQS
	Phenanthrene	210	200	NCGWQS
	Phenol	300	30	NCGWQS
	Metals			
	Aluminum	50	3,700	RSL-Tapwater
	Iron	300	300	NCGWQS
Soil (μg/kg)	**SVOCs**			
	Benzo(a)anthracene	700	2,100	RSL-Industrial Soil
	Carbazole	500	None	None
	Chrysene	1,000	210,000	RSL-Industrial Soil
	2-Methylnaphthalene	30,000	370,000	RSL-Industrial Soil
	Naphthalene	30,000	18,000	RSL-Industrial Soil

Notes:
-- COC identified post-ROD based on exceedances of current cleanup levels during LTM
Cleanup levels achieved

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Legend

- LTM Monitoring Wells
- Direction of Groundwater Flow
- Operable Unit 12
- Aquifer Use Control Boundary (1000 ft)
- Non-Industrial Use and Intrusive Activites (Soil) Control Boundary
- Intrusive Activites Control Boundary (Groundwater)

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 12-1
OU 12 (Site 3)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 13

Operable Unit No. 13 (Site 63)

13.1 Site History and Background

OU 13 is located south of the MCAS New River (**Figure 1-2**) and consists of one site:

- **Site 63—Verona Loop Dump** encompasses approximately 5 acres (**Figure 13-1**). The area reportedly received bivouac wastes generated during training exercises. No hazardous wastes were reportedly disposed of at Site 63. Currently, training exercises, maneuvers, and recreational hunting take place in the area.

13.2 Site Chronology

A site chronology of key events and documents for OU 13 is presented below.

Date	Event
Unknown	Waste disposal operations
1983	IAS
1991	SI
1996	RI
1997	ROD
2001	LUCs prepared
2002	LUCs updated

13.3 Site Characterization

Findings from the OU 13 investigations are summarized below:

- Organic and inorganic compounds were detected in surface water, sediment, soil, and groundwater
- Fill material was identified in the soil and piles of various inert materials, including reinforced concrete rubble and construction debris, was identified on the ground surface
- No unacceptable risks to human health or the environment were identified

13.4 Description of Remedial Actions

The ROD for NFA at OU 13 was signed on April 3, 1997 (Baker, 1997c). However, institutional controls were implemented by the Base in 2001 for base planning purposes due to the sites past use as a dump. LUCs were implemented for groundwater to eliminate potential exposure to (e.g., deed restriction recorded with Onslow County as a notice of

contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The LUC objectives are to:

- Prohibit intrusive activities within the vicinity of the estimated impacted groundwater extent
- Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, for the aquifers within 1,000 feet of the estimated impacted groundwater extent

13.4.1 Remedy Implementation

LUCs were implemented at Site 63 in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

13.4.2 Remedy Operation and Maintenance

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 13-1**. A visual inspection of the site was conducted in September 2008 to evaluate the LUCs and general site conditions (**Appendix B)**. No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

13.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) did not identify any issues at Site 63 and concluded that the LUCs were protective of human health and the environment. No additional activities have been conducted since the previous Five-Year Review and LUCs remain in-place.

13.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes, LUCs have been implemented to restrict intrusive activities and aquifer use. Because of the suspected waste disposal at the site, LUCs restricting soil intrusive activities and prohibiting non-industrial land use are recommended within the extent of waste.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Yes, the exposure assumptions and toxicity data are still valid. Due to a lack of ecological or human health risks, no cleanup levels or RAOs were established at the time of the remedy selection.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that questions the protectiveness of the remedy.

13.6 Issues, Recommendations, and Follow-up Actions

Confirmation of whether the monitoring wells remain in-place since the RI will be conducted as part of the Basewide monitoring well survey. If the monitoring wells remain in-place, they will be recommended for abandonment.

Because of the suspected waste disposal at the site, LUCs restricting soil intrusive activities and prohibiting non-industrial land use are recommended within the extent of waste. An ESD is recommended to document the LUCs as the selected remedy.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Monitoring wells remain in-place	Y	Y	Abandon existing monitoring wells in accordance with NC Regulations.	Navy	EPA/State	2012	Y	Y
Current LUCs do not prevent soil intrusive activities or prohibit non-industrial use	Y	Y	Update LUCs to include restrictions for soil to prevent potential exposure to waste.	Navy	EPA/State	2012	Y	Y
NFA was the selected remedy in the ROD	Y	Y	Submit an ESD to identify LUCs as the remedy	Navy	EPA/State	2013	Y	Y

13.7 Statement of Protectiveness

LUCs are in-place to restrict groundwater intrusive activities and aquifer use; however, LUCs to prohibit non-industrial use and restrict soil intrusive activities are recommended to prevent exposure to remaining waste in-place at Site 63.

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Legend

- Aquifer Use Control Boundary (1000 ft)
- Intrusive Activites Control Boundary (Groundwater)
- Operable Unit 13

N

0 750 1,500 3,000 Feet

1 inch = 1,500 feet

Figure 13-1
OU 13 (Site 63)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 14

Operable Unit No. 14 (Site 69)

14.1 Site History and Background

OU 14 is located in the Rifle Range operations area near Sneads Ferry (**Figure 1-2**) and is comprised of one site.

- **Site 69—Rifle Range Chemical Dump**, encompasses approximately 14 acres (**Figure 14-1**). From 1950 to 1976, Site 69 was reportedly used to dispose of chemical wastes including PCBs, solvents, pesticides, and drums of gas that possibly contained cyanide (i.e., tear gas) or other training agents, also known as chemical agents. Site 69 is located within a former explosive range, Unexploded Ordnance (UXO)-02, which was used from 1973 to 2002 and is currently being addressed under the MMRP.

14.2 Site Chronology

A site chronology of key events and documents for OU 14 is presented below.

Date	Event
1950-1976	Disposal operations
1980-1981	Radiation survey and soil sampling
1983	IAS
1984-1987	CS
1992-1995	RI
1996-1998	Treatability Study for in-well aeration
1998	PRAP
1998-2005	LTM
2000	Interim ROD
2001	LUCs prepared
2002	LUCs updated
2008-present	Supplemental Investigation initiated

14.3 Site Characterization

Findings for the OU 14 investigations are summarized below:

- VOCs were detected in groundwater in the surficial aquifer and Castle Hayne Aquifer
- Geophysical investigations indicated buried metallic objects near the groundwater source area
- Groundwater flow in the surficial aquifer is radial from the lower lying areas to the north, south, east, and west; groundwater flow in the intermediate Castle Hayne Aquifer is towards the south/southeast; and groundwater flow in the deep Castle Hayne Aquifer is to the northeast toward the New River
- Surface water and sediment analytical results indicated that the New River, Everett Creek, and an unnamed tributary north of the site have not been impacted by the former disposal operations
- No unacceptable ecological risks were identified
- Potential human health risks were identified for future residents due to exposure to VOCs and metals in groundwater

14.4 Description of Remedial Actions

An Interim ROD for OU 14 was signed on June 29, 2000 (Baker, 2000). The ROD addresses soil, groundwater, and waste and was issued as Interim based on the potential for chemical agent and the location within UXO-02 that will be addressed under the MMRP. A Preliminary Assessment/Site Inspection (PA/SI) is planned at UXO-02, concurrently with the Supplemental Investigation at Site 69. Once the nature and extent of contamination is defined and potential risks to human health and the environment are evaluated, a Final ROD will be issued to address both UXO-02 and Site 69.

The RAOs identified in the Interim ROD were:

- Prevent exposure to contaminated groundwater
- Protect uncontaminated groundwater for future beneficial use
- Remediate contaminated groundwater for future beneficial use
- Prevent future potential exposure to subsurface soil, including landfill material
- Prevent migration of potential contaminants to shallow groundwater

The major components of the Interim Selected Remedy included:

- LTM for MNA of VOCs in groundwater and to monitor potential migration
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, fencing, signs. and inspections). The LUC objectives are to:
  - Prohibit intrusive activities within the vicinity of the estimated impacted groundwater extent

- Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, for the aquifers within 1,000 feet of the estimated impacted groundwater extent
- Prevent site access and maintain site access controls
- Prohibit non-industrial land use within the extent of the former waste disposal area which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities.
- Prohibit the installation of groundwater supply wells

The cleanup levels for soil and groundwater identified in the Interim ROD for OU 14 are summarized in **Table 14-1**.

14.4.1 Remedy Implementation

LTM at Site 69 was implemented in 1998 and included twice a year sampling of 15 monitoring wells for VOCs and NAIPs. LTM was discontinued in 2005 based on the planned Supplemental Investigation. LUCs were implemented in 2001 and updated in 2002 (Baker, 2002a). The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

14.4.2 Remedy Operation and Maintenance

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries are shown on **Figure 14-1**. A visual inspection of the site was conducted in September 2008 to evaluate LUCs and general site conditions (**Appendix B**). No issues concerning the protectiveness of the remedies in-place were noted during the site inspections.

14.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded that the remedy was functioning as intended by the Interim ROD and was protective of human health and the environment. Since the last Five-Year Review, LUCs have remained in-place, LTM optimization was conducted, a radiation survey was conducted, surface water and sediment sampling was performed, and a Supplemental Investigation was planned.

In 2005, an optimization of the LTM Program was conducted and the LTM Optimization Report (CH2M HILL, 2005) recommended removal of Site 69 from the program, as a Supplemental Investigation was planned. Prior to completion of the report, groundwater samples were collected in October 2004 and April 2005. The results of those sampling events indicated VOCs (primarily TCE and associated daughter products) were concentrated in the south-central portion of the site. Some low levels of VOCs were detected in wells installed in the deep zone of the Castle Hayne Aquifer.

In 2005, due to a request by Onslow County Commissioners, NCDENR–Department of Water Quality and the Base performed split surface water and sediment sampling in surface waters adjacent to Site 69. NCDENR recommended no further sampling and no advisory to be issued.

In 2007, a radiation survey was conducted and confirmed the 1981 investigation results, only naturally-occurring radioactivity levels were identified (RASO, 2007).

Because an Interim ROD is in-place for this site, the IRP Partnering Team agreed to complete supplemental field activities in order to delineate the nature and extent of contamination. Based on the potential presence of chemical agent, a Chemical Safety Submission (CSS) was initiated to address potential health and safety issues. However, an Applicability Determination was completed and a low level of risk was assigned and therefore a CSS was not required. The preparation of the CSS and Applicability Determination resulted in an extended schedule. Field activities were conducted in 2010, including a geophysical survey, monitoring well installation, and soil, groundwater, surface water, and sediment sampling (CH2M HILL, 2009d). The results will be evaluated and reported in 2010/2011.

14.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

No. The interim remedy for OU 14 was LTM for MNA and LUCs. LTM was discontinued due to planned additional Supplemental Investigations. Previous documents and LTM data were reviewed and evaluated to confirm that the VOCs in groundwater are not impacting the New River. Based on the direction of groundwater flow, VOC concentrations, and velocity, results indicate that the VOC plume is not expected to reach the river for at least 20 years. LUCs and access controls are in-place to prohibit exposure to waste and VOCs in groundwater.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Yes. The exposure assumptions, toxicity data, and RAOs are still valid. The cleanup levels were identified as the more conservative of the Federal MCLs or NCGWQS at the time the Interim ROD was signed. The data collected during the Supplemental Investigation will be compared and evaluated with respect to current screening levels and cleanup levels will be developed in the Final ROD.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that questions the protectiveness of the remedy.

14.6 Issues, Recommendations, and Follow-up Actions

A Supplemental Investigation at Site 69 and PA/SI for UXO-02 will be completed in 2010/2011. Once the nature and extent of contamination is defined and potential risks to human health and the environment are evaluated, a Final ROD will be issued to address both UXO-02 and Site 69.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
LTM program was discontinued due to supplemental investigation activities in support of a Final ROD	N	Y	LTM should be reinstituted upon completion of the supplemental investigation to monitor for potential downgradient migration.	Navy	EPA/State	2014	Y	Y

14.7 Statement of Protectiveness

The remedy at OU 14 is protective of human health and the environment, because exposure pathways that could result in unacceptable risks are being controlled. Perimeter fencing restricts access to the waste area at Site 69. The LUCs to restrict soil and groundwater intrusive activities and prohibit non-industrial and aquifer use is protective of human health and the environment because exposure to waste, soil, and groundwater that could result in unacceptable risks is being controlled.

Table 14-1
Cleanup Levels for OU 14 (Site 69)
Five-Year Review
MCB CamLej

Media	COCs	Interim ROD Cleanup Levels (Baker, 2000)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	1,2-Dichloroethene	70	70	MCL
	Trichloroethene	2.8	3	NCGWQS
	Vinyl chloride	0.015	0.03	NCGWQS
	Metals			
	Beryllium	4	4	MCL
	Chromium	50	10	NCGWQS
	Lead	15	15	NCGWQS/MCL
	Manganese	50	50	NCGWQS
	Vanadium	110	18	RSL-Tapwater
	Zinc	2,100	1,000	NCGWQS

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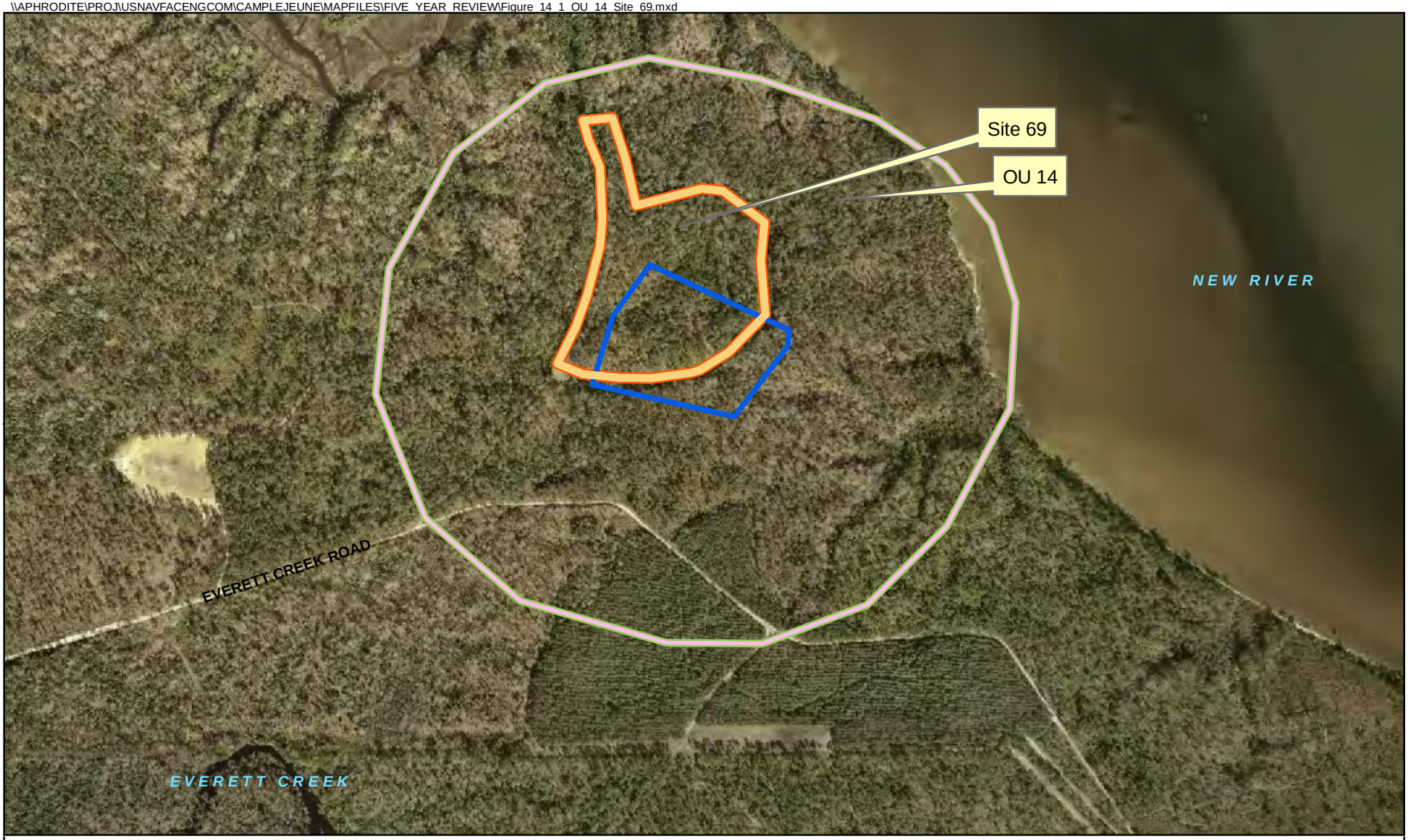

Legend

- Operable Unit 14
- Aquifer Use Control Boundary (1000 ft)
- Non-Industrial Use and Intrusive Activites (Soil) Control Boundary
- Intrusive Activites Control Boundary (Groundwater)
- Access Control Boundary

N

0 300 600 1,200 Feet

1 inch = 600 feet

Figure 14-1
OU 14 (Site 69)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 15

Operable Unit No. 15 (Site 88)

15.1 Site History and Background

OU 15 is located on the Mainside of the Base (**Figure 1-2**) and consists of one site.

- **Site 88—Former Base Dry Cleaning Facility** is former Building 25 that operated as a dry cleaning facility beginning in the 1940s (**Figure 15-1**). Five 750-gallon USTs were installed on the north side of the building to store dry cleaning fluids. Initially, Varsol™ was used in dry cleaning operations. Because of flammability concerns, the use of Varsol™ was discontinued in the 1970s and it was replaced with PCE. The PCE was stored in one 150-gallon AST adjacent to the north wall of Building 25, in the vicinity of the five USTs. PCE was reportedly stored from the 1970s until 1995. During this time, facility employees have reported that spent PCE was disposed of in floor drains. In December 1986 and March 1995, self-contained dry cleaning machines were installed in Building 25, eliminating the need for bulk storage of PCE. The USTs and AST were removed in November 1995. The dry cleaning operations ceased in January 2004, and the building was demolished to slab in August 2004.

15.2 Site Chronology

A site chronology of key events and documents for OU 15 is presented below.

Date	Event
1940s - 1995	Dry cleaning operations and five 750-gallon USTs used to store Varsol™
1970s – 1995	150-gallon AST used to store PCE
1986-1995	Self-contained dry cleaning machines installed
1995	Removal of the 5 USTs and AST
1996 - 1998	Focused RI
1998	Dense non-aqueous phase liquid (DNAPL) recovery
1999-2000	Surfactant Enhanced Aquifer Remediation (SEAR) Pilot Study
1999-2002	LTM
2001-2002	Reductive Anaerobic Bioremediation *In situ* Treatment Technology (RABITT) Pilot Study; Aggressive Fluid Vapor Recovery
2002-2003	Supplemental SI
2004	Dry cleaning operations ceased and Building 25 demolished
2004	Membrane Interface Probe (MIP) Investigation
2004	EE/CA for soil source area under Building 25

Date	Event
2004-2005	NTCRA, including soil mixing with clay-zero valent iron (ZVI) and dual-phase extraction in soil source area
2006 – 2008	Comprehensive RI
2007-2009	Basewide Vapor Intrusion Study
2009	Geophysical Investigation to confirm former UST removal
2009	Treatability Studies

15.3 Site Characterization

Findings from the OU 15 investigations are summarized below:

- Organic compounds were identified throughout soil and groundwater at OU 15, specifically:
  - Chlorinated solvents (PCE, TCE, and cis-1,2-DCE) were identified in soil under and adjacent to Building 25 and in groundwater within the surficial aquifer and the upper portion of the Castle Hayne aquifer
  - The presence of DNAPL was identified
- Groundwater in this shallow zone flows to the southeast, east, south, and north and groundwater in the intermediate and deep Castle Hayne Aquifer flows to the west, northwest, and northeast (**Figure 15-1**)
- No unacceptable ecological risks were identified
- Potential human health risks from exposure to VOCs in groundwater were identified for construction workers, industrial workers, and future residents

15.4 Description of Remedial Actions

Several interim actions have been conducted to reduce VOC concentrations in groundwater, including:

- Free-phase liquid recovery
- SEAR
- RABITT pilot scale test
- Shallow soil mixing with clay-ZVI addition

15.4.1 Remedy Implementation

A partial free-phase liquid recovery was conducted from 1998 through 2004. The SEAR Pilot Study was conducted from 1999 through 2000. The RABITT pilot scale test was implemented within the dissolved portion of the plume in 2001 and completed in 2002. Aggressive fluid vapor recovery (AFVR) activities were conducted during the RABITT pilot

test. Soil mixing with clay-ZVI was completed in the source area in 2005 as an NTCRA (CH2M HILL, 2006d).

15.4.2 Remedy Operation and Maintenance

No remedy is currently in-place at Site 88. A visual inspection of the site was conducted in September 2008 to evaluate the general site conditions (**Appendix B**). No issues were noted during the site inspection.

15.4.3 Progress since Last Five-Year Review

Since the last Five-Year Review (Baker, 2005), the soil mixing NTCRA and Comprehensive RI were completed, a Basewide Vapor Intrusion Investigation was conducted, and a Treatability Study was initiated. An FS was submitted in 2008 (CH2M HILL, 2008a); however, the Treatability Study is being conducted to evaluate potential remedial options in support of the FS.

In 2005, an NTCRA for shallow soil mixing with clay-ZVI and dual phase extraction was completed in the Building 25 source area. Approximately 7,050 yd^3 of impacted soil were treated. Within the treatment area (**Figure 15-1**), PCE concentrations in the soil were reduced by greater than 99 percent. Residual dissolved phase groundwater contamination remains over a large portion of the surrounding and downgradient areas.

From 2006 through 2008, a Comprehensive RI was conducted to define the source area and complete delineation of the chlorinated solvent release (CH2M HILL, 2008c). Field activities included monitoring well installation and groundwater sampling. The RI Report identified the horizontal and vertical extent and potential fate and transport of the VOC plume in groundwater. The HHRA identified potential human health risks based on exposure to VOCs in groundwater.

A Basewide Vapor Intrusion Study from 2007 through 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings (CH2M HILL, 2009k). Multiple locations across the Base were selected for evaluation, including the Site 88. Indoor air samples, groundwater grab samples, soil gas samples, and subslab soil gas samples were collected for VOC analysis. Elevated VOC concentrations were observed in exterior and subslab soil gas samples across the Site; however, based on comparisons with indoor air samples, it was concluded that vapor intrusion is not a current significant pathway of concern. The Report recommended additional sampling for temporal and spatial variability and/or evaluation of preferential pathways at Buildings 3, 3B, 4, 37, 43, and HP-57 that was conducted and will be reported in 2010 (**Figure 15-1**).

A Treatability Study was initiated in 2009 to further evaluate potential remedial technologies in support of the FS. ERD and chemical oxidation is being evaluated within the extent of the dissolved–phase VOC groundwater plume (CH2M HILL, 2009j).

15.5 Technical Assessment

An FS for Site 88 is currently being prepared. RAOs, cleanup levels, ARARs, and remedial alternatives will be developed in the FS, PRAP, and ROD.

15.6 Issues, Recommendations, and Follow-up Actions

The Final FS will be submitted based on the Treatability Study results, followed by submittal of a PRAP and ROD.

No current significant pathway of concern for vapor intrusion was identified based on the results of the Basewide Vapor Intrusion Evaluation (CH2M HILL, 2009k) and additional evaluation is being conducted to assess temporal and spatial variability and preferential pathways. If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway as part of the FS and during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

15.7 Statement of Protectiveness

Because there is potential human health risk from exposure to VOCs in groundwater and a ROD is not yet in-place, Base Environmental Management Division (EMD) ensures protectiveness of onsite workers and evaluates property use through the Base Master Planning process by maintaining up to-date GIS layers depicting groundwater contamination boundaries.

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Legend

- Operable Unit 15
- Site 88 Boundary (2007)
- Direction of Groundwater Flow
- NTCRA Soil Mixing (2005)

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 15-1
OU 15 (Site 88)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 16

Operable Unit No. 16 (Sites 89 and 93)

16.1 Site History and Background

OU 16 is located in the Camp Geiger operations area at MCAS New River and covers approximately 58 acres (**Figure 1-2**). OU 16 consists of two sites (Sites 89 and 93) that have been grouped together because of their proximity to one another and unique characteristic of suspected waste (solvents).

- **Site 89—the former DRMO** covers approximately 42 acres located west of the New River, near the intersection of G and 8th Streets (**Figure 16-1**). The Base Motor Pool operated onsite until approximately 1988, reportedly using solvents for parts cleaning. The DRMO was also operated at Site 89 as a storage yard for items such as scrap and surplus metal, electronic equipment, vehicles, and rubber tires until 2000. In the early 1990s, fuel bladders, which ranged in size from 600 to 20,000 gallons, were used onsite in training exercises for helicopter refueling. Base personnel reported that the bladders were emptied on the ground, cleaned with solvents, re-emptied on the ground, and capped prior to storage at the DRMO. The bladders were stored for 3 to 4 years in a pile approximately 75 feet in diameter by 25 feet high. A shredder was then brought onsite and placed immediately north of the bladder pile to shred the bladders into small cubes, which were placed into roll-off boxes. During shredding operations, liquids were observed escaping from the bladders. These liquids were not contained or removed. The site has not been used since the DRMO relocated in 2000. Access to most of Site 89 is restricted. Several vacant buildings are located within the restricted area. The unrestricted area is currently in use by the Marine Infantry School. All buildings onsite are planned for demolition.
- **Site 93—Building TC942** covers approximately 16 acres located at the intersection of Ninth and "E" Streets in the Camp Geiger section of MCAS New River (**Figure 16-1**). The buildings in this portion of Camp Geiger were constructed during the Korean War and currently function as classrooms, barracks, and supply rooms for the Marine Infantry School. Historical records indicate that a 550-gallon UST storing waste oil was previously located on Site 93, off the southwest corner of Building TC-942. The UST was permanently closed in December 1993.

16.2 Site Chronology

A site chronology of key events and documents for OU 16 is presented below.

Date	Event
Unknown	Waste oil UST installed at Site 93
1983	Waste oil UST installed at Site 89
Unknown-1988	Base Motor Pool operated at Site 89
1988-2000	Storage for miscellaneous items such as scrap and surplus metal, electronic equipment, rubber tires, vehicles, and fuel bladders for DRMO at Site 89
1993	USTs removed at Site 89 and Site 93
1994	UST Investigation at Site 89
1995 - 1996	Geotechnical Investigation and environmental screening conducted near the barracks area at Site 93
1996-1997	Focused RI at Sites 89 and 93
1999-2000	Post RI at Site 89
1999-2005	LTM at Sites 89 and 93
2000	TCRA to remove and treat vadose zone contaminated soil via Low Temperature Thermal Desorption (LTTD) conducted at Site 89
2001	NAE conducted for Site 93
2001	Aeration system installed in tributary of Edwards Creek
2001-2004	Electrical Resistance Heating (ERH) Pilot Study to address DNAPL at Site 89
2002	Additional Plume Characterization at Site 93
2005	FS for Site 93
2006	PRAP and Interim ROD for Site 93
2006-2008	Treatability Studies in dissolved-phase VOC plume at Site 89
2006-2008	RD/RA at Site 93
2006-2008	Comprehensive RI for Site 89
2007	EE/CA for source area treatment at Site 89
2007-2009	Basewide Vapor Intrusion Study
2008	Baseline Ecological Risk Assessment (BERA) Addendum for Site 89
2008-2009	NTCRA in source area via soil mixing with clay-ZVI at Site 89
2008-present	LTM at Site 93
2009	IRACR and LUCs at Site 93
2009	EE/CA for western wetland area at Site 89
2009-present	Fate and transport sampling at Site 89

16.3 Site Characterization

Findings from the OU 16 investigations are summarized below:

- Organic compounds were identified throughout OU 16 in soil, groundwater, and sediment, specifically:
  - Chlorinated VOCs were identified in soil and groundwater at Site 89 extending to approximately 50 feet bgs
  - PAHs and pesticides were identified in sediment in the western wetland area at Site 89
  - Chlorinated VOCs were identified in the surficial aquifer at Site 93
  - Groundwater analytical data from both sites suggested contaminant discharge to Edwards Creek, which is located along the southern boundary of Site 89
- Groundwater flow is south and east towards Edwards Creek and the New River (**Figure 16-1)**
- Potential ecological risks were identified for benthic dwelling organisms and amphibians primarily due to the presence of PAHs and pesticides in sediment in the western wetland area at Site 89. No unacceptable ecological risks were identified at Site 93
- Potential human health risks were identified for industrial workers and future residents at Site 89 due to exposure to VOCs in soil and groundwater. Potential human health risks were identified for future residents at Site 93 due to exposure to VOCs in groundwater

16.4 Description of Remedial Actions

In October 2006, a ROD was signed to address VOCs in groundwater at Site 93 (CH2M HILL, 2006c). The RAOs were:

- Reduce COC concentrations to meet the more conservative of NCGWQS or Federal MCLs
- Prevent human exposure to water containing COCs at concentrations above NCGWQS or Federal MCLs
- Achieve suitability of Site 93 groundwater for unlimited use with a reasonable approach and within a reasonable timeframe

The major components of the Selected Remedy for Site 93 included:

- ISCO with permanganate to treat the target area
- LTM for MNA of VOCs in groundwater and to monitor potential migration

- LUC implementation for groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The objectives of the LUCs are to:
  - Prohibit the withdrawal and any use of contaminated groundwater, except for environmental monitoring, from the aquifers (surficial and Castle Hayne) within 1,000 feet of the groundwater plume
  - Prohibit intrusive activities within the extent of the current groundwater contamination unless specifically approved by both NCDENR and USEPA
  - Maintain the integrity of any current or future remedial or monitoring system such as monitoring wells

The cleanup levels identified in the ROD for groundwater at Site 93 are summarized in **Table 16-1**.

16.4.1 Remedy Implementation

A TCRA was completed at Site 89 in October 2000 for the removal and treatment of vadose zone contaminants in the southern portion of the site. LTTD units were used to treat the contaminated soil. In 2008, a NTCRA of soil mixing with clay-ZVI was conducted in the VOC source area at Site 89.

The ISCO injections were conducted at Site 93 from 2006 through 2008. LTM at Site 93 was initiated in 2008, upon completion of the ISCO injections. LUCs for Site 93 were implemented in 2009. The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

16.4.2 Remedy Operation and Maintenance

The ISCO injections were conducted at Site 93 from 2006 through 2008. Upon completion of the ISCO injections, LTM at Site 93 was initiated in 2008. Eleven shallow wells, five intermediate wells, and one deep monitoring well are sampled quarterly for VOCs and NAIPs (**Figure 16-1**). Water quality parameters for groundwater (temperature, pH, conductivity, DO, ORP, and turbidity) and groundwater elevations are measured prior to LTM. The results of LTM at Site 93 as well as recommendations are documented in annual LTM Reports.

In 2008, a NTCRA consisting of soil mixing with clay-ZVI was conducted in the VOC source area at Site 89. Baseline and follow-up monitoring was conducted through August 2009.

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries at Site 93 are shown on **Figure 16-1**. A visual inspection of Sites 89 and 93 was conducted in September 2008 to evaluate the LUCs, and general site conditions (**Appendix B**). No issues were noted during the site inspections.

16.4.3 Progress since Last Five-Year Review

Since the last Five-Year Review (Baker, 2005) a Treatability Study (AGVIQ-CH2M HILL, 2008a), Comprehensive RI, BERA Addendum, EE/CA (AGVIQ-CH2M HILL, 2007) and

Action Memorandum, NTCRA, and fate and transport sampling were conducted at Site 89. At Site 93, an FS and a PRAP were prepared, the ROD was signed, the RD/RA was conducted (CH2M HILL, 2006e), LTM was initiated, LUCs were established, and an IRACR was prepared (Shaw, 2009). A Basewide Vapor Intrusion Investigation was also conducted that included OU 16.

Site 89

In 2006, a Treatability Study was implemented at Site 89 in the dissolved-phase VOC plume to evaluate the performance and effectiveness of four remedial alternatives (air sparging using a horizontal well, permeable reactive barrier (PRB) of mulch/compost, chemical reduction via ZVI, and ERD) (**Figure 16-1**). While air sparging and ERD reduced contaminant mass for a similar cost per volume treated, air sparging was the most practical technology for full scale implementation. The results of the studies will be used to develop a better exit strategy for the site, and to provide options for future treatment train approaches (CH2M HILL, 2008b).

A Comprehensive RI was conducted at Site 89 from 2006 through 2008. Field activities included a MIP Investigation; monitoring well installation; slug testing; groundwater, soil, vapor, sediment, surface water, and pore water sampling; and a benthic community survey. TCE and PCA and their degradation products were detected at elevated concentrations in soil, groundwater, and surface water (CH2M HILL, 2008c). Elevated pesticides and PAHs were also identified in sediment in the adjacent western wetland area. A BERA Addendum was conducted and confirmed an isolated area of elevated sediment concentrations and potential ecological risks were identified (CH2M HILL, 2008h). An EE/CA and Action Memorandum was prepared to evaluate removal action alternatives to address the potential ecological risks and the NTCRA was conducted (CH2M HILL, 2009i).

In 2007, an EE/CA was prepared to evaluate removal action alternatives to reduce risks to human health and environment in the DNAPL source area. Five alternatives were evaluated and soil mixing with ZVI-clay addition was the selected NTCRA. A Bench-Scale Study was conducted to optimize the amount of ZVI and clay for treatment. The area treated was 32,000 ft^2 at a depth of 25 feet resulting in a total treated volume of 30,000 yd^3. Follow-up monitoring indicated significant reduction in VOC concentrations in the soil, groundwater, and adjacent creek.

Because of the potential for groundwater transport to the adjacent creek, additional fate and transport monitoring of groundwater downgradient from the soil mixing area is being conducted in 2009. The results will be incorporated in the FS for Site 89.

Site 93

In 2005, an FS was prepared to evaluate remedial alternatives to address groundwater VOC contamination (CH2M HILL, 2005). In 2006, the PRAP was completed and a public meeting and public comment period were held to solicit community input on the preferred alternative: ISCO, MNA, and LUCs (CH2M HILL, 2006). The ROD was signed in 2006 and ISCO, MNA, and LUCs were identified as the Selected Remedy (CH2M HILL, 2006).

ISCO was conducted in two phases (Shaw, 2008). The first phase was conducted from October 2006 to February 2007. Due to wet conditions during the winter months, the

treatment was suspended until drier conditions. The second phase of ISCO was conducted June 2007 to December 2007. The aerial extent of the injection site covered 20,000 ft^2 with 200 injection points installed in the shallow aquifer to total depths of 16 feet bgs. During Phase I of the ISCO treatment, approximately 92,000 gallons of permanganate solution were injected. During Phase II, an additional 144,000 gallons of permanganate solution were injected. At the completion of Phase II only 60 percent of the design quantity of reagent had been injected due to site conditions, low site permeability, and increasing costs. Baseline and follow-up groundwater monitoring was conducted and results indicated slight reductions in VOC concentrations; however, the concentrations remained above the cleanup levels. After reviewing the data, it was determined that the ISCO treatment was not cost effective and would be suspended and MNA initiated.

LTM was initiated in 2008 and includes quarterly sampling at 11 shallow, five intermediate, and one deep well for TCL VOCs and NAIPs. Results of the 2008 LTM sampling indicate seven VOCs (1,1,2,2-PCA, PCE, TCE, 1,1-dichloroethane [1,1-DCA], cis-1,2-DCE, trans-1,2-DCE, and VC) were detected in groundwater samples at concentrations above the cleanup levels. The presence of parent and daughter products indicates that degradation is occurring.

LUCs to prohibit aquifer use and restrict intrusive activities within the extent of groundwater VOC contamination were established in 2009. An IRACR was prepared to document the remedy was implemented and is operational (Shaw, 2009).

OU 16

A Basewide Vapor Intrusion Study was conducted from 2007 to 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings. Multiple locations across the Base were selected for evaluation, including Camp Geiger. The investigation within Camp Geiger included buildings at Site 89 and Site 93. Groundwater grab samples, soil gas samples, and subslab soil gas samples were collected for VOC analysis. Elevated VOC concentrations were detected in exterior soil gas samples collected at Site 89; however, no current vapor intrusion impacts were identified. No risks were identified from indoor air related to vapor intrusion at Site 93. Therefore, it was concluded that vapor intrusion is not a current significant pathway of concern for any of the buildings located in the vicinity of OU 16. The Report (CH2M HILL, 2009k) recommended additional sampling to evaluate temporal and spatial variability at Buildings TC860 and TC864 located at Site 89 that was completed and will be reported in 2010.

16.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

Yes. Based on the review of documents, LTM results, ARARs, risk assumptions, site inspections, and O&M costs, the remedy at Site 93 is functioning as designed. The results from the 2008 Annual LTM Report (AGVIQ/CH2M HILL, 2009) indicate that VOC concentrations at Site 93 appear to be confined to the shallow and intermediate aquifers and vertical migration to the deep aquifer has not occurred.

Although ORP, nitrate, and Fe^{2+} levels favor limited reductive dechlorination, the high DO and sulfate concentrations are not favorable for this process. The average DO levels in shallow and intermediate wells were 4.36 mg/L and 2.91 mg/L, respectively, in August 2008. Previous DO concentrations were lower but still greater than 1.0 mg/L overall.

NAIP	Range of Results (August 2008)	Condition Needed for Reductive Dechlorination	Favorable / Unfavorable
Shallow Aquifer Zone			
ORP	-189 mV to +104 mV	Less than +50 mV (favorable) Less than -100 mV (ideal)	Ideal to Unfavorable
DO	0.24 mg/L to 7.26 mg/L	Less than 1.0 mg/L	Unfavorable
Nitrate	< 0.05 mg/L	Less than 1.0 mg/L	Favorable
Fe^{2+}	<0.4 mg/L to 6.57 mg/L	Measurable Levels	Favorable
Sulfate	13 mg/L to 212 mg/L	Less than 20 mg/L	Unfavorable
Intermediate Aquifer Zone			
ORP	-167 mV to 54 mV	Less than +50 mV (favorable) Less than -100 mV (ideal)	Ideal to Favorable
DO	0.00 mg/L to 7.12 mg/L	Less than 1.0 mg/L	Favorable
Nitrate	< 0.05 mg/L	Less than 1.0 mg/L	Favorable
Fe^{2+}	1.95 mg/L to 3.88 mg/L	Measurable Levels	Favorable
Sulfate	0.00 mg/L to 18.7 mg/L	Less than 20 mg/L	Favorable

The presence of parent and daughter products (1,1,2,2-PCA, PCE, TCE, 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, and VC); however, indicates that some degradation is occurring (AGVIQ/CH2M HILL, 2009). LUCs remain in-place to prohibit intrusive activities below the water table and restrict aquifer use until cleanup levels are achieved.

An FS is currently underway at Site 89. RAOs, cleanup levels, ARARs, and remedial alternatives will be developed in the FS, PRAP, and ROD.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Yes. The exposure assumptions, toxicity data, and RAOs are still valid for Site 93. The cleanup levels were identified as the more conservative of the Federal MCLs or NCGWQS at the time the ROD was signed and are still current. Since the ROD, some of the updated cleanup levels are less conservative. In addition, several VOC constituents (**Table 16-1**) that were not included in the ROD have exceeded current cleanup levels during the previous four sampling rounds.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

16.6 Issues, Recommendations, and Follow-up Actions

Site 89

No issues have been identified at Site 89 during the Five-Year Review. An NTCRA to address potential ecological risks in the adjacent western wetland area was conducted and will be reported in 2010. In preparation for the FS, a fate and transport evaluation is ongoing to monitor groundwater quality between the soil mixing treatment area and Edwards Creek. An FS, PRAP, and ROD will then be completed.

Site 93

Currently, LTM data collected at Site 93 is compared to the cleanup levels identified in the ROD. Two VOCs (1,2-DCA and 1,2-DCE) that are daughter products not included in the ROD have exceeded NCGWQS during the previous four sampling rounds (**Table 16-1**). It is recommended that these VOCs continue to be monitored during LTM events until four consecutive sampling events indicate the concentrations are below their respective NCGWQS.

An analysis of the LTM Program was conducted in 2009 (**Appendix D**) to provide optimization recommendations based on the current data. The recommendations for Site 93 are:

- Begin annual monitoring of all LTM monitoring wells
- Replace low-flow sampling techniques with PDB sample technology
- Begin NAIP sampling utilizing low-flow sampling techniques every other year
- Remove IR93-MW02DW, IR93-MW03, IR93-MW03IW, IR93-MW04, and IR93-MW04IW from the LTM Program

Additionally, because LTM is ongoing and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

OU 16

Although no current significant pathway of concern for vapor intrusion was identified based on the results of the basewide vapor intrusion evaluation (CH2M HILL 2009), additional evaluation to assess temporal and spatial variability was conducted and will be reported in 2010. If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Site 93 cleanup levels have changed since the ROD	Y	Y	Update groundwater COCs and cleanup levels for Site 93 to reflect recent standards.	Navy	EPA/State	2012	Y	Y
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

16.7 Statement of Protectiveness

Site 89

Through the implementation of several pilot studies and NTCRAs, the overall VOC contamination at Site 89 has been significantly reduced. However, there is potential human health risk from exposure to VOCs in groundwater and ecological risk from PAHs and pesticides in the western wetland area. To ensure protectiveness until the ROD is signed, the following preventative measures have been instituted:

- Base EMD ensures protectiveness of onsite workers and evaluates property use through the Base Master Planning process by maintaining up to-date GIS layers depicting groundwater contamination boundaries
- A fence was installed around the site boundary to restrict access
- An aeration system, installed in Edwards Creek, is currently operational to promote reduction of VOC concentrations
- An NTCRA was completed in 2010 to mitigate potential risks to ecological receptors in the western wetland area
- Fate and transport sampling is ongoing to monitor groundwater quality between the soil mixing treatment area and Edwards Creek

Site 93

LTM is ongoing to monitor MNA of VOCs in groundwater and potential migration. LUCs are in-place to prohibit groundwater intrusive activities and aquifer use until cleanup levels are achieved. These remedies for groundwater at Site 93 are protective of human health and the environment in the short-term because exposure pathways that could result in unacceptable risks are being controlled and LUCs preventing exposure to groundwater are in-place. However, the remedy will be protective in the long-term once the cleanup levels have been achieved by the natural attenuation process.

Table 16-1
Cleanup Levels for OU 16 (Site 93)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (CH2M HILL, 2006)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	1,2-Dichloroethane	--	0.02	NCGWQS
	1,2-Dichloroethene	--	0.4	NCGWQS
	cis-1,2-Dichloroethene	70	70	NCGWQS/MCL
	trans-1,2-Dichloroethene	70	100	NCGWQS/MCL
	1,1,2,2-Tetrachloroethane	0.17	0.2	NCGWQS
	Tetrachloroethene	0.7	0.7	NCGWQS
	Trichloroethene	2.8	3	NCGWQS
	Vinyl chloride	0.015	0.03	NCGWQS

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Legend

- LTM Monitoring Well Locations
- Direction of Groundwater Flow
- PRB Treatability Study (2006)
- Horizontal Air Sparge Treatability Study (2006)
- Surface Water Body
- ISCO (2007)
- ERH (2004)
- ERD Treatability Study (2006)
- Ferox Treatability Study (2006)
- Soil Mixing NCTRA (2008)
- Site 89 Boundary
- Aquifer Use Control Boundary
- Intrusive Activites Control Boundary (Groundwater)
- Operable Unit 16

N

0 150 300 600 Feet

1 inch = 300 feet

Figure 16-1
OU 16 (Sites 89 and 93)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 17

Operable Unit No. 19 (Site 84)

17.1 Site History and Background

OU 19 is located within Mainside, one mile west of the Main Gate (**Figure 1-2**), and consists of one site:

- **Site 84—Former Building 45** covers approximately 5 acres just south of State Route 24, one mile west of the Main Gate (**Figure 17-1**). The property was purchased by the federal government in 1941 and Building 45 was a former electric substation, where transformers reportedly containing PCBs were used and possibly stored. The building was constructed by the Navy soon after purchasing the property, and leased to Tidewater Electric, who operated the building through 1965. In 1965, Building 45 was converted to a maintenance facility for large machinery. While no official operational history exists for the building and the surrounding property, former employees recalled that site activities included PCB transformer maintenance, recycling, and onsite disposal of spent transformer casings. A transformer was discovered near a wooded area and additional transformers (approximately 20), potentially containing PCB dielectric oil, were discovered near the woods of the powerhouse. Maintenance personnel at Building 45 have previously indicated that additional transformers may still be buried in areas near a former lagoon; however, an excavation is reported to have been performed by Public Works Center personnel and no waste materials were discovered. The site is currently not in use and access is restricted.

17.2 Site Chronology

A site chronology of key events and documents for OU 19 is presented below.

Date	Event
Unknown	Electrical transformers used and possibly stored in powerhouse
1965-early 1990s	Building 45 maintenance facility
1990	Preliminary SI
1992	UST Investigation
1995	Phase I Site Screening Sampling
1996	Corrective Action Plan
1998	Additional Site Screening and Pre-RI Study
1999	UST Removal
1999	Preliminary EE/CA
1999	Building 45 partially demolished (foundation left in-place)

Date	Event
1999	Concrete chip and surface water sampling
2001-2002	RI/FS
2002	PRAP, EE/CA, and Action Memorandum
2002	Phase I NTCRA including removal of Building 45 foundation and surrounding soils
2002-2004	Phase II NTCRA to remove PCB- and comingled PCB/TPH-contaminated soil and removal/backfill of lagoon
2005-2006	Supplemental Investigation
2006	Phase III NTCRA to remove PCB-contaminated soil
2007	CCR
2008	Amended FS and PRAP
2009	ROD and LUCs implemented

17.3 Site Characterization

Findings from the OU 19 investigations are summarized below:

- Organics and inorganics were identified in soil, groundwater, surface water, and sediment at OU 19, specifically:
  - PCBs were detected in soil, surface water, and sediment in and around the lagoon
  - PCBs, pesticides, PAHs, and metals were identified in soil around former Building 45 and west of the building
  - VOCs, pesticides, and metals were identified in shallow groundwater
- Groundwater in the surficial aquifer flows northwest toward Northeast Creek
- Potential unacceptable risks to terrestrial receptors were identified primarily due to the presence of PCBs, pesticides, and metals in surface soil. Potential unacceptable risks to aquatic receptors were identified primarily due to the presence of VOCs, SVOCs, and PCBs in lagoon sediment
- Potential unacceptable human health risks were identified for future industrial workers, construction workers, and residents due to the presence of PCBs and PAHs in surface soil and for future residents due to the presence of pesticides and metals in groundwater
- Following the three NTCRAs and subsequent data evaluation, the only potential unacceptable risk remaining was for future construction workers and residents due to the presence of PCBs in soil

17.4 Description of Remedial Actions

The ROD for OU 19 was signed in January 2009 (Rhea, 2009) and the RAO is:

- Remove contaminated surface and subsurface soils that contain PCBs in excess of the selected remedial cleanup level and prevent exposure to remaining PCB-contaminated soil consistent with the requirements for a low occupancy industrial area

The major components of the Selected Remedy include:

- Removal of PCB-contaminated soil
- LUC implementation for soil to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, fencing, signs, and inspections). The objectives of the LUCs are to:
  - Prohibit non-industrial land use which includes restrictions on the construction of residential housing, hospitals, hotels, nursing homes, and day care facilities
  - Prohibit intrusive activities within the areas of PCB contamination greater than 10 milligrams per kilogram (mg/kg) in subsurface soils (i.e., greater than 2-foot depth)
  - Maintain the integrity of the 24-inch vegetative soil cover to limit exposure to subsurface soil with PCB contamination greater than 10 mg/kg

The cleanup levels identified in the ROD are included on **Table 17-1**.

17.4.1 Remedy Implementation

Three NTCRAs were conducted from 2002 through 2006 to remove PCB-contaminated soil and a soil cover has been put in-place across the site. In 2009, LUCs were implemented in the extent of PCB soil contamination greater than 10 mg/kg to restrict intrusive activities and a fence and signs were installed to restrict access. LUCs were also implemented to prohibit non-industrial use in the extent of PCB soil contamination greater than 1 mg/kg. The LUCs were recorded with Onslow County as a notice of contamination and in the Base GIS and Master Planning.

17.4.2 Remedy Operation and Maintenance

Monitoring of the LUCs is routinely performed by the Base (**Appendix A**). The LUC boundaries at Site 84 are shown on **Figure 17-1**. A visual inspection of the site was conducted in September 2008 to evaluate the LUCs and general site conditions (**Appendix B**). No issues were noted during the site inspections.

17.4.3 Progress since Last Five-Year Review

The previous Five-Year Review (Baker, 2005) concluded the interim NTCRAs at the site were protective of human health and the environment. Since that time, a Supplemental Investigation was performed; the Phase III NCTRA was conducted; an Amended FS, PRAP, and ROD were completed; and LUCs were implemented.

In 2005, a Supplemental Investigation was conducted at Site 84 (Rhea, 2006). A Geophysical Investigation uncovered two underground pipes originating from the area of former Building 45. One of the pipes corresponded to the location of a concrete-encased steel pipe partially excavated during the Phase II NTCRA. PCB concentrations in soil samples collected from both pipes were less than 10 mg/kg and the pipes were left in-place. A confirmation groundwater sample collected during the investigation indicated no exceedances of the NCGWQS.

The Phase III NTCRA was conducted in 2006 to remove additional PCB-contaminated soil to the south and west of the previous NTCRA locations (Rhea, 2007). Complete excavation was deemed impractical in areas with buried, active utility and communication lines. In these areas, a 2-foot thick vegetative soil cover was placed over the PCB-contaminated soil.

In 2008, an Amended FS was prepared to evaluate remedial alternatives to address PCB soil contamination (Rhea, 2008b) and the PRAP was completed followed by a public meeting and public comment period to solicit community input on the preferred alternative: removal of PCB-contaminated soil and LUCs (Rhea, 2008a). The ROD was signed in 2009 and removal of PCB-contaminated soil and LUCs were identified as the Selected Remedy (RHEA, 2009). The LUCs were implemented in 2009.

17.5 Technical Assessment and Summary

Is the remedy functioning as intended by the decision document?

Yes. Based on a review of documents, ARARs, risk assumptions, site inspections, and O&M costs, the OU 19 remedy is functioning as designed. Three NTCRAs have been performed to remove PCB-contaminated soil and a soil cover is in-place. LUCs have been implemented to restrict non-industrial land use and intrusive activities. A fence and signs were also installed to restrict access.

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Yes. The exposure assumptions, toxicity data, cleanup levels, and RAOs are still valid.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the remedy.

17.6 Issues, Recommendations, and Follow-up Actions

Because there was no unacceptable risk identified based on exposure to groundwater at Site 84, confirmation of whether the monitoring wells remain in-place since the RI will be conducted as part of the Basewide monitoring well survey. If the monitoring wells remain in-place, they will be recommended for abandonment.

A RACR is currently being prepared to document that the remedy is in-place.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Monitoring wells remain in-place	Y	Y	Abandon existing monitoring wells in accordance with NC Regulations.	Navy	EPA/State	2012	Y	Y

17.7 Statement of Protectiveness

LUCs are in-place to prohibit soil intrusive activities and prohibit non-industrial use within the extent of the former soil removal action areas where PCBs remain in soil above levels that allow for UU/UE. A fence and signs were also installed to restrict access. The LUCs for soil at OU 19 are protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled.

Table 17-1
Cleanup Levels for OU 19 (Site 84)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels for Intrusive Activities (RHEA, 2009)	Source of Cleanup Levels for Intrusive Activities	ROD Cleanup Levels for Industrial Land Use (RHEA, 2009)	Source of Cleanup Levels for Industrial Land Use
Soil (µg/kg)	PCBs	10,000	Action Level for Low Occupancy Land Use (USEPA, 1990)	1,000	Action Level for High Occupancy Land Use (USEPA & TSCA)

Notes:
Cleanup levels achieved

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Legend

- Non-Industrial Use Control Boundary
- Intrusive Activites Control Boundary (Soil)
- Access Control Boundary
- Operable Unit 19
- Installation Boundary

N

0 300 600 1,200 Feet

1 inch = 600 feet

Figure 17-1
OU 19 (Site 84)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 18

Operable Unit No. 21 (Site 73)

18.1 Site History and Background

OU 21 is located in the Courthouse Bay area on the Mainside of the Base (**Figure 1-2**) and is comprised of one site.

- **Site 73—Amphibious Vehicle Maintenance Facility** covers approximately 13 acres located along the northwest shore of Courthouse Bay (**Figure 18-1**). The Amphibious Vehicle Maintenance Facility was constructed in 1946. Maintenance activities were historically conducted in the former maintenance building (Building A3), located southeast of the current Building A47. Used motor oil and battery acid resulting from maintenance activities were reportedly discharged directly to the ground surface northeast of Building A3. Between 1983 and 1989, Building A3 was demolished and Building A47 was constructed. Based on the nature of maintenance activities conducted and CVOCs identified in groundwater, it is likely that other hazardous substances including chlorinated solvents, were also disposed of in this area. Ten USTs containing various petroleum hydrocarbon products (diesel fuel, gasoline, and/or waste oil) were formerly located at Site 73 to support the operations. All USTs except A47-1 have been removed (approximate location of A47-1 is within the footprint of the former maintenance building). UST A47-1 is currently not in use and is believed to be closed in-place. NCDENR issued NFA for five of the USTs (A47-2, A47-4, A47-5, A-2, and A-10/SA26). Investigations are currently being completed under the UST Program for four of the USTs (A47-3, UST-A47/SA21, A12-1, and A12-2). Significant development of the Courthouse Bay area surrounding Site 73 has occurred in the last 10 to 15 years and the current land use is industrial.

18.2 Site Chronology

Date	Event
1946-1977	Waste oil and battery acid disposal operations
1983	IAS
1984-1987	CS
1991-1993	UST Investigations
1994	Preliminary Investigation
1995-1997	RI
1998	Supplemental Groundwater Investigation and FS
2000-2002	NAE Investigation
2000-2005	LTM

Date	Event
2002	Air Sparging Interim Measure
2003-2006	Technology Evaluation and Hydrogen Sparging Pilot Study
2005–2009	Supplemental RI
2007-2008	Ozone Sparging Pilot Study
2007-2009	Basewide Vapor Intrusion Study
2009	FS/PRAP/ROD

18.3 Site Characterization

Findings for the OU 21 investigations are summarized below:

- Organics were identified in soil and groundwater at Site 73, specifically:
  - VOCs were detected in shallow, intermediate, and deep groundwater
  - Petroleum hydrocarbons were detected in soil
- Groundwater generally flows to the east-southeast toward Courthouse Bay (**Figure 18-1**)
- No unacceptable ecological risks were identified
- Potential human health risks were identified to future residents due to the presence of VOCs in groundwater and petroleum hydrocarbons in subsurface soil

18.4 Description of Remedial Actions

Several interim actions have been conducted at Site 73 including air sparging via well injection points and hydrogen sparging via a horizontal well. The ROD for OU 21 was signed in November 2009 (CH2M HILL, 2009m). The RAOs were:

- Restore groundwater quality at Site 73 to the NCGWQS and MCL standards based on the classification of the aquifer as a potential source of drinking water (Class GA or Class GSA) under 15A NCAC 02L.0201, and to prevent human ingestion of water containing COCs (benzene, TCE, cis-1,2-DCE, 1,1-DCE, and VC) at concentrations above NCGWQS or MCL standards, whichever is more stringent, until the cleanup levels have been obtained
- Prevent future residential exposure to petroleum hydrocarbon-contaminated soils above the North Carolina Hazardous Waste Section Soil Screening Levels (NC HWS SSLs) and minimize transport to groundwater
- Minimize migration of COCs in groundwater to surface water

The major components of the Selected Remedy include:

- Air sparging using a horizontal well

- Downgradient ERD injections
- LTM for MNA of VOCs in groundwater and to monitor potential migration
- LUC implementation for soil and groundwater to eliminate exposure to contaminants (e.g., deed restriction recorded with Onslow County as a notice of contamination and maintained in the Base GIS and with Base Master Planning, and inspections). The objectives of the LUCs are to:
  - To prohibit human consumption of groundwater from the surficial aquifer and Castle Hayne aquifer underlying Site 73
  - To prohibit residential/recreational uses and development at the site including, but not limited to, any form of housing, any kind of school, day care facilities, playgrounds, and adult nursing facilities
  - To prohibit unauthorized intrusive activities in areas with contaminated soil
  - To maintain the integrity of any existing or future monitoring or remediation system at the site such as monitoring wells, concrete cover, and horizontal air sparge system

The cleanup levels identified in the ROD are summarized in **Table 18-1**.

18.4.1 Remedy Implementation

Air sparge via vertical injection was conducted in 2002 and discontinued based on limited distribution. Therefore, a horizontal well was installed and a Pilot Study conducted to evaluate hydrogen sparging from 2003 through 2006 (MicroPact and Baker, 2006). From 2007 through 2008, a Pilot Study was conducted to evaluate air and ozone sparging via the horizontal well. Due to the success of air sparging, operation of the system was continued in 2009.

18.4.2 Remedy Operation and Maintenance

The horizontal well and air sparge system is currently operating to treat VOCs in groundwater. Operation and maintenance activities will be defined in the upcoming RD. A visual inspection of the site was conducted in September 2008 to evaluate the air sparge system and general site conditions (**Appendix B**). No issues were noted during the site inspection.

18.4.3 Progress since Last Five-Year Review

Since the previous Five-Year Review (Baker, 2005), pilot studies, Supplemental RI, FS, PRAP, ROD, and Basewide Vapor Intrusion Investigation were completed.

A horizontal well (**Figure 18-1**) was installed and Pilot Study completed in 2006 to evaluate the performance and effectiveness of hydrogen sparging in the VOC "hot spot" area (MicroPact/Baker, 2006). Results indicated the average TCE concentration decreased approximately 35 percent and the average total VOC concentration decreased approximately 8 percent. A second Pilot Study to evaluate air sparging with ozone was completed in 2008 (AGVIQ-CH2M HILL, 2008b). Results indicated that TCE concentrations in the intermediate aquifer zone decreased by 75 percent.

The Supplemental RI was completed in 2009 to delineate the extent of contamination (CH2M HILL, 2009f). Benzene and CVOCs were detected in groundwater exceeding screening criteria and the highest VOC concentrations are located beneath the paved area associated with Building A47 and the footprint of the former maintenance building. Petroleum-related impacts were identified in soil in the area corresponding with historic waste oil discharge. The source of contamination is likely from multiple surficial spills associated with maintenance activities that occurred before the concrete-paved parking area was constructed. Potential risks to human health were identified from exposure to soil and groundwater based on future residential use. The FS evaluated the following remedial alternatives: no action, MNA with LUCs, ERD with bioaugmentation, LTM, and LUCs, and *in situ* air sparging using the horizontal well, downgradient ERD injections, LTM, and LUCs (CH2M HILL, 2009c). A PRAP was issued in April 2009 (CH2M HILL, 2009h) to solicit public input on the preferred alternative (*in situ* air sparging using the horizontal well, downgradient ERD injections, LTM for MNA, and LUCs) and a public meeting was held. Questions received during the public meeting were general inquiries and no comments were received during the public comment period. The Final ROD was issued and signed in November 2009 (CH2M HILL, 2009m). The RD for *in situ* air sparging by the horizontal well, downgradient ERD injections, LTM and MNA, and LUCs was submitted in 2010 (**Figure 18-1**).

A Basewide Vapor Intrusion Study was conducted from 2007 to 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings. Multiple locations across the Base were selected for evaluation, including the Courthouse Bay area. The investigation included buildings at Site 73 and groundwater grab samples, soil gas samples, and subslab soil gas samples were collected for VOC analysis. No risks were identified from indoor air related to vapor intrusion; therefore, it was concluded that vapor intrusion is not a current significant pathway of concern for any of the buildings located in the vicinity of Site 73. The Report (CH2M HILL, 2009k) recommended additional sampling at Building A47 to confirm temporal variability. The follow-up sampling was conducted and will be reported in 2010.

18.5 Technical Assessment

Is the remedy functioning as intended by the decision document?

The RA for *in situ* air sparging by the horizontal well, downgradient ERD injections, LTM and MNA, and LUCs will be completed in 2010-2011 (**Figure 18-1**).

Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

The ROD (CH2M HILL, 2009m) identified the cleanup levels for groundwater as the more conservative of the Federal MCLs or NCGWQS which are still valid. For soil, the cleanup level was based on the NC HWS SSL (33.6 mg/kg) that was recently updated and there was no value for petroleum C11-C-22 aromatic hydrocarbon fraction class included. The North Carolina UST Program identifies a soil to groundwater Maximum Soil Contaminant Concentration of 34 mg/kg which is valid.

Has any other information come to light that could question the protectiveness of the remedy?

No additional information has been obtained that would affect the protectiveness of the planned remedy.

18.6 Issues, Recommendations, and Follow-up Actions

The RA for *in situ* air sparging by the horizontal well, downgradient ERD injections, LTM and MNA, and LUCs is planned in 2010-2011.

Because LTM is planned and several monitoring wells remain in-place that are not included in the LTM Program, confirmation of whether the wells remain in-place and an evaluation of the well locations will be conducted as part of the Basewide monitoring well survey. Based on the results of the survey, monitoring wells will be recommended for repair or abandonment, if needed.

No current significant pathway of concern for vapor intrusion was identified based on the results of the Basewide Vapor Intrusion Evaluation (CH2M HILL, 2009k) and additional evaluation to assess temporal and spatial variability and preferential pathways is planned for 2010. If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.

Issues	Affects Protectiveness (Y/N)		Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
	Current	Future					Current	Future
Potential for vapor intrusion pathway	N	Y	Evaluate and mitigate vapor intrusion pathway during construction planning.	Navy/Base	EPA/State	Ongoing	Y	Y

18.7 Statement of Protectiveness

The remedies for groundwater and soil at OU 21 are expected to be protective of human health and the environment upon completion. The horizontal air sparging system is intended to treat the highest VOC concentrations in groundwater and the ERD injections will be conducted to ensure VOC concentrations are not impacting the adjacent surface water body. LTM and MNA will be conducted to evaluate the effectiveness of the system and monitor plume migration. LUCs will be implemented to prohibit aquifer use and exposure to soil until cleanup levels for UU/UE are achieved.

Table 18-1
Cleanup Levels for OU 21 (Site 73)
Five-Year Review
MCB CamLej

Media	COCs	ROD Cleanup Levels (NCGWQS/MCL) (CH2M HILL, 2009)	2010 Cleanup Levels	Source of 2010 Cleanup Levels
Groundwater (μg/L)	**VOCs**			
	Benzene	1	1	NCGWQS
	1,1-Dichloroethene	7	7	NCGWQS/MCL
	cis-1,2-Dichloroethene	70	70	NCGWQS/MCL
	Trichloroethene	2.8	3	NCGWQS
	Vinyl chloride	0.015	0.03	NCGWQS
Soil (mg/kg)	**Petroleum Aromatic Carbon Fraction Class C9-C22**	33.6	34	UST Program Soil to Groundwater Maximum Soil Contaminant Concentration

\\APHRODITE\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\FIVE_YEAR_REVIEW\Figure_18_1_OU_18_Site_73.mxd

Legend

- Proposed LTM Monitoring Wells
- Direction of Groundwater Flow
- Horizontal Well
- Slotted Section of Horizontal Well
- Estimated Aquifer Use Control Boundary (1000 ft)
- Estimated Non-Industrial Use Control Boundary (Soil)
- Installation Boundary
- Site 73 Boundary
- Operable Unit 21

N

0 200 400 800 Feet

1 inch = 400 feet

Figure 18-1
OU 18 (Site 73)
Five-Year Review
MCB CamLej

CH2MHILL

SECTION 19

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Appendix A
LUC Inspections

15 January, 2010

MEMORANDUM

From: Installation Restoration Program
To: Head, Environmental Quality Branch

Subj: LAND USE CONTROL ASSURANCE PLAN, QUARTERLY INSPECTION FOR JANUARY 2010

The subject was completed on 15 January 2010. In summary, none of the identified sites have had changes in land use, which would pose a threat to human health or the environment. Existing land use controls are adequate at all sites.

Site-specific comments are listed below.

OU 2, Site 6: A temporary fence barrier is in place at IR Site 6, to control access to an area where unexploded ordnance (UXO) was discovered.

OU 6, Site 54: Construction activities are in progress within the vicinity of IR Site 54. However, no intrusive activities are planned or observed within the boundary of IR Site 54.

OU 8, Site 16: Construction activities noticed near Site. Does not appear to impact Site.

OU 4, Site 41: 2 large trees have fallen on fence. Also, one large branch entangled in barbed wire.

OU 4, Site 74: clearing and grubbing within approved Right-of-Way (25 feet from edge of roadway) along saw Mill Road. Does not appear to impact Site.

Brynn Ashton

Brynn Ashton

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-1; Sites 24, 21, 78

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-2; Sites 6, 9, 82

INSPECTION DATE: 1/15/~~82~~ 10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

* IR-6 - Temporary fence installed to control area where UXO was found buried. A metal plate was also put in place to cover the excavation.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-4 ; Sites 41, 74

INSPECTION DATE: 1/15/10

* IR-41 : 2 large trees have fallen on Fence. Also one large branch tangled in barbed wire.

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

IR-74 → * Clearing and grubbing within approved ROW along Old Saw Mill Rd. (within 25 feet of edge of Road).

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-5 ; Site 2

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: [signature] DATE: 1/15/10

IRP MANAGER: [signature] DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-6; Sites 36, 43, 44, 54

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

* Construction activities near IR-54. No intrusive activities within LUCIP boundary identified

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-7; Sites 1, 28

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-9; Site 16

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.
* Construction activities noticed near site. Does not appear to impact site.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: [signature] DATE: 1/15/10

IRP MANAGER: [signature] DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-11; Site 80

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-12; Site 3

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: [signature] DATE: 1/15/10

IRP MANAGER: [signature] DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-13; Site 63

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-14; Site 69

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: OU-16; Site 93

INSPECTION DATE: 1/15/10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1/15/10

IRP MANAGER: _____ DATE: 1/15/10

LAND USE CONTROLS ASSURANCE PLAN
QUARTERLY INSPECTION CHECKLIST

SITE INSPECTED: Pre-RI Site 68

INSPECTION DATE: 1\15\10

☑ Visually inspect each site to confirm that no changes in land use have taken place that are inconsistent with the exposure assumptions in the risk assessment that was the basis for the land use controls (LUCs). For example, any change from industrial, commercial, or recreational land use to a more sensitive land use, such as housing, schools, hospitals, and/or day-care centers.

☑ Visually inspect each site to ensure that no apparent signs or conditions exist that might pose a threat to public health and the environment. For example, removal of fencing or warning signs, or the natural or artificial creation of wetlands. Ensure that all on-site remediation systems and/or monitoring systems are intact and functioning.

☑ Visually inspect each site to ensure that no action is taking place, or has taken place, that may disrupt the effectiveness of the remedial action. For example, excavation at a landfill, groundwater pumping that may impact a groundwater pump and treat system, or a construction project that may result in unacceptable exposure to an ecological habitat protected by the remedy.

☑ Visually inspect each site for any other action that might alter or negate the need for the LUCs. For example, any plan to actively remediate a site subject to LUCs in order to allow for unrestricted use.

INSPECTED BY: _____ DATE: 1\15\10

IRP MANAGER: _____ DATE: 1\15\10

Appendix B
Site Inspections

Five-Year Review Site Inspection Checklist

Site name: Sites 78, 21, 24 (OU1)	**Date/Time:** 9/3/08 4:05pm
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. **Pumps and Electrical**	☐ Yes ☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes ☐ No
iii. **Treatment Technology**	☐ Yes ☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes ☐ No
v. **Recovery Wells**	☒ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☐ Yes ☒ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☒ Yes ☒ No

Remarks:

1. Area ~~was~~ let dug up & regraded, MWs may be destroyed appears to have been
2. MW not locked - not labeled
3. MWs 24-1, 24-2, 24-3 are not locked
4. GW25 has no lid
5. Area cleared & graded

Five-Year Review Site Inspection Checklist

Site name: Sites 6, 9, 82 OU2	**Date/Time:** 9/3/08 4:52 Pm	8/9/4/08 8:00 Am
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]	
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes ☐ No	
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical**	☑ Yes ☐ No	Check plant maintenance records
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☑ Yes ☐ No	
iii. **Treatment Technology**	☑ Yes ☐ No	
iv. **Discharge Structure and Appurtenances**	☑ Yes ☐ No	
v. **Recovery Wells**	☑ Yes ☐ No	
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☑ No	
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☑ No	
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☑ Yes ☐ No	
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes ☐ No	
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☑ No	
Remarks:		

Five-Year Review Site Inspection Checklist

Site name: Site 41 (OU 4)	**Date/Time:** 9/4/08 1:37 Pm
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. Pumps and Electrical NA	☐ Yes	☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes	☐ No
iii. Treatment Technology	☐ Yes	☐ No
iv. Discharge Structure and Appurtenances	☐ Yes	☐ No
v. Recovery Wells	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks NA	☐ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 74 (OU 4)	**Date/Time:** 9/3/09 ; 1320
Inspector: Brooke Proost	**Signature:** Brooke Proost
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. Pumps and Electrical	☐ Yes ☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes ☐ No
iii. Treatment Technology	☐ Yes ☐ No
iv. Discharge Structure and Appurtenances	☐ Yes ☐ No
v. Recovery Wells	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☐ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☐ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No

Remarks:

Site Access controls in effect, fenced areas on both sides of gravel road, condition good

Several bags of landscaping debris left behind west fence on the northside of fenced area

Five-Year Review Site Inspection Checklist

Site name: Site 2 (OU5)	**Date/Time:** 9/3/08 ; 0940
Inspector: Brooke Ropst	**Signature:** Brook Ropst

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	NA
i. **Pumps and Electrical**	☐ Yes ☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes ☐ No
iii. **Treatment Technology**	☐ Yes ☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes ☐ No
v. **Recovery Wells**	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 36 OU6	**Date/Time:** 9/4/08
Inspector: Kim Henderson / Brooke Phopst	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical**	N/A ☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☑ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Sitkat (OU6)	**Date/Time:** 9/4/08 2:52 PM
Inspector: Kim Henderson / Brooke Phipst	**Signature:** Kim H

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical** NA	☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks NA	☐ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 54 (OU6)	**Date/Time:** 9/4/08 1:55 pm
Inspector: Kim Henderson/Brooke Propst	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical** NA	☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks NA	☐ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 43 (OU6)	**Date/Time:** 8/4/08 2:23 pm
Inspector: Brooke Propst/Kim Henderson	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical** NA	☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks N/A	☐ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 1 (OU 7)	**Date/Time:** 9/3/08 ; 1350
Inspector: B. Propst	**Signature:** Brook Propst
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. **Pumps and Electrical**	☐ Yes ☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes ☐ No
iii. **Treatment Technology**	☐ Yes ☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes ☐ No
v. **Recovery Wells**	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☐ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No
Remarks:	

Five-Year Review Site Inspection Checklist

Site name: Site 28 (OU 7) & Site 1	**Date/Time:** 9/3/08 - 1400
Inspector: Brooke Propst	**Signature:** Brooke Propst
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. **Pumps and Electrical**	☐ Yes ☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes ☐ No
iii. **Treatment Technology**	☐ Yes ☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes ☐ No
v. **Recovery Wells**	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☐ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No
Remarks:	

Five-Year Review Site Inspection Checklist

Site name: Site 16 (OU 8)	**Date/Time:** 9/3/08 ; 1135
Inspector: B. Proost	**Signature:** Brooke Proost
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. **Pumps and Electrical**	☐ Yes ☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes ☐ No
iii. **Treatment Technology**	☐ Yes ☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes ☐ No
v. **Recovery Wells**	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☐ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No

Remarks:

Fence w/Haz. Waste ~~Sign~~ sign posted along w/warning posted ahead of fence.

Five-Year Review Site Inspection Checklist

Site name: Site 35 (OU 10)	**Date/Time:** 9/4/08 1600
Inspector: Brooke Pingel	**Signature:** Brooke Pingel

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☐ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical**	☒ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☒ Yes	☐ No
iii. **Treatment Technology**	☒ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells** N/A	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☐ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☒ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 80 (OU 11)	**Date/Time:** 9/3/08 - 1030
Inspector: B. Propst	**Signature:** Bonnie Propst
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	
i. Pumps and Electrical	N/A ☐ Yes ☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes ☐ No
iii. Treatment Technology	☐ Yes ☐ No
iv. Discharge Structure and Appurtenances	☐ Yes ☐ No
v. Recovery Wells	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☐ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No

Remarks:

Some old tires from golf course equipment (lawn mowers) next to building

All ASTs & Storage Buildings for chemicals appear intact, No leaks observed, proper impervious materials around ASTs & Storage Units

Five-Year Review Site Inspection Checklist

Site name: Site 3 (OU 12)	**Date/Time:** 9/3/09 · 1305
Inspector: Brooke Propst	**Signature:** Brooke Propst
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	
i. Pumps and Electrical	N/A ☐ Yes ☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes ☐ No
iii. Treatment Technology	☐ Yes ☐ No
iv. Discharge Structure and Appurtenances	☐ Yes ☐ No
v. Recovery Wells	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No

Remarks:

Hazardous Waste Site signs posted + cable guidwire barrier along boundary of Old Sawmill Rd

Five-Year Review Site Inspection Checklist

Site name: Site 03 0013	**Date/Time:** 9/4/08 1247 PM
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical**	NA ☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	NA ☐ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 69 & UXO-2 (OU14)	**Date/Time:** 9/4/08 1200 pm
Inspector: Kim Henderson / Brooke Ploost	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below		
i. **Pumps and Electrical**	N/A	
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☑ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☑ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Gap in gate entrance

Five-Year Review Site Inspection Checklist

Site name: Site 88 (OU 15)	**Date/Time:** 9/3/08 3:30 pm
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks N/A	☐ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. Pumps and Electrical	☐ Yes ☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes ☐ No
iii. Treatment Technology	☐ Yes ☐ No
iv. Discharge Structure and Appurtenances	☐ Yes ☐ No
v. Recovery Wells	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks N/A	☐ Yes ☐ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes ☒ No

Remarks:

(1) Intrusive construction activities associated with pilot study

Five-Year Review Site Inspection Checklist

Site name: Site 93 (OU 16)	**Date/Time:** 9/4/08; 1545
Inspector:	**Signature:**
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A
i. Pumps and Electrical	☐ Yes ☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes ☐ No
iii. Treatment Technology	☐ Yes ☐ No
iv. Discharge Structure and Appurtenances	☐ Yes ☐ No
v. Recovery Wells	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes ☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks (1)	☒ Yes ☐ No
Remarks:	
(1) New retention pond on 8th St b/n Rodne + C Streets	

Five-Year Review Site Inspection Checklist

Site name: Site 89 (OU16)	**Date/Time:** 9/4/08 · 1530
Inspector: Brooke Proost	**Signature:** Brooke Proost
Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks N/A	☐ Yes ☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below N/A	
i. Pumps and Electrical	☐ Yes ☐ No
ii. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances	☐ Yes ☐ No
iii. Treatment Technology	☐ Yes ☐ No
iv. Discharge Structure and Appurtenances	☐ Yes ☐ No
v. Recovery Wells	☐ Yes ☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks N/A	☐ Yes ☐ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes ☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes ☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes ☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☒ Yes ☐ No

Remarks:

1. Soil Mixing for remediation recently completed, area has been backfilled and re-graded

Five-Year Review Site Inspection Checklist

Site name: Site 94 (OU 18)	**Date/Time:** 9/3/08 3:50 pm
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks N/A	☐ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below N/A		
i. **Pumps and Electrical**	☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks N/A	☐ Yes	☐ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☐ Yes	☒ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☒ No

Remarks:

Well MW16 is not locked
Well MW08's lid is askew

Five-Year Review Site Inspection Checklist

Site name: Site 84 (OU 19)	**Date/Time:** 9/3/09; 0955
Inspector: Brooke Propst	**Signature:** Brooke Propst

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks	☒ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below	N/A	
i. **Pumps and Electrical**	☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	☐ Yes	☒ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☒ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☒ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☒ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☒ No

Remarks:

Fence surrounding site

Five-Year Review Site Inspection Checklist

Site name: Site 86 (OU 20)	**Date/Time:** 9/4/00 2:30 Am
Inspector: Kim Henderson / Brooke Propst	**Signature:** Kim H

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks NA	☐ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below NA		
i. **Pumps and Electrical**	☐ Yes	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**	☐ Yes	☐ No
iii. **Treatment Technology**	☐ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	☐ Yes	☐ No
v. **Recovery Wells**	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks NA	☐ Yes	☐ No
Has land use on- or offsite changed? If yes, explain in Remarks	☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks	☑ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks	☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks	☐ Yes	☑ No

Remarks:

Five-Year Review Site Inspection Checklist

Site name: Site 73 OU21	**Date/Time:** 9/4/08
Inspector: Kim Henderson / Brooke Propst	**Signature:** [illegible]

Are institutional controls and LUCs properly implemented and fully enforced? If no, note on map and explain in Remarks		☑ Yes	☐ No
For active remediation systems, are the following components in good condition and working properly? If no, explain in Remarks below			
i. **Pumps and Electrical**	NA	~~☐ Yes~~	☐ No
ii. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**		☑ Yes	☐ No
iii. **Treatment Technology**		☑ Yes	☐ No
iv. **Discharge Structure and Appurtenances**	NA	☐ Yes	☐ No
v. **Recovery Wells**	NA	☐ Yes	☐ No
Do any observations indicate that RAOs are not being met? If yes, explain in Remarks	NA	☐ Yes	☐ No
Has land use on- or offsite changed? If yes, explain in Remarks		☐ Yes	☑ No
Do monitoring wells at the site appear to be functioning, locked and in good condition? If no, explain in Remarks		☑ Yes	☐ No
Is the area free of identifiable concerns, such as, signs of dumping of chemicals or debris, with regards to this site? If no, explain in Remarks		☑ Yes	☐ No
Are there any previously undocumented features at the site (new roads, wetlands, changes in grade)? If yes, note on map; identify any effect on the remedy in Remarks		☑ Yes	☐ No

Remarks:

① Grading and construction along roadway & soil stockpile in cleared area

Appendix C
Community Interview Questionnaires

Community Involvement Plan Questions
for RAB Members

Marine Corps Base Camp Lejeune

Name _____

Address _____

Telephone/email _____

We are currently updating the 2005 Camp Lejeune Community Involvement Plan (CIP), which guides our program for citizen participation in the environmental cleanup efforts at Camp Lejeune. An important part of updating this plan is interviewing community members.

The purpose of these interviews is to:

- Identify any new or ongoing concerns of the surrounding community
- Ask for ideas to keep the community informed about the cleanup program
- Ask for ideas to encourage more public participation in cleanup decisions

As a RAB member, your input is especially important. *We plan to talk with the RAB as a group during the October 24 RAB Site Tour. We would very much appreciate it if you would fill out this survey and either mail it back to us, or bring it with you to the RAB Site Tour.*

At the end of these interviews, we will summarize what we learned in the Camp Lejeune CIP. However, specific statements made in the interviews will not be attributed to individuals. The CIP is a public document, which will be presented to Marine Corps officials and other interested persons and will be used to guide future public outreach. It will be placed in the information repository (Onslow Library) for members of the community to review, if they wish.

Community Profile

1. How would you describe your community? (economic, social structure)

2. Do you feel people in your community are concerned about environmental issues in general?

   What kinds of issues?

Interest and Concerns

1. How much do you think other community members (not on the RAB) know about Camp Lejeune's environmental cleanup or munitions response programs?

   ___ Nothing ___ A little ___ A lot ___ Don't know

2. Do you think the general community is interested in the Camp Lejeune environmental cleanup or munitions response programs? __ Yes ___ No ___ Don't know

   If yes, how much? ___ A little ___ A lot

3. If yes, what kinds of issues about environmental cleanup or munitions response at Camp Lejeune have attracted the most attention in the community?

4. What are your own primary concerns about environmental or munitions sites at Camp Lejeune? *(please add details if you wish)*

   ____ none ___ surface water contamination ___ groundwater contamination
   ___ munitions/related chemicals ___ health issues ___property values
   ___ other:

5. Do you feel that you are directly or indirectly affected by the contamination and cleanup program at Camp Lejeune? ___ No ___ Yes

   If yes, how?

6. As discussed in the October 2008 RAB meeting, Camp Lejeune is currently conducting a Five-Year Review of sites with ongoing remedial actions, land-use controls, or long-term monitoring. Do you have any concerns or information to share about any of those sites?

Information Needs

1. Do you feel the information concerning the environmental cleanup and munitions programs is being presented effectively to the public at RAB meetings? __ Yes ___ No

   If no, how could it be improved?

2. Is there anything else you think the RAB should do differently?

3. Other than RAB meetings, have you received any information about the Camp Lejeune environmental cleanup or munitions response programs? ___ No ___ Yes

4. If yes, how have you received this information?

   __ fact sheet ___ MCB Camp Lejeune website __ newspaper notices
   ___ newspaper articles __ email/phone inquiry ___other:

5. If yes, do you have any suggestions for improving the type of information you receive?

6. Have you ever used the information repositories in your area? ___ No ___ Yes
   If yes, was the information available there useful to you?

7. Have you ever visited the website for the Camp Lejeune environmental cleanup program?
   ___ No ___ Yes

   If yes, was the information available there useful to you? Do you have any suggestions for improving it?

8. What newspaper, radio, or TV stations do you subscribe to and/or listen to?

CIP Interviews

1. Who else (besides RAB members) would you suggest that we interview for the CIP?

   (This could be someone who has asked you about the cleanup, or whom you know to be interested in or concerned about environmental issues, or who is considered a leader in your community.)

   Name:

   Phone number/email:

   Address:

2. Are you aware of any environmental or citizen/action groups that are especially active in the community? If yes, who and how they can be contacted?

   Name:

   Address or general location:

   Phone number/email/website:

Thank you for your participation!

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5700 CLEVELAND ST STE 101
VIRGINIA BEACH VA 23462-1752

Interest and Concerns

1. How much do you think other community members (not on the RAB) know about Camp Lejeune's environmental cleanup or mentions response programs?

   ___ Nothing ✓ A little ___ A lot ___ Don't know

2. Do you think the general community is interested in the Camp Lejeune environmental cleanup or munitions response programs? __ Yes ✓ No ___ Don't know

   If yes, how much? ___ A little ___ A lot

3. If yes, what kinds of issues about environmental cleanup or munitions response at Camp Lejeune have attracted the most attention in the community?

4. What are your own primary concerns about environmental or munitions sites at Camp Lejeune? *(please add details if you wish)*

   ✓ none ___ surface water contamination ___ groundwater contamination
   ___ munitions/related chemicals ___ health issues ___property values
   ___ other:

5. Do you feel that you are directly or indirectly affected by the contamination and cleanup program at Camp Lejeune? ✓ No ___ Yes

   If yes, how?

6. As discussed in the October 2008 RAB meeting, Camp Lejeune is currently conducting a Five-Year Review of sites with ongoing remedial actions, land-use controls, or long-term monitoring. Do you have any concerns or information to share about any of those sites?

   No

Information Needs

1. Do you feel the information concerning the environmental cleanup and munitions programs is being presented effectively to the public at RAB meetings? ✓ Yes ___ No

   If no, how could it be improved?

2. Is there anything else you think the RAB should do differently?

Community Involvement Plan Questions
for RAB Members

Marine Corps Base Camp Lejeune

Note: to protect privacy, the addresses of private individuals are not published.

We are currently updating the 2005 Camp Lejeune Community Involvement Plan (CIP), which guides our program for citizen participation in the environmental cleanup efforts at Camp Lejeune. An important part of updating this plan is interviewing community members.

The purpose of these interviews is to:

- Identify any new or ongoing concerns of the surrounding community
- Ask for ideas to keep the community informed about the cleanup program
- Ask for ideas to encourage more public participation in cleanup decisions

As a RAB member, your input is especially important. *We plan to talk with the RAB as a group during the October 24 RAB Site Tour. We would very much appreciate it if you would fill out this survey and either mail it back to us, or bring it with you to the RAB Site Tour.*

At the end of these interviews, we will summarize what we learned in the Camp Lejeune CIP. However, specific statements made in the interviews will not be attributed to individuals. The CIP is a public document, which will be presented to Marine Corps officials and other interested persons and will be used to guide future public outreach. It will be placed in the information repository (Onslow Library) for members of the community to review, if they wish.

Community Profile

1. How would you describe your community? (economic, social structure)

   Semi-rural, medium-low income, social structure changing due to increased military presence and increased number of retirees (military & civilian)

2. Do you feel people in your community are concerned about environmental issues in general? Not really, if at all it's only as to how effects the fishing

   What kinds of issues?

3. Other than RAB meetings, have you received any information about the Camp Lejeune environmental cleanup or munitions response programs? ✓ No ___ Yes

4. If yes, how have you received this information?

   ___ fact sheet ___ MCB Camp Lejeune website ___ newspaper notices
   ___ newspaper articles ___ email/phone inquiry ___ other:

5. If yes, do you have any suggestions for improving the type of information you receive?

6. Have you ever used the information repositories in your area? ✓ No ___ Yes
   If yes, was the information available there useful to you?

7. Have you ever visited the website for the Camp Lejeune environmental cleanup program?
   ___ No ✓ Yes

   If yes, was the information available there useful to you? Do you have any suggestions for improving it? Yes / No

8. What newspaper, radio, or TV stations do you subscribe to and/or listen to?
   Jacksonville Daily News
   93.7 FM Big Talker (Wilmington)

CIP Interviews

1. Who else (besides RAB members) would you suggest that we interview for the CIP?

   (This could be someone who has asked you about the cleanup, or whom you know to be interested in or concerned about environmental issues, or who is considered a leader in your community.)

   Name:

   Phone number/email:

   Address:

2. Are you aware of any environmental or citizen/action groups that are especially active in the community? If yes, who and how they can be contacted?

   Name:

   Address or general location:

   Phone number/email/website:

Community Involvement Plan Questions
for RAB Members

Marine Corps Base Camp Lejeune

Note: to protect privacy, the addresses of private individuals are not published.

We are currently updating the 2005 Camp Lejeune Community Involvement Plan (CIP), which guides our program for citizen participation in the environmental cleanup efforts at Camp Lejeune. An important part of updating this plan is interviewing community members.

The purpose of these interviews is to:

- Identify any new or ongoing concerns of the surrounding community
- Ask for ideas to keep the community informed about the cleanup program
- Ask for ideas to encourage more public participation in cleanup decisions

As a RAB member, your input is especially important. *We plan to talk with the RAB as a group during the October 24 RAB Site Tour. We would very much appreciate it if you would fill out this survey and either mail it back to us, or bring it with you to the RAB Site Tour.*

At the end of these interviews, we will summarize what we learned in the Camp Lejeune CIP. However, specific statements made in the interviews will not be attributed to individuals. The CIP is a public document, which will be presented to Marine Corps officials and other interested persons and will be used to guide future public outreach. It will be placed in the information repository (Onslow Library) for members of the community to review, if they wish.

Community Profile

1. How would you describe your community? (economic, social structure)
   SMALL TOWN, SERVICE INDUSTRY JOBS, LOWER TO MIDDLE CLASS AVERAGE EARNINGS, RETIREMENT GROWTH POPULATION, MILITARY POSITIVE
2. Do you feel people in your community are concerned about environmental issues in general? YES

   What kinds of issues? COASTAL ISSUE'S, BARRIER ISLANDS, FISHING & RECREATION ECONOMY. POSITIVE RECYCLING FOCUS WITH LITTLE EFFORT BY LOCAL GOVERNMENTS.

Interest and Concerns

1. How much do you think other community members (not on the RAB) know about Camp Lejeune's environmental cleanup or munitions response programs?

   ___ Nothing X A little ___ A lot ___ Don't know

2. Do you think the general community is interested in the Camp Lejeune environmental cleanup or munitions response programs? __ Yes ___ No X Don't know

   If yes, how much? ___ A little ___ A lot

3. If yes, what kinds of issues about environmental cleanup or munitions response at Camp Lejeune have attracted the most attention in the community?

4. What are your own primary concerns about environmental or munitions sites at Camp Lejeune? *(please add details if you wish)*

   ___ none X surface water contamination X groundwater contamination
   X munitions/related chemicals X health issues X property values
   ___ other:

5. Do you feel that you are directly or indirectly affected by the contamination and cleanup program at Camp Lejeune? ___ No X Yes

   If yes, how? I RESIDE ON CHADWICK BAY. THE NEW RIVER WATERWAY TO THE OCEAN IS AN IMPORTANT SOCIAL & ECOMOMIC CONCERN.

6. As discussed in the October 2008 RAB meeting, Camp Lejeune is currently conducting a Five-Year Review of sites with ongoing remedial actions, land-use controls, or long-term monitoring. Do you have any concerns or information to share about any of those sites?

   COURTHOUSE BAY BOAT BASIN HAS HAD LITTLE STUDY. I AM AWARE OF PAST HISTORY 80's/90's, PRIOR TO NEW BUILDINGS.

Information Needs

1. Do you feel the information concerning the environmental cleanup and munitions programs is being presented effectively to the public at RAB meetings? X Yes ___ No

   If no, how could it be improved?

2. Is there anything else you think the RAB should do differently?

   NONE AT THIS TIME AS I AM A NEW MEMBER.

3. Other than RAB meetings, have you received any information about the Camp Lejeune environmental cleanup or munitions response programs? ___ No X Yes

4. If yes, how have you received this information?

   X fact sheet X MCB Camp Lejeune website X newspaper notices
   X newspaper articles X email/phone inquiry ___other:

5. If yes, do you have any suggestions for improving the type of information you receive?

   THE INFORMATION IS EASILY AVAILABLE FOR THOSE WHO HAVE INTEREST

6. Have you ever used the information repositories in your area? X No ___ Yes
   If yes, was the information available there useful to you?

7. Have you ever visited the website for the Camp Lejeune environmental cleanup program?
   ___ No X Yes

   If yes, was the information available there useful to you? Do you have any suggestions for improving it?

   LOOKED MORE THAN ADEQUATE

8. What newspaper, radio, or TV stations do you subscribe to and/or listen to?
   JACKSONVILLE DAILY NEWS - XM RADIO NON-LOCAL

CIP Interviews

1. Who else (besides RAB members) would you suggest that we interview for the CIP?

   (This could be someone who has asked you about the cleanup, or whom you know to be interested in or concerned about environmental issues, or who is considered a leader in your community.)

   Name:

   Phone number/email:

   Address:

2. Are you aware of any environmental or citizen/action groups that are especially active in the community? If yes, who and how they can be contacted?

   Name: NEW RIVER KEEPERS

   Address or general location:

   Phone number/email/website:

Appendix D
LTM Optimization Update

2009 Long-term Monitoring Optimization Update MCB Camp Lejeune, North Carolina

PREPARED FOR: Bob Lowder/MCB Camp Lejeune

PREPARED BY: CH2M HILL

COPIES: Camp Lejeune Partnering Team

DATE: December 17, 2009

The purpose of this Technical Memorandum (TM) is to provide recommendations for the optimization of the current Long-term Monitoring (LTM) Program at Marine Corps Base Camp Lejeune (MCB CamLej) located in Jacksonville, North Carolina. This TM provides a summary of the monitoring activities associated with each site and discusses the opportunities that exist to optimize the LTM Program while maintaining or increasing the program's effectiveness.

The LTM requirements for each site were initially specified in the applicable Records of Decision (RODs) and Interim RODs (IRODs). In 2005, the Camp Lejeune Partnering Team approved the recommendations in the LTM Optimization Report which optimized the sampling frequency, analyte list, approach, data management, and reporting (CH2M HILL, 2005a). The current LTM optimization effort continues the evaluation of the LTM Program and has identified additional opportunities to optimize the monitoring efforts of the program while maintaining protectiveness of human health and the environment while meeting the requirements of the RODs.

Optimization Approach

The optimization approach evaluated historical data associated with the LTM Program. **Figure 1** is a flow diagram detailing this procedure. Activities associated with data evaluation include:

- Records review of RODS and IRODS (Baker, 1993b; 1994; 1997; 2005; CH2M HILL, 2006), 2005 LTM Optimization Report (CH2M HILL, 2005a), and past LTM reports associated with the LTM sites (JV II 2007a; 2007b; 2008).
- Groundwater contaminant trend analysis over time for each site.
- Technical assessment of the individual site, based on site conditions:
  - LTM Program requirements
  - Monitoring well location appropriateness
  - Monitoring parameters and sampling frequency requirements

The evaluation examined parameters and sampling points for their appropriateness within the overall LTM program. This evaluation generated site-specific recommendations involving number of wells, well locations, lab analyses, and sampling frequency. In

addition, the overall LTM program was evaluated for ways to optimize standard operating procedures for field work, data management, and reporting.

For several of the sites, the Air Force Center for Environmental Excellence (AFCEE) Monitoring and Remediation Optimization System (MAROS) software was used to evaluate the appropriateness of wells, parameters, etc., thus providing a formal mechanism to identify essential data and reduce redundancy. MAROS provides a means to identify essential data and reduce redundancy with regard to (1) the optimum number of wells, (2) frequency and duration of sampling, and (3) data management and reporting. MAROS uses simple statistical and heuristic methods, simple input, and is employed after a site is fully characterized and remediation is in place; it is not used for modeling or plume delineation. MAROS is specific to site and chemical of concern (COC). It is limited to single plumes, two-dimensional analysis, and evaluation only within the existing well network.

Site Strategy Considerations

Several strategy considerations for optimization of the LTM Program at MCB CamLej have been taken into account for each site. Each consideration evaluates unique areas in which cost savings, level-of-effort reduction, data quality, and quality of deliverables can be optimized. **Figures 2** and **3** summarize a decision-making process for future considerations of whether or not a sample location should be included within the site LTM Program, whether or not to include a site in the LTM Program, and the criteria for removing both sample locations and sites from the LTM Program (AFCEE, 2006).

The three core considerations that were utilized during this LTM optimization update are discussed below.

Reduce Number of Sample Locations

Monitoring wells considered for removal from the LTM program were evaluated based on the LTM Program Monitoring Well Evaluation Process outlined in **Figure 2**. Monitoring wells within the plume that are not critical to the definition of plume extent, or that are considered to provide redundant data, were considered for removal from the LTM program. In addition, regular inspection of wells and abandonment of wells determined to be deteriorating will help maximize the effectiveness of the LTM well network.

Frequency of Sampling

Decreasing the number of samples collected through a reduction in sampling frequency can be accomplished through evaluating contaminant concentrations, properties, fate and transport, and the location of the monitoring wells within the plume. For example, it is recommended that a monitoring well is sampled quarterly for four consecutive quarters in order to obtain baseline data for future comparisons (AFCEE, 2006). Once baseline data is established, that well may then be considered for reduction in the frequency of sampling (i.e. annually) in accordance with the LTM Program Monitoring Well Evaluation Process outlined in **Figure 2**. Annual or multi-year sampling intervals (e.g., 2-year, 3-year, 4-year, 5-year) will still allow for periodic assessments of aquifer impacts at that location (AFCEE, 2006).

Analysis

Optimization of analytical methods to coincide with site history, site COCs, or ROD/IROD requirements focuses LTM efforts toward achieving site objectives. Careful consideration should be given when determining which analytical method to use as well as limiting reporting to site COCs only.

Site Sampling Optimization

The LTM Program at MCB CamLej includes six sites within five operable units (OUs) (**Figure 4**):

- Site 78: Hadnot Point Industrial Area (OU 1)
- Site 6: Lots 201 and 203 (OU 2)
- Site 82: Piney Green VOC Area (OU 2)
- Site 36: Camp Geiger Dump Area Near Sewage Treatment Plant (OU 6)
- Site 3: Old Creosote Plant (OU 12)
- Site 93: Building TC-942 (OU 16)

The following sections summarize each site within the LTM Program discuss the current LTM Program status, the optimization opportunities, and site-specific recommendations for optimizing the LTM Program at MCB CamLej. Further detailed information regarding site history can be found in the Fiscal Year 2010 Site Management Plan (CH2M HILL, 2009b). In addition, **Table 1** provides a general summary of each site's regulatory status, current monitoring status, and LTM optimization recommendations. **Table 2** provides detailed information regarding the LTM monitoring well network at each site, in addition to the sampling frequency, sampling method, and specific LTM optimization recommendations for each well. **Appendix A** provides tables of historical LTM data, **Appendix B** provides trends of historical trichloroethene (TCE) LTM data (non-detect COC concentrations are assumed to be half of the North Carolina Groundwater Quality Standards [NCGWQS]) for wells recommended for removal from Site 78, wells recommended for annual sampling at Site 82, and all wells at Site 93, and **Appendix C** provides MAROS output files for Sites 78 North and South, Sites 6 and 82, and Site 93.

OU 1 (Site 78)

Site 78, the Hadnot Point Industrial Area (HPIA), is the area bounded by Holcomb Boulevard to the west, Sneads Ferry Road to the north, Louis Street to the east, and the Main Service Road to the south.

The Site 78 LTM monitoring network currently includes 39 monitoring wells and 9 recovery wells that are sampled for volatile organic compounds (VOCs). Five wells are sampled quarterly while the remaining wells are sampled annually utilizing either low-flow or permeable diffusion bag (PDB) sampling techniques (**Table 2**).

The initial analysis of Site 78 data indicated that many wells at the site provide potentially redundant data, as they are within the same vicinity and have similar depths, however, a review of the construction details of these wells revealed that some have different screen lengths, either a 5-foot or 20-foot screened interval (**Tables 3** and **4**). LTM sample results

utilizing PDB sampling technology with 20-foot screens may not be representative of groundwater conditions due to relatively long screen length across different lithology. Therefore, the number of sampling locations may be reduced based upon whether data from a well with a 20-foot screen is considered redundant with a nearby well with a 5-foot screen; then it may be appropriate to remove the well with the 20-foot screen from the LTM program.

There are currently several wells at Site 78 that utilize low-flow sampling techniques. Deploying PDBs would reduce the LTM field effort at this site since there is confidence a representative aquifer sample may be obtained with a PDB, the sampling time requirement is estimated to be halved, and there is a reduction in equipment rental costs as compared with cost requirements for low-flow sampling. Therefore, all monitoring well sampling should be conducted with PDB sample technology at all wells currently sampled with low-flow sampling techniques.

A secondary analysis utilized MAROS modeling by evaluating data up through the August 2008 LTM sampling event. For the purposes of MAROS modeling, Site 78 was divided into a north and south area and examined individually because the contaminant plumes in each area are separate from one another and are being addressed by two different pump and treatment systems. Inputs for MAROS modeling were determined through recent LTM data and from the Final Remedial Investigation (RI) Report (JV II, 2009, Baker 1994).

Site 78 North

Groundwater flow direction, analytical data from the 2008 LTM and 2009 Hadnot Point sampling events, current LTM wells, and LTM wells that are recommended to be removed from the LTM program at Site 78 North are shown on **Figure 5** and details of these recommendations are also included in **Table 3.**

It is recommended that monitoring wells IR78-GW45 and IR78-GW25 be removed from the LTM program. IR78-GW45 is not a true source upgradient well and IR78-GW25 has had no detections of VOCs above NCGWQS for 4 annual sampling events (**Appendix A**) and no detections of TCE during the last three annual sampling events (**Appendix B** [non-detect COC concentrations are assumed to be half of the NCGWQS]). In addition IR78-GW25 has a 20-foot screened interval, and is screened within a clay layer. Thus, for the MAROS model, these wells were not used in the analysis as they are neither source or tail wells.

Based on data from the 2008 LTM Report, the downgradient monitoring well locations (IR78-GW44, IR78-GW46, and IR78-GW47) have had recent detections of COCs exceeding NCGWQS (JV II, 2009). Therefore, to ensure adequate plume delineation as to the extent of impacts at Site 78 North (**Figure 5**) additional monitoring locations should be added to the LTM Program. MAROS modeling results indicate a need for new downgradient locations from monitoring wells IR78-GW40 and IR78-GW46. The new wells should be a nested shallow/intermediate monitoring well pair. With these new wells in place, IR78-GW23 and IR78-GW40 can be removed from the LTM monitoring program to prevent redundant data collection, which is also desirable since both wells have 20-foot screened intervals. All MAROS modeling output results, including the new well location analysis figures for each COC can be found in **Appendix C**.

Since MAROS is a two-dimensional model, deeper monitoring wells IR78-GW24-2 and IR78-GW24-3 could not be included in the MAROS analysis. However, based on a review of recent analytical data, IR78-GW24-2 has not had COC detections above NCGWQS for 4 annual LTM sampling events, IR78-GW24-3 did not have COC detections above NCGWQS for 2005, 2006, and 2007 sampling events as it was not sampled during the 2008 LTM annual groundwater sampling event, and neither well had COC detections greater than NCGWQS during the 2009 LTM annual groundwater sampling even, although data is not yet validated (**Appendices A** and **B**). The deeper well, IR78-GW24-3 can be removed from the monitoring program while the shallower monitoring well can be retained to monitor for potential vertical COC migration.

Site 78 North Recommendations Summary

- Sample all monitoring locations on an annual basis using PDBs.
- Remove monitoring wells IR78-GW23, IR78-GW24-3, IR78-GW25, IR78-GW40, and IR78-GW45 from the LTM program.
- Install 4 new monitoring wells: 2 shallow- and 2 intermediate-depth wells.

Site 78 South

Groundwater flow direction, analytical data from the 2008 LTM and 2009 Hadnot Point sampling events, current LTM wells, and LTM wells that are recommended to be removed from the LTM program at Site 78 South are shown on **Figure 6** and all Site 78 South specific LTM optimization recommendations are detailed in **Table 4**.

Based on data from the August 2008 LTM monitoring event (**Figure 6**) and MAROS modeling results (**Appendix C**), the plume at Site 78 South appears relatively stable.

Monitoring wells IR78-GW05 and IR78-GW08 can be removed from the LTM program because neither location is a true upgradient source location, neither have had COC detections exceeding NCGWQS for the last 4 annual LTM sampling events, and both have a 20-foot screened interval that is set within a clay layers (**Table 4**, **Appendices A** and **B**). IR78-GW10 can continue to be monitored as the upgradient source area well.

IR78-GW51 and IR78-GW58 can be removed from the LTM program based on MAROS modeling results indicating that sufficient delineation will be provided by the monitoring wells that will remain in the LTM program, as shown in the new well location analysis summary figures for each COC, **Appendix C**.

Since extensive monitoring of the site has been conducted since 1987, there appears to be little value in monitoring wells more frequently than annually at the site, in accordance with the LTM Program Monitoring Well Evaluation Process, outlined in **Figure 2**. Another goal is to optimize the number of wells within the source area and downgradient areas to prevent the collection of redundant data. Therefore, source area wells IR78-GW09-1 and IR78-GW78 can be removed from the sampling program as source area wells IR78-GW60 and IR78-GW73, with similar screened depths in the vicinity, will continue to be monitored. Monitoring wells IR78-GW73 and IR78-GW49, located just downgradient of the source area, will continue to be monitored within the LTM program. Likewise, downgradient of the

source area, monitoring well IR78-GW01 may be removed as monitoring wells IR78-GW42, IR78-RW06, and IR78-GW59 can provide relevant data from those areas.

It is also recommended that IR78-GW39 be removed from the LTM monitoring list despite a recent detection of tetrachloroethene (PCE) during the 2009 Hadnot Point and the most recent 2009 LTM groundwater sampling events (0.85 J µg/L and 1.1 µg/L [unvalidated], respectively) (**Appendix A**). IR78-GW61 and IR78-GW62 are downgradient wells that have had no exceedances of COCs during the past three LTM groundwater sampling events and will continue to be monitored within the LTM program (**Appendix A**). In addition, IR78-GW39 will be rolled into the upcoming SWMU-360 investigation.

During the 2009 Hadnot Point groundwater sampling event, a vinyl chloride (VC) exceedance of 0.47 J µg/L was detected in IR78-GW64 despite having had no previous exceedances of COCs for the 2006 and 2007 LTM sampling events or from the 2009 LTM sampling event (**Appendix A**). Therefore, it is recommended to confirm plume delineation at this most downgradient location, or a further downgradient monitoring location will need to be installed and added to the LTM program.

Site 78 South Recommendations Summary

- Sample all monitoring locations on an annual basis using PDBs.
- Remove monitoring wells IR78-GW01, IR78-GW05, IR78-GW08, IR78-GW09-1, IR78-GW39, IR78-GW51, IR78-GW58, and IR78-GW78 from the LTM program.
- Confirm downgradient delineation of VC plume at IR78-GW64.

OU 2 (Sites 6 and 82)

Site 6 (Storage Lots 201 and 203) and Site 82 (Piney Green Road VOC Area) adjoin one another and comprise over 200 acres. The sites are bounded by Wallace Creek to the north, Site 9 to the south, Piney Green Road to the east, and Holcomb Boulevard to the west. A groundwater extraction and treatment operations building and contractor field offices are located on the northeastern portion of Lot 203.

Currently, 38 wells, three sediment locations, and three surface water locations are being sampled at the site under the LTM Program for VOCs, utilizing either low-flow or PDB sampling techniques**.** All locations are sampled annually, with the exception of two monitoring wells at Site 82 that are currently sampled quarterly, and the sediment and surface water locations, which are sampled twice a year.

Within OU 2, Sites 6 and 82 are included as part of the LTM Program. Site 6 and Site 82 LTM monitoring analytical data from the August 2008 LTM sampling event, general groundwater flow direction, and wells included in the LTM program are shown in **Figures 7** through **9**.

The initial analysis of Sites 6 and 82 data indicated that there are currently several wells being sampled with low-flow sampling techniques. Deploying PDBs would reduce the LTM field effort at this site since there is confidence a representative aquifer sample may be obtained with a PDB, the sampling time requirement is estimated to be halved, and there is a reduction in equipment rental costs as compared with cost requirements for low-flow sampling. Therefore, all monitoring well sampling should be conducted with PDB sample

technology at all wells currently sampled with low-flow sampling techniques. During the 2005 LTM optimization effort, data for both Sites 6 and 82 were combined and analyzed using the AFCEE MAROS software. The MAROS modeling was thus updated for Sites 6 and 82 using LTM data available through the August 2008 sampling event for the secondary portion of the analysis. Since MAROS is a two-dimensional modeling program, the monitoring wells screened within the shallow and intermediate aquifers were examined separately. For the purpose of optimization, OU 2 Sites 6 and 82 were examined together, but the recommendations are listed separately for each site in the following subsections. Inputs for MAROS modeling were determined through recent LTM data and from the Final RI (JV II, 2009, Baker 1993a).

Site 6

Site 6 has a history of various uses, including the disposal and storage of wastes and supplies, including pesticides. Because chlorobenzene is used as a solvent for some pesticide formulations it is believed that historical storage and disposal of pesticides in the area may have contributed to chlorobenzene impacts detected at the site. An investigation intended to characterize the nature and extent of chlorobenzene-impacted groundwater in the vicinity of monitoring well IR06-GW16 located at Site 6 is currently underway (**Figure 7**). An elevated chlorobenzene concentration (57,000 micrograms per liter [µg/L]) was reported in monitoring well IR06-GW16 during the third quarter 2000 Long-term Monitoring (LTM) which has prompted the investigation efforts at Site 6 (JV II, 2009; CH2M HILL, 2009a). Burial sources containing pesticides were removed from the proximity in 1997 (Baker 1993a; OHM, 1997), but due to the elevated chlorobenzene result in 2000, it is possible that additional sources of chlorobenzene remain in the proximity of IR06-GW16.

Site 6 Recommendations Summary

- Recommend completion of Chlorobenzene Investigation, Operable Unit No. 2, Site 6, with no changes to current LTM program.
- Re-evaluate the Site 6 LTM program when results and recommendations from the Chlorobenzene Investigation, Operable Unit No. 2, Site 6, are finalized.

Site 82

Groundwater analytical results from monitoring wells IR06-GW32 and IR06-GW37D and recovery wells IR06-SRW02, IR06-SRW03, IR06-SRW04, and IR06-SRW06 have had detections of COCs with concentrations exceeding NCGWQS (JV II, 2009). The results of recent surface water sampling activities indicate that the downgradient receptor, Wallace Creek, is not being impacted by Site 6 and Site 82 COCs (JV II, 2009). However, to ensure adequate downgradient groundwater plume delineation, monitoring locations should be added to the LTM Program between the existing wells and surface water discharge.

MAROS modeling results indicate a potential need for new locations both northeast and northwest of IR06-GW32 and northwest of IR06-GW37D (**Appendix C**). Nested shallow/intermediate monitoring well pairs should be installed in each of these locations so both plume delineation and potential vertical migration of COCs can be monitored. All MAROS modeling output results, including the new well location analysis figures for each COC can be found in **Appendix C**, and the recommended locations for each nested pair is

shown in **Figures 8** and **9** and should be sampled in accordance with in accordance with the LTM Program Monitoring Well Evaluation Process outlined in **Figure 2**.

Currently there are no recommendations for removing any wells from the LTM program at Site 82; however, it is recommended that annual sampling be conducted for IR06-GW33 and IR06-GW28DW, as now the quarterly sampling requirement for four consecutive quarters has established baseline data (**Appendices A** and **B**) in accordance with the LTM Program Monitoring Well Evaluation Process outlined in **Figure 2**.

Site 82 Recommendations Summary

- Sample all monitoring locations on an annual basis using PDBs.
- Install two nested wells clusters north of IR06-GW32 and a third nested well cluster north of IR06-GW37D.

OU 6 (Site 36)

Site 36, Camp Geiger Dump Area, is located approximately 1,000 feet east of Camp Geiger and 500 feet west of the New River, adjacent to the Camp Geiger Sewage Treatment Plant. Camp Geiger is situated directly north of MCAS New River and approximately 3 miles southwest of Jacksonville. Site 36 comprises approximately 20 acres.

There are 10 wells being sampled annually and four surface water locations being sampled semiannually at the site under the current LTM Program. Included in the sampling are three shallow wells, six intermediate wells, and one deep well. Surface water locations are sampled for VOCs, and all wells are sampled for VOCs and natural attenuation indicator parameters (NAIPs).

Within OU 6, Site 36 is included as part of the LTM Program. The groundwater flow direction is generally northeast towards receptor Brinson Creek NCGWQS exceedances from the August 2008 LTM Sampling event are shown on **Figure 10**.

Wells at Site 36 are currently sampled utilizing the low-flow sampling technique. Deploying PDBs would reduce the LTM field effort at this site since there is confidence a representative aquifer sample may be obtained with a PDB, the sampling time requirement is estimated to be halved, and there is a reduction in equipment rental costs as compared with cost requirements for low-flow sampling. Therefore, all monitoring well sampling should be conducted with PDB sample technology at all wells currently sampled with low-flow sampling techniques. In addition, since adequate baseline NAIP data has been collected, continued monitoring of NAIPs should be conducted every other year versus the current annual monitoring frequency using the low-flow sampling techniques to save on labor and analytical costs associated with these sample parameters.

Site 36 Recommendations Summary

- Sample all monitoring locations on an annual basis using PDBs.
- Sample NAIPs at Site 36 utilizing a low-flow sampling every other year.

OU 12 (Site 3)

Site 3, Old Creosote Plant, is located on the main side portion of MCB CamLej, approximately 1 mile north of Wallace Creek along Holcomb Boulevard. Site 3 encompasses approximately 5 acres, is generally flat, and is intersected by a dirt access road.

Currently, four wells are being sampled annually for VOCs and semivolatile organic compounds (SVOCs) utilizing low-flow sampling techniques. Included in the sampling are three shallow wells and one intermediate well.

Within OU 12, Site 3 is included as part of the LTM Program. The groundwater flow direction is generally northeast towards the receptor Wallace Creek, and NCGWQS exceedances from the August 2008 LTM Sampling event are shown on **Figure 11**.

Site 3 sampling currently utilizes low-flow sampling techniques. Deploying a PDB would greatly reduce the LTM Program effort at this site; however, since SVOCs require monitoring at the site and sampling procedures of SVOCs require a significant volume to be sampled, low-flow sampling techniques must continue to be employed at Site 3 as long as SVOCs are monitored.

Site 3 Recommendations Summary

The LTM program is determined to be sufficient and therefore there are no optimization recommendations for Site 3 under the LTM Program.

OU 16 (Site 93)

Site 93, Building TC-942, is northwest of the intersection of E and 10th Streets at Camp Geiger. Site 93 was added to the LTM Program in April 1999, but was halted in 2005 for a natural attenuation evaluation and *in situ* chemical oxidation via permanganate injections in 2006. Regular LTM sampling was re-instated in May 2008 in accordance with the ROD and completion of the Remedial Action.

Seventeen wells are being sampled quarterly for VOCs and NAIPs utilizing low-flow sampling techniques under the current LTM Program. Included in the sampling are eleven shallow wells, five intermediate wells, and one deep monitoring well.

The groundwater flow direction is generally east, towards the receptor Edwards Creek, and exceedances of NCGWQS during the August 2008 LTM sampling event are shown on **Figure 12**.

The initial analysis of Site 93 data indicated that quarterly groundwater sampling has taken place since May 2008 for VOCs and NAIPs utilizing low-flow sampling techniques. Deploying PDBs would reduce the LTM field effort at this site since there is confidence a representative aquifer sample may be obtained with a PDB, the sampling time requirement is estimated to be halved, and there is a reduction in equipment rental costs as compared with cost requirements for low-flow sampling. Therefore, all monitoring well sampling should be conducted with PDB sample technology at all wells currently sampled with low-flow sampling techniques. In addition, since adequate baseline NAIP data has been collected, continued monitoring of NAIPs should be conducted every other year versus the current annual monitoring frequency using the low-flow sampling techniques to save on

labor and analytical costs associated with these sample parameters. The secondary portion of the analysis at Site 93 utilized MAROS modeling of the shallow aquifer using data collected through February 2009. Inputs for MAROS modeling were determined through recent LTM data and from the Final Feasibility Study (JV II, 2009, CH2M HILL, 2005b). Only five intermediate aquifer wells are monitored in the LTM program, and a minimum six monitoring well locations are required to conduct MAROS modeling, thus, MAROS was not conducted for the intermediate aquifer wells at Site 93.

Although MAROS modeling results indicated no wells were removable for every COC, the new well location analysis figures indicate that IR93-MW03 and IR93-MW04 can be removed from the LTM program (**Appendix C**), as sufficient delineation will be provided by the monitoring wells that will remain in the LTM program. Therefore, it is also recommended to remove the intermediate wells associated with these locations, IR93-MW03IW and IR93-MW04IW, as neither the shallow or intermediate monitoring wells had exceedances of COCs during the 2008 LTM groundwater sampling event (**Appendices A** and **B**). In addition, IR93-MW02IW and IR93-MW02DW have had no exceedances of COCs during at least four previous sampling events, so it is recommended that IR93-MW02IW continue to be monitored for vertical migration of COCs and IR93-MW02DW be removed from the LTM program.

Site 93 Recommendations Summary

- Begin annual monitoring of all LTM monitoring wells at Site 93.
- Replace low-flow sampling techniques with PDB sample technology.
- Begin NAIP sampling utilizing low-flow sampling techniques every other year.
- Remove IR93-MW02DW, IR93-MW03, IR93-MW03IW, IR93-MW04, and IR93-MW04IW from the LTM program.

Estimate of Total Cost Reduction

Table 5 provides a breakdown of the estimated costs associated with the above recommendations to the LTM program. By implementing the proposed recommendations, the LTM program can save $49,850 annually. The estimated one-time cost of the ten new monitoring wells is approximately $35,250.

Summary of Recommendations

The LTM Program may be optimized by the following general activities:

- Reduce the number of monitoring wells sampled by 81 wells annually that are sampled by eliminating wells in the LTM network that either provide redundant data, are wells that have not had COC detections exceeding NCGWQS for over four consecutive LTM sampling events, have issues related to poor construction, cannot be located, or meet a combination of these considerations.

- Begin annual monitoring of all LTM monitoring wells at MCB CamLej that are currently undergoing quarterly monitoring. This recommendation excludes proposed monitoring wells that must be initially sampled quarterly for one year or downgradient wells located on a receptor pathway that must be sampled semiannually, in accordance with the LTM Program Monitoring Well Evaluation Process, outlined in **Figure 2**.
- Replace low-flow sampling techniques with PDB sample technology at 50 wells.
- At sites where NAIP sampling is conducted, sample for NAIPs every other year.
- The estimated one-time cost of the ten new monitoring wells is approximately $35,250.
- The estimated annual cost savings for LTM is $49,850.

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Figures

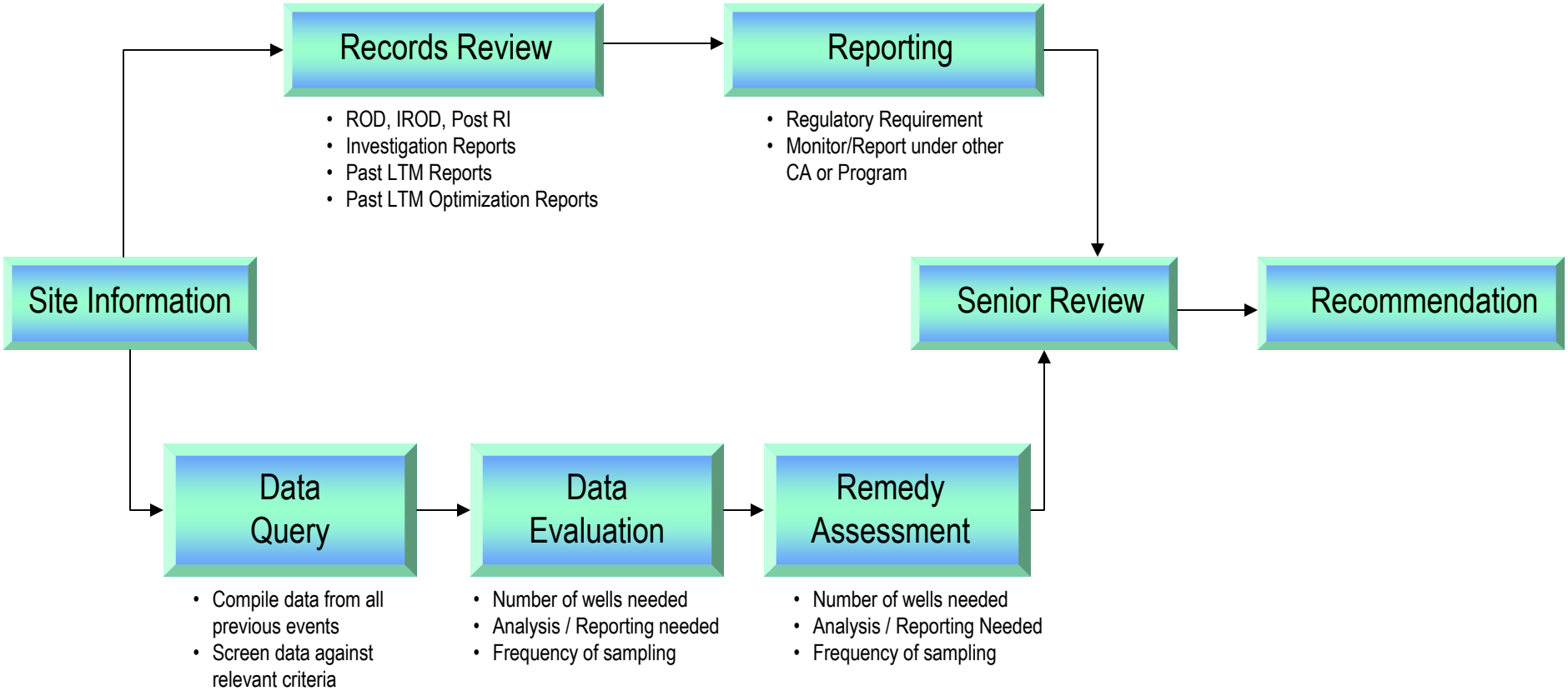

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Figure 1
Summary of Site Evaluation Process
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

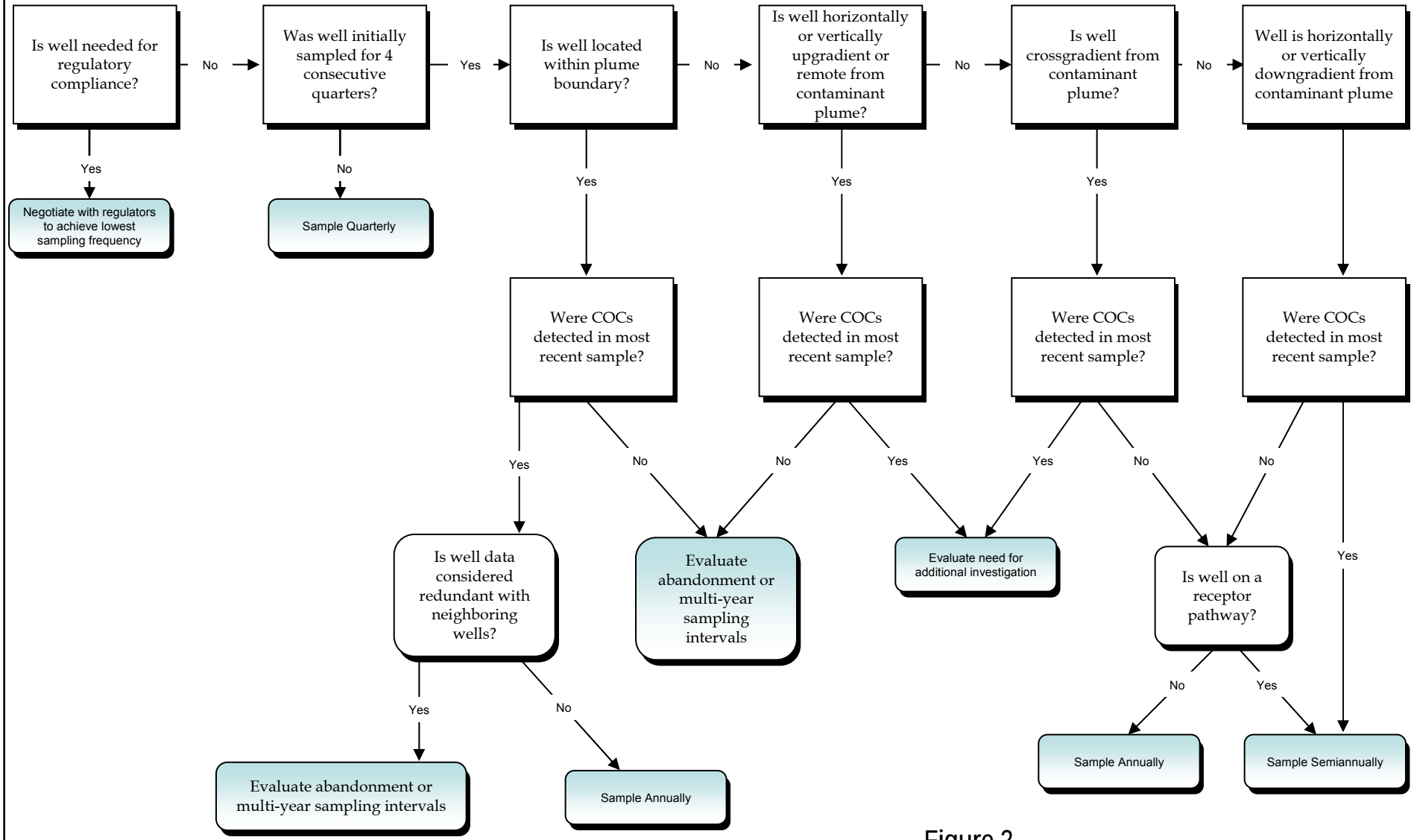

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Figure 2
LTM Program Monitoring Well Evaluation Process
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

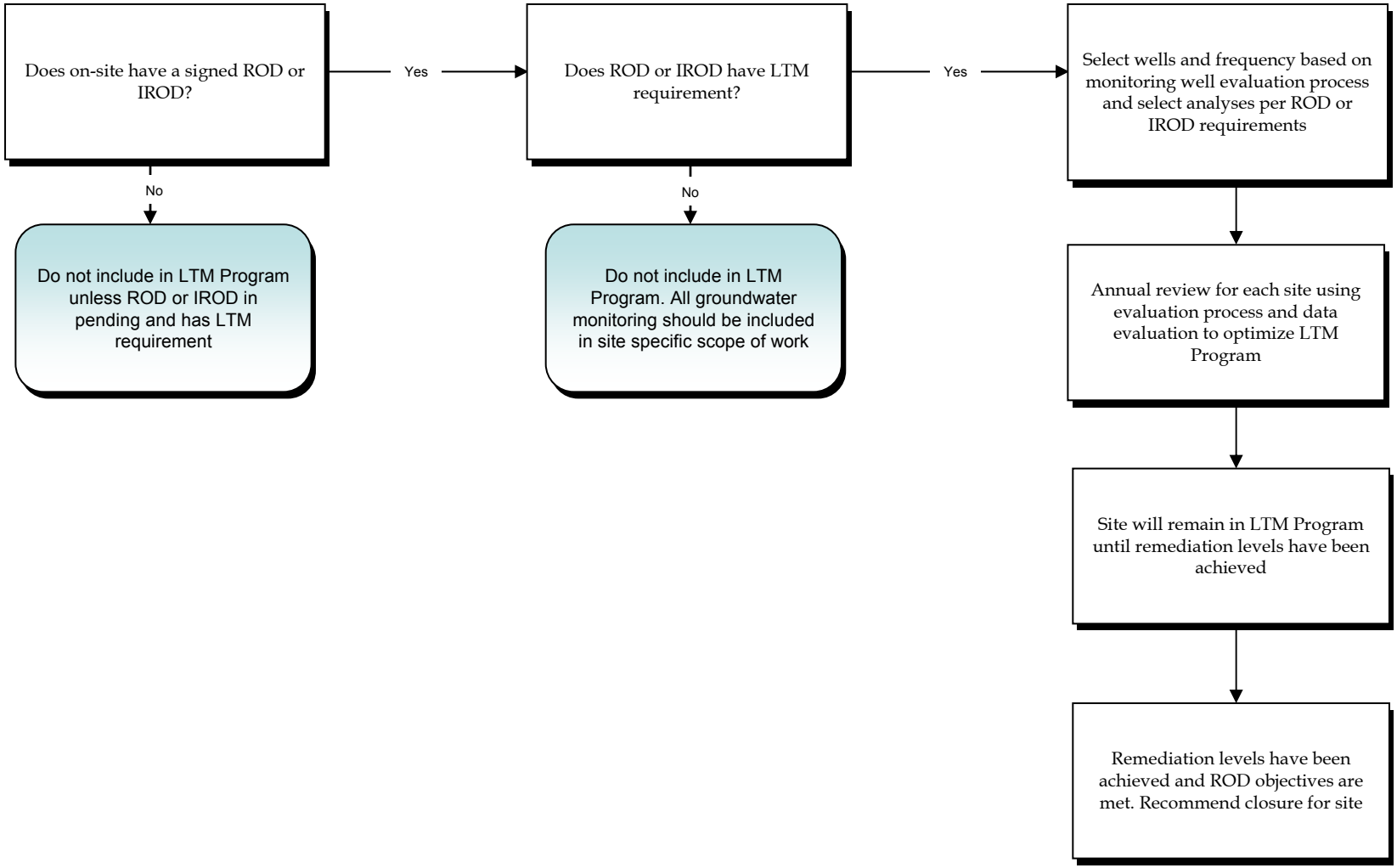

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Figure 3
LTM Program Site Evaluation Process
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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Legend

- Highways
- IR Site
- Installation Boundary

N

0 7,500 15,000 30,000 Feet

1 inch = 15,000 feet

Figure 4
Sites 3, 6, 36, 78, 82 and 93 Location Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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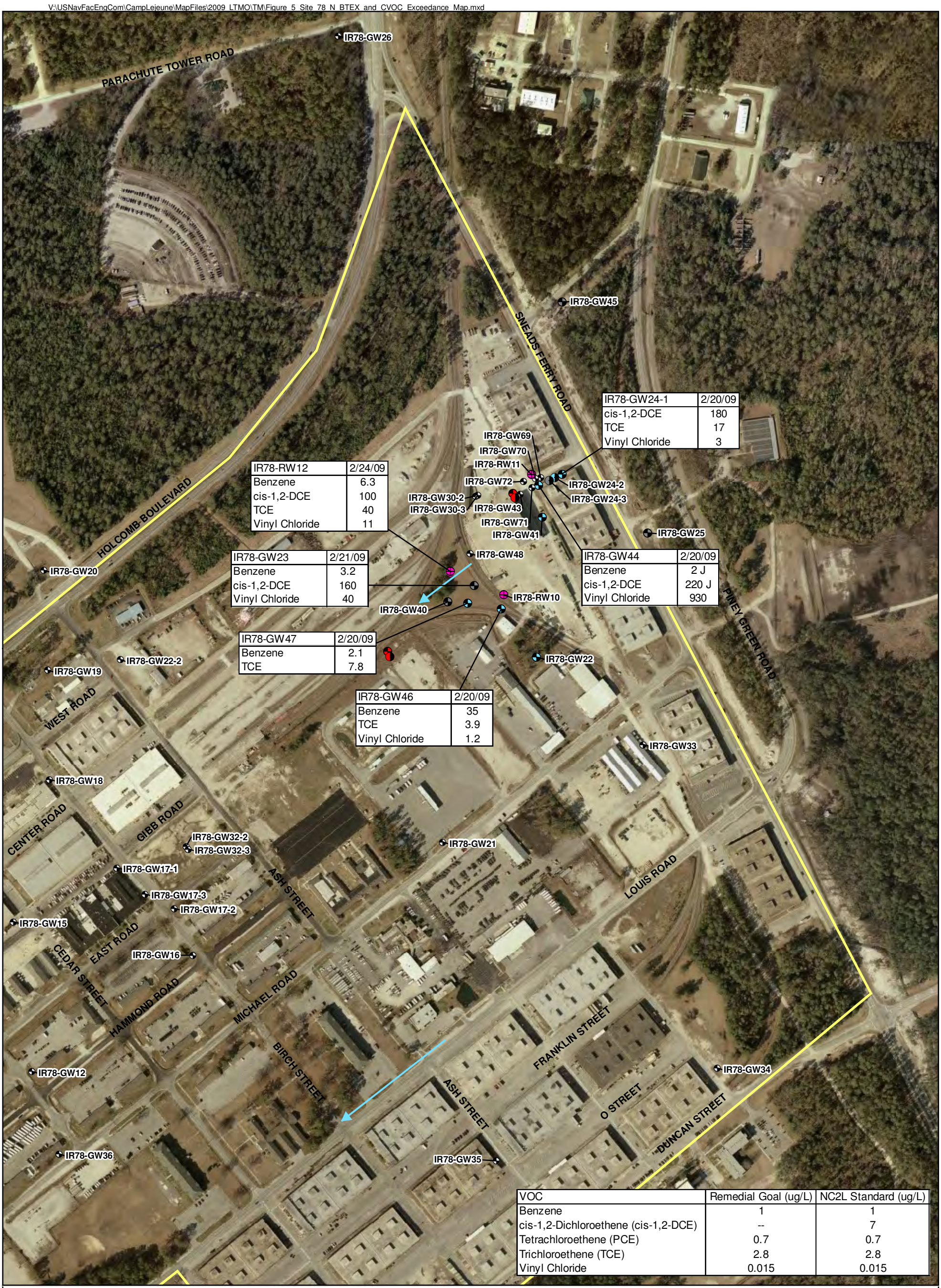

IR78-GW24-1	2/20/09
cis-1,2-DCE	180
TCE	17
Vinyl Chloride	3

IR78-RW12	2/24/09
Benzene	6.3
cis-1,2-DCE	100
TCE	40
Vinyl Chloride	11

IR78-GW23	2/21/09
Benzene	3.2
cis-1,2-DCE	160
Vinyl Chloride	40

IR78-GW44	2/20/09
Benzene	2 J
cis-1,2-DCE	220 J
Vinyl Chloride	930

IR78-GW47	2/20/09
Benzene	2.1
TCE	7.8

IR78-GW46	2/20/09
Benzene	35
TCE	3.9
Vinyl Chloride	1.2

VOC	Remedial Goal (ug/L)	NC2L Standard (ug/L)
Benzene	1	1
cis-1,2-Dichloroethene (cis-1,2-DCE)	--	7
Tetrachloroethene (PCE)	0.7	0.7
Trichloroethene (TCE)	2.8	2.8
Vinyl Chloride	0.015	0.015

Legend

- Shallow Monitoring Well (Not in the LTM Program)
- Shallow Monitoring Well
- Deep Monitoring Well
- Shallow Monitoring Well (Recommended Removal from LTM Program)
- Deep Monitoring Well (Recommended Removal from LTM Program)
- Recovery Well
- Shallow Monitoring Well (Proposed Location for LTM Program)
- Deep Monitoring Well (Proposed Location for LTM Program)
- Estimated Direction of Groundwater Flow
- Site 78 Boundary

Notes:
- Concentrations in µg/L
- Exceedance data from 2009 Hadnot Point groundwater sampling event for LTM wells only.

1 inch = 400 feet

Figure 5
Site 78 North Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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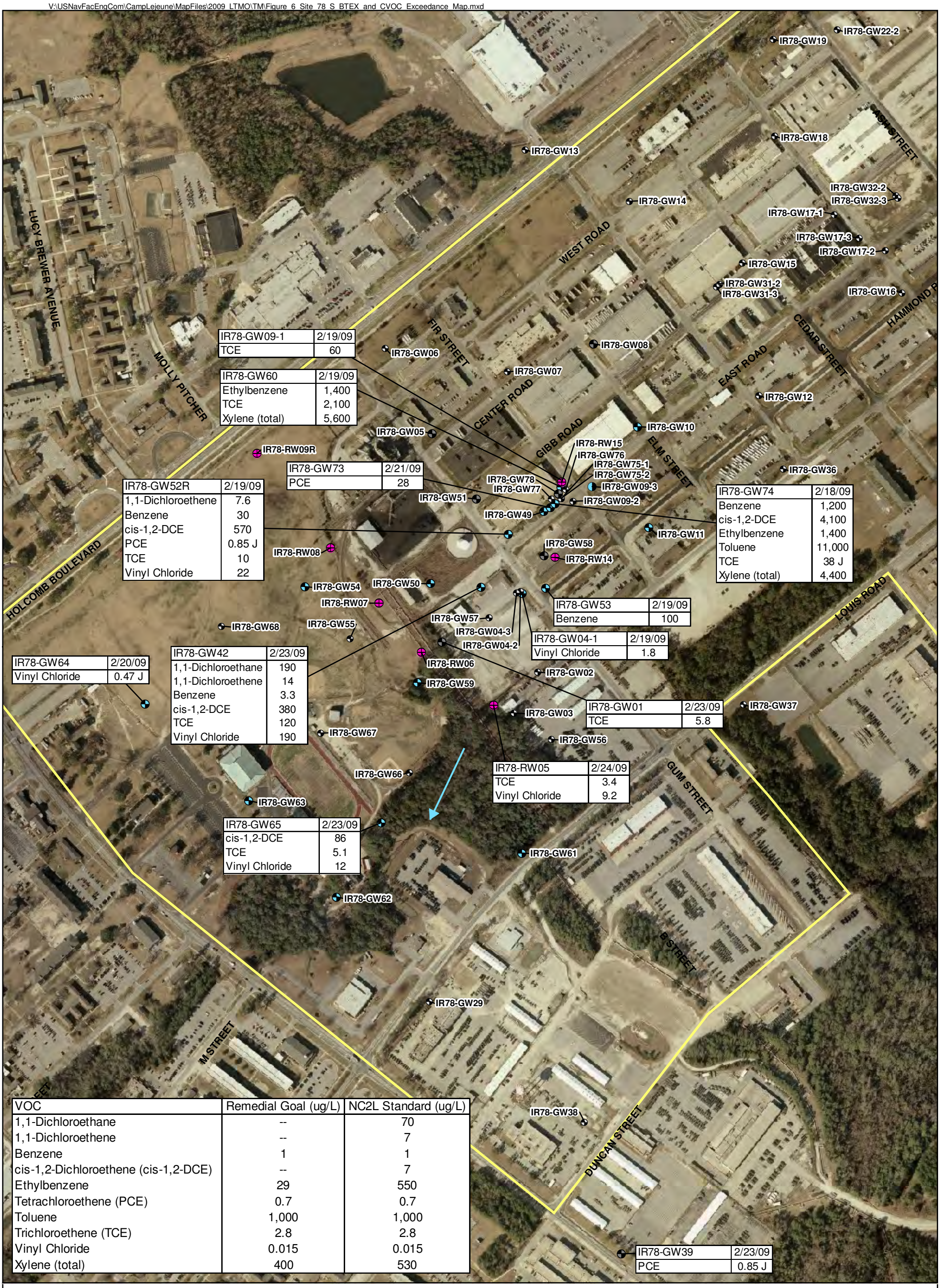

IR78-GW09-1	2/19/09
TCE	60

IR78-GW60	2/19/09
Ethylbenzene	1,400
TCE	2,100
Xylene (total)	5,600

IR78-GW73	2/21/09
PCE	28

IR78-GW52R	2/19/09
1,1-Dichloroethene	7.6
Benzene	30
cis-1,2-DCE	570
PCE	0.85 J
TCE	10
Vinyl Chloride	22

IR78-GW74	2/18/09
Benzene	1,200
cis-1,2-DCE	4,100
Ethylbenzene	1,400
Toluene	11,000
TCE	38 J
Xylene (total)	4,400

IR78-GW53	2/19/09
Benzene	100

IR78-GW04-1	2/19/09
Vinyl Chloride	1.8

IR78-GW64	2/20/09
Vinyl Chloride	0.47 J

IR78-GW42	2/23/09
1,1-Dichloroethane	190
1,1-Dichloroethene	14
Benzene	3.3
cis-1,2-DCE	380
TCE	120
Vinyl Chloride	190

IR78-GW01	2/23/09
TCE	5.8

IR78-RW05	2/24/09
TCE	3.4
Vinyl Chloride	9.2

IR78-GW65	2/23/09
cis-1,2-DCE	86
TCE	5.1
Vinyl Chloride	12

VOC	Remedial Goal (ug/L)	NC2L Standard (ug/L)
1,1-Dichloroethane	--	70
1,1-Dichloroethene	--	7
Benzene	1	1
cis-1,2-Dichloroethene (cis-1,2-DCE)	--	7
Ethylbenzene	29	550
Tetrachloroethene (PCE)	0.7	0.7
Toluene	1,000	1,000
Trichloroethene (TCE)	2.8	2.8
Vinyl Chloride	0.015	0.015
Xylene (total)	400	530

Legend

- Shallow Monitoring Well (Not in the LTM Program)
- Shallow Monitoring Well
- Deep Monitoring Well
- Shallow Monitoring Well (Recommended Removal from LTM Program)
- Recovery Well
- Estimated Direction of Groundwater Flow
- Site 78 Boundary

N

0 225 450 900 Feet

1 inch = 450 feet

Notes:
- Concentrations in µg/L
- Exceedance data from 2009 Hadnot Point groundwater sampling event for LTM wells only.

Figure 6
Site 78 South Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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IR06-GW31	08/21/08
Dichlorodifluoromethane	0.45 J

IR06-GW16	08/21/08	10/22/08
Acetone	--	10 J
Benzene	--	**1.2**
Chlorobenzene	25	**1800**
Dichlorodifluoromethane	0.11 J	2.7 J
cis-1,2-DCE	0.18 J	48
trans-1,2-DCE	0.13 J	9
Vinyl Chloride	--	**0.82 J**

VOC	Remedial Goal (ug/L)	NC2L Standard (ug/L)
Acetone	--	700
Benzene	--	1
Chlorobenzene	--	50
Dichlorodifluoromethane	--	1,400
cis-1,2-DCE	--	70
trans-1,2-DCE	70	100
Vinyl Chloride	0.015	0.015

Legend

- Shallow Monitoring Well
- Deep Monitoring Well
- Shallow Monitoring Well (Not in the LTM program)
- Intermediate Monitoring Well (Not in the LTM program)
- Deep Monitoring Well (Not in the LTM program)
- Shallow Monitoring Well (Site 82)
- Deep Monitoring Well (Site 82)
- Shallow Recovery Well
- Deep Recovery Well
- Estimated Direction of Groundwater Flow
- Site 6 and 82 Boundaries

- Concentrations in µg/L
- **Bold** text values are in the exceedance of NC2L standards

N

0 300 600 Feet

1 inch = 650 feet

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Figure 7

Site 6 Groundwater Detections and Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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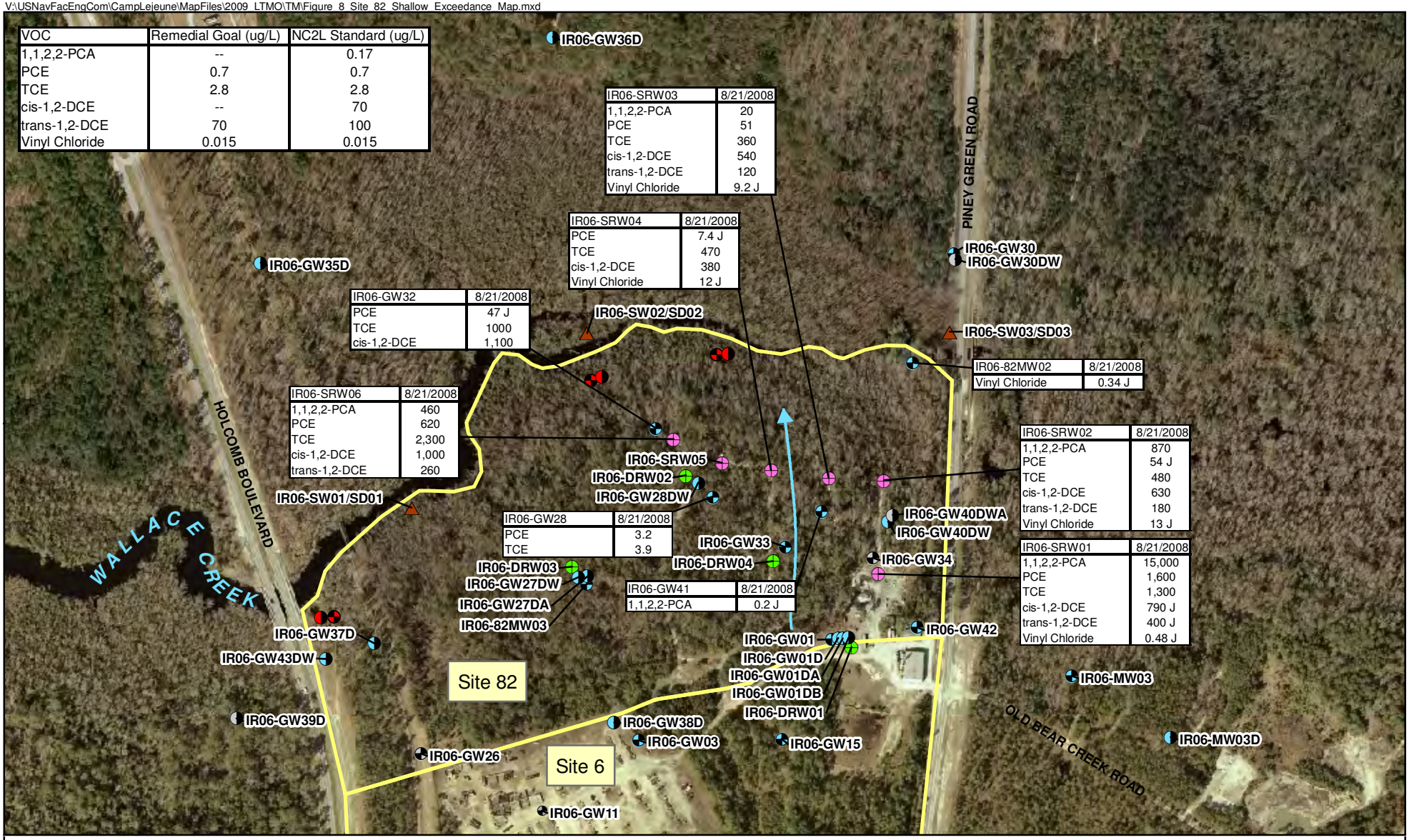

VOC	Remedial Goal (ug/L)	NC2L Standard (ug/L)
1,1,2,2-PCA	--	0.17
PCE	0.7	0.7
TCE	2.8	2.8
cis-1,2-DCE	--	70
trans-1,2-DCE	70	100
Vinyl Chloride	0.015	0.015

IR06-SRW03	8/21/2008
1,1,2,2-PCA	20
PCE	51
TCE	360
cis-1,2-DCE	540
trans-1,2-DCE	120
Vinyl Chloride	9.2 J

IR06-SRW04	8/21/2008
PCE	7.4 J
TCE	470
cis-1,2-DCE	380
Vinyl Chloride	12 J

IR06-GW32	8/21/2008
PCE	47 J
TCE	1000
cis-1,2-DCE	1,100

IR06-82MW02	8/21/2008
Vinyl Chloride	0.34 J

IR06-SRW06	8/21/2008
1,1,2,2-PCA	460
PCE	620
TCE	2,300
cis-1,2-DCE	1,000
trans-1,2-DCE	260

IR06-SRW02	8/21/2008
1,1,2,2-PCA	870
PCE	54 J
TCE	480
cis-1,2-DCE	630
trans-1,2-DCE	180
Vinyl Chloride	13 J

IR06-GW28	8/21/2008
PCE	3.2
TCE	3.9

IR06-SRW01	8/21/2008
1,1,2,2-PCA	15,000
PCE	1,600
TCE	1,300
cis-1,2-DCE	790 J
trans-1,2-DCE	400 J
Vinyl Chloride	0.48 J

IR06-GW41	8/21/2008
1,1,2,2-PCA	0.2 J

Legend

- Shallow Monitoring Well - Not in LTM program
- Deep Monitoring Well - Not in LTM program
- Shallow Monitoring Well Locations
- Deep Monitoring Well Locations
- Shallow Recovery Well Locations
- Deep Recovery Well Locations
- Surface Water and Sediment Sampling Locations
- Shallow Monitoring Well (Proposed Location for LTM Program)
- Deep Monitoring Well (Proposed Location for LTM Program)
- Groundwater Flow Arrow
- Site 6 and 82 Boundaries

Note: all concentrations are in µg/L

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 8
Site 82 Shallow Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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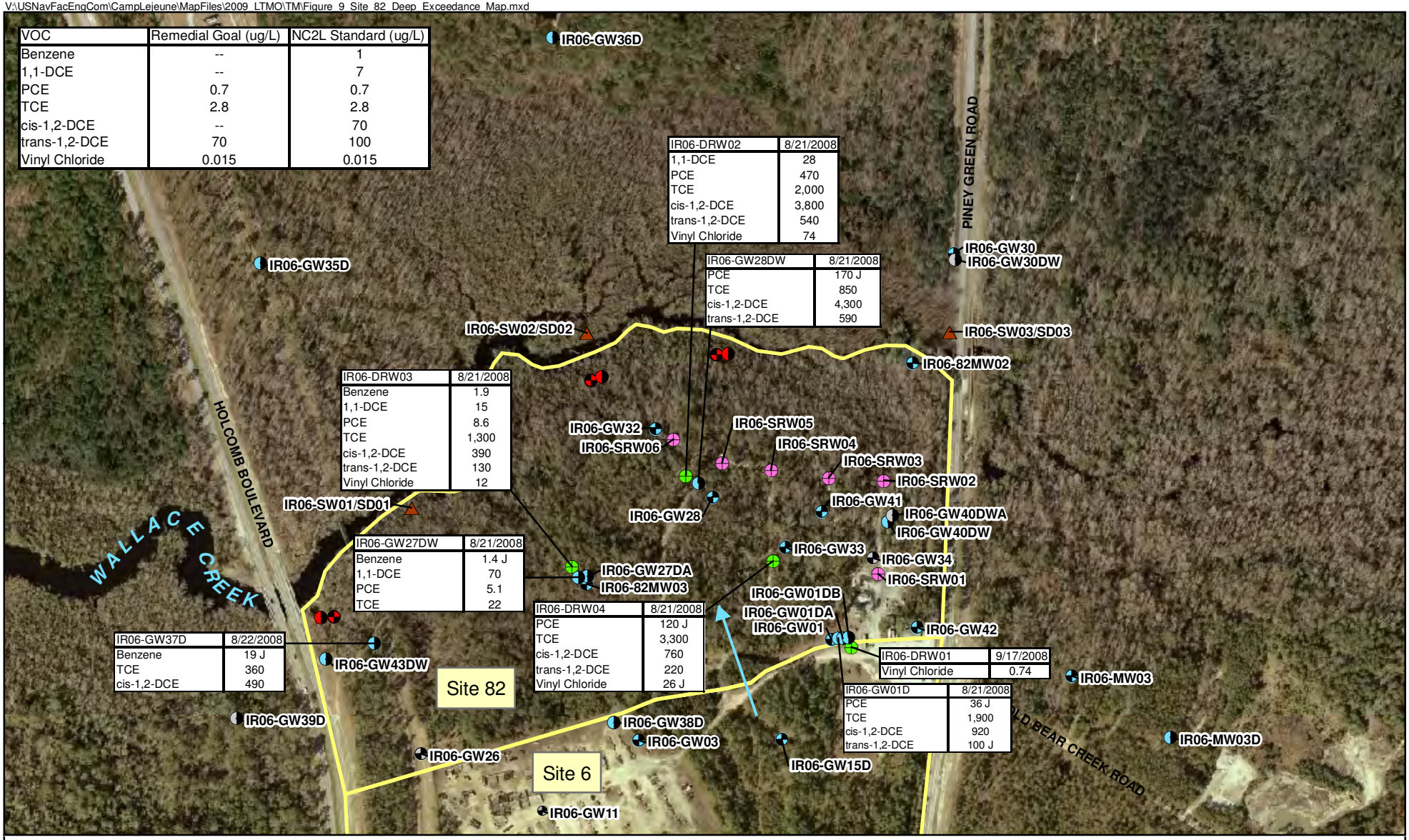

VOC	Remedial Goal (ug/L)	NC2L Standard (ug/L)
Benzene	--	1
1,1-DCE	--	7
PCE	0.7	0.7
TCE	2.8	2.8
cis-1,2-DCE	--	70
trans-1,2-DCE	70	100
Vinyl Chloride	0.015	0.015

IR06-DRW02	8/21/2008
1,1-DCE	28
PCE	470
TCE	2,000
cis-1,2-DCE	3,800
trans-1,2-DCE	540
Vinyl Chloride	74

IR06-GW28DW	8/21/2008
PCE	170 J
TCE	850
cis-1,2-DCE	4,300
trans-1,2-DCE	590

IR06-DRW03	8/21/2008
Benzene	1.9
1,1-DCE	15
PCE	8.6
TCE	1,300
cis-1,2-DCE	390
trans-1,2-DCE	130
Vinyl Chloride	12

IR06-GW27DW	8/21/2008
Benzene	1.4 J
1,1-DCE	70
PCE	5.1
TCE	22

IR06-DRW04	8/21/2008
PCE	120 J
TCE	3,300
cis-1,2-DCE	760
trans-1,2-DCE	220
Vinyl Chloride	26 J

IR06-GW37D	8/22/2008
Benzene	19 J
TCE	360
cis-1,2-DCE	490

IR06-DRW01	9/17/2008
Vinyl Chloride	0.74

IR06-GW01D	8/21/2008
PCE	36 J
TCE	1,900
cis-1,2-DCE	920
trans-1,2-DCE	100 J

Legend

- Shallow Monitoring Well - Not in LTM program
- Deep Monitoring Well - Not in LTM program
- Shallow Monitoring Well Locations
- Deep Monitoring Well Locations
- Shallow Recovery Well Locations
- Deep Recovery Well Locations
- Surface Water and Sediment Sampling Locations
- Shallow Monitoring Well (Proposed Location for LTM Program)
- Deep Monitoring Well (Proposed Location for LTM Program)
- Groundwater Flow Arrow
- Site 6 and 82 Boundaries

Note: all concentrations are in µg/L

N

0 250 500 1,000 Feet

1 inch = 500 feet

Figure 9
Site 82 Deep Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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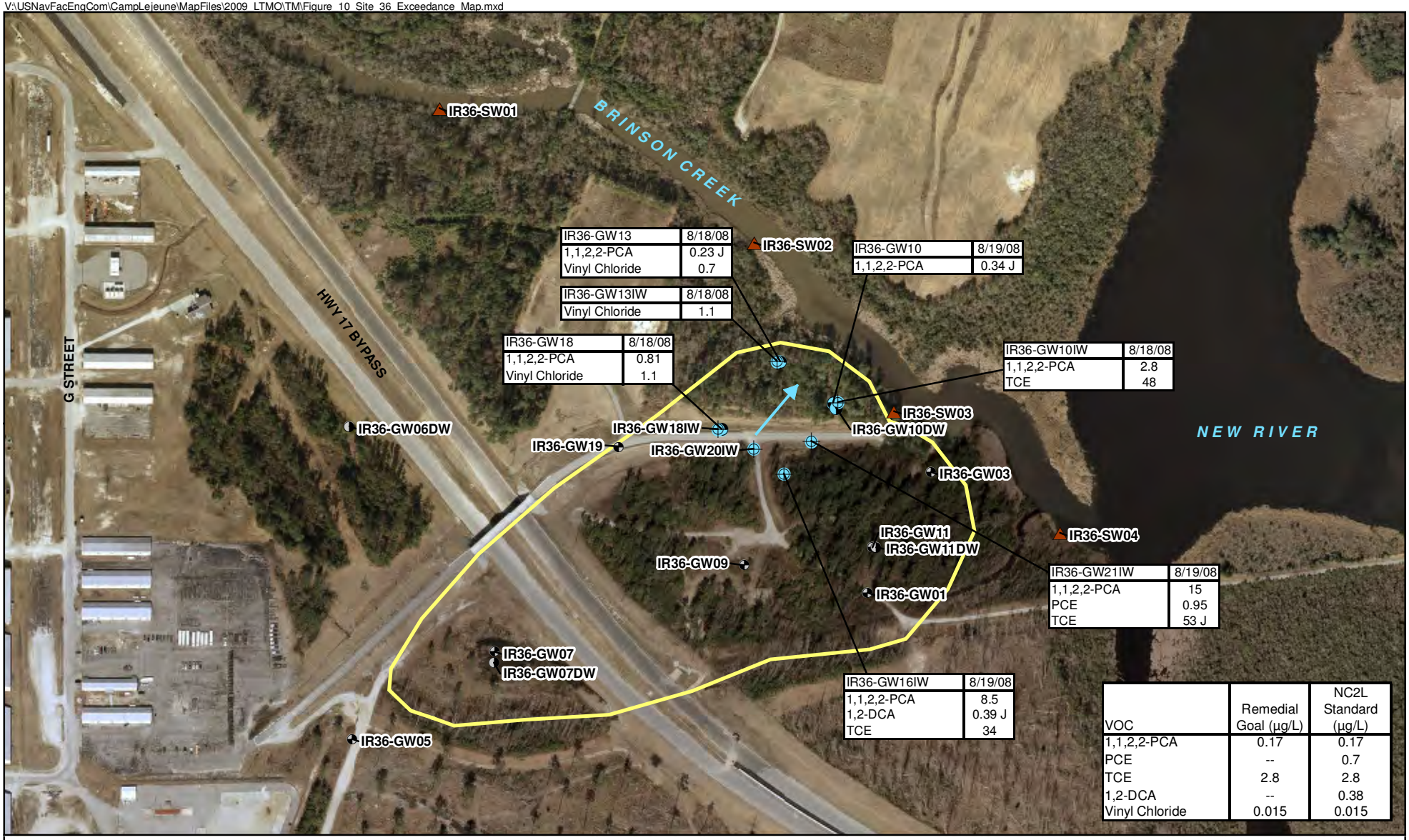

VOC	Remedial Goal (µg/L)	NC2L Standard (µg/L)
1,1,2,2-PCA	0.17	0.17
PCE	--	0.7
TCE	2.8	2.8
1,2-DCA	--	0.38
Vinyl Chloride	0.015	0.015

Legend

- Shallow Monitoring Well (Not in the LTM program)
- Deep Monitoring Well (Not in the LTM program)
- Shallow Monitoring Well
- Intermediate Monitoring Well
- Deep Monitoring Well
- Surface Water and Sediment Sampling
- Estimated Direction of Groundwater Flow
- Site 36 Boundary

Note: Concentrations in µg/L.

N

0 200 400 800 Feet

1 inch = 400 feet

Figure 10
Site 36 Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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VOC	Remedial Goal (µg/L)	NC2L Standard (µg/L)
Dibenzofuran	6	28
Vinyl Chloride	--	0.015

Legend

- Shallow Monitoring Well (Not in LTM program)
- Intermediate Monitoring Well (Not in LTM program)
- Deep Monitoring Well (Not in LTM program)
- Shallow Monitoring Well
- Intermediate Monitoring Well
- Estimated Direction of Groundwater Flow
- Surface Water Centerline
- Site 3 Boundary

Note: all concentrations are in µg/L

N

0 100 200 400 Feet

1 inch = 200 feet

Figure 11
Site 3 Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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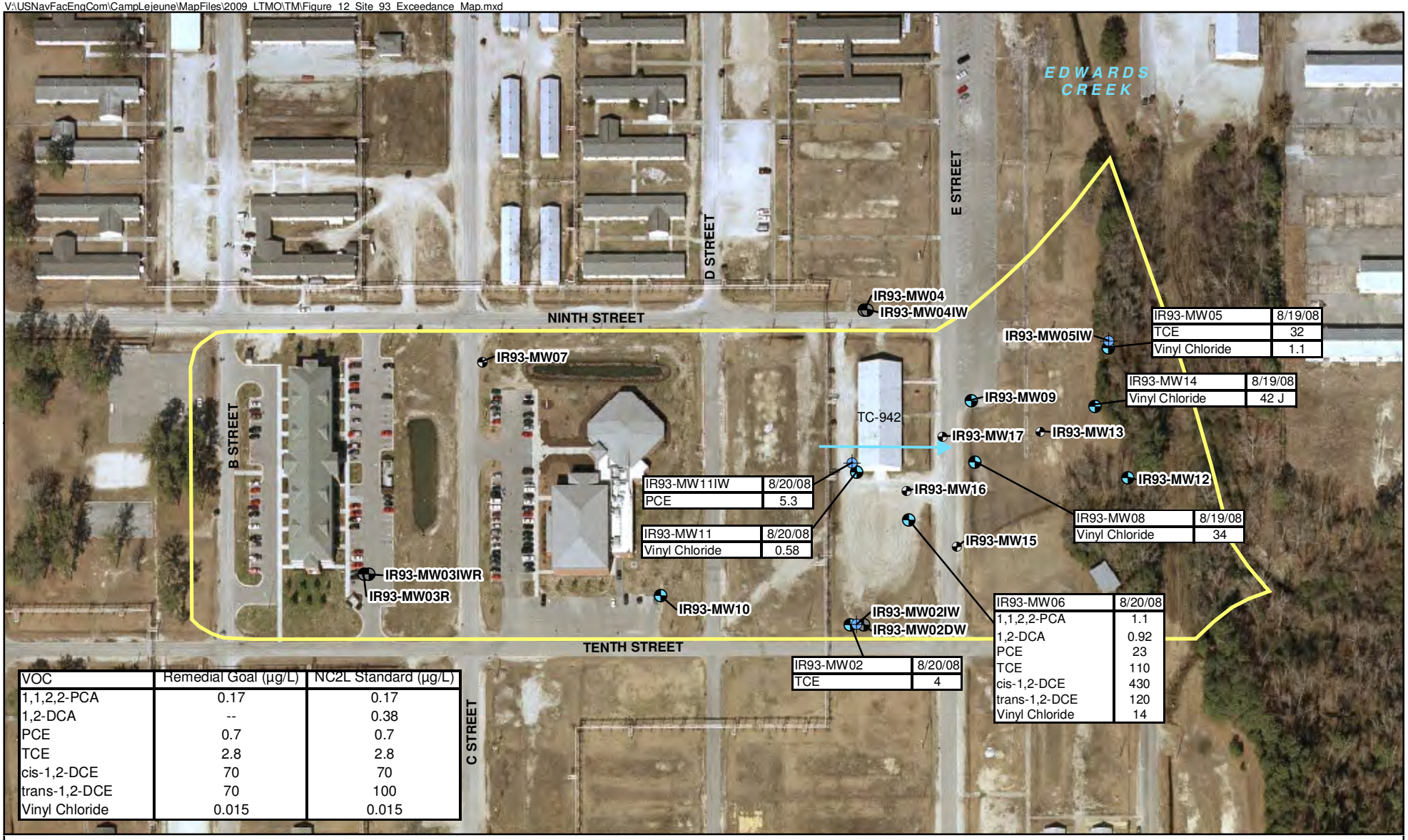

VOC	Remedial Goal (µg/L)	NC2L Standard (µg/L)
1,1,2,2-PCA	0.17	0.17
1,2-DCA	--	0.38
PCE	0.7	0.7
TCE	2.8	2.8
cis-1,2-DCE	70	70
trans-1,2-DCE	70	100
Vinyl Chloride	0.015	0.015

Legend

- Shallow Monitoring Well (Not in the LTM Program)
- Shallow Monitoring Well
- Shallow Monitoring Well (Recommended Removal from LTM Program)
- Intermediate Monitoring Well
- Deep Monitoring Well
- Estimated Direction of Groundwater Flow
- Site 93 Boundary

Note: all concentrations are in µg/L

N

0 100 200 400 Feet

1 inch = 200 feet

Figure 12
Site 93 Exceedance Map
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

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Tables

Table 1
Summary of LTM Regulatory Framework, Monitoring Status, and Recommendations
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Site	Regulatory Status	Current Monitoring Status	2009 LTMO Recommendations
OU 1, Site 78	ROD 1994, LUCs updated 2002 Groundwater extraction and treatment, LUCs, and LTM	39 monitoring wells, 9 recovery wells. VOCs; 5 wells sampled quarterly, remaining wells sampled annually.	31 monitoring wells (27 existing and 4 proposed monitoring wells) and 9 recovery wells: Sample all wells annually for VOCs utilizing PDB sampling technique. The proposed monitoring locations are as follows: One shallow/intermediate nested pair located near IR78-GW43. IR78-GW43 can be used as shallow well if ilocated. A second shallow/intermediate nested pair recommended for installation approximately 200 ft southwest of IR78-GW40 and IR78-GW47. Monitoring well IR78-RW09R was added to program in August 2008 since recovery well IR78-RW09 was damaged and could no longer be sampled.
OU 2, Site 6	ROD 1993, LUCs updated 2002 LUCs, and LTM	Monitoring 8 wells for VOCs (5 shallow monitoring wells and 3 deep monitoring wells) annually.	No recommended changes to LTM program.
OU 2, Site 82	ROD 1993, LUCs updated 2002 Groundwater extraction and treatment, LUCs, and LTM	Monitoring 30 wells for VOCs (9 shallow monitoring wells, 6 shallow recovery wells, 11 deep monitoring wells, and 4 deep recovery wells) annually, except 2 monitored quarterly; 3 sediment/surface water locations sampled semiannually for VOCs.	Monitoring 35 wells for VOCs (Monitor 19 existing and three proposed shallow/deep well pairs, one new deep well will replace damaged deep monitoring well IR06-GW43DW [12 shallow monitoring wells, 6 shallow recovery wells, 13 deep monitoring wells, and 4 deep recovery wells] for VOCs using PDBs annually, 3 sediment/surface water locations sampled semiannually for VOCs.
OU 6, Site 36	ROD 2005	10 monitoring wells, 4 surface water locations. VOCs and NAIPs; surface water locations sampled semiannually, wells annually.	10 monitoring wells, 4 surface water locations: Sample for VOCs annually utilizing PDB sample technique. Sample for NAIPs every other year utilizing low-flow sample techniques. Continue surface water location monitoring semiannually.
OU 12, Site 3	ROD amended 2000 Soil removal and LTM	4 monitoring wells. VOCs, SVOCs; annual sampling.	No recommended changes to LTM program.
OU 16, Site 93	ROD 2006 In situ chemical treatment, LUCs, and LTM	17 monitoring wells (11 shallow, 5 intermediate, 1 deep); VOCs and NAIPs, sampled quarterly.	12 existing monitoring wells (9 shallow and 3 intermediate aquifer): Begin annual monitoring of VOCs, utilizing PDB sample technique. Sample for NAIPs every other year utilizing low-flow sampling techniques.

Notes:
OU - Operable Unit
LUCs - Land Use Controls
ROD - Record of Decision
LTM - Long Term Monitoring
LTMO - Long Term Monitoring Optimization
NAIPs - Natural Attenuation Input Parameters
PDB - Permeable Diffusion Bag
VOCs - Volatile Organic Compounds

Table 2
Summary of Current and Recommended LTM Sampling Points, Frequency, Analytes
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

OU 1						OU 2						OU 6			OU 12			OU 16		
Site 78 North[F]			Site 78 South			Site 6			Site 82[F]			Site 36			Site 3			Site 93		
Analytical Parameters																				
VOCs			VOCs			VOCs			VOCs			VOCs, NAIPs[‡]			VOCs, SVOCs			VOCs, NAIPs[‡]		
Monitoring Wells Sampled, Sample Method, and Frequency																				
GW22	PDB	A	GW01	PDB	A	IR06-GW03	PDB	A	IR06-GW01	PDB	A	IR36-GW10	Low-flow	A	IR03-MW02	Low-flow	A	IR93-MW02	Low-flow	**Q**
GW23	PDB	Q	GW04-1	PDB	A	IR06-MW03	PDB	A	IR06-GW28	PDB	A	IR36-GW13	Low-flow	A	IR03-MW06	Low-flow	A	IR93-MW02IW	Low-flow	**Q**
GW24-1	PDB	A	GW05	PDB	A	IR06-GW16	PDB	A	IR06-GW30	PDB	A	IR36-GW18	Low-flow	A	IR03-MW11	Low-flow	A	IR93-MW02DW	Low-flow	Q
GW24-2	PDB	A	GW08	PDB	A	IR06-GW23	PDB	A	IR06-GW32	PDB	A	IR36-GW10IW	Low-flow	A	IR03-MW02IW	Low-flow	A	IR93-MW03	Low-flow	Q
GW24-3	PDB	A	GW09-1	PDB	A	IR06-GW31	PDB	A	IR06-GW33	PDB	**Q**	IR36-GW13IW	Low-flow	A				IR93-MW03IW	Low-flow	Q
GW25	PDB	A	GW09-3	PDB	A	IR06-MW03D	PDB	A	IR06-GW41	PDB	A	IR36-GW16IW	Low-flow	A				IR93-MW04	Low-flow	Q
GW40	PDB	A	GW10	PDB	A	IR06-GW15D	PDB	A	IR06-GW42	PDB	A	IR36-GW18IW	Low-flow	A				IR93-MW04IW	Low-flow	Q
GW41	PDB	A	GW11	PDB	A	IR06-GW38D	PDB	A	IR06-82MW02	PDB	A	IR36-GW20IW	Low-flow	A				IR93-MW05	Low-flow	**Q**
GW44	Low-flow	A	GW39	PDB	A				IR06-82MW03	PDB	A	IR36-GW21IW	Low-flow	A				IR93-MW05IW	Low-flow	**Q**
GW45*	Low-flow	A	GW42	Low-flow	**Q**				IR06-GW01D	PDB	A	IR36-GW10DW	Low-flow	A				IR93-MW06	Low-flow	**Q**
GW46	Low-flow	A	GW49	Low-flow	A				IR06-GW01DA	PDB	A	IR36-SW02	Grab (VOCs only)	S				IR93-MW08	Low-flow	**Q**
GW47	Low-flow	A	GW50	Low-flow	A				IR06-GW01DB	PDB	A	IR36-SW03	Grab (VOCs only)	S				IR93-MW09	Low-flow	**Q**
RW10	PDB	A	GW51*	Low-flow	A				IR06-GW27DW	PDB	A	IR36-SW04	Grab (VOCs only)	S				IR93-MW10	Low-flow	**Q**
RW11	PDB	A	GW52R	Low-flow	A				IR06-GW27DA	PDB	A	IR36-SW05	Grab (VOCs only)	S				IR93-MW11	Low-flow	**Q**
RW12	PDB	A	GW53	PDB	**Q**				IR06-GW28DW	PDB	**Q**							IR93-MW11IW	Low-flow	**Q**
			GW54	PDB	A				IR06-GW35D	PDB	A							IR93-MW12	Low-flow	**Q**
			GW58*	Low-flow	A				IR06-GW36D	PDB	A							IR93-MW14	Low-flow	**Q**
			GW59	Low-flow	A				IR06-GW37D	PDB	A									
			GW60	Low-flow	**Q**				IR06-GW40DW	PDB	A									
			GW61	Low-flow	A				IR06-GW43DW**	PDB	A									
			GW62	Low-flow	A				SRW01	Low-flow	A									
			GW63	Low-flow	A				SRW02	Low-flow	A									
			GW64	Low-flow	A				SRW03	Low-flow	A									
			GW65	Low-flow	A				SRW04	Low-flow	A									
			GW73	Low-flow	A				SRW05	Low-flow	A									
			GW74	Low-flow	A				SRW06	Low-flow	A									
			GW78	Low-flow	Q				DRW01	PDB	A									
			RW05	PDB	A				DRW02	Low-flow	A									
			RW06	Low-flow	A				DRW03	Low-flow	A									
			RW07	Low-flow	A				DRW04	Low-flow	A									
			RW08	PDB	A				SW01	Grab	S									
			RW09R	Low-flow	A				SW02	Grab	S									
			RW14	PDB	A				SW03	Grab	S									
			RW15	PDB	A				SD01	Grab	S									
									SD02	Grab	S									
									SD03	Grab	S									

Notes:

[F] - Install 5 new downgradient LTM monitoring shallow/intermediate nested well pairs (10 new wells total):
- Site 78 North: Install one shallow/intermediate nested pair located near IR78-GW43 (IR78-GW43 can be used as the shallow well if located); and one shallow/intermediate nested pair should be installed 200 ft southwest of IR78-GW40 and IR78-GW47.
- Site 82: Install one shallow/intermediate cluster northwest and another northeast of IR06-GW32, and one shallow/intermediate cluster northeast of IR06-GW37D.

[‡] - Replace low-flow sampling with PDB sampling technique for VOCs annually and low-flow sampling technique for NAIPs every other year.

* – Well cannot be located and not considered necessary for plume delineation.

** – Well not sampled due to damage. Abandon well and area will be covered with new shallow/intermediate nested pair to be placed northeast of IR06-GW37D.

VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
NAIPs - Natural attenuation indicator parameters
A - Location sampled annually
Q - Well sampled quarterly
S - Well sampled semiannually

Recommend sample location be removed from LTM program
Currently sampled with low-flow sampling techniques. Recommend PDB sample technology.
Q - Recommend sample frequency be reduced to annual monitoring

Table 3
Summary of Site 78 North Optimization Opportunities
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Sample Point	Well Depth (ft bgs)	Well Screen Length (ft)	Analysis	Sample Method	Detections (Yes/No)	LTM Recommendation	Comments/Recommendations*
Site 78 North							
IR78-GW45	25.0	5.0	VOCs	Low-flow	NS	Remove	Not a true upgradient well.
IR78-GW25	25.0	20.0	VOCs	PDB	No	Remove	No VOC detections above NCGWQS for 4 annual sampling events and 20 ft screened interval is within a clay layer.
IR78-GW24-1	25.0	20.0	VOCs	PDB	Yes	Retain	Near source area.
IR78-GW24-2	76.6	20.0	VOCs	PDB	No	Retain	No VOC detections above NCGWQS for 4 annual sampling events. Continue to monitor for vertical migration.
IR78-GW24-3	148.0	20.0	VOCs	PDB	No	Remove	No VOC detections above NCGWQS for 4 annual sampling events. IR78-GW24-2 will remain in the LTM program to monitor for vertical migration.
IR78-GW44	31.2	5.0	VOCs	Low-flow	Yes	Retain	Replace low-flow sample method with PDB sample technique.
IR78-GW41	24.0	20.0	VOCs	PDB	No	Retain	No VOC detections above NCGWQS for 4 annual sampling events, therefore, location provides upradient source area plume radial and downgradient delineation.
IR78-GW43[1]	NA	NA	NS	NS	NS	Add	Historically, well has not been found. Recommend a final search for the location of well. If well cannot be found, install a shallow and intermediate nested pair in vicinity or downgradient of this location.
IR78-RW11	35.0	20.0	VOCs	PDB	Yes	Retain	Groundwater elevation to be measured during each gauging event while recovery pumps are running.
IR78-GW23	25.0	20.0	VOCs	PDB	Yes	Remove	Redundant well with 20 ft screened interval. IR78-GW47 will continue to be monitored.
IR78-GW46	23.0	5.0	VOCs	Low-flow	Yes	Retain	Downgradient well with NCGWQS detections. Replace low flow sampling method with PDB sampling technique.
IR78-GW47[2]	30.0	5.0	VOCs	Low-flow	Yes	Retain	Downgradient well with NCGWQS detections.
IR78-GW40[2]	24.6	20.0	VOCs	PDB	No	Remove/Add	Redundant well with 20 ft screened interval. IR78-GW47 will continue to be monitored. No VOC detections above NCGWQS for 4 annual sampling events.
IR78-GW22	25.0	20.0	VOCs	PDB	No	Retain	No VOC detections above NCGWQS for 4 annual sampling events, therefore, location provides plume radial and downgradient delineation. Move PDB to 9 ft bgs.
IR78-RW10	35.0	20.0	VOCs	PDB	Yes	Retain	Groundwater elevation needs to be measured during every gauging event while recovery pumps are running.
IR78-RW12	35.0	20.0	VOCs	PDB	Yes	Retain	

Notes:
*Information is based on Final 2008 Long-Term Monitoring Annual Report and 2009 Hadnot Point groundwater sampling event. 2009 LTM data not available during analysis.
[1] - If IR78-GW43 can be found, add to LTM and install an intermediate well to monitor for vertical migration. If IR78-GW43 cannot be found, install a shallow and intermediate nested pair in vicinity of former IR78-GW43 to delineate impacts of northereastern source area.
[2] - Install a shallow and intermediate nested pair of monitoring wells approximately 200 ft southwest of IR78-GW40 and IR78-GW47 and incorporate into LTM program for delineation of impacts.
ft - foot
ft bgs - feet below ground surface
NA - Not available
NCGWQS - North Carolina Groundwater Quality Standards (2L)
NS - Not sampled
PDB - Permeable Diffusion Bag
ug/L - micrograms per liter
VOC - volatile organic compound

Table 4
Summary of Site 78 South Optimization Opportunities
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Sample Point	Well Depth (ft bgs)	Well Screen Length (ft)	Analysis	Sample Method	Detections (Yes/No)	LTM Recommendation	Comments/Recommendations*
Site 78 South							
IR78-GW05	27.0	20.0	VOCs	PDB	No	Remove	No VOC detections exceeding NCGWQS for the last 4 annual LTM sampling events and 20 ft screened interval is set within clay layers.
IR78-GW08	25.0	20.0	VOCs	PDB	No	Remove	No VOC detections exceeding NCGWQS for the last 4 annual LTM sampling events and 20 ft screened interval is within clay layers.
IR78-GW10	25.0	20.0	VOCs	PDB	Yes	Retain	No VOC detections exceeding NCGWQS for the last 3 annual LTM sampling events. Location defines upgradient delineation of impacts.
IR78-GW11	25.0	20.0	VOCs	PDB	No	Retain	No VOC detections exceeding NCGWQS for the last 4 annual LTM sampling events. Location defines radial delineation of impacts.
IR78-GW51	24.0	5.0	VOCs	Low-flow	NS	Remove	Well cannot be located.
IR78-GW09-1	25.0	20.0	VOCs	PDB	Yes	Remove	Redundant well with 20 ft screened interval within a clay later. Wells in vicinity (IR78-GW60 and IR78-GW73) will continue to monitored.
IR78-GW09-3	150.0	20.0	VOCs	PDB	No	Retain	Retain to monitor for vertical migration.
IR78-GW60	31.0	6.0	VOCs	Low-flow	Yes	Retain	VOC detections exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique.
IR78-GW78	32.0	5.0	VOCs	Low-flow	Yes	Remove	Redundant well, located in vicinity of wells that will continue to monitored (IR78-GW60 and IR78-GW73).
IR78-GW73	30.0	5.0	VOCs	Low-flow	Yes	Retain	VOC detected exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique.
IR78-GW74	43.0	5.0	VOCs	Low-flow	Yes	Retain	VOC detections exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique.
IR78-GW49	30.5	5.0	VOCs	Low-flow	Yes	Retain	VOC detections exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique.
IR78-GW52R	32.0	5.0	VOCs	Low-flow	Yes	Retain	VOC detections exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique.
IR78-GW01	25.0	20.0	VOCs	PDB	Yes	Remove	Redundant well with a 20 foot screened interval within a clay later. Located in vicinity of wells that will continue to monitored (IR78-GW42, IR78-RW06, and IR78-GW59). Also, no VOC detections exceeding NCGWQS for last two annual LMT sampling events.
IR78-GW04-1	24.5	20.0	VOCs	PDB	Yes	Retain	VOC detections exceeding NCGWQS.
IR78-GW53	25.0	10.0	VOCs	PDB	Yes	Retain	VOC detections exceeding NCGWQS. Sample annually.
IR78-GW39	20.0	10.0	VOCs	PDB	No	Remove	No VOC detections exceeding NCGWQS for the last 4 annual LTM sampling events. Downgradient plume migration will be covered by IR78-GW61 and IR78-GW62.
IR78-GW42	23.0	20.0	VOCs	Low-flow	Yes	Retain	VOC detections exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique and set PDB at 10 ft bgs. Sample annually.
IR78-GW59	25.0	5.0	VOCs	Low-flow	Yes	Retain	VOC detections exceeding NCGWQS. Replace low flow sampling method with PDB sampling technique.
IR78-GW50	23.0	5.0	VOCs	Low-flow	Yes	Retain	No VOC detections exceeding NCGWQS for the last 3 annual LTM sampling events. Location defines radial delineation of impacts.
IR78-GW54	24.0	5.0	VOCs	PDB	No	Retain	No VOC detections exceeding NCGWQS since well was installed in 2007. Previous well at this location was abandoned in place prior to 2005.

Table 4
Summary of Site 78 South Optimization Opportunities
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Sample Point	Well Depth (ft bgs)	Well Screen Length (ft)	Analysis	Sample Method	Detections (Yes/No)	LTM Recommendation	Comments/Recommendations*
Site 78 South							
IR78-GW58	28.0	5.0	VOCs	Low-flow	NS	Remove	Well cannot be located and not considered necessary for plume delineation.
IR78-GW61	29.0	5.0	VOCs	Low-flow	No	Retain	Continue monitoring. CERCLA point-of-compliance well. Replace low flow sampling method with PDB sampling technique.
IR78-GW62	30.0	5.0	VOCs	Low-flow	No	Retain	Continue monitoring. CERCLA point-of-compliance well. Replace low flow sampling method with PDB sampling technique.
IR78-GW63	29.0	5.0	VOCs	Low-flow	No	Retain	Continue monitoring. CERCLA point-of-compliance well. Replace low flow sampling method with PDB sampling technique.
IR78-GW64	28.0	5.0	VOCs	Low-flow	Yes	Retain	Continue monitoring. CERCLA point-of-compliance well. Replace low flow sampling method with PDB sampling technique.
IR78-GW65	32.0	5.0	VOCs	Low-flow	Yes	Retain	Continue monitoring, leading edge of plume. Replace low flow sampling method with PDB sampling technique.
IR78-RW09R*	25.00	10.0	VOCs	Low-flow	No	Retain	Replace low flow sampling method with PDB sampling technique.
IR78-RW05	35.0	20.0	VOCs	PDB	Yes	Retain	Modify well heads to be able to measure groundwater elevation while recovery pumps are running. Replace low flow sampling method with PDB sampling technique.
IR78-RW06	35.0	20.0	VOCs	Low-flow	Yes	Retain	
IR78-RW07	35.0	20.0	VOCs	Low-flow	NS	Retain	
IR78-RW08	35.0	20.0	VOCs	PDB	Yes	Retain	
IR78-RW14	35.0	20.0	VOCs	PDB	Yes	Retain	
IR78-RW15	35.0	20.0	VOCs	PDB	Yes	Retain	

Notes:
*Information is based on Final 2008 Long-Term Monitoring Annual Report and 2009 Hadnot Point groundwater sampling event. 2009 LTM data not available during analysis.
COC - chemical of concern
ft - foot
ft bgs - feet below ground surface
NCGWQS - North Carolina Groundwater Quality Standards (2L)
NS - Not sampled
PDB - Permeable Diffusion Bag
ug/L - micrograms per liter
VOC - volatile organic compound

Table 5
LTM Optimization—Cost Savings
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Subtask		Unit Cost Cost ($ per well)	# Units Added	# Units Deleted	Unit Difference		Cost Difference ($)
Well Installation (MW)	$	3,000.00	10	0	10	$	30,000.00
IDW Management (ID)	$	250.00	10	0	10	$	2,500.00
Mapping and Surveying (FM)	$	275.00	10	0	10	$	2,750.00
One-Time Installation Cost Subtotal						$	35,250.00
Low-Flow Groundwater Sampling	$	250.00	0	119	-119	$	(29,750.00)
PDB/Low-flow for NAIPS every other year Groundwater Sampling (FQ)	$	125.00	60	22	38	$	4,750.00
IDW Management (ID) with low-flow**	$	100.00	16	119	-103	$	(10,300.00)
Subtotal						$	(35,300.00)
Laboratory Analyses - VOCs	$	66.00	10	91	-81	$	(5,346.00)
Laboratory Analyses - SVOCs	$	179.00	0	0	0	$	-
Laboratory Analyses - NAIPs**	$	255.00	0.0	16.0	-16.0	$	(4,080.00)
Data Validation (DV) - VOCs	$	13.50	10	91	-81	$	(1,093.50)
Data Validation (DV) - SVOCs	$	14.50	0	0	0	$	-
Sample Management (SM)	$	50.00	10	91	-81	$	(4,050.00)
Subtotal						$	(14,569.50)
Total* (annual savings)						$	(49,869.50)

Notes:
Costs include labor, other direct costs, and travel, does not include project planning or award fees.
* - Field Investigation costs represent one-time costs that are not included in the overall annual cost savings estimate total
VOC - Volatile Organic Compounds Method SW-846 8260 Volatiles without Encore (TCL from OLM04)
SVOC - Semivolatile Organic Compounds Method SW-846 8270 Semivolatiles (OLM04 compound list)
NAIP - Natural Attenuation Indicator Paramters Methods:
Alkalinity (310.1)
Chloride, Nitrate, Nitrite, Sulfate (300.0)
Ferrous Iron (3500-Fe D)
Ferric Iron (3500-Fe D)
Methane, ethane, ethene (RSK-175)
Sulfide (376.1/ 9030)
Total Organic Carbon (TOC) (415.2/ 9060)
** - NAIPs will be sampled every other year, so the total annual cost for 34 monitoring well locations requiring NAIPs is halved

Appendix A
Historical Data Tables

Table A-1
Site 78 North Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L	IR78-GW22											IR78-GW22-2	IR78-GW23										
Sample ID	(December 2005)	IR78-GW22-05C	IR78-GW22-05D	IR78-GW22-06A	IR78-GW22-06B	IR78-GW22-06C	IR78-GW22-06D	IR78-GW22-07A	IR78-GW22-07A2	IR78-GW22-07C	IR78-GW22-08C	IR78-GW22D-08C	IR78-GW22-2-06D	IR78-GW23-05C	IR78-GW23-05D	IR78-GW23-06A	IR78-GW23-06B	IR78-GW23-06C	IR78-GW23-06D	IR78-GW23D-06D	IR78-GW23-07A	IR78-GW23-07A2	IR78-GW23-07B
Sample Date		10/10/05	10/20/05	01/11/06	04/17/06	08/23/06	10/17/06	03/13/07	03/13/07	08/23/07	08/22/08	08/22/08	10/02/06	10/10/05	11/22/05	02/21/06	05/04/06	08/22/06	12/05/06	12/05/06	01/16/07	03/13/07	05/03/07
1,1,1-Trichloroethane	200	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,1,2,2-Tetrachloroethane	0.17	1 U	1 U	1 U	1 U	0.5 U	1 U	2 U	2 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	80 U	80 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.5 U	10 U	10 U	NA	NA	10 U
1,1,2-Trichloroethane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,1-Dichloroethane	70	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,1-Dichloroethene	7	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,2,3-Trichlorobenzene	--	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	NA	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.5 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.5 U	10 U	10 U	NA	NA	10 U
1,2-Dibromo-3-chloropropane	--	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.5 U	20 R	50 R	NA	NA	10 U
1,2-Dichloroethane	0.38	0.5 UJ	NA	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	0.5 U	25 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,2-Dichlorobenzene	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	1 U	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,2-Dichloroethane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,2-Dichloroethene (total)	--			NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA			NA	NA	NA	300	290	NA	NA	280
1,2-Dichloropropane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,3-Dichlorobenzene	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	1 U	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
1,4-Dichlorobenzene	1.4	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	1 U	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
2-Butanone	4,200	5 UJ	NA	NA	NA	5 U	NA	NA	NA	10 U	5 U	5 U	NA	5 U	250 R	420 U	420 U	5 U	10 U	10 U	NA	NA	6 J
2-Chloroethyl vinyl ether	--	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	5 UJ	NA	NA	NA	5 U	NA	NA	NA	10 U	5 U	5 UJ	NA	5 U	250 U	420 U	420 U	5 U	10 U	10 U	NA	NA	10 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 UJ	NA	NA	NA	5 U	NA	NA	NA	10 U	5 U	5 UJ	NA	5 U	250 U	420 U	420 U	5 U	10 U	10 U	NA	NA	10 U
Acetone	700	6.6 R	NA	NA	NA	11 U	NA	NA	NA	6 J	5 U	5 U	NA	170 R	250 R	420 U	690 U	13 U	10 U	8 U	NA	NA	17 U
Benzene	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	**98.3**	20 U	**4.9**	**4.56**	**6.02**	**4.79**	**2.82**	**3 J**	**3.34**	**3.1**	**3 J**
Bromochloromethane	--	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	NA	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.5 U	NA	NA	NA	NA	NA
Bromodichloromethane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Bromoform	4.43	1 U	1 U	2 U	2 U	0.5 U	2 U	2 U	2 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	100 U	40 U	0.5 U	50 U	10 U	80 U	80 U	10 U
Bromomethane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Carbon disulfide	700	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.11 J	0.16 J	NA	0.5 U	25 U	42 U	42 U	0.21 J	10 U	10 U	NA	NA	10 U
Carbon tetrachloride	--	1 U	1 U	1 U	1 U	0.5 U	1 U	2 U	2 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	80 U	80 U	10 U
Chlorobenzene	50	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	1 U	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Chloroethane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Chloroform	70	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Chloromethane	2.6	1 U	1 U	1 U	1 U	0.5 U	1 U	1.52	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Cyclohexane	--	0.5 UJ	NA	NA	NA	0.14 J	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.18 J	25 U	42 U	42 U	0.37 J	10 U	10 U	NA	NA	10 U
Dibromochloromethane	--	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Dichlorodifluoromethane (Freon-12)	1,400	1 U	1 U	NA	NA	0.5 UJ	NA	NA	NA	10 U	0.5 U	0.5 U	NA	20 U	1 U	42 UJ	42 U	0.5 UJ	10 U	10 U	NA	NA	10 U
Ethylbenzene	550	1 U	1 U	1 U	1 U	0.45 J	1 U	1 U	1 U	10 U	0.5 U	0.5 U	6.3	20 U	1.2	1.33	1.14	1.68	1.32	2 J	2.04	1.01	2 J
Isopropyl ether	70	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U	NA	1 U	1 U	NA
Isopropylbenzene	70	0.4 J	NA	NA	NA	0.12 J	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.41 J	25 U	42 U	42 U	1.4	2 J	1 J	NA	NA	10 U
Methane	--			NA	NA	NA	NA	NA	NA	NA	NA	NA	57.8			NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	0.5 R	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.5 U	0.5 U	NA	13 R	25 U	42 UJ	42 R	0.5 U	10 U	10 U	NA	NA	10 U
Methyl-tert-butyl ether (MTBE)	200	1 U	1 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	0.5 U	0.5 U	1 U	20 U	1 U	2 U	2 U	52.9	32.9	10 U	2 U	2 U	10 U
Methylcyclohexane	--	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.47 J	10 U	10 U	NA	NA	10 U
Methylene chloride	4.6	5 U	5 U	5 U	5 U	0.5 U	5 U	5 U	5 U	10 U	0.5 U	0.5 U	NA	100 U	5 U	250 U	100 U	0.5 U	125 U	10 U	200 U	200 U	10 U
Styrene	--	0.5 UJ	NA	NA	NA	0.5 U	NA	NA	NA	10 U	0.5 U	0.5 U	NA	0.5 U	25 U	42 U	42 U	0.5 U	10 U	10 U	NA	NA	10 U
Tetrachloroethene	0.7	1 U	1 U	1 U	1 U	0.5 U	1 U	2 U	2 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	80 U	80 U	10 U
Toluene	1,000	1 U	1 U	1 U	1 U	1.87	1 U	0.87 J	1 U	10 U	0.5 U	0.5 U	18.1	20 U	2.3	1.95	2.49	3.85	3.01	2 J	3.21	1.95	3 J
Trichloroethene	2.8	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	**5.5**	50 U	20 U	1.3	25 U	1 J	40 U	40 U	1 J
Trichlorofluoromethane(Freon-11)	2,100	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
Vinyl chloride	0.015	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	**59.3**	**77.3**	**57.2**	**64**	**81**	**65.8**	**74**	**39.8 J**	**22 J**	**75**
Xylene, total	530	3 U	3 U	2 U	2 U	3.59	2 U	2 U	2 U	10 U	1.5 U	1.5 U	12.9	24.7 J	24.9	20.9	24.8	25.9	16.5	14	15.3	11.9	15
cis-1,2-Dichloroethene	70	1 U	1 U	1 U	1 U	0.5 U	1 U	2 U	2 U	10 U	0.5 U	0.5 U	NA	**769**	1 U	**674**	**569**	**440**	**274**	**240**	**319**	**294**	**250**
cis-1,3-Dichloropropene	0.19	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U
m- and p-Xylene	530	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	**NA**	NA	2 J	2 J	NA	NA	1 J
o-Xylene	530	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	12	12	NA	NA	14
trans-1,2-Dichloroethene	100	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	43.6	64.2	50 U	6.52 J	27	25 U	21	40 U	40 U	19
trans-1,3-Dichloropropene	0.19	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	1 U	10 U	0.5 U	0.5 U	NA	20 U	1 U	50 U	20 U	0.5 U	25 U	10 U	40 U	40 U	10 U

Table A-1
Site 78 North Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L									IR78-GW24-1				IR78-GW24-2				IR78-GW24-3			IR78-GW25					IR78-(
Sample ID	(December 2005)	IR78-GW23D-07B	IR78-GW23-07C	IR78-GW23D-07C	IR78-GW23-07D	IR78-GW23-08A	IR78-GW23-08B	IR78-GW23-08C	IR78-GW23D-08C	IR78-GW24-05C	IR78-GW24-1-06C	IR78-GW24-07C	IR78-GW24-08C	IR78-GW24IW-05C	IR78-GW24-2-06C	IR78-GW24IW-07C	IR78-GW24IW-08C	IR78-GW24DW-05C	IR78-GW24-3-06C	IR78-GW24DW-07C	IR78-GW25-05C	IR78-GW25-06C	IR78-GW25D-06C	IR78-GW25-07C	IR78-GW25-08C	IR78-GW40-05C	IR78-GW40-06C
Sample Date		05/03/07	08/22/07	08/22/07	11/15/07	02/18/08	05/19/08	08/22/08	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	10/10/05	08/22/06	08/22/06	08/23/07	08/22/08	10/10/05	08/22/06
1,1,1-Trichloroethane	200	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	7	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.41 J	0.15 J	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	--	NA	NA	NA	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	NA	6.3 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	70	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.38	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	--	280	230	250	NA	NA	NA	NA	NA		NA	400	NA		NA	10 U	NA			10 U		NA	NA	10 U	NA		NA
1,2-Dichloropropane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	1.4	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
2-Butanone	4,200	4 J	10 U	10 U	130 U	42 U	5 U	42 U	63 U	5 UJ	5 U	10 U	63 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	10 U	10 U	10 U	130 U	42 U	5 U	42 U	63 U	5 UJ	5 U	10 U	63 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	10 U	10 U	10 U	130 U	42 U	5 U	42 U	63 U	5 UJ	5 U	10 U	63 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U
Acetone	700	13 U	10 UJ	10 UJ	130 U	42 U	5.9 U	42 U	63 U	110 R	3 U	10 UJ	63 U	5 R	2.9 U	10 UJ	5.6 U	5 R	3.2 U	10 UJ	5 R	2.3 U	5 U	10 U	9 U	5.2 R	2.7 U
Benzene	1	3 J	2 J	2 J	2.8 J	4.2 U	3.2	6	5.6 J	0.39 J	0.29 J	10 U	6.3 U	0.5 U	0.13 J	10 U	0.21 J	0.11 J	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	--	NA	NA	NA	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	NA	6.3 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U
Bromodichloromethane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Bromoform	4.43	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.17 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Bromomethane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 UJ	10 U	6.3 U	0.5 U	0.5 UJ	10 U	0.5 U	0.5 U	0.5 UJ	10 U	0.5 U	0.5 UJ	0.5 UJ	10 U	0.5 U	0.5 U	0.5 U
Carbon disulfide	700	10 U	10 U	10 U	13 U	4.2 U	0.1 J	4.2 U	6.3 U	0.5 UJ	0.22 J	10 U	6.3 U	0.5 UJ	0.12 J	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 UJ	0.49 J	0.93	10 U	0.5 U	0.5 UJ	0.5 U
Carbon tetrachloride	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	50	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	10 U	10 UJ	10 UJ	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 UJ	6.3 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Chloroform	70	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Chloromethane	2.6	10 U	10 UJ	10 UJ	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 UJ	6.3 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Cyclohexane	--	10 U	10 U	10 U	13 U	4.2 U	0.36 J	4.2 U	6.3 U	0.5 UJ	0.12 J	10 U	6.3 U	0.11 J	0.13 J	2 J	0.5 U	0.13 J	0.17 J	10 U	0.13 J	0.12 J	0.13 J	1 J	0.5 U	0.5 U	0.17 J
Dibromochloromethane	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	10 U	10 UJ	10 UJ	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 UJ	10 UJ	6.3 U	0.5 U	0.5 UJ	10 UJ	0.5 U	0.5 U	0.5 UJ	10 UJ	0.5 U	0.5 UJ	0.5 UJ	10 U	0.5 U	0.5 U	0.5 UJ
Ethylbenzene	550	2 J	1 J	10 U	13 U	4.2 U	0.38 J	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Isopropyl ether	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	70	10 U	1 J	1 J	13 U	4.2 U	0.69	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U		0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA		NA	NA	NA			U		NA	NA	NA	NA		NA
Methyl acetate	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	6.3 R	0.5 U	10 U	6.3 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Methyl-tert-butyl ether (MTBE)	200	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	--	10 U	10 U	10 U	13 U	4.2 U	0.37 J	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Methylene chloride	4.6	10 U	10 U	10 U	13 U	4.2 U	0.5 U	5.3 U	6.3 U	0.5 UJ	0.5 U	10 U	7.9 U	0.5 U	0.5 U	10 U	0.63 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Styrene	--	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.7	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Toluene	1,000	3 J	3 J	2 J	13 U	4.2 U	1	4.2 U	6.3 U	0.15 J	0.13 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.12 J	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Trichloroethene	2.8	10 U	1 J	1 J	13 U	4.2 U	0.86	0.93 J	6.3 U	24 J	7.7	32	13	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.44 J	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane(Freon-11)	2,100	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.015	74	93 J	97 J	49	4.2 U	64	29	34	0.5 UJ	1.3	4 J	2.2 J	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
Xylene, total	530	15	11	9 J	38 U	2.9 J	9.1	8.5 J	6.5 J	0.11 J	0.5 U	10 U	19 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	250	180	190	150	110	210	170	150	160	250	280	210	0.18 J	0.16 U	10 U	0.2 J	0.31 J	0.49 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.19	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
m- and p-Xylene	530	1 J	1 J	10 U	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA			10 U	NA	NA	NA	10 U	NA	NA	NA
o-Xylene	530	13	10	9 J	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA			10 U	NA	NA	NA	10 U	NA	NA	NA
trans-1,2-Dichloroethene	100	18	22	24	9.8 J	6.7	13	12	9.7	7 J	1.9	18	10	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.19	10 U	10 U	10 U	13 U	4.2 U	0.5 U	4.2 U	6.3 U	0.5 UJ	0.5 U	10 U	6.3 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U

Table A-1
Site 78 North Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L	GW40		IR78-GW41				IR78-GW44				IR78-GW46				
Sample ID	(December 2005)	IR78-GW40-07C	IR78-GW40-08C	IR78-GW41-05C	IR78-GW41-06C	IR78-GW41-07C	IR78-GW41-08C	IR78-GW44-05C	IR78-GW44-06C	IR78-GW44-07C	IR78-GW44-08C	IR78-GW46-05C	IR78-GW46-06C	IR78-GW46-07C	IR78-GW46D-07C	IR78-GW46-08C
Sample Date		08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	09/29/05	08/22/06	08/22/07	08/21/08	09/27/05	08/23/06	08/23/07	08/23/07	08/21/08
1,1,1-Trichloroethane	200	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,1,2-Trichloroethane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethane	70	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,1-Dichloroethene	7	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.29 J	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,2,3-Trichlorobenzene	--	NA	0.5 U	0.5 UJ	0.5 U	NA	0.5 U	25 U	0.5 U	NA	50 U	4.2 U	0.5 U	NA	NA	0.5 U
1,2,4-Trichlorobenzene	70	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethane	0.38	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichlorobenzene	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	10 U	NA		NA	22	NA		NA	240	NA		NA	8 J	8 J	NA
1,2-Dichloropropane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,3-Dichlorobenzene	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
1,4-Dichlorobenzene	1.4	10 U	0.5 U	0.1 J	0.21 J	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
2-Butanone	4,200	10 U	5 U	5 UJ	5 U	10 U	5 U	250 U	5 U	10 U	500 U	42 U	5 U	10 U	10 U	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	10 U	5 U	5 UJ	5 U	10 U	5 U	250 U	5 U	10 U	500 U	42 U	5 U	10 U	10 U	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	10 U	5 U	5 UJ	5 U	10 U	5 U	250 U	5 U	10 U	500 U	42 U	5 U	10 U	10 U	5 U
Acetone	700	10 UJ	10 U	5 R	3.5 U	10 U	5.4 U	500 R	3 U	10 UJ	500 U	42 R	5 U	10 U	10 U	7.3 U
Benzene	1	10 U	0.5 U	0.17 J	0.47 J	10 U	0.5 U	25 U	**2.1 J**	1 J	50 U	**99**	**41**	**39**	**38**	**23**
Bromochloromethane	--	NA	0.5 U	0.5 UJ	0.5 U	NA	0.5 U	25 U	0.5 U	NA	50 U	4.2 U	0.5 U	NA	NA	0.5 U
Bromodichloromethane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Bromoform	4.43	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Bromomethane	--	10 U	0.5 U	0.5 UJ	0.5 UJ	10 U	0.5 U	25 U	0.5 UJ	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Carbon disulfide	700	10 U	0.5 U	0.45 J	0.31 J	10 U	0.13 J	25 U	0.44 J	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.1 J
Carbon tetrachloride	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Chlorobenzene	50	10 U	0.5 U	0.16 J	0.33 J	10 U	0.12 J	25 U	0.5 U	10 U	50 U	4.2 U	0.39 J	10 U	10 U	0.35 J
Chloroethane	--	10 UJ	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 UJ	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Chloroform	70	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Chloromethane	2.6	10 UJ	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 UJ	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Cyclohexane	--	2 J	0.5 U	0.21 J	0.1 J	10 U	0.5 U	25 U	0.13 J	10 U	50 U	16	7.2	7 J	6 J	4.1
Dibromochloromethane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	10 UJ	0.5 U	13 J	5.1 J	5 J	2.8	25 U	0.1 J	10 UJ	50 U	4.2 U	0.5 UJ	10 U	10 U	0.5 U
Ethylbenzene	550	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.17 J	10 U	50 U	21	8.5	7 J	6 J	2.6
Isopropyl ether	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	70	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	5.8	2.7	3 J	3 J	1.4
Methane	--	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA	NA
Methyl acetate	--	10 U	0.5 U	0.5 R	0.5 U	10 UJ	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	200	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	8	13	24	24	8.8
Methylcyclohexane	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	11	2.8	3 J	3 J	2
Methylene chloride	4.6	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.63 U	25 U	0.5 U	10 U	54 U	4.2 U	0.5 U	10 U	10 U	0.66 U
Styrene	--	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Tetrachloroethene	0.7	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Toluene	1,000	10 U	0.5 U	0.5 UJ	0.18 U	10 U	0.5 U	25 U	1.4 U	1 J	50 U	1.2 J	0.55 U	1 J	1 J	0.5 U
Trichloroethene	2.8	10 U	0.5 U	0.15 J	0.28 J	10 U	0.11 J	25 U	0.25 J	1 J	50 U	4.2 U	0.68	10 U	10 U	0.57
Trichlorofluoromethane(Freon-11)	2,100	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.14 J	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
Vinyl chloride	0.015	10 UJ	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	**1,400**	**1,200**	**650**	**670**	4.2 U	0.5 U	**1 J**	**1 J**	0.5 U
Xylene, total	530	10 U	1.5 U	0.5 UJ	0.5 U	10 U	1.5 U	25 U	2.7	10 U	150 U	21	5	3 J	3 J	1.7
cis-1,2-Dichloroethene	70	10 U	0.5 U	21 J	35	22	0.74	**290**	**230**	**160**	**200**	15	9.6	8 J	8 J	5.2
cis-1,3-Dichloropropene	0.19	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U
m- and p-Xylene	530	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	2 J	2 J	NA
o-Xylene	530	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	1 J	1 J	NA
trans-1,2-Dichloroethene	100	10 U	0.5 U	0.2 J	0.37 J	10 U	0.5 U	9.7 J	10	7 J	50 U	4.2 U	0.23 J	10 U	10 U	0.17 J
trans-1,3-Dichloropropene	0.19	10 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	25 U	0.5 U	10 U	50 U	4.2 U	0.5 U	10 U	10 U	0.5 U

Station ID	IR78-GW47				IR78-RW10							
Sample ID	IR78-GW47-05C	IR78-GW47-06C	IR78-GW47-07C	IR78-GW47-08C	IR78-RW10-05C	IR78-RW10-05D	IR78-RW10-06A	IR78-RW10-06B	IR78-RW10-06C	IR78-RW10D-06C	IR78-RW10-06D	IR78-RW10-07A
Sample Date	09/27/05	08/23/06	08/23/07	08/21/08	07/26/05	10/20/05	01/11/06	04/17/06	09/07/06	09/07/06	10/17/06	01/16/07
1,1,1-Trichloroethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	8 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	1 U	6.3 U	NA	NA
1,1,2-Trichloroethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,1-Dichloroethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,1-Dichloroethene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	1.4 J	1.4 J	4 U	4 U
1,2,3-Trichlorobenzene	0.5 UJ	0.5 U	NA	0.5 U	NA	NA	NA	NA	4.2 U	6.3 UJ	NA	NA
1,2,4-Trichlorobenzene	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	4.2 U	6.3 UJ	NA	NA
1,2-Dibromo-3-chloropropane	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	4.2 U	6.3 U	NA	NA
1,2-Dichloroethane	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,2-Dichlorobenzene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,2-Dichloroethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	2.5 J	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,2-Dichloroethene (total)		NA	1 J	NA			NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,3-Dichlorobenzene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
1,4-Dichlorobenzene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
2-Butanone	5 UJ	5 U	10 U	5 U	NA	NA	NA	NA	42 U	63 U	NA	NA
2-Chloroethyl vinyl ether	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA
2-Hexanone	5 UJ	5 U	10 U	5 U	NA	NA	NA	NA	42 U	63 U	NA	NA
2-Propanol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	5 UJ	5 U	10 U	5 U	NA	NA	NA	NA	42 U	63 U	NA	NA
Acetone	5 R	4.4 U	3 J	7.1 U	NA	NA	NA	NA	18 U	34 U	NA	NA
Benzene	**2.1 J**	**1.3**	**4 J**	**5.1 J**	**168**	**114**	**138**	**122**	**10.6**	**130**	**148**	**80.1**
Bromochloromethane	0.5 UJ	0.5 U	NA	0.5 U	NA	NA	NA	NA	4.2 U	6.3 U	NA	NA
Bromodichloromethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Bromoform	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	16 U	10 U	4.2 U	6.3 U	8 U	8 U
Bromomethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Carbon disulfide	0.5 UJ	0.15 J	10 U	0.5 U	NA	NA	NA	NA	4.2 U	6.3 U	NA	NA
Carbon tetrachloride	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	8 U
Chlorobenzene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Chloroethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Chloroform	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Chloromethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Cyclohexane	1 J	0.53	1 J	1.8 J	NA	NA	NA	NA	9.9	8.2	NA	NA
Dibromochloromethane	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	10 U	0.5 U	5 U	5 U	NA	NA	4.2 U	6.3 U	NA	NA
Ethylbenzene	0.5 UJ	0.5 U	10 U	0.5 U	18.1	13.8	13.3	8.84	0.89 J	8.3	14	5.8
Isopropyl ether	NA	NA	NA	NA	NA	NA	2.53 J	3.71 J	0.72 J	NA	8 U	1.7 J
Isopropylbenzene	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	1.4 J	6.3 U	NA	NA
Methane		NA	NA	NA			NA	NA	NA	NA	NA	NA
Methyl acetate	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	4.2 U	6.3 U	NA	NA
Methyl-tert-butyl ether (MTBE)	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	16 U	10 U	2 U	6.3 U	16 U	8 U
Methylcyclohexane	0.5 UJ	0.5 U	10 U	0.55 J	NA	NA	NA	NA	3.6 J	6.3 U	NA	NA
Methylene chloride	0.5 UJ	0.5 U	10 U	0.57 U	25 U	25 U	40 U	**6.98 J**	1.3 U	6.3 U	20 U	20 U
Styrene	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	4.2 U	6.3 U	NA	NA
Tetrachloroethene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	8 U
Toluene	0.5 UJ	0.5 U	10 U	0.5 UJ	2.6 J	5 U	8 U	5 U	1.39	6.3 U	8 U	4 U
Trichloroethene	**3.9 J**	2.5	**6 J**	**10 J**	**105**	**24.5**	**56.9**	**25.1**	**27**	**25**	**35.7**	**32.9**
Trichlorofluoromethane(Freon-11)	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
Vinyl chloride	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	**8.3**	**6.7**	4 U	**0.75 J**
Xylene, total	0.5 UJ	0.5 U	10 U	1.5 U	12.6 J	8.7 J	5.33 J	10 U	2.73 J	6.3 U	16 U	2.23 J
cis-1,2-Dichloroethene	0.86 J	0.55 U	1 J	1.6	**116**	37.3	60.5	39.8	30	27	42.4	33.9
cis-1,3-Dichloropropene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
m- and p-Xylene	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.14 J	0.5 U	10 U	0.15 J	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U
trans-1,3-Dichloropropene	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	8 U	5 U	4.2 U	6.3 U	4 U	4 U

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Station ID	NC2L (December 2005)	IR78-RW11							IR78-RW12			
Sample ID		IR78-RW10-07A2	IR78-RW10-07C	IR78-RW10-08C	IR78-RW11-05C	IR78-RW11-06C	IR78-RW11-07C	IR78-RW11-08C	IR78-RW12-05C	IR78-RW12-06C	IR78-RW12-07C	IR78-RW12-08C
Sample Date		03/13/07	08/23/07	08/21/08	10/10/05	09/07/06	08/23/07	08/21/08	10/10/05	08/23/06	08/23/07	08/21/08
1,1,1-Trichloroethane	200	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,1,2,2-Tetrachloroethane	0.17	8 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	10 U	6.3 U	0.5 U	0.31 J	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,1,2-Trichloroethane	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 UJ	10 U	3.1 U
1,1-Dichloroethane	70	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,1-Dichloroethene	7	4 U	10 U	6.3 U	0.5 U	0.25 J	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,2,3-Trichlorobenzene	--	NA	NA	6.3 U	0.5 U	1 UJ	NA	0.5 U	2.5 U	0.5 U	NA	3.1 U
1,2,4-Trichlorobenzene	70	NA	10 U	6.3 U	0.5 U	1 UJ	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,2-Dibromo-3-chloropropane	--	NA	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,2-Dichloroethane	0.38	4 U	**1 J**	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,2-Dichlorobenzene	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,2-Dichloroethane	--	4 U	1 J	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,2-Dichloroethene (total)	--	NA	26	NA		NA	10 U	NA		NA	200	NA
1,2-Dichloropropane	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 UJ	10 U	3.1 U
1,3-Dichlorobenzene	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
1,4-Dichlorobenzene	1.4	4 U	10 U	6.3 U	0.5 U	0.27 J	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
2-Butanone	4,200	NA	10 U	63 U	5 U	10 U	7 J	5 U	25 U	5 U	10 U	31 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	NA	10 U	63 U	5 U	10 U	10 U	5 U	25 U	5 U	10 U	31 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	NA	10 U	63 U	5 U	10 U	10 U	5 U	25 U	5 UJ	10 U	31 U
Acetone	700	NA	10 U	63 U	5 R	6 U	**1,200**	6 U	31 R	3.8 U	10 U	31 U
Benzene	1	**108**	**120**	**210**	0.13 J	0.49 J	10 U	0.5 U	**1.1 J**	0.3 J	**6 J**	**4.9**
Bromochloromethane	--	NA	NA	6.3 U	0.5 U	1 U	NA	0.5 U	2.5 U	0.5 U	NA	3.1 U
Bromodichloromethane	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 UJ	10 U	3.1 U
Bromoform	4.43	8 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Bromomethane	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Carbon disulfide	700	NA	10 U	6.3 U	0.5 UJ	1 U	6 J	0.4 J	2.5 U	0.5 U	10 U	3.1 U
Carbon tetrachloride	--	8 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Chlorobenzene	50	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.12 J	10 U	3.1 U
Chloroethane	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Chloroform	70	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.11 U	10 U	3.1 U
Chloromethane	2.6	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Cyclohexane	--	NA	8 J	10	0.15 J	1 U	10 U	0.5 U	2.5 U	0.13 J	10 U	0.63 J
Dibromochloromethane	--	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Dichlorodifluoromethane (Freon-12)	1,400	NA	10 UJ	6.3 U	0.87 J	0.44 J	10 U	0.5 U	2.5 U	0.5 UJ	10 UJ	3.1 U
Ethylbenzene	550	9.04	10 J	8.8	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	2 J	0.73 J
Isopropyl ether	70	2.71 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	70	NA	2 J	1.3 J	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Methane	--	NA	NA	NA		NA	NA	NA		NA	NA	NA
Methyl acetate	--	NA	10 UJ	6.3 U	0.5 UJ	1 U	10 U	0.5 U	2.5 R	0.5 U	10 UJ	3.1 U
Methyl-tert-butyl ether (MTBE)	200	8 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Methylcyclohexane	--	NA	2 J	2.4 J	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 UJ	10 U	3.1 U
Methylene chloride	4.6	20 U	10 U	6.4 U	0.5 UJ	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.3 U
Styrene	--	NA	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Tetrachloroethene	0.7	8 U	10 U	6.3 U	0.5 U	0.22 J	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Toluene	1,000	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.13 U	10 U	3.1 U
Trichloroethene	2.8	**34.7**	**19**	**33**	0.5 U	0.22 J	10 U	0.5 U	**47**	**24**	**62**	**35**
Trichlorofluoromethane(Freon-11)	2,100	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 U	10 U	3.1 U
Vinyl chloride	0.015	4 U	10 U	**2.4 J**	**20 J**	**20**	10 U	**0.56**	**1.2 J**	0.5 U	**10 J**	**7.3**
Xylene, total	530	8 U	3 J	4.6 J	0.5 U	1 U	10 U	1.5 U	2.5 U	0.5 U	4 J	0.92 J
cis-1,2-Dichloroethene	70	36	26	22	2.9 J	8.9	10 U	0.18 J	45	18 J	**190**	**94**
cis-1,3-Dichloropropene	0.19	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 UJ	10 U	3.1 U
m- and p-Xylene	530	NA	2 J	NA	NA	NA	10 U	NA	NA	NA	2 J	NA
o-Xylene	530	NA	1 J	NA	NA	NA	10 U	NA	NA	NA	2 J	NA
trans-1,2-Dichloroethene	100	4 U	10 U	6.3 U	0.17 J	0.38 J	10 U	0.5 U	1.4 J	0.2 J	8 J	3.9
trans-1,3-Dichloropropene	0.19	4 U	10 U	6.3 U	0.5 U	1 U	10 U	0.5 U	2.5 U	0.5 UJ	10 U	3.1 U

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Station ID	NC2L (December 2005)	IR78-GW22											IR78-GW22-2	IR78-GW23									
Sample ID		IR78-GW22-05C	IR78-GW22-05D	IR78-GW22-06A	IR78-GW22-06B	IR78-GW22-06C	IR78-GW22-06D	IR78-GW22-07A	IR78-GW22-07A2	IR78-GW22-07C	IR78-GW22-08C	IR78-GW22D-08C	IR78-GW22-2-06D	IR78-GW23-05C	IR78-GW23-05D	IR78-GW23-06A	IR78-GW23-06B	IR78-GW23-06C	IR78-GW23-06D	IR78-GW23D-06D	IR78-GW23-07A	IR78-GW23-07A2	IR78-GW23-07B
Sample Date		10/10/05	10/20/05	01/11/06	04/17/06	08/23/06	10/17/06	03/13/07	03/13/07	08/23/07	08/22/08	08/22/08	10/02/06	10/10/05	11/22/05	02/21/06	05/04/06	08/22/06	12/05/06	12/05/06	01/16/07	03/13/07	05/03/07
Semivolatile Organic Compounds (UG/L)																							
1,2,4-Trichlorobenzene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
1,2-Dichlorobenzene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
1,2-Diphenylhydrazine	--	4.8 U	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
1,4-Dichlorobenzene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
1-Methylnaphthalene	--			NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U			NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2,4-Dichlorophenol	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2,4-Dimethylphenol	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2,4-Dinitrophenol	--	24 U	24 U	50 U	50 U	50 U	50 U	50 U	50 U	NA	NA	NA	NA	25 U	24 U	50 U	50 U	50 U	50 U	NA	50 U	50 U	NA
2,4-Dinitrotoluene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2,6-Dinitrotoluene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2-Chloronaphthalene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2-Chlorophenol	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
2-Methylnaphthalene	--			NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U			NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
3,3'-Dichlorobenzidine	--	9.5 U	9.5 U	20 U	20 U	20 U	20 U	20 U	20 U	NA	NA	NA	NA	9.9 U	9.6 U	20 U	20 U	20 U	20 U	NA	20 U	20 U	NA
4,6-Dinitro-2-methylphenol	--	9.5 U	9.5 U	50 U	50 U	50 U	50 U	50 U	50 U	NA	NA	NA	NA	9.9 U	9.6 U	50 U	50 U	50 U	50 U	NA	50 U	50 U	NA
4-Bromophenyl-phenylether	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
4-Chloro-3-methylphenol	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
4-Chloroaniline	--	9.5 U	9.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.9 U	9.6 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
4-Nitrophenol	--	24 U	24 U	50 U	50 U	50 U	50 U	50 U	50 U	NA	NA	NA	NA	25 U	24 U	50 U	50 U	50 U	50 U	NA	50 U	50 U	NA
Acenaphthene	80	4.8 U	1.1 J	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	3.8 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Acenaphthylene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	3.8 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Anthracene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	1.9 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Benzidine	--	24 U	24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	24 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Benzo(a)pyrene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Benzo(b)fluoranthene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Benzo(g,h,i)perylene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Benzo(k)fluoranthene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Butylbenzylphthalate	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Chrysene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	1.9 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Di-n-butylphthalate	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Di-n-octylphthalate	140	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	5.3 J	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Dibenz(a,h)anthracene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Diethylphthalate	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Dimethyl phthalate	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Diphenylamine	--			10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA			10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Fluoranthene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	1.9 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Fluorene	280	1.9 J	2.5 J	1.6 J	1.5 J	1.7 J	10 U	10 U	10 U	NA	NA	NA	1.9 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Hexachlorobenzene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Hexachlorobutadiene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Hexachlorocyclopentadiene	--	4.8 U	4.8 U	20 U	20 U	20 U	20 U	20 U	20 U	NA	NA	NA	NA	5 U	4.8 U	20 U	20 U	20 U	20 U	NA	20 U	20 U	NA
Hexachloroethane	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Indeno(1,2,3-cd)pyrene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	0.19 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Isophorone	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Naphthalene	21	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	1.9 U	1.1 J	1.2 J	1.2 J	1.2 J	10 U	10 U	NA	1.2 J	1.5 J	NA
Nitrobenzene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Pentachlorophenol	--	24 U	24 U	50 U	50 U	50 U	50 U	50 U	50 U	NA	NA	NA	NA	25 U	24 U	50 U	50 U	50 U	50 U	NA	50 U	50 U	NA
Phenanthrene	210	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	1.9 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Phenol	300	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
Pyrene	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	1.9 U	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
bis(2-Chloroethoxy)methane	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
bis(2-Chloroethyl)ether	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
bis(2-Chloroisopropyl)ether	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
bis(2-Ethylhexyl)phthalate	2.5	4.8 U	4.8 U	3.1 J	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	38	10 U	10 U	10 U	NA	10 U	10 U	NA
n-Nitroso-di-n-propylamine	--	4.8 U	4.8 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA	5 U	4.8 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	NA
n-Nitrosodimethylamine	--	4.8 U	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	--	4.8 U	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA

Table A-1
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Station ID	NC2L (December 2005)	IR78-GW23D-07B	IR78-GW23-07C	IR78-GW23D-07C	IR78-GW23-07D	IR78-GW23-08A	IR78-GW23-08B	IR78-GW23-08C	IR78-GW23D-08C	IR78-GW24-1				IR78-GW24-2				IR78-GW24-3			IR78-GW25					IR78-(
Sample ID										IR78-GW24-05C	IR78-GW24-1-06C	IR78-GW24-07C	IR78-GW24-08C	IR78-GW24IW-05C	IR78-GW24-2-06C	IR78-GW24IW-07C	IR78-GW24IW-08C	IR78-GW24DW-05C	IR78-GW24-3-06C	IR78-GW24DW-07C	IR78-GW25-05C	IR78-GW25-06C	IR78-GW25D-06C	IR78-GW25-07C	IR78-GW25-08C	IR78-GW40-05C	IR78-GW40-06C
Sample Date		05/03/07	08/22/07	08/22/07	11/15/07	02/18/08	05/19/08	08/22/08	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	10/10/05	08/22/06	08/22/06	08/23/07	08/22/08	10/10/05	08/22/06
Semivolatile Organic Compounds (UG/L)																											
1,2,4-Trichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Diphenylhydrazine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	--	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA		NA
2,4,6-Trichlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA		NA
2-Nitrophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diphenylamine	--	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA		NA
Fluoranthene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroisopropyl)ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-1
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Station ID	NC2L (December 2005)	GW40		IR78-GW41				IR78-GW44				IR78-GW46					IR78-GW47				IR78-RW10							
Sample ID		IR78-GW40-07C	IR78-GW40-08C	IR78-GW41-05C	IR78-GW41-06C	IR78-GW41-07C	IR78-GW41-08C	IR78-GW44-05C	IR78-GW44-06C	IR78-GW44-07C	IR78-GW44-08C	IR78-GW46-05C	IR78-GW46-06C	IR78-GW46-07C	IR78-GW46D-07C	IR78-GW46-08C	IR78-GW47-05C	IR78-GW47-06C	IR78-GW47-07C	IR78-GW47-08C	IR78-RW10-05C	IR78-RW10-05D	IR78-RW10-06A	IR78-RW10-06B	IR78-RW10-06C	IR78-RW10D-06C	IR78-RW10-06D	IR78-RW10-07A
Sample Date		08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	09/29/05	08/22/06	08/22/07	08/21/08	09/27/05	08/23/06	08/23/07	08/23/07	08/21/08	09/27/05	08/23/06	08/23/07	08/21/08	07/26/05	10/20/05	01/11/06	04/17/06	09/07/06	09/07/06	10/17/06	01/16/07
Semivolatile Organic Compounds (UG/L)																												
1,2,4-Trichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
1,2-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
1,2-Diphenylhydrazine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
1,4-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
1-Methylnaphthalene	--	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA	NA		NA	NA	NA			NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2,4-Dichlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2,4-Dimethylphenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2,4-Dinitrophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	24 U	24 U	50 U	50 U	50 U	NA	50 U	50 U
2,4-Dinitrotoluene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2,6-Dinitrotoluene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2-Chloronaphthalene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2-Chlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
2-Methylnaphthalene	--	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA	NA		NA	NA	NA			NA	NA	NA	NA	NA	NA
2-Nitrophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
3,3'-Dichlorobenzidine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.6 U	9.6 U	20 U	20 U	20 U	NA	20 U	20 U
4,6-Dinitro-2-methylphenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.6 U	9.6 U	50 U	50 U	50 U	NA	50 U	50 U
4-Bromophenyl-phenylether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
4-Chloro-3-methylphenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
4-Chloroaniline	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.6 U	9.6 U	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
4-Nitrophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	24 U	24 U	50 U	50 U	50 U	NA	50 U	50 U
Acenaphthene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	3.1 J	21	NA	10 U	10 U
Acenaphthylene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Anthracene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Benzidine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	24 U	24 U	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Benzo(a)pyrene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Benzo(b)fluoranthene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Benzo(g,h,i)perylene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Benzo(k)fluoranthene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Butylbenzylphthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Chrysene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Di-n-butylphthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Di-n-octylphthalate	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Dibenz(a,h)anthracene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Diethylphthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Dimethyl phthalate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Diphenylamine	--	NA	NA		NA	NA	NA		NA	NA	NA		NA	NA	NA	NA		NA	NA	NA			10 U	10 U	10 U	NA	10 U	10 U
Fluoranthene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Fluorene	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	1.8 J	NA	10 U	10 U
Hexachlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Hexachlorobutadiene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Hexachlorocyclopentadiene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	20 U	20 U	20 U	NA	20 U	20 U
Hexachloroethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Indeno(1,2,3-cd)pyrene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Isophorone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Naphthalene	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.1	10.4	11.9	7.9 J	4.8 J	NA	10 U	4.8 J
Nitrobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
Pentachlorophenol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	24 U	24 U	50 U	50 U	50 U	NA	50 U	50 U
Phenanthrene	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	1.9 J	NA	10 U	10 U
Phenol	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	4.9 J	10 U	10 U	NA	10 U	10 U
Pyrene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
bis(2-Chloroethoxy)methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
bis(2-Chloroethyl)ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
bis(2-Chloroisopropyl)ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
bis(2-Ethylhexyl)phthalate	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	6.5 J	10 U	10 U	NA	10 U	10 U
n-Nitroso-di-n-propylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	10 U	10 U	10 U	NA	10 U	10 U
n-Nitrosodimethylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.8 U	4.8 U	NA	NA	NA	NA	NA	NA

Table A-1
Site 78 North Historical Groundwater Data Table
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MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)				IR78-RW11				IR78-RW12			
Sample ID		IR78-RW10-07A2	IR78-RW10-07C	IR78-RW10-08C	IR78-RW11-05C	IR78-RW11-06C	IR78-RW11-07C	IR78-RW11-08C	IR78-RW12-05C	IR78-RW12-06C	IR78-RW12-07C	IR78-RW12-08C
Sample Date		03/13/07	08/23/07	08/21/08	10/10/05	09/07/06	08/23/07	08/21/08	10/10/05	08/23/06	08/23/07	08/21/08
Semivolatile Organic Compounds (UG/L)												
1,2,4-Trichlorobenzene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Diphenylhydrazine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	--	NA	NA	NA		NA	NA	NA		NA	NA	NA
2,4,6-Trichlorophenol	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	--	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	NA	NA	NA		NA	NA	NA		NA	NA	NA
2-Nitrophenol	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	--	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	--	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	--	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	80	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	140	6.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diphenylamine	--	10 U	NA	NA		NA	NA	NA		NA	NA	NA
Fluoranthene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	280	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	--	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	21	7.9 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	--	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	210	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	300	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroisopropyl)ether	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	2.5	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	--	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-1
Site 78 North Historical Groundwater Data Table
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MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR78-GW22											IR78-GW22-2	IR78-GW23									
Sample ID		IR78-GW22-05C	IR78-GW22-05D	IR78-GW22-06A	IR78-GW22-06B	IR78-GW22-06C	IR78-GW22-06D	IR78-GW22-07A	IR78-GW22-07A2	IR78-GW22-07C	IR78-GW22-08C	IR78-GW22D-08C	IR78-GW22-2-06D	IR78-GW23-05C	IR78-GW23-05D	IR78-GW23-06A	IR78-GW23-06B	IR78-GW23-06C	IR78-GW23-06D	IR78-GW23D-06D	IR78-GW23-07A	IR78-GW23-07A2	IR78-GW23-07B
Sample Date		10/10/05	10/20/05	01/11/06	04/17/06	08/23/06	10/17/06	03/13/07	03/13/07	08/23/07	08/22/08	08/22/08	10/02/06	10/10/05	11/22/05	02/21/06	05/04/06	08/22/06	12/05/06	12/05/06	01/16/07	03/13/07	05/03/07
Total Metals (UG/L)																							
Aluminum	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	5 U	5 U	5 U	5 U B	5 U	5 U	NA	NA	NA	NA	NA	NA	5 U	5 U	5 U	0.75 JB	5 U	5 U	NA	NA	NA	NA
Magnesium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																							
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.00E-03 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.00E-03 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferric iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite	--			NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U			NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	119	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (UG/L)																							
Aliphatics C19-C36	--	190 U	190 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	NA	NA	NA	190 U	190 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	NA
Aliphatics C5-C8	420	75 U	75 U	NA	100 U	100 U	100 U	100 U	100 U	NA	NA	NA	NA	169	**487**	320	310	330	130	NA	120	150	NA
Aliphatics C9-C18	4,200	190 U	190 U	100 U	100 U	100 U	100 U	100 U	100 U	NA	NA	NA	NA	40.7 J	89.6	100 U	100 U	100 U	100 U	NA	100 U	120	NA
Aromatics C9-C22	210	201	189	100 U	100 U	100 U	100 U	100 U	100 U	NA	NA	NA	NA	205	190 U	100 U	100 U	100 U	100 U	NA	100 U	100 U	NA

Notes:

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Table A-1
Site 78 North Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR78-GW23D-07B	IR78-GW23-07C	IR78-GW23D-07C	IR78-GW23-07D	IR78-GW23-08A	IR78-GW23-08B	IR78-GW23-08C	IR78-GW23D-08C	IR78-GW24-1				IR78-GW24-2				IR78-GW24-3			IR78-GW25					IR78-(
Sample ID		IR78-GW23D-07B	IR78-GW23-07C	IR78-GW23D-07C	IR78-GW23-07D	IR78-GW23-08A	IR78-GW23-08B	IR78-GW23-08C	IR78-GW23D-08C	IR78-GW24-05C	IR78-GW24-1-06C	IR78-GW24-07C	IR78-GW24-08C	IR78-GW24IW-05C	IR78-GW24-2-06C	IR78-GW24IW-07C	IR78-GW24IW-08C	IR78-GW24DW-05C	IR78-GW24-3-06C	IR78-GW24DW-07C	IR78-GW25-05C	IR78-GW25-06C	IR78-GW25D-06C	IR78-GW25-07C	IR78-GW25-08C	IR78-GW40-05C	IR78-GW40-06C
Sample Date		05/03/07	08/22/07	08/22/07	11/15/07	02/18/08	05/19/08	08/22/08	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	10/10/05	08/22/06	08/22/06	08/23/07	08/22/08	10/10/05	08/22/06
Total Metals (UG/L)																											
Aluminum	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																											
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferric iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite	--	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA		NA	NA	NA	NA	NA	NA		NA	NA	NA	NA		NA
Nitrite	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (UG/L)																											
Aliphatics C19-C36	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C5-C8	420	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C9-C18	4,200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aromatics C9-C22	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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Site 78 North Historical Groundwater Data Table
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MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	GW40		IR78-GW41				IR78-GW44			
Sample ID		IR78-GW40-07C	IR78-GW40-08C	IR78-GW41-05C	IR78-GW41-06C	IR78-GW41-07C	IR78-GW41-08C	IR78-GW44-05C	IR78-GW44-06C	IR78-GW44-07C	IR78-GW44-08C
Sample Date		08/22/07	08/22/08	10/10/05	08/22/06	08/22/07	08/22/08	09/29/05	08/22/06	08/22/07	08/21/08
Total Metals (UG/L)											
Aluminum	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)											
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferric iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite	--	NA	NA		NA	NA	NA		NA	NA	NA
Nitrite	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (UG/L)											
Aliphatics C19-C36	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C5-C8	420	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C9-C18	4,200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aromatics C9-C22	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Station ID	IR78-GW46					IR78-GW47			
Sample ID	IR78-GW46-05C	IR78-GW46-06C	IR78-GW46-07C	IR78-GW46D-07C	IR78-GW46-08C	IR78-GW47-05C	IR78-GW47-06C	IR78-GW47-07C	IR78-GW47-08C
Sample Date	09/27/05	08/23/06	08/23/07	08/23/07	08/21/08	09/27/05	08/23/06	08/23/07	08/21/08
Total Metals (UG/L)									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)									
Alkalinity	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferric iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite		NA	NA	NA	NA		NA	NA	NA
Nitrite	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (UG/L)									
Aliphatics C19-C36	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C5-C8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C9-C18	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aromatics C9-C22	NA	NA	NA	NA	NA	NA	NA	NA	NA

Station ID	IR78-RW10							
Sample ID	IR78-RW10-05C	IR78-RW10-05D	IR78-RW10-06A	IR78-RW10-06B	IR78-RW10-06C	IR78-RW10D-06C	IR78-RW10-06D	IR78-RW10-07A
Sample Date	07/26/05	10/20/05	01/11/06	04/17/06	09/07/06	09/07/06	10/17/06	01/16/07
Total Metals (UG/L)								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	5 U	5 U	1.5 J	2.3 JB	5 U	NA	5 U	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)								
Alkalinity	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	NA	NA	NA	NA	NA	NA	NA	NA
Ferric iron	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	NA	NA	NA	NA	NA	NA	NA	NA
Methane	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite			NA	NA	NA	NA	NA	NA
Nitrite	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (UG/L)								
Aliphatics C19-C36	190 U	190 U	100 U	100 U	100 U	NA	100 U	100 U
Aliphatics C5-C8	279	396	**450**	330	100 U	NA	**430**	200
Aliphatics C9-C18	35 J	88.2	120	100 U	100 U	NA	100 U	100 U
Aromatics C9-C22	**213**	60.7	100 U	100 U	100 U	NA	100 U	100 U

Notes:

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R - Unreliable Result
U - The material was analyed for, but not detected
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2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**				IR78-RW11				IR78-RW12			
Sample ID		IR78-RW10-07A2	IR78-RW10-07C	IR78-RW10-08C	IR78-RW11-05C	IR78-RW11-06C	IR78-RW11-07C	IR78-RW11-08C	IR78-RW12-05C	IR78-RW12-06C	IR78-RW12-07C	IR78-RW12-08C
Sample Date		03/13/07	08/23/07	08/21/08	10/10/05	09/07/06	08/23/07	08/21/08	10/10/05	08/23/06	08/23/07	08/21/08
Total Metals (UG/L)												
Aluminum	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)												
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferric iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite	--	NA	NA	NA		NA	NA	NA		NA	NA	NA
Nitrite	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (UG/L)												
Aliphatics C19-C36	--	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C5-C8	420	360	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aliphatics C9-C18	4,200	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aromatics C9-C22	210	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-2
Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW01			IR78-GW04		IR78-GW05				IR78-GW08				IR78-GW09-1			
Sample ID		IR78-GW01-06C	IR78-GW01-07C	IR78-GW01-08C	IR78-GW04-05C	IR78-GW04-08C-2	IR78-GW05-05C	IR78-GW05-06C	IR78-GW05-07C	IR78-GW05-08C	IR78-GW08-05C	IR78-GW08-06C	IR78-GW08-07C	IR78-GW08-08C	IR78-GW09-05C	IR78-GW09-06C	IR78-GW09-1-07C	IR78-GW09-08C
Sample Date		08/23/06	08/21/07	08/22/08	10/10/05	08/22/08	10/10/05	08/23/06	08/21/07	08/22/08	10/10/05	08/23/06	08/21/07	08/22/08	10/10/05	08/23/06	08/21/07	08/22/08
Chemical Name																		
Volatile Organic Compounds (UG/L)							NA				NA				NA			
1,1,1-Trichloroethane	200	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	6.3	4.5	3 J	3
1,1,2,2-Tetrachloroethane	0.17	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,1,2-Trichloroethane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,1-Dichloroethane	70	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.34 J	10 U	2.5 U
1,1-Dichloroethene	7	0.5 U	10 U	0.27 J	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,2,3-Trichlorobenzene	--	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	2.5 U	0.5 U	NA	2.5 U
1,2,4-Trichlorobenzene	70	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,2-Dibromo-3-chloropropane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,2-Dibromoethane	0.0004	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,2-Dichlorobenzene	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,2-Dichloroethane	0.38	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,2-Dichloroethene (total)	--	NA	2 J	NA	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	2 J	NA
1,2-Dichloropropane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,3-Dichlorobenzene	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
1,4-Dichlorobenzene	1.4	0.5 U	10 U	0.5 U	0.16 J	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
2-Butanone	4,200	5 U	10 U	5 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	25 U	5 U	10 U	25 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5 U	10 U	5 U	5 U	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	10 U	5 U	25 U	5 U	10 U	25 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 U	10 U	5 U	5 U	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	10 U	5 U	25 U	5 U	10 U	25 U
Acetone	700	4 U	5 J	5.1 U	9.1 R	14 U	8.1 R	5 U	10 U	5 U	5 R	2.7 U	10 U	5 U	36 R	3.4 U	10 U	25 U
Benzene	1	0.55	10 U	0.38 J	0.2 J	0.21 J	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Bromochloromethane	--	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	2.5 U	0.5 U	NA	2.5 U
Bromodichloromethane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Bromoform	4.43	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Bromomethane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 UJ	2.5 U	0.5 U	10 U	2.5 UJ
Carbon disulfide	700	0.5 U	10 U	0.5 U	0.5 UJ	0.18 J	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	0.54 J
Carbon tetrachloride	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Chlorobenzene	50	0.5 U	10 U	0.5 U	1.1 J	1.2	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Chloroethane	2,800	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Chloroform	70	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.3 U	10 U	2.5 U
Chloromethane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Cyclohexane	--	0.2 J	10 U	0.5 U	0.97 J	1.6 J	0.5 U	0.11 J	10 U	0.5 U	0.5 U	0.11 J	10 U	0.5 U	2.5 U	0.11 J	10 U	2.5 U
Dibromochloromethane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Dichlorodifluoromethane (Freon-12)	1,400	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.13 J	10 UJ	0.5 U	0.5 U	0.5 UJ	10 U	0.5 U	2.5 U	0.5 UJ	10 U	2.5 U
Ethylbenzene	550	0.51	10 U	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Isopropylbenzene	70	0.89	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Methyl acetate	--	0.5 UJ	10 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	10 UJ	0.5 UJ	0.5 R	0.5 U	10 U	0.5 U	2.5 R	0.5 U	10 U	2.5 U
Methyl-tert-butyl ether (MTBE)	200	0.97	1 J	0.32 J	2.7 J	1.8	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Methylcyclohexane	--	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Methylene chloride	4.6	0.12 U	10 U	0.95 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	0.85 UJ	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Styrene	100	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Tetrachloroethene	0.7	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.15 J	10 U	2.5 U
Toluene	1,000	0.29 U	10 U	0.5 U	0.5 U	0.5 U	0.27 J	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Trichloroethene	2.8	**4.4**	2 J	2.3	0.15 J	0.48 J	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	**72**	**85**	**72**	**62**
Trichlorofluoromethane(Freon-11)	2,100	0.5 U	10 U	0.1 J	0.5 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 UJ	2.5 U	0.5 U	10 U	2.5 UJ
Vinyl chloride	0.015	0.5 UJ	10 U	0.5 U	**0.27 J**	**0.73**	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
Xylene, total	530	0.2 J	10 U	1.5 U	0.11 J	1.5 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	0.5 U	10 U	1.5 U	2.5 U	0.5 U	10 U	7.5 U
cis-1,2-Dichloroethene	70	7	2 J	2.6	0.5 U	0.11 J	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.23 J	10 U	0.5 U	1.7 J	2	2 J	1 J
cis-1,3-Dichloropropene	0.19	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
m- and p-Xylene	530	NA	10 U	NA	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
o-Xylene	530	NA	10 U	NA	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
trans-1,2-Dichloroethene	100	0.35 J	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U
trans-1,3-Dichloropropene	0.19	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	2.5 U

Notes:

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-2
Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW09-3	IR78-GW09-3	IR78-GW10				IR78-GW11				IR78-GW39		
Sample ID		IR78-GW09DW-07C	IR78-GW09DW-08C	IR78-GW10-05C	IR78-GW10-06C	IR78-GW10-07C	IR78-GW10-08C	IR78-GW11-05C	IR78-GW11-06C	IR78-GW11-07C	IR78-GW11-08C	IR78-GW39-06C	IR78-GW39-07C	IR78-GW39-08C
Sample Date		08/21/07	08/22/08	10/10/05	08/23/06	08/21/07	08/22/08	10/10/05	08/23/06	08/21/07	08/22/08	08/23/06	08/22/07	08/22/08
Chemical Name														
Volatile Organic Compounds (UG/L)				NA				NA						
1,1,1-Trichloroethane	200	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U			0.5 U
1,1,2,2-Tetrachloroethane	0.17	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloroethane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethane	70	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethene	7	10 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2,3-Trichlorobenzene	--	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	10 U	0.5 U
1,2,4-Trichlorobenzene	70	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U		0.5 U
1,2-Dibromo-3-chloropropane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dibromoethane	0.0004	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichlorobenzene	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethane	0.38	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA		10 U	
1,2-Dichloropropane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,3-Dichlorobenzene	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,4-Dichlorobenzene	1.4	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
2-Butanone	4,200	10	45	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
2-Hexanone	280	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			
4-Methyl-2-pentanone	--	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U
Acetone	700	6 J	5.1 U	5 R	5 U	10 U	5 U	5 R	2.4 U	10 U	5 U	5 U	10 UJ	6 U
Benzene	1	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Bromochloromethane	--	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U		0.5 U
Bromodichloromethane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Bromoform	4.43	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Bromomethane	--	10 UJ	0.5 U	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	10 U	0.5 UJ
Carbon disulfide	700	10 U	0.29 J	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Carbon tetrachloride	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chlorobenzene	50	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chloroethane	2,800	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 UJ	0.5 U
Chloroform	70	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chloromethane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 UJ	0.5 U
Cyclohexane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.11 J	10 U	0.5 U	0.1 J	10 U	0.5 U
Dibromochloromethane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	10 U	0.5 U	0.5 U	0.5 UJ	10 UJ	0.5 U	0.5 U	0.5 UJ	10 UJ	0.5 U	0.5 UJ	10 UJ	0.5 U
Ethylbenzene	550	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Isopropylbenzene	70	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Methyl acetate	--	10 U	0.5 UJ	0.5 R	0.5 U	10 UJ	0.5 U	0.5 R	0.5 U	10 UJ	0.5 U	0.5 U	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	200	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Methylcyclohexane	--	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Methylene chloride	4.6	10 U	0.74 UJ	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Styrene	100	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Tetrachloroethene	0.7	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.98	10 U	1.2
Toluene	1,000	1 J	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Trichloroethene	2.8	10 U	0.5 U	0.13 J	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.18 J	10 U	0.37 J
Trichlorofluoromethane(Freon-11)	2,100	10 UJ	0.5 UJ	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	10 U	0.5 UJ
Vinyl chloride	0.015	10 U	0.5 U	**0.1 J**	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 UJ	0.5 U
Xylene, total	530	10 U	1.5 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	70	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
cis-1,3-Dichloropropene	0.19	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
m- and p-Xylene	530	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA		10 U	
o-Xylene	530	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA		10 U	
trans-1,2-Dichloroethene	100	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U
trans-1,3-Dichloropropene	0.19	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U

Notes:

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Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-2
Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW42								IR78-GW42		IR78-GW49				
Sample ID		IR78-GW42-06B	IR78-GW42-06C	IR78-GW42-06D	IR78-GW42-07A	IR78-GW42-07B	IR78-GW42-07C	IR78-GW42-07D	IR78-GW42-08A	IR78-GW42-08B	IR78-GW42-08C	IR78-GW49-05C	IR78-GW49D-07C	IR78-GW49-07C	IR78-GW49D-08C	IR78-GW49-08C
Sample Date		05/04/06	08/23/06	12/05/06	02/28/07	05/03/07	08/22/07	11/15/07	02/18/08	05/19/08	08/22/08	09/29/05	09/10/07	09/10/07	08/21/08	08/21/08
Chemical Name																
Volatile Organic Compounds (UG/L)												NA				
1,1,1-Trichloroethane	200	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,1,2,2-Tetrachloroethane	0.17	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,1,2-Trichloroethane	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,1-Dichloroethane	70	**220**	**180**	**160**	**190**	**180**	**180**	**190**	**160**	**180**	**190**	25 U	10 U	10 U	13 U	13 U
1,1-Dichloroethene	7	**22**	50 U	**17**	**18**	**21**	**23**	31 U	**17 J**	**21 J**	**27 J**	25 U	10 U	10 U	13 U	13 U
1,2,3-Trichlorobenzene	--	0.5 U	50 U	NA	NA	NA	NA	31 U	31 U	50 U	25 U	25 U	NA	NA	13 U	13 U
1,2,4-Trichlorobenzene	70	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,2-Dibromo-3-chloropropane	--	0.5 U	50 U	50 R	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,2-Dibromoethane	0.0004	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,2-Dichlorobenzene	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,2-Dichloroethane	0.38	**1.5**	50 U	**1 J**	10 U	**1 J**	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,2-Dichloroethene (total)	--	NA	NA	680	770	850	830	NA	NA	NA	NA	NA	10 U	10 U	NA	NA
1,2-Dichloropropane	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,3-Dichlorobenzene	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
1,4-Dichlorobenzene	1.4	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
2-Butanone	4,200	5 U	500 U	10 U	10 U	3 J	10 U	310 U	310 U	500 U	250 U	250 U	10 U	10 U	130 U	130 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5 U	500 U	10 U	10 U	10 U	10 U	310 U	310 U	500 U	250 U	250 U	10 U	10 U	130 U	130 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 U	500 U	10 U	10 U	10 U	10 U	310 U	310 U	500 U	250 U	250 U	10 U	10 U	130 U	130 U
Acetone	700	5 U	320 U	10 U	14	15 U	10 UJ	310 U	310 U	500 U	250 U	3,600 R	10 U	10 U	260 U	230 U
Benzene	1	**3.5**	50 U	**4 J**	**4 J**	**4 J**	**4 J**	**7.2 J**	31 U	50 U	25 U	2,300	10 U	10 U	13 U	13 U
Bromochloromethane	--	0.5 U	50 U	NA	NA	NA	NA	31 U	31 U	50 U	25 U	25 U	NA	NA	13 U	13 U
Bromodichloromethane	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Bromoform	4.43	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Bromomethane	--	0.15 J	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 UJ	25 U	25 U	10 U	10 U	13 U	13 U
Carbon disulfide	700	0.28 J	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Carbon tetrachloride	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Chlorobenzene	50	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Chloroethane	2,800	1.1	50 U	10 U	1 J	10 U	10 UJ	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Chloroform	70	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Chloromethane	--	0.5 U	50 U	10 U	10 U	10 U	10 UJ	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Cyclohexane	--	0.44 J	50 U	2 J	10 U	10 U	10 U	31 U	31 U	50 U	25 U	880	170	170	220	180
Dibromochloromethane	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Dichlorodifluoromethane (Freon-12)	1,400	0.5 U	50 U	10 U	10 U	10 U	10 UJ	31 U	31 U	50 UJ	25 U	25 U	10 U	10 U	13 U	13 U
Ethylbenzene	550	0.14 J	50 U	2 J	10 U	10 U	10 U	31 U	31 U	50 U	25 U	1,200	10 U	10 U	13 U	13 U
Isopropylbenzene	70	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	67	14	14	7.2 J	5.3 J
Methyl acetate	--	42 R	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 UJ	25 U	10 U	10 U	13 U	13 U
Methyl-tert-butyl ether (MTBE)	200	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Methylcyclohexane	--	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	390	320	320	450	430
Methylene chloride	4.6	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	45 UJ	25 U	10 U	10 U	22 U	28 U
Styrene	100	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
Tetrachloroethene	0.7	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	**58**	**57**	**42**	**33**
Toluene	1,000	1.3	50 U	4 J	3 J	3 J	3 J	31 U	31 U	50 U	25 U	9,200	10 U	10 U	13 U	13 U
Trichloroethene	2.8	**220 J**	**160**	**160**	**200**	**180**	**200**	**160**	**130**	**140**	**130**	27	10 U	10 U	13 U	13 U
Trichlorofluoromethane(Freon-11)	2,100	0.5 U	50 UJ	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 UJ	25 U	10 U	10 U	13 U	13 U
Vinyl chloride	0.015	**180**	**180**	**160**	**160**	**200**	**230**	**220**	31 U	**230**	**160**	25 U	10 U	10 U	13 U	13 U
Xylene, total	530	1.2	50 U	5 J	1 J	10 U	2 J	94 U	94 U	150 U	75 U	**4,700**	5 J	5 J	38 U	38 U
cis-1,2-Dichloroethene	70	**1,000**	**820**	**680**	**770**	**850**	**830**	**990**	**670**	**750**	**870**	**4,400**	10 U	10 U	13 U	13 U
cis-1,3-Dichloropropene	0.19	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U
m- and p-Xylene	530	NA	NA	3 J	10 U	10 U	10 U	NA	NA	NA	NA	NA	4 J	4 J	NA	NA
o-Xylene	530	NA	NA	2 J	1 J	10 U	2 J	NA	NA	NA	NA	NA	2 J	2 J	NA	NA
trans-1,2-Dichloroethene	100	5.1 J	50 U	3 J	2 J	3 J	4 J	31 U	31 U	50 U	25 U	19 J	10 U	10 U	13 U	13 U
trans-1,3-Dichloropropene	0.19	0.5 U	50 U	10 U	10 U	10 U	10 U	31 U	31 U	50 U	25 U	25 U	10 U	10 U	13 U	13 U

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Site 78 South Historical Groundwater Data Table
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MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW50			IR78-GW52R	IR78-GW53						IR78-GW54		IR78-GW59	IR78-GW59		
Sample ID		IR78-GW50-05C	IR78-GW50-05C-DUP	IR78-GW50-08C-2	IR78-GW52R-08C	IR78-GW53-07B	IR78-GW53-07C	IR78-GW53-07D	IR78-GW53-08A	IR78-GW53-08B	IR78-GW53-08C	IR78-GW54-07C	IR78-GW54-08C-2	IR78-GW59-05C	IR78-GW59-06C	IR78-GW59-07C	IR78-GW59-08C-2
Sample Date		09/29/05	09/29/05	08/22/08	08/22/08	05/03/07	08/21/07	11/15/07	02/18/08	05/19/08	08/22/08	08/21/07	08/22/08	09/29/05	08/23/06	08/21/07	08/21/08
Chemical Name																	
Volatile Organic Compounds (UG/L)		NA	NA											NA			
1,1,1-Trichloroethane	200	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.1 J	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,1,2-Trichloroethane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,1-Dichloroethane	70	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	2.9	2.4	2 J	0.5 U
1,1-Dichloroethene	7	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 UJ	1.9	0.93	10 U	0.5 U
1,2,3-Trichlorobenzene	--	0.5 UJ	0.5 UJ	0.5 U	50 U	NA	NA	13 U	8.3 U	0.5 U	13 U	NA	0.5 U	0.96 U	0.5 U	NA	0.5 U
1,2,4-Trichlorobenzene	70	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,2-Dibromoethane	0.0004	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,2-Dichlorobenzene	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,2-Dichloroethane	0.38	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	10 U	NA	NA	NA	7 J	NA
1,2-Dichloropropane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,3-Dichlorobenzene	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
1,4-Dichlorobenzene	1.4	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
2-Butanone	4,200	5 UJ	5 UJ	5 U	500 U	10 U	10 U	130 U	83 U	5 U	130 U	1 J	5 U	9.6 U	5 U	10 U	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5 UJ	5 UJ	5 U	500 U	10 U	10 U	130 U	83 U	5 U	130 U	10 U	5 U	9.6 U	5 U	10 U	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 UJ	5 UJ	5 U	500 U	10 U	10 U	130 U	83 U	5 U	130 U	10 U	5 U	9.6 U	5 U	10 U	5 U
Acetone	700	5 R	5 R	5 U	500 U	10 U	7 J	130 U	83 U	5 U	210 U	10 U	5 U	9.6 R	5 U	10 U	5 U
Benzene	1	0.5 UJ	0.5 UJ	0.5 U	**44 J**	**32**	**80**	**160**	**230**	**220**	**310**	10 U	0.5 U	0.36 J	0.5 U	10 U	0.16 J
Bromochloromethane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	NA	NA	13 U	8.3 U	0.5 U	13 U	NA	0.5 U	0.96 U	0.5 U	NA	0.5 U
Bromodichloromethane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Bromoform	4.43	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Bromomethane	--	0.5 UJ	0.5 UJ	0.5 UJ	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 UJ	10 UJ	0.5 U	0.96 U	0.5 U	10 UJ	0.5 U
Carbon disulfide	700	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Carbon tetrachloride	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Chlorobenzene	50	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Chloroethane	2,800	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Chloroform	70	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Chloromethane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Cyclohexane	--	0.61 J	0.6 J	0.5 U	360	28	15	96	150	190	260	10 U	0.5 U	9.6	1.6	4 J	1.8
Dibromochloromethane	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 UJ	10 U	0.5 U
Ethylbenzene	550	0.5 UJ	0.5 UJ	0.5 U	380	4 J	6 J	13	34	23	38	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Isopropylbenzene	70	0.5 UJ	0.5 UJ	0.5 U	12 J	10 U	10 U	13 U	8.3 U	0.81	13 U	10 U	0.5 U	0.23 J	0.1 J	10 U	0.5 U
Methyl acetate	--	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 UJ	0.96 U	0.5 U	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	200	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Methylcyclohexane	--	0.5 UJ	0.5 UJ	0.5 U	140	9 J	3 J	27	24	52	44	10 U	0.5 U	0.57 J	0.5 U	2 J	0.5 U
Methylene chloride	4.6	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.96 UJ	1.4 U	0.5 U	10 U	0.79 U
Styrene	100	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Tetrachloroethene	0.7	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
Toluene	1,000	0.5 UJ	0.5 UJ	0.5 U	50 U	7 J	12	33	37 U	2.9	80	10 U	0.5 U	0.23 J	0.5 U	5 J	0.5 U
Trichloroethene	2.8	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	6.1	1.9	2 J	0.5 U
Trichlorofluoromethane(Freon-11)	2,100	0.5 UJ	0.5 UJ	0.5 UJ	50 UJ	10 U	10 U	13 U	8.3 U	0.5 U	13 UJ	10 UJ	0.16 J	0.96 U	0.5 U	10 UJ	0.5 U
Vinyl chloride	0.015	**0.22 J**	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	**12**	**8 J**	0.5 U
Xylene, total	530	0.5 UJ	0.5 UJ	1.5 U	140 J	1 J	4 J	13 J	24 J	12	35 J	10 U	1.5 U	0.96 U	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	70	2 J	1.9 J	0.66	**830**	10 U	10 U	13 U	8.3 U	0.5 UJ	13 U	10 U	0.5 U	26	12	7 J	0.38 J
cis-1,3-Dichloropropene	0.19	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	0.96 U	0.5 U	10 U	0.5 U
m- and p-Xylene	530	NA	NA	NA	NA	10 U	1 J	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
o-Xylene	530	NA	NA	NA	NA	1 J	2 J	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
trans-1,2-Dichloroethene	100	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 UJ	13 U	10 U	0.5 U	0.68 J	0.38 J	10 U	0.5 U
trans-1,3-Dichloropropene	0.19	0.5 UJ	0.5 UJ	0.5 U	50 U	10 U	10 U	13 U	8.3 U	0.5 U	13 U	10 U	0.5 U	**0.6 J**	0.5 U	10 U	0.5 U

Notes:

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-2
Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW60													IR78-GW61		
Sample ID		IR78-GW60-06B	IR78-GW60-06C	IR78-GW60D-06C	IR78-GW60-06D	IR78-GW60-07A	IR78-GW60-07B	IR78-GW60-07C	IR78-GW60-07D	IR78-GW60D-07D	IR78-GW60-08A	IR78-GW60D-08A	IR78-GW60-08B	IR78-GW60-08C	IR78-GW61-05C	IR78-GW61-06C	IR78-GW61-07C
Sample Date		05/04/06	08/24/06	08/24/06	12/04/06	02/27/07	05/03/07	08/21/07	11/15/07	11/15/07	02/18/08	02/18/08	05/20/08	08/22/08	09/28/05	08/23/06	08/22/07
Chemical Name																	
Volatile Organic Compounds (UG/L)															NA		
1,1,1-Trichloroethane	200	170 U	130 U	130 U	10 U	20 U	1 J	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,1,2,2-Tetrachloroethane	0.17	170 U	130 U	130 U	10 U	20 U	10 U	**46**	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,1,2-Trichloroethane	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 UJ	160 U	0.5 UJ	0.5 U	10 U
1,1-Dichloroethane	70	170 U	130 UJ	130 UJ	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,1-Dichloroethene	7	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,2,3-Trichlorobenzene	--	170 UJ	130 U	130 U	NA	NA	NA	NA	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	NA
1,2,4-Trichlorobenzene	70	170 UJ	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,2-Dibromo-3-chloropropane	--	170 U	130 U	130 U	100 R	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,2-Dibromoethane	0.0004	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,2-Dichlorobenzene	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,2-Dichloroethane	0.38	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,2-Dichloroethene (total)	--	NA	NA	NA	10 U	3 J	2 J	8 J	NA	NA	NA	NA	NA	NA	NA	NA	10 U
1,2-Dichloropropane	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,3-Dichlorobenzene	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
1,4-Dichlorobenzene	1.4	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
2-Butanone	4,200	1,700 U	260 J	1,300 U	10 U	24	10 U	20 U	500 U	630 U	1,300 U	1,300 U	20	1,600 U	5 UJ	5 U	10 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	1,700 U	1,300 U	1,300 U	4 J	20 U	10 U	4 J	500 U	630 U	1,300 U	1,300 U	5 U	1,600 U	5 UJ	5 U	10 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	1,700 U	1,300 U	1,300 U	10 U	20 U	10 U	7 J	500 U	630 U	1,300 U	1,300 U	4.3 J	1,600 U	5 UJ	5 U	10 U
Acetone	700	1,700 U	1,300 U	1,300 U	390	25	10 U	20 U	500 U	630 U	1,300 U	1,300 U	5 U	1,600 U	5 R	2.7 U	10 UJ
Benzene	1	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Bromochloromethane	--	170 U	130 U	130 U	NA	NA	NA	NA	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	NA
Bromodichloromethane	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Bromoform	4.43	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Bromomethane	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Carbon disulfide	700	170 U	130 U	130 U	10 U	20 U	1 J	20 U	50 U	63 U	130 U	130 U	0.71	160 U	0.5 UJ	0.5 U	10 U
Carbon tetrachloride	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Chlorobenzene	50	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Chloroethane	2,800	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 UJ
Chloroform	70	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.21 J	160 U	0.26 J	0.5 U	10 U
Chloromethane	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 UJ
Cyclohexane	--	780	680	980	1,000	850	780	1,000	960	920	300	1,100	930	1,500	0.5 UJ	0.5 U	10 U
Dibromochloromethane	--	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Dichlorodifluoromethane (Freon-12)	1,400	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 UJ	10 UJ
Ethylbenzene	550	**1,100**	**1,100**	**1,300**	**1,200**	**1,500**	**1,300**	**1,400**	**1,500**	**1,400**	**910**	**1,600**	**1,500**	**2,000**	0.5 UJ	0.5 U	10 U
Isopropylbenzene	70	59 J	56 J	69 J	**100 J**	**80**	70	79	52	56 J	38 J	**82 J**	58	**71 J**	0.5 UJ	0.5 U	10 U
Methyl acetate	--	170 R	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Methyl-tert-butyl ether (MTBE)	200	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Methylcyclohexane	--	230	230	360	490	380	290	380	400	360	96 J	370	360	650	0.5 UJ	0.5 U	10 U
Methylene chloride	4.6	170 U	28 U	33 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Styrene	100	170 U	130 U	130 U	18 J	20 U	14	9 J	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Tetrachloroethene	0.7	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
Toluene	1,000	360	460	390	360	420	450	270	360	390	300 U	420 U	390	390	0.5 UJ	0.5 U	10 U
Trichloroethene	2.8	**2,800**	**2,200**	**2,500**	**2,000**	**2,200**	**1,800**	**2,400**	**1,900**	**2,100**	**1,300**	**2,000**	**2,000**	**2,900**	0.5 UJ	0.5 U	10 U
Trichlorofluoromethane(Freon-11)	2,100	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 UJ	0.26 J	0.5 U	10 U
Vinyl chloride	0.015	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 UJ
Xylene, total	530	**4,900**	**4,900**	**5,600**	**2,800**	**3,900**	**3,400**	**3,700**	**6,600**	**6,000**	**3,700**	**6,200**	**6,000**	**9,500**	0.5 UJ	0.5 U	10 U
cis-1,2-Dichloroethene	70	170 U	84 U	28 U	10 U	3 J	2 J	8 J	50 U	63 U	130 U	130 U	1.6	160 U	0.5 UJ	0.5 U	10 U
cis-1,3-Dichloropropene	0.19	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 UJ	160 U	0.5 UJ	0.5 U	10 U
m- and p-Xylene	530	NA	NA	NA	**1,300**	**2,000**	**1,600**	**1,900**	NA	NA	NA	NA	NA	NA	NA	NA	10 U
o-Xylene	530	NA	NA	NA	**1,500**	**1,900**	**1,800**	**1,900**	NA	NA	NA	NA	NA	NA	NA	NA	10 U
trans-1,2-Dichloroethene	100	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 U	160 U	0.5 UJ	0.5 U	10 U
trans-1,3-Dichloropropene	0.19	170 U	130 U	130 U	10 U	20 U	10 U	20 U	50 U	63 U	130 U	130 U	0.5 UJ	160 U	0.5 UJ	0.5 U	10 U

Notes:

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

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Table A-2
Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW61	IR78-GW62				IR78-GW63					IR78-GW64				IR78-GW65			
Sample ID		IR78-GW61-08C-2	IR78-GW62-05C	IR78-GW62-07C	IR78-GW62D-07C	IR78-GW62-08C-2	IR78-GW63-05C-DUP	IR78-GW63-05C	IR78-GW63-06C	IR78-GW63-07C	IR78-GW63-08C-2	IR78-GW64-05C	IR78-GW64-06C	IR78-GW64-07C	IR78-GW64-08C-2	IR78-GW65-05C	IR78-GW65-06C	IR78-GW65-07C	IR78-GW65-08C-2
Sample Date		08/21/08	10/11/05	08/22/07	08/22/07	08/21/08	09/28/05	09/28/05	08/23/06	08/21/07	08/21/08	09/28/05	08/24/06	08/21/07	08/21/08	09/29/05	08/23/06	08/22/07	08/21/08
Chemical Name																			
Volatile Organic Compounds (UG/L)			NA				NA	NA				NA				NA			
1,1,1-Trichloroethane	200	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,1,2,2-Tetrachloroethane	0.17	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,1,2-Trichloroethane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,1-Dichloroethane	70	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	10 U	1.3 U	1.3 U	0.5 UJ	10 U	2.5 U	0.48 J	1.9	2 J	2.4 J
1,1-Dichloroethene	7	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.18 J	10 U	2.5 U	0.64 J	2	2 J	3.1 U
1,2,3-Trichlorobenzene	--	0.5 U	0.5 U	NA	NA	0.5 U	0.5 UJ	0.5 UJ	0.5 U	NA	1.3 U	1.3 U	0.5 U	NA	2.5 U	1.3 U	0.5 U	NA	3.1 U
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,2-Dibromo-3-chloropropane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,2-Dibromoethane	0.0004	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,2-Dichlorobenzene	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,2-Dichloroethane	0.38	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,2-Dichloroethene (total)	--	NA	NA	10 U	10 U	NA	NA	NA	NA	13	NA	NA	NA	55	NA	NA	NA	78	NA
1,2-Dichloropropane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,3-Dichlorobenzene	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
1,4-Dichlorobenzene	1.4	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
2-Butanone	4,200	5 U	5 U	10 U	10 U	5 U	5 UJ	5 UJ	5 U	10 U	13 U	13 U	5 U	10 U	25 U	13 U	5 U	10 U	31 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5 U	5 U	10 U	10 U	5 U	5 UJ	5 UJ	5 U	10 U	13 U	13 U	5 U	10 U	25 U	13 U	5 U	10 U	31 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 U	5 U	10 U	10 U	5 U	5 UJ	5 UJ	5 U	10 U	13 U	13 U	5 U	10 U	25 U	13 U	5 U	10 U	31 U
Acetone	700	5 U	5 R	10 U	10 U	5 U	5 R	5 R	5 U	10 U	13 U	13 R	2.4 U	10 U	25 U	13 R	5 U	10 U	31 U
Benzene	1	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.29 J	10 U	3.1 U
Bromochloromethane	--	0.5 U	0.5 U	NA	NA	0.5 U	0.5 UJ	0.5 UJ	0.5 U	NA	1.3 U	1.3 U	0.5 U	NA	2.5 U	1.3 U	0.5 U	NA	3.1 U
Bromodichloromethane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Bromoform	4.43	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	0.39 J	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Bromomethane	--	0.5 U	0.5 U	10 UJ	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 UJ	1.3 U	1.3 U	0.5 U	1 J	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Carbon disulfide	700	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Carbon tetrachloride	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Chlorobenzene	50	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Chloroethane	2,800	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Chloroform	70	0.5 U	0.15 J	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Chloromethane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Cyclohexane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.35 J	10 U	3.1 U
Dibromochloromethane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Dichlorodifluoromethane (Freon-12)	1,400	0.5 U	0.5 U	10 U	10 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 UJ	10 U	3.1 U
Ethylbenzene	550	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Isopropylbenzene	70	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Methyl acetate	--	0.5 U	0.5 R	10 U	10 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Methyl-tert-butyl ether (MTBE)	200	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Methylcyclohexane	--	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Methylene chloride	4.6	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.32 U	10 U	1.3 U	1.3 U	0.35 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Styrene	100	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Tetrachloroethene	0.7	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Toluene	1,000	0.5 U	0.11 J	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.11 J	10 U	1.3 U	1.3 U	0.5 U	2 J	2.5 U	1.3 U	0.5 U	1 J	3.1 U
Trichloroethene	2.8	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.2 J	10 U	0.86 J	1.3 U	0.5 U	10 U	0.76 J	3.7 U	**9.7**	**6 J**	**4.2**
Trichlorofluoromethane(Freon-11)	2,100	0.36 J	0.5 U	10 UJ	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 UJ	1.3 U	1.3 U	0.5 U	10 UJ	2.5 U	1.3 U	0.5 U	10 U	3.1 U
Vinyl chloride	0.015	0.5 U	0.5 U	10 U	10 U	0.5 U	**0.14 J**	**0.12 J**	0.5 U	10 U	1.3 U	1.1 J	**0.98**	10 U	2.5 U	**5.6**	**15**	**12**	**7.7**
Xylene, total	530	1.5 U	0.5 U	10 U	10 U	1.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	3.8 U	1.3 U	0.5 U	10 U	7.5 U	1.3 U	0.5 U	10 U	9.4 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	10 U	10 U	0.44 J	5.9 J	5.8 J	7.4	13	35	35	68	54	66	31	**94**	**78**	**83**
cis-1,3-Dichloropropene	0.19	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U
m- and p-Xylene	530	NA	NA	10 U	10 U	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
o-Xylene	530	NA	NA	10 U	10 U	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
trans-1,2-Dichloroethene	100	0.5 U	0.5 U	10 U	10 U	0.5 U	0.15 J	0.12 J	0.12 J	10 U	0.4 J	0.89 J	1.7	1 J	0.89 J	0.31 J	0.92	10 U	0.7 J
trans-1,3-Dichloropropene	0.19	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	1.3 U	1.3 U	0.5 U	10 U	2.5 U	1.3 U	0.5 U	10 U	3.1 U

Notes:

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J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

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Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-2
Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR78-GW73					IR78-GW74						
Sample ID		IR78-GW73-06C	IR78-GW73D-06C	IR78-GW73-07C	IR78-GW73-08C	IR78-GW73D-08C	IR78-GW74-06C	IR78-GW74D-06C	IR78-GW74-06D	IR78-GW74-07A	IR78-GW74-07C	IR78-GW74-08C	IR78-GW74D-08C
Sample Date		08/24/06	08/24/06	09/10/07	08/22/08	08/22/08	08/24/06	08/24/06	12/05/06	02/27/07	08/21/07	08/22/08	08/22/08
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1,1-Trichloroethane	200	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,1,2,2-Tetrachloroethane	0.17	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,1,2-Trichloroethane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,1-Dichloroethane	70	6.3 UJ	8.4 UJ	10 U	180 U	630 U	250 UJ	250 UJ	10 U	50 U	50 U	250 U	250 U
1,1-Dichloroethene	7	6.3 U	8.4 U	5 J	180 U	630 U	250 U	250 U	**9 J**	50 U	50 U	250 U	250 UJ
1,2,3-Trichlorobenzene	--	6.3 U	8.4 U	NA	180 U	630 U	250 U	250 U	NA	NA	NA	250 U	250 U
1,2,4-Trichlorobenzene	70	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,2-Dibromo-3-chloropropane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	500 R	50 U	50 U	250 U	250 U
1,2-Dibromoethane	0.0004	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	**10 J**	**23 J**	50 U	250 U	250 U
1,2-Dichlorobenzene	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,2-Dichloroethane	0.38	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,2-Dichloroethene (total)	--	NA	NA	7,100	NA	NA	NA	NA	7,900	1,800	7,000	NA	NA
1,2-Dichloropropane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,3-Dichlorobenzene	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
1,4-Dichlorobenzene	1.4	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
2-Butanone	4,200	29 J	24 J	10 U	1,800 U	6,300 U	2,500 U	2,500 U	10 U	50 U	50 U	2,500 U	2,500 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	63 U	84 U	10 U	1,800 U	6,300 U	2,500 U	2,500 U	10 U	50 U	50 U	2,500 U	2,500 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	63 U	84 U	10 U	1,800 U	6,300 U	2,500 U	2,500 U	10 U	50 U	50 U	2,500 U	2,500 U
Acetone	700	51 U	52 U	10 U	1,800 U	6,300 U	1,200 U	1,400 U	10 U	50 U	50 U	2,500 U	2,500 U
Benzene	1	6.3 U	8.4 U	**2,000**	**2,000**	**2,000**	**1,900**	**1,500**	**1,000**	**2,700**	**1,100**	**1,400**	**1,700**
Bromochloromethane	--	6.3 U	8.4 U	NA	180 U	630 U	250 U	250 U	NA	NA	NA	250 U	250 U
Bromodichloromethane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Bromoform	4.43	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Bromomethane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Carbon disulfide	700	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Carbon tetrachloride	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Chlorobenzene	50	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Chloroethane	2,800	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Chloroform	70	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Chloromethane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Cyclohexane	--	230	230	1,000	440	540 J	760 J	390 J	190 J	680	370	870	1,100
Dibromochloromethane	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Dichlorodifluoromethane (Freon-12)	1,400	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 UJ	250 U	250 U
Ethylbenzene	550	6.3 U	8.4 U	**1,700**	**1,100**	**1,100**	**1,300**	**950**	**820**	**1,500**	**720**	**1,300**	**1,300**
Isopropylbenzene	70	14	14	**75**	180 U	630 U	55 J	250 U	**90 J**	61	31 J	250 U	250 U
Methyl acetate	--	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 UJ	250 U	250 UJ
Methyl-tert-butyl ether (MTBE)	200	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Methylcyclohexane	--	280	290	430 J	130 J	230 J	300 J	140 J	57 J	280	89	390	420
Methylene chloride	4.6	6.3 U	8.4 U	10 U	180 U	630 U	51 U	250 U	10 U	50 U	50 U	250 U	590 UJ
Styrene	100	6.3 U	8.4 U	22	180 U	630 U	250 U	250 U	13 J	11 J	50 U	250 U	250 U
Tetrachloroethene	0.7	**59**	**58**	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
Toluene	1,000	1.5 U	8.4 U	**11,000**	**12,000**	**13,000**	**9,200**	**7,200**	**2,400**	**8,400**	**2,700**	**5,200**	**5,500**
Trichloroethene	2.8	3.2 U	3.4 U	**26**	180 U	630 U	71 U	59 U	10 U	**39 J**	50 U	250 U	250 U
Trichlorofluoromethane(Freon-11)	2,100	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 UJ
Vinyl chloride	0.015	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	**12 J**	50 U	250 U	250 U
Xylene, total	530	11	9.1	**3,600**	**4,500**	**4,500**	**4,800**	**3,400**	**890**	**3,000**	**620**	**2,700**	**2,500**
cis-1,2-Dichloroethene	70	2.8 U	2.7 U	**7,100**	**3,900**	**4,500**	**5,500**	**4,700**	**7,900**	**2,300**	**7,000**	**3,700**	**4,000**
cis-1,3-Dichloropropene	0.19	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U
m- and p-Xylene	530	NA	NA	**2,000**	NA	NA	NA	NA	360 J	**1,900**	410	NA	NA
o-Xylene	530	NA	NA	**1,600**	NA	NA	NA	NA	200 J	**1,600**	210	NA	NA
trans-1,2-Dichloroethene	100	6.3 U	8.4 U	44	180 U	630 U	250 U	250 U	100 J	7 J	82	250 U	250 U
trans-1,3-Dichloropropene	0.19	6.3 U	8.4 U	10 U	180 U	630 U	250 U	250 U	10 U	50 U	50 U	250 U	250 U

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Site 78 South Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR78-GW78							IR78-GW78	IR78-GW78		IR78-RW07	IR78-RW09R	IR78-RW14				IR78-RW15		
Sample ID		IR78-GW78-06A	IR78-GW78-06B	IR78-GW78-06C	IR78-GW78-07B	IR78-GW78-07C	IR78-GW78-07D	IR78-GW78-08A	IR78-GW78-08B	IR78-GW78D-08B	IR78-GW78-08C	IR78-RW07-08C	IR78-RW09R-08C	IR78-RW14-05C	IR78-RW14-06C	IR78-RW14-07C	IR78-RW14-08C	IR78-RW15-05C	IR78-RW15-06C	IR78-RW15-08C
Sample Date		02/21/06	05/04/06	08/24/06	05/03/07	08/21/07	11/15/07	02/18/08	05/20/08	05/20/08	08/22/08	08/21/08	08/22/08	10/11/05	09/07/06	08/22/07	08/21/08	10/11/05	08/23/06	08/21/08
Chemical Name																				
Volatile Organic Compounds (UG/L)														NA				NA		
1,1,1-Trichloroethane	200	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,1,2,2-Tetrachloroethane	0.17	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,1,2-Trichloroethane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,1-Dichloroethane	70	250 U	250 UJ	130 UJ	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,1-Dichloroethene	7	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,2,3-Trichlorobenzene	--	250 U	250 U	130 U	NA	NA	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	NA	0.5 U	1.3 U	0.5 U	1.8 U
1,2,4-Trichlorobenzene	70	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,2-Dibromo-3-chloropropane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,2-Dibromoethane	0.0004	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,2-Dichlorobenzene	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,2-Dichloroethane	0.38	250 U	**69 J**	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,2-Dichloroethene (total)	--	NA	NA	NA	1,100	1,800	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA
1,2-Dichloropropane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,3-Dichlorobenzene	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
1,4-Dichlorobenzene	1.4	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
2-Butanone	4,200	2,500 U	2,500 U	1,300 U	10 UJ	20 U	130 U	2,500 U	500 U	2,500 U	3,100 U	5 U	5 U	50 R	50 U	10 U	5 U	13 U	5 U	18 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	2,500 U	2,500 U	1,300 U	10 UJ	20 U	130 U	2,500 U	500 U	2,500 U	3,100 U	5 U	5 U	50 R	50 U	10 U	5 U	13 U	5 U	18 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	2,500 U	2,500 U	1,300 U	10 UJ	20 U	130 U	2,500 U	500 U	2,500 U	3,100 U	5 U	5 U	50 R	50 U	10 U	5 U	13 U	5 U	18 U
Acetone	700	2,500 U	2,500 U	530 U	10 UJ	20 U	130 U	2,500 U	500 U	2,500 U	3,100 U	5.1 U	5 U	36 R	24 U	10 UJ	46 U	13 R	5 U	26 U
Benzene	1	**150 J**	250 U	**150**	**84 J**	**83**	**68**	250 U	**91**	**85 J**	**220 J**	0.5 U	0.5 U	**3.6 J**	5 U	1 J	0.4 J	**4.3**	0.5 U	1.8 U
Bromochloromethane	--	250 U	250 U	130 U	NA	NA	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	NA	0.5 U	1.3 U	0.5 U	1.8 U
Bromodichloromethane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Bromoform	4.43	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5.8 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Bromomethane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 UJ	250 UJ	310 U	0.5 U	0.5 UJ	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Carbon disulfide	700	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.95	0.11 J	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Carbon tetrachloride	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Chlorobenzene	50	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Chloroethane	2,800	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 UJ	0.5 U	1.3 U	0.5 U	1.8 U
Chloroform	70	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Chloromethane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 UJ	0.5 U	1.3 U	0.5 U	1.8 U
Cyclohexane	--	590	860	880	750	800	630	950	640	510	480	0.5 U	0.5 U	150	84	20	11 J	25	26	9.3
Dibromochloromethane	--	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Dichlorodifluoromethane (Freon-12)	1,400	250 U	250 U	130 U	10 UJ	20 UJ	13 U	250 U	50 UJ	250 UJ	310 U	0.5 U	0.5 U	5 R	5 U	10 UJ	0.5 U	1.3 U	0.5 UJ	1.8 U
Ethylbenzene	550	**1,600**	**1,600**	**1,700**	**1,500**	**1,500**	**1,400**	**1,900**	**1,500**	**1,300**	**1,500**	0.5 U	0.5 U	140	2.5 J	10 U	0.24 J	1.3 U	0.89	1.8 U
Isopropylbenzene	70	250 U	55 J	53 J	61 J	55	39	**75 J**	42 J	250 U	310 U	0.5 U	0.5 U	11 J	5 U	10 U	0.37 J	1.5	3.1	0.39 J
Methyl acetate	--	250 UJ	250 R	130 U	10 UJ	20 UJ	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 UJ	10 U	0.5 U	1.3 R	0.5 U	1.8 U
Methyl-tert-butyl ether (MTBE)	200	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	0.33 J	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Methylcyclohexane	--	250 U	300	300	260	300	240	370	220	160 J	140 J	0.5 U	0.5 U	21 J	35	9 J	3.3 J	9.6	8	11
Methylene chloride	4.6	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	4.5 R	2.9 U	10 U	0.54 U	1.3 U	0.5 U	1.8 U
Styrene	100	250 U	250 U	130 U	12 J	9 J	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Tetrachloroethene	0.7	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	**2 J**	**1.8 J**	**2 J**	**1**	1.3 U	0.2 J	1.8 U
Toluene	1,000	**7,200**	**6,200**	**6,200**	**3,800**	**4,500 J**	**5,900**	**6,600**	**6,200**	**5,200**	**9,100**	0.5 U	0.5 U	34	19 U	10 U	0.5 U	1.3 U	0.11 U	1.8 U
Trichloroethene	2.8	**64 J**	**150 J**	**140**	**85 J**	**77**	**50**	**73 J**	**53**	250 U	310 U	0.5 U	0.5 U	1.5 J	5 U	1 J	1.2	**3.9**	**3.9**	1.2 J
Trichlorofluoromethane(Freon-11)	2,100	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 UJ	0.5 U	0.5 UJ	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
Vinyl chloride	0.015	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 UJ	0.5 U	1.3 U	0.5 U	1.8 U
Xylene, total	530	**6,200**	**6,300**	**6,300**	**3,400**	**3,600**	**5,700**	**6,700**	**5,400**	**5,200**	**6,200**	1.5 U	1.5 U	320	170	8 J	1.1 J	14	5.9	5.4 U
cis-1,2-Dichloroethene	70	**570**	**1,000**	**1,200**	**1,100**	**1,800**	**620**	**770**	**530**	**330**	**490**	0.5 U	0.5 U	2.2 J	5 U	10 U	1.7	0.27 J	0.44 U	1.8 U
cis-1,3-Dichloropropene	0.19	250 U	**60 J**	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
m- and p-Xylene	530	NA	NA	NA	**1,700**	**1,900**	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 J	NA	NA	NA	NA
o-Xylene	530	NA	NA	NA	**1,700**	**1,700**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7 J	NA	NA	NA	NA
trans-1,2-Dichloroethene	100	250 U	250 U	130 U	9 J	16 J	3.6 J	250 U	50 U	250 U	310 U	0.5 U	0.5 U	0.18 J	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U
trans-1,3-Dichloropropene	0.19	250 U	250 U	130 U	10 UJ	20 U	13 U	250 U	50 U	250 U	310 U	0.5 U	0.5 U	5 R	5 U	10 U	0.5 U	1.3 U	0.5 U	1.8 U

Notes:

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-3
Site 78 South Unvalidated Recovery Well Detected Analytical Results August 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Sample ID	IR78-RW05-09C	IR78-RW09R-09C	IR78-RW14-09C	IR78-RW15-09C	IR78-RW15D-09C
Sample Date	8/11/09	8/9/09	8/11/09	8/9/09	8/9/09
Chemical Name					
Volatile Organic Compounds (UG/L)					
1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U
Acetone	5 U	5 U	5 U	4.6 J	6
Benzene	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	14	1 U	2.2	1 U	1 U
Cyclohexane	1 U	1 U	1 U	2.7	3.1
Methylcyclohexane	1 U	1 U	1 U	4.5	4.8
Tetrachloroethene	1.1 U	1.1 U	2.7	1.1 U	1.1 U
Vinyl chloride	1.9	1 U	1 U	1 U	1 U

Notes:
J - Analyte present. Value may or may not be accurate or precise
NA - Not analyzed

U - The material was analyed for, but not detected
UG/L - Micrograms per liter
Shading indicates detectior

Table A-4
Site 78 South Unvalidated Monitoring Well Detected Analytical Results August 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Sample ID	IR78-GW01-09C	IR78-GW04-09C	IR78-GW05-09C	IR78-GW08-09C	IR78-GW09-09C	IR78-GW09DW-09C	IR78-GW10-09C	IR78-GW11-09C	IR78-GW39-09C	IR78-GW42-09C	IR78-GW49-09C	IR78-GW50-09C	IR78-GW51R-09C	IR78-GW52R-09C
Sample Date	9/3/09	8/8/09	8/9/09	8/9/09	8/9/09	8/8/09	8/9/09	8/8/09	8/9/09	8/8/09	8/8/09	8/8/09	8/8/09	8/8/09
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	2.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	130	1 U	1 U	1 U	1 U
1,1-Dichloroethene	0.4 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	7.6	1 U	1 U	1 U	5.1
1,2,3-Trichlorobenzene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-Butanone	5 U	5 U	5 U	5 U	5 U	16	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	21	4.4 J	5 U	5 U	1.2 J	4.7 J	5 U	5 U	5 U	10	5 U	5 U	5 U	5 U
Benzene	0.5 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.7	1 U	1 U	1 U	36
Chlorobenzene	1 U	0.94 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	2.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	12	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	770 E	2.9	1 U	1 U	710 E
Cyclohexane	0.4 J	1 U	1 U	1.2	1 U	1 U	1.2	1 U	1 U	1 U	110	1 U	1 U	300 E
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	290 E
Isopropylbenzene	0.6 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	6.2	1 U	1 U	14
Methylcyclohexane	0.4 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	200 E	1 U	1 U	83
Methylene chloride	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	18
Methyl-tert-butyl ether (MTBE)	0.9 J	0.84 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	3 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1	1.1 U	26	1.1 U	1.1 U	1.1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1 U	24
trans-1,2-Dichloroethene	0.7 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.6	1 U	1 U	1 U	1 U
Trichloroethene	7	5.1 U	5.1 U	5.1 U	50	5.1 U	5.1 U	5.1 U	5.1 U	43	5.1 U	5.1 U	5.1 U	5.1 U
Vinyl chloride	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	190	1 U	1 U	1 U	24
Xylene, total	3 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.4	1.2 U	1.2 U	1.2 U	1.2 U

Notes:
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present. Value may or may not be accurate or precise
NA - Not analyzed

U - The material was analyed for, but not detected
UG/L - Micrograms per liter
Shading indicates detection

Table A-4
Site 78 South Unvalidated Monitoring Well Detected Analytical Results August 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Sample ID	IR78-GW53-09C	IR78-GW54-09C	IR78-GW58-09C		IR78-GW59-09C	IR78-GW60-09C	IR78-GW60D-09C	IR78-GW61-09C	IR78-GW62-09C	IR78-GW63-09C	IR78-GW64-09C	IR78-GW65-09C
Sample Date	8/8/09	8/9/09	8/11/09	8/11/09	8/8/09	8/9/09	8/9/09	8/8/09	9/3/09	8/8/09	8/9/09	8/8/09
Chemical Name												
Volatile Organic Compounds (UG/L)												
1,1,1-Trichloroethane	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.6
1,1-Dichloroethene	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.3
1,2,3-Trichlorobenzene	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	2.1
1,2,4-Trichlorobenzene	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.8
1,2-Dibromo-3-chloropropane	2 U	2 U	50 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.83 J
2-Butanone	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	5 U	5 U	130 U	5 U	5 U	5 U	5 U	5 U	7 U	5 U	5 U	5 U
Benzene	220 E	1 U	25 U	29	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	0.6 J	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	25 U	1 U	1.1	1 U	1 U	1 U	7	11	42	67
Cyclohexane	270 E	1 U	330	940 E	1.1	710 E	660 E	1 U	1 U	1 U	1 U	1.4
Ethylbenzene	41	1 U	270	580 E	1 U	680 E	760 E	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	1.4	1 U	42	73	1 U	130	110	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	90	1 U	160	310 E	1 U	610 E	710 E	1 U	1 U	1 U	1 U	1 U
Methylene chloride	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U
Methyl-tert-butyl ether (MTBE)	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U
Tetrachloroethene	1.1 U	1.1 U	28 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	3 U	1.1 U	1.1 U	1.1 U
Toluene	68	1 U	110	180	1 U	410 E	410 E	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.97 J	0.84 J
Trichloroethene	5.1 U	5.1 U	130 U	5.1 U	5.1 U	2,200 E	2,700 E	5.1 U	1	5.1 U	5.1 U	5.1 U
Vinyl chloride	1 U	1 U	25 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	6.7
Xylene, total	1.2 U	1.2 U	30 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	3 U	1.2 U	1.2 U	1.2 U

Notes:
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Shading indicates detection

Table A-5
Site 78 Hadnot Point Sampling Event Monitoring Well Analytical Results February 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NCGWQS (December, 2006)**	IR78-GW01	IR78-GW02		IR78-GW03	IR78-GW04-1	IR78-GW04-2		IR78-GW05	IR78-GW06	IR78-GW08	IR78-GW09-1	IR78-GW09-3
Sample ID		IR78-GW01-09A	IR78-GW02-09A	IR78-GW02D-09A	IR78-GW03-09A	IR78-GW04-1-09A	IR78-GW04-2-09A	IR78-GW04-2D-09A	IR78-GW05-09A	IR78-GW06-09A	IR78-GW08-09A	IR78-GW09-1-09A	IR78-GW09-3-09A
Sample Date		02/23/09	02/23/09	02/23/09	02/23/09	02/19/09	02/23/09	02/23/09	02/22/09	02/24/09	02/18/09	02/19/09	02/19/09
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1,1-Trichloroethane	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	3.3	1 U
1,1-Dichloroethane	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
1,1-Dichloroethene	7	0.27 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
1,2-Dibromoethane	0.0004	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Acetone	700	16 UJ	3 UJ	3 UJ	3 UJ	3 U	3 UJ	3 UJ	3 UJ	3 U	3 U	2.1 J	3 U
Benzene	1	0.43 J	1 U	1 U	1 U	0.17 J	4.8	5	1 U	5 R	1 U	1 U	1 U
Chlorobenzene	50	1 U	1 U	1 U	1 U	0.84 J	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Chloroform	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	3.1	1 U
cis-1,2-Dichloroethene	70	8.6	1 U	1 U	1.6	0.59 J	1 U	1 U	1 U	5 R	1 U	1.6	1 U
Cyclohexane	--	1 U	1 U	1 U	1 U	1.4	1 U	1 U	1 U	18	1 U	1 U	1 U
Dichlorodifluoromethane (Freon-12)	1,400	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Ethylbenzene	550	0.11 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	67	1 U	1 U	1 U
Isopropylbenzene	70	0.25 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	14	1 U	1 U	1 U
Methylcyclohexane	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	7.7 R	1 U	1 U	1 U
Methylene chloride	4.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4 U	5 R	1 U	1 U	1 U
Methyl-tert-butyl ether (MTBE)	200	1.5	1 U	1 U	1 U	4.8	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Styrene	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.61 J	1 U	1 U	1 U
Tetrachloroethene	0.7	1 U	1 U	1 U	1 n	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Toluene	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	23	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	0.31 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Trichloroethene	2.8	5.8	1 U	1 U	1 U	1	1 U	1 U	1 U	3.9 R	1 U	60	1 U
Trichlorofluoromethane(Freon-11)	2,100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Vinyl chloride	0.015	1 U	1 U	1 U	1 U	1.8	1 U	1 U	1 U	5 R	1 U	1 U	1 U
Xylene, total	530	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	490 R	1 U	1 U	1 U
Wet Chemistry													
Alkalinity (MG/L)	--	14.2	91.3	99.4	138	61.7	32.5	16.2	314	NA	55.8	77.9	52.8
Carbon (MG/L)	--	8.7 *	3.9 *	3.3 *	13.2	4.8	2 U	2 U	1.9 J	3.5	1.4 J	4.3	0.97 J
Chloride (MG/L)	250	26.4	6.4	6.4	9.9	11.4	8.1	8.1	33	9.3	7.4	11.8	9.4
Ethane (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethene (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methane (UG/L)	--	190	19	19	630 D	340	0.85 J	1.4 J	1.5 U	2	1.5 U	1.5 U	1.9
Nitrogen (MG/L)	--	1.1	0.6 U	0.6 U	1.3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Sulfate (MG/L)	250	111	53.6	54.7	45.1	22.1	7.5	7.6	140	32.5	17.7	25.5	8
Total Organic Carbon (TOC) (mg/L)	--	8.7 *	3.9 *	3.3 *	13.2	4.8	2 U	2 U	1.9 J	1.4 J	3.5	4.3	0.97 J

Notes:

Shading indicates exceedance of NCGWQS criteria
NA - Not analyzed
* - Duplicate analysis was not within control limits
B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter
Please Note: TOC was not validated

Table A-5
Site 78 Hadnot Point Sampling Event Monitoring Well Analytical Results February 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NCGWQS (December, 2006)**	IR78-GW10	IR78-GW11	IR78-GW23	IR78-GW24-1	IR78-GW24-2	IR78-GW24-3	IR78-GW25	IR78-GW26		IR78-GW29	IR78-GW34	IR78-GW35
Sample ID		IR78-GW10-09A	IR78-GW11-09A	IR78-GW23-09A	IR78-GW24-1-09A	IR78-GW24-2-09A	IR78-GW24-3-09A	IR78-GW25-09A	IR78-GW26-09A	IR78-GW26D-09A	IR78-GW29-09A	IR78-GW34-09A	IR78-GW35-09A
Sample Date		02/23/09	02/19/09	02/21/09	02/20/09	02/20/09	02/18/09	02/22/09	02/22/09	02/22/09	02/21/09	02/22/09	02/21/09
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1,1-Trichloroethane	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	1 U	1 U	1 U	0.42 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	0.0004	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	700	3 UJ	1.6 J	6.3 U	3 UJ	3.2 UJ	3 U	3 UJ	3 U	3 U	3 UJ	3 UJ	3 UJ
Benzene	1	1 U	1 U	3.2	0.41 J	0.15 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3
cis-1,2-Dichloroethene	70	1 U	1 U	160	180	0.35 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane	--	1 U	1 U	0.25 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon-12)	1,400	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	550	1 U	1 U	0.33 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	70	1 U	1 U	0.86 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	--	1 U	1 U	0.4 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.13 J
Methylene chloride	4.6	1 U	1 U	1 U	1.1 U	3 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U
Methyl-tert-butyl ether (MTBE)	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	0.7	1 U	1 U	1 U	1 U	1 U	0.29 J	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	1 U	1 U	12	9.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	2.8	1 U	1 U	0.55 J	17	1 U	1 U	1 U	1 U	1 U	1 U	0.38 J	1 U
Trichlorofluoromethane(Freon-11)	2,100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	0.015	1 U	1 U	40	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	530	1 U	1 U	5.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Wet Chemistry													
Alkalinity (MG/L)	--	117	2	14.2	120	225	166	13.4	1 U	1 U	112	7.3	1 U
Carbon (MG/L)	--	2.6	0.78 J	19	11.4	0.67 J	0.77 J	2 J	1.1 J	1.1 J	1.6 J	3.1	0.78 J
Chloride (MG/L)	250	5.9	3.5	19.6	30.8	16.2	11.6	11.9	8.7	9.4	10.4	4.1	9.1
Ethane (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethene (UG/L)	--	1 U	1 U	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methane (UG/L)	--	1.5 U	1.5 U	580	830 D	49	100	13	40	33	1.5 U	1.8	1.5 U
Nitrogen (MG/L)	--	0.6 U	0.6 U	0.6 U	1.1	0.2 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Sulfate (MG/L)	250	22.5	29.3	27.5	15.1	46.2	2.3 J	24.1	13.9	13.5	34.2	30.8	68.9
Total Organic Carbon (TOC) (mg/L)	--	2.6	0.78 J	19	11.4	0.67 J	0.77 J	2 J	1.1 J	1.1 J	1.6 J	3.1	0.78 J

Notes:

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U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter
Please Note: TOC was not validated

Table A-5
Site 78 Hadnot Point Sampling Event Monitoring Well Analytical Results February 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NCGWQS (December, 2006)**	IR78-GW36	IR78-GW37	IR78-GW38	IR78-GW39	IR78-GW40	IR78-GW42	IR78-GW44	IR78-GW46	IR78-GW47		IR78-GW50	IR78-GW52
Sample ID		IR78-GW36-09A	IR78-GW37-09A	IR78-GW38-09A	IR78-GW39-09A	IR78-GW40-09A	IR78-GW42-09A-40	IR78-GW44-09A	IR78-GW46-09A	IR78-GW47-09A	IR78-GW47D-09A	IR78-GW50-09A	IR78-GW52-09A
Sample Date		02/22/09	02/21/09	02/18/09	02/23/09	02/21/09	02/23/09	02/20/09	02/20/09	02/20/09	02/20/09	02/23/09	02/19/09
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1,1-Trichloroethane	200	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1 U	1 U	5 U
1,1-Dichloroethane	70	1 U	1 U	0.5 J	1 U	1 U	190	10 U	1 U	1 U	1 U	1 U	2 J
1,1-Dichloroethene	7	1 U	1 U	0.36 J	1 U	1 U	14	10 U	1 U	1 U	1 U	1 U	7.6
1,2-Dibromoethane	0.0004	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1 U	1 U	5 U
Acetone	700	3 UJ	3 UJ	1.6 J	3 U	3 U	30 R	30 U	3 UJ	5.4 UJ	4.2 UJ	3 U	15 UJ
Benzene	1	1 U	1 U	1 U	1 U	1 U	3.3	2 J	35	2.1	1.7	1 U	30
Chlorobenzene	50	1 U	1 U	1 U	1 U	1 U	10 R	10 U	0.29 J	1 U	1 U	1 U	5 U
Chloroform	70	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1 U	1 U	5 U
cis-1,2-Dichloroethene	70	1 U	1 U	17	1 U	1 U	380	220 J	12	1.3	1.1	0.53 J	570
Cyclohexane	--	1 U	1 U	1 U	1 U	1 U	10 R	10 U	5.5	0.6 J	0.57 J	1 U	190
Dichlorodifluoromethane (Freon-12)	1,400	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1 U	1 U	5 U
Ethylbenzene	550	1 U	1 U	1 U	1 U	1 U	10 R	10 U	3.7	1 U	1 U	1 U	160
Isopropylbenzene	70	1 U	1 U	1 U	1 U	1 U	10 R	10 U	2.8	1 U	1 U	1 U	9.7
Methylcyclohexane	--	1 U	1 U	1 U	1 U	1 U	10 R	10 U	2.3	0.18 J	0.18 J	1 U	67
Methylene chloride	4.6	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1.2 U	1 U	5 U
Methyl-tert-butyl ether (MTBE)	200	1 U	1 U	1 U	1 U	1 U	10 R	10 U	4.2	1 U	1 U	1 U	5 U
Styrene	100	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1 U	1 U	5 U
Tetrachloroethene	0.7	1 U	1 U	3	0.85 J	1 U	10 R	10 U	1 U	1 U	1 U	1 U	0.85 J
Toluene	1,000	1 U	1 U	1 U	1 U	1 U	2.9	10 U	1 U	1 U	1 U	1 U	16 U
trans-1,2-Dichloroethene	100	1 U	1 U	0.35 J	1 U	1 U	10 R	7.6 J	0.47 J	1 U	1 U	1 U	5 U
Trichloroethene	2.8	1 U	1 U	2.7	1 U	1 U	120	10 U	3.9	7.8	6.5	1 U	10
Trichlorofluoromethane(Freon-11)	2,100	1 U	1 U	1 U	1 U	1 U	10 R	10 U	1 U	1 U	1 U	1 U	5 U
Vinyl chloride	0.015	1 U	1 U	1 U	1 U	1 U	190	930	1.2	1 U	1 U	1 U	22
Xylene, total	530	1 U	1 U	1 U	1 U	1 U	3.6 R	4.1 J	1.1	1 U	1 U	0.39 J	65
Wet Chemistry													
Alkalinity (MG/L)	--	82.8	6.1	42.6 N	175	20.3	54.4	260	6.1	22.3	18.3	161	217
Carbon (MG/L)	--	1.2 J	1.1 J	1.5 J	2 J	8.9	4.2	2.4	7.1	2.2	2.2	6.6	2.4
Chloride (MG/L)	250	1.6	24.1	11.8	15.5	7.7	9.4	14.7	27.1	8	8	19.5	5.8
Ethane (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethene (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	82	1 U	1 U	1 U	1 U	1.8
Methane (UG/L)	--	1.5 U	1.5 U	0.6 JB	1.5 U	270	210	1,800 E	410	84	98	120	360
Nitrogen (MG/L)	--	0.6 U	0.6 U	0.6 U	0.6 U	0.62	0.6 U	0.51 J	0.51 J	0.6 U	0.36 J	0.6 J	0.6 U
Sulfate (MG/L)	250	2.3 J	36.9	108 N	70.4	16.9	73	4.4 J	23.6	35.1	35.5	244	2.1
Total Organic Carbon (TOC) (mg/L)	--	1.2 J	1.1 J	1.5 J	2 J	8.9	4.2	2.4	7.1	2.2	2.2	6.6	2.4

Notes:

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E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
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N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
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U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter
Please Note: TOC was not validated

Table A-5
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2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NCGWQS (December, 2006)**	IR78-GW53		IR78-GW54	IR78-GW56	IR78-GW57	IR78-GW60	IR78-GW61	IR78-GW62	IR78-GW63	IR78-GW64	IR78-GW65	IR78-
Sample ID		IR78-GW53-09A-40	IR78-GW53D-09A-40	IR78-GW54-09A	IR78-GW56-09A	IR78-GW57-09A	IR78-GW60-09A-40	IR78-GW61-09A	IR78-GW62-09A	IR78-GW63-09A	IR78-GW64-09A	IR78-GW65-09A	IR78-GW66-09A
Sample Date		02/19/09	02/19/09	02/21/09	02/24/09	02/23/09	02/19/09	02/22/09	02/23/09	02/22/09	02/20/09	02/23/09	02/22/09
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1,1-Trichloroethane	200	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	70	1 U	1 U	1 U	1 U	1.3	40 U	1 U	1 U	1 U	1 U	3.5	4.4
1,1-Dichloroethene	7	1 U	1 U	1 U	1 U	0.32 J	40 U	1 U	1 U	1 U	1 U	1.7	3
1,2-Dibromoethane	0.0004	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	700	3 U	3 U	3 UJ	3 U	3 UJ	120 UJ	3 U	3.4 J	3 UJ	0.93 J	3 UJ	3 UJ
Benzene	1	100	80	1 U	1 U	1.2	40 U	1 U	1 U	1 U	1 U	0.17 J	0.33 J
Chlorobenzene	50	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	70	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	70	1 U	1 U	1 U	1.9	3.4	53	1 U	2.8	32	62	86	60
Cyclohexane	--	52	42	1 U	1 U	7.4	680	1 U	1 U	1 U	1 U	0.43 J	1.9
Dichlorodifluoromethane (Freon-12)	1,400	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	550	11	7.8	1 U	1 U	1 U	1,400	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	70	0.48 J	0.41 J	1 U	1 U	1 U	66	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	--	15	10	1 U	1 U	1 U	200	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	4.6	1 U	1 U	1 U	1 U	1.3 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl-tert-butyl ether (MTBE)	200	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	100	1 U	1 U	1 U	1 U	1 U	8.2 J	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	0.7	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1,000	15 U	8.1 U	1 U	1 U	1 U	320	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	1 U	1 U	1 U	1 U	1 U	40 U	1 U	1 U	0.4 J	0.94 J	0.91 J	0.89 J
Trichloroethene	2.8	1 U	1 U	1 U	2.1	1 U	2,100	1 U	0.34 J	0.96 J	1.1	5.1	6.2
Trichlorofluoromethane(Freon-11)	2,100	1 U	1 U	1 U	1 U	1 U	40 U	1.4	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	0.015	1 U	1 U	1 U	1 U	3.2	40 U	1 U	1 U	1 U	0.47 J	12	23
Xylene, total	530	8.4	5.1	1 U	1 U	1 U	5,600	1 U	1 U	1 U	1 U	1 U	1 U
Wet Chemistry													
Alkalinity (MG/L)	--	273	256	321	280 N	117	52.8	4.1	35.3	114	197	273	276
Carbon (MG/L)	--	3.4	3.4	2.9	0.95 J	1.6 J*	3.7	1.5 J	3.5	1.2 J	1.2 J	1.4 J	1.8 J
Chloride (MG/L)	250	11.2	11.1	19.7	10.2	8.5	5.6	23.8	9.4	16.1	24.1	10.7	10.6
Ethane (UG/L)	--	1 U	1 U	1 U	1 U	58	5.7	1 U	1 U	1 U	1 U	1 U	1 U
Ethene (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methane (UG/L)	--	600	520	11	2.2	120 D	12	47	2.5	17 B	18	200	230
Nitrogen (MG/L)	--	0.56 J	0.6 U	0.22 J	0.6 U	0.6 U	0.6 U	0.6 U	0.59 J	0.6 U	0.67	0.6 U	0.6 U
Sulfate (MG/L)	250	12.6	11.8	104	28	5.5	9.7	48.9	39.5	83.9	73.2	68.5	55.7
Total Organic Carbon (TOC) (mg/L)	--	3.4	3.4	2.9	0.95 J	1.6 J*	3.7	1.5 J	3.5	1.2 J	1.2 J	1.4 J	1.8 J

Notes:

Shading indicates exceedance of NCGWQS criteria
NA - Not analyzed
* - Duplicate analysis was not within control limits
B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter
Please Note: TOC was not validated

Table A-5
Site 78 Hadnot Point Sampling Event Monitoring Well Analytical Results February 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NCGWQS (December, 2006)**	GW66	IR78-GW68	IR78-GW71	IR78-GW72	IR78-GW73	IR78-GW74	IR78-GW75-1	IR78-GW75-2	IR78-GW76	IR78-GW77
Sample ID		IR78-GW66D-09A	IR78-GW68-09A	IR78-GW71-09A	IR78-GW72-09A	IR78-GW73-09A	IR78-GW74-09A	IR78-GW75-1-09A	IR78-GW75-2-09A	IR78-GW76-09A	IR78-GW77-09A
Sample Date		02/22/09	02/23/09	02/20/09	02/20/09	02/21/09	02/18/09	02/18/09	02/19/09	02/19/09	02/19/09
Chemical Name											
Volatile Organic Compounds (UG/L)											
1,1,1-Trichloroethane	200	1 U	1 U	4 U	2 U	1 U	100 U	20 U	40 U	12 U	50 U
1,1-Dichloroethane	70	4.5	1 U	4 U	2 U	1 U	100 U	20 U	40 U	12 U	50 U
1,1-Dichloroethene	7	3	1 U	1.6 J	0.96 J	1 U	100 U	20 U	40 U	12 U	50 U
1,2-Dibromoethane	0.0004	1 U	1 U	4 U	2 U	1 U	100 U	5.6 J	40 U	12 U	50 U
Acetone	700	3 UJ	3.2 J	12 U	6 U	7.9 UJ	300 U	60 U	470 J	38 UJ	150 UJ
Benzene	1	0.32 J	1 U	1.3 J	0.94 J	1 U	1,200	2,100	40 U	12 U	27 J
Chlorobenzene	50	1 U	1 U	4 U	2 U	1 U	100 U	20 U	40 U	12 U	50 U
Chloroform	70	1 U	1 U	4 U	2 U	1 U	100 U	20 U	40 U	12 U	50 U
cis-1,2-Dichloroethene	70	61	4.2	320	310	2.1	4,100	1,200	40 U	1,200	170
Cyclohexane	--	2	1 U	4 U	2 U	110	760	980	40 U	540	830
Dichlorodifluoromethane (Freon-12)	1,400	1 U	1 U	4 U	1.2 J	1 U	100 U	20 U	40 U	12 U	50 U
Ethylbenzene	550	1 U	1 U	4 U	2 U	0.16 J	1,400	1,600	40 U	250	1,700
Isopropylbenzene	70	1 U	1 U	4 U	2 U	7.7	70 J	85	40 U	55	76
Methylcyclohexane	--	1 U	1 U	4 U	2 U	170	240	340	40 U	210	250
Methylene chloride	4.6	1 U	1 U	4 U	2 U	1 U	100 UJ	20 U	2,200 J	12 U	50 U
Methyl-tert-butyl ether (MTBE)	200	1 U	1 U	4 U	2 U	1 U	100 U	20 U	40 U	12 U	50 U
Styrene	100	1 U	1 U	4 U	2 U	1 U	14 J	12 R	40 U	1.7 J	14 J
Tetrachloroethene	0.7	1 U	1 U	4 U	2 U	28	100 U	20 U	40 U	2.1 J	57
Toluene	1,000	1 U	1 U	4 U	2 U	1 U	11,000	9,500 J	40 U	25 U	960
trans-1,2-Dichloroethene	100	0.83 J	0.37 J	8.9	7.8	1 U	100 U	20 U	40 U	7.3 J	50 U
Trichloroethene	2.8	6.4	0.86 J	6.3	6	1.3	38 J	20 U	40 U	300	99
Trichlorofluoromethane(Freon-11)	2,100	1 U	1 U	4 U	2 U	1 U	100 U	20 U	40 U	12 U	50 U
Vinyl chloride	0.015	23	0.36 J	320	96	1 U	100 U	20 U	40 U	12 U	50 U
Xylene, total	530	1 U	1 U	4 U	2 U	2.8	4,400	5,000	11 J	1,600	5,500
Wet Chemistry											
Alkalinity (MG/L)	--	286	272	270	270	6.1	85.2	203	164	84.8	69
Carbon (MG/L)	--	1.8 J	0.98 J	1.6 J	2 J	0.94 J	7.8	6.4	5.9	4.4	3.7
Chloride (MG/L)	250	10.6	62.2	15	11.9	3.4	8.2	6.4	7.4	8.4	3.2
Ethane (UG/L)	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.2	1 U	7
Ethene (UG/L)	--	1 U	1 U	35	1 U	1 U	1 U	1 U	2.8	1 U	1 U
Methane (UG/L)	--	240	91	1,200 D	460 J	1.5 U	2,000 D	780	580	170	630 D
Nitrogen (MG/L)	--	0.6 U	0.6 U	0.2 U	0.37 J	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Sulfate (MG/L)	250	55.5	180	14.1	19.3	24.8	10.8	1.8 J	5 U	11.9	5 U
Total Organic Carbon (TOC) (mg/L)	--	1.8 J	0.98 J	1.6 J	2 J	0.94 J	7.8	6.4	5.9	4.4	3.7

Notes:

Shading indicates exceedance of NCGWQS criteria
NA - Not analyzed
* - Duplicate analysis was not within control limits
B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter
Please Note: TOC was not validated

Table A-6
Site 78 Hadnot Point Sampling Event Recovery Well Analytical Results February 2009
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NCGWQS (December, 2006)**	IR78-RW05	IR78-RW06	IR78-RW08	IR78-RW09	IR78-RW10	IR78-RW11	IR78-RW12	IR78-RW13	IR78-RW14
Sample ID		IR78-RW05-09A	IR78-RW06-09A	IR78-RW08-09A	IR78-RW09-09A	IR78-RW10-09A	IR78-RW11-09A	IR78-RW12-09A	IR78-RW13-09A	IR78-RW14-09A
Sample Date		02/24/09	02/24/09	02/24/09	02/23/09	02/24/09	02/24/09	02/24/09	02/24/09	02/24/09
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1-Dichloroethane	70	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1.4	1 U
1,1-Dichloroethene	7	0.55 J	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U
2-Butanone	4,200	5 U	5 U	5 U	5 U	5 U	5 U	10 U	8.4	5 U
Acetone	700	3 U	4.4 U	3 U	3 U	3 U	3 U	6 U	190	6.4 U
Benzene	1	0.31 J	1 U	1 U	1 U	1 U	1 U	6.3	1 U	0.73 J
Carbon disulfide	700	1 U	1 U	1 U	0.37 J	1 U	1 U	2 U	0.87 J	1 U
Chloromethane	2.6	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1.7	1 U
cis-1,2-Dichloroethene	70	34	1 U	1.6	1 U	4.2	1 U	100	20	0.89 J
Cyclohexane	--	3.7	0.64 J	1 U	1 U	1 U	1 U	0.86 J	1 U	42
Ethylbenzene	550	1 U	1 U	1 U	1 U	1 U	1 U	1.7 J	1 U	14
Isopropylbenzene	70	1 U	1 U	1 U	1 U	1 U	1 U	0.74 J	1 U	1.4
Methylcyclohexane	--	1 U	1 U	1 U	1 U	1 U	1 U	0.44 J	1 U	16
Methyl-tert-butyl ether (MTBE)	200	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	0.28 J
Tetrachloroethene	0.7	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	0.46 J
Toluene	1,000	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	18
trans-1,2-Dichloroethene	100	1 U	1 U	1 U	1 U	1 U	1 U	4.7	1 U	1 U
Trichloroethene	2.8	3.4	1 U	1	1 U	0.71 J	1 U	40	5.5	0.45 J
Vinyl chloride	0.015	9.2	1 U	1 U	1 U	1 U	1 U	11	1 U	1 U
Xylene, total	530	1 U	1 U	1 U	1 U	1 U	1 U	5.6	1 U	62
Wet Chemistry										
Alkalinity (MG/L)	--	284	108	258	6.1	152	191	154	213	203
Carbon (MG/L)	--	2.4	2 *J	1.1 *J	1 J	8.4	4.6	8.6 *	147	4.8
Chloride (MG/L)	250	9.1	20.2	10.1	24.9	12	12.7	12.3	8.9	8.3
Methane (UG/L)	--	200	1.5 U	13	6	1.5 U	1.9	710	2.2	55
Nitrogen (MG/L)	--	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.69	0.45 J	0.42 J
Sulfate (MG/L)	250	35.5	133	165	3.9 J	28.7	22.9	10.1	85.8	72.8
Total Organic Carbon (TOC) (mg/L)		2.4	2 J*	1.1 J*	1 J	8.4	4.6	8.6 *	147	4.8

Notes:

Shading indicates exceedance of NCGWQS criteria
NA - Not analyzed
* - Duplicate analysis was not within control limits
J - Analyte present, value may or may not be accurate or precise
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter
Please Note: TOC was not validated

Table A-7
Site 6 Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR06-GW03								IR06-GW15D					IR06-GW15D	
Sample ID		IR06-GW03-01A-01/10/2001	IR06-GW03-01C-07/11/2001	IR06-GW03-04A-01/21/2004	IR06-GW03-04A	IR06-GW03-05C	IR06-GW03-06C	IR06-GW03-07C	IR06-GW03-08C	IR06-GW15D-01A-01/11/2001	IR06-GW15D-02A-01/15/2002	IR06-GW15D-02C-08/01/2002	IR06-GW15D-03A-01/24/2003	IR06-GW15D-03A	IR06-GW15D-04A-01/20/2004	IR06-GW15D-04A
Sample Date		01/10/01	07/11/01	01/21/04	01/21/04	10/11/05	08/23/06	08/21/07	08/21/08	01/11/01	01/15/02	08/01/02	01/24/03	01/24/03	01/20/04	01/20/04
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,2,2-Tetrachloroethane	0.17	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	--	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	--	NA	NA	NA	NA	0.5 UJ	0.5 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	24	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	--	5 U	5 U	10 U	10 U	NA	NA	10 U	NA	5 U	5 U	5 U	5 U	5 U	10 U	10 U
1,3-Dichlorobenzene	170	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.4	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
2-Butanone	4,200	10 U	10 U	10 U	10 U	5 UJ	5 U	10 U	5 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
Acetone	700	10 U	10 UJ	10 U	10 U	5 UJ	2.2 U	10 U	5 U	10 U	10 UJ	10 R	10 U	10 U	10 U	10 U
Benzene	1	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	4.43	5 U	5 U	5 U	5 U	0.5 UJ	0.23 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	700	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	0.269	5 U	5 U	0.2 J	0.2 J	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	50	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	70	5 U	2 J	1 J	1 J	0.11 J	0.29 J	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cyclohexane	--	NA	NA	NA	NA	0.12 J	0.5 U	1 J	0.5 U	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane (Freon-12)	1,400	NA	NA	NA	NA	0.5 UJ	0.5 U	10 UJ	0.5 U	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.7	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1,000	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	2.8	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	0.8 J	5 U	5 U	5 U	5 U
Vinyl chloride	0.015	2 U	2 U	2 U	2 U	0.5 UJ	0.5 U	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylene, total	530	5 U	5 U	15 U	15 U	0.5 UJ	0.5 U	10 U	1.5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m- and p-Xylene	530	NA	NA	10 U	10 U	NA	NA	10 U	NA	NA	NA	NA	5 U	5 U	10 U	10 U
o-Xylene	530	NA	NA	5 U	5 U	NA	NA	10 U	NA	NA	NA	NA	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pesticide/Polychlorinated Biphenyls (UG/L)																
No Detections																
Total Metals (UG/L)																
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																
Carbon	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	5.9	5.9	NA	NA	NA	NA	NA	NA	5 J	4	4	4.3	4.3
Methane	--	NA	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Nitrate/Nitrite	--	NA	NA	0.31	0.31	NA	NA	NA	NA	NA	NA	NA	0.08	0.08	0.1	0.1
Sulfate	250	NA	NA	6.7	6.7	NA	NA	NA	NA	NA	NA	4.5	5.2	5.2	5.2	5.2
Sulfide	--	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U
Total Kjeldahl nitrogen	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic nitrogen (TON)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Shading indicates detection

Bold text indicates exceedance of NC2L criteria

Table A-7
Site 6 Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR06-GW15D					IR06-GW16									
Sample ID		IR06-GW03-01A-01/10/2001	IR06-GW15D-05C	IR06-GW15D-06C	IR06-GW15D-07C	IR06-GW15D-08C	IR06-GW16-01A-01/10/2001	IR06-GW16-01C-07/11/2001	IR06-GW16-02A-01/13/2002	IR06-GW16-02C-07/28/2002	IR06-GW16-02C-07/29/2002	IR06-GW16-03A	IR06-GW16-03A-01/21/2003	IR06-GW16-03B-04/12/2003	IR06-GW16-03B	IR06-GW16-03C-07/22/2003
Sample Date		01/10/01	10/10/05	09/07/06	08/21/07	08/21/08	01/10/01	07/11/01	01/13/02	07/28/02	07/29/02	01/21/03	01/21/03	04/12/03	04/12/03	07/22/03
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,2,2-Tetrachloroethane	0.17	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U	**3 J**	NA	**17**	5 U	10 U	5 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	0.5 U	0.2 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	–	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	5 U	10 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	–	NA	0.5 U	0.19 J	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	NA	0.5 U	0.24 J	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	24	NA	0.5 U	0.13 J	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	–	5 U	NA	NA	10 U	NA	5 U	5 U	3 J	NA	3 J	33	33	1 J	1 J	1 J
1,3-Dichlorobenzene	170	NA	0.5 U	0.19 J	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.4	NA	0.5 U	0.24 J	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	4,200	10 U	5 U	5 U	10 U	5 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	700	10 U	5 U	5.8 U	10 U	7 U	10 U	10 UJ	10 UJ	NA	1,000 U	10 U	10 U	10 R	10 U	10 U
Benzene	1	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U	100 U	NA	250 U	**3 J**	**3 J**	**2 J**	**2 J**	0.2 J
Bromoform	4.43	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	5 U	10 U	5 U	5 U	5 U
Carbon disulfide	700	5 U	0.5 U	0.1 U	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	5 U	10 U	5 U	5 U	5 U
Carbon tetrachloride	0.269	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	5 U	10 U	5 U	5 U	5 U
Chlorobenzene	50	5 U	0.5 U	0.5 U	10 U	0.5 U	**2,400**	**9,600**	**3,100**	NA	**6,000 E**	**180**	**180 E**	35	35	21
Chloroform	70	5 U	0.5 U	0.5 U	10 U	0.5 U	18	**84**	14	NA	5 U	5 U	10 U	5 U	5 U	5 U
Cyclohexane	–	NA	0.24 J	1.4	1 J	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane (Freon-12)	1,400	NA	0.5 U	0.5 U	10 UJ	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.7	5 U	0.5 U	0.27 J	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	**2 J**	**6 J**	5 U	5 U	5 U
Toluene	1,000	5 U	0.5 U	0.16 U	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	2 J	2 J	5 U	0.4 J	5 U
Trichloroethene	2.8	5 U	0.26 J	0.1 J	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	0.8 J	0.8 J	5 U	5 U	5 U
Vinyl chloride	0.015	2 U	0.5 U	0.5 U	10 U	0.5 U	2 U	2 U	2 U	NA	2 U	**2 J**	**2 J**	2 U	2 U	2 U
Xylene, total	530	5 U	0.5 U	0.5 U	10 U	1.5 U	5 U	5 U	100 U	NA	5 U	5 U	10 U	5 U	0.5 JB	5 U
cis-1,2-Dichloroethene	70	5 U	0.5 U	0.5 UJ	10 U	0.5 U	5 U	5 U	100 U	NA	5 U	16	16	5 U	5 U	0.5 J
m- and p-Xylene	530	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	5 U	10 U	5 U	0.5 JB	5 U
o-Xylene	530	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	5 U	10 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	100	5 U	0.5 U	0.5 UJ	10 U	0.5 U	5 U	5 U	3 J	NA	5 U	17	17	1 J	1 J	0.9 J
Pesticide/Polychlorinated Biphenyls (UG/L)																
No Detections																
Total Metals (UG/L)																
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																
Carbon	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	30 J	20	20	NA	NA	26
Methane	–	NA	NA	NA	NA	NA	NA	NA	NA	0.33	NA	1.2	1.2	NA	NA	0.13
Nitrate/Nitrite	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2	1.2	NA	NA	6.1
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	34 J	80	80	NA	NA	140
Sulfide	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	2	NA	NA	2
Total Kjeldahl nitrogen	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic nitrogen (TON)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
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U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
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Table A-7
Site 6 Historical Groundwater Data Table
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North Carolina

Station ID	NC2L (December 2005)	IR06-GW16							IR06-GW16		IR06-GW23	IR06-GW23					
Sample ID		IR06-GW03-01A-01/10/2001	IR06-GW16-03C	IR06-GW16-04A-01/20/2004	IR06-GW16-04A	IR06-GW16-05B	IR06-GW16-05C	IR06-GW16-06C	IR06-GW16-07C	IR06-GW16-08C	IR06-GW23-02A-01/14/2002	IR06-GW23-02C-07/29/2002	IR06-GW23-03A-01/21/2003	IR06-GW23-03A	IR06-GW23-03C-07/22/2003	IR06-GW23-03C	IR06-GW23-04A-01/29/2004
Sample Date		01/10/01	07/22/03	01/20/04	01/20/04	05/20/05	10/10/05	08/23/06	08/20/07	08/21/08	01/14/02	07/29/02	01/21/03	01/21/03	07/22/03	07/22/03	01/29/04
Chemical Name																	
Volatile Organic Compounds (UG/L)																	
1,1,2,2-Tetrachloroethane	0.17	5 U	5 U	**16**	**16**	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	NA	NA	NA	21 U	250 U	100 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	–	5 U	5 U	0.3 J	0.3 J	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	–	NA	NA	NA	NA	NA	250 U	100 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	NA	NA	NA	NA	21 U	250 U	100 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	24	NA	NA	NA	NA	21 U	250 U	100 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	–	5 U	1 J	2 J	2 J	NA	NA	NA	10 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	10 U
1,3-Dichlorobenzene	170	NA	NA	NA	NA	21 U	250 U	100 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.4	NA	NA	NA	NA	21 U	250 U	100 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
2-Butanone	4,200	10 U	10 U	10 U	10 U	100 U	2,500 U	1,000 U	10 U	5 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	700	10 U	10 U	10 U	10 U	100 U	2,800 U	500 U	10 U	9.8 U	10 UJ	10 R	10 U	10 U	10 U	10 U	10 U
Benzene	1	5 U	0.2 J	**4 J**	**4 J**	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	4.43	5 U	5 U	5 U	5 U	21 U	250 U	48 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	700	5 U	5 U	5 U	5 U	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	0.269	5 U	5 U	**0.3 J**	**0.3 J**	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	50	5 U	21	**11,000 D**	11,000 B	**910**	**5,000**	**1,100**	**140**	25	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	70	5 U	5 U	96 B	96 B	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cyclohexane	–	NA	NA	NA	NA	21 U	250 U	100 U	1 J	0.5 U	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane (Freon-12)	1,400	NA	NA	NA	NA	21 U	250 U	100 U	10 UJ	0.11 J	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.7	5 U	5 U	**4 J**	**4 J**	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1,000	5 U	5 U	0.2 J	0.2 J	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	2.8	5 U	5 U	**17**	**17**	21 U	250 U	100 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	0.015	2 U	2 U	2 U	2 U	21 U	250 U	100 U	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylene, total	530	5 U	5 U	2 J	2 J	21 U	250 U	100 U	10 U	1.5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U
cis-1,2-Dichloroethene	70	5 U	0.5 J	1 J	1 J	21 U	250 U	100 U	10 U	0.18 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m- and p-Xylene	530	NA	5 U	1 J	1 J	42 U	NA	NA	10 U	NA	NA	NA	5 U	5 U	5 U	5 U	10 U
o-Xylene	530	NA	5 U	0.5 J	0.5 J	21 U	NA	NA	10 U	NA	NA	NA	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	100	5 U	0.9 J	1 J	1 J	21 U	250 U	100 U	10 U	0.13 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pesticide/Polychlorinated Biphenyls (UG/L)																	
No Detections																	
Total Metals (UG/L)																	
Barium	2,000	NA	NA	NA	NA	27.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	1.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	1.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																	
Carbon	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	26	36	36	NA	NA	NA	NA	NA	NA	27 J	39	39	48	48	25
Methane	–	NA	0.13	0.054	0.054	NA	NA	NA	NA	NA	NA	0.015	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Nitrate/Nitrite	–	NA	6.1	0.98	0.98	NA	NA	NA	NA	NA	NA	NA	0.38	0.38	0.3	0.3	0.46
Sulfate	250	NA	140	170	170	NA	NA	NA	NA	NA	NA	21 J	26	26	25	25	25
Sulfide	–	NA	2	1.8	1.8	NA	NA	NA	NA	NA	NA	NA	2	2	1 U	1 U	1.2
Total Kjeldahl nitrogen	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic nitrogen (TON)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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North Carolina

Station ID	NC2L (December 2005)			IR06-GW23				IR06-GW31	IR06-GW31							IR06-GW31		
Sample ID		IR06-GW03-01A-01/10/2001	IR06-GW23-04A	IR06-GW23-05C	IR06-GW23-06C	IR06-GW23-07C	IR06-GW23-08C	IR06-GW31-02A-01/14/2002	IR06-GW31-02C-07/29/2002	IR06-GW31-03A-01/21/2003	IR06-GW31-03A	IR06-GW31-03C-07/22/2003	IR06-GW31-03C	IR06-GW31-04A-01/21/2004	IR06-GW31-04A	IR06-GW31-05C	IR06-GW31-06C	IR06-GW31-07C
Sample Date		01/10/01	01/29/04	10/11/05	08/23/06	08/21/07	08/21/08	01/14/02	07/29/02	01/21/03	01/21/03	07/22/03	07/22/03	01/21/04	01/21/04	10/11/05	08/23/06	08/21/07
Chemical Name																		
Volatile Organic Compounds (UG/L)																		
1,1,2,2-Tetrachloroethane	0.17	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.1 J	10 U
1,1,2-Trichloroethane	–	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
1,2,3-Trichlorobenzene	–	NA	NA	0.5 UJ	0.5 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	NA
1,2,4-Trichlorobenzene	70	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U
1,2-Dichlorobenzene	24	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U
1,2-Dichloroethene (total)	–	5 U	10 U	NA	NA	10 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	10 U	10 U	NA	NA	10 U
1,3-Dichlorobenzene	170	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U
1,4-Dichlorobenzene	1.4	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U
2-Butanone	4,200	10 U	10 U	5 UJ	5 U	10 U	5 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 UJ	5 U	10 U
Acetone	700	10 U	10 U	5 UJ	5 U	10 U	6.8 U	10 UJ	10	10 U	10 U	10 U	10 U	10 U	10 U	5 UJ	5 UJ	10 UJ
Benzene	1	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Bromoform	4.43	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Carbon disulfide	700	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Carbon tetrachloride	0.269	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Chlorobenzene	50	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.21 J	0.5 U	10 U
Chloroform	70	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Cyclohexane	–	NA	NA	0.21 J	0.12 J	2 J	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.26 J	0.5 U	2 J
Dichlorodifluoromethane (Freon-12)	1,400	NA	NA	0.5 UJ	0.5 U	10 UJ	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	87	2.4	3 J
Tetrachloroethene	0.7	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	**15**	**15**	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Toluene	1,000	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Trichloroethene	2.8	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.12 J	0.5 U	10 U
Vinyl chloride	0.015	2 U	2 U	0.5 UJ	0.5 U	10 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.5 UJ	0.5 UJ	10 UJ
Xylene, total	530	5 U	15 U	0.5 UJ	0.5 U	10 U	1.5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U	0.5 UJ	0.5 U	10 U
cis-1,2-Dichloroethene	70	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
m- and p-Xylene	530	NA	10 U	NA	NA	10 U	NA	NA	NA	5 U	5 U	5 U	5 U	10 U	10 U	NA	NA	10 U
o-Xylene	530	NA	5 U	NA	NA	10 U	NA	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	10 U
trans-1,2-Dichloroethene	100	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U
Pesticide/Polychlorinated Biphenyls (UG/L)																		
No Detections																		
Total Metals (UG/L)																		
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																		
Carbon	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	25	NA	NA	NA	NA	NA	15 J	16	16	15	15	18	18	NA	NA	NA
Methane	–	NA	0.01 U	NA	NA	NA	NA	NA	0.016	0.46	0.46	0.22	0.22	0.077	0.077	NA	NA	NA
Nitrate/Nitrite	–	NA	0.46	NA	NA	NA	NA	NA	NA	0.95	0.95	0.47	0.47	0.28	0.28	NA	NA	NA
Sulfate	250	NA	25	NA	NA	NA	NA	NA	4.1 J	6.2	6.2	5.4	5.4	1 U	1 U	NA	NA	NA
Sulfide	–	NA	1.2	NA	NA	NA	NA	NA	NA	2	2	1 U	1 U	1 U	1 U	NA	NA	NA
Total Kjeldahl nitrogen	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic nitrogen (TON)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
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MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)			IR06-GW38D	IR06-GW38D							IR06-GW38D			IR06-MW03	
Sample ID		IR06-GW03-01A-01/10/2001	IR06-GW31-08C	IR06-GW38D-01A-01/11/2001	IR06-GW38D-02A-01/14/2002	IR06-GW38D-02C-07/30/2002	IR06-GW38D-03A-01/27/2003	IR06-GW38D-03A	IR06-GW38D-04A-01/21/2004	IR06-GW38D-04A	IR06-GW38D-05C	IR06-GW38D-06C	IR06-GW38D-07C	IR06-GW38D-08C	IR06-MW03-03A-01/22/2003	IR06-MW03-03A
Sample Date		01/10/01	08/21/08	01/11/01	01/14/02	07/30/02	01/27/03	01/27/03	01/21/04	01/21/04	10/11/05	09/07/06	08/21/07	08/21/08	01/22/03	01/22/03
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,2,2-Tetrachloroethane	0.17	5 U	0.5 U	5 U	5 U	1 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	10 U	0.5 U	NA	NA
1,1,2-Trichloroethane	–	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
1,2,3-Trichlorobenzene	–	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	NA	0.5 U	NA	NA
1,2,4-Trichlorobenzene	70	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	10 U	0.5 U	NA	NA
1,2-Dichlorobenzene	24	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	10 U	0.5 U	NA	NA
1,2-Dichloroethene (total)	–	5 U	NA	5 U	5 U	5 U	5 U	5 U	10 U	10 U	NA	NA	10 U	NA	5 U	5 U
1,3-Dichlorobenzene	170	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	10 U	0.5 U	NA	NA
1,4-Dichlorobenzene	1.4	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	10 U	0.5 U	NA	NA
2-Butanone	4,200	10 U	5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 U	5 U	2 J	5 U	10 U	10 U
Acetone	700	10 U	10 U	10 U	10 U	10 R	10 U	10 U	10 U	10 U	5 R	6.4 U	10 U	6.6 U	10 U	10 U
Benzene	1	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Bromoform	4.43	5 U	0.5 U	5 U	5 U	1 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Carbon disulfide	700	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Carbon tetrachloride	0.269	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Chlorobenzene	50	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Chloroform	70	5 U	0.5 U	5 U	5 U	5 U	0.3 J	0.3 J	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Cyclohexane	–	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	0.16 J	1.9	7 J	0.5 U	NA	NA
Dichlorodifluoromethane (Freon-12)	1,400	NA	0.45 J	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	10 UJ	0.5 U	NA	NA
Tetrachloroethene	0.7	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	10 U	0.5 U	5 U	5 U
Toluene	1,000	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.47 U	10 U	0.5 U	5 U	5 U
Trichloroethene	2.8	5 U	0.5 U	5 U	5 U	5 U	2 J	2 J	5 U	5 U	0.22 J	0.5 U	10 U	0.5 U	0.6 J	0.6 J
Vinyl chloride	0.015	2 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.5 U	0.5 U	10 U	0.5 U	2 U	2 U
Xylene, total	530	5 U	1.5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U	0.5 U	0.5 U	10 U	1.5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 UJ	10 U	0.5 U	5 U	5 U
m- and p-Xylene	530	NA	NA	NA	NA	NA	5 U	5 U	10 U	10 U	NA	NA	10 U	NA	5 U	5 U
o-Xylene	530	NA	NA	NA	NA	NA	5 U	5 U	5 U	5 U	NA	NA	10 U	NA	5 U	5 U
trans-1,2-Dichloroethene	100	5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 UJ	10 U	0.5 U	5 U	5 U
Pesticide/Polychlorinated Biphenyls (UG/L)																
No Detections																
Total Metals (UG/L)																
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																
Carbon	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3	NA
Chloride	250	NA	NA	NA	NA	56 J	50	50	50	50	NA	NA	NA	NA	9	9
Methane	–	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA	NA	0.089	0.089
Nitrate/Nitrite	–	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.093	0.09	NA	NA	NA	NA	0.05 U	0.05 U
Sulfate	250	NA	NA	NA	NA	28	23	23	28	28	NA	NA	NA	NA	3	3
Sulfide	–	NA	NA	NA	NA	NA	2	2	2.3	2.3	NA	NA	NA	NA	1 U	1 U
Total Kjeldahl nitrogen	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.3	0.3
Total organic carbon (TOC)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.3	3
Total organic nitrogen (TON)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection
Bold text indicates exceedance of NC2L criteria

Table A-7
Site 6 Historical Groundwater Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR06-MW03							IR06-MW03	
Sample ID		IR06-GW03-01A-01/10/2001	IR06-MW03-03C-07/22/2003	IR06-MW03-03C	IR06-MW03-04A-01/20/2004	IR06-MW03-04A	IR06-MW03-05C	IR06-MW03-06C	IR06-MW03-07C	IR06-MW03-08C
Sample Date		01/10/01	07/22/03	07/22/03	01/20/04	01/20/04	10/10/05	08/23/06	08/20/07	08/21/08
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,2,2-Tetrachloroethane	0.17	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
1,1,2-Trichloroethane	--	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
1,2,3-Trichlorobenzene	--	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	NA	0.5 U
1,2,4-Trichlorobenzene	70	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
1,2-Dichlorobenzene	24	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	5 U	5 U	5 U	10 U	10 U	NA	NA	10 U	NA
1,3-Dichlorobenzene	170	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
1,4-Dichlorobenzene	1.4	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
2-Butanone	4,200	10 U	10 U	10 U	10 U	10 U	5 UJ	5 U	10 U	5 U
Acetone	700	10 U	10 U	10 U	10 U	10 U	5 UJ	7.7 UJ	10 U	5.6 U
Benzene	1	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
Bromoform	4.43	5 U	5 U	5 U	5 U	5 U	0.18 J	0.5 U	10 U	0.5 U
Carbon disulfide	700	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.13 J	10 U	0.5 U
Carbon tetrachloride	0.269	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
Chlorobenzene	50	5 U	5 U	5 U	5 U	0.1 JB	0.5 UJ	0.5 U	10 U	0.5 U
Chloroform	70	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
Cyclohexane	--	NA	NA	NA	NA	NA	0.2 J	0.5 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	10 UJ	0.5 U
Tetrachloroethene	0.7	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
Toluene	1,000	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.1 U	10 U	0.5 U
Trichloroethene	2.8	5 U	5 U	5 U	5 U	5 U	0.47 J	0.5 U	10 U	0.5 U
Vinyl chloride	0.015	2 U	2 U	2 U	2 U	2 U	0.5 UJ	0.5 U	10 U	0.5 U
Xylene, total	530	5 U	5 U	5 U	15 U	15 U	0.5 UJ	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
m- and p-Xylene	530	NA	5 U	5 U	10 U	10 U	NA	NA	10 U	NA
o-Xylene	530	NA	5 U	5 U	5 U	5 U	NA	NA	10 U	NA
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	10 U	0.5 U
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections										
Total Metals (UG/L)										
Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)										
Carbon	--	NA	2	NA	2.4	2.4	NA	NA	NA	NA
Chloride	250	NA	9.8	9.8	12	12	NA	NA	NA	NA
Methane	--	NA	0.096	0.096	0.092	0.092	NA	NA	NA	NA
Nitrate/Nitrite	--	NA	0.05 U	0.05 U	0.099	0.09	NA	NA	NA	NA
Sulfate	250	NA	2	2	2.8	2.8	NA	NA	NA	NA
Sulfide	--	NA	2	2	2.3	2.3	NA	NA	NA	NA
Total Kjeldahl nitrogen	--	NA	0.25 U	0.25 U	0.26	0.26	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	2	NA	NA	NA	NA	NA	NA
Total organic nitrogen (TON)	--	NA	0.25 U	0.25 U	0.26	0.26	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection
Bold text indicates exceedance of NC2L criteria

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR06-82MW02				IR06-82MW03			IR06-DRW01							
Sample ID		IR06-82MW02-05C	IR06-82MW02-06C	IR06-82MW02-07C	IR06-82MW02-08C	IR06-82MW03-05C	IR06-82MW03-06C	IR06-82MW03-08C	IR06-DRW01-05C	IR06-DRW01-06C	IR06-DRW01-07A	IR06-DRW01-07B	IR06-DRW01-07B2	IR06-DRW01-07C2	IR06-DRW01-07C	IR06-DRW01-08C
Sample Date		10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	09/07/06	08/21/08	09/27/05	09/07/06	02/01/07	04/18/07	06/13/07	08/14/07	08/14/07	09/17/08
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	200	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	**2,400**	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	1.4 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloroethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	41 J	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethane	70	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethene	7	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	1.6 J	4.2 U	0.5 U	0.13 J	0.5 U	10 U	0.13 J
1,2,3-Trichlorobenzene	--	0.5 UJ	0.5 U	NA	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	NA	NA	NA	NA	NA	0.5 U
1,2,4-Trichlorobenzene	70	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dibromoethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichlorobenzene	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethane	0.38	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7 J	NA
1,2-Dichloropropane	0.51	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,3-Dichlorobenzene	170	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,4-Dichlorobenzene	1.4	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	**1.5 J**	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
2-Butanone	4,200	5 UJ	5 U	10 U	5 U	5 UJ	5 U	5 U	1,300 U	63 U	21 U	44	26	32	16	7.5
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5 UJ	5 U	10 U	5 U	5 UJ	5 U	5 U	1,300 U	63 U	21 U	2.5 U	3.8	4.6	10 U	13
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 UJ	5 U	10 U	5 U	5 UJ	5 U	5 U	1,300 U	63 U	21 U	2.5 U	2.5 U	1.6 J	10 U	5 U
Acetone	700	5 R	5.1 UJ	7 J	10 U	5 R	4.9 U	10 U	2,500 R	42 U	21 U	2.5 U	42 B	78 B	21	8.9 U
Benzene	1	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Bromochloromethane	--	0.5 UJ	0.5 U	NA	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	NA	NA	NA	NA	NA	0.5 U
Bromodichloromethane	0.56	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Bromoform	4.43	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Bromomethane	--	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 UJ
Carbon disulfide	700	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.38 J	0.42 BJ	0.43 J	10 U	0.21 J
Carbon tetrachloride	0.269	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Chlorobenzene	50	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.11 J	10 U	0.5 U
Chloroethane	2,800	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Chloroform	70	0.5 UJ	0.5 U	10 U	0.5 U	0.71 J	0.46 U	1 U	130 U	6.3 U	4.2 U	9.2	3.4	0.64	10 U	0.5 U
Chloromethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Cyclohexane	--	0.13 J	0.11 J	1 J	0.5 U	0.12 J	0.71	0.5 U	130 U	2.3 J	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Dibromochloromethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	NA	NA	NA
Ethylbenzene	550	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.13 J	10 U	0.5 U
Isopropylbenzene	70	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	43 B	NA	NA	NA
Methyl acetate	--	0.5 UJ	0.5 R	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	250 R	6.3 U	4.2 U	1 U	0.5 U	0.5 U	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	200	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Methylcyclohexane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Methylene chloride	4.6	0.5 U	0.5 U	10 U	0.5 U	0.5 UJ	0.13 U	0.5 U	130 U	2.7 U	4.2 U	4.6	4.8 B	5.8 B	10 U	0.5 U
Styrene	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Tetrachloroethene	0.7	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	**790**	**8.6**	**15**	0.17 J	0.26 J	0.28 J	10 U	0.5 U
Toluene	1,000	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.1 U	0.5 U	130 U	1.9 U	4.2 U	0.5 U	0.19 J	0.5 J	10 U	0.12 J
Trichloroethene	2.8	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	**9,200**	**170**	**160**	2	2.2	1.9	1 J	0.26 J
Trichlorofluoromethane(Freon-11)	2,100	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 UJ
Vinyl chloride	0.015	0.5 UJ	0.5 U	10 U	**0.34 J**	0.5 UJ	0.5 U	0.5 U	**33 J**	6.3 U	**1.6 J**	**0.79**	0.5 U	**0.74**	10 U	**0.74**
Xylene, total	530	0.5 UJ	0.5 U	10 U	1.5 U	0.5 UJ	0.5 U	1.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	70	0.13 J	0.15 J	10 U	0.1 J	0.5 UJ	0.5 U	0.5 U	**1,600**	25	**150**	29 D	7.3	10	7 J	11
cis-1,3-Dichloropropene	0.19	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
m- and p-Xylene	--	NA	NA	10 U	NA	NA	NA	NA	NA	NA	8.3 U	1 U	1 U	1 U	10 U	NA
o-Xylene	--	NA	NA	10 U	NA	NA	NA	NA	NA	NA	4.2 U	0.5 U	0.5 U	0.5 U	10 U	NA
trans-1,2-Dichloroethene	100	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	**330**	8.8	36	5	1.7	1.7	10 U	0.47 J
trans-1,3-Dichloropropene	0.19	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U	0.5 U	130 U	6.3 U	4.2 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Total Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3,780 E**	**28,900 N**	**36,700**	**16,600**	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	44.2 E	**82.1**	**65.7 E**	**60.9**	NA	NA
Dissolved Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	87.4 B	**26,900**	**34,000**	**13,700 E**	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	24.9	**81.6**	**66.8**	**52.3 E**	NA	NA

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR06-82MW02				IR06-82MW03			IR06-DRW01							
Sample ID		IR06-82MW02-05C	IR06-82MW02-06C	IR06-82MW02-07C	IR06-82MW02-08C	IR06-82MW03-05C	IR06-82MW03-06C	IR06-82MW03-08C	IR06-DRW01-05C	IR06-DRW01-06C	IR06-DRW01-07A	IR06-DRW01-07B	IR06-DRW01-07B2	IR06-DRW01-07C2	IR06-DRW01-07C	IR06-DRW01-08C
Sample Date		10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	09/07/06	08/21/08	09/27/05	09/07/06	02/01/07	04/18/07	06/13/07	08/14/07	08/14/07	09/17/08
Wet Chemistry (MG/L)																
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	91.9	587	499	586	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	2.89	0.66	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7	2.8	3.12	2.03	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.002 U	7.00E-04 J	NA	4.00E-04 J	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.002 U	0.002 U	NA	0.002 U	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.00E-04 JB	0.002	NA	0.079 BD	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	**8.94**	**6.44**	0.05 U	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.46	1.38 B	5 U	0.185 B	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	1 U	1	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	470	332	310	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR06-DRW02						IR06-DRW03				IR06-DRW04						
Sample ID		IR06-DRW02-05C	IR06-DRW02-DUP-05C	IR06-DRW02-06C	IR06-DRW02-07C	IR06-DRW02D-07C	IR06-DRW02-08C	IR06-DRW03-05C	IR06-DRW03-06C	IR06-DRW03-07C	IR06-DRW03-08C	IR06-DRW04-05C	IR06-DRW04-DUP-05C	IR06-DRW04-06C	IR06-DRW04D-06C	IR06-DRW04-07C	IR06-DRW04D-07C	IR06-DRW04-08C
Sample Date		09/27/05	09/27/05	08/22/06	08/21/07	08/21/07	08/21/08	09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	09/27/05	08/22/06	08/22/06	08/21/07	08/21/07	08/21/08
Chemical Name																		
Volatile Organic Compounds (UG/L)																		
1,1,1-Trichloroethane	200	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,1,2,2-Tetrachloroethane	0.17	**100 J**	**120 J**	**180**	**110**	**110**	25 U	130 U	0.5 U	10 U	0.5 U	**0.47 J**	0.5 U	130 U	130 U	10 U	10 U	130 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,1,2-Trichloroethane	--	130 U	130 U	11	12	12	10 J	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,1-Dichloroethane	70	130 U	130 U	1.4	1 J	10 U	25 U	130 U	2.5	2 J	2.4	4.4 J	3.7 J	130 U	130 U	4 J	3 J	130 U
1,1-Dichloroethene	7	130 U	130 U	**8.5**	**10**	**11**	**28**	130 U	**11**	**12**	**15**	**19 J**	**17 J**	**38 J**	130 U	**20**	**15**	130 U
1,2,3-Trichlorobenzene	--	130 U	130 U	0.5 U	NA	NA	25 U	130 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	130 U	130 U	NA	NA	130 U
1,2,4-Trichlorobenzene	70	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,2-Dibromo-3-chloropropane	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,2-Dibromoethane	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,2-Dichlorobenzene	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,2-Dichloroethane	0.38	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,2-Dichloroethene (total)	--	NA	NA	NA	2,500	2,600	NA	NA	NA	570	NA	NA	NA	NA	NA	990	1,000	NA
1,2-Dichloropropane	0.51	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,3-Dichlorobenzene	170	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
1,4-Dichlorobenzene	1.4	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
2-Butanone	4,200	1,300 U	1,300 U	5 U	10 U	10 U	250 U	1,300 U	5 U	3 J	5 U	5 U	5 U	1,300 U	1,300 U	10 U	10 U	1,300 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	1,300 U	1,300 U	5 U	10 U	10 U	250 U	1,300 U	5 U	10 U	5 U	5 U	5 U	1,300 U	1,300 U	10 U	10 U	1,300 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	1,300 U	1,300 U	5 U	10 U	10 U	250 U	1,300 U	5 U	10 U	5 U	5 U	5 U	1,300 U	1,300 U	10 U	10 U	1,300 U
Acetone	700	1,300 R	1,300 R	5 U	10 U	10 U	250 U	1,300 R	5 U	7 J	5 U	1,700 R	1,700 R	1,300 U	1,300 U	10 U	10 UJ	1,300 U
Benzene	1	130 U	130 U	**4**	**3 J**	**3 J**	25 U	130 U	**1.3**	10 U	**1.9**	**5.1 J**	**4.6 J**	130 U	130 U	**3 J**	**3 J**	130 U
Bromochloromethane	--	130 U	130 U	0.5 U	NA	NA	25 U	130 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	130 U	130 U	NA	NA	130 U
Bromodichloromethane	0.56	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Bromoform	4.43	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.13 J	130 U	130 U	10 U	10 U	130 U
Bromomethane	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 UJ	130 U
Carbon disulfide	700	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Carbon tetrachloride	0.269	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Chlorobenzene	50	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Chloroethane	2,800	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Chloroform	70	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Chloromethane	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 UJ	10 UJ	130 U
Cyclohexane	--	130 U	130 U	0.17 J	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	480 J	130 UJ	10 U	10 U	130 U
Dibromochloromethane	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Dichlorodifluoromethane (Freon-12)	1,400	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.82	1 J	1.3	0.5 U	0.5 U	130 U	130 U	10 UJ	10 UJ	130 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	130 U	130 U	0.26 J	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.11 J	0.5 U	130 U	130 U	10 U	10 U	130 U
Isopropylbenzene	70	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	130 R	130 R	0.5 UJ	10 U	10 U	25 U	130 R	0.5 UJ	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Methyl-tert-butyl ether (MTBE)	200	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Methylcyclohexane	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Methylene chloride	4.6	130 U	130 U	0.18 U	10 U	10 U	25 U	130 U	0.2 U	10 U	0.5 U	0.9 U	0.7 U	130 U	130 U	10 U	10 U	130 U
Styrene	--	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Tetrachloroethene	0.7	**610**	**600**	**740**	**610**	**580**	**470**	130 U	**9.1**	**6 J**	**8.6**	**160 J**	**140 J**	**140**	**120 J**	**140**	**130**	**120 J**
Toluene	1,000	130 U	130 U	0.2 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.16 J	0.12 J	130 U	130 U	10 U	10 U	130 U
Trichloroethene	2.8	**3,500**	**3,500**	**3,700**	**3,100**	**3,000**	**2,000**	**1,700**	**1,500**	**950**	**1,300**	**4,000**	**3,900**	**4,000**	**3,600**	**3,000**	**3,000**	**3,300**
Trichlorofluoromethane(Freon-11)	2,100	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Vinyl chloride	0.015	**72 J**	130 U	**32 J**	**36**	**35**	**74**	130 U	**13 J**	**10 J**	**12**	**45 J**	**26 J**	**26 J**	130 U	**25**	**26 J**	130 U
Xylene, total	530	130 U	130 U	1.3	10 U	10 U	75 U	130 U	0.5 U	10 U	1.5 U	0.35 J	0.5 U	130 U	130 U	10 U	10 U	380 U
cis-1,2-Dichloroethene	70	**1,900**	**1,900**	**2,000**	**2,000**	**2,100**	**3,800**	**630**	**580**	**440**	**390**	**1,000**	**1,000**	**1,000**	**910**	**730**	**760**	**730**
cis-1,3-Dichloropropene	0.19	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.1 J	130 U	130 U	10 U	10 U	130 U
m- and p-Xylene	--	NA	NA	NA	10 U	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA
o-Xylene	--	NA	NA	NA	10 U	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	10 U	NA
trans-1,2-Dichloroethene	100	**690**	**720**	**610**	**520**	**540**	**540**	**270**	**200**	**130**	**130**	**350**	**330**	**330**	**310**	**260 J**	**240 J**	**210**
trans-1,3-Dichloropropene	0.19	130 U	130 U	0.5 U	10 U	10 U	25 U	130 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	130 U	130 U	10 U	10 U	130 U
Total Metals (UG/L)																		
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																		
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR06-DRW02						IR06-DRW03				IR06-DRW04						
Sample ID		IR06-DRW02-05C	IR06-DRW02-DUP-05C	IR06-DRW02-06C	IR06-DRW02-07C	IR06-DRW02D-07C	IR06-DRW02-08C	IR06-DRW03-05C	IR06-DRW03-06C	IR06-DRW03-07C	IR06-DRW03-08C	IR06-DRW04-05C	IR06-DRW04-DUP-05C	IR06-DRW04-06C	IR06-DRW04D-06C	IR06-DRW04-07C	IR06-DRW04D-07C	IR06-DRW04-08C
Sample Date		09/27/05	09/27/05	08/22/06	08/21/07	08/21/07	08/21/08	09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	09/27/05	08/22/06	08/22/06	08/21/07	08/21/07	08/21/08
Wet Chemistry (MG/L)																		
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Val

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be needed to co

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)		IR06-GW01			IR06-GW01D							IR06-GW01DA				IR06-GW01DB	
Sample ID		IR06-DRW04D-08C	IR06-GW01-05C	IR06-GW01-06C	IR06-GW01-07C	IR06-GW01D-05C	IR06-GW01D-06C	IR06-GW01DD-06C	IR06-GW01D-07C	IR06-GW01DD-07C	IR06-GW01D-08C	IR06-GW01DD-08C	IR06-GW01DA-05C	IR06-GW01DA-06C	IR06-GW01DA-07C	IR06-GW01DA-08C	IR06-GW01DB-05C	IR06-GW01DB-06C
Sample Date		08/21/08	10/10/05	08/22/06	09/10/07	10/10/05	09/07/06	09/07/06	08/21/07	08/21/07	08/21/08	08/21/08	10/10/05	09/07/06	08/21/07	08/21/08	10/10/05	09/07/06
Chemical Name																		
Volatile Organic Compounds (UG/L)																		
1,1,1-Trichloroethane	200	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,1,2,2-Tetrachloroethane	0.17	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	51 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.14 U
1,1,2-Trichloroethane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,1-Dichloroethane	70	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,1-Dichloroethene	7	130 U	0.5 UJ	0.5 U	10 U	4.3 J	250 U	250 U	6 J	5 J	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.1 J
1,2,3-Trichlorobenzene	--	130 U	0.5 UJ	0.5 U	NA	0.5 U	250 U	250 U	NA	NA	130 U	100 U	0.5 UJ	0.5 U	NA	0.5 U	0.5 UJ	0.5 U
1,2,4-Trichlorobenzene	70	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	51 J	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,2-Dibromo-3-chloropropane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,2-Dibromoethane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,2-Dichlorobenzene	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,2-Dichloroethane	0.38	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,2-Dichloroethene (total)	--	NA	NA	NA	10 U	NA	NA	NA	1,400	980 J	NA	NA	NA	NA	10 U	NA	NA	NA
1,2-Dichloropropane	0.51	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
1,3-Dichlorobenzene	170	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.1 J
1,4-Dichlorobenzene	1.4	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	**55 J**	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.12 J
2-Butanone	4,200	1,300 U	5 UJ	5 U	2 J	5 U	2,500 U	2,500 U	10 U	10 U	1,300 U	1,000 U	5 UJ	5 U	10 U	5 U	5 UJ	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	1,300 U	5 UJ	5 U	10 U	5 U	2,500 U	2,500 U	10 U	10 U	1,300 U	1,000 U	5 UJ	5 U	10 U	5 U	5 UJ	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	1,300 U	5 UJ	5 U	10 U	5 U	2,500 U	2,500 U	10 U	10 U	1,300 U	1,000 U	5 UJ	5 U	10 U	5 U	5 UJ	5 U
Acetone	700	1,600 U	5 UJ	2.8 U	10 U	5 U	2,100 U	1,200 U	5 J	6 J	1,300 U	1,000 U	5 UJ	6.6 U	2 J	6.3 U	5 UJ	5.4 U
Benzene	1	130 U	0.5 UJ	0.5 U	10 U	0.94 J	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Bromochloromethane	--	130 U	0.5 UJ	0.5 U	NA	0.5 U	250 U	250 U	NA	NA	130 U	100 U	0.5 UJ	0.5 U	NA	0.5 U	0.5 UJ	0.5 U
Bromodichloromethane	0.56	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Bromoform	4.43	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.52 U	10 U	0.5 U	0.5 UJ	0.5 U
Bromomethane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Carbon disulfide	700	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Carbon tetrachloride	0.269	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Chlorobenzene	50	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Chloroethane	2,800	130 U	0.5 UJ	0.5 U	10 U	0.5 UJ	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.5 U
Chloroform	70	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Chloromethane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 UJ	10 UJ	130 U	100 U	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.5 U
Cyclohexane	--	130 U	0.16 J	0.1 J	10 U	0.33 J	250 U	250 U	3 J	10 U	130 U	100 U	0.21 J	3.4	17	0.5 U	0.18 J	1.9
Dibromochloromethane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 UJ	10 UJ	130 U	100 U	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.5 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	130 U	0.5 UJ	0.5 U	10 U	0.26 J	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Isopropylbenzene	70	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 UJ	250 UJ	10 U	10 U	130 U	100 U	0.5 UJ	0.5 UJ	10 U	0.5 U	0.5 UJ	0.5 UJ
Methyl-tert-butyl ether (MTBE)	200	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Methylcyclohexane	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Methylene chloride	4.6	130 U	0.5 UJ	0.25 U	10 U	0.5 U	71 U	82 U	10 U	10 U	130 U	100 U	0.5 UJ	0.18 U	10 U	0.5 U	0.5 UJ	0.19 U
Styrene	--	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Tetrachloroethene	0.7	**110 J**	0.5 UJ	0.5 U	10 U	**230 J**	**390**	**400**	**270 J**	**230 J**	**36 J**	**36 J**	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.12 J
Toluene	1,000	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.56	10 U	0.5 U	0.5 UJ	0.12 U
Trichloroethene	2.8	**3,200**	0.44 J	0.51 U	10 U	**11,000**	**17,000**	**18,000**	**9,000**	**7,400**	**1,900**	**1,900**	0.34 J	0.27 J	10 U	0.48 J	0.5 UJ	0.5 U
Trichlorofluoromethane(Freon-11)	2,100	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Vinyl chloride	0.015	**26 J**	0.5 UJ	0.5 U	10 U	**10 J**	250 U	250 U	**10 J**	**9 J**	130 U	100 U	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.5 U
Xylene, total	530	380 U	0.5 UJ	0.5 U	10 U	0.64 J	250 U	250 U	10 U	10 U	380 U	300 U	0.5 UJ	0.5 U	10 U	1.5 U	0.5 UJ	0.5 U
cis-1,2-Dichloroethene	70	**760**	0.5 UJ	0.5 U	10 U	**700**	**1,100**	**1,100**	**1,200**	**800 J**	**910**	**920**	0.5 UJ	0.5 UJ	10 U	0.5 U	0.5 UJ	0.5 U
cis-1,3-Dichloropropene	0.19	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
m- and p-Xylene	--	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	10 U	NA	NA	NA
o-Xylene	--	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	10 U	NA	NA	NA
trans-1,2-Dichloroethene	100	**220**	0.5 UJ	0.5 U	10 U	**210 J**	**340**	**340**	**240 J**	**180 J**	100 J	91 J	0.5 UJ	0.5 UJ	10 U	0.5 U	0.5 UJ	0.5 U
trans-1,3-Dichloropropene	0.19	130 U	0.5 UJ	0.5 U	10 U	0.5 U	250 U	250 U	10 U	10 U	130 U	100 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.5 U
Total Metals (UG/L)																		
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																		
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**		IR06-GW01			IR06-GW01D							IR06-GW01DA				IR06-GW01DB	
Sample ID		IR06-DRW04D-08C	IR06-GW01-05C	IR06-GW01-06C	IR06-GW01-07C	IR06-GW01D-05C	IR06-GW01D-06C	IR06-GW01DD-06C	IR06-GW01D-07C	IR06-GW01DD-07C	IR06-GW01D-08C	IR06-GW01DD-08C	IR06-GW01DA-05C	IR06-GW01DA-06C	IR06-GW01DA-07C	IR06-GW01DA-08C	IR06-GW01DB-05C	IR06-GW01DB-06C
Sample Date		08/21/08	10/10/05	08/22/06	09/10/07	10/10/05	09/07/06	09/07/06	08/21/07	08/21/07	08/21/08	08/21/08	10/10/05	09/07/06	08/21/07	08/21/08	10/10/05	09/07/06
Wet Chemistry (MG/L)																		
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Val

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be needed to co

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)		IR06-GW27DA				IR06-GW27DW				IR06-GW28S						
Sample ID		IR06-GW01DB-07C	IR06-GW27DA-05C	IR06-GW27DA-06C	IR06-GW27DA-07C	IR06-GW27DA-08C	IR06-GW27DW-05C	IR06-GW27DW-06C	IR06-GW27DW-07C	IR06-GW27DW-08C	IR06-GW28-05C	IR06-GW28-06C	IR06-GW28-07C	IR06-GW28-08C	IR06-GW28DW-05C	IR06-GW28DW-05D	IR06-GW28DW-06A
Sample Date		08/21/07	10/10/05	09/07/06	08/21/07	08/21/08	10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	11/15/05	02/21/06
Chemical Name																	
Volatile Organic Compounds (UG/L)																	
1,1,1-Trichloroethane	200	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 UJ
1,1,2-Trichloroethane	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.21 J
1,1-Dichloroethane	70	10 U	0.5 UJ	0.5 U	9 J	0.5 U	7.9	22	10 U	12	0.5 UJ	0.5 U	10 U	0.5 U	0.4 J	31 U	1.2
1,1-Dichloroethene	7	10 U	0.5 UJ	0.5 U	**46**	0.5 U	**22**	**130**	10 U	**70**	0.5 UJ	0.5 U	10 U	0.5 U	3.5 J	31 U	6.6
1,2,3-Trichlorobenzene	--	NA	0.5 UJ	0.5 U	NA	0.5 U	2.5 U	0.5 U	NA	4.2 U	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	31 U	0.5 U
1,2,4-Trichlorobenzene	70	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,2-Dibromo-3-chloropropane	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,2-Dibromoethane	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,2-Dichlorobenzene	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,2-Dichloroethane	0.38	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,2-Dichloroethene (total)	--	10 U	NA	NA	51	NA	NA	NA	10 U	NA	NA	NA	8 J	NA	NA	NA	NA
1,2-Dichloropropane	0.51	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,3-Dichlorobenzene	170	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
1,4-Dichlorobenzene	1.4	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
2-Butanone	4,200	10 U	5 UJ	5 U	10 U	5 U	25 U	5 U	10 U	42 U	5 UJ	5 U	10 U	5 U	5 U	310 U	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	10 U	5 UJ	5 U	10 U	5 U	25 U	5 U	10 U	42 U	5 UJ	5 U	10 U	5 U	5 U	310 U	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	10 U	5 UJ	5 U	10 U	5 U	25 U	5 U	10 U	42 U	5 UJ	5 U	10 U	5 U	5 U	310 U	5 U
Acetone	700	10 UJ	5 UJ	6.2 U	10 U	6 U	27 U	5.4 U	10 U	42 U	5 UJ	2.3 U	10 UJ	8.9 U	5 U	310 U	5 U
Benzene	1	10 U	0.5 UJ	0.5 U	**2 J**	0.5 U	1 J	**2**	10 U	**1.4 J**	0.5 UJ	0.5 U	10 U	0.5 U	0.63 J	31 U	**1.2**
Bromochloromethane	--	NA	0.5 UJ	0.5 U	NA	0.5 U	2.5 U	0.5 U	NA	4.2 U	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	31 U	0.5 U
Bromodichloromethane	0.56	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Bromoform	4.43	10 U	0.5 UJ	0.79 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.13 J	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Bromomethane	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 U	31 U	0.5 U
Carbon disulfide	700	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.11 J	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Carbon tetrachloride	0.269	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Chlorobenzene	50	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.44 J	0.5 U	10 U	0.5 U	0.34 J	31 U	0.5 U
Chloroethane	2,800	10 UJ	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.79	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	31 U	0.5 UJ
Chloroform	70	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.18 J	0.33 J	10 U	0.5 U	0.5 U	31 U	0.5 U
Chloromethane	--	10 UJ	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 U	31 U	0.5 U
Cyclohexane	--	1 J	0.22 J	2.1	10 U	0.5 U	2.5 U	0.14 J	2 J	4.2 U	0.2 J	0.11 J	10 U	0.5 U	0.21 J	31 U	0.26 J
Dibromochloromethane	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	10 UJ	0.5 UJ	0.5 U	8 J	0.5 U	6.3	14	10 U	7.7	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 U	31 U	0.5 UJ
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Isopropylbenzene	70	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 UJ
Methyl-tert-butyl ether (MTBE)	200	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.13 J	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Methylcyclohexane	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Methylene chloride	4.6	10 U	0.5 UJ	0.15 U	10 U	0.5 U	2.5 U	0.31 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Styrene	--	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Tetrachloroethene	0.7	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	**6.1**	10 U	**5.1**	3.3 J	**17**	**7 J**	**3.2**	**29 J**	**77**	**120**
Toluene	1,000	10 U	0.5 UJ	0.22 U	10 U	0.5 U	2.5 U	0.11 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Trichloroethene	2.8	10 U	0.5 UJ	1.3	**9 J**	0.5 U	**27**	**49**	2 J	**22**	21 J	**5.6**	**44**	**3.9**	**380**	**470**	**810**
Trichlorofluoromethane(Freon-11)	2,100	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Vinyl chloride	0.015	10 UJ	0.5 UJ	0.5 U	**16**	0.5 U	**1 J**	**1.4**	10 U	4.2 U	0.5 UJ	0.5 U	10 UJ	0.5 U	**1.3 J**	31 U	**1.8**
Xylene, total	530	10 U	0.5 UJ	0.5 U	10 U	1.5 U	2.5 U	0.5 U	10 U	12 U	0.5 UJ	0.5 U	10 U	1.5 U	0.5 U	31 U	0.5 U
cis-1,2-Dichloroethene	70	10 U	0.5 UJ	0.5 UJ	41	0.5 U	22	19	10 U	18	7.7 J	0.76	8 J	0.83	**230**	**200**	**420**
cis-1,3-Dichloropropene	0.19	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
m- and p-Xylene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA
o-Xylene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA
trans-1,2-Dichloroethene	100	10 U	0.5 UJ	0.5 UJ	10	0.5 U	4.5	4.5	10 U	5.8	1.2 J	0.5 U	10 U	0.5 U	79	77	**180**
trans-1,3-Dichloropropene	0.19	10 U	0.5 UJ	0.5 U	10 U	0.5 U	2.5 U	0.5 U	10 U	4.2 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	31 U	0.5 U
Total Metals (UG/L)																	
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																	
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**		IR06-GW27DA				IR06-GW27DW				IR06-GW28S						
Sample ID		IR06-GW01DB-07C	IR06-GW27DA-05C	IR06-GW27DA-06C	IR06-GW27DA-07C	IR06-GW27DA-08C	IR06-GW27DW-05C	IR06-GW27DW-06C	IR06-GW27DW-07C	IR06-GW27DW-08C	IR06-GW28-05C	IR06-GW28-06C	IR06-GW28-07C	IR06-GW28-08C	IR06-GW28DW-05C	IR06-GW28DW-05D	IR06-GW28DW-06A
Sample Date		08/21/07	10/10/05	09/07/06	08/21/07	08/21/08	10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	11/15/05	02/21/06
Wet Chemistry (MG/L)																	
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Val

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be needed to co

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

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MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR06-GW28DW												
Sample ID		IR06-GW28DW-06B	IR06-GW28DWD-06B	IR06-GW28DW-06C	IR06-GW28DWD-06C	IR06-GW28DW-06D	IR06-GW28DW-07A	IR06-GW28DWD-07A	IR06-GW28DW-07B	IR06-GW28DW-07C	IR06-GW28DW-07D	IR06-GW28DW-08A	IR06-GW28DW-08B	IR06-GW28DW-08C
Sample Date		05/04/06	05/04/06	08/23/06	08/23/06	12/05/06	02/27/07	02/27/07	05/03/07	08/21/07	11/15/07	02/18/08	05/19/08	08/21/08
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	200	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,1,2,2-Tetrachloroethane	0.17	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,1,2-Trichloroethane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,1-Dichloroethane	70	63 UJ	63 UJ	130 U	130 U	1 J	1 J	1 J	2 J	2 J	13 U	130 U	130 U	180 U
1,1-Dichloroethene	7	**20 J**	**21 J**	130 U	130 U	**10**	7 J	7 J	**10 J**	**10 J**	**14**	130 U	130 U	180 U
1,2,3-Trichlorobenzene	--	63 U	63 U	130 U	130 U	NA	NA	NA	NA	NA	13 U	130 U	130 U	180 U
1,2,4-Trichlorobenzene	70	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,2-Dibromo-3-chloropropane	--	63 U	63 U	130 U	130 U	100 R	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,2-Dibromoethane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,2-Dichlorobenzene	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,2-Dichloroethane	0.38	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,2-Dichloroethene (total)	--	NA	NA	NA	NA	1,400	1,400	1,300	1,900	2,300	NA	NA	NA	NA
1,2-Dichloropropane	0.51	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,3-Dichlorobenzene	170	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
1,4-Dichlorobenzene	1.4	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
2-Butanone	4,200	630 U	630 U	1,300 U	1,300 U	1 J	10 U	10 U	10 U	10 U	130 U	1,300 U	1,300 U	1,800 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	630 U	630 U	1,300 U	1,300 U	10 U	10 U	10 U	10 U	10 U	130 U	1,300 U	1,300 U	1,800 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	630 U	630 U	1,300 U	1,300 U	10 U	10 U	10 U	10 U	10 U	130 U	1,300 U	1,300 U	1,800 U
Acetone	700	820 U	630 U	1,300 U	550 U	7 U	8 J	8 J	10 U	2 J	130 U	1,300 U	1,300 U	1,800 U
Benzene	1	63 U	63 U	130 U	130 U	**3 J**	**2 J**	**2 J**	**3 J**	**4 J**	**5.2 J**	130 U	130 U	180 U
Bromochloromethane	--	63 U	63 U	130 U	130 U	NA	NA	NA	NA	NA	13 U	130 U	130 U	180 U
Bromodichloromethane	0.56	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Bromoform	4.43	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Bromomethane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 UJ	10 U	13 U	130 U	130 UJ	180 U
Carbon disulfide	700	50 J	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Carbon tetrachloride	0.269	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Chlorobenzene	50	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Chloroethane	2,800	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Chloroform	70	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Chloromethane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Cyclohexane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Dibromochloromethane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Dichlorodifluoromethane (Freon-12)	1,400	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 UJ	180 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Isopropylbenzene	70	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	63 R	63 R	130 U	130 U	10 U	10 U	10 U	10 UJ	10 U	13 U	130 U	130 U	180 U
Methyl-tert-butyl ether (MTBE)	200	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Methylcyclohexane	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Methylene chloride	4.6	63 U	63 U	130 U	34 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Styrene	--	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Tetrachloroethene	0.7	**220**	**210**	**360**	**370**	**360**	**530**	**540**	**740**	**760**	**870**	**320**	**61 J**	**170 J**
Toluene	1,000	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Trichloroethene	2.8	**1,400**	**1,400**	**1,800**	**1,800**	**1,600**	**1,800**	**1,700**	**2,200**	**2,200**	**3,200**	**1,900**	**440**	**850**
Trichlorofluoromethane(Freon-11)	2,100	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Vinyl chloride	0.015	63 U	63 U	130 U	130 U	**4 J**	10 U	10 U	**6 J**	**8 J**	**9.2 J**	130 U	130 U	180 U
Xylene, total	530	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	38 U	380 U	380 U	540 U
cis-1,2-Dichloroethene	70	**780**	**780**	**1,000**	**1,000**	**1,000**	**1,000**	**960**	**1,400**	**1,800**	**2,100**	**2,600**	**4,900**	**4,300**
cis-1,3-Dichloropropene	0.19	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
m- and p-Xylene	--	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA
o-Xylene	--	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	NA	NA	NA	NA
trans-1,2-Dichloroethene	100	**400**	**400**	**400**	**400**	**380**	**350**	**320**	**510**	**500**	**610**	**580**	**590**	**590**
trans-1,3-Dichloropropene	0.19	63 U	63 U	130 U	130 U	10 U	10 U	10 U	10 U	10 U	13 U	130 U	130 U	180 U
Total Metals (UG/L)														
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)														
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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North Carolina

Station ID	**NC2L (December 2005)**	IR06-GW28DW												
Sample ID		IR06-GW28DW-06B	IR06-GW28DWD-06B	IR06-GW28DW-06C	IR06-GW28DWD-06C	IR06-GW28DW-06D	IR06-GW28DW-07A	IR06-GW28DWD-07A	IR06-GW28DW-07B	IR06-GW28DW-07C	IR06-GW28DW-07D	IR06-GW28DW-08A	IR06-GW28DW-08B	IR06-GW28DW-08C
Sample Date		05/04/06	05/04/06	08/23/06	08/23/06	12/05/06	02/27/07	02/27/07	05/03/07	08/21/07	11/15/07	02/18/08	05/19/08	08/21/08
Wet Chemistry (MG/L)														
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Val

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be needed to co

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR06-GW30				IR06-GW32				IR06-GW33							
Sample ID		IR06-GW30-05C	IR06-GW30-06C	IR06-GW30-07C	IR06-GW30-08C	IR06-GW32-05C	IR06-GW32-06C	IR06-GW32-07C	IR06-GW32-08C	IR06-GW33-05C	IR06-GW33-05D	IR06-GW33-06A	IR06-GW33-06B	IR06-GW33-06C	IR06-GW33-06D	IR06-GW33-07A	IR06-GW33-07B
Sample Date		10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	09/07/06	09/10/07	08/21/08	10/10/05	11/15/05	02/21/06	05/04/06	08/23/06	12/05/06	02/27/07	05/03/07
Chemical Name																	
Volatile Organic Compounds (UG/L)																	
1,1,1-Trichloroethane	200	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	0.17	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.2 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,1,2-Trichloroethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,1-Dichloroethane	70	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	10 U	10 U	10 U
1,1-Dichloroethene	7	0.5 UJ	0.5 U	10 U	0.5 U	0.16 J	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,2,3-Trichlorobenzene	--	0.5 UJ	0.5 U	NA	0.5 U	0.5 UJ	0.78 U	NA	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,2-Dibromo-3-chloropropane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 R	10 U	10 U
1,2-Dibromoethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,2-Dichlorobenzene	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,2-Dichloroethane	0.38	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	--	NA	NA	10 U	NA	NA	NA	200	NA	NA	NA	NA	NA	NA	10 U	10 U	2 J
1,2-Dichloropropane	0.51	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,3-Dichlorobenzene	170	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
1,4-Dichlorobenzene	1.4	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
2-Butanone	4,200	5 UJ	5 U	10 U	5 U	5 UJ	7.8 U	2 J	500 U	5 UJ	5 UJ	5 U	5 U	5 U	10 U	10 U	5 J
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5 UJ	5 U	10 U	5 U	5 UJ	7.8 U	10 U	500 U	5 UJ	5 UJ	5 U	5 U	5 U	10 U	10 U	10 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5 UJ	5 U	10 U	5 U	5 UJ	7.8 U	10 U	500 U	5 UJ	5 UJ	5 U	5 U	5 U	10 U	10 U	10 U
Acetone	700	5 UJ	5.6 UJ	10 U	8.8 U	5 UJ	6.2 U	10 U	500 U	5 UJ	5 UJ	5 U	7.4 U	8.2 U	10 U	6 J	15 U
Benzene	1	0.5 UJ	0.5 U	10 U	0.5 U	0.14 J	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Bromochloromethane	--	0.5 UJ	0.5 U	NA	0.5 U	0.5 UJ	0.78 U	NA	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	NA	NA
Bromodichloromethane	0.56	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Bromoform	4.43	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.69 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Bromomethane	--	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 UJ
Carbon disulfide	700	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.21 J	10 U	10 U	10 U
Carbon tetrachloride	0.269	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Chlorobenzene	50	0.5 UJ	0.5 U	10 U	0.5 U	0.18 J	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Chloroethane	2,800	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Chloroform	70	0.5 UJ	0.5 U	10 U	0.5 U	0.43 J	0.31 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Chloromethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Cyclohexane	--	0.19 J	0.18 J	2 J	0.5 U	0.18 J	0.78 U	10 U	50 U	0.14 J	0.14 J	0.5 U	0.5 U	0.1 J	1 J	10 U	10 U
Dibromochloromethane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Dichlorodifluoromethane (Freon-12)	1,400	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.1 J	0.5 UJ	0.5 U	0.5 U	10 U	10 U	10 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Isopropylbenzene	70	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	0.5 UJ	0.5 R	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 R	0.5 U	10 U	10 U	10 UJ
Methyl-tert-butyl ether (MTBE)	200	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Methylcyclohexane	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Methylene chloride	4.6	0.5 UJ	0.14 U	10 U	0.5 U	0.5 UJ	0.41 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Styrene	--	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Tetrachloroethene	0.7	0.5 UJ	0.5 U	10 U	0.5 U	**1.8 J**	0.29 J	**13**	**47 J**	0.28 J	0.43 J	0.14 J	0.21 J	0.24 J	10 U	10 U	10 U
Toluene	1,000	5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.23 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Trichloroethene	2.8	0.5 UJ	0.5 U	10 U	0.5 U	**89**	**6.9**	**200**	**1,000**	**9.6 J**	**8.4 J**	**5.3**	**6.8**	**5.3**	**3 J**	**3 J**	**7 J**
Trichlorofluoromethane(Freon-11)	2,100	0.5 UJ	0.5 U	10 UJ	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Vinyl chloride	0.015	0.5 UJ	0.5 U	10 U	0.5 U	0.57 J	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
Xylene, total	530	0.5 UJ	0.5 U	10 U	1.5 U	0.5 UJ	0.78 U	10 U	150 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	70	0.5 UJ	0.5 U	10 U	0.5 U	**96**	18	**170**	**1,100**	1.4 J	1.2 J	0.41 J	0.73 U	0.44 J	10 U	10 U	2 J
cis-1,3-Dichloropropene	0.19	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U
m- and p-Xylene	--	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U
o-Xylene	--	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U
trans-1,2-Dichloroethene	100	0.5 UJ	0.5 U	10 U	0.5 U	10 J	0.75 J	22	97	0.17 J	0.15 J	0.5 U	0.12 J	0.5 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	0.19	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	0.78 U	10 U	50 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	10 U

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR06-GW30				IR06-GW32				IR06-GW33							
Sample ID		IR06-GW30-05C	IR06-GW30-06C	IR06-GW30-07C	IR06-GW30-08C	IR06-GW32-05C	IR06-GW32-06C	IR06-GW32-07C	IR06-GW32-08C	IR06-GW33-05C	IR06-GW33-05D	IR06-GW33-06A	IR06-GW33-06B	IR06-GW33-06C	IR06-GW33-06D	IR06-GW33-07A	IR06-GW33-07B
Sample Date		10/10/05	08/23/06	08/21/07	08/21/08	10/10/05	09/07/06	09/10/07	08/21/08	10/10/05	11/15/05	02/21/06	05/04/06	08/23/06	12/05/06	02/27/07	05/03/07
Total Metals (UG/L)																	
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																	
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																	
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR06-GW33						IR06-GW35D				IR06-GW36D				IR06-
Sample ID		IR06-GW33-07C	IR06-GW33-07D	IR06-GW33-08A	IR06-GW33-08B	IR06-GW33-08C	IR06-GW33D-08C	IR06-GW35D-05C	IR06-GW35D-06C	IR06-GW35D-07C	IR06-GW35D-08C	IR06-GW36D-06C	IR06-GW36D-07C	IR06-GW36D-08C	IR06-GW37D-05C	IR06-GW37D-06C
Sample Date		08/21/07	11/15/07	02/18/08	05/19/08	08/21/08	08/21/08	10/10/05	09/07/06	08/22/07	08/22/08	09/07/06	08/21/07	08/21/08	10/10/05	08/23/06
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	200	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,1,2,2-Tetrachloroethane	0.17	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,1,2-Trichloroethane	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,1-Dichloroethane	70	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,1-Dichloroethene	7	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	4.4 J	5.5 J
1,2,3-Trichlorobenzene	--	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	NA	0.5 U	13 U	16 U
1,2,4-Trichlorobenzene	70	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,2-Dibromo-3-chloropropane	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,2-Dibromoethane	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,2-Dichlorobenzene	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,2-Dichloroethane	0.38	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,2-Dichloroethene (total)	--	2 J	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA
1,2-Dichloropropane	0.51	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,3-Dichlorobenzene	170	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
1,4-Dichlorobenzene	1.4	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
2-Butanone	4,200	10 U	5 U	5 U	5 U	3.4 J	3.6 J	5 UJ	5 U	10 U	5 UJ	5 U	10 U	5 U	130 U	160 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	10 U	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 U	10 U	5 U	5 U	10 U	5 U	130 U	160 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	10 U	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 U	10 U	5 U	5 U	10 U	5 U	130 U	160 U
Acetone	700	2 J	12 U	6 U	5 U	5.6 U	5.7 U	5 UJ	7.5 U	3 J	6.1 UJ	9.4 U	5 J	8.9 U	160 U	160 UJ
Benzene	1	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	**13**	**13 J**
Bromochloromethane	--	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	NA	0.5 U	0.5 U	NA	0.5 U	13 U	16 U
Bromodichloromethane	0.56	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Bromoform	4.43	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.68 U	10 U	0.5 U	13 U	16 U
Bromomethane	--	10 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 UJ	0.5 U	10 UJ	0.5 U	13 U	16 UJ
Carbon disulfide	700	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Carbon tetrachloride	0.269	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Chlorobenzene	50	10 U	0.5 U	0.5 U	0.5 U	0.49 J	0.51	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Chloroethane	2,800	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Chloroform	70	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Chloromethane	--	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Cyclohexane	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.16 J	1.7	2 J	0.5 U	2.1	4 J	0.5 U	13 U	16 U
Dibromochloromethane	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Dichlorodifluoromethane (Freon-12)	1,400	10 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Isopropylbenzene	70	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 UJ
Methyl-tert-butyl ether (MTBE)	200	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Methylcyclohexane	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Methylene chloride	4.6	10 U	0.5 U	0.5 U	0.5 U	0.63 U	0.53 U	0.5 UJ	0.17 U	10 U	0.5 U	0.17 U	10 U	0.5 U	13 U	4.4 U
Styrene	--	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Tetrachloroethene	0.7	10 U	0.23 J	0.19 J	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
Toluene	1,000	10 U	0.5 U	0.5 U	0.5 U	0.77 U	0.74 U	0.5 UJ	0.17 U	10 U	0.5 U	0.15 U	10 U	0.5 U	13 U	16 U
Trichloroethene	2.8	**7 J**	**18**	**15**	**3.2**	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	**110**	**150**
Trichlorofluoromethane(Freon-11)	2,100	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 UJ	0.5 U	10 UJ	0.5 U	13 U	16 U
Vinyl chloride	0.015	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	**38**	**11 J**
Xylene, total	530	10 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	0.5 UJ	0.5 U	10 U	1.5 U	0.5 U	10 U	1.5 U	13 U	16 U
cis-1,2-Dichloroethene	70	2 J	2.5	2.2	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	10 U	0.5 U	**660**	**490**
cis-1,3-Dichloropropene	0.19	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U
m- and p-Xylene	--	10 U	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA
o-Xylene	--	10 U	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA
trans-1,2-Dichloroethene	100	10 U	0.4 J	0.2 J	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 UJ	10 U	0.5 U	8.9 J	7.7 J
trans-1,3-Dichloropropene	0.19	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	10 U	0.5 U	0.5 U	10 U	0.5 U	13 U	16 U

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	IR06-GW33						IR06-GW35D				IR06-GW36D				IR06-(
Sample ID		IR06-GW33-07C	IR06-GW33-07D	IR06-GW33-08A	IR06-GW33-08B	IR06-GW33-08C	IR06-GW33D-08C	IR06-GW35D-05C	IR06-GW35D-06C	IR06-GW35D-07C	IR06-GW35D-08C	IR06-GW36D-06C	IR06-GW36D-07C	IR06-GW36D-08C	IR06-GW37D-05C	IR06-GW37D-06C
Sample Date		08/21/07	11/15/07	02/18/08	05/19/08	08/21/08	08/21/08	10/10/05	09/07/06	08/22/07	08/22/08	09/07/06	08/21/07	08/21/08	10/10/05	08/23/06
Total Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks

D - Compound identified in an analysis at a secondary dilution factor

E - Concentration exceeds calibration range of GC/MS instrument (Organic)

J - Analyte present, value may or may not be accurate or precise

N - Tentative Identification, consider present, special methods may be neede

NA - Not analyzed

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	GW37D		IR06-GW40DW				IR06-GW41					IR06-GW42			
Sample ID		IR06-GW37D-07C	IR06-GW37D-08C	IR06-GW40DW-05C	IR06-GW40DW-06C	IR06-GW40DW-07C	IR06-GW40DW-08C	IR06-GW41-05C	IR06-GW41-06C	IR06-GW41D-06C	IR06-GW41-07C	IR06-GW41-08C	IR06-GW42-05C	IR06-GW42-06C	IR06-GW42-07C	IR06-GW42-08C
Sample Date		08/22/07	08/22/08	10/10/05	09/07/06	08/21/07	08/21/08	10/10/05	08/23/06	08/23/06	08/21/07	08/21/08	10/10/05	08/23/06	08/21/07	08/21/08
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	200	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	**0.19 J**	0.5 U	0.5 U	10 U	**0.2 J**	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloroethane	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethane	70	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethene	7	3 J	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2,3-Trichlorobenzene	--	NA	25 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U
1,2,4-Trichlorobenzene	70	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dibromoethane	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichlorobenzene	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethane	0.38	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	510	NA	NA	NA	10 U	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
1,2-Dichloropropane	0.51	**2 J**	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,3-Dichlorobenzene	170	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
1,4-Dichlorobenzene	1.4	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
2-Butanone	4,200	10 U	250 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	10 U	250 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	10 U	5 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	10 U	250 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	10 U	5 UJ	5 U	5 U	10 U	5 U
Acetone	700	3 J	250 U	5 R	4.5 U	2 J	9.6 U	13 R	5 U	2.1 U	10 U	5 U	5 R	2.9 UJ	10 U	5 U
Benzene	1	**15**	**19 J**	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Bromochloromethane	--	NA	25 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U
Bromodichloromethane	0.56	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Bromoform	4.43	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Bromomethane	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 UJ	0.5 U
Carbon disulfide	700	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Carbon tetrachloride	0.269	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Chlorobenzene	50	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Chloroethane	2,800	10 U	25 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Chloroform	70	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	1.2	0.47 J	0.49 J	10 U	1.6 U	0.5	0.84	10 U	0.5 U
Chloromethane	--	10 U	25 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Cyclohexane	--	1 J	25 U	0.12 J	1.4	4 J	0.5 U	0.13 J	0.5 U	0.5 U	10 U	0.5 U	0.13 J	0.5 U	1 J	0.5 U
Dibromochloromethane	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1,400	10 U	25 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Isopropylbenzene	70	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 R	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	200	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Methylcyclohexane	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Methylene chloride	4.6	10 U	25 U	0.5 U	0.12 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.51 U
Styrene	--	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Tetrachloroethene	0.7	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.11 J	0.5 U	0.16 J	10 U	0.14 J
Toluene	1,000	10 U	25 U	0.5 U	0.23 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Trichloroethene	2.8	**280**	**360**	0.5 U	0.16 J	10 U	0.5 U	0.16 J	0.5 U	0.5 U	10 U	0.5 U	0.12 J	0.16 U	10 U	0.19 J
Trichlorofluoromethane(Freon-11)	2,100	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	10 U	0.5 U	0.5 U	0.5 U	10 UJ	0.5 U
Vinyl chloride	0.015	**16**	25 U	0.5 U	0.5 U	10 UJ	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
Xylene, total	530	10 U	75 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	0.5 U	0.5 U	10 U	1.5 U	0.5 U	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	70	**500**	**490**	0.5 U	0.5 U	10 U	0.5 U	0.16 J	0.5 U	0.5 U	10 U	0.5 U	0.46 J	0.73	10 U	1.4
cis-1,3-Dichloropropene	0.19	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.1 J	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U
m- and p-Xylene	--	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
o-Xylene	--	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	10 U	NA	NA	NA	10 U	NA
trans-1,2-Dichloroethene	100	12	6.9 J	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.15 J	0.39 J	10 U	0.52
trans-1,3-Dichloropropene	0.19	10 U	25 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	0.5 U	10 U	0.5 U

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Station ID	**NC2L (December 2005)**	GW37D		IR06-GW40DW				IR06-GW41					IR06-GW42			
Sample ID		IR06-GW37D-07C	IR06-GW37D-08C	IR06-GW40DW-05C	IR06-GW40DW-06C	IR06-GW40DW-07C	IR06-GW40DW-08C	IR06-GW41-05C	IR06-GW41-06C	IR06-GW41D-06C	IR06-GW41-07C	IR06-GW41-08C	IR06-GW42-05C	IR06-GW42-06C	IR06-GW42-07C	IR06-GW42-08C
Sample Date		08/22/07	08/22/08	10/10/05	09/07/06	08/21/07	08/21/08	10/10/05	08/23/06	08/23/06	08/21/07	08/21/08	10/10/05	08/23/06	08/21/07	08/21/08
Total Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic)
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be neede
NA - Not analyzed
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
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Station ID	NC2L (December 2005)	IR06-SRW01				IR06-SRW02					IR06-SRW03					IR06-S
Sample ID		IR06-SRW01-05C	IR06-SRW01-06C	IR06-SRW01-07C	IR06-SRW01-08C	IR06-SRW02-05C	IR06-SRW02-05C-DUP	IR06-SRW02-06C	IR06-SRW02-07C	IR06-SRW02-08C	IR06-SRW03-05C	IR06-SRW03-06C	IR06-SRW03-07C	IR06-SRW03-08C	IR06-SRW04-05C	IR06-SRW04-06C
Sample Date		09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	08/22/06
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	200	500 U	0.28 J	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,1,2,2-Tetrachloroethane	0.17	**19,000**	**18,000**	**17,000**	**15,000**	**34**	**36**	**1,200**	**700**	**870**	5.3 J	**8.3 J**	**50 J**	**20**	16 U	16 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	**4.7 J**	31 U	10 UJ	16 U	16 U	16 U
1,1,2-Trichloroethane	--	130 J	91 J	130	99 J	13 U	13 U	130 U	4 J	63 U	16 U	31 U	3 J	3.6 J	16 U	16 U
1,1-Dichloroethane	70	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,1-Dichloroethene	7	500 U	2.1	100 U	2.3	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	1 J	16 U	16 U	16 U
1,2,3-Trichlorobenzene	--	500 U	0.5 U	NA	0.5 U	13 U	13 U	130 U	NA	63 U	16 U	31 U	NA	16 U	16 U	16 U
1,2,4-Trichlorobenzene	70	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,2-Dibromo-3-chloropropane	--	500 U	0.5 U	100 U	0.5 UJ	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,2-Dibromoethane	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,2-Dichlorobenzene	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,2-Dichloroethane	0.38	500 U	0.5 U	100 U	0.27 J	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,2-Dichloroethene (total)	--	NA	NA	1,100	NA	NA	NA	NA	310 J	NA	NA	NA	680	NA	NA	NA
1,2-Dichloropropane	0.51	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,3-Dichlorobenzene	170	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
1,4-Dichlorobenzene	1.4	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	**3.4 J**	31 U	10 UJ	16 U	16 U	16 U
2-Butanone	4,200	5,000 U	5 U	100 U	5 U	130 U	130 U	1,300 U	10 UJ	630 U	160 U	310 U	10 UJ	160 U	160 U	160 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	5,000 U	5 U	100 U	5 U	130 U	130 U	1,300 U	10 UJ	630 U	160 U	310 U	10 UJ	160 U	160 U	160 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	5,000 U	5 U	100 U	5 U	130 U	130 U	1,300 U	10 UJ	630 U	160 U	310 U	10 UJ	160 U	160 U	160 U
Acetone	700	5,000 R	2.3 U	100 U	5 U	130 R	130 R	540 U	10 UJ	630 U	160 R	190 U	10 UJ	160 U	160 R	160 U
Benzene	1	500 U	0.2 J	100 U	0.27 J	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Bromochloromethane	--	500 U	0.5 U	NA	0.5 U	13 U	13 U	130 U	NA	63 U	16 U	31 U	NA	16 U	16 U	16 U
Bromodichloromethane	0.56	500 U	0.41 J	100 U	0.18 J	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Bromoform	4.43	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	3.4 J
Bromomethane	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Carbon disulfide	700	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Carbon tetrachloride	0.269	500 U	0.21 J	100 U	0.26 J	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Chlorobenzene	50	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Chloroethane	2,800	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Chloroform	70	500 U	12	15 J	19 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Chloromethane	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Cyclohexane	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Dibromochloromethane	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Dichlorodifluoromethane (Freon-12)	1,400	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	10 U	31 U	10 UJ	16 U	16 U	16 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Isopropylbenzene	70	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	500 U	0.5 UJ	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Methyl-tert-butyl ether (MTBE)	200	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Methylcyclohexane	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Methylene chloride	4.6	500 U	0.23 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	3.2 U
Styrene	--	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Tetrachloroethene	0.7	**1,700**	**1,100**	**780**	**1,600**	**90**	**87**	**55 J**	**33 J**	**54 J**	**39**	**43**	**38 J**	**51**	16 U	**11 J**
Toluene	1,000	500 U	0.17 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
Trichloroethene	2.8	**1,200**	**1,000**	**1,300**	**1,300**	**330**	**320**	**270**	**140 J**	**480**	**350**	**510**	**340**	**360**	**330**	**450**
Trichlorofluoromethane(Freon-11)	2,100	500 U	0.5 U	100 UJ	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 UJ
Vinyl chloride	0.015	500 U	**0.38 J**	100 U	**0.48 J**	**13**	**13**	130 U	**4 J**	**13 J**	**16**	31 U	**11 J**	**9.2 J**	**13 J**	16 U
Xylene, total	530	500 U	1.1	100 U	1.5 U	13 U	13 U	130 U	10 UJ	190 U	16 U	31 U	10 UJ	47 U	16 U	16 U
cis-1,2-Dichloroethene	70	**890**	**740**	**800**	**790 J**	**470**	**470**	**360**	**250**	**630**	**520**	**750**	**540**	**540**	**280**	**390**
cis-1,3-Dichloropropene	0.19	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U
m- and p-Xylene	--	NA	NA	100 U	NA	NA	NA	NA	10 UJ	NA	NA	NA	10 UJ	NA	NA	NA
o-Xylene	--	NA	NA	100 U	NA	NA	NA	NA	10 UJ	NA	NA	NA	10 UJ	NA	NA	NA
trans-1,2-Dichloroethene	100	**380 J**	**320**	**330**	**400 J**	99	100	**110 J**	65 J	**180**	**110**	**160**	**140 J**	**120**	42	51
trans-1,3-Dichloropropene	0.19	500 U	0.5 U	100 U	0.5 U	13 U	13 U	130 U	10 UJ	63 U	16 U	31 U	10 UJ	16 U	16 U	16 U

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Station ID	**NC2L (December 2005)**	IR06-SRW01				IR06-SRW02					IR06-SRW03					IR06-S
Sample ID		IR06-SRW01-05C	IR06-SRW01-06C	IR06-SRW01-07C	IR06-SRW01-08C	IR06-SRW02-05C	IR06-SRW02-05C-DUP	IR06-SRW02-06C	IR06-SRW02-07C	IR06-SRW02-08C	IR06-SRW03-05C	IR06-SRW03-06C	IR06-SRW03-07C	IR06-SRW03-08C	IR06-SRW04-05C	IR06-SRW04-06C
Sample Date		09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	08/22/06	08/21/07	08/21/08	09/27/05	08/22/06
Total Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic)
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be neede
NA - Not analyzed
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

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Station ID	**NC2L (December 2005)**	RW04		IR06-SRW06				
Sample ID		IR06-SRW04-07C	IR06-SRW04-08C	IR06-SRW06-05C	IR06-SRW06-DUP-05C	IR06-SRW06-06C	IR06-SRW06-07C	IR06-SRW06-08C
Sample Date		08/21/07	08/21/08	09/27/05	09/27/05	08/22/06	08/21/07	08/21/08
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	200	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,1,2,2-Tetrachloroethane	0.17	**15**	16 U	**340**	**290**	**46**	**260**	**460**
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,1,2-Trichloroethane	--	10 U	16 U	8.3 J	8 J	13 U	9 J	130 U
1,1-Dichloroethane	70	10 U	16 U	0.51 J	0.45 J	13 U	10 U	130 U
1,1-Dichloroethene	7	2 J	16 U	1.8 J	1.8 J	2.7 J	2 J	130 U
1,2,3-Trichlorobenzene	--	NA	16 U	0.5 U	0.5 U	13 U	NA	130 U
1,2,4-Trichlorobenzene	70	10 U	16 U	0.5 U	0.5 U	13 U	10 UJ	130 U
1,2-Dibromo-3-chloropropane	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,2-Dibromoethane	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,2-Dichlorobenzene	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,2-Dichloroethane	0.38	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,2-Dichloroethene (total)	--	530	NA	NA	NA	NA	710	NA
1,2-Dichloropropane	0.51	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,3-Dichlorobenzene	170	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
1,4-Dichlorobenzene	1.4	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
2-Butanone	4,200	10 U	160 U	5 U	5 U	130 U	10 U	1,300 U
2-Chloroethyl vinyl ether	--	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	280	10 U	160 U	5 U	5 U	130 U	10 U	1,300 U
2-Propanol	--	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	--	10 U	160 U	5 U	5 U	130 U	10 U	1,300 U
Acetone	700	10 U	160 U	3 J	2.3 J	81 U	10 U	1,300 U
Benzene	1	10 U	16 U	0.96 J	0.93 J	13 U	10 U	130 U
Bromochloromethane	--	NA	16 U	0.5 U	0.5 U	13 U	NA	130 U
Bromodichloromethane	0.56	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Bromoform	4.43	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Bromomethane	--	10 UJ	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Carbon disulfide	700	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Carbon tetrachloride	0.269	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Chlorobenzene	50	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Chloroethane	2,800	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Chloroform	70	10 U	16 U	0.5 U	0.13 J	13 U	10 U	130 U
Chloromethane	--	10 U	16 U	0.5 U	0.5 U	13 U	10 UJ	130 U
Cyclohexane	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Dibromochloromethane	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Dichlorodifluoromethane (Freon-12)	1,400	10 U	16 U	0.5 U	0.5 U	13 U	10 UJ	130 U
Ethane	--	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	550	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Isopropylbenzene	70	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Methane	--	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Methyl-tert-butyl ether (MTBE)	200	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Methylcyclohexane	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Methylene chloride	4.6	10 U	16 U	0.51 U	0.52 U	2.9 U	10 U	130 U
Styrene	--	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Tetrachloroethene	0.7	**14**	**7.4 J**	**260**	**250**	**49**	**310**	**620**
Toluene	1,000	10 U	16 U	0.12 J	0.12 J	13 U	10 U	130 U
Trichloroethene	2.8	**540**	**470**	**830**	**790**	**320**	**1,300**	**2,300**
Trichlorofluoromethane(Freon-11)	2,100	10 UJ	16 U	0.5 U	0.5 U	13 U	10 U	130 U
Vinyl chloride	0.015	**23**	**12 J**	**7.3 J**	**6.3 J**	13 U	**12**	130 U
Xylene, total	530	10 U	47 U	0.22 J	0.5 J	13 U	10 U	380 U
cis-1,2-Dichloroethene	70	**460**	**380**	**440**	**420**	**260**	**540**	**1,000**
cis-1,3-Dichloropropene	0.19	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U
m- and p-Xylene	--	10 U	NA	NA	NA	NA	10 U	NA
o-Xylene	--	10 U	NA	NA	NA	NA	10 U	NA
trans-1,2-Dichloroethene	100	93	47	**140**	**140**	37	**200**	**260**
trans-1,3-Dichloropropene	0.19	10 U	16 U	0.5 U	0.5 U	13 U	10 U	130 U

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	**NC2L (December 2005)**	RW04		IR06-SRW06				
Sample ID		IR06-SRW04-07C	IR06-SRW04-08C	IR06-SRW06-05C	IR06-SRW06-DUP-05C	IR06-SRW06-06C	IR06-SRW06-07C	IR06-SRW06-08C
Sample Date		08/21/07	08/21/08	09/27/05	09/27/05	08/22/06	08/21/07	08/21/08
Total Metals (UG/L)								
Iron	300	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)								
Iron	300	NA	NA	NA	NA	NA	NA	NA
Manganese	50	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)								
Alkalinity	--	NA	NA	NA	NA	NA	NA	NA
Bromide	--	NA	NA	NA	NA	NA	NA	NA
Chloride	250	NA	NA	NA	NA	NA	NA	NA
Ethane	--	NA	NA	NA	NA	NA	NA	NA
Ethene	--	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA
Ferrous iron	--	NA	NA	NA	NA	NA	NA	NA
Methane	--	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NA	NA	NA	NA	NA	NA	NA
Sulfide	--	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC)	--	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
E - Concentration exceeds calibration range of GC/MS instrument (Organic)
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be neede
NA - Not analyzed
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2L Criteria

Shading indicates detection

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	RSLs Residential Soil Adjusted	RSLs Industrial Soil Adjusted	IR06-SD01								IR06-SD01					
Sample ID			IR06-SD01-01A-01/10/2001	IR06-SD01-01B-04/06/2001	IR06-SD01-01C-07/10/2001	IR06-SD01-02A-01/15/2002	IR06-SD01-02C-07/30/2002	IR06-SD01-03A-01/21/2003	IR06-SD01-03A	IR06-SD01-03C-07/23/2003	IR06-SD01-03C	IR06-SD01-04A-01/22/2004	IR06-SD01-04A	IR06-SD01-05C	IR06-SD01-06A	IR06-SD01-06C
Sample Date			01/10/01	04/06/01	07/10/01	01/15/02	07/30/02	01/21/03	01/21/03	07/23/03	07/23/03	01/22/04	01/22/04	09/27/05	02/21/06	08/23/06
Chemical Name																
Volatile Organic Compounds (UG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
1,1,2,2-Tetrachloroethane	590	2,900	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 UJ	14 U	19 U	14 U	23 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
1,1,2-Trichloroethane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
1,1-Dichloroethane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
1,1-Dichloroethene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
1,2,4-Trichlorobenzene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
1,2-Dibromo-3-chloropropane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
1,2-Dibromoethane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
1,2-Dichlorobenzene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
1,2-Dichloroethane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
1,2-Dichloroethene (total)	70,000	920,000	8 U	8 U	7 U	8 J	14 U	16 U	16 U	18 UJ	17 U	28 U	28 U	NA	NA	NA
1,2-Dichloropropane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
1,3-Dichlorobenzene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
1,4-Dichlorobenzene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
2-Butanone	2,800,000	19,000,000	17 U	16 U	15 UJ	21 UJ	36 U	33 U	33 U	36 UJ	33 U	70 U	70 U	19 U	14 U	23 U
2-Hexanone	--	--	17 U	16 U	15 U	21 UJ	36 U	33 U	33 U	36 UJ	33 U	70 U	70 U	19 U	14 U	23 U
4-Methyl-2-pentanone	530,000	3,200,000	17 U	16 U	15 U	21 UJ	36 U	33 U	33 U	36 UJ	33 U	70 U	70 U	19 U	14 U	23 U
Acetone	6,100,000	61,000,000	17 U	18	10 J	16 J	36 U	33 U	33 U	69 UJ	68 B	86 J	86	37 U	14 U	23 U
Benzene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Bromodichloromethane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Bromoform	--	--	8 U	8 U	7 UJ	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 UJ	14 U	19 U	14 U	23 U
Bromomethane	--	--	8 U	8 U	7 U	10 R	14 U	16 U	16 U	18 UJ	17 U	28 U	28 U	19 U	14 U	23 U
Carbon disulfide	67,000	260,000	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	3 J	14 U	14 U	19 U	14 U	23 U
Carbon tetrachloride	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Chlorobenzene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Chloroethane	--	--	8 U	8 U	7 UJ	10 UJ	14 U	16 U	16 U	18 UJ	17 U	28 U	28 U	19 U	14 U	23 U
Chloroform	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Chloromethane	--	--	8 U	8 U	7 U	10 UJ	14 U	16 U	16 U	18 UJ	17 U	28 U	28 U	19 U	14 U	23 U
cis-1,2-Dichloroethene	78,000	1,000,000	8 U	8 U	7 U	8 J	7 U	8 U	8 U	4 J	8 U	4 J	4 J	19 U	14 U	23 U
cis-1,3-Dichloropropene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Cyclohexane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
Dibromochloromethane	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Dichlorodifluoromethane (Freon-12)	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
Ethylbenzene	5,700	29,000	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Isopropylbenzene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
m- and p-Xylene	--	--	NA	NA	NA	NA	NA	16 U	16 U	18 UJ	17 U	28 UJ	28 U	NA	NA	NA
Methyl acetate	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
Methylcyclohexane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
Methylene chloride	11,000	54,000	8 U	5 JB	9 U	13 UJ	7 U	8 U	8 U	9 UJ	8 U	18	18	19 U	14 U	23 U
Methyl-tert-butyl ether (MTBE)	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
o-Xylene	300,000	300,000	NA	NA	NA	NA	NA	8 U	8 U	9 UJ	8 U	14 UJ	14 U	NA	NA	NA
Styrene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 UJ	14 U	19 U	14 U	23 U
Tetrachloroethene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Toluene	500,000	930,000	8 U	10	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
trans-1,2-Dichloroethene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
trans-1,3-Dichloropropene	--	--	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	14 U	14 U	19 U	14 U	23 U
Trichloroethene	2,800	14,000	8 U	8 U	7 U	10 UJ	7 U	8 U	8 U	9 UJ	8 U	2 J	2 J	19 U	14 U	23 U
Trichlorofluoromethane(Freon-11)	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	14 U	23 U
Vinyl chloride	60	1,700	17 U	16 U	15 U	21 UJ	14 U	16 U	16 U	18 UJ	17 U	5 J	5 J	19 U	14 U	23 U
Xylene, total	60,000	260,000	8 U	8 U	7 U	5 J	21 U	24 U	24 U	27 UJ	25 U	42 UJ	42 U	19 U	14 U	23 U
Wet Chemistry (MG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Solids	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total solid residue (%)	--	--	NA	NA	NA	NA	NA	NA	NA	53	NA	31	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
JB
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection
Bold text indicates exceedance of Industrial criteria
Bold box indicates exceedance of Residential criteria

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	RSLs Residential Soil Adjusted	RSLs Industrial Soil Adjusted	IR06-SD01				IR06-SD02									
Sample ID			IR06-SD01-07A	IR06-SD01-07C	IR06-SD01-08A	IR06-SD01-08C	IR06-SD02-01A-01/10/2001	IR06-SD02-01B-04/10/2001	IR06-SD02-01C-07/10/2001	IR06-SD02-02A-01/15/2002	IR06-SD02-02C-07/30/2002	IR06-SD02-03A	IR06-SD02-03A-01/21/2003	IR06-SD02-03C	IR06-SD02-03C-07/23/2003	IR06-SD02-04A
Sample Date			02/27/07	08/22/07	02/19/08	08/20/08	01/10/01	04/10/01	07/10/01	01/15/02	07/30/02	01/21/03	01/21/03	07/23/03	07/23/03	01/22/04
Chemical Name																
Volatile Organic Compounds (UG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
1,1,2,2-Tetrachloroethane	590	2,900	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 UJ	7 U	7 U	9 U	9 UJ	16 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
1,1-Dichloroethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
1,1-Dichloroethene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
1,2,4-Trichlorobenzene	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
1,2-Dichloroethene (total)	70,000	920,000	69 U	17 U	NA	NA	14 U	18 U	31 UJ	8 U	22 U	14 U	14 U	18 U	18 UJ	32 U
1,2-Dichloropropane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
1,3-Dichlorobenzene	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	2,800,000	19,000,000	69 U	7 J	13 U	23 U	29 U	36 U	62 UJ	17 U	54 U	28 U	28 U	36 U	35 UJ	79 U
2-Hexanone	--	--	69 U	17 U	13 U	23 U	29 U	36 U	62 UJ	17 U	54 U	28 U	28 U	36 U	35 UJ	79 U
4-Methyl-2-pentanone	530,000	3,200,000	69 U	24	13 U	23 U	29 U	36 U	62 UJ	17 U	54 U	28 U	28 U	36 U	35 UJ	79 U
Acetone	6,100,000	61,000,000	110	42 UJ	13 U	16 J	29 U	57	62 UJ	17 R	54 U	28 U	28 U	62 B	72 UJ	87
Benzene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Bromodichloromethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Bromoform	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Bromomethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	22 U	14 U	14 U	18 U	18 UJ	32 U
Carbon disulfide	67,000	260,000	13 J	7 J	13 U	23 U	14 U	18 U	31 UJ	8 U	4 J	9	9	9 U	5 J	8 J
Carbon tetrachloride	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Chlorobenzene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Chloroethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	22 U	14 U	14 U	18 U	18 UJ	32 U
Chloroform	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Chloromethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	22 U	14 U	14 U	18 U	18 UJ	32 U
cis-1,2-Dichloroethene	78,000	1,000,000	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
cis-1,3-Dichloropropene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Cyclohexane	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Dichlorodifluoromethane (Freon-12)	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5,700	29,000	69 U	9 J	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Isopropylbenzene	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m- and p-Xylene	--	--	69 U	24	NA	NA	NA	NA	NA	NA	NA	14 U	14 U	18 U	18 UJ	32 U
Methyl acetate	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	11,000	54,000	69 U	17 U	13 U	23 U	14 U	10 JB	37 UJ	9 UJ	10 J	7 U	7 U	9 U	9 UJ	60
Methyl-tert-butyl ether (MTBE)	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	300,000	300,000	69 U	5 J	NA	NA	NA	NA	NA	NA	NA	7 U	7 U	9 U	9 UJ	16 U
Styrene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Tetrachloroethene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Toluene	500,000	930,000	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	3 J
trans-1,2-Dichloroethene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
trans-1,3-Dichloropropene	--	--	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	11 U	7 U	7 U	9 U	9 UJ	16 U
Trichloroethene	2,800	14,000	69 U	17 U	13 U	23 U	14 U	18 U	31 UJ	8 U	7 J	7 U	7 U	9 U	9 UJ	16 U
Trichlorofluoromethane(Freon-11)	--	--	69 U	17 U	13 U	23 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	60	1,700	69 U	17 U	13 U	23 U	29 U	36 U	62 UJ	17 U	22 U	14 U	14 U	18 U	18 UJ	32 U
Xylene, total	60,000	260,000	69 U	29	13 U	23 U	14 U	18 U	31 UJ	8 U	32 U	21 U	21 U	27 U	26 UJ	48 U
Wet Chemistry (MG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Solids	--	--	14	58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total solid residue (%)	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	45	NA

Notes:

B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
JB
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection
Bold text indicates exceedance of Industrial criteria
Bold box indicates exceedance of Residential criteria

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	RSLs Residential Soil Adjusted	RSLs Industrial Soil Adjusted	IR06-SD02						IR06-SD02				IR06-SD03					
Sample ID			IR06-SD02-04A-01/22/2004	IR06-SD02-05C	IR06-SD02D-06A	IR06-SD02-06A	IR06-SD02-06C	IR06-SD02-07A	IR06-SD02-07C	IR06-SD02-08A	IR06-SD02-08C	IR06-SD02D-08C	IR06-SD03-01A-01/10/2001	IR06-SD03-01B-04/06/2001	IR06-SD03-01C-07/10/2001	IR06-SD03-02A-01/15/2002	IR06-SD03-02C-07/30/2002	IR06-SD03-03
Sample Date			01/22/04	09/27/05	02/21/06	02/21/06	08/23/06	02/27/07	08/22/07	02/19/08	08/20/08	08/20/08	01/10/01	04/06/01	07/10/01	01/15/02	07/30/02	01/21/03
Chemical Name																		
Volatile Organic Compounds (UG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
1,1,2,2-Tetrachloroethane	590	2,900	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	8	7 U	7 U	8 UJ	7
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
1,1-Dichloroethane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
1,1-Dichloroethene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
1,2,4-Trichlorobenzene	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
1,2-Dichloroethene (total)	70,000	920,000	32 U	NA	NA	NA	NA	18 U	14 U	NA	NA	NA	7 U	7 U	7 U	7 U	15 U	15
1,2-Dichloropropane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
1,3-Dichlorobenzene	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
2-Butanone	2,800,000	19,000,000	79 U	15 U	13 U	13 U	34 U	18 U	5 J	23 U	12 U	13 U	15 U	14 U	15 UJ	15 U	38 U	30
2-Hexanone	--	--	79 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	15 U	14 U	15 U	15 U	38 U	30
4-Methyl-2-pentanone	530,000	3,200,000	79 U	15 U	13 U	13 U	34 U	18 U	20	23 U	12 U	13 U	15 U	14 U	15 U	15 U	38 U	30
Acetone	6,100,000	61,000,000	87 J	22 U	13 U	13 U	34 U	18 U	26 UJ	23 U	9 J	13	14 J	14 U	15 UJ	10 J	38 U	30
Benzene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Bromodichloromethane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Bromoform	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 UJ	7 U	8 U	7
Bromomethane	--	--	32 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	15 U	15
Carbon disulfide	67,000	260,000	8 J	15 U	13 U	13 U	34 U	18 U	4 J	23 U	12 U	13 U	7 U	7 U	7 U	7 U	3 J	3
Carbon tetrachloride	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Chlorobenzene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Chloroethane	--	--	32 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 UJ	7 U	15 U	15
Chloroform	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Chloromethane	--	--	32 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	15 U	15
cis-1,2-Dichloroethene	78,000	1,000,000	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
cis-1,3-Dichloropropene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Cyclohexane	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
Dibromochloromethane	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Dichlorodifluoromethane (Freon-12)	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	5,700	29,000	16 U	15 U	13 U	13 U	34 U	18 U	6 J	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Isopropylbenzene	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
m- and p-Xylene	--	--	32 U	NA	NA	NA	NA	18 U	16	NA	NA	NA	NA	NA	NA	NA	NA	15
Methyl acetate	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
Methylcyclohexane	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
Methylene chloride	11,000	54,000	60	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	5 J	5 JB	8 U	8 UJ	27	7
Methyl-tert-butyl ether (MTBE)	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
o-Xylene	300,000	300,000	16 U	NA	NA	NA	NA	18 U	3 J	NA	NA	NA	NA	NA	NA	NA	NA	7
Styrene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Tetrachloroethene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Toluene	500,000	930,000	3 J	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
trans-1,2-Dichloroethene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
trans-1,3-Dichloropropene	--	--	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	8 U	7
Trichloroethene	2,800	14,000	16 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	7 U	7 U	7 U	7 U	5 J	7
Trichlorofluoromethane(Freon-11)	--	--	NA	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	NA	NA	NA	NA	NA	NA
Vinyl chloride	60	1,700	32 U	15 U	13 U	13 U	34 U	18 U	14 U	23 U	12 U	13 U	15 U	14 U	15 U	15 U	15 U	15
Xylene, total	60,000	260,000	48 U	15 U	13 U	13 U	34 U	18 U	19	23 U	12 U	13 U	7 U	7 U	7 U	7 U	22 U	22
Wet Chemistry (MG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Solids	--	--	NA	NA	NA	NA	NA	53	72	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total solid residue (%)	--	--	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	RSLs Residential Soil Adjusted	RSLs Industrial Soil Adjusted	IR06-SD03										IR06-SD03		
Sample ID			IR06-SD03-03A-01/21/2003	IR06-SD03-03C	IR06-SD03-03C-07/23/2003	IR06-SD03-04A	IR06-SD03-04A-01/22/2004	IR06-SD03-05C	IR06-SD03-06A	IR06-SD03D-06A	IR06-SD03-06C	IR06-SD03-07A	IR06-SD03-07C	IR06-SD03-08A	IR06-SD03-08C
Sample Date			01/21/03	07/23/03	07/23/03	01/22/04	01/22/04	09/27/05	02/21/06	02/21/06	08/23/06	02/27/07	08/22/07	02/19/08	08/20/08
Chemical Name															
Volatile Organic Compounds (UG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,1,2,2-Tetrachloroethane	590	2,900 U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,1,2-Trichloroethane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,1-Dichloroethane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,1-Dichloroethene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,2,4-Trichlorobenzene	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,2-Dibromo-3-chloropropane	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,2-Dibromoethane	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,2-Dichlorobenzene	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,2-Dichloroethane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,2-Dichloroethene (total)	70,000	920,000 U	15 U	13 U	13 U	54 U	54 U	NA	NA	NA	NA	18 U	16 U	NA	NA
1,2-Dichloropropane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,3-Dichlorobenzene	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
1,4-Dichlorobenzene	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
2-Butanone	2,800,000	19,000,000 U	30 U	25 U	25 U	140 U	140 U	18 U	22 U	20 U	31 U	18 U	7 J	18 U	16 J
2-Hexanone	--	-- U	30 U	25 U	25 U	140 U	140 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
4-Methyl-2-pentanone	530,000	3,200,000 U	30 U	25 U	25 U	140 U	140 U	18 U	22 U	20 U	31 U	18 U	48	18 U	23 U
Acetone	6,100,000	61,000,000 U	30 U	36 B	36 U	460	460 J	31 U	22 U	20 UJ	31 U	18 U	41 UJ	14 J	86
Benzene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Bromodichloromethane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Bromoform	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Bromomethane	--	-- U	15 U	13 U	13 U	54 U	54 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Carbon disulfide	67,000	260,000 J	3 J	6 U	6 U	22 J	22 J	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Carbon tetrachloride	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Chlorobenzene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Chloroethane	--	-- U	15 U	13 U	13 U	54 U	54 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Chloroform	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Chloromethane	--	-- U	15 U	13 U	13 U	54 U	54 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
cis-1,2-Dichloroethene	78,000	1,000,000 U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
cis-1,3-Dichloropropene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Cyclohexane	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Dibromochloromethane	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Dichlorodifluoromethane (Freon-12)	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Ethylbenzene	5,700	29,000 U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	13 J	18 U	23 U
Isopropylbenzene	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
m- and p-Xylene	--	-- U	15 U	13 U	13 U	54 U	54 U	NA	NA	NA	NA	18 U	43	NA	NA
Methyl acetate	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Methylcyclohexane	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Methylene chloride	11,000	54,000 U	7 U	6 U	6 U	440	440	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Methyl-tert-butyl ether (MTBE)	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
o-Xylene	300,000	300,000 U	7 U	6 U	6 U	27 U	27 U	NA	NA	NA	NA	18 U	8 J	NA	NA
Styrene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Tetrachloroethene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Toluene	500,000	930,000 U	7 U	6 U	6 U	27	27	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
trans-1,2-Dichloroethene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
trans-1,3-Dichloropropene	--	-- U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Trichloroethene	2,800	14,000 U	7 U	6 U	6 U	27 U	27 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Trichlorofluoromethane(Freon-11)	--	--	NA	NA	NA	NA	NA	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Vinyl chloride	60	1,700 U	15 U	13 U	13 U	54 U	54 U	18 U	22 U	20 U	31 U	18 U	16 U	18 U	23 U
Xylene, total	60,000	260,000 U	22 U	19 U	19 U	81 U	81 U	18 U	22 U	20 U	31 U	18 U	50	18 U	23 U
Wet Chemistry (MG/KG)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Solids	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	56	60	NA	NA
Total solid residue (%)	--	--	NA	NA	72	NA	18	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2B-SW-Water Supply & Human Health	IR06-SW01								IR06-SW01				
Sample ID		IR06-SW01-00A-01/16/2000	IR06-SW01-01A-01/10/2001	IR06-SW01-01B-04/06/2001	IR06-SW01-01C-07/10/2001	IR06-SW01-02A-01/15/2002	IR06-SW01-02C-07/30/2002	IR06-SW01-03A-01/21/2003	IR06-SW01-03A	IR06-SW01-03C-07/23/2003	IR06-SW01-03C	IR06-SW01-04A-01/22/2004	IR06-SW01-04A	IR06-SW01-05C
Sample Date		01/16/00	01/10/01	04/06/01	07/10/01	01/15/02	07/30/02	01/21/03	01/21/03	07/23/03	07/23/03	01/22/04	01/22/04	09/27/05
Chemical Name														
Volatile Organic Compounds (UG/L)														
1,1,1-Trichloroethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
1,1,2,2-Tetrachloroethane	4	5 U	5 U	5 U	5 U	**12**	1 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.44 J
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,1,2-Trichloroethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
1,1-Dichloroethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
1,1-Dichloroethene	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
1,2,3-Trichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,2,4-Trichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,2-Dibromo-3-chloropropane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,2-Dibromoethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,2-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,2-Dichloroethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
1,2-Dichloroethene (total)	--	22	8	4 J	5 U	2 J	2 J	1 J	1 J	6 J	6	7 J	7 J	NA
1,2-Dichloropropane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
1,3-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
1,4-Dichlorobenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
2-Butanone	--	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ
2-Hexanone	--	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ
4-Methyl-2-pentanone	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ
Acetone	--	10 U	10 U	10 U	10 UJ	10 UJ	10 R	10 U	10 U	10 UJ	10 U	5 J	5 J	2.3 J
Benzene	51	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	0.1 J	0.1 J	0.5 UJ
Bromochloromethane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
Bromodichloromethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Bromoform	--	5 U	5 U	5 U	5 U	5 U	1 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Bromomethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Carbon disulfide	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Carbon tetrachloride	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Chlorobenzene	488	6	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Chloroethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Chloroform	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Chloromethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
cis-1,2-Dichloroethene	--	17	8	4 J	5 U	2 J	2 J	1 J	1 J	4 J	4 J	6	6	0.47 J
cis-1,3-Dichloropropene	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Cyclohexane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
Dibromochloromethane	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Dichlorodifluoromethane (Freon-12)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
Ethylbenzene	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Isopropylbenzene	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
m- and p-Xylene	--	NA	NA	NA	NA	NA	NA	5 U	5 U	0.2 J	0.2 J	10 U	10 U	NA
Methyl acetate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
Methylcyclohexane	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
Methylene chloride	--	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 UJ	5 U	5 U	2 JB	0.5 UJ
Methyl-tert-butyl ether (MTBE)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
o-Xylene	--	NA	NA	NA	NA	NA	NA	5 U	5 U	5 UJ	5 U	5 U	5 U	NA
Styrene	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Tetrachloroethene	3.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Toluene	--	5 U	5 U	5 U	5 U	5 J	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
trans-1,2-Dichloroethene	--	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2 J	2 J	2 J	2 J	0.5 UJ
trans-1,3-Dichloropropene	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ
Trichloroethene	--	28	13	6	4 J	5 U	5 U	5 U	5 U	5 J	5 J	3 J	3 JB	0.67 J
Trichlorofluoromethane(Freon-11)	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ
Vinyl chloride	2.4	3	2 U	2 U	2 U	1 J	2 U	0.9 J	0.9 J	0.6 J	0.6 J	2 J	2 J	0.19 J
Xylene, total	--	5 U	5 U	5 U	5 U	6	5 U	5 U	5 U	5 UJ	5 U	15 U	15 U	0.5 UJ

Notes:

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection

Bold text indicates exceedance of NC2B-SW criteria

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	IR06-SW01						IR06-SW02								
Sample ID	IR06-SW01-06A	IR06-SW01-06C	IR06-SW01-07A	IR06-SW01-07C	IR06-SW01-08A	IR06-SW01-08C	IR06-SW02-00A-01/16/2000	IR06-SW02-01A-01/10/2001	IR06-SW02-01B-04/10/2001	IR06-SW02-01C-07/10/2001	IR06-SW02-02A-01/15/2002	IR06-SW02-02C-07/30/2002	IR06-SW02-03A-01/21/2003	IR06-SW02-03A	IR06-SW02-03C-07/23/20
Sample Date	02/21/06	08/23/06	02/27/07	08/22/07	02/19/08	08/20/08	01/16/00	01/10/01	04/10/01	07/10/01	01/15/02	07/30/02	01/21/03	01/21/03	07/23/03
Chemical Name															
Volatile Organic Compounds (UG/L)															
1,1,1-Trichloroethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
1,1,2,2-Tetrachloroethane	0.27 J	0.5 U	10 U	10 U	0.5 U	0.23 J	2 J	3 J	5 U	5 U	**22**	1 U	5 U	5 U	5
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
1,1-Dichloroethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
1,1-Dichloroethene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
1,2,3-Trichlorobenzene	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
1,2-Dichloroethene (total)	NA	NA	10 U	10 U	NA	NA	3 J	5 U	5 U	5 U	5 U	1 J	5 U	5 U	5
1,2-Dichloropropane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
1,3-Dichlorobenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	5 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10
2-Hexanone	5 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10
4-Methyl-2-pentanone	5 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10
Acetone	5 U	5.6 U	3 J	2 J	5 U	6.2 U	10 U	10 U	10 U	10 UJ	10 UJ	10 R	10 U	10 U	10
Benzene	0.5 U	0.5 U	10 U	10 U	0.23 J	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Bromochloromethane	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Bromoform	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	1 U	5 U	5 U	5
Bromomethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Carbon disulfide	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Carbon tetrachloride	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Chlorobenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Chloroethane	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Chloroform	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Chloromethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	2
cis-1,2-Dichloroethene	7.6	0.5 U	10 U	10 U	0.39 J	8.4	3 J	5 U	5 U	5 U	5 U	1 J	5 U	5 U	5
cis-1,3-Dichloropropene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Cyclohexane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Isopropylbenzene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
m- and p-Xylene	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	5 U	5 U	5
Methyl acetate	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5
Methyl-tert-butyl ether (MTBE)	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	5 U	5 U	5
Styrene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Tetrachloroethene	0.59	0.5 U	10 U	10 U	0.5 U	0.79	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Toluene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
trans-1,2-Dichloroethene	2.5	0.5 U	10 U	10 U	0.5 U	1.8	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
trans-1,3-Dichloropropene	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Trichloroethene	9.2	0.5 U	10 U	10 U	0.5 U	13	5 U	3 J	5 U	4 J	5 U	5 U	5 U	5 U	5
Trichlorofluoromethane(Freon-11)	0.5 U	0.5 UJ	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	1.8	0.5 U	10 U	10 U	0.5 U	0.63	**3**	2 J	2 U	2 UJ	2 U	2 U	2 U	2 U	0.4
Xylene, total	0.5 U	0.5 U	10 U	10 U	1.5 U	1.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5

Notes:

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Shading indicates detection

Bold text indicates exceedance of NC2B-SW criteria

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID		IR06-SW02							IR06-SW02									IR06-SW03
Sample ID	03	IR06-SW02-03C	IR06-SW02-04A-01/22/2004	IR06-SW02-04A	IR06-SW02-05C	IR06-SW02-06A	IR06-SW02D-06A	IR06-SW02-06C	IR06-SW02-07A	IR06-SW02-07C	IR06-SW02-08A	IR06-SW02-08C	IR06-SW02D-08C	IR06-SW03-00A-01/12/2000	IR06-SW03-01A-01/10/2001	IR06-SW03-01B-04/06/2001	IR06-SW03-01C-07/10/2001
Sample Date		07/23/03	01/22/04	01/22/04	09/27/05	02/21/06	02/21/06	08/23/06	02/27/07	08/22/07	02/19/08	08/20/08	08/20/08	01/12/00	01/10/01	04/06/01	07/10/01
Chemical Name																	
Volatile Organic Compounds (UG/L)																	
1,1,1-Trichloroethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	UJ	5 U	5 U	5 U	0.42 J	0.25 J	0.21 J	0.5 U	10 U	10 U	0.5 U	0.26 J	0.33 J	3 J	3 J	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)		NA	NA	NA	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,1,2-Trichloroethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2,4-Trichlorobenzene		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dibromoethane		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dichlorobenzene		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dichloroethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	UJ	5 U	1 J	1 J	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	2 J	5 U	5 U	5 U
1,2-Dichloropropane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,4-Dichlorobenzene		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
2-Butanone	UJ	10 U	10 U	10 U	5 U	5 U	5 U	5 U	10 U	10 U	5 U	5 U	5 U	10 U	10 U	10 U	10 U
2-Hexanone	UJ	10 U	10 U	10 U	5 U	5 U	5 U	5 U	10 U	10 U	5 U	5 U	5 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UJ	10 U	10 U	10 U	5 U	5 U	5 U	5 U	10 U	10 U	5 U	5 U	5 U	10 U	10 U	10 U	10 U
Acetone	UJ	10 U	2 J	2 J	2.2 J	5 U	5 U	3.1 U	10 U	2 J	5 U	5 U	5 U	10 U	10 U	10 U	10 UJ
Benzene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.15 J	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Bromochloromethane		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Bromodichloromethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Bromoform	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Bromomethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Carbon disulfide	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Chlorobenzene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Chloroethane	UJ	5 U	5 U	5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Chloroform	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Chloromethane	J	2 J	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	UJ	5 U	1 J	1 J	0.5	0.47 J	0.51	0.5 U	10 U	10 U	0.41 J	0.5 U	0.5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Cyclohexane		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Dibromochloromethane	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane (Freon-12)		NA	NA	NA	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Ethylbenzene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Isopropylbenzene		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
m- and p-Xylene	UJ	5 U	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Methyl acetate		NA	NA	NA	0.5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Methylcyclohexane		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Methylene chloride	UJ	5 U	5 U	1 JB	0.5 U	0.5 U	0.5 U	0.1 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Methyl-tert-butyl ether (MTBE)		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
o-Xylene	UJ	5 U	5 U	5 U	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Styrene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 UJ
Toluene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	UJ	5 U	5 U	5 U	0.13 J	0.5 U	0.12 J	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	UJ	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U
Trichloroethene	UJ	5 U	5 U	0.5 JB	0.85 U	0.46 J	0.56	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	3 J	4 J	5 U	5 UJ
Trichlorofluoromethane(Freon-11)		NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 UJ	10 U	10 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Vinyl chloride	J	0.4 J	0.5 J	0.5 J	0.23 J	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	2 U	2 U	2 U	2 U
Xylene, total	UJ	5 U	15 U	15 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	1.5 U	1.5 U	1.5 U	5 U	5 U	5 U	5 U

Notes:

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection
Bold text indicates exceedance of NC2B-SW criteria

Table A-8
Site 82 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID							IR06-SW03									
Sample ID	IR06-SW03-02A-01/15/2002	IR06-SW03-02C-07/30/2002	IR06-SW03-03A-01/21/2003	IR06-SW03-03A	IR06-SW03-03C-07/23/2003	IR06-SW03-03C	IR06-SW03-04A-01/22/2004	IR06-SW03-04A	IR06-SW03-05C	IR06-SW03-06A	IR06-SW03D-06A	IR06-SW03-06C	IR06-SW03-07A	IR06-SW03-07C	IR06-SW03-08A	IR06-SW03-08C
Sample Date	01/15/02	07/30/02	01/21/03	01/21/03	07/23/03	07/23/03	01/22/04	01/22/04	09/27/05	02/21/06	02/21/06	08/23/06	02/27/07	08/22/07	02/19/08	08/20/08
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	**39**	1 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.17 J	0.17 J	0.5 U	10 U	10 U	0.5 U	0.15 J
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	5 U	5 U	5 U	5 U	5 UJ	5 U	0.6 J	0.6 J	NA	NA	NA	NA	10 U	1 J	NA	NA
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
2-Butanone	10 UJ	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ	5 U	5 U	5 U	10 U	10 U	5 U	5 U
2-Hexanone	10 UJ	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ	5 U	5 U	5 U	10 U	10 U	5 U	5 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ	5 U	5 U	5 U	10 U	10 U	5 U	5 U
Acetone	10 UJ	10 R	10 U	10 U	10 UJ	10 U	10 U	10 U	5 UJ	5 U	5 U	3 U	10 U	1 J	5 U	5 U
Benzene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.14 J	0.5 U
Bromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Bromoform	5 U	1 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Bromomethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Carbon disulfide	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Carbon tetrachloride	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloroethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloroform	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloromethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	5 U	5 U	0.5 J	0.5 J	5 UJ	5 U	0.6 J	0.6 J	0.2 J	0.47 J	0.48 J	0.5 U	10 U	1 J	0.35 J	0.5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
m- and p-Xylene	NA	NA	5 U	5 U	5 UJ	5 U	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA	NA
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Methylene chloride	5 UJ	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
o-Xylene	NA	NA	5 U	5 U	5 UJ	5 U	5 U	5 U	NA	NA	NA	NA	10 U	10 U	NA	NA
Styrene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Toluene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.1 J	0.5 U	10 U	10 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	0.5 JB	0.5 UJ	0.4 J	0.38 J	0.5 U	10 U	10 U	0.5 U	0.5 U
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	0.5 UJ	10 U	10 U	0.5 U	0.5 U
Vinyl chloride	2 U	2 U	2 U	2 U	0.4 J	0.4 J	2 U	2 U	0.27 J	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Xylene, total	5 U	5 U	5 U	5 U	5 UJ	5 U	15 U	15 U	0.5 UJ	0.5 U	0.5 U	0.5 U	10 U	10 U	1.5 U	1.5 U

Notes:

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection

Bold text indicates exceedance of NC2B-SW criteria

Table A-9
Site 36 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2B-SW-Human Health & Water Supply	IR36-SW01								IR36-SW01								IR36-SW02				
Sample ID		IR36-SW01-01A-01232001	IR36-SW01-01B-04042001	IR36-SW01-01C-07172001	IR36-SW01-02A-01222002	IR36-SW01-02D-10152002	IR36-SW01-03B-04082003	IR36-SW01-03B	IR36-SW01-03D-10212003	IR36-SW01-03D	IR36-SW01-05C	IR36-SW01-06A	IR36-SW01-06C	IR36-SW01-07A	IR36-SW01-07C	IR36-SW01-08A	IR36-SW01-08C	IR36-SW02-01A-01232001	IR36-SW02-01B-04042001	IR36-SW02-01C-07172001	IR36-SW02-02A-01222002	IR36-SW02-02D-10152002
Sample Date		01/23/01	04/04/01	07/17/01	01/22/02	10/15/02	04/08/03	04/08/03	10/21/03	10/21/03	10/11/05	02/21/06	10/06/06	02/27/07	08/24/07	02/19/08	08/19/08	01/23/01	04/04/01	07/17/01	01/22/02	10/15/02
Chemical Name																						
Volatile Organic Compounds (UG/L)																						
1,1,1-Trichloroethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	4	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.25 J	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,2-Dibromoethane	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,2-Dichloroethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
2-Butanone	–	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	1 J	5 U	5 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	–	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	–	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U	10 U	10 U	10 U	10 U	10 U
Acetone	–	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	5.4 R	5 U	3.8 UJ	10 U	6 J	5 U	6.5 U	10 U	10 U	10 UJ	10 U	10 U
Benzene	51	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA
Bromodichloromethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.46 J	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	488	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.23 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 J	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.1 J	1.2	0.15 J	10 U	10 U	0.15 J	0.5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.11 J	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Cyclohexane	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.13 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
Dibromochloromethane	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	0.7 J	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Dichlorodifluoromethane (Freon-12)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 UJ	0.5 U	0.5 U	NA	NA	NA	NA	NA
Ethylbenzene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
m- and p-Xylene	–	NA	NA	NA	NA	2 U	5 U	5 U	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	2 U
Methyl acetate	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 R	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
Methylcyclohexane	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
Methylene chloride	–	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 UJ	5 U
Methyl-tert-butyl ether (MTBE)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
o-Xylene	–	NA	NA	NA	NA	1 U	5 U	5 U	5 U	5 U	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	1 U
Styrene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	3.3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Toluene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
trans-1,2-Dichloroethene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.3 J	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	30	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane(Freon-11)	–	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	NA	NA	NA
Vinyl chloride	2.4	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.1 J	0.1 J	0.14 J	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	2 U	2 U	2 U	2 U	2 U
Xylene, total	–	5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	1.5 U	1.5 U	5 U	5 U	5 U	5 U	5 U
Total Metals (UG/L)	–																					
Aluminum	–	NA	638	6,090	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,160	607	NA	NA
Antimony	–	NA	3.65 U	3.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.65 U	3.65 U	NA	NA
Arsenic	10	NA	3.5 B	5.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.8 B	4.6 J	NA	NA
Barium	1,000	NA	11.1 B	37.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18.6 B	18.3 J	NA	NA
Barium	–	NA	11.1 B	37.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18.6 B	18.3 J	NA	NA
Beryllium	–	NA	0.18 U	0.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.18 U	0.46 J	NA	NA
Cadmium	–	NA	0.24 B	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.25 B	0.24 U	NA	NA
Calcium	–	NA	52,900	81,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50,800	82,300	NA	NA
Chromium	–	NA	1.9 B	11.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.7 B	4.81 U	NA	NA
Cobalt	–	NA	0.92 U	1.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4 B	0.92 U	NA	NA
Copper	–	NA	0.84 U	7.6 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.5 B	2.4 J	NA	NA
Iron	–	NA	1,660	6,320	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,690	867	NA	NA
Lead	–	NA	2.2 B	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.4	2.1 U	NA	NA
Magnesium	–	NA	7,490	105,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15,100	106,000	NA	NA
Manganese	200	NA	39.2	65.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	46.7	37.2	NA	NA
Mercury	–	NA	0.03 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.03 U	0.03 U	NA	NA
Nickel	–	NA	1.2 B	5.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.1 B	2.2 U	NA	NA
Potassium	–	NA	4,420 B	39,300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,310	39,000	NA	NA
Selenium	–	NA	3.04 U	3.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.04 U	3.04 U	NA	NA
Silver	–	NA	1.03 U	1.03 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.03 U	1.03 U	NA	NA
Sodium	–	NA	73,400	929,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	136,000	941,000	NA	NA
Thallium	–	NA	4.74 U	4.74 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.74 U	4.74 U	NA	NA
Vanadium	–	NA	1.9 B	11.6 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.6 B	2.6 U	NA	NA
Zinc	–	NA	8 B	46.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23.6	7 U	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection
Bold text indicates exceedance of NC2B-SW criteria

Table A-9
Site 36 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	IR36-SW02			IR36-SW02								
Sample ID	IR36-SW02-03B-04082003	IR36-SW02-03B	IR36-SW02-03D-10212003	IR36-SW02-03D	IR36-SW02-05C	IR36-SW02-06A	IR36-SW02-06C	IR36-SW02-07A	IR36-SW02-07C	IR36-SW02-08A	IR36-SW02-08C
Sample Date	04/08/03	04/08/03	10/21/03	10/21/03	09/28/05	02/21/06	10/06/06	02/27/07	08/24/07	02/19/08	08/19/08
Chemical Name											
Volatile Organic Compounds (UG/L)											
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	**9**	**9**	5 U	5 U	0.16 J	**12**	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	0.5 UJ	0.36 J	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	0.5 UJ	0.23 J	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromoethane	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichlorobenzene	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	4 J	4 J	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA
1,2-Dichloropropane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,3-Dichlorobenzene	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,4-Dichlorobenzene	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
2-Butanone	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U
Acetone	10 U	10 U	10 U	10 U	3.3 J	5 U	3.8 UJ	10 U	4 J	5 U	5 U
Benzene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.21 J	0.5 U
Bromochloromethane	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.31 J	10 U	10 U	0.5 U	0.5 U
Bromoform	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Bromomethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Carbon disulfide	5 U	5 U	5 U	5 U	0.5 UJ	0.53 J	0.5 U	10 U	10 U	0.5 U	0.5 U
Carbon tetrachloride	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Chlorobenzene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloroethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloroform	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.24 U	10 U	10 U	0.5 U	0.5 U
Chloromethane	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	3 J	3 J	5 U	5 U	0.5 UJ	5.6	0.16 J	10 U	10 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Cyclohexane	NA	NA	NA	NA	0.5 UJ	0.5 U	0.12 U	10 U	10 U	0.5 U	0.5 U
Dibromochloromethane	0.3 J	0.3 J	0.5 J	0.5 J	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 UJ	0.5 U	0.5 U
Ethylbenzene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Isopropylbenzene	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
m- and p-Xylene	5 U	5 U	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA
Methyl acetate	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Methylcyclohexane	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Methylene chloride	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	0.11 J	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
o-Xylene	5 U	5 U	5 U	5 U	NA	NA	NA	10 U	10 U	NA	NA
Styrene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	0.5 UJ	0.13 J	0.5 U	10 U	10 U	0.5 U	0.5 U
Toluene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	2 J	2 J	5 U	5 U	0.5 UJ	3.1	0.5 U	10 U	10 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Trichloroethene	9	9	5 U	5 U	0.5 UJ	4.3	0.5 U	10 U	10 U	0.5 U	0.5 U
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Vinyl chloride	1 J	1 J	0.4 J	0.4 J	0.5 UJ	**2.7**	0.5 U	10 U	10 U	0.5 U	0.5 U
Xylene, total	5 U	5 U	15 U	15 U	0.5 UJ	0.25 J	0.5 U	10 U	10 U	1.5 U	1.5 U
Total Metals (UG/L)											
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Station ID	IR36-SW03											
Sample ID	IR36-SW03-01A-01232001	IR36-SW03-01B-04042001	IR36-SW03-01C-07172001	IR36-SW03-02A-01222002	IR36-SW03-02D-10152002	IR36-SW03-03B-04082003	IR36-SW03-03B	IR36-SW03-03D-10212003	IR36-SW03-03D	IR36-SW03-05C	IR36-SW03-06A	IR36-SW03-06C
Sample Date	01/23/01	04/04/01	07/17/01	01/22/02	10/15/02	04/08/03	04/08/03	10/21/03	10/21/03	09/28/05	02/21/06	10/06/06
Chemical Name												
Volatile Organic Compounds (UG/L)												
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U	10 U	NA	NA	NA
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	5 U	5 U	5 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	5 U	5 U	5 U
Acetone	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	3.1 J	5 U	4.8 UJ
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	0.5 U	0.5 U	0.5 U
Bromomethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Chloroethane	5 U	5 U	5 U	5 U	5 U	3 J	3 J	5 U	5 U	0.5 U	0.5 U	0.5 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.22 U
Chloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.11 J	0.29 J	0.18 J
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.13 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	0.3 J	0.3 J	0.5 J	0.5 J	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
m- and p-Xylene	NA	NA	NA	NA	2 U	5 U	5 U	10 U	10 U	NA	NA	NA
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 R	0.5 UJ	0.5 U
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
Methylene chloride	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	0.14 J	0.5 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
o-Xylene	NA	NA	NA	NA	1 U	5 U	5 U	5 U	5 U	NA	NA	NA
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.12 J	0.5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.13 J	0.5 U
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U
Vinyl chloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.12 J	0.5 U	0.5 U
Xylene, total	5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U	0.5 U	0.5 U	0.5 U
Total Metals (UG/L)												
Aluminum	NA	458	163 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	3.65 U	3.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	2.9 B	3.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	10.4 B	20.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	10.4 B	20.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	0.18 U	0.41 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	0.24 B	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	50,800	88,800	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	1 B	4.81 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	0.92 U	0.92 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	1.1 B	0.84 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	1,420	512	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	2.2 B	1.48 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	13,700	139,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	40.4	41.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	0.03 U	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	1.1 B	1.6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	6,530	50,400	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	3.04 U	3.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	1.03 U	1.03 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	129,000	1,190,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	4.74 U	4.74 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	1.9 B	2.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	7.2 B	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Station ID	IR36-SW03	IR36-SW03	
Sample ID	IR36-SW03-07A	IR36-SW03-07C	IR36-SW03-08A	IR36-SW03-08C
Sample Date	02/27/07	08/24/07	02/19/08	08/19/08
Chemical Name				
Volatile Organic Compounds (UG/L)				
1,1,1-Trichloroethane	10 U	10 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloroethane	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethene	10 U	10 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	0.5 U	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	10 U	10 U	0.5 U	0.5 U
1,2-Dibromoethane	10 U	10 U	0.5 U	0.5 U
1,2-Dichlorobenzene	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethane	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	10 U	10 U	NA	NA
1,2-Dichloropropane	10 U	10 U	0.5 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	0.5 U	0.5 U
1,4-Dichlorobenzene	10 U	10 U	0.5 U	0.5 U
2-Butanone	10 U	10 U	5 U	5 U
2-Hexanone	10 U	10 U	5 U	5 U
4-Methyl-2-pentanone	10 U	10 U	5 U	5 U
Acetone	3 J	6.2 U	5 U	5 U
Benzene	10 U	10 U	0.19 J	0.5 U
Bromochloromethane	NA	NA	0.5 U	0.5 U
Bromodichloromethane	10 U	10 U	0.5 U	0.5 U
Bromoform	10 U	10 U	0.5 U	0.5 U
Bromomethane	10 U	10 U	0.5 U	0.5 U
Carbon disulfide	10 U	10 U	0.5 U	0.11 J
Carbon tetrachloride	10 U	10 U	0.5 U	0.5 U
Chlorobenzene	10 U	10 U	0.5 U	0.5 U
Chloroethane	10 U	10 U	0.5 U	0.5 U
Chloroform	10 U	10 U	0.5 U	0.5 U
Chloromethane	10 U	10 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	10 U	10 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	10 U	10 U	0.5 U	0.5 U
Cyclohexane	10 U	10 U	0.5 U	0.5 U
Dibromochloromethane	10 U	10 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	10 U	10 UJ	0.5 U	0.5 U
Ethylbenzene	10 U	10 U	0.5 U	0.5 U
Isopropylbenzene	10 U	10 U	0.5 U	0.5 U
m- and p-Xylene	10 U	10 U	NA	NA
Methyl acetate	10 U	10 U	0.5 U	0.5 U
Methylcyclohexane	10 U	10 U	0.5 U	0.5 U
Methylene chloride	10 U	10 U	0.5 U	0.5 U
Methyl-tert-butyl ether (MTBE)	10 U	10 U	0.5 U	0.5 U
o-Xylene	10 U	10 U	NA	NA
Styrene	10 U	10 U	0.5 U	0.5 U
Tetrachloroethene	10 U	10 U	0.5 U	0.5 U
Toluene	10 U	10 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	10 U	10 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	10 U	10 U	0.5 U	0.5 U
Trichloroethene	10 U	10 U	0.5 U	0.5 U
Trichlorofluoromethane(Freon-11)	10 U	10 U	0.5 U	0.5 U
Vinyl chloride	10 U	10 U	0.5 U	0.5 U
Xylene, total	10 U	10 U	1.5 U	1.5 U
Total Metals (UG/L)				
Aluminum	NA	NA	NA	NA
Antimony	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA
Barium	NA	NA	NA	NA
Barium	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA
Calcium	NA	NA	NA	NA
Chromium	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Iron	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA
Manganese	NA	NA	NA	NA
Mercury	NA	NA	NA	NA
Nickel	NA	NA	NA	NA
Potassium	NA	NA	NA	NA
Selenium	NA	NA	NA	NA
Silver	NA	NA	NA	NA
Sodium	NA	NA	NA	NA
Thallium	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA
Zinc	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Shading indicates detection

Bold text indicates exceedance of NC2B-SW criteria

Table A-9
Site 36 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	IR36-SW04								IR36-SW04							
Sample ID	IR36-SW04-01A-01232001	IR36-SW04-01B-04042001	IR36-SW04-01C-07172001	IR36-SW04-02A-01222002	IR36-SW04-02D-10152002	IR36-SW04-03B-04082003	IR36-SW04-03B	IR36-SW04-03D-10212003	IR36-SW04-03D	IR36-SW04-05C	IR36-SW04-06A	IR36-SW04-06C	IR36-SW04-07A	IR36-SW04-07C	IR36-SW04-08A	IR36-SW04-08C
Sample Date	01/23/01	04/04/01	07/17/01	01/22/02	10/15/02	04/08/03	04/08/03	10/21/03	10/21/03	09/28/05	02/21/06	10/06/06	02/27/07	08/24/07	02/19/08	08/19/08
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	**10**	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.2 J	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	5 U	5 U	5 U	5	5 U	5 U	5 U	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U	5 UJ	5 U	5 U	10 U	10 U	5 U	5 U
Acetone	10 U	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U	3.5 J	5 U	3.3 UJ	10 U	3 J	5 U	5.9 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.14 J	0.5 U	10 U	10 U	0.18 J	0.5 U
Bromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	0.5 UJ	0.5 U	0.76	10 U	1 J	0.5 U	0.5 U
Bromomethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Carbon disulfide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.42 J	0.5 U	10 U	10 U	0.5 U	0.5 U
Carbon tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.12 J	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.25 U	10 U	10 U	0.5 U	0.5 U
Chloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	5 U	5 U	5 U	4 J	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.21 J	0.23 J	10 U	10 U	0.16 J	0.5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.12 U	10 U	10 U	0.12 J	0.5 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 UJ	0.5 U	0.5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
m- and p-Xylene	NA	NA	NA	NA	2 U	5 U	5 U	10 U	10 U	NA	NA	NA	10 U	10 U	NA	NA
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Methylene chloride	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
o-Xylene	NA	NA	NA	NA	1 U	5 U	5 U	5 U	5 U	NA	NA	NA	10 U	10 U	NA	NA
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.11 J	0.5 U
trans-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 UJ	0.22 J	0.5 U	10 U	10 U	0.5 U	0.5 U
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Vinyl chloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U
Xylene, total	5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	15 U	0.5 UJ	0.5 U	0.5 U	10 U	10 U	1.5 U	1.5 U
Total Metals (UG/L)																
Aluminum	NA	1,060	230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	3.65 U	3.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	2.9 B	4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	14.1 B	23.6 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	14.1 B	23.6 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	0.18 U	0.42 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	0.24 B	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	37,100	116,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	2.5 B	4.81 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	0.92 U	0.92 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	2.2 B	1.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	1,640	314	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	3.8	1.48 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	31,700	316,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	50.2	48.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	0.03 U	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	1.4 B	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	12,700	110,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	3.04 U	3.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	1.03 U	1.03 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	262,000	2,520,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	4.74 U	4.74 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	2.8 B	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	13.8 B	14.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Shading indicates detection

Bold text indicates exceedance of NC2B-SW criteria

Table A-10
Site 3 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	IR03-MW02										IR03-MW02IW					
Sample ID	IR03-MW02-02/12/1994	IR03-MW02-07/13/1995	IR03-MW02-09/28/1995	IR03-MW02-05C	IR03-MW02D-06C	IR03-MW02-06C	IR03-GW02-07C	IR03-GW02D-07C	IR03-MW02-08C	IR03-MW02D-08C	IR03-MW02IW-06/12/1995	IR03-MW02IW-09/29/1995	IR03-MW02IW-05C	IR03-MW02IW-06C	IR03-GW02IW-07C	IR03-MW02IW-08C
Sample Date	02/12/94	07/13/95	09/28/95	09/27/05	08/22/06	08/22/06	08/24/07	08/24/07	08/22/08	08/22/08	06/12/95	09/29/95	09/27/05	08/22/06	08/24/07	08/22/08
Chemical Name																
Volatile Organic Compounds (UG/L)																
1,1-Dichloroethene	NA	10 U	10 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	1 J	10 U	0.5 UJ	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	3 J	NA
Acetone	NA	10 U	10 UJ	3.8 J	3.6 U	5.8 U	10 U	10 U	5 U	5 U	10 U	10 U	5 R	5 U	10 U	5 U
Benzene	NA	10 U	3 J	0.19 J	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.28 J	0.4 J	10 U	0.48 J
Chloroform	NA	1 J	10 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Chloromethane	NA	10 U	10 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.26 J	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Cyclohexane	NA	NA	NA	0.5 U	0.11 J	0.11 J	10 U	10 U	0.5 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
Ethylbenzene	NA	10 U	10	0.26 J	0.19 J	0.21 J	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Isopropylbenzene	NA	NA	NA	0.5 U	0.1 J	0.11 J	10 U	10 U	0.5 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	0.36 J	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
Naphthalene	64	11 U	1,500	NA	NA	NA	NA	NA	NA	NA	10 U	4 J	NA	NA	NA	NA
Toluene	NA	10 U	11	0.18 J	0.14 U	0.16 U	10 U	10 U	0.5 U	0.5 U	2 J	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Trichloroethene	NA	10 U	10 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	1 J	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Vinyl chloride	NA	10 U	10 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	10 U	0.5 UJ	0.26 J	10 U	0.21 J
Xylene, total	NA	10 U	20	0.56 J	0.14 J	0.37 J	10 U	10 U	1.5 U	1.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	NA	NA	NA	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	2 J	2.2	3 J	2.3
trans-1,2-Dichloroethene	NA	NA	NA	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	NA	NA	0.17 J	0.3 J	10 U	0.16 J
Semivolatile Organic Compounds (UG/L)																
1,1-Biphenyl	NA	NA	NA	4.7 J	5.9 J	5.1	12 U	12 U	5.4 U	5.6 U	NA	NA	5.1 U	5 UJ	12 U	5.6 U
2,4-Dimethylphenol	2 J	11 U	64 J	5 U	5 U	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
2-Methylnaphthalene	65	11 U	94	23 J	29 J	24	8 J	9 J	5.4 U	5.6 U	10 U	1 J	5.1 U	5 U	12 U	5.6 U
2-Methylphenol	1 J	11 U	160 J	5 U	5 U	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
4-Methylphenol	3 J	11 U	200 J	5 U	5 U	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Acenaphthene	280	11 U	45 J	130 J	200	250	120	130	24	36	34	28	5.1 U	5 U	12 U	5.6 U
Acenaphthylene	NA	NA	NA	5 U	3 J	2.7 J	12 U	12 U	5.4 U	5.6 U	NA	NA	5.1 U	5 U	12 U	5.6 U
Anthracene	33	11 U	5 NJ	6.3 J	7.1 J	6.9	12 U	12 U	10	2 J	3 J	11 NJ	5.1 U	5 U	12 U	5.6 U
Benzo(a)anthracene	8 J	11 U	11 U	5 U	5 U	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Benzo(a)pyrene	3 J	11 U	11 U	5 U	5 UJ	5 UJ	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Benzo(b)fluoranthene	3 J	11 U	11 U	5 U	5 UJ	5 UJ	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Benzo(k)fluoranthene	3 J	11 U	11 U	5 U	5 UJ	5 UJ	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Carbazole	39 J	11 U	82	NA	NA	NA	12 U	12 U	NA	NA	3 J	4 J	NA	NA	12 U	NA
Chrysene	8 J	11 U	11 U	5 U	5 U	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Di-n-butylphthalate	1 J	11 U	11 U	5 U	5 UJ	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 UJ	12 U	5.6 U
Dibenzofuran	230	11 U	120 J	58 J	100	120	58	62	11	16	17	29	5.1 U	5 U	12 U	5.6 U
Fluoranthene	NA	NA	NA	21 J	30	29	20	21	23	6.6	NA	NA	5.1 J	1.9 J	12 U	1.7 J
Fluorene	210	11 U	80	71 J	87	110	66	70	19	17	23	35	5.1 U	5 U	12 U	5.6 U
Naphthalene	NA	NA	NA	130 J	140	130	33	38	5.4 U	2.6 J	NA	NA	5.1 U	5 U	12 U	5.6 U
Phenanthrene	410	11 U	97 J	110 J	150	180	84	93	8.9	19	10 U	120	2.9 J	5 U	12 U	5.6 U
Phenol	3 J	11 U	68	5 U	5 U	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5 U	12 U	5.6 U
Pyrene	58	11 U	8 J	13 J	15	15	11 J	13	22	4.1 J	11	16	3.2 J	5 U	12 U	5.6 U
bis(2-Ethylhexyl)phthalate	10 U	2 J	11 U	5 U	5 UJ	5 U	12 U	12 U	5.4 U	5.6 U	10 U	10 U	5.1 U	5.7 J	12 U	5.6 U

Notes:

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
R - Unreliable Result
U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection

Table A-10
Site 3 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	IR03-MW06							IR03-MW11					
Sample ID	IR03-MW06-12/01/1994	IR03-MW06-07/12/1995	IR03-MW06-09/29/1995	IR03-MW06-05C	IR03-MW06-06C	IR03-GW06-07C	IR03-MW06-08C	IR03-MW11-07/12/1995	IR03-MW11-09/29/1995	IR03-MW11-05C	IR03-MW11-06C	IR03-GW11-07C	IR03-MW11-08C
Sample Date	12/01/94	07/12/95	09/29/95	09/27/05	08/22/06	08/24/07	08/22/08	07/12/95	09/29/95	09/27/05	08/22/06	08/24/07	08/22/08
Chemical Name													
Volatile Organic Compounds (UG/L)													
1,1-Dichloroethene	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA	10 U	NA
Acetone	NA	10 U	10 U	5 R	3.3 U	10 U	5 U	10 U	10 U	5 R	5 U	10 U	5 U
Benzene	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Chloroform	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Chloromethane	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	0.43 J	10 U	10 U	0.5 UJ	0.5 U	10 U	0.25 J
Cyclohexane	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
Ethylbenzene	NA	10 U	1 J	0.18 J	0.5 U	10 U	0.16 J	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Isopropylbenzene	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U
Naphthalene	6 J	110	360	NA	NA	NA	NA	11 U	12 U	NA	NA	NA	NA
Toluene	NA	10 U	8 J	0.5 UJ	0.5 U	10 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Trichloroethene	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Vinyl chloride	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	0.5 U
Xylene, total	NA	10 U	10 U	0.5 UJ	0.5 U	10 U	1.5 U	10 U	10 U	0.5 UJ	0.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 UJ
trans-1,2-Dichloroethene	NA	NA	NA	0.5 UJ	0.5 U	10 U	0.5 U	NA	NA	0.5 UJ	0.5 U	10 U	0.5 UJ
Semivolatile Organic Compounds (UG/L)													
1,1-Biphenyl	NA	NA	NA	2.2 J	5 UJ	12 U	5.4 U	NA	NA	5.2 U	5 U	11 U	5 UJ
2,4-Dimethylphenol	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
2-Methylnaphthalene	10 U	10	23	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
2-Methylphenol	10 UJ	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
4-Methylphenol	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
Acenaphthene	2 J	24	55	11	1.5 J	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Acenaphthylene	NA	NA	NA	5 U	5 U	12 U	5.4 U	NA	NA	5.2 U	5 U	11 U	5 UJ
Anthracene	10 U	1 J	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Benzo(a)anthracene	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
Benzo(a)pyrene	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Benzo(b)fluoranthene	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Benzo(k)fluoranthene	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Carbazole	10 U	10	11 J	NA	NA	12 U	NA	11 U	12 U	NA	NA	11 U	NA
Chrysene	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
Di-n-butylphthalate	10 U	10 U	12 U	5 U	5 UJ	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Dibenzofuran	2 J	25	24	6.8	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
Fluoranthene	NA	NA	NA	5 U	5 U	12 U	5.4 U	NA	NA	5.2 U	5 U	11 U	5 U
Fluorene	1 J	28	20	5.9	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
Naphthalene	NA	NA	NA	1.8 J	5 U	12 U	5.4 U	NA	NA	5.2 U	5 U	11 U	5 UJ
Phenanthrene	10 U	21	23	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 UJ
Phenol	10 U	10 U	12 U	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
Pyrene	10 U	10 U	2 J	5 U	5 U	12 U	5.4 U	11 U	12 U	5.2 U	5 U	11 U	5 U
bis(2-Ethylhexyl)phthalate	10 U	2 J	1 J	5 U	5 UJ	6 J	5.4 U	4 J	12 U	5.2 U	5 U	11 U	5 UJ

Notes:

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
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U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
Shading indicates detection

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR93-MW02			IR93-MW02DW				IR93-MW02IW				IR93-MW03	IR93-MW03IW	IR93-MW03IWR	IR93-MW03R		
Sample ID		IR93-MW02-06021997	IR93-MW02-08B	IR93-MW02-08C	IR93-MW02DW-05291997	IR93-MW02DW-04B	IR93-MW02DW-08B	IR93-MW02DW-08C	IR93-MW02IW-06021997	IR93-MW02IW-04B	IR93-MW02IW-08B	IR93-MW02IW-08C	IR93-MW03-05201997	IR93-MW03IW-05201997	IR93-MW03IWR-08C	IR93-MW03R-08C	IR93-MW04-05301997	IR93-MW04-08B
Sample Date		06/02/97	05/20/08	08/20/08	05/29/97	04/14/04	05/20/08	08/20/08	06/02/97	04/14/04	05/20/08	08/20/08	05/20/97	05/20/97	08/20/08	08/20/08	05/30/97	05/21/08
Chemical Name																		
Volatile Organic Compounds (UG/L)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2,2-Tetrachloroethane	0.17	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	210,000	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
1,1,2-Trichloroethane	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethane	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,1-Dichloroethene	7	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2,3-Trichlorobenzene	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
1,2,4-Trichlorobenzene	--	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dibromo-3-chloropropane	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
1,2-Dibromoethane	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
1,2-Dichlorobenzene	--	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethane	0.38	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,2-Dichloroethene (total)	--	10 U	NA	NA	10 U	2 U	NA	NA	10 U	0.9 J	NA	NA	10 U	10 U	NA	NA	10 U	NA
1,2-Dichloropropane	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,3-Dichlorobenzene	--	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
1,4-Dichlorobenzene	--	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
2-Butanone	--	10 U	5 U	5 U	10 U	5 R	5 U	5 U	10 U	5 R	5 U	5 U	10 U	10 U	5 U	5 U	10 U	5 U
2-Hexanone	--	10 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	10 U	5 U	5 U	10 U	5 U
4-Methyl-2-pentanone	--	10 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	10 U	5 U	5 U	10 U	5 U
Acetone	--	10 U	5 U	5 U	10 U	5 R	5 U	5 U	10 U	5 R	5.4 U	5 U	10 U	10 U	5 U	5 U	10 U	5 U
Benzene	1	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Bromochloromethane	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
Bromodichloromethane	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Bromoform	4.43	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.59	0.5 U	10 U	0.5 U
Bromomethane	--	10 U	0.5 UJ	0.5 U	10 U	2 U	0.5 UJ	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Carbon disulfide	700	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.14 J	0.11 J	10 U	0.5 U
Carbon tetrachloride	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chlorobenzene	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chloroethane	--	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chloroform	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Chloromethane	2.6	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Cyclohexane	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
Dibromochloromethane	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Dichlorodifluoromethane (Freon-12)	--	NA	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 UJ
Ethylbenzene	550	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Hexachloroethane	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Isopropylbenzene	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
Methyl acetate	--	NA	0.5 U	0.5 R	NA	NA	0.5 U	0.5 R	NA	NA	0.5 U	0.5 R	NA	NA	0.5 R	0.5 U	NA	0.5 U
Methyl-tert-butyl ether (MTBE)	200	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
Methylcyclohexane	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
Methylene chloride	--	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Naphthalene	21	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Styrene	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Tetrachloroethene	0.7	**3 J**	0.39 J	0.42 J	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.39 J	0.5 U	10 U	0.5 U
Toluene	1,000	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.15 J	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Trichloroethene	2.8	10 U	2.6	**4**	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.24 J	0.5 U	10 U	0.5 U
Trichlorofluoromethane(Freon-11)	--	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
Vinyl chloride	0.015	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	2 U	0.5 UJ	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 UJ
Xylene, total	530	10 U	1.5 U	1.5 U	10 U	3 U	1.5 U	1.5 U	10 U	3 U	1.5 U	1.5 U	10 U	10 U	1.5 U	1.5 U	10 U	1.5 U
cis-1,2-Dichloroethene	70	NA	4.1	4.7	NA	1 U	0.5 U	0.5 U	NA	0.9 J	0.39 J	0.46 J	NA	NA	0.5 U	3.9	NA	0.5 U
cis-1,3-Dichloropropene	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
m- and p-Xylene	--	NA	NA	NA	NA	2 U	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	--	NA	NA	NA	NA	1 U	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	100	NA	0.56	0.86	NA	1 U	0.5 U	0.5 U	NA	1 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U
trans-1,3-Dichloropropene	--	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	10 U	0.5 U
Semivolatile Organic Compounds (UG/L)																		
2,2'-Oxybis(1-chloropropane)	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2,4,5-Trichlorophenol	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
2,4,6-Trichlorophenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2,4-Dichlorophenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2,4-Dimethylphenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2,4-Dinitrotoluene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2,6-Dinitrotoluene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2-Chloronaphthalene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2-Chlorophenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2-Methylnaphthalene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2-Methylphenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
2-Nitroaniline	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
2-Nitrophenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
3,3'-Dichlorobenzidine	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
3-Nitroaniline	--	25 U	NA	NA	25 UJ	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 UJ	NA

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR93-MW02			IR93-MW02DW				IR93-MW02IW				IR93-MW03	IR93-MW03IW	IR93-MW03IWR	IR93-MW03R		
Sample ID		IR93-MW02-06021997	IR93-MW02-08B	IR93-MW02-08C	IR93-MW02DW-05291997	IR93-MW02DW-04B	IR93-MW02DW-08B	IR93-MW02DW-08C	IR93-MW02IW-06021997	IR93-MW02IW-04B	IR93-MW02IW-08B	IR93-MW02IW-08C	IR93-MW03-05201997	IR93-MW03IW-05201997	IR93-MW03IWR-08C	IR93-MW03R-08C	IR93-MW04-05301997	IR93-MW04-08B
Sample Date		06/02/97	05/20/08	08/20/08	05/29/97	04/14/04	05/20/08	08/20/08	06/02/97	04/14/04	05/20/08	08/20/08	05/20/97	05/20/97	08/20/08	08/20/08	05/30/97	05/21/08
Chemical Name																		
4,6-Dinitro-2-methylphenol	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
4-Bromophenyl-phenylether	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
4-Chloro-3-methylphenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
4-Chloroaniline	--	10 U	NA	NA	10 UJ	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 UJ	NA
4-Chlorophenyl-phenylether	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
4-Methylphenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
4-Nitroaniline	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
4-Nitrophenol	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
Acenaphthene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Anthracene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Benzo(a)anthracene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Benzo(a)pyrene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Benzo(b)fluoranthene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Benzo(g,h,i)perylene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Benzo(k)fluoranthene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Butylbenzylphthalate	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Carbazole	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Chrysene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Di-n-butylphthalate	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Di-n-octylphthalate	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Dibenz(a,h)anthracene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Dibenzofuran	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Diethylphthalate	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Dimethyl phthalate	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Fluorene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Hexachlorobenzene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Hexachlorobutadiene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Hexachlorocyclopentadiene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Indeno(1,2,3-cd)pyrene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Isophorone	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Nitrobenzene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Pentachlorophenol	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
Phenanthrene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Phenol	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	NA	10 U	NA	NA	10 U	NA
Pyrene	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
bis(2-Chloroethoxy)methane	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
bis(2-Ethylhexyl)phthalate	2.5	2 J	NA	NA	10 UJ	NA	NA	NA	2 J	NA	NA	NA	2 J	10 U	NA	NA	16 U	NA
gamma-Chlordane	--	25 U	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	NA	25 U	25 U	NA	NA	25 U	NA
n-Nitroso-di-n-propylamine	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
n-Nitrosodiphenylamine	--	10 U	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	NA	10 U	10 U	NA	NA	10 U	NA
Pesticide/Polychlorinated Biphenyls (UG/L)																		
4,4'-DDD	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
4,4'-DDE	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
4,4'-DDT	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Aldrin	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
Aroclor-1016	--	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA
Aroclor-1221	--	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA
Aroclor-1232	--	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA
Aroclor-1242	--	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA
Aroclor-1248	--	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA
Aroclor-1254	--	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA
Aroclor-1260	--	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA
Dieldrin	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Endosulfan I	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
Endosulfan II	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Endosulfan sulfate	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Endrin	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Endrin aldehyde	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Endrin ketone	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA
Heptachlor	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
Heptachlor epoxide	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
Methoxychlor	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	NA	NA	NA	NA
Toxaphene	--	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
alpha-BHC	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 UJ	NA	NA	NA	NA
alpha-Chlordane	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
beta-BHC	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
delta-BHC	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 UJ	NA	NA	NA	NA
gamma-BHC (Lindane)	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
gamma-Chlordane	--	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA
	--																	
Total Metals (UG/L)	--																	
Aluminum	--	NA	NA	NA	32.6 U	NA	NA	NA	2,540	NA	NA	NA	98.4 U	50.7 U	NA	NA	277	NA

Table A-11
Site 93 Historical Analytical Data Table
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MCB Camp Lejeune
North Carolina

Station ID	NC2L (December 2005)	IR93-MW02			IR93-MW02DW				IR93-MW02IW				IR93-MW03	IR93-MW03IW	IR93-MW03IWR	IR93-MW03R		
Sample ID		IR93-MW02-06021997	IR93-MW02-08B	IR93-MW02-08C	IR93-MW02DW-05291997	IR93-MW02DW-04B	IR93-MW02DW-08B	IR93-MW02DW-08C	IR93-MW02IW-06021997	IR93-MW02IW-04B	IR93-MW02IW-08B	IR93-MW02IW-08C	IR93-MW03-05201997	IR93-MW03IW-05201997	IR93-MW03IWR-08C	IR93-MW03R-08C	IR93-MW04-05301997	IR93-MW04-08B
Sample Date		06/02/97	05/20/08	08/20/08	05/29/97	04/14/04	05/20/08	08/20/08	06/02/97	04/14/04	05/20/08	08/20/08	05/20/97	05/20/97	08/20/08	08/20/08	05/30/97	05/21/08
Chemical Name																		
Antimony	--	NA	NA	NA	1.9 U	NA	NA	NA	2.3	NA	NA	NA	1.9 U	1.9 U	NA	NA	1.9 U	NA
Arsenic	50	NA	NA	NA	2.7 U	NA	NA	NA	4.3	NA	NA	NA	2.7 U	2.7 U	NA	NA	2.7 U	NA
Barium	2,000	NA	NA	NA	4.2	NA	NA	NA	73.9	NA	NA	NA	35.3	29.4	NA	NA	58.6	NA
Beryllium	--	NA	NA	NA	0.3 U	NA	NA	NA	0.3 U	NA	NA	NA	0.3 U	0.3 U	NA	NA	0.3 U	NA
Cadmium	1.75	NA	NA	NA	0.4 U	NA	NA	NA	1.6	NA	NA	NA	0.4 U	0.4 U	NA	NA	0.4 U	NA
Calcium	--	NA	NA	NA	61,700	NA	NA	NA	15,200	NA	NA	NA	7,870	106,000	NA	NA	4,860	NA
Chromium	50	NA	NA	NA	0.5 U	NA	NA	NA	17	NA	NA	NA	0.98	0.57	NA	NA	0.5 U	NA
Cobalt	--	NA	NA	NA	0.5 U	NA	NA	NA	1	NA	NA	NA	0.5 U	0.5 U	NA	NA	1.8	NA
Copper	1,000	NA	NA	NA	0.8 UJ	NA	NA	NA	32.1	NA	NA	NA	0.8 UJ	0.8 UJ	NA	NA	0.8 UJ	NA
Iron	300	NA	**429**	**1,980**	**577**	NA	**481**	**461**	**3,630**	NA	**2,100**	**1,890**	**1,600**	**3,340**	**906**	**1,210**	**934**	163
Lead	15	NA	NA	NA	1.4 U	NA	NA	NA	**164**	NA	NA	NA	1.4 U	1.4 U	NA	NA	2	NA
Magnesium	--	NA	NA	NA	3,440	NA	NA	NA	5,220	NA	NA	NA	457	2,360	NA	NA	1,200	NA
Manganese	50	NA	NA	NA	41.9	NA	NA	NA	**206**	NA	NA	NA	9.2	38.7	NA	NA	17.3	NA
Mercury	--	NA	NA	NA	0.1 U	NA	NA	NA	0.1 U	NA	NA	NA	0.1 U	0.1 U	NA	NA	0.1 U	NA
Nickel	100	NA	NA	NA	1.5 U	NA	NA	NA	3.7	NA	NA	NA	0.7 U	0.7 U	NA	NA	4.4	NA
Potassium	--	NA	NA	NA	7,620	NA	NA	NA	24,500	NA	NA	NA	1,080	1,900	NA	NA	905	NA
Selenium	50	NA	NA	NA	2.2 U	NA	NA	NA	2.9	NA	NA	NA	2.2 U	2.2 U	NA	NA	2.2 U	NA
Silver	--	NA	NA	NA	0.5 U	NA	NA	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	NA	NA	0.5 U	NA
Sodium	--	NA	NA	NA	39,700	NA	NA	NA	188 UJ	NA	NA	NA	7,900	7,860	NA	NA	26,900	NA
Thallium	--	NA	NA	NA	3 U	NA	NA	NA	3 U	NA	NA	NA	3 U	3 U	NA	NA	3 U	NA
Vanadium	--	NA	NA	NA	0.7 U	NA	NA	NA	6.4	NA	NA	NA	0.71	0.7 U	NA	NA	0.96	NA
Zinc	1,050	NA	NA	NA	0.4 UJ	NA	NA	NA	316	NA	NA	NA	0.4 UJ	0.4 UJ	NA	NA	2.7 J	NA
Dissolved Metals (UG/L)																		
Aluminum	--	21.6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	--	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	--	2.7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	24.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	--	0.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	--	84,900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	0.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	--	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	**2,810**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	--	1.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	--	1,820	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	27.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	--	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	--	0.7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	1,270	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	--	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	--	6,610	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	--	3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	0.7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	1,050	4.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																		
Alkalinity	--	NA	214	197	NA	NA	252	240	NA	NA	235	228	NA	NA	5.7	84.2	NA	101
Chloride	250	NA	11	8.62	NA	NA	15.7	13.3	NA	NA	12.1	8.53	NA	NA	12.5 U	10.2	NA	14.3
Ethane	--	NA	0.002 U	0.002 U	NA	NA	0.003 U	0.002 U	NA	NA	0.002 U	0.002 U	NA	NA	0.002 U	0.002 U	NA	0.002 U
Ethene	--	NA	0.002 U	0.002 U	NA	NA	0.003 U	0.002 U	NA	NA	0.002 U	0.002 U	NA	NA	0.002 U	0.002 U	NA	0.002 U
Ferric iron	--	NA	0.4 U	0.4 U	NA	NA	0.4 U	0.4 U	NA	NA	0.4 U	0.4 U	NA	NA	0.4	0.4 U	NA	0.4 U
Ferrous iron	--	NA	3.36	2.85	NA	NA	0.8	0.68	NA	NA	2.78	2.5	NA	NA	2.94 B	1.52	NA	0.29 B
Methane	--	NA	0.012 B	0.015 B	NA	NA	0.021 BD	0.018 BD	NA	NA	0.016 B	0.036 B	NA	NA	0.008 U	0.031 B	NA	7.00E-04 JB
Nitrate	10	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	NA	2.14
Nitrite	1	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	NA	NA	0.05	0.275	NA	0.05 U
Sulfate	250	NA	21.7	20.9	NA	NA	5 U	5 U	NA	NA	8.88	5 U	NA	NA	10.7 U	70	NA	25
Sulfide	--	NA	1 U	1 U	NA	NA	0.6 B	1 U	NA	NA	1 U	1 U	NA	NA	1 B	1 U	NA	1 U
Total organic carbon (TOC)	--	NA	5 U	5 U	NA	NA	2.8 B	2.96 B	NA	NA	2.73 B	2.54 B	NA	NA	1.82 B	3.91 B	NA	5 U

Notes:

B - Analyte not detected above the level reported in blanks
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-11
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MCB Camp Lejeune
North Carolina

Station ID	IR93-MW04			IR93-MW04IW				IR93-MW05			IR93-MW05IW				IR93-MW06		IR93-MW08		IR93-
Sample ID	IR93-MW04D-08B	IR93-MW04-08C	IR93-MW04D-08C	IR93-MW04IW-05301997	IR93-MW04IW-04B	IR93-MW04IW-08B	IR93-MW04IW-08C	IR93-MW05-05271997	IR93-MW05-08B	IR93-MW05-08C	IR93-MW05IW-05271997	IR93-MW05IW-04B	IR93-MW05IW-08B	IR93-MW05IW-08C	IR93-MW06-08B	IR93-MW06-08C	IR93-MW08-08B	IR93-MW08-08C	IR93-MW09-08B
Sample Date	05/21/08	08/20/08	08/20/08	05/30/97	04/14/04	05/21/08	08/20/08	05/27/97	05/20/08	08/19/08	05/27/97	04/14/04	05/20/08	08/19/08	05/20/08	08/20/08	05/21/08	08/19/08	05/21/08
Chemical Name																			
Volatile Organic Compounds (UG/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	**1.8**	**1.1**	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.16 J	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.17 J	0.24 J	10 U	1 U	0.5 U	0.5 U	3.8	4.1	0.5 U	0.15 J	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.15 J	0.5 U	10 U	1 U	0.13 J	0.5 U	1.4	4.5	0.17 J	1.4	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.12 J	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	**0.66**	**0.92**	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	NA	NA	NA	10 U	2 U	NA	NA	92	NA	NA	10 U	2 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	5 U	5 U	5 U	10 U	5 R	5 U	5 U	10 U	5 U	5 U	10 U	5 R	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	10 U	5 U	5 U	5 U	10 U	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U
Acetone	5 U	5 U	5 U	10 U	5 R	5 U	5 U	10 U	5 U	5 U	10 U	5 R	5 U	5 U	5 U	5 U	14 UJ	5 U	5 UJ
Benzene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.1 J	10 U	0.51	0.48 J	10 U	1 U	0.5 U	0.5 U	0.19 J	0.2 J	0.5 U	0.16 J	0.5 U
Bromochloromethane	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.41 J	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 J	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	0.5 UJ	0.5 U	10 U	2 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Carbon disulfide	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 J	0.5 U	0.5 U
Cyclohexane	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.15 J	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 U	0.5 U	NA	NA	0.5 UJ	0.5 U	NA	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Ethylbenzene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.59	0.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	0.5 U	0.5 R	0.5 R	NA	NA	0.5 U	0.5 R	NA	0.5 U	4.2 R	NA	NA	0.5 U	0.5 R	0.5 U	18 R	0.5 U	4.2 R	0.5 U
Methyl-tert-butyl ether (MTBE)	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.95	0.5 U	0.5 U	0.5 U
Methylcyclohexane	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	0.5 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	NA	NA	NA	10 U	NA	NA	NA	6 J	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.41 J	0.56	10 U	1 U	0.5 U	0.5 U	**12**	**23**	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	1.6	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	**28**	**27**	**32**	10 U	1 U	0.5 U	0.5 U	**100**	**110**	0.27 J	0.32 J	0.62
Trichlorofluoromethane(Freon-11)	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 UJ	0.5 U	0.5 U	10 U	2 U	0.5 UJ	0.5 U	10 U	**1.1**	0.5 U	10 U	2 U	0.5 U	0.5 U	**12**	**14**	**1.6 J**	**34**	0.5 UJ
Xylene, total	1.5 U	1.5 U	1.5 U	10 U	3 U	1.5 U	1.5 U	10 U	1.5 U	1.5 U	10 U	3 U	1.5 U	1.5 U	2.7	1.5 U	1.5 U	1.5 U	1.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	NA	1 U	0.5 U	0.5 U	NA	53	61 E	NA	0.1 J	0.11 J	0.5 U	**390**	**430**	4	42	1.7
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m- and p-Xylene	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA
o-Xylene	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	NA	1 U	0.5 U	0.5 U	NA	20	24	NA	1 U	0.5 U	0.5 U	**120**	**120**	0.2 J	0.74	0.85
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	10 U	0.5 U	0.5 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds (UG/L)																			
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	25 UJ	NA	NA	NA	25 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA

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Station ID	IR93-MW04			IR93-MW04IW				IR93-MW05			IR93-MW05IW				IR93-MW06		IR93-MW08		IR93-
Sample ID	IR93-MW04D-08B	IR93-MW04-08C	IR93-MW04D-08C	IR93-MW04IW-05301997	IR93-MW04IW-04B	IR93-MW04IW-08B	IR93-MW04IW-08C	IR93-MW05-05271997	IR93-MW05-08B	IR93-MW05-08C	IR93-MW05IW-05271997	IR93-MW05IW-04B	IR93-MW05IW-08B	IR93-MW05IW-08C	IR93-MW06-08B	IR93-MW06-08C	IR93-MW08-08B	IR93-MW08-08C	IR93-MW09-08B
Sample Date	05/21/08	08/20/08	08/20/08	05/30/97	04/14/04	05/21/08	08/20/08	05/27/97	05/20/08	08/19/08	05/27/97	04/14/04	05/20/08	08/19/08	05/20/08	08/20/08	05/21/08	08/19/08	05/21/08
Chemical Name																			
4,6-Dinitro-2-methylphenol	NA	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	10 UJ	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	25 U	NA	NA	NA	25 UJ	NA	NA	25 UJ	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	25 U	NA	NA	NA	25 UJ	NA	NA	25 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	13 U	NA	NA	NA	10 U	NA	NA	**130**	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	25 U	NA	NA	NA	25 U	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	10 U	NA	NA	NA	10 U	NA	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/L)																			
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (UG/L)																			
Aluminum	NA	NA	NA	35.4 U	NA	NA	NA	39.3 U	NA	NA	26.6 U	NA	NA	NA	NA	NA	NA	NA	NA

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Station ID	IR93-MW04			IR93-MW04IW				IR93-MW05			IR93-MW05IW				IR93-MW06		IR93-MW08		IR93-
Sample ID	IR93-MW04D-08B	IR93-MW04-08C	IR93-MW04D-08C	IR93-MW04IW-05301997	IR93-MW04IW-04B	IR93-MW04IW-08B	IR93-MW04IW-08C	IR93-MW05-05271997	IR93-MW05-08B	IR93-MW05-08C	IR93-MW05IW-05271997	IR93-MW05IW-04B	IR93-MW05IW-08B	IR93-MW05IW-08C	IR93-MW06-08B	IR93-MW06-08C	IR93-MW08-08B	IR93-MW08-08C	IR93-MW09-08B
Sample Date	05/21/08	08/20/08	08/20/08	05/30/97	04/14/04	05/21/08	08/20/08	05/27/97	05/20/08	08/19/08	05/27/97	04/14/04	05/20/08	08/19/08	05/20/08	08/20/08	05/21/08	08/19/08	05/21/08
Chemical Name																			
Antimony	NA	NA	NA	1.9 U	NA	NA	NA	1.9 U	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	2.7 U	NA	NA	NA	2.7 U	NA	NA	2.7 U	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	11.7	NA	NA	NA	45.2	NA	NA	10.5	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	0.3 U	NA	NA	NA	0.3 U	NA	NA	0.3 U	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	0.4 U	NA	NA	NA	0.4 U	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	88,000	NA	NA	NA	16,300	NA	NA	83,000	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	0.5 U	NA	NA	NA	0.64	NA	NA	0.57	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	0.5 U	NA	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	0.8 UJ	NA	NA	NA	0.8 U	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	32.8 B	41.1 B	**3,130**	NA	**563**	**2,140**	**1,840 J**	269	261	**3,400 J**	NA	**479**	**784**	**785**	**586**	**674**	131	**2,910**
Lead	NA	NA	NA	1.4 U	NA	NA	NA	1.4 U	NA	NA	1.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	1,740	NA	NA	NA	1,410	NA	NA	1,830	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	37.7	NA	NA	NA	25.8	NA	NA	47.2	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	0.1 U	NA	NA	NA	0.1 U	NA	NA	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	1.5 U	NA	NA	NA	0.7 U	NA	NA	0.7 U	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	1,240	NA	NA	NA	1,330 J	NA	NA	1,740 J	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	2.2 U	NA	NA	NA	2.2 U	NA	NA	2.2 U	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	0.5 U	NA	NA	NA	0.5 U	NA	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	6,660	NA	NA	NA	14,700	NA	NA	7,300	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	3 U	NA	NA	NA	3 U	NA	NA	3 U	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	0.7 U	NA	NA	NA	1.2 U	NA	NA	0.7 U	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	0.4 UJ	NA	NA	NA	0.4 UJ	NA	NA	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)																			
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)																			
Alkalinity	NA	88.4	90.2	NA	NA	194	178	NA	31.7	27.8	NA	NA	198	190	209	170	228	206	48.7
Chloride	NA	7.57	7.9	NA	NA	12.2	10.2	NA	13.4	10.7	NA	NA	11.8	9.85	30.7	26.1	14.9	13.6	10.5
Ethane	NA	0.002 U	0.002 U	NA	NA	0.002 U	0.002 U	NA	0.002 U	0.002 U	NA	NA	0.002 U	1.00E-04 J	0.003 U	0.002 U	0.003 U	0.002 U	0.002 U
Ethene	NA	0.002 U	0.002 U	NA	NA	0.002 U	0.002 U	NA	0.002 U	0.002 U	NA	NA	0.002 U	0.002 U	0.003 U	0.002 U	1.00E-04 JD	6.00E-04 J	0.002 U
Ferric iron	NA	0.4 U	0.4 U	NA	NA	0.4 U	0.4 U	NA	0.4 U	0.4 U	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Ferrous iron	NA	0.4 U	0.4 U	NA	NA	3.5	3.25	NA	2.08	1.94	NA	NA	3.72	3.88	6.94	6.57	1.01	0.87	3.24
Methane	NA	5.00E-04 JB	5.00E-04 JB	NA	NA	0.042 B	0.015 B	NA	0.017 B	0.051 B	NA	NA	0.02 B	0.015 BD	0.026 BD	0.027 BD	0.033 BD	0.035 B	0.027 B
Nitrate	NA	0.05 U	0.05 U	NA	NA	0.78	0.05 U	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nitrite	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.25	NA	0.05 U	0.05 U	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfate	NA	17.4	19.6	NA	NA	15.7	17.5	NA	36.6	34.7	NA	NA	13.1	18.7	210	212	215	192	26.3
Sulfide	NA	1 U	1 U	NA	NA	1 U	1 U	NA	0.6 B	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total organic carbon (TOC)	NA	5 U	5 U	NA	NA	1.86 B	2.31 B	NA	5 U	5 U	NA	NA	2.21 B	2.18 B	5 U	3.55 B	4.81 B	4.56 B	2.98 B

Notes:

B - Analyte not detected above the level reported in blanks
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	MW09	IR93-MW10		IR93-MW11		IR93-MW11IW				IR93-MW12		IR93-MW14
Sample ID	IR93-MW09-08C	IR93-MW10-08B	IR93-MW10-08C	IR93-MW11-08B	IR93-MW11-08C	IR93-MW11IW-08B	IR93-MW11IWD-08B	IR93-MW11IW-08C	IR93-MW11IWD-08C	IR93-MW12-08B	IR93-MW12-08C	IR93-MW14-08C
Sample Date	08/19/08	05/20/08	08/19/08	05/20/08	08/20/08	05/20/08	05/20/08	08/20/08	08/20/08	05/21/08	08/19/08	08/19/08
Chemical Name												
Volatile Organic Compounds (UG/L)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.14 J	0.5 U	0.5 U	0.5 U	0.48 J	0.5 U	0.55	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.11 J	0.5 U	0.5 U	0.29 J
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	0.65 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.31 J
Bromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.14 J	0.5 U	0.5 U
Cyclohexane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	0.5 R	0.5 U	0.5 R	0.5 U	0.5 R	0.5 U	0.5 U	0.5 U	0.5 R	0.5 U	0.5 UJ	1.3 R
Methyl-tert-butyl ether (MTBE)	0.5 U	0.5 U	0.5 U	0.14 J	0.26 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.14 J	0.17 J	0.5 U	**4.5**	**8**	**2.2**	**5.3**	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U	0.5 U	0.15 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.82	0.2 J	0.24 J	2.8	1.6	2.1	**4**	0.84	2.1	0.5 U	0.1 J	2.3
Trichlorofluoromethane(Freon-11)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 U	**1 J**	0.5 U	0.5 UJ	**0.58**	0.5 UJ	**0.86 J**	0.5 U	0.5 U	**1.6 J**	0.5 U	**42 J**
Xylene, total	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
cis-1,2-Dichloroethene	12	7.7	6.7	11	16	1.6	2.8	0.38 J	2.9	17	21	35
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m- and p-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	2.4	0.19 J	0.15 J	0.5 U	0.93	0.5 U	0.5 U	0.5 U	0.5 U	2	4	5.6
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds (UG/L)												
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	MW09	IR93-MW10		IR93-MW11		IR93-MW11IW				IR93-MW12		IR93-MW14
Sample ID	IR93-MW09-08C	IR93-MW10-08B	IR93-MW10-08C	IR93-MW11-08B	IR93-MW11-08C	IR93-MW11IW-08B	IR93-MW11IWD-08B	IR93-MW11IW-08C	IR93-MW11IWD-08C	IR93-MW12-08B	IR93-MW12-08C	IR93-MW14-08C
Sample Date	08/19/08	05/20/08	08/19/08	05/20/08	08/20/08	05/20/08	05/20/08	08/20/08	08/20/08	05/21/08	08/19/08	08/19/08
Chemical Name												
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/L)												
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (UG/L)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	MW09	IR93-MW10		IR93-MW11		IR93-MW11IW				IR93-MW12		IR93-MW14
Sample ID	IR93-MW09-08C	IR93-MW10-08B	IR93-MW10-08C	IR93-MW11-08B	IR93-MW11-08C	IR93-MW11IW-08B	IR93-MW11IWD-08B	IR93-MW11IW-08C	IR93-MW11IWD-08C	IR93-MW12-08B	IR93-MW12-08C	IR93-MW14-08C
Sample Date	08/19/08	05/20/08	08/19/08	05/20/08	08/20/08	05/20/08	05/20/08	08/20/08	08/20/08	05/21/08	08/19/08	08/19/08
Chemical Name												
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	**1,580**	**3,120**	67.4 B	229	131	**409**	NA	**381**	**1,180**	**839**	**1,100**	**438**
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)												
Alkalinity	38.6	9.29 B	10 U	211	217	237	NA	215	208	215	212	272
Chloride	7.91	12.7	10.2	8.93	6.99	14.3	NA	8.57	8.34	12.3	9.6	9.89
Ethane	0.002 U	0.002 U	9.00E-05 J	0.002 U	5.00E-05 J	0.002 U	NA	1.00E-04 J	2.00E-04 J	0.002 U	0.002 U	1.00E-04 J
Ethene	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	9.00E-04 J
Ferric iron	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Ferrous iron	2.6	5.09	5.75	2.12	1.12	2.78	NA	2.05	1.95	2.96	2.79	3.95
Methane	0.045 B	0.018 B	0.044 B	0.021 B	0.041 B	0.017 B	NA	0.026 B	0.027 B	0.03 B	0.055 B	0.047 B
Nitrate	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nitrite	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfate	22.8	100	84.9	43.2	34.3	17.7	NA	15.9	16.4	14.4	13	86.4
Sulfide	1 U	1 U	1 U	1 U	1 U	1.2	NA	1 U	1 U	0.6 B	1 U	1 U
Total organic carbon (TOC)	4.16 B	4.62 B	5 U	5 U	2.44 B	1.97 B	NA	1.86 B	2 B	1.95 B	1.96 B	3.05 B

Notes:

B - Analyte not detected above the level reported in blanks
E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Shading indicates detection

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	MW09	IR93-MW10		IR93-MW11		IR93-MW11IW				IR93-MW12		IR93-MW14
Sample ID	IR93-MW09-08C	IR93-MW10-08B	IR93-MW10-08C	IR93-MW11-08B	IR93-MW11-08C	IR93-MW11IW-08B	IR93-MW11IWD-08B	IR93-MW11IW-08C	IR93-MW11IWD-08C	IR93-MW12-08B	IR93-MW12-08C	IR93-MW14-08C
Sample Date	08/19/08	05/20/08	08/19/08	05/20/08	08/20/08	05/20/08	05/20/08	08/20/08	08/20/08	05/21/08	08/19/08	08/19/08
Chemical Name												
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/L)												
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (UG/L)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A-11
Site 93 Historical Analytical Data Table
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

Station ID	MW09	IR93-MW10		IR93-MW11		IR93-MW11IW				IR93-MW12		IR93-MW14
Sample ID	IR93-MW09-08C	IR93-MW10-08B	IR93-MW10-08C	IR93-MW11-08B	IR93-MW11-08C	IR93-MW11IW-08B	IR93-MW11IWD-08B	IR93-MW11IW-08C	IR93-MW11IWD-08C	IR93-MW12-08B	IR93-MW12-08C	IR93-MW14-08C
Sample Date	08/19/08	05/20/08	08/19/08	05/20/08	08/20/08	05/20/08	05/20/08	08/20/08	08/20/08	05/21/08	08/19/08	08/19/08
Chemical Name												
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	**1,580**	**3,120**	67.4 B	229	131	**409**	NA	**381**	**1,180**	**839**	**1,100**	**438**
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Metals (UG/L)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/L)												
Alkalinity	38.6	9.29 B	10 U	211	217	237	NA	215	208	215	212	272
Chloride	7.91	12.7	10.2	8.93	6.99	14.3	NA	8.57	8.34	12.3	9.6	9.89
Ethane	0.002 U	0.002 U	9.00E-05 J	0.002 U	5.00E-05 J	0.002 U	NA	1.00E-04 J	2.00E-04 J	0.002 U	0.002 U	1.00E-04 J
Ethene	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	9.00E-04 J
Ferric iron	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Ferrous iron	2.6	5.09	5.75	2.12	1.12	2.78	NA	2.05	1.95	2.96	2.79	3.95
Methane	0.045 B	0.018 B	0.044 B	0.021 B	0.041 B	0.017 B	NA	0.026 B	0.027 B	0.03 B	0.055 B	0.047 B
Nitrate	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Nitrite	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfate	22.8	100	84.9	43.2	34.3	17.7	NA	15.9	16.4	14.4	13	86.4
Sulfide	1 U	1 U	1 U	1 U	1 U	1.2	NA	1 U	1 U	0.6 B	1 U	1 U
Total organic carbon (TOC)	4.16 B	4.62 B	5 U	5 U	2.44 B	1.97 B	NA	1.86 B	2 B	1.95 B	1.96 B	3.05 B

Notes:

B - Analyte not detected above the level reported in blanks

E - Concentration exceeds calibration range of GC/MS instrument (Organic) OR Value is estimated due to matrix interferences (Inorganic)

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The material was analyed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

Bold text indicates exceedance of NC2LGW Criteria

Appendix B
Historical Data Trends

Figure B-1
Site 78 Trichloroethene Historical Data Trends
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

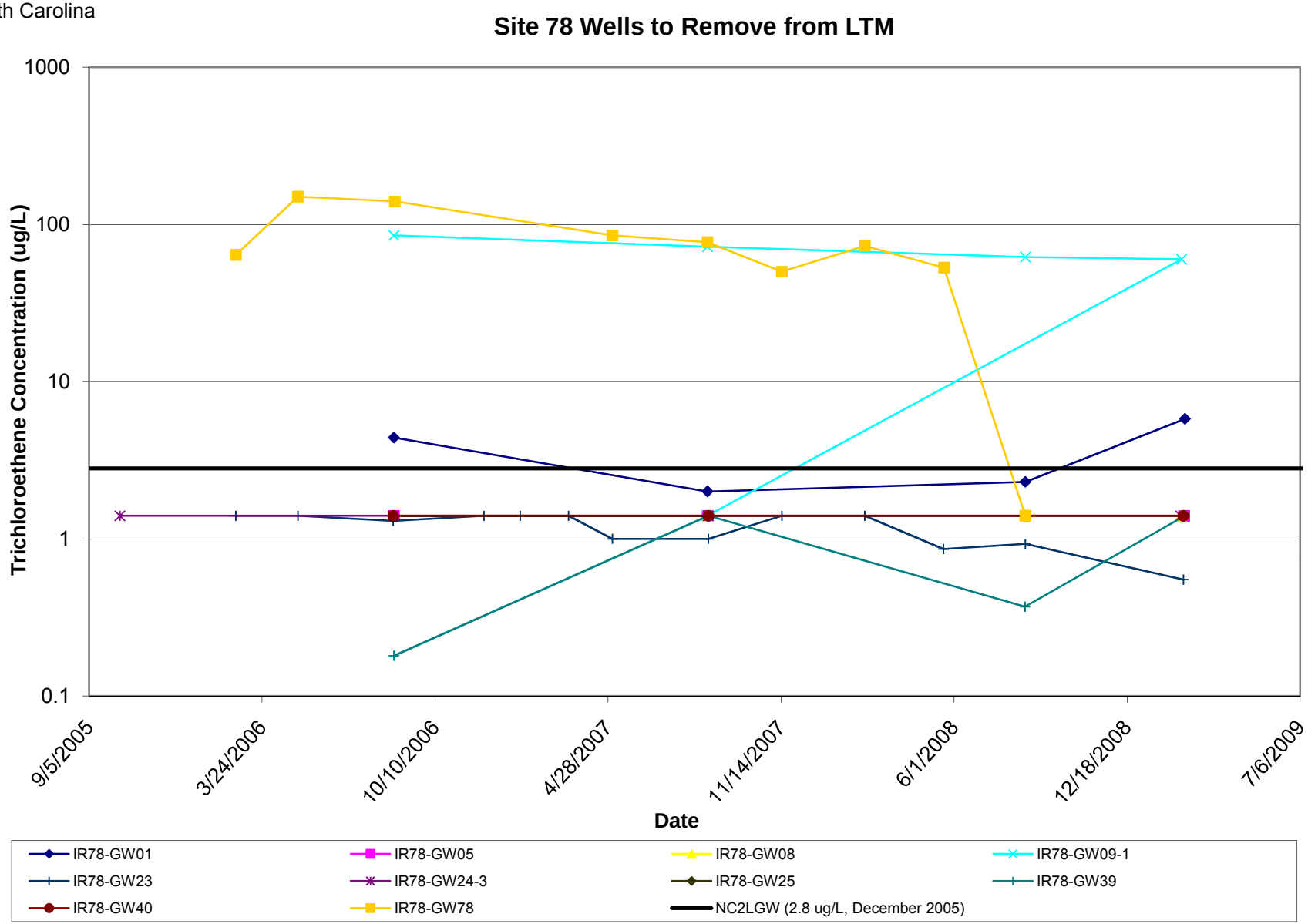


Figure B-2
Site 82 Trichloroethene Historical Data Trends
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina

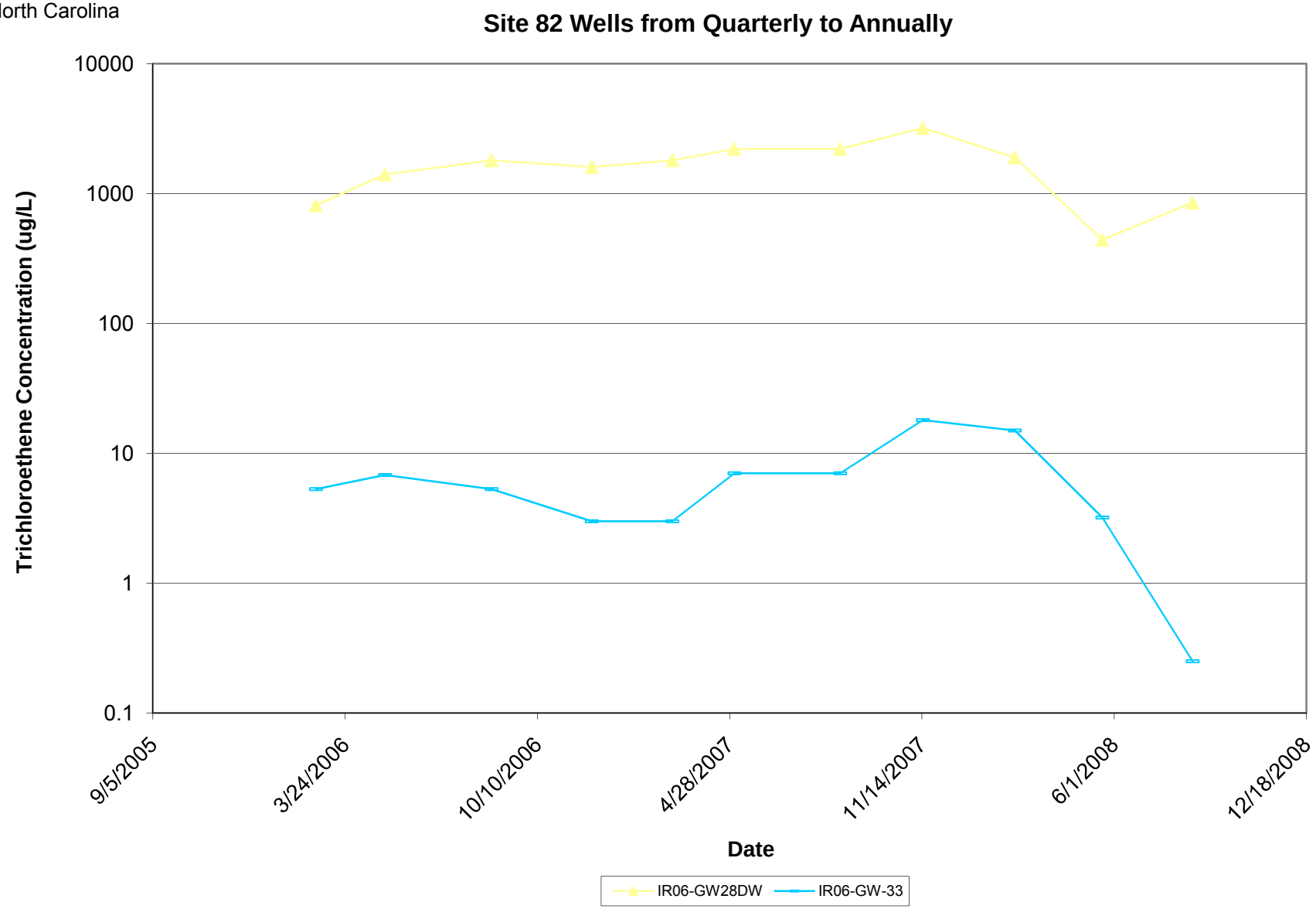
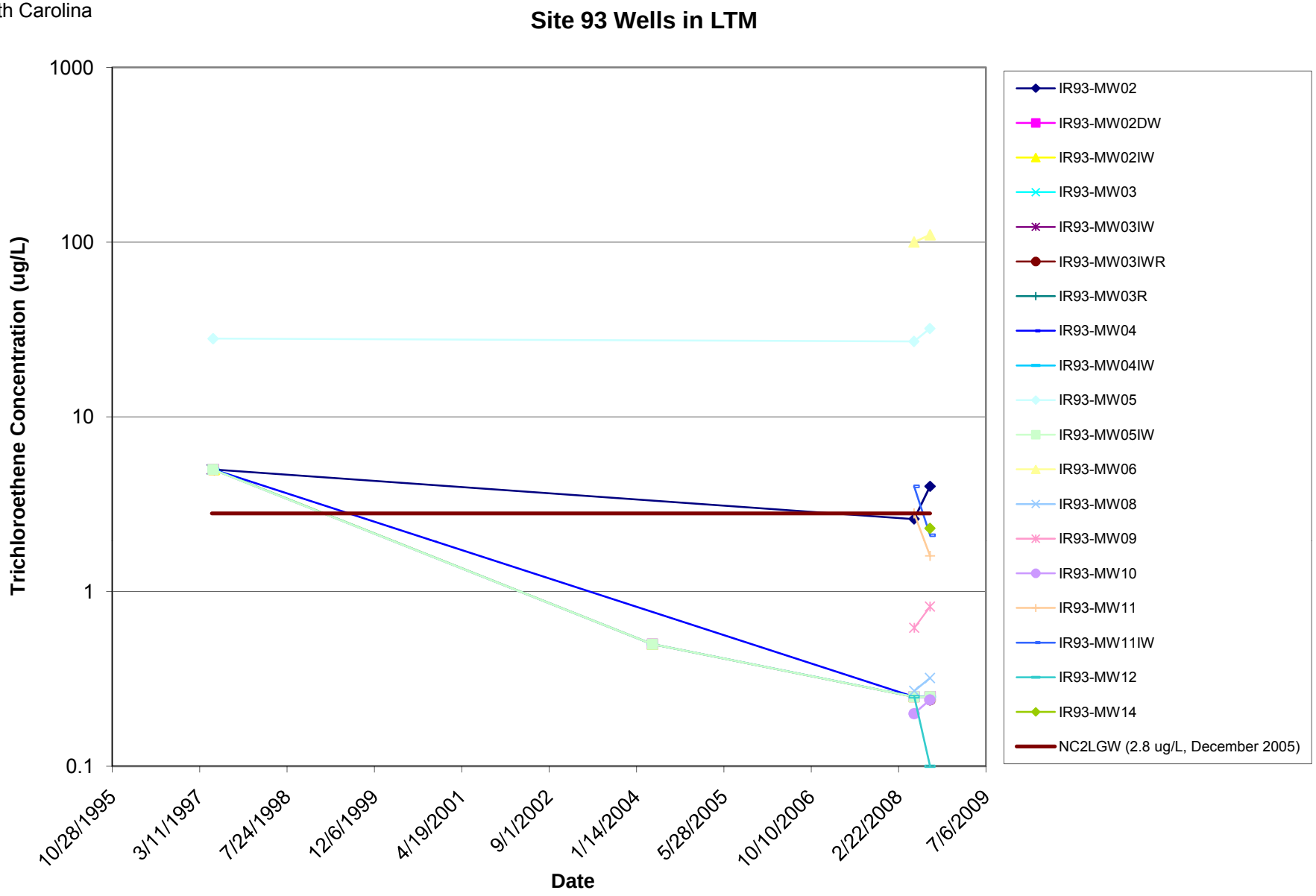


Figure B-3
Site 93 Trichloroethene Historical Data Trends
2009 Long-Term Monitoring Optimization Tech Memo
MCB Camp Lejeune
North Carolina



MAROS Site Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

User Defined Site and Data Assumptions:

Hydrogeology and Plume Information:

Groundwater Seepage Velocity: 9.88 ft/yr

Current Plume Length: 600 ft

Current Plume Width 500 ft

Number of Tail Wells: 8

Number of Source Wells: 3

Source Information:

Source Treatment: Pump and Treat

NAPL is not observed at this site.

Down-gradient Information:

Distance from Edge of Tail to Nearest:

Down-gradient receptor: 3200 ft

Down-gradient property: 3200 ft

Distance from Source to Nearest:

Down-gradient receptor: 4000 ft

Down-gradient property: 4000 ft

Data Consolidation Assumptions:

Time Period: 1/19/1987 **to** 2/28/2009

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Plume Information Weighting Assumptions:

Consolidation Step 1. Weight Plume Information by Chemical

Summary Weighting: Weighting Applied to All Chemicals Equally

Consolidation Step 2. Weight Well Information by Chemical

Well Weighting: No Weighting of Wells was Applied.

Chemical Weighting: No Weighting of Chemicals was Applied.

Note: These assumptions were made when consolidating the historical montoring data and lumping the Wells and COCs.

1. Compliance Monitoring/Remediation Optimization Results:

Preliminary Monitoring System Optimization Results: Based on site classification, source treatment and Monitoring System Category the following suggestions are made for site Sampling Frequency, Duration of Sampling before reassessment, and Well Density. These criteria take into consideration: Plume Stability, Type of Plume, and Groundwater Velocity.

COC	Tail Stability	Source Stability	Level of Effort	Sampling Duration	Sampling Frequency	Sampling Density
BENZENE	PD	S	L	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	21
cis-1,2-DICHLOROETHYLENE	PD	PD	L	Continue remediation mechanism unitl reach stable trend or PRG met.	No Recommendation	21
TETRACHLOROETHYLENE(PCE)	S	S	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	21
TRICHLOROETHYLENE (TCE)	S	S	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	21
VINYL CHLORIDE	S	D	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	21

Note:

Plume Status: (I) Increasing; (PI)Probably Increasing; (S) Stable; (NT) No Trend; (PD) Probably Decreasing; (D) Decreasing

Design Categories: (E) Extensive; (M) Moderate; (L) Limited (N/A) Not Applicable, Insufficient Data Available

Level of Monitoring Effort Indicated by Analysi Moderate

2. Spatial Moment Analysis Results:

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	BENZENE	1.56	1	50.0%	NT
	cis-1,2-DICHLOROETHYLENE	1.48	-114	97.8%	D
	TETRACHLOROETHYLENE(PCE)	1.51	-51	76.0%	NT
	TRICHLOROETHYLENE (TCE)	1.88	57	100.0%	I
	VINYL CHLORIDE	1.66	64	100.0%	I
1st Moment: Distance to Source					
	BENZENE	0.04	-1	50.0%	S
	cis-1,2-DICHLOROETHYLENE	0.10	-31	93.0%	PD
	TETRACHLOROETHYLENE(PCE)	0.05	13	72.1%	NT
	TRICHLOROETHYLENE (TCE)	0.05	-45	98.6%	D
	VINYL CHLORIDE	0.21	17	78.2%	NT
2nd Moment: Sigma XX					
	BENZENE	0.17	-3	53.9%	S
	cis-1,2-DICHLOROETHYLENE	0.20	17	78.2%	NT
	TETRACHLOROETHYLENE(PCE)	0.16	3	53.9%	NT
	TRICHLOROETHYLENE (TCE)	0.24	43	98.2%	I
	VINYL CHLORIDE	0.22	33	94.3%	PI
2nd Moment: Sigma YY					
	BENZENE	0.23	19	81.0%	NT
	cis-1,2-DICHLOROETHYLENE	0.36	-3	53.9%	S
	TETRACHLOROETHYLENE(PCE)	0.20	-13	72.1%	S
	TRICHLOROETHYLENE (TCE)	0.26	33	94.3%	PI
	VINYL CHLORIDE	0.30	17	78.2%	NT

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.30 **Saturated Thickness:** Uniform: 25 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

MAROS Mann-Kendall Statistics Summary

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

Time Period: 1/19/1987 **to** 2/28/2009
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
BENZENE								
IR78-RW11	S	17	9	0.74	-63	99.6%	No	D
IR78-GW24-1	S	24	13	0.98	4	52.9%	No	NT
IR78-GW44	S	16	13	1.26	-15	73.3%	No	NT
IR78-GW46	T	14	14	1.46	-63	100.0%	No	D
IR78-GW23	T	32	30	0.65	-408	100.0%	No	D
IR78-GW22	T	22	2	0.96	-7	56.6%	No	S
IR78-RW12	T	15	7	0.66	-4	55.8%	No	S
IR78-GW47	T	14	12	0.38	-7	62.6%	No	S
IR78-GW40	T	15	0	0.70	-31	93.0%	Yes	PD
IR78-RW10	T	20	19	0.51	-55	96.0%	No	D
IR78-GW41	T	14	5	0.92	-22	87.2%	No	S
cis-1,2-DICHLOROETHYLENE								
IR78-GW44	S	16	16	0.98	-33	92.4%	No	PD
IR78-GW24-1	S	18	18	0.56	-27	83.5%	No	S
IR78-RW11	S	17	15	0.88	-87	100.0%	No	D
IR78-GW47	T	14	12	2.30	-46	99.4%	No	D
IR78-GW41	T	14	11	0.98	49	99.7%	No	I
IR78-GW46	T	14	14	0.54	4	56.4%	No	NT
IR78-GW40	T	15	2	0.79	-37	96.3%	No	D
IR78-GW23	T	24	23	1.37	-231	100.0%	No	D
IR78-RW12	T	15	13	2.30	2	52.0%	No	NT
IR78-GW22	T	17	1	0.86	-44	96.2%	No	D
IR78-RW10	T	20	20	1.36	-128	100.0%	No	D
TETRACHLOROETHYLENE(PCE)								
IR78-GW24-1	S	22	0	0.92	22	72.1%	Yes	NT
IR78-GW44	S	16	0	1.48	28	88.6%	Yes	NT
IR78-RW11	S	17	1	0.90	-56	98.9%	No	D
IR78-RW10	T	20	1	0.38	40	89.6%	No	NT
IR78-GW22	T	22	1	0.99	15	65.2%	No	NT
IR78-RW12	T	15	0	0.55	-32	93.7%	Yes	PD
IR78-GW47	T	14	0	0.74	-27	92.1%	Yes	PD
IR78-GW23	T	28	0	1.39	58	86.9%	Yes	NT
IR78-GW41	T	14	0	0.65	-28	92.9%	Yes	PD
IR78-GW40	T	15	0	0.70	-31	93.0%	Yes	PD
IR78-GW46	T	14	0	0.58	-34	96.5%	Yes	D

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TRICHLOROETHYLENE (TCE)								
TRICHLOROETHYLENE (TCE)								
IR78-RW11	S	17	1	0.90	-56	98.9%	No	D
IR78-GW24-1	S	29	29	0.51	-15	60.3%	No	S
IR78-GW44	S	16	2	1.58	15	73.3%	No	NT
IR78-RW12	T	15	12	2.34	-6	59.6%	No	NT
IR78-GW22	T	21	0	1.02	7	57.1%	Yes	NT
IR78-GW23	T	35	28	4.27	-393	100.0%	No	D
IR78-GW41	T	15	7	0.80	-36	95.9%	No	D
IR78-GW40	T	15	0	0.70	-31	93.0%	Yes	PD
IR78-GW46	T	14	4	0.53	-16	79.1%	No	S
IR78-GW47	T	14	12	2.29	-7	62.6%	No	NT
IR78-RW10	T	20	19	0.75	-101	100.0%	No	D
VINYL CHLORIDE								
IR78-GW44	S	16	16	0.72	-78	100.0%	No	D
IR78-GW24-1	S	28	25	2.80	-167	100.0%	No	D
IR78-RW11	S	17	15	1.14	-78	100.0%	No	D
IR78-GW23	T	34	34	0.82	-264	100.0%	No	D
IR78-GW47	T	14	3	1.09	-38	97.9%	No	D
IR78-GW46	T	14	7	0.68	2	52.2%	No	NT
IR78-GW22	T	21	0	1.23	19	70.5%	Yes	NT
IR78-RW10	T	20	9	1.19	-48	93.6%	No	PD
IR78-RW12	T	15	7	1.35	1	50.0%	No	NT
IR78-GW40	T	15	0	1.11	-31	93.0%	Yes	PD
IR78-GW41	T	14	5	1.34	-30	94.4%	No	PD

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Plume Analysis Summary

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

Time Period: 1/19/1987 **to** 2/28/2009

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
BENZENE											
	IR78-RW11	S	17	9	1.7E+00	2.0E+00	No	D	D	N/A	N/A
	IR78-GW24-1	S	24	13	1.3E+00	4.4E-01	No	NT	S	N/A	N/A
	IR78-GW44	S	16	13	4.7E+00	3.0E+00	No	NT	NT	N/A	N/A
	IR78-GW46	T	14	14	1.6E+02	9.2E+01	No	D	D	N/A	N/A
	IR78-GW23	T	32	30	1.1E+01	1.1E+01	No	D	D	N/A	N/A
	IR78-GW22	T	22	2	1.3E+00	5.0E-01	No	S	S	N/A	N/A
	IR78-RW12	T	15	7	3.2E+00	2.5E+00	No	S	S	N/A	N/A
	IR78-GW47	T	14	12	3.3E+00	3.0E+00	No	S	S	N/A	N/A
	IR78-GW40	T	15	0	1.9E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-RW10	T	20	19	1.3E+02	1.3E+02	No	D	S	N/A	N/A
	IR78-GW41	T	14	5	1.6E+00	1.5E+00	No	S	PD	N/A	N/A
cis-1,2-DICHLOROETHYLENE											
	IR78-GW44	S	16	16	7.2E+02	4.1E+02	No	PD	D	N/A	N/A
	IR78-GW24-1	S	18	18	2.5E+02	2.0E+02	No	S	S	N/A	N/A
	IR78-RW11	S	17	15	1.0E+02	8.4E+01	No	D	D	N/A	N/A
	IR78-GW47	T	14	12	3.1E+01	1.5E+00	No	D	D	N/A	N/A
	IR78-GW41	T	14	11	9.9E+00	6.0E+00	No	I	NT	N/A	N/A
	IR78-GW46	T	14	14	1.2E+01	1.3E+01	No	NT	NT	N/A	N/A
	IR78-GW40	T	15	2	1.7E+00	2.5E+00	No	D	D	N/A	N/A
	IR78-GW23	T	24	23	2.0E+03	7.2E+02	No	D	D	N/A	N/A
	IR78-RW12	T	15	13	2.8E+02	4.1E+01	No	NT	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
cis-1,2-DICHLOROETHYLENE											
	IR78-GW22	T	17	1	1.6E+00	1.0E+00	No	D	D	N/A	N/A
	IR78-RW10	T	20	20	1.0E+02	5.1E+01	No	D	D	N/A	N/A
TETRACHLOROETHYLENE(PCE)											
	IR78-GW24-1	S	22	0	1.5E+00	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW44	S	16	0	4.2E+00	2.5E+00	Yes	NT	PI	N/A	N/A
	IR78-RW11	S	17	1	1.5E+00	5.0E-01	No	D	D	N/A	N/A
	IR78-RW10	T	20	1	2.7E+00	2.5E+00	No	NT	S	N/A	N/A
	IR78-GW22	T	22	1	1.3E+00	5.0E-01	No	NT	NT	N/A	N/A
	IR78-RW12	T	15	0	2.1E+00	2.5E+00	Yes	PD	PD	N/A	N/A
	IR78-GW47	T	14	0	1.9E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW23	T	28	0	6.9E+00	2.5E+00	Yes	NT	PI	N/A	N/A
	IR78-GW41	T	14	0	2.0E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW40	T	15	0	1.9E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW46	T	14	0	2.1E+00	2.5E+00	Yes	D	D	N/A	N/A
TRICHLOROETHYLENE (TCE)											
	IR78-RW11	S	17	1	1.5E+00	5.0E-01	No	D	D	N/A	N/A
	IR78-GW24-1	S	29	29	2.2E+01	2.0E+01	No	S	S	N/A	N/A
	IR78-GW44	S	16	2	4.0E+00	2.5E+00	No	NT	NT	N/A	N/A
	IR78-RW12	T	15	12	1.2E+02	2.8E+01	No	NT	I	N/A	N/A
	IR78-GW22	T	21	0	1.3E+00	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW23	T	35	28	5.4E+02	1.4E+01	No	D	D	N/A	N/A
	IR78-GW41	T	15	7	1.7E+00	2.5E+00	No	D	D	N/A	N/A
	IR78-GW40	T	15	0	1.9E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW46	T	14	4	2.3E+00	2.5E+00	No	S	S	N/A	N/A
	IR78-GW47	T	14	12	2.7E+01	6.0E+00	No	NT	PD	N/A	N/A
	IR78-RW10	T	20	19	5.5E+01	3.9E+01	No	D	D	N/A	N/A
VINYL CHLORIDE											
	IR78-GW44	S	16	16	2.5E+03	2.2E+03	No	D	D	N/A	N/A
	IR78-GW24-1	S	28	25	2.0E+01	4.7E+00	No	D	D	N/A	N/A
	IR78-RW11	S	17	15	3.2E+02	1.9E+02	No	D	D	N/A	N/A
	IR78-GW23	T	34	34	2.1E+02	1.9E+02	No	D	D	N/A	N/A
	IR78-GW47	T	14	3	1.3E+00	1.0E+00	No	D	PD	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
VINYL CHLORIDE											
	IR78-GW46	T	14	7	1.4E+00	1.0E+00	No	NT	S	N/A	N/A
	IR78-GW22	T	21	0	8.2E-01	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-RW10	T	20	9	3.8E+00	2.5E+00	No	PD	PD	N/A	N/A
	IR78-RW12	T	15	7	5.4E+00	1.0E+00	No	NT	NT	N/A	N/A
	IR78-GW40	T	15	0	1.0E+00	1.0E+00	Yes	PD	NT	N/A	N/A
	IR78-GW41	T	14	5	2.4E+00	1.0E+00	No	PD	NT	N/A	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS COC Assessment

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Toxicity:

Contaminant of Concern	Representative Concentration (mg/L)	PRG (mg/L)	Percent Above PRG
VINYL CHLORIDE	2.8E+02	2.0E-03	13925355.8%
BENZENE	2.9E+01	1.0E-03	2898159.3%
TRICHLOROETHYLENE (TCE)	7.1E+01	5.0E-03	1413631.8%
cis-1,2-DICHLOROETHYLENE	3.2E+02	7.0E-02	461393.3%
TETRACHLOROETHYLENE(PCE)	2.6E+00	5.0E-03	51234.9%

Note: Top COCs by toxicity were determined by examining a representative concentration for each compound over the entire site. The compound representative concentrations are then compared with the chosen PRG for that compound, with the percentage excedence from the PRG determining the compound's toxicity. All compounds above exceed the PRG.

Prevalence:

Contaminant of Concern	Class	Total Wells	Total Excedences	Percent Excedences	Total detects
cis-1,2-DICHLOROETHYLENE	ORG	11	11	100.0%	11
BENZENE	ORG	11	10	90.9%	10
VINYL CHLORIDE	ORG	11	9	81.8%	9
TRICHLOROETHYLENE (TCE)	ORG	11	9	81.8%	9
TETRACHLOROETHYLENE(PCE)	ORG	11	3	27.3%	3

Note: Top COCs by prevalence were determined by examining a representative concentration for each well location at the site. The total excedences (values above the chosen PRGs) are compared to the total number of wells to determine the prevalence of the compound.

Mobility:

Contaminant of Concern	Kd
VINYL CHLORIDE	0.042
cis-1,2-DICHLOROETHYLENE	0.0724
BENZENE	0.0984
TRICHLOROETHYLENE (TCE)	0.297
TETRACHLOROETHYLENE(PCE)	0.923

Note: Top COCs by mobility were determined by examining each detected compound in the dataset and comparing their mobilities (Koc's for organics, assume foc = 0.001, and Kd's for metals).

Contaminants of Concern (COC's)

BENZENE

TETRACHLOROETHYLENE(PCE)

TRICHLOROETHYLENE (TCE)

cis-1,2-DICHLOROETHYLENE

VINYL CHLORIDE

MAROS Sampling Location Optimization Results

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Sampling Events Analyzed: **From** January 1987 **to** February 2009

1/19/1987 2/28/2009

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
BENZENE	0.3	0.1	0.75	0.75
cis-1,2-DICHLOROETHYLENE	0.3	0.1	0.75	0.75
TETRACHLOROETHYLENE(PCE	0.3	0.1	0.75	0.75
TRICHLOROETHYLENE (TCE)	0.3	0.1	0.75	0.75
VINYL CHLORIDE	0.3	0.1	0.75	0.75

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
BENZENE							
IR78-GW22	286730.66	3839314.25	☑	0.616	0.227	0.814	☐
IR78-GW23	286647.72	3839409.00	☑	0.174	0.001	0.663	☑
IR78-GW24-1	286764.81	3839557.50	☑	0.316	0.000	0.569	☐
IR78-GW40	286613.16	3839387.75	☑	0.479	0.162	0.741	☐
IR78-GW41	286738.59	3839499.75	☑	0.489	0.106	0.827	☐
IR78-GW44	286733.63	3839543.00	☑	0.482	0.166	1.000	☐
IR78-GW46	286684.00	3839377.75	☑	0.330	0.018	0.618	☐
IR78-GW47	286639.28	3839385.75	☑	0.258	0.066	0.656	☑
IR78-RW10	286687.13	3839396.50	☑	0.344	0.000	0.689	☐
IR78-RW11	286724.06	3839556.50	☑	0.343	0.000	0.931	☐
IR78-RW12	286607.19	3839427.75	☑	0.288	0.003	0.634	☐
cis-1,2-DICHLOROETHYLENE							
IR78-GW22	286730.66	3839314.25	☑	0.695	0.338	0.800	☐
IR78-GW23	286647.72	3839409.00	☑	0.647	0.479	0.898	☐
IR78-GW24-1	286764.81	3839557.50	☑	0.224	0.010	0.497	☐
IR78-GW40	286613.16	3839387.75	☑	0.761	0.187	1.000	☐
IR78-GW41	286738.59	3839499.75	☑	0.526	0.071	0.836	☐
IR78-GW44	286733.63	3839543.00	☑	0.380	0.159	0.645	☐
IR78-GW46	286684.00	3839377.75	☑	0.308	0.021	0.770	☐
IR78-GW47	286639.28	3839385.75	☑	0.595	0.093	1.000	☐
IR78-RW10	286687.13	3839396.50	☑	0.255	0.046	0.832	☑
IR78-RW11	286724.06	3839556.50	☑	0.381	0.005	0.908	☐
IR78-RW12	286607.19	3839427.75	☑	0.486	0.106	1.000	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
TETRACHLOROETHYLENE(PCE)							
IR78-GW22	286730.66	3839314.25	☑	0.136	0.000	0.518	☐
IR78-GW23	286647.72	3839409.00	☑	0.158	0.000	0.716	☑
IR78-GW24-1	286764.81	3839557.50	☑	0.152	0.000	0.641	☐
IR78-GW40	286613.16	3839387.75	☑	0.119	0.000	0.618	☐
IR78-GW41	286738.59	3839499.75	☑	0.187	0.000	0.717	☐
IR78-GW44	286733.63	3839543.00	☑	0.248	0.000	0.810	☐
IR78-GW46	286684.00	3839377.75	☑	0.115	0.000	0.639	☑
IR78-GW47	286639.28	3839385.75	☑	0.144	0.000	0.677	☑
IR78-RW10	286687.13	3839396.50	☑	0.128	0.000	0.720	☑
IR78-RW11	286724.06	3839556.50	☑	0.233	0.000	0.791	☐
IR78-RW12	286607.19	3839427.75	☑	0.089	0.000	0.666	☑
TRICHLOROETHYLENE (TCE)							
IR78-GW22	286730.66	3839314.25	☑	0.545	0.173	0.737	☐
IR78-GW23	286647.72	3839409.00	☑	0.324	0.034	0.595	☐
IR78-GW24-1	286764.81	3839557.50	☑	0.631	0.454	0.794	☐
IR78-GW40	286613.16	3839387.75	☑	0.471	0.000	0.775	☐
IR78-GW41	286738.59	3839499.75	☑	0.533	0.037	0.976	☐
IR78-GW44	286733.63	3839543.00	☑	0.452	0.092	1.000	☐
IR78-GW46	286684.00	3839377.75	☑	0.467	0.140	0.748	☐
IR78-GW47	286639.28	3839385.75	☑	0.332	0.000	0.674	☐
IR78-RW10	286687.13	3839396.50	☑	0.600	0.361	0.777	☐
IR78-RW11	286724.06	3839556.50	☑	0.378	0.000	0.793	☐
IR78-RW12	286607.19	3839427.75	☑	0.531	0.006	0.817	☐
VINYL CHLORIDE							
IR78-GW22	286730.66	3839314.25	☑	0.626	0.080	1.000	☐
IR78-GW23	286647.72	3839409.00	☑	0.808	0.569	1.000	☐
IR78-GW24-1	286764.81	3839557.50	☑	0.609	0.249	1.000	☐
IR78-GW40	286613.16	3839387.75	☑	0.796	0.377	1.000	☐
IR78-GW41	286738.59	3839499.75	☑	0.781	0.387	1.000	☐
IR78-GW44	286733.63	3839543.00	☑	0.592	0.377	0.783	☐
IR78-GW46	286684.00	3839377.75	☑	0.614	0.020	1.000	☐
IR78-GW47	286639.28	3839385.75	☑	0.757	0.303	1.000	☐
IR78-RW10	286687.13	3839396.50	☑	0.414	0.061	1.000	☐
IR78-RW11	286724.06	3839556.50	☑	0.340	0.004	1.000	☐
IR78-RW12	286607.19	3839427.75	☑	0.564	0.076	1.000	☐

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the state coordinates system (i.e., X and Y refer to Easting and Northing respectively) or local coordinates systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Location Optimization

Results by Considering All COCs

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

Sampling Events Analyzed: **From** January 1987 **to** February 2009

1/19/1987 2/28/2009

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
IR78-GW22	286730.66	3839314.25	5	0.524	☐
IR78-GW23	286647.72	3839409.00	5	0.422	☐
IR78-GW24-1	286764.81	3839557.50	5	0.386	☐
IR78-GW40	286613.16	3839387.75	5	0.525	☐
IR78-GW41	286738.59	3839499.75	5	0.503	☐
IR78-GW44	286733.63	3839543.00	5	0.431	☐
IR78-GW46	286684.00	3839377.75	5	0.367	☐
IR78-GW47	286639.28	3839385.75	5	0.417	☐
IR78-RW10	286687.13	3839396.50	5	0.348	☐
IR78-RW11	286724.06	3839556.50	5	0.335	☐
IR78-RW12	286607.19	3839427.75	5	0.391	☐

Note: the COC-Averaged Slope Factor is the value calculated by averaging those "Average Slope Factor" obtained earlier across COCs; to be conservative, a location is "abandoned" only when it is eliminated from all COCs; "abandoned" doesn't necessarily mean the abandon of well, it can mean that NO samples need to be collected for any COCs.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Frequency Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

The Overall Number of Sampling Events: 43

"Recent Period" defined by events: **From** January 1987 **To** February 2009

1/19/1987 2/28/2009

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
BENZENE	0.001	0.0005	0.001	0.002
cis-1,2-DICHLOROETHYLENE	0.07	0.035	0.07	0.14
TETRACHLOROETHYLENE(PCE	0.005	0.0025	0.005	0.01
TRICHLOROETHYLENE (TCE)	0.005	0.0025	0.005	0.01
VINYL CHLORIDE	0.002	0.001	0.002	0.004

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
BENZENE			
IR78-GW22	Annual	Annual	Annual
IR78-GW23	Annual	Annual	Annual
IR78-GW24-1	Quarterly	Quarterly	Quarterly
IR78-GW40	Annual	Annual	Annual
IR78-GW41	Annual	Annual	Annual
IR78-GW44	Quarterly	Quarterly	Quarterly
IR78-GW46	Annual	Annual	Annual
IR78-GW47	Annual	Annual	Annual
IR78-RW10	Annual	Annual	Annual
IR78-RW11	Annual	Annual	Annual
IR78-RW12	Quarterly	Quarterly	Quarterly
cis-1,2-DICHLOROETHYLENE			
IR78-GW22	Annual	Annual	Annual
IR78-GW23	Annual	Annual	Annual
IR78-GW24-1	Annual	Annual	Annual
IR78-GW40	Annual	Annual	Annual
IR78-GW41	Quarterly	Quarterly	Quarterly
IR78-GW44	Annual	Annual	Annual
IR78-GW46	Annual	Annual	Annual
IR78-GW47	Annual	Annual	Annual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-RW10	Annual	Annual	Annual
IR78-RW11	Annual	Annual	Annual
IR78-RW12	Annual	Annual	Annual
TETRACHLOROETHYLENE(PCE)			
IR78-GW22	Quarterly	Quarterly	Quarterly
IR78-GW23	Quarterly	Quarterly	Quarterly
IR78-GW24-1	Quarterly	Quarterly	Quarterly
IR78-GW40	Annual	Annual	Annual
IR78-GW41	Annual	Annual	Annual
IR78-GW44	Quarterly	Quarterly	Quarterly
IR78-GW46	Annual	Annual	Annual
IR78-GW47	Annual	Annual	Annual
IR78-RW10	Quarterly	Quarterly	Quarterly
IR78-RW11	Annual	Annual	Annual
IR78-RW12	Annual	Annual	Annual
TRICHLOROETHYLENE (TCE)			
IR78-GW22	Annual	Annual	Annual
IR78-GW23	Annual	Annual	Annual
IR78-GW24-1	Annual	Annual	Annual
IR78-GW40	Annual	Annual	Annual
IR78-GW41	Annual	Annual	Annual
IR78-GW44	Quarterly	Quarterly	Quarterly
IR78-GW46	Quarterly	Quarterly	Quarterly
IR78-GW47	Annual	Annual	Annual
IR78-RW10	Annual	Annual	Annual
IR78-RW11	Annual	Annual	Annual
IR78-RW12	Annual	Annual	Annual
VINYL CHLORIDE			
IR78-GW22	Quarterly	Quarterly	Quarterly
IR78-GW23	Annual	Annual	Annual
IR78-GW24-1	Annual	Annual	Annual
IR78-GW40	Quarterly	Quarterly	Quarterly
IR78-GW41	Annual	Annual	Annual
IR78-GW44	Annual	Annual	Annual
IR78-GW46	Annual	Annual	Annual
IR78-GW47	Annual	Annual	Annual

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-RW10	Annual	Annual	Annual
IR78-RW11	Annual	Annual	Annual
IR78-RW12	Annual	Annual	Annual

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

MAROS Power Analysis for Individual Well Cleanup Status

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 North

State: North Carolina

From Period: 1/19/1987 **to** 2/28/2009

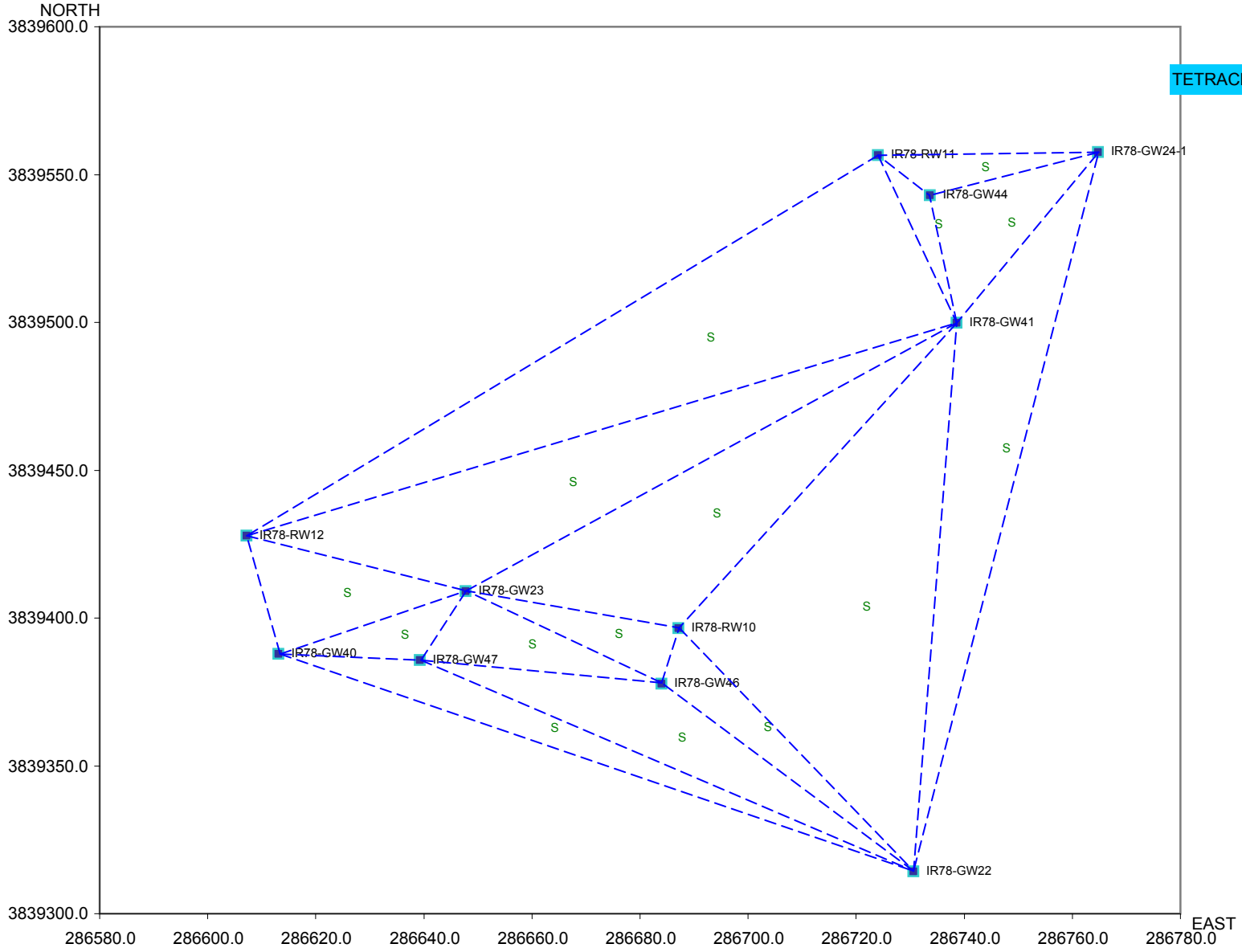
Well	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
BENZENE			Cleanup Goal (mg/L) = 0.001		Target Level (mg/L) = 0.0008		
IR78-GW22	12	1.27E+00	1.01E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW23	13	1.11E+01	7.07E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW24-1	14	1.48E+00	1.41E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW40	10	1.76E+00	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW41	9	1.56E+00	1.57E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW44	10	5.77E+00	7.48E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW46	10	1.40E+02	1.57E+02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW47	10	3.17E+00	1.31E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-RW10	10	1.28E+02	6.45E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW11	10	1.58E+00	1.49E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW12	10	3.35E+00	2.11E+00	Cont Sampling	Cont Sampling	0.05	0.8
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR78-GW22	9	1.51E+00	1.12E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW23	10	1.96E+03	2.68E+03	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW24-1	10	2.48E+02	8.97E+01	Cont Sampling	Not Attained	0.05	0.8
IR78-GW40	10	1.61E+00	1.49E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW41	9	1.20E+01	1.15E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW44	10	5.14E+02	5.27E+02	Cont Sampling	Not Attained	0.05	0.8
IR78-GW46	10	1.13E+01	5.90E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW47	10	3.52E+01	8.27E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW10	10	1.03E+02	1.09E+02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW11	10	7.21E+01	8.89E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW12	10	2.30E+02	3.69E+02	Cont Sampling	Cont Sampling	0.05	0.8
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR78-GW22	12	1.25E+00	1.07E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW23	12	5.29E+00	5.11E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW24-1	12	1.59E+00	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW40	10	1.76E+00	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW41	9	1.91E+00	1.56E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW44	10	5.86E+00	7.57E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW46	10	2.01E+00	1.43E+00	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 North **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR78-GW47	10	1.76E+00	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW10	10	2.50E+00	9.69E-01	Cont Sampling	Not Attained	0.05	0.8
IR78-RW11	10	1.56E+00	1.56E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW12	10	2.04E+00	1.30E+00	Cont Sampling	Not Attained	0.05	0.8
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR78-GW22	11	1.26E+00	1.08E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW23	14	4.48E+02	1.61E+03	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW24-1	15	2.24E+01	1.21E+01	Cont Sampling	Not Attained	0.05	0.8
IR78-GW40	10	1.76E+00	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW41	10	1.61E+00	1.56E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW44	10	5.46E+00	7.72E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW46	10	2.33E+00	1.38E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW47	10	3.27E+01	7.39E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW10	10	5.51E+01	3.59E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW11	10	1.56E+00	1.56E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW12	10	1.03E+02	1.69E+02	Cont Sampling	Cont Sampling	0.05	0.8
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR78-GW22	11	8.24E-01	7.15E-01	Cont Sampling	Not Attained	0.05	0.8
IR78-GW23	14	2.22E+02	1.78E+02	Cont Sampling	Not Attained	0.05	0.8
IR78-GW24-1	14	2.00E+01	5.76E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW40	10	1.09E+00	1.41E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW41	9	2.19E+00	2.66E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW44	10	2.25E+03	1.90E+03	Cont Sampling	Not Attained	0.05	0.8
IR78-GW46	10	1.26E+00	7.72E-01	Cont Sampling	Not Attained	0.05	0.8
IR78-GW47	10	1.44E+00	1.68E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW10	10	3.61E+00	3.24E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-RW11	10	2.39E+02	3.10E+02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW12	10	5.54E+00	4.92E+00	Cont Sampling	Cont Sampling	0.05	0.8

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the analysis; The Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The test for evaluating attainment status is from EPA (1992). Refer to Appendix A.6 of MAROS Manual for details.



New Location Analysis for

TETRACHLOROETHYLENE(PCE)

Existing Locations

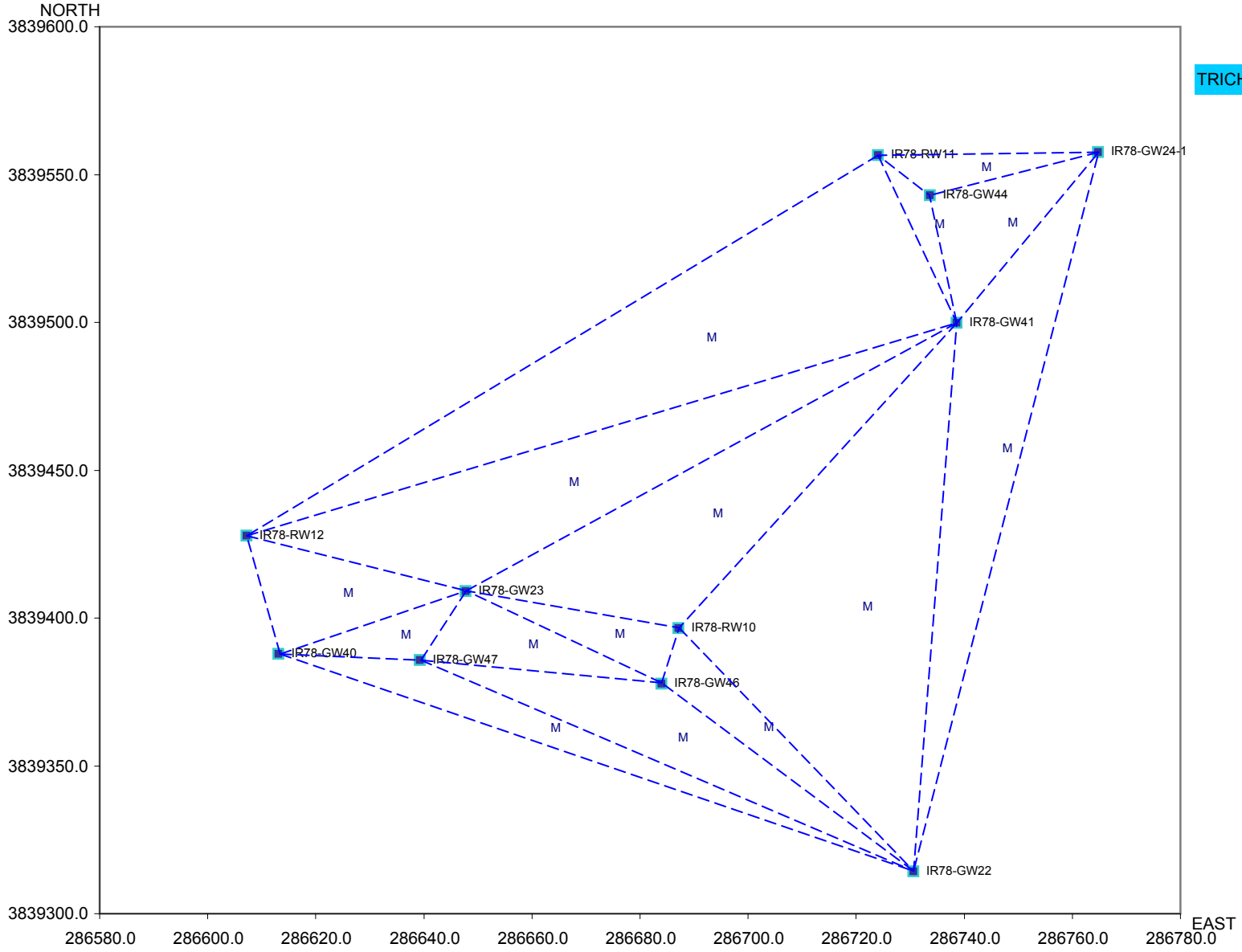
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

TRICHLOROETHYLENE (TCE)

Existing Locations

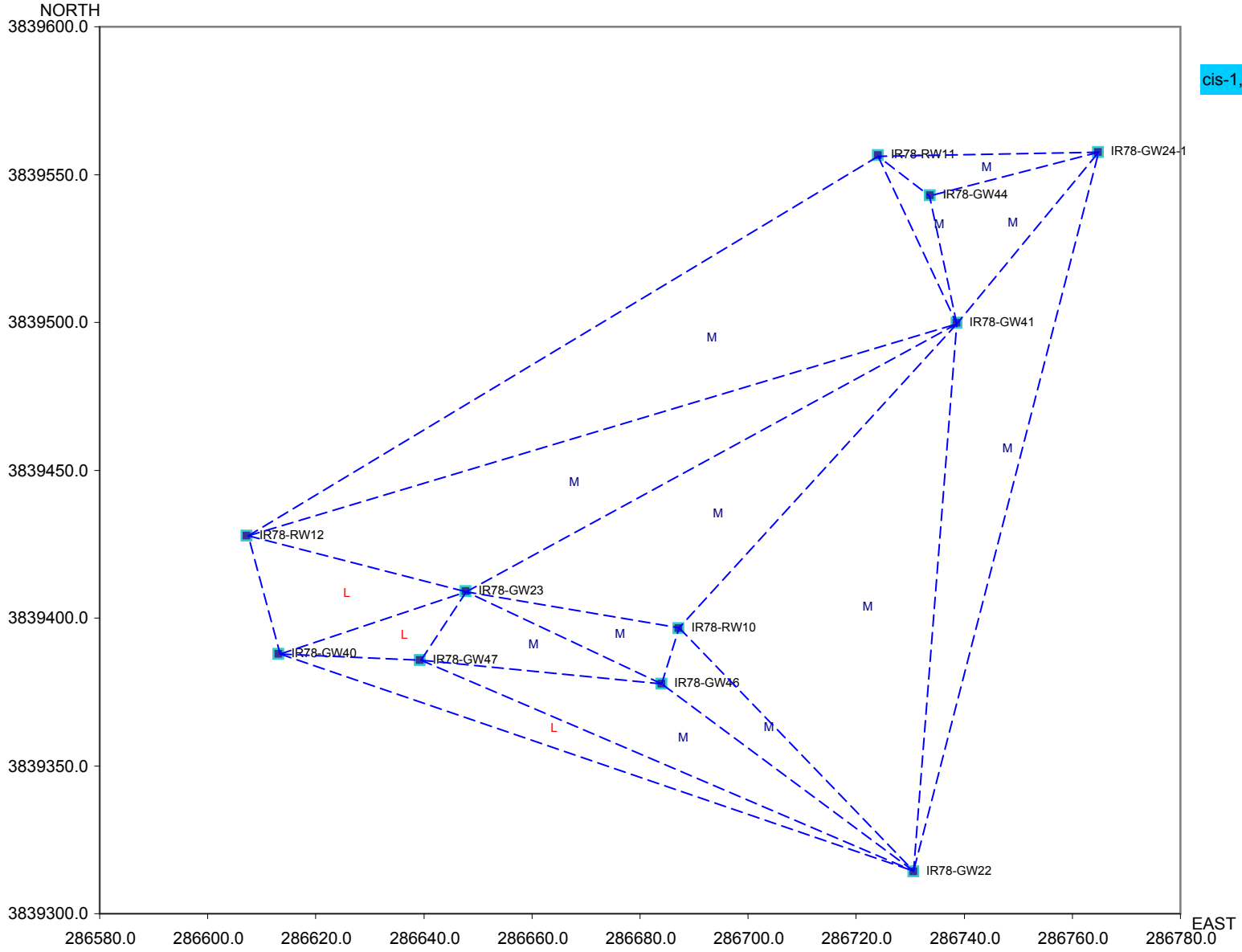
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

cis-1,2-DICHLOROETHYLENE

Existing Locations

Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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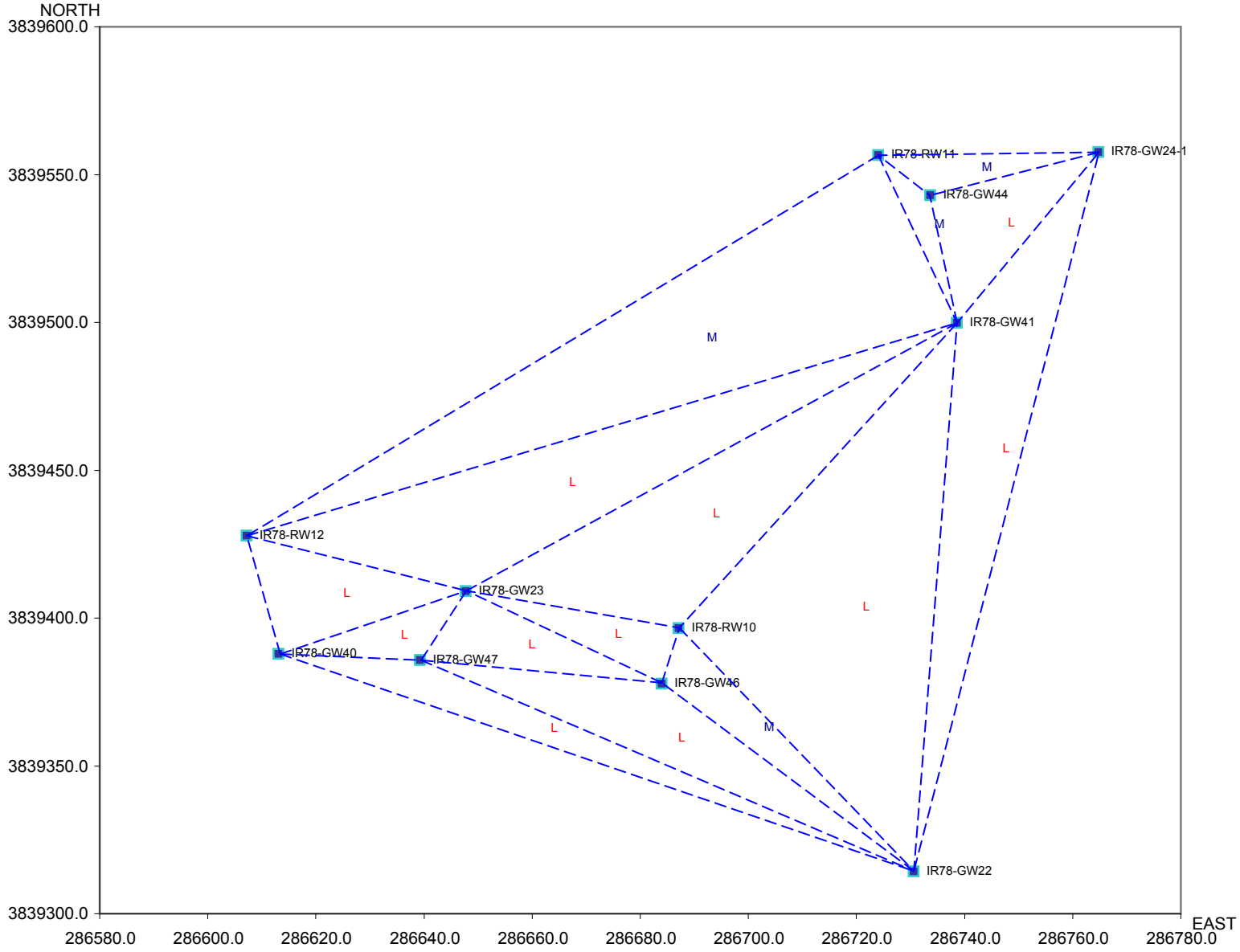


New Location Analysis for

VINYL CHLORIDE

Existing Locations

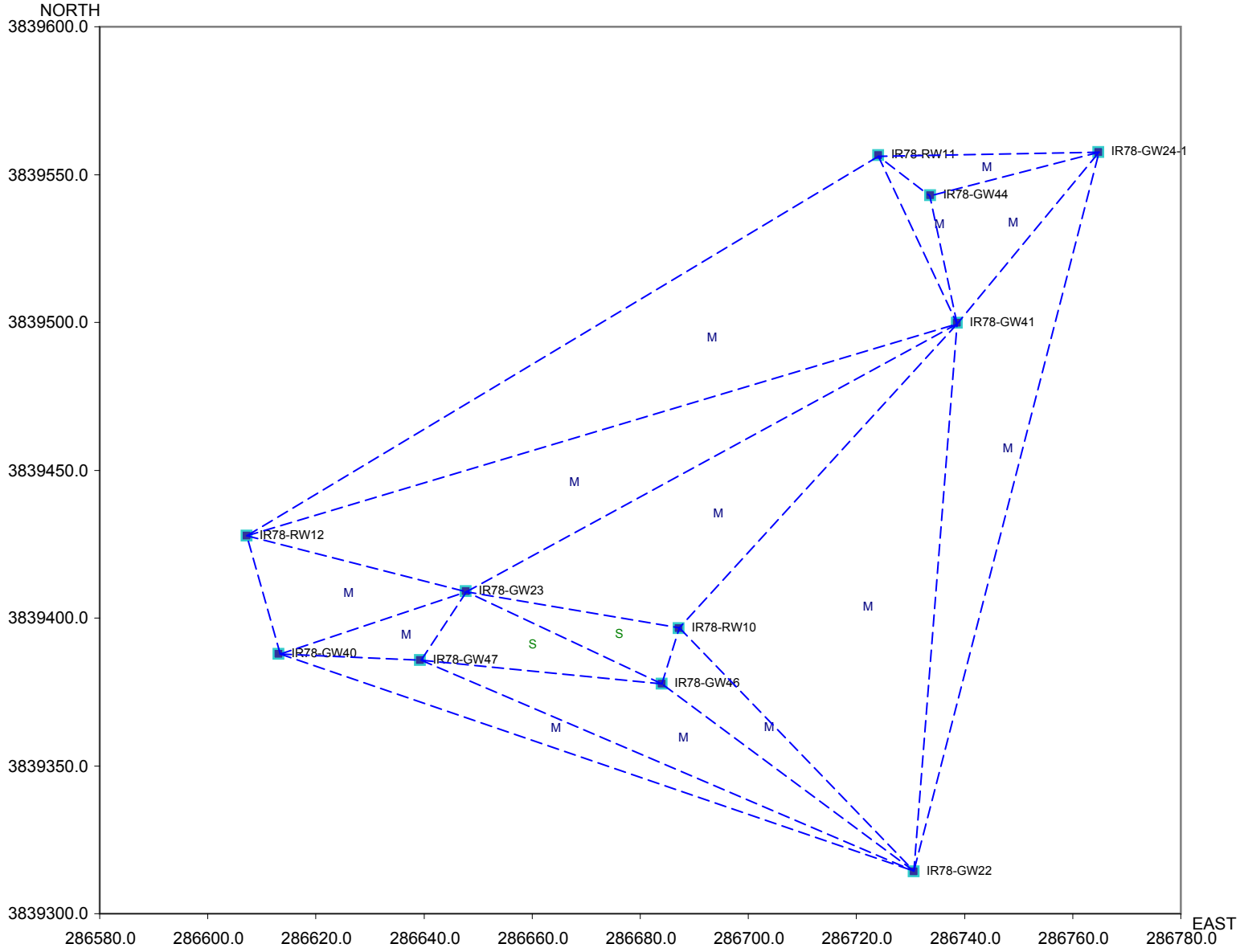
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

BENZENE

Existing Locations

Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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MAROS Site Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

User Defined Site and Data Assumptions:

Hydrogeology and Plume Information:

Groundwater Seepage Velocity: 9.88 ft/yr

Current Plume Length: 1350 ft

Current Plume Width 900 ft

Number of Tail Wells: 21

Number of Source Wells: 12

Source Information:

Source Treatment: Pump and Treat

NAPL is not observed at this site.

Down-gradient Information:

Distance from Edge of Tail to Nearest:

Down-gradient receptor: 900 ft

Down-gradient property: 900 ft

Distance from Source to Nearest:

Down-gradient receptor: 2700 ft

Down-gradient property: 2700 ft

Data Consolidation Assumptions:

Time Period: 1/14/1987 **to** 2/15/2009

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Plume Information Weighting Assumptions:

Consolidation Step 1. Weight Plume Information by Chemical

Summary Weighting: Weighting Applied to All Chemicals Equally

Consolidation Step 2. Weight Well Information by Chemical

Well Weighting: No Weighting of Wells was Applied.

Chemical Weighting: No Weighting of Chemicals was Applied.

Note: These assumptions were made when consolidating the historical montoring data and lumping the Wells and COCs.

1. Compliance Monitoring/Remediation Optimization Results:

Preliminary Monitoring System Optimization Results: Based on site classification, source treatment and Monitoring System Category the following suggestions are made for site Sampling Frequency, Duration of Sampling before reassessment, and Well Density. These criteria take into consideration: Plume Stability, Type of Plume, and Groundwater Velocity.

COC	Tail Stability	Source Stability	Level of Effort	Sampling Duration	Sampling Frequency	Sampling Density
BENZENE	S	NT	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	29
cis-1,2-DICHLOROETHYLENE	S	S	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	29
TETRACHLOROETHYLENE(PCE)	S	NT	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	29
TRICHLOROETHYLENE (TCE)	S	S	M	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	29
VINYL CHLORIDE	NT	NT	E	Remove treatment system if previously reducing concentration or PRG met.	No Recommendation	29

Note:

Plume Status: (I) Increasing; (PI)Probably Increasing; (S) Stable; (NT) No Trend; (PD) Probably Decreasing; (D) Decreasing

Design Categories: (E) Extensive; (M) Moderate; (L) Limited (N/A) Not Applicable, Insufficient Data Available

Level of Monitoring Effort Indicated by Analysi Extensive

2. Spatial Moment Analysis Results:

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	BENZENE	1.78	-7	53.4%	NT
	cis-1,2-DICHLOROETHYLENE	1.72	-76	95.1%	D
	TETRACHLOROETHYLENE(PCE)	1.70	-62	83.7%	NT
	TRICHLOROETHYLENE (TCE)	2.17	78	82.3%	NT
	VINYL CHLORIDE	2.12	-5	52.5%	NT
1st Moment: Distance to Source					
	BENZENE	0.18	19	73.3%	NT
	cis-1,2-DICHLOROETHYLENE	0.26	-3	53.9%	S
	TETRACHLOROETHYLENE(PCE)	0.36	23	77.7%	NT
	TRICHLOROETHYLENE (TCE)	0.43	36	87.0%	NT
	VINYL CHLORIDE	0.25	1	50.0%	NT
2nd Moment: Sigma XX					
	BENZENE	0.72	91	99.9%	I
	cis-1,2-DICHLOROETHYLENE	0.78	69	100.0%	I
	TETRACHLOROETHYLENE(PCE)	0.65	95	100.0%	I
	TRICHLOROETHYLENE (TCE)	1.01	82	99.6%	I
	VINYL CHLORIDE	0.69	69	99.2%	I
2nd Moment: Sigma YY					
	BENZENE	0.35	69	99.2%	I
	cis-1,2-DICHLOROETHYLENE	0.36	-23	85.9%	S
	TETRACHLOROETHYLENE(PCE)	0.37	-17	71.0%	S
	TRICHLOROETHYLENE (TCE)	0.40	0	48.7%	S
	VINYL CHLORIDE	0.35	61	98.3%	I

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.30 **Saturated Thickness:** Uniform: 25 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

MAROS Mann-Kendall Statistics Summary

Project: 2009 LTMO Update
User Name: CH2M HILL
Location: Site 78 South
State: North Carolina

Time Period: 1/14/1987 **to** 2/15/2009
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
BENZENE								
IR78-GW49	S	9	1	0.61	6	69.4%	No	NT
IR78-GW74	S	11	11	0.70	21	94.0%	No	PI
IR78-GW09-1	S	18	0	0.74	2	51.5%	Yes	NT
IR78-GW08	S	18	0	0.92	13	67.3%	Yes	NT
IR78-GW78	S	15	13	2.62	-31	93.0%	No	PD
IR78-GW10	S	19	0	0.96	23	77.7%	Yes	NT
IR78-GW51	S	8	3	0.83	-16	96.9%	No	D
IR78-GW73	S	9	2	0.86	9	79.2%	No	NT
IR78-GW11	S	19	0	0.94	12	64.8%	Yes	NT
IR78-GW60	S	19	3	1.38	53	96.6%	No	I
IR78-RW15	S	14	6	1.16	-28	92.9%	No	PD
IR78-GW05	S	14	0	0.94	-3	54.3%	Yes	S
IR78-RW06	T	10	0	0.56	-20	95.5%	Yes	D
IR78-GW65	T	10	6	1.71	-6	66.8%	No	NT
IR78-RW07	T	9	0	0.50	-14	91.0%	Yes	PD
IR78-GW50	T	11	0	0.90	-15	85.9%	Yes	S
IR78-GW64	T	10	0	0.84	-12	83.2%	Yes	S
IR78-GW42	T	21	14	1.80	74	98.7%	No	I
IR78-RW05	T	9	3	1.01	-12	87.0%	No	NT
IR78-GW39	T	20	0	0.91	28	80.7%	Yes	NT
IR78-RW14	T	12	10	3.09	-19	88.9%	No	NT
IR78-GW59	T	11	8	2.84	0	46.9%	No	NT
IR78-GW01	T	22	12	1.82	-65	96.5%	No	D
IR78-GW58	T	8	8	0.20	3	59.4%	No	NT
IR78-GW04-1	T	16	6	1.35	26	86.7%	No	NT
IR78-GW54	T	8	0	0.64	-6	72.6%	Yes	S
IR78-RW08	T	13	0	0.60	-23	90.8%	Yes	PD
IR78-GW61	T	11	0	1.01	-12	79.9%	Yes	NT
IR78-GW53	T	11	8	1.38	-14	84.0%	No	NT
IR78-GW62	T	8	0	1.06	-6	72.6%	Yes	NT
IR78-RW09R	T	2	0	0.00	0	0.0%	Yes	N/A
IR78-GW52R	T	2	2	0.00	0	0.0%	No	N/A
IR78-GW63	T	10	0	0.93	-10	78.4%	Yes	S
cis-1,2-DICHLOROETHYLENE								
IR78-GW49	S	9	1	0.57	16	94.0%	No	PI
IR78-GW51	S	8	3	0.83	-14	94.6%	No	PD
IR78-GW73	S	9	8	1.59	12	87.0%	No	NT

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
cis-1,2-DICHLOROETHYLENE								
IR78-GW74	S	11	11	0.78	32	99.4%	No	I
IR78-GW60	S	19	12	1.56	-8	59.6%	No	NT
IR78-GW05	S	12	0	0.83	-19	88.9%	Yes	S
IR78-GW09-1	S	14	14	1.16	-81	100.0%	No	D
IR78-GW78	S	15	15	0.90	21	83.6%	No	NT
IR78-GW08	S	14	1	0.76	-28	92.9%	No	PD
IR78-GW10	S	14	0	0.74	-27	92.1%	Yes	PD
IR78-GW11	S	15	0	0.77	-32	93.7%	Yes	PD
IR78-RW15	S	14	12	1.00	-11	70.5%	No	S
IR78-RW14	T	12	10	2.48	-20	90.2%	No	PD
IR78-GW61	T	11	0	1.01	-12	79.9%	Yes	NT
IR78-GW53	T	11	2	0.95	6	64.8%	No	NT
IR78-RW08	T	13	8	1.92	4	57.1%	No	NT
IR78-GW04-1	T	9	5	1.31	-7	72.8%	No	NT
IR78-GW64	T	10	10	1.00	37	100.0%	No	I
IR78-GW62	T	8	2	1.18	-12	91.1%	No	PD
IR78-GW52R	T	2	2	0.00	0	0.0%	No	N/A
IR78-GW54	T	8	5	2.40	5	68.3%	No	NT
IR78-GW63	T	10	10	1.19	33	99.9%	No	I
IR78-GW01	T	15	14	3.74	22	84.8%	No	NT
IR78-GW58	T	8	5	1.91	9	83.2%	No	NT
IR78-RW09R	T	2	0	0.00	0	0.0%	Yes	N/A
IR78-GW42	T	20	20	0.34	3	52.6%	No	NT
IR78-GW39	T	15	1	0.71	-24	87.0%	No	S
IR78-GW59	T	11	11	0.91	-51	100.0%	No	D
IR78-RW05	T	9	7	2.04	-4	61.9%	No	NT
IR78-GW50	T	11	10	3.30	-26	97.5%	No	D
IR78-RW06	T	10	4	1.11	1	50.0%	No	NT
IR78-GW65	T	10	10	0.47	-22	97.1%	No	D
IR78-RW07	T	9	6	1.85	8	76.2%	No	NT
TETRACHLOROETHYLENE(PCE)								
IR78-GW09-1	S	18	1	0.76	-2	51.5%	No	S
IR78-GW11	S	19	0	0.94	12	64.8%	Yes	NT
IR78-GW60	S	19	1	1.37	40	91.3%	No	PI
IR78-GW73	S	9	7	2.91	8	76.2%	No	NT
IR78-RW15	S	14	9	1.51	-32	95.5%	No	D
IR78-GW49	S	9	2	1.35	-14	91.0%	No	PD
IR78-GW10	S	18	0	0.92	13	67.3%	Yes	NT
IR78-GW78	S	15	0	1.14	35	95.4%	Yes	I
IR78-GW74	S	11	4	1.25	25	97.0%	No	I
IR78-GW05	S	13	0	0.89	-11	72.5%	Yes	S
IR78-GW51	S	8	0	0.70	-15	95.8%	Yes	D
IR78-GW08	S	18	0	0.92	13	67.3%	Yes	NT
IR78-GW04-1	T	14	0	0.94	35	96.9%	Yes	I
IR78-GW54	T	8	0	0.64	-6	72.6%	Yes	S
IR78-GW39	T	21	14	1.70	-14	65.1%	No	NT
IR78-GW50	T	11	0	0.90	-15	85.9%	Yes	S
IR78-GW01	T	19	0	0.94	12	64.8%	Yes	NT
IR78-GW53	T	11	0	0.71	-3	56.0%	Yes	S

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TETRACHLOROETHYLENE(PCE)								
IR78-GW52R	T	2	1	0.00	0	0.0%	No	N/A
IR78-GW42	T	20	0	1.07	46	92.7%	Yes	PI
IR78-GW58	T	8	1	2.14	4	64.0%	No	NT
IR78-GW62	T	8	2	1.40	-1	50.0%	No	NT
IR78-GW65	T	10	0	0.82	-12	83.2%	Yes	S
IR78-GW64	T	10	0	0.84	-12	83.2%	Yes	S
IR78-RW05	T	9	2	0.96	-8	76.2%	No	S
IR78-RW06	T	10	1	0.59	-20	95.5%	No	D
IR78-GW63	T	10	0	0.93	-10	78.4%	Yes	S
IR78-RW07	T	9	0	0.50	-14	91.0%	Yes	PD
IR78-RW08	T	13	1	0.62	-24	91.8%	No	PD
IR78-GW61	T	11	0	1.01	-12	79.9%	Yes	NT
IR78-RW14	T	12	7	1.23	-41	99.8%	No	D
IR78-GW59	T	11	0	0.87	-16	87.5%	Yes	S
IR78-RW09R	T	2	0	0.00	0	0.0%	Yes	N/A
TRICHLOROETHYLENE (TCE)								
IR78-RW15	S	14	14	1.35	-65	100.0%	No	D
IR78-GW49	S	9	1	0.75	4	61.9%	No	NT
IR78-GW78	S	15	13	2.31	-23	85.9%	No	NT
IR78-GW11	S	23	3	1.11	80	98.2%	No	I
IR78-GW09-1	S	26	26	1.89	-281	100.0%	No	D
IR78-GW10	S	20	3	1.04	43	91.3%	No	PI
IR78-GW51	S	8	3	1.02	-16	96.9%	No	D
IR78-GW08	S	18	0	0.92	13	67.3%	Yes	NT
IR78-GW05	S	14	0	0.94	-3	54.3%	Yes	S
IR78-GW60	S	19	19	0.41	-73	99.5%	No	D
IR78-GW73	S	9	6	2.93	8	76.2%	No	NT
IR78-GW74	S	11	7	1.81	2	53.0%	No	NT
IR78-RW07	T	9	3	1.08	3	58.0%	No	NT
IR78-RW05	T	9	8	2.80	-28	99.9%	No	D
IR78-GW01	T	25	24	4.17	-141	100.0%	No	D
IR78-GW04-1	T	20	18	3.22	0	48.7%	No	NT
IR78-RW14	T	12	6	1.04	-28	96.9%	No	D
IR78-RW09R	T	2	0	0.00	0	0.0%	Yes	N/A
IR78-GW59	T	11	9	1.57	-11	77.7%	No	NT
IR78-RW06	T	10	5	1.19	-11	81.0%	No	NT
IR78-GW39	T	20	4	1.06	5	55.1%	No	NT
IR78-GW58	T	8	1	2.14	4	64.0%	No	NT
IR78-RW08	T	13	9	2.09	-3	54.8%	No	NT
IR78-GW54	T	8	5	2.40	8	80.1%	No	NT
IR78-GW61	T	11	0	1.01	-12	79.9%	Yes	NT
IR78-GW53	T	11	3	1.08	14	84.0%	No	NT
IR78-GW52R	T	2	1	0.00	0	0.0%	No	N/A
IR78-GW63	T	10	4	1.33	-7	70.0%	No	NT
IR78-GW62	T	8	3	1.90	0	45.2%	No	NT
IR78-GW50	T	11	2	1.10	-8	70.3%	No	NT
IR78-GW64	T	10	3	1.24	-7	70.0%	No	NT
IR78-GW42	T	21	21	0.45	-87	99.6%	No	D
IR78-GW65	T	10	9	2.55	-23	97.7%	No	D

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
VINYL CHLORIDE								
VINYL CHLORIDE								
IR78-GW09-1	S	18	0	1.02	26	82.6%	Yes	NT
IR78-GW05	S	13	0	1.28	-11	72.5%	Yes	NT
IR78-GW73	S	9	0	2.75	14	91.0%	Yes	PI
IR78-GW08	S	19	0	1.30	23	77.7%	Yes	NT
IR78-GW51	S	8	0	0.54	-15	95.8%	Yes	D
IR78-GW11	S	20	0	1.29	23	76.0%	Yes	NT
IR78-RW15	S	14	0	0.32	-37	97.6%	Yes	D
IR78-GW60	S	19	1	1.38	34	87.4%	No	NT
IR78-GW10	S	18	1	1.30	10	63.2%	No	NT
IR78-GW74	S	11	1	1.33	18	90.5%	No	PI
IR78-GW78	S	15	0	1.14	31	93.0%	Yes	PI
IR78-GW49	S	9	0	1.26	12	87.0%	Yes	NT
IR78-RW14	T	12	2	1.24	1	50.0%	No	NT
IR78-GW01	T	19	2	1.49	33	86.7%	No	NT
IR78-GW59	T	11	9	0.81	-3	56.0%	No	S
IR78-GW04-1	T	14	3	1.59	17	80.6%	No	NT
IR78-GW58	T	8	0	1.84	14	94.6%	Yes	PI
IR78-GW53	T	11	0	0.90	-3	56.0%	Yes	S
IR78-GW54	T	8	2	1.50	-3	59.4%	No	NT
IR78-RW09R	T	2	0	0.00	0	0.0%	Yes	N/A
IR78-RW08	T	13	1	1.11	-2	52.4%	No	NT
IR78-GW52R	T	2	1	0.00	0	0.0%	No	N/A
IR78-RW07	T	9	0	0.40	-14	91.0%	Yes	PD
IR78-GW39	T	20	0	1.25	28	80.7%	Yes	NT
IR78-RW06	T	10	1	0.55	-8	72.9%	No	S
IR78-GW65	T	10	10	0.62	-22	97.1%	No	D
IR78-GW62	T	8	0	1.38	-6	72.6%	Yes	NT
IR78-RW05	T	9	6	2.31	2	54.0%	No	NT
IR78-GW50	T	11	2	1.49	-8	70.3%	No	NT
IR78-GW63	T	10	1	1.34	-10	78.4%	No	NT
IR78-GW64	T	10	4	1.59	-6	66.8%	No	NT
IR78-GW42	T	21	19	3.69	108	100.0%	No	I
IR78-GW61	T	11	0	1.37	-12	79.9%	Yes	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Plume Analysis Summary

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Time Period: 1/14/1987 **to** 2/15/2009

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
BENZENE											
	IR78-GW49	S	9	1	3.0E+00	2.5E+00	No	NT	NT	N/A	N/A
	IR78-GW74	S	11	11	1.4E+00	1.1E+00	No	PI	PI	N/A	N/A
	IR78-GW09-1	S	18	0	1.8E+00	2.5E+00	Yes	NT	NT	N/A	N/A
	IR78-GW08	S	18	0	1.5E+00	1.5E+00	Yes	NT	NT	N/A	N/A
	IR78-GW78	S	15	13	1.7E+01	1.5E-01	No	PD	NT	N/A	N/A
	IR78-GW10	S	19	0	1.5E+00	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW51	S	8	3	1.6E+00	2.5E+00	No	D	D	N/A	N/A
	IR78-GW73	S	9	2	1.5E+00	5.0E-01	No	NT	NT	N/A	N/A
	IR78-GW11	S	19	0	1.5E+00	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW60	S	19	3	2.3E+01	5.0E+00	No	I	I	N/A	N/A
	IR78-RW15	S	14	6	1.0E+00	2.5E-01	No	PD	NT	N/A	N/A
	IR78-GW05	S	14	0	1.6E+00	1.5E+00	Yes	S	NT	N/A	N/A
	IR78-RW06	T	10	0	1.9E+00	2.5E+00	Yes	D	D	N/A	N/A
	IR78-GW65	T	10	6	9.7E-01	1.0E-03	No	NT	NT	N/A	N/A
	IR78-RW07	T	9	0	2.0E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW50	T	11	0	1.7E+00	2.5E+00	Yes	S	PD	N/A	N/A
	IR78-GW64	T	10	0	1.8E+00	1.9E+00	Yes	S	S	N/A	N/A
	IR78-GW42	T	21	14	4.6E+00	4.4E-03	No	I	NT	N/A	N/A
	IR78-RW05	T	9	3	1.7E+00	2.5E+00	No	NT	D	N/A	N/A
	IR78-GW39	T	20	0	1.5E+00	1.5E+00	Yes	NT	NT	N/A	N/A
	IR78-RW14	T	12	10	2.3E-01	5.0E-03	No	NT	NT	N/A	N/A
	IR78-GW59	T	11	8	5.2E-01	4.0E-03	No	NT	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
BENZENE											
	IR78-GW01	T	22	12	7.4E-01	2.3E-02	No	D	D	N/A	N/A
	IR78-GW58	T	8	8	2.7E-01	2.9E-01	No	NT	S	N/A	N/A
	IR78-GW04-1	T	16	6	1.1E+00	2.5E-01	No	NT	NT	N/A	N/A
	IR78-GW54	T	8	0	2.3E+00	2.5E+00	Yes	S	D	N/A	N/A
	IR78-RW08	T	13	0	2.1E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW61	T	11	0	1.5E+00	5.0E-01	Yes	NT	PD	N/A	N/A
	IR78-GW53	T	11	8	8.0E-01	2.2E-01	No	NT	D	N/A	N/A
	IR78-GW62	T	8	0	1.6E+00	1.0E+00	Yes	NT	NT	N/A	N/A
	IR78-RW09R	T	2	0	3.8E-01	3.8E-01	Yes	N/A	N/A	N/A	N/A
	IR78-GW52R	T	2	2	3.7E-02	3.7E-02	No	N/A	N/A	N/A	N/A
	IR78-GW63	T	10	0	1.7E+00	1.6E+00	Yes	S	S	N/A	N/A
cis-1,2-DICHLOROETHYLENE											
	IR78-GW49	S	9	1	3.2E+00	2.5E+00	No	PI	NT	N/A	N/A
	IR78-GW51	S	8	3	1.6E+00	2.5E+00	No	PD	D	N/A	N/A
	IR78-GW73	S	9	8	1.7E+00	9.0E-03	No	NT	PI	N/A	N/A
	IR78-GW74	S	11	11	3.3E+00	2.3E+00	No	I	I	N/A	N/A
	IR78-GW60	S	19	12	2.1E+01	1.2E-02	No	NT	NT	N/A	N/A
	IR78-GW05	S	12	0	1.8E+00	2.5E+00	Yes	S	D	N/A	N/A
	IR78-GW09-1	S	14	14	1.2E-02	6.0E-03	No	D	D	N/A	N/A
	IR78-GW78	S	15	15	6.3E-01	5.7E-01	No	NT	I	N/A	N/A
	IR78-GW08	S	14	1	1.9E+00	2.5E+00	No	PD	PD	N/A	N/A
	IR78-GW10	S	14	0	1.9E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-GW11	S	15	0	1.8E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-RW15	S	14	12	6.9E-01	5.0E-01	No	S	S	N/A	N/A
	IR78-RW14	T	12	10	6.3E-01	2.6E-03	No	PD	NT	N/A	N/A
	IR78-GW61	T	11	0	1.5E+00	5.0E-01	Yes	NT	PD	N/A	N/A
	IR78-GW53	T	11	2	2.8E+00	2.5E+00	No	NT	I	N/A	N/A
	IR78-RW08	T	13	8	8.1E-01	8.0E-03	No	NT	NT	N/A	N/A
	IR78-GW04-1	T	9	5	1.4E+00	6.0E-03	No	NT	NT	N/A	N/A
	IR78-GW64	T	10	10	3.0E-02	2.1E-02	No	I	I	N/A	N/A
	IR78-GW62	T	8	2	1.5E+00	8.8E-01	No	PD	D	N/A	N/A
	IR78-GW52R	T	2	2	7.0E-01	7.0E-01	No	N/A	N/A	N/A	N/A
	IR78-GW54	T	8	5	7.2E-01	9.0E-03	No	NT	I	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
cis-1,2-DICHLOROETHYLENE											
	IR78-GW63	T	10	10	1.1E-02	5.3E-03	No	I	I	N/A	N/A
	IR78-GW01	T	15	14	1.7E-01	7.0E-03	No	NT	NT	N/A	N/A
	IR78-GW58	T	8	5	2.4E+01	4.5E-03	No	NT	I	N/A	N/A
	IR78-RW09R	T	2	0	3.8E-01	3.8E-01	Yes	N/A	N/A	N/A	N/A
	IR78-GW42	T	20	20	7.4E-01	7.9E-01	No	NT	PI	N/A	N/A
	IR78-GW39	T	15	1	1.9E+00	2.5E+00	No	S	D	N/A	N/A
	IR78-GW59	T	11	11	8.7E-02	8.7E-02	No	D	D	N/A	N/A
	IR78-RW05	T	9	7	8.6E-01	3.4E-02	No	NT	NT	N/A	N/A
	IR78-GW50	T	11	10	4.6E-01	2.0E-03	No	D	NT	N/A	N/A
	IR78-RW06	T	10	4	1.1E+00	3.8E-01	No	NT	NT	N/A	N/A
	IR78-GW65	T	10	10	1.2E-01	1.2E-01	No	D	D	N/A	N/A
	IR78-RW07	T	9	6	5.9E-01	8.0E-03	No	NT	NT	N/A	N/A
TETRACHLOROETHYLENE(PCE)											
	IR78-GW09-1	S	18	1	1.8E+00	2.5E+00	No	S	S	N/A	N/A
	IR78-GW11	S	19	0	1.5E+00	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW60	S	19	1	2.3E+01	5.0E+00	No	PI	PI	N/A	N/A
	IR78-GW73	S	9	7	2.3E+01	8.2E-02	No	NT	PI	N/A	N/A
	IR78-RW15	S	14	9	6.0E-01	1.6E-02	No	D	NT	N/A	N/A
	IR78-GW49	S	9	2	2.8E+00	2.5E+00	No	PD	D	N/A	N/A
	IR78-GW10	S	18	0	1.5E+00	1.5E+00	Yes	NT	NT	N/A	N/A
	IR78-GW78	S	15	0	5.1E+01	1.0E+01	Yes	I	I	N/A	N/A
	IR78-GW74	S	11	4	4.4E+01	2.5E+01	No	I	I	N/A	N/A
	IR78-GW05	S	13	0	1.7E+00	2.5E+00	Yes	S	S	N/A	N/A
	IR78-GW51	S	8	0	1.7E+00	2.5E+00	Yes	D	D	N/A	N/A
	IR78-GW08	S	18	0	1.5E+00	1.5E+00	Yes	NT	NT	N/A	N/A
	IR78-GW04-1	T	14	0	1.6E+00	1.5E+00	Yes	I	I	N/A	N/A
	IR78-GW54	T	8	0	2.3E+00	2.5E+00	Yes	S	D	N/A	N/A
	IR78-GW39	T	21	14	8.5E-01	1.0E-03	No	NT	NT	N/A	N/A
	IR78-GW50	T	11	0	1.7E+00	2.5E+00	Yes	S	PD	N/A	N/A
	IR78-GW01	T	19	0	1.5E+00	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW53	T	11	0	3.3E+00	2.5E+00	Yes	S	S	N/A	N/A
	IR78-GW52R	T	2	1	1.3E+01	1.3E+01	No	N/A	N/A	N/A	N/A
	IR78-GW42	T	20	0	7.3E+00	3.8E+00	Yes	PI	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
TETRACHLOROETHYLENE(PCE)											
	IR78-GW58	T	8	1	1.0E+01	2.5E+00	No	NT	NT	N/A	N/A
	IR78-GW62	T	8	2	1.3E+00	3.8E-01	No	NT	NT	N/A	N/A
	IR78-GW65	T	10	0	1.8E+00	2.0E+00	Yes	S	S	N/A	N/A
	IR78-GW64	T	10	0	1.8E+00	1.9E+00	Yes	S	S	N/A	N/A
	IR78-RW05	T	9	2	1.8E+00	2.5E+00	No	S	S	N/A	N/A
	IR78-RW06	T	10	1	1.8E+00	2.5E+00	No	D	D	N/A	N/A
	IR78-GW63	T	10	0	1.7E+00	1.6E+00	Yes	S	S	N/A	N/A
	IR78-RW07	T	9	0	2.0E+00	2.5E+00	Yes	PD	D	N/A	N/A
	IR78-RW08	T	13	1	2.1E+00	2.5E+00	No	PD	PD	N/A	N/A
	IR78-GW61	T	11	0	1.5E+00	5.0E-01	Yes	NT	PD	N/A	N/A
	IR78-RW14	T	12	7	1.0E+00	2.6E-03	No	D	D	N/A	N/A
	IR78-GW59	T	11	0	1.7E+00	2.5E+00	Yes	S	D	N/A	N/A
	IR78-RW09R	T	2	0	3.8E-01	3.8E-01	Yes	N/A	N/A	N/A	N/A
TRICHLOROETHYLENE (TCE)											
	IR78-RW15	S	14	14	1.8E+00	9.9E-01	No	D	D	N/A	N/A
	IR78-GW49	S	9	1	2.7E+00	2.5E+00	No	NT	NT	N/A	N/A
	IR78-GW78	S	15	13	1.9E+01	1.3E-01	No	NT	NT	N/A	N/A
	IR78-GW11	S	23	3	1.2E+00	2.5E-01	No	I	I	N/A	N/A
	IR78-GW09-1	S	26	26	7.7E-01	1.9E-01	No	D	D	N/A	N/A
	IR78-GW10	S	20	3	1.4E+00	3.8E-01	No	PI	PI	N/A	N/A
	IR78-GW51	S	8	3	1.3E+00	1.4E+00	No	D	D	N/A	N/A
	IR78-GW08	S	18	0	1.5E+00	1.5E+00	Yes	NT	NT	N/A	N/A
	IR78-GW05	S	14	0	1.6E+00	1.5E+00	Yes	S	NT	N/A	N/A
	IR78-GW60	S	19	19	2.8E+00	2.4E+00	No	D	D	N/A	N/A
	IR78-GW73	S	9	6	2.3E+01	1.2E-02	No	NT	NT	N/A	N/A
	IR78-GW74	S	11	7	2.7E+01	5.0E+00	No	NT	NT	N/A	N/A
	IR78-RW07	T	9	3	1.2E+00	2.5E-01	No	NT	NT	N/A	N/A
	IR78-RW05	T	9	8	3.0E-01	1.3E-02	No	D	D	N/A	N/A
	IR78-GW01	T	25	24	1.2E-01	1.8E-02	No	D	D	N/A	N/A
	IR78-GW04-1	T	20	18	3.8E-01	5.5E-03	No	NT	NT	N/A	N/A
	IR78-RW14	T	12	6	1.3E+00	1.3E+00	No	D	D	N/A	N/A
	IR78-RW09R	T	2	0	3.8E-01	3.8E-01	Yes	N/A	N/A	N/A	N/A
	IR78-GW59	T	11	9	9.7E-02	3.7E-02	No	NT	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
TRICHLOROETHYLENE (TCE)											
	IR78-RW06	T	10	5	1.1E+00	2.7E-01	No	NT	NT	N/A	N/A
	IR78-GW39	T	20	4	1.4E+00	3.8E-01	No	NT	NT	N/A	N/A
	IR78-GW58	T	8	1	1.0E+01	2.5E+00	No	NT	NT	N/A	N/A
	IR78-RW08	T	13	9	7.2E-01	7.0E-03	No	NT	NT	N/A	N/A
	IR78-GW54	T	8	5	7.2E-01	8.5E-03	No	NT	I	N/A	N/A
	IR78-GW61	T	11	0	1.5E+00	5.0E-01	Yes	NT	PD	N/A	N/A
	IR78-GW53	T	11	3	2.6E+00	5.0E-01	No	NT	I	N/A	N/A
	IR78-GW52R	T	2	1	1.3E+01	1.3E+01	No	N/A	N/A	N/A	N/A
	IR78-GW63	T	10	4	1.3E+00	2.5E-01	No	NT	NT	N/A	N/A
	IR78-GW62	T	8	3	9.1E-01	2.5E-01	No	NT	NT	N/A	N/A
	IR78-GW50	T	11	2	1.5E+00	5.0E-01	No	NT	NT	N/A	N/A
	IR78-GW64	T	10	3	1.4E+00	4.5E-01	No	NT	NT	N/A	N/A
	IR78-GW42	T	21	21	1.9E-01	1.8E-01	No	D	NT	N/A	N/A
	IR78-GW65	T	10	9	7.9E-02	1.9E-02	No	D	PD	N/A	N/A
VINYL CHLORIDE											
	IR78-GW09-1	S	18	0	1.1E+00	1.0E+00	Yes	NT	NT	N/A	N/A
	IR78-GW05	S	13	0	9.8E-01	1.0E+00	Yes	NT	NT	N/A	N/A
	IR78-GW73	S	9	0	2.4E+01	1.0E+00	Yes	PI	PI	N/A	N/A
	IR78-GW08	S	19	0	8.3E-01	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-GW51	S	8	0	7.2E-01	1.0E+00	Yes	D	D	N/A	N/A
	IR78-GW11	S	20	0	8.1E-01	5.0E-01	Yes	NT	NT	N/A	N/A
	IR78-RW15	S	14	0	8.6E-01	1.0E+00	Yes	D	D	N/A	N/A
	IR78-GW60	S	19	1	2.3E+01	5.0E+00	No	NT	I	N/A	N/A
	IR78-GW10	S	18	1	8.5E-01	7.5E-01	No	NT	NT	N/A	N/A
	IR78-GW74	S	11	1	4.2E+01	5.0E+00	No	PI	NT	N/A	N/A
	IR78-GW78	S	15	0	5.1E+01	1.0E+01	Yes	PI	I	N/A	N/A
	IR78-GW49	S	9	0	3.3E+00	1.0E+00	Yes	NT	I	N/A	N/A
	IR78-RW14	T	12	2	1.1E+00	1.0E+00	No	NT	NT	N/A	N/A
	IR78-GW01	T	19	2	7.4E-01	2.5E-01	No	NT	PI	N/A	N/A
	IR78-GW59	T	11	9	1.7E-01	1.7E-01	No	S	D	N/A	N/A
	IR78-GW04-1	T	14	3	8.0E-01	2.5E-01	No	NT	NT	N/A	N/A
	IR78-GW58	T	8	0	2.5E+01	1.0E+00	Yes	PI	I	N/A	N/A
	IR78-GW53	T	11	0	2.9E+00	1.0E+00	Yes	S	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
VINYL CHLORIDE											
	IR78-GW54	T	8	2	1.1E+00	7.5E-01	No	NT	NT	N/A	N/A
	IR78-RW09R	T	2	0	3.8E-01	3.8E-01	Yes	N/A	N/A	N/A	N/A
	IR78-RW08	T	13	1	1.1E+00	1.0E+00	No	NT	NT	N/A	N/A
	IR78-GW52R	T	2	1	1.3E+01	1.3E+01	No	N/A	N/A	N/A	N/A
	IR78-RW07	T	9	0	8.3E-01	1.0E+00	Yes	PD	D	N/A	N/A
	IR78-GW39	T	20	0	8.4E-01	7.5E-01	Yes	NT	PI	N/A	N/A
	IR78-RW06	T	10	1	7.1E-01	1.0E+00	No	S	NT	N/A	N/A
	IR78-GW65	T	10	10	2.3E-02	2.0E-02	No	D	D	N/A	N/A
	IR78-GW62	T	8	0	1.2E+00	7.5E-01	Yes	NT	NT	N/A	N/A
	IR78-RW05	T	9	6	7.1E-01	1.6E-02	No	NT	NT	N/A	N/A
	IR78-GW50	T	11	2	9.4E-01	5.0E-01	No	NT	NT	N/A	N/A
	IR78-GW63	T	10	1	1.1E+00	8.2E-01	No	NT	NT	N/A	N/A
	IR78-GW64	T	10	4	9.5E-01	6.3E-01	No	NT	NT	N/A	N/A
	IR78-GW42	T	21	19	9.1E-01	1.6E-01	No	I	I	N/A	N/A
	IR78-GW61	T	11	0	1.0E+00	5.0E-01	Yes	NT	NT	N/A	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS COC Assessment

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Toxicity:

Contaminant of Concern	Representative Concentration (mg/L)	PRG (mg/L)	Percent Above PRG
VINYL CHLORIDE	6.2E+00	2.0E-03	308706.3%
BENZENE	2.6E+00	1.0E-03	258056.6%
TETRACHLOROETHYLENE(PCE)	6.5E+00	5.0E-03	129267.5%
TRICHLOROETHYLENE (TCE)	3.8E+00	5.0E-03	74900.4%
cis-1,2-DICHLOROETHYLENE	2.4E+00	7.0E-02	3366.8%

Note: Top COCs by toxicity were determined by examining a representative concentration for each compound over the entire site. The compound representative concentrations are then compared with the chosen PRG for that compound, with the percentage excedence from the PRG determining the compound's toxicity. All compounds above exceed the PRG.

Prevalence:

Contaminant of Concern	Class	Total Wells	Total Excedences	Percent Excedences	Total detects
TRICHLOROETHYLENE (TCE)	ORG	33	29	87.9%	29
cis-1,2-DICHLOROETHYLENE	ORG	33	25	75.8%	28
VINYL CHLORIDE	ORG	33	17	51.5%	17
BENZENE	ORG	33	17	51.5%	17
TETRACHLOROETHYLENE(PCE)	ORG	33	14	42.4%	14

Note: Top COCs by prevalence were determined by examining a representative concentration for each well location at the site. The total excedences (values above the chosen PRGs) are compared to the total number of wells to determine the prevalence of the compound.

Mobility:

Contaminant of Concern	Kd
VINYL CHLORIDE	0.042
cis-1,2-DICHLOROETHYLENE	0.0724
BENZENE	0.0984
TRICHLOROETHYLENE (TCE)	0.297
TETRACHLOROETHYLENE(PCE)	0.923

Note: Top COCs by mobility were determined by examining each detected compound in the dataset and comparing their mobilities (Koc's for organics, assume foc = 0.001, and Kd's for metals).

Contaminants of Concern (COC's)

BENZENE

TETRACHLOROETHYLENE(PCE)

TRICHLOROETHYLENE (TCE)

cis-1,2-DICHLOROETHYLENE

VINYL CHLORIDE

MAROS Sampling Location Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Sampling Events Analyzed: **From** January 1987 **to** February 2009

1/14/1987 2/15/2009

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
BENZENE	0.3	0.1	0.75	0.75
cis-1,2-DICHLOROETHYLENE	0.3	0.1	0.75	0.75
TETRACHLOROETHYLENE(PCE	0.3	0.1	0.75	0.75
TRICHLOROETHYLENE (TCE)	0.3	0.1	0.75	0.75
VINYL CHLORIDE	0.3	0.1	0.75	0.75

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
BENZENE							
IR78-GW01	285586.31	3838393.25	☑	0.548	0.000	0.842	☐
IR78-GW04-1	285706.00	3838465.75	☑	0.373	0.000	0.911	☐
IR78-GW05	285571.34	3838705.00	☑	0.106	0.000	0.368	☐
IR78-GW08	285812.69	3838839.75	☑	0.058	0.000	0.638	☐
IR78-GW09-1	285765.41	3838632.25	☑	0.171	0.000	0.715	☐
IR78-GW10	285878.59	3838715.50	☑	0.071	0.000	0.557	☐
IR78-GW11	285895.44	3838564.75	☑	0.167	0.000	0.487	☐
IR78-GW39	285854.28	3837476.00	☑	0.050	0.000	0.265	☐
IR78-GW42	285644.03	3838475.50	☑	0.506	0.000	0.907	☐
IR78-GW49	285738.25	3838588.75	☑	0.220	0.093	0.478	☐
IR78-GW50	285569.16	3838480.25	☑	0.256	0.065	0.612	☐
IR78-GW51	285637.38	3838607.25	☑	0.385	0.112	0.857	☐
IR78-GW52R	285682.03	3838437.00	☑	0.252	0.159	0.348	☐
IR78-GW53	285741.16	3838473.50	☑	0.386	0.089	0.636	☐
IR78-GW54	285380.66	3838476.25	☑	0.085	0.000	0.245	☐
IR78-GW58	285738.59	3838522.25	☑	0.221	0.035	0.353	☐
IR78-GW59	285549.75	3838332.25	☑	0.493	0.000	0.918	☐
IR78-GW60	285763.84	3838625.25	☑	0.279	0.018	0.592	☐
IR78-GW61	285705.56	3838076.50	☑	0.332	0.000	0.581	☐
IR78-GW62	285427.97	3838011.00	☑	0.175	0.000	0.356	☐
IR78-GW63	285297.16	3838155.00	☑	0.202	0.000	0.349	☐
IR78-GW64	285141.88	3838300.75	☑	0.028	0.000	0.129	☑
IR78-GW65	285495.22	3838122.25	☑	0.554	0.000	0.927	☐
IR78-GW73	285748.53	3838594.50	☑	0.080	0.010	0.172	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR78-GW74	285755.31	3838600.50	☑	0.096	0.041	0.152	☐
IR78-GW78	285760.22	3838615.50	☑	0.284	0.184	0.374	☐
IR78-RW05	285663.47	3838298.25	☑	0.391	0.000	0.844	☐
IR78-RW06	285555.53	3838377.25	☑	0.397	0.000	0.589	☐
IR78-RW07	285492.00	3838451.50	☑	0.109	0.000	0.353	☐
IR78-RW08	285419.06	3838534.00	☑	0.057	0.000	0.298	☐
IR78-RW09R	285315.63	3838663.50	☑	0.022	0.000	0.043	☑
IR78-RW14	285755.06	3838520.00	☑	0.537	0.076	0.855	☐
IR78-RW15	285765.41	3838632.25	☑	0.181	0.000	0.664	☐
cis-1,2-DICHLOROETHYLENE							
IR78-GW01	285586.31	3838393.25	☑	0.428	0.021	0.891	☐
IR78-GW04-1	285706.00	3838465.75	☑	0.463	0.138	0.763	☐
IR78-GW05	285571.34	3838705.00	☑	0.313	0.004	0.676	☐
IR78-GW08	285812.69	3838839.75	☑	0.282	0.010	0.894	☐
IR78-GW09-1	285765.41	3838632.25	☑	0.538	0.183	0.847	☐
IR78-GW10	285878.59	3838715.50	☑	0.254	0.088	0.460	☐
IR78-GW11	285895.44	3838564.75	☑	0.275	0.026	0.545	☐
IR78-GW39	285854.28	3837476.00	☑	0.145	0.000	0.440	☐
IR78-GW42	285644.03	3838475.50	☑	0.389	0.068	0.659	☐
IR78-GW49	285738.25	3838588.75	☑	0.409	0.111	0.819	☐
IR78-GW50	285569.16	3838480.25	☑	0.559	0.245	0.774	☐
IR78-GW51	285637.38	3838607.25	☑	0.447	0.240	0.790	☐
IR78-GW52R	285682.03	3838437.00	☑	0.269	0.159	0.383	☐
IR78-GW53	285741.16	3838473.50	☑	0.336	0.000	0.546	☐
IR78-GW54	285380.66	3838476.25	☑	0.276	0.008	0.514	☐
IR78-GW58	285738.59	3838522.25	☑	0.374	0.017	0.716	☐
IR78-GW59	285549.75	3838332.25	☑	0.313	0.048	0.786	☐
IR78-GW60	285763.84	3838625.25	☑	0.430	0.297	0.577	☐
IR78-GW61	285705.56	3838076.50	☑	0.218	0.113	0.344	☑
IR78-GW62	285427.97	3838011.00	☑	0.411	0.219	0.780	☐
IR78-GW63	285297.16	3838155.00	☑	0.408	0.090	0.653	☐
IR78-GW64	285141.88	3838300.75	☑	0.273	0.024	0.670	☐
IR78-GW65	285495.22	3838122.25	☑	0.146	0.020	0.436	☑
IR78-GW73	285748.53	3838594.50	☑	0.325	0.022	0.638	☐
IR78-GW74	285755.31	3838600.50	☑	0.317	0.053	0.602	☐
IR78-GW78	285760.22	3838615.50	☑	0.229	0.033	0.534	☑
IR78-RW05	285663.47	3838298.25	☑	0.203	0.016	0.458	☑
IR78-RW06	285555.53	3838377.25	☑	0.480	0.356	0.757	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR78-RW07	285492.00	3838451.50	☑	0.466	0.176	0.824	☐
IR78-RW08	285419.06	3838534.00	☑	0.337	0.007	0.670	☐
IR78-RW09R	285315.63	3838663.50	☑	0.151	0.037	0.269	☐
IR78-RW14	285755.06	3838520.00	☑	0.457	0.008	0.728	☐
IR78-RW15	285765.41	3838632.25	☑	0.500	0.183	0.747	☐
TETRACHLOROETHYLENE(PCE)							
IR78-GW01	285586.31	3838393.25	☑	0.053	0.000	0.367	☑
IR78-GW04-1	285706.00	3838465.75	☑	0.067	0.000	0.371	☐
IR78-GW05	285571.34	3838705.00	☑	0.125	0.000	0.549	☐
IR78-GW08	285812.69	3838839.75	☑	0.149	0.000	0.515	☐
IR78-GW09-1	285765.41	3838632.25	☑	0.370	0.000	0.905	☐
IR78-GW10	285878.59	3838715.50	☑	0.129	0.000	0.456	☐
IR78-GW11	285895.44	3838564.75	☑	0.102	0.000	0.274	☐
IR78-GW39	285854.28	3837476.00	☑	0.494	0.000	0.844	☐
IR78-GW42	285644.03	3838475.50	☑	0.131	0.000	0.504	☐
IR78-GW49	285738.25	3838588.75	☑	0.253	0.000	0.509	☐
IR78-GW50	285569.16	3838480.25	☑	0.044	0.000	0.147	☑
IR78-GW51	285637.38	3838607.25	☑	0.055	0.000	0.123	☐
IR78-GW52R	285682.03	3838437.00	☑	0.460	0.183	0.749	☐
IR78-GW53	285741.16	3838473.50	☑	0.190	0.000	0.376	☐
IR78-GW54	285380.66	3838476.25	☑	0.005	0.000	0.036	☑
IR78-GW58	285738.59	3838522.25	☑	0.231	0.000	0.572	☐
IR78-GW59	285549.75	3838332.25	☑	0.077	0.000	0.542	☐
IR78-GW60	285763.84	3838625.25	☑	0.287	0.000	0.708	☐
IR78-GW61	285705.56	3838076.50	☑	0.145	0.000	0.470	☐
IR78-GW62	285427.97	3838011.00	☑	0.249	0.000	0.855	☐
IR78-GW63	285297.16	3838155.00	☑	0.079	0.000	0.211	☐
IR78-GW64	285141.88	3838300.75	☑	0.128	0.000	0.403	☐
IR78-GW65	285495.22	3838122.25	☑	0.128	0.000	0.375	☐
IR78-GW73	285748.53	3838594.50	☑	0.281	0.055	0.494	☐
IR78-GW74	285755.31	3838600.50	☑	0.296	0.045	0.489	☐
IR78-GW78	285760.22	3838615.50	☑	0.160	0.000	0.294	☐
IR78-RW05	285663.47	3838298.25	☑	0.250	0.000	0.817	☐
IR78-RW06	285555.53	3838377.25	☑	0.102	0.000	0.885	☐
IR78-RW07	285492.00	3838451.50	☑	0.007	0.000	0.052	☑
IR78-RW08	285419.06	3838534.00	☑	0.104	0.000	0.986	☐
IR78-RW09R	285315.63	3838663.50	☑	0.022	0.000	0.043	☑
IR78-RW14	285755.06	3838520.00	☑	0.490	0.000	0.915	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR78-RW15	285765.41	3838632.25	☑	0.459	0.000	0.905	☐
TRICHLOROETHYLENE (TCE)							
IR78-GW01	285586.31	3838393.25	☑	0.357	0.011	0.729	☐
IR78-GW04-1	285706.00	3838465.75	☑	0.569	0.201	0.872	☐
IR78-GW05	285571.34	3838705.00	☑	0.272	0.025	0.642	☑
IR78-GW08	285812.69	3838839.75	☑	0.180	0.031	0.466	☐
IR78-GW09-1	285765.41	3838632.25	☑	0.338	0.130	0.614	☐
IR78-GW10	285878.59	3838715.50	☑	0.210	0.055	0.954	☐
IR78-GW11	285895.44	3838564.75	☑	0.178	0.047	0.522	☐
IR78-GW39	285854.28	3837476.00	☑	0.423	0.000	0.936	☐
IR78-GW42	285644.03	3838475.50	☑	0.220	0.071	0.480	☑
IR78-GW49	285738.25	3838588.75	☑	0.182	0.000	0.420	☑
IR78-GW50	285569.16	3838480.25	☑	0.443	0.141	0.984	☐
IR78-GW51	285637.38	3838607.25	☑	0.401	0.093	0.830	☐
IR78-GW52R	285682.03	3838437.00	☑	0.229	0.066	0.386	☑
IR78-GW53	285741.16	3838473.50	☑	0.424	0.255	0.638	☐
IR78-GW54	285380.66	3838476.25	☑	0.339	0.106	0.670	☐
IR78-GW58	285738.59	3838522.25	☑	0.317	0.022	0.724	☐
IR78-GW59	285549.75	3838332.25	☑	0.215	0.000	0.474	☑
IR78-GW60	285763.84	3838625.25	☑	0.304	0.101	0.785	☐
IR78-GW61	285705.56	3838076.50	☑	0.344	0.054	0.503	☐
IR78-GW62	285427.97	3838011.00	☑	0.405	0.058	0.727	☐
IR78-GW63	285297.16	3838155.00	☑	0.403	0.017	0.848	☐
IR78-GW64	285141.88	3838300.75	☑	0.373	0.000	0.847	☐
IR78-GW65	285495.22	3838122.25	☑	0.279	0.074	0.547	☑
IR78-GW73	285748.53	3838594.50	☑	0.345	0.052	0.599	☐
IR78-GW74	285755.31	3838600.50	☑	0.262	0.034	0.526	☑
IR78-GW78	285760.22	3838615.50	☑	0.280	0.109	0.799	☑
IR78-RW05	285663.47	3838298.25	☑	0.335	0.074	0.668	☐
IR78-RW06	285555.53	3838377.25	☑	0.494	0.147	0.916	☐
IR78-RW07	285492.00	3838451.50	☑	0.438	0.131	0.859	☐
IR78-RW08	285419.06	3838534.00	☑	0.449	0.000	0.878	☐
IR78-RW09R	285315.63	3838663.50	☑	0.257	0.162	0.355	☐
IR78-RW14	285755.06	3838520.00	☑	0.449	0.084	0.783	☐
IR78-RW15	285765.41	3838632.25	☑	0.348	0.130	0.614	☐
VINYL CHLORIDE							
IR78-GW01	285586.31	3838393.25	☑	0.195	0.000	0.900	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR78-GW04-1	285706.00	3838465.75	☑	0.324	0.000	0.727	☐
IR78-GW05	285571.34	3838705.00	☑	0.060	0.000	0.199	☑
IR78-GW08	285812.69	3838839.75	☑	0.027	0.000	0.638	☑
IR78-GW09-1	285765.41	3838632.25	☑	0.040	0.000	0.715	☑
IR78-GW10	285878.59	3838715.50	☑	0.067	0.000	0.783	☐
IR78-GW11	285895.44	3838564.75	☑	0.140	0.000	0.487	☐
IR78-GW39	285854.28	3837476.00	☑	0.061	0.000	0.474	☐
IR78-GW42	285644.03	3838475.50	☑	0.302	0.008	0.839	☐
IR78-GW49	285738.25	3838588.75	☑	0.115	0.000	0.453	☐
IR78-GW50	285569.16	3838480.25	☑	0.156	0.012	0.841	☐
IR78-GW51	285637.38	3838607.25	☑	0.115	0.032	0.217	☐
IR78-GW52R	285682.03	3838437.00	☑	0.237	0.088	0.380	☐
IR78-GW53	285741.16	3838473.50	☑	0.160	0.000	0.354	☐
IR78-GW54	285380.66	3838476.25	☑	0.309	0.025	0.846	☐
IR78-GW58	285738.59	3838522.25	☑	0.216	0.019	0.638	☐
IR78-GW59	285549.75	3838332.25	☑	0.240	0.057	0.877	☐
IR78-GW60	285763.84	3838625.25	☑	0.141	0.000	0.474	☐
IR78-GW61	285705.56	3838076.50	☑	0.162	0.000	0.273	☐
IR78-GW62	285427.97	3838011.00	☑	0.214	0.132	0.397	☐
IR78-GW63	285297.16	3838155.00	☑	0.288	0.118	0.682	☐
IR78-GW64	285141.88	3838300.75	☑	0.321	0.000	0.844	☐
IR78-GW65	285495.22	3838122.25	☑	0.425	0.225	0.663	☐
IR78-GW73	285748.53	3838594.50	☑	0.121	0.000	0.265	☐
IR78-GW74	285755.31	3838600.50	☑	0.136	0.000	0.312	☐
IR78-GW78	285760.22	3838615.50	☑	0.081	0.000	0.233	☐
IR78-RW05	285663.47	3838298.25	☑	0.389	0.180	0.870	☐
IR78-RW06	285555.53	3838377.25	☑	0.131	0.047	0.545	☐
IR78-RW07	285492.00	3838451.50	☑	0.143	0.000	0.395	☐
IR78-RW08	285419.06	3838534.00	☑	0.195	0.000	0.881	☐
IR78-RW09R	285315.63	3838663.50	☑	0.088	0.060	0.117	☐
IR78-RW14	285755.06	3838520.00	☑	0.214	0.000	0.849	☐
IR78-RW15	285765.41	3838632.25	☑	0.009	0.000	0.056	☑

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the state coordinates system (i.e., X and Y refer to Easting and Northing respectively) or local coordinates systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Location Optimization

Results by Considering All COCs

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Sampling Events Analyzed: **From** January 1987 **to** February 2009

1/14/1987 2/15/2009

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
IR78-GW01	285586.31	3838393.25	5	0.316	☐
IR78-GW04-1	285706.00	3838465.75	5	0.359	☐
IR78-GW05	285571.34	3838705.00	5	0.175	☐
IR78-GW08	285812.69	3838839.75	5	0.139	☐
IR78-GW09-1	285765.41	3838632.25	5	0.291	☐
IR78-GW10	285878.59	3838715.50	5	0.146	☐
IR78-GW11	285895.44	3838564.75	5	0.172	☐
IR78-GW39	285854.28	3837476.00	5	0.234	☐
IR78-GW42	285644.03	3838475.50	5	0.310	☐
IR78-GW49	285738.25	3838588.75	5	0.236	☐
IR78-GW50	285569.16	3838480.25	5	0.291	☐
IR78-GW51	285637.38	3838607.25	5	0.281	☐
IR78-GW52R	285682.03	3838437.00	5	0.289	☐
IR78-GW53	285741.16	3838473.50	5	0.299	☐
IR78-GW54	285380.66	3838476.25	5	0.203	☐
IR78-GW58	285738.59	3838522.25	5	0.272	☐
IR78-GW59	285549.75	3838332.25	5	0.268	☐
IR78-GW60	285763.84	3838625.25	5	0.288	☐
IR78-GW61	285705.56	3838076.50	5	0.240	☐
IR78-GW62	285427.97	3838011.00	5	0.291	☐
IR78-GW63	285297.16	3838155.00	5	0.276	☐
IR78-GW64	285141.88	3838300.75	5	0.224	☐
IR78-GW65	285495.22	3838122.25	5	0.307	☐
IR78-GW73	285748.53	3838594.50	5	0.231	☐
IR78-GW74	285755.31	3838600.50	5	0.221	☐
IR78-GW78	285760.22	3838615.50	5	0.207	☐
IR78-RW05	285663.47	3838298.25	5	0.314	☐
IR78-RW06	285555.53	3838377.25	5	0.321	☐
IR78-RW07	285492.00	3838451.50	5	0.233	☐
IR78-RW08	285419.06	3838534.00	5	0.228	☐
IR78-RW09R	285315.63	3838663.50	5	0.108	☐
IR78-RW14	285755.06	3838520.00	5	0.429	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
IR78-RW15	285765.41	3838632.25	5	0.299	☐

Note: the COC-Averaged Slope Factor is the value calculated by averaging those "Average Slope Factor" obtained earlier across COCs; to be conservative, a location is "abandoned" only when it is eliminated from all COCs; "abandoned" doesn't necessarily mean the abandon of well, it can mean that NO samples need to be collected for any COCs.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Frequency Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

The Overall Number of Sampling Events: 39

"Recent Period" defined by events: **From** January 1987 **To** February 2009

1/14/1987 2/15/2009

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
BENZENE	0.001	0.0005	0.001	0.002
cis-1,2-DICHLOROETHYLENE	0.07	0.035	0.07	0.14
TETRACHLOROETHYLENE(PCE	0.005	0.0025	0.005	0.01
TRICHLOROETHYLENE (TCE)	0.005	0.0025	0.005	0.01
VINYL CHLORIDE	0.002	0.001	0.002	0.004

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
BENZENE			
IR78-GW01	Quarterly	Quarterly	Quarterly
IR78-GW04-1	Quarterly	Quarterly	Quarterly
IR78-GW05	Quarterly	Quarterly	Quarterly
IR78-GW08	Quarterly	Quarterly	Quarterly
IR78-GW09-1	Quarterly	Quarterly	Quarterly
IR78-GW10	Quarterly	Quarterly	Quarterly
IR78-GW11	Quarterly	Quarterly	Quarterly
IR78-GW39	Quarterly	Quarterly	Quarterly
IR78-GW42	Quarterly	Quarterly	Quarterly
IR78-GW49	Quarterly	Quarterly	Quarterly
IR78-GW50	Annual	Annual	Annual
IR78-GW51	Annual	Annual	Annual
IR78-GW52R	Quarterly	Quarterly	Quarterly
IR78-GW53	Annual	Annual	Annual
IR78-GW54	Annual	Annual	Annual
IR78-GW58	Annual	Annual	Annual
IR78-GW59	Quarterly	Quarterly	Quarterly
IR78-GW60	Quarterly	Quarterly	Quarterly
IR78-GW61	Annual	Annual	Annual
IR78-GW62	Annual	Annual	Annual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-GW63	Annual	Annual	Annual
IR78-GW64	Annual	Annual	Annual
IR78-GW65	Quarterly	Quarterly	Quarterly
IR78-GW73	Quarterly	Quarterly	Quarterly
IR78-GW74	Quarterly	Quarterly	Quarterly
IR78-GW78	Quarterly	Quarterly	Quarterly
IR78-RW05	Annual	Annual	Annual
IR78-RW06	Annual	Annual	Annual
IR78-RW07	Annual	Annual	Annual
IR78-RW08	Annual	Annual	Annual
IR78-RW09R	Quarterly	Quarterly	Quarterly
IR78-RW14	Quarterly	Quarterly	Quarterly
IR78-RW15	Annual	Annual	Annual
cis-1,2-DICHLOROETHYLENE			
IR78-GW01	Annual	Annual	Annual
IR78-GW04-1	SemiAnnual	SemiAnnual	SemiAnnual
IR78-GW05	Annual	Annual	Annual
IR78-GW08	Annual	Annual	Annual
IR78-GW09-1	Annual	Annual	Annual
IR78-GW10	Annual	Annual	Annual
IR78-GW11	Annual	Annual	Annual
IR78-GW39	Annual	Annual	Annual
IR78-GW42	Annual	Annual	Annual
IR78-GW49	Quarterly	Quarterly	Quarterly
IR78-GW50	Quarterly	Quarterly	Quarterly
IR78-GW51	Annual	Annual	Annual
IR78-GW52R	Quarterly	Quarterly	Quarterly
IR78-GW53	Quarterly	Quarterly	Quarterly
IR78-GW54	Quarterly	Quarterly	Quarterly
IR78-GW58	Quarterly	Quarterly	Quarterly
IR78-GW59	Annual	Annual	Annual
IR78-GW60	Quarterly	Quarterly	Quarterly
IR78-GW61	Annual	Annual	Annual
IR78-GW62	Annual	Annual	Annual
IR78-GW63	Annual	Annual	Annual
IR78-GW64	Annual	Annual	Annual
IR78-GW65	Annual	Annual	Annual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-GW73	Quarterly	Quarterly	Quarterly
IR78-GW74	Quarterly	Quarterly	Quarterly
IR78-GW78	SemiAnnual	SemiAnnual	SemiAnnual
IR78-RW05	SemiAnnual	SemiAnnual	SemiAnnual
IR78-RW06	Annual	Annual	Annual
IR78-RW07	SemiAnnual	SemiAnnual	SemiAnnual
IR78-RW08	Quarterly	Quarterly	Quarterly
IR78-RW09R	Quarterly	Quarterly	Quarterly
IR78-RW14	Quarterly	Quarterly	Quarterly
IR78-RW15	Annual	Annual	Annual
TETRACHLOROETHYLENE(PCE)			
IR78-GW01	Quarterly	Quarterly	Quarterly
IR78-GW04-1	Quarterly	Quarterly	Quarterly
IR78-GW05	Annual	Annual	Annual
IR78-GW08	Quarterly	Quarterly	Quarterly
IR78-GW09-1	Quarterly	Quarterly	Quarterly
IR78-GW10	Quarterly	Quarterly	Quarterly
IR78-GW11	Quarterly	Quarterly	Quarterly
IR78-GW39	Quarterly	Quarterly	Quarterly
IR78-GW42	Quarterly	Quarterly	Quarterly
IR78-GW49	Annual	Annual	Annual
IR78-GW50	Annual	Annual	Annual
IR78-GW51	Annual	Annual	Annual
IR78-GW52R	Quarterly	Quarterly	Quarterly
IR78-GW53	Quarterly	Quarterly	Quarterly
IR78-GW54	Annual	Annual	Annual
IR78-GW58	Quarterly	Quarterly	Quarterly
IR78-GW59	Annual	Annual	Annual
IR78-GW60	Quarterly	Quarterly	Quarterly
IR78-GW61	Annual	Annual	Annual
IR78-GW62	Quarterly	Quarterly	Quarterly
IR78-GW63	Annual	Annual	Annual
IR78-GW64	Annual	Annual	Annual
IR78-GW65	Annual	Annual	Annual
IR78-GW73	Quarterly	Quarterly	Quarterly
IR78-GW74	Quarterly	Quarterly	Quarterly
IR78-GW78	Quarterly	Quarterly	Quarterly

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-RW05	Annual	Annual	Annual
IR78-RW06	Annual	Annual	Annual
IR78-RW07	Annual	Annual	Annual
IR78-RW08	Annual	Annual	Annual
IR78-RW09R	Quarterly	Quarterly	Quarterly
IR78-RW14	Annual	Annual	Annual
IR78-RW15	Annual	Annual	Annual
TRICHLOROETHYLENE (TCE)			
IR78-GW01	Annual	Annual	Annual
IR78-GW04-1	Quarterly	Quarterly	Quarterly
IR78-GW05	Quarterly	Quarterly	Quarterly
IR78-GW08	Quarterly	Quarterly	Quarterly
IR78-GW09-1	Annual	Annual	Annual
IR78-GW10	Quarterly	Quarterly	Quarterly
IR78-GW11	Quarterly	Quarterly	Quarterly
IR78-GW39	Quarterly	Quarterly	Quarterly
IR78-GW42	Annual	Annual	Annual
IR78-GW49	Quarterly	Quarterly	Quarterly
IR78-GW50	Annual	Annual	Annual
IR78-GW51	Annual	Annual	Annual
IR78-GW52R	Quarterly	Quarterly	Quarterly
IR78-GW53	Quarterly	Quarterly	Quarterly
IR78-GW54	Quarterly	Quarterly	Quarterly
IR78-GW58	Quarterly	Quarterly	Quarterly
IR78-GW59	Quarterly	Quarterly	Quarterly
IR78-GW60	Annual	Annual	Annual
IR78-GW61	Annual	Annual	Annual
IR78-GW62	Quarterly	Quarterly	Quarterly
IR78-GW63	Annual	Annual	Annual
IR78-GW64	Annual	Annual	Annual
IR78-GW65	Annual	Annual	Annual
IR78-GW73	Quarterly	Quarterly	Quarterly
IR78-GW74	Quarterly	Quarterly	Quarterly
IR78-GW78	Quarterly	Quarterly	Quarterly
IR78-RW05	Annual	Annual	Annual
IR78-RW06	Annual	Annual	Annual
IR78-RW07	Annual	Annual	Annual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-RW08	Quarterly	Quarterly	Quarterly
IR78-RW09R	Quarterly	Quarterly	Quarterly
IR78-RW14	Annual	Annual	Annual
IR78-RW15	Annual	Annual	Annual
VINYL CHLORIDE			
IR78-GW01	Quarterly	Quarterly	Quarterly
IR78-GW04-1	Quarterly	Quarterly	Quarterly
IR78-GW05	Quarterly	Quarterly	Quarterly
IR78-GW08	Quarterly	Quarterly	Quarterly
IR78-GW09-1	Quarterly	Quarterly	Quarterly
IR78-GW10	Quarterly	Quarterly	Quarterly
IR78-GW11	Quarterly	Quarterly	Quarterly
IR78-GW39	Quarterly	Quarterly	Quarterly
IR78-GW42	Quarterly	Quarterly	Quarterly
IR78-GW49	Quarterly	Quarterly	Quarterly
IR78-GW50	Quarterly	Quarterly	Quarterly
IR78-GW51	Annual	Annual	Annual
IR78-GW52R	Quarterly	Quarterly	Quarterly
IR78-GW53	Quarterly	Quarterly	Quarterly
IR78-GW54	Quarterly	Quarterly	Quarterly
IR78-GW58	Quarterly	Quarterly	Quarterly
IR78-GW59	Annual	Annual	Annual
IR78-GW60	Quarterly	Quarterly	Quarterly
IR78-GW61	Quarterly	Quarterly	Quarterly
IR78-GW62	Quarterly	Quarterly	Quarterly
IR78-GW63	Quarterly	Quarterly	Quarterly
IR78-GW64	Quarterly	Quarterly	Quarterly
IR78-GW65	Annual	Annual	Annual
IR78-GW73	Quarterly	Quarterly	Quarterly
IR78-GW74	Quarterly	Quarterly	Quarterly
IR78-GW78	Quarterly	Quarterly	Quarterly
IR78-RW05	Quarterly	Quarterly	Quarterly
IR78-RW06	Annual	Annual	Annual
IR78-RW07	Annual	Annual	Annual
IR78-RW08	Quarterly	Quarterly	Quarterly
IR78-RW09R	Quarterly	Quarterly	Quarterly
IR78-RW14	Quarterly	Quarterly	Quarterly

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR78-RW15	Annual	Annual	Annual

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

MAROS Power Analysis for Individual Well Cleanup Status

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 78 South

State: North Carolina

From Period: 1/14/1987 **to** 2/15/2009

Well	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
BENZENE			Cleanup Goal (mg/L) = 0.001		Target Level (mg/L) = 0.0008		
IR78-GW01	13	9.06E-01	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW04-1	10	1.26E+00	1.67E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW05	10	1.54E+00	1.58E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW08	12	1.51E+00	1.51E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW09-1	12	1.74E+00	1.35E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW10	12	1.51E+00	1.51E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW11	12	1.52E+00	1.50E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW39	12	1.60E+00	1.46E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW42	10	3.39E+00	4.63E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW49	6	3.36E+00	1.95E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW50	8	1.58E+00	1.69E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW51	5	1.25E+00	1.25E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW52R	2	3.70E-02	9.90E-03	N/C	N/C	0.05	0.8
IR78-GW53	6	1.32E+00	1.29E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW54	6	2.21E+00	1.72E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW58	5	2.65E-01	6.64E-02	Cont Sampling	Not Attained	0.05	0.8
IR78-GW59	7	7.88E-01	1.86E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW60	7	2.04E+01	2.02E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW61	8	1.59E+00	1.67E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW62	7	1.54E+00	1.79E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW63	8	1.63E+00	1.65E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW64	8	1.75E+00	1.56E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW65	8	1.06E+00	1.71E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW73	6	1.97E+00	1.31E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW74	6	1.71E+00	1.02E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW78	5	1.47E+01	2.03E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW05	8	1.61E+00	1.82E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW06	7	1.74E+00	1.01E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW07	6	1.94E+00	9.41E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW08	9	2.00E+00	1.52E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW09R	2	3.75E-01	1.77E-01	N/C	N/C	0.05	0.8
IR78-RW14	9	2.95E-01	8.28E-01	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
BENZENE			Cleanup Goal (mg/L) = 0.001		Target Level (mg/L) = 0.0008		
IR78-RW15	8	1.11E+00	1.01E+00	Cont Sampling	Cont Sampling	0.05	0.8
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR78-GW01	10	1.31E-01	3.95E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW04-1	7	1.25E+00	1.91E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW05	9	1.68E+00	1.61E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW08	10	1.74E+00	1.57E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW09-1	10	9.81E-03	1.29E-02	Attained	Cont Sampling	0.05	0.8
IR78-GW10	10	1.76E+00	1.54E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW11	10	1.77E+00	1.52E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW39	10	1.87E+00	1.46E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW42	9	6.55E-01	2.91E-01	Cont Sampling	Not Attained	0.05	0.8
IR78-GW49	6	3.71E+00	1.91E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW50	8	6.27E-01	1.77E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW51	5	1.25E+00	1.25E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW52R	2	7.00E-01	1.84E-01	N/C	N/C	0.05	0.8
IR78-GW53	6	1.89E+00	2.16E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW54	6	9.62E-01	1.99E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW58	5	3.25E+01	5.34E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW59	7	7.13E-02	7.83E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW60	7	1.83E+01	2.14E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW61	8	1.59E+00	1.67E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW62	7	1.43E+00	1.87E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW63	8	1.26E-02	1.34E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW64	8	3.66E-02	3.00E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW65	8	1.10E-01	5.43E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW73	6	2.50E+00	2.97E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW74	6	3.58E+00	2.07E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW78	5	7.69E-01	5.36E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW05	8	8.11E-01	1.75E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW06	7	1.01E+00	1.09E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW07	6	4.64E-01	6.16E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW08	9	1.03E+00	1.71E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW09R	2	3.75E-01	1.77E-01	N/C	N/C	0.05	0.8
IR78-RW14	9	8.35E-01	1.77E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW15	8	5.01E-01	4.98E-01	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR78-GW01	12	1.52E+00	1.50E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW04-1	9	1.81E+00	1.62E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW05	10	1.54E+00	1.58E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW08	12	1.51E+00	1.51E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW09-1	12	1.72E+00	1.38E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW10	12	1.51E+00	1.51E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW11	12	1.52E+00	1.50E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW39	13	9.72E-01	1.62E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW42	9	5.54E+00	4.42E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW49	6	3.16E+00	4.70E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW50	8	1.58E+00	1.69E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW51	5	1.38E+00	1.13E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW52R	2	1.25E+01	1.77E+01	N/C	N/C	0.05	0.8
IR78-GW53	6	2.73E+00	1.60E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW54	6	2.21E+00	1.72E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW58	5	8.76E+00	1.41E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW59	7	1.78E+00	1.71E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW60	7	2.08E+01	1.98E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW61	8	1.59E+00	1.67E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW62	7	1.32E+00	1.82E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW63	8	1.63E+00	1.65E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW64	8	1.75E+00	1.56E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW65	8	1.79E+00	1.55E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW73	6	3.46E+01	8.23E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW74	6	6.50E+01	5.15E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW78	5	5.33E+01	4.74E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW05	8	1.66E+00	1.78E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW06	7	1.70E+00	1.08E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW07	6	1.94E+00	9.41E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW08	9	1.98E+00	1.55E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW09R	2	3.75E-01	1.77E-01	N/C	N/C	0.05	0.8
IR78-RW14	9	8.34E-01	1.25E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW15	8	5.63E-01	5.41E-01	Cont Sampling	Cont Sampling	0.05	0.8
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

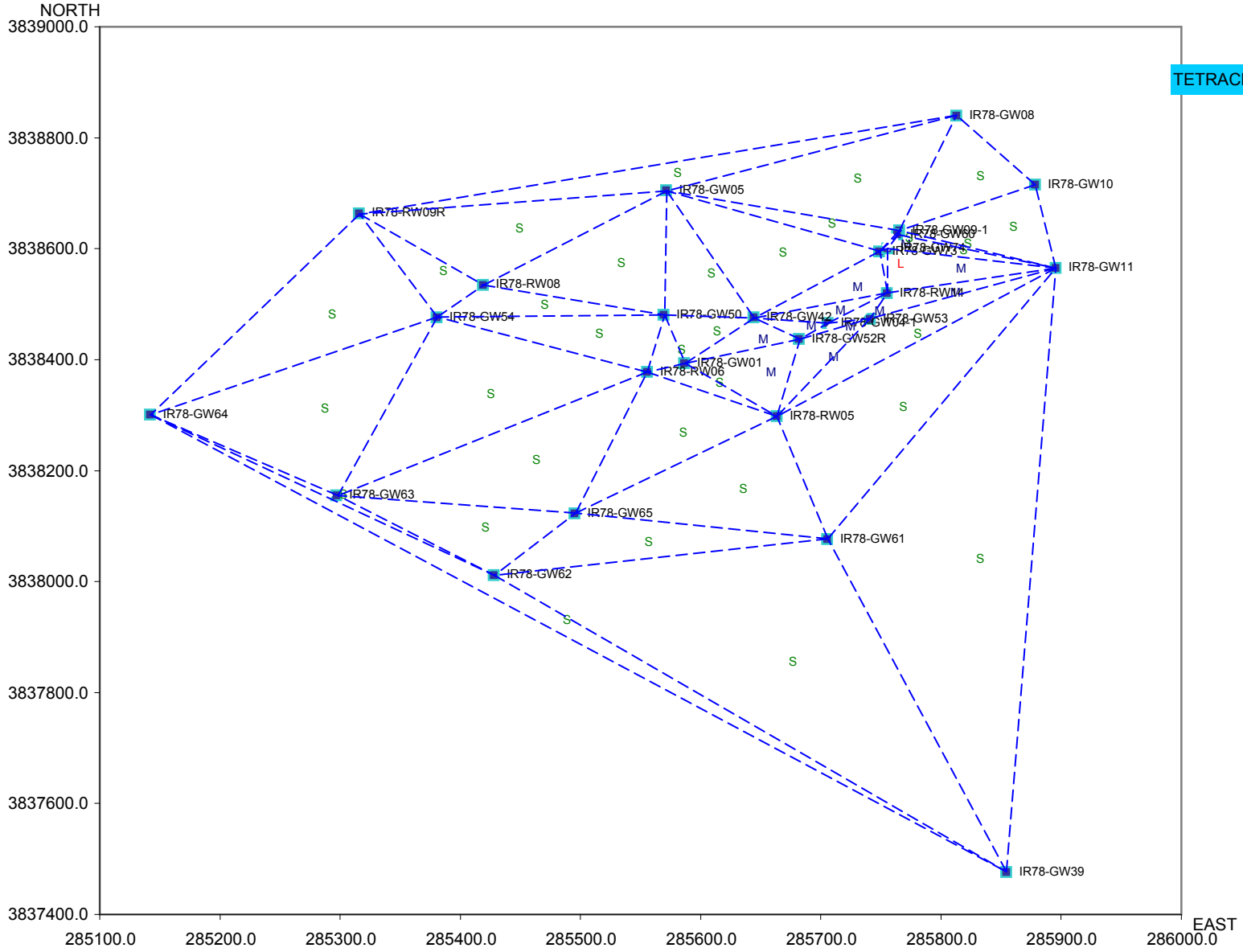
Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR78-GW01	14	1.05E-01	3.33E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW04-1	12	5.25E-01	1.45E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW05	10	1.54E+00	1.58E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW08	12	1.51E+00	1.51E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW09-1	15	6.25E-01	1.39E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW10	13	1.38E+00	1.52E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW11	13	1.41E+00	1.49E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW39	12	1.46E+00	1.55E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW42	10	1.78E-01	1.01E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW49	6	2.98E+00	2.38E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW50	8	1.41E+00	1.78E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW51	5	1.05E+00	1.33E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW52R	2	1.25E+01	1.77E+01	N/C	N/C	0.05	0.8
IR78-GW53	6	1.49E+00	2.25E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW54	6	9.61E-01	1.99E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW58	5	8.76E+00	1.41E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW59	7	7.66E-02	1.35E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW60	7	2.66E+00	1.01E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW61	8	1.59E+00	1.67E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW62	7	9.29E-01	1.81E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW63	8	1.14E+00	1.80E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW64	8	1.22E+00	1.76E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW65	8	9.26E-02	2.25E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW73	6	3.44E+01	8.24E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW74	6	3.45E+01	5.08E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW78	5	2.40E+01	3.28E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW05	8	1.73E-01	4.45E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW06	7	1.15E+00	1.06E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW07	6	1.31E+00	1.06E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW08	9	9.50E-01	1.72E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW09R	2	3.75E-01	1.77E-01	N/C	N/C	0.05	0.8
IR78-RW14	9	1.11E+00	1.16E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW15	8	1.56E+00	1.81E+00	Cont Sampling	Cont Sampling	0.05	0.8
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR78-GW01	12	8.75E-01	1.34E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW04-1	9	9.59E-01	1.58E+00	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 78 South **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR78-GW05	10	1.01E+00	1.44E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW08	12	9.48E-01	1.32E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW09-1	12	1.18E+00	1.25E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW10	12	9.27E-01	1.33E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW11	12	9.58E-01	1.31E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW39	12	9.79E-01	1.31E+00	Cont Sampling	Not Attained	0.05	0.8
IR78-GW42	10	5.83E-01	1.24E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW49	6	4.44E+00	4.64E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW50	8	1.03E+00	1.64E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW51	5	6.25E-01	3.75E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW52R	2	1.25E+01	1.77E+01	N/C	N/C	0.05	0.8
IR78-GW53	6	1.97E+00	1.91E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW54	6	1.21E+00	1.89E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW58	5	3.30E+01	5.31E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW59	7	1.69E-01	1.59E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW60	7	2.05E+01	1.99E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW61	8	1.13E+00	1.59E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW62	7	1.18E+00	1.72E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW63	8	1.13E+00	1.60E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW64	8	1.05E+00	1.68E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW65	8	1.95E-02	1.28E-02	Cont Sampling	Not Attained	0.05	0.8
IR78-GW73	6	3.60E+01	8.16E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW74	6	6.31E+01	5.34E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-GW78	5	5.34E+01	4.73E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW05	8	7.38E-01	1.73E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW06	7	7.03E-01	3.03E-01	Cont Sampling	Not Attained	0.05	0.8
IR78-RW07	6	8.13E-01	3.14E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW08	9	1.20E+00	1.47E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW09R	2	3.75E-01	1.77E-01	N/C	N/C	0.05	0.8
IR78-RW14	9	1.26E+00	1.57E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR78-RW15	8	8.03E-01	2.74E-01	Cont Sampling	Not Attained	0.05	0.8

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the analysis; The Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The test for evaluating attainment status is from EPA (1992). Refer to Appendix A.6 of MAROS Manual for details.



New Location Analysis for

TETRACHLOROETHYLENE(PCE)

Existing Locations

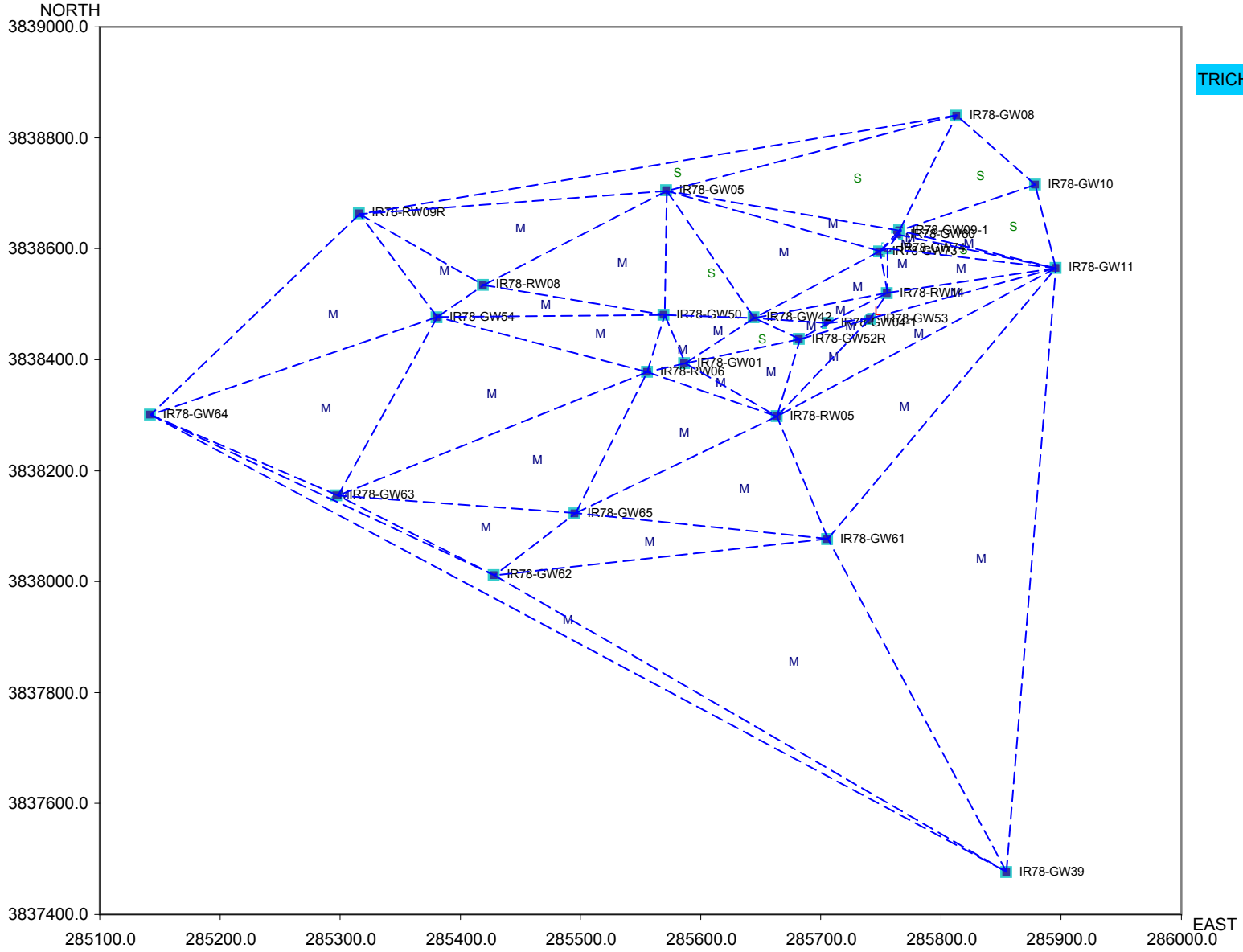
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

TRICHLOROETHYLENE (TCE)

Existing Locations

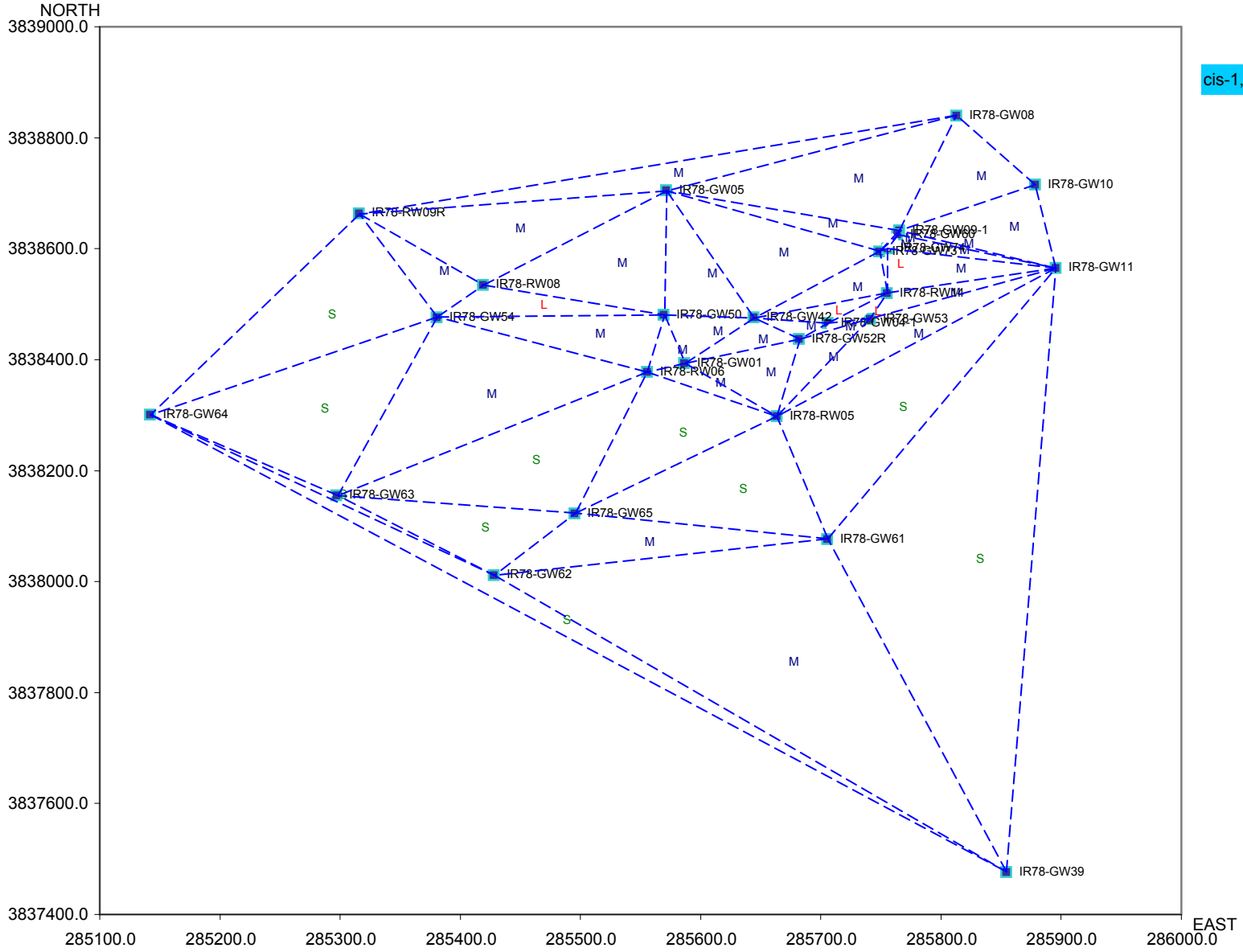
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

cis-1,2-DICHLOROETHYLENE

Existing Locations

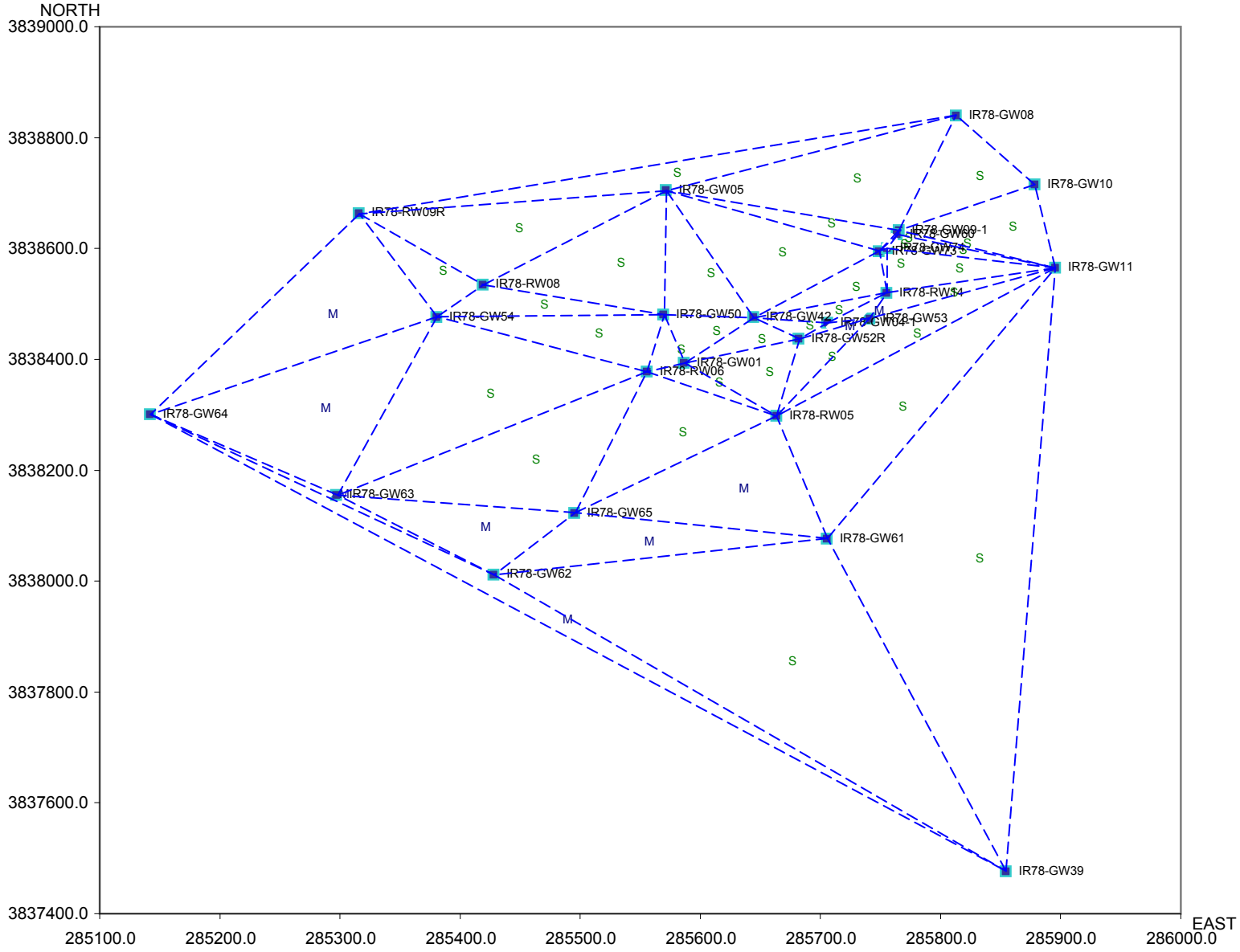
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

VINYL CHLORIDE

Existing Locations

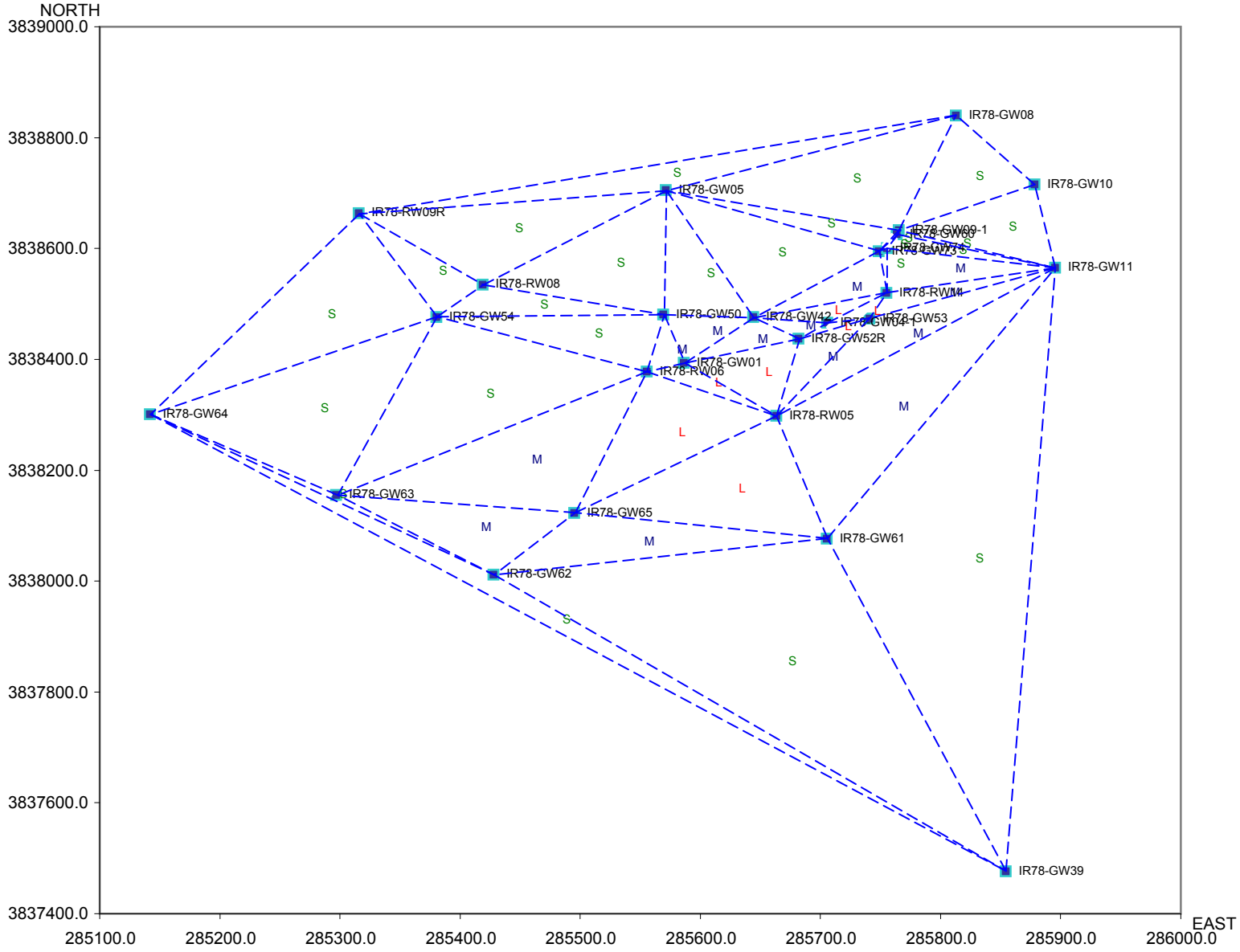
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

BENZENE

Existing Locations

Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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MAROS Site Results

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

User Defined Site and Data Assumptions:

Hydrogeology and Plume Information:

Groundwater Seepage Velocity: 12.26 ft/yr

Current Plume Length: 1000 ft

Current Plume Width 1500 ft

Number of Tail Wells: 15

Number of Source Wells: 5

Source Information:

Source Treatment: Pump and Treat

NAPL is not observed at this site.

Down-gradient Information:

Distance from Edge of Tail to Nearest:

Down-gradient receptor: 250 ft

Down-gradient property: 250 ft

Distance from Source to Nearest:

Down-gradient receptor: 1000 ft

Down-gradient property: 1000 ft

Data Consolidation Assumptions:

Time Period: 11/20/1986 **to** 8/21/2008

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Plume Information Weighting Assumptions:

Consolidation Step 1. Weight Plume Information by Chemical

Summary Weighting: Weighting Applied to All Chemicals Equally

Consolidation Step 2. Weight Well Information by Chemical

Well Weighting: No Weighting of Wells was Applied.

Chemical Weighting: No Weighting of Chemicals was Applied.

Note: These assumptions were made when consolidating the historical montoring data and lumping the Wells and COCs.

1. Compliance Monitoring/Remediation Optimization Results:

Preliminary Monitoring System Optimization Results: Based on site classification, source treatment and Monitoring System Category the following suggestions are made for site Sampling Frequency, Duration of Sampling before reassessment, and Well Density. These criteria take into consideration: Plume Stability, Type of Plume, and Groundwater Velocity.

COC	Tail Stability	Source Stability	Level of Effort	Sampling Duration	Sampling Frequency	Sampling Density
1,1,2,2-TETRACHLOROETHANE	PD	S	L	Remove treatment system if previously reducing concentation	No Recommendation	25
cis-1,2-DICHLOROETHYLENE	PD	NT	M	Remove treatment system if previously reducing concentation	No Recommendation	25
TETRACHLOROETHYLENE(PCE)	S	NT	M	Remove treatment system if previously reducing concentation	No Recommendation	25
TRICHLOROETHYLENE (TCE)	S	NT	M	Remove treatment system if previously reducing concentation	No Recommendation	25
VINYL CHLORIDE	PD	D	L	Continue remediation mechanism unitl reach stable trend or	No Recommendation	25

Note:

Plume Status: (I) Increasing; (PI)Probably Increasing; (S) Stable; (NT) No Trend; (PD) Probably Decreasing; (D) Decreasing

Design Categories: (E) Extensive; (M) Moderate; (L) Limited (N/A) Not Applicable, Insufficient Data Available

Level of Monitoring Effort Indicated by Analysi Moderate

2. Spatial Moment Analysis Results:

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	1,1,2,2-TETRACHLOROETHANE	3.48	8	54.5%	NT
	cis-1,2-DICHLOROETHYLENE	1.06	-65	96.5%	D
	TETRACHLOROETHYLENE(PCE)	1.43	5	52.5%	NT
	TRICHLOROETHYLENE (TCE)	1.56	-1	50.0%	NT
	VINYL CHLORIDE	1.24	-9	54.9%	NT
1st Moment: Distance to Source					
	1,1,2,2-TETRACHLOROETHANE	0.35	-25	79.7%	S
	cis-1,2-DICHLOROETHYLENE	0.13	-2	52.4%	S
	TETRACHLOROETHYLENE(PCE)	0.18	-43	92.8%	PD
	TRICHLOROETHYLENE (TCE)	0.19	-19	73.3%	S
	VINYL CHLORIDE	0.25	-5	55.5%	S
2nd Moment: Sigma XX					
	1,1,2,2-TETRACHLOROETHANE	0.81	-37	89.5%	S
	cis-1,2-DICHLOROETHYLENE	0.32	38	98.9%	I
	TETRACHLOROETHYLENE(PCE)	0.49	63	98.6%	I
	TRICHLOROETHYLENE (TCE)	0.42	49	95.3%	I
	VINYL CHLORIDE	0.42	39	90.7%	PI
2nd Moment: Sigma YY					
	1,1,2,2-TETRACHLOROETHANE	1.10	-85	99.9%	D
	cis-1,2-DICHLOROETHYLENE	0.31	-26	93.6%	PD
	TETRACHLOROETHYLENE(PCE)	0.82	-21	75.5%	S
	TRICHLOROETHYLENE (TCE)	0.67	-29	83.4%	S
	VINYL CHLORIDE	0.53	-21	75.5%	S

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.30 **Saturated Thickness:** Uniform: 25 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

MAROS Mann-Kendall Statistics Summary

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Time Period: 11/20/1986 **to** 8/21/2008
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
1,1,2,2-TETRACHLOROETHANE								
IR06-82MW02	T	18	0	0.00	0	48.5%	Yes	ND
IR06-82MW03	T	17	0	0.00	0	48.4%	Yes	ND
IR06-GW01	S	17	2	3.69	-31	89.0%	No	NT
IR06-GW03	T	18	1	3.81	5	55.9%	No	NT
IR06-GW16	S	20	8	2.11	-58	96.8%	No	D
IR06-GW23	T	11	0	0.00	0	46.9%	Yes	ND
IR06-GW28S	S	14	1	3.29	-7	62.6%	No	NT
IR06-GW30	T	19	0	0.00	0	48.6%	Yes	ND
IR06-GW31	T	11	0	0.00	0	46.9%	Yes	ND
IR06-GW32	T	18	2	3.10	-19	75.0%	No	NT
IR06-GW33	S	26	1	3.55	-7	55.2%	No	NT
IR06-GW41	T	13	7	1.66	-7	64.0%	No	NT
IR06-GW42	S	13	0	0.00	0	47.6%	Yes	ND
IR06-MW03	T	7	0	0.00	0	43.7%	Yes	ND
IR06-SRW01	T	12	12	0.51	-38	99.6%	No	D
IR06-SRW02	T	11	10	0.87	14	84.0%	No	NT
IR06-SRW03	T	14	14	2.32	-37	97.6%	No	D
IR06-SRW04	T	14	3	2.34	-14	75.8%	No	NT
IR06-SRW05	T	12	4	2.72	10	72.7%	No	NT
IR06-SRW06	T	12	11	1.11	32	98.4%	No	I
cis-1,2-DICHLOROETHYLENE								
IR06-82MW02	T	10	3	0.91	16	90.7%	No	PI
IR06-82MW03	T	9	0	0.00	0	46.0%	Yes	ND
IR06-GW01	S	10	0	0.00	0	46.4%	Yes	ND
IR06-GW03	T	11	0	0.00	0	46.9%	Yes	ND
IR06-GW16	S	10	4	2.32	8	72.9%	No	NT
IR06-GW23	T	5	0	0.00	0	40.8%	Yes	ND
IR06-GW28S	S	8	6	1.34	5	68.3%	No	NT
IR06-GW30	T	13	0	0.00	0	47.6%	Yes	ND
IR06-GW31	T	5	0	0.00	0	40.8%	Yes	ND
IR06-GW32	T	13	12	1.98	22	89.8%	No	NT
IR06-GW33	S	21	13	2.32	-17	68.4%	No	NT
IR06-GW41	T	13	5	2.73	-5	59.4%	No	NT
IR06-GW42	S	13	5	1.38	34	97.9%	No	I
IR06-MW03	T	3	0	0.00	0	0.0%	Yes	ND
IR06-SRW01	T	12	12	0.89	-4	58.0%	No	S
IR06-SRW02	T	12	11	0.84	28	96.9%	No	I

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
cis-1,2-DICHLOROETHYLENE								
IR06-SRW03	T	11	11	0.57	-16	87.5%	No	S
IR06-SRW04	T	11	11	0.41	9	72.9%	No	NT
IR06-SRW05	T	10	10	0.69	-21	96.4%	No	D
IR06-SRW06	T	11	11	0.62	9	72.9%	No	NT
TETRACHLOROETHYLENE(PCE)								
IR06-82MW02	T	18	1	3.99	3	53.0%	No	NT
IR06-82MW03	T	17	3	2.58	7	59.6%	No	NT
IR06-GW01	S	17	3	2.80	-31	89.0%	No	NT
IR06-GW03	T	18	2	2.27	-23	79.5%	No	NT
IR06-GW16	S	20	3	2.56	-2	51.3%	No	NT
IR06-GW23	T	11	0	0.00	0	46.9%	Yes	ND
IR06-GW28S	S	15	12	1.18	-3	53.9%	No	NT
IR06-GW30	T	19	3	2.68	-19	73.3%	No	NT
IR06-GW31	T	11	1	3.26	-2	53.0%	No	NT
IR06-GW32	T	19	11	1.94	5	55.5%	No	NT
IR06-GW33	S	27	9	2.84	18	63.7%	No	NT
IR06-GW41	T	13	3	2.92	9	68.4%	No	NT
IR06-GW42	S	13	2	1.07	19	86.1%	No	NT
IR06-MW03	T	7	0	0.00	0	43.7%	Yes	ND
IR06-SRW01	T	14	14	0.49	-16	79.1%	No	S
IR06-SRW02	T	13	13	0.97	17	83.2%	No	NT
IR06-SRW03	T	14	14	0.78	-41	98.7%	No	D
IR06-SRW04	T	14	13	1.43	-77	100.0%	No	D
IR06-SRW05	T	11	11	0.53	-26	97.5%	No	D
IR06-SRW06	T	12	12	0.79	34	99.0%	No	I
TRICHLOROETHYLENE (TCE)								
IR06-82MW02	T	18	0	0.00	0	48.5%	Yes	ND
IR06-82MW03	T	17	1	2.87	6	58.0%	No	NT
IR06-GW01	S	17	3	2.13	-9	62.7%	No	NT
IR06-GW03	T	17	2	3.02	-17	74.2%	No	NT
IR06-GW16	S	20	3	3.49	4	53.8%	No	NT
IR06-GW23	T	11	1	2.24	-10	75.3%	No	NT
IR06-GW28S	S	15	11	1.23	-22	84.8%	No	NT
IR06-GW30	T	19	0	0.00	0	48.6%	Yes	ND
IR06-GW31	T	11	1	0.85	4	59.0%	No	NT
IR06-GW32	T	19	18	1.79	-14	67.4%	No	NT
IR06-GW33	S	26	16	2.09	85	96.8%	No	I
IR06-GW41	T	13	3	3.14	1	50.0%	No	NT
IR06-GW42	S	13	2	1.13	19	86.1%	No	NT
IR06-MW03	T	7	2	1.47	-7	80.9%	No	NT
IR06-SRW01	T	12	12	0.46	-11	74.9%	No	S
IR06-SRW02	T	13	12	0.86	23	90.8%	No	PI
IR06-SRW03	T	12	12	0.75	-24	94.2%	No	PD
IR06-SRW04	T	12	12	1.08	-11	74.9%	No	NT
IR06-SRW05	T	10	10	0.52	-28	99.4%	No	D
IR06-SRW06	T	11	11	0.60	-4	59.0%	No	S
VINYL CHLORIDE								

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
VINYL CHLORIDE								
IR06-82MW02	T	18	3	2.34	-4	54.5%	No	NT
IR06-82MW03	T	17	0	0.00	0	48.4%	Yes	ND
IR06-GW01	S	17	0	0.00	0	48.4%	Yes	ND
IR06-GW03	T	18	0	0.00	0	48.5%	Yes	ND
IR06-GW16	S	20	1	3.34	3	52.6%	No	NT
IR06-GW23	T	11	0	0.00	0	46.9%	Yes	ND
IR06-GW28S	S	15	0	0.00	0	48.0%	Yes	ND
IR06-GW30	T	19	0	0.00	0	48.6%	Yes	ND
IR06-GW31	T	11	0	0.00	0	46.9%	Yes	ND
IR06-GW32	T	19	5	2.30	-20	74.4%	No	NT
IR06-GW33	S	27	0	0.00	0	49.2%	Yes	ND
IR06-GW41	T	13	0	0.00	0	47.6%	Yes	ND
IR06-GW42	S	13	0	0.00	0	47.6%	Yes	ND
IR06-MW03	T	7	0	0.00	0	43.7%	Yes	ND
IR06-SRW01	T	14	4	2.52	20	84.8%	No	NT
IR06-SRW02	T	13	9	0.95	18	84.7%	No	NT
IR06-SRW03	T	14	12	0.58	-21	86.0%	No	S
IR06-SRW04	T	14	12	0.58	12	72.3%	No	NT
IR06-SRW05	T	12	11	0.56	-20	90.2%	No	PD
IR06-SRW06	T	12	9	0.81	-6	63.1%	No	S

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Plume Analysis Summary

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Time Period: 11/20/1986 **to** 8/21/2008

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
1,1,2,2-TETRACHLOROETHANE											
	IR06-82MW02	T	18	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-82MW03	T	17	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01	S	17	2	4.1E-03	2.5E-05	No	NT	D	N/A	N/A
	IR06-GW03	T	18	1	2.5E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW16	S	20	8	6.8E-03	2.5E-05	No	D	D	N/A	N/A
	IR06-GW23	T	11	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW28S	S	14	1	2.1E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW30	T	19	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW31	T	11	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW32	T	18	2	9.7E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW33	S	26	1	8.2E-05	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW41	T	13	7	2.7E-03	1.9E-04	No	NT	NT	N/A	N/A
	IR06-GW42	S	13	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-MW03	T	7	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-SRW01	T	12	12	1.9E+01	1.9E+01	No	D	S	N/A	N/A
	IR06-SRW02	T	11	10	5.5E-01	6.5E-01	No	NT	NT	N/A	N/A
	IR06-SRW03	T	14	14	6.4E-02	1.3E-02	No	D	PD	N/A	N/A
	IR06-SRW04	T	14	3	3.6E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-SRW05	T	12	4	1.3E-02	2.5E-05	No	NT	NT	N/A	N/A
	IR06-SRW06	T	12	11	2.1E-01	1.2E-01	No	I	I	N/A	N/A
cis-1,2-DICHLOROETHYLENE											

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
cis-1,2-DICHLOROETHYLENE											
	IR06-82MW02	T	10	3	5.6E-05	2.5E-05	No	PI	I	N/A	N/A
	IR06-82MW03	T	9	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01	S	10	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW03	T	11	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW16	S	10	4	1.8E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW23	T	5	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW28S	S	8	6	7.2E-03	4.3E-03	No	NT	NT	N/A	N/A
	IR06-GW30	T	13	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW31	T	5	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW32	T	13	12	1.5E-01	3.8E-02	No	NT	NT	N/A	N/A
	IR06-GW33	S	21	13	1.5E-02	4.4E-04	No	NT	NT	N/A	N/A
	IR06-GW41	T	13	5	2.4E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW42	S	13	5	3.2E-04	2.5E-05	No	I	I	N/A	N/A
	IR06-MW03	T	3	0	2.5E-05	2.5E-05	Yes	N/A	N/A	N/A	N/A
	IR06-SRW01	T	12	12	7.3E-01	7.7E-01	No	S	NT	N/A	N/A
	IR06-SRW02	T	12	11	3.1E-01	2.6E-01	No	I	NT	N/A	N/A
	IR06-SRW03	T	11	11	8.6E-01	7.0E-01	No	S	D	N/A	N/A
	IR06-SRW04	T	11	11	3.5E-01	3.3E-01	No	NT	NT	N/A	N/A
	IR06-SRW05	T	10	10	2.4E-01	1.9E-01	No	D	D	N/A	N/A
	IR06-SRW06	T	11	11	5.7E-01	5.4E-01	No	NT	NT	N/A	N/A
TETRACHLOROETHYLENE(PCE)											
	IR06-82MW02	T	18	1	4.1E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-82MW03	T	17	3	2.9E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW01	S	17	3	1.1E-03	2.5E-05	No	NT	D	N/A	N/A
	IR06-GW03	T	18	2	1.1E-04	2.5E-05	No	NT	PD	N/A	N/A
	IR06-GW16	S	20	3	4.8E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW23	T	11	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW28S	S	15	12	1.3E-02	7.0E-03	No	NT	NT	N/A	N/A
	IR06-GW30	T	19	3	5.7E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW31	T	11	1	1.4E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW32	T	19	11	1.6E-02	1.0E-03	No	NT	NT	N/A	N/A
	IR06-GW33	S	27	9	3.8E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW41	T	13	3	5.7E-04	2.5E-05	No	NT	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
TETRACHLOROETHYLENE(PCE)											
	IR06-GW42	S	13	2	4.4E-05	2.5E-05	No	NT	I	N/A	N/A
	IR06-MW03	T	7	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-SRW01	T	14	14	1.8E+00	1.8E+00	No	S	S	N/A	N/A
	IR06-SRW02	T	13	13	4.3E-02	2.8E-02	No	NT	NT	N/A	N/A
	IR06-SRW03	T	14	14	6.4E-02	4.7E-02	No	D	D	N/A	N/A
	IR06-SRW04	T	14	13	6.4E-02	3.8E-02	No	D	D	N/A	N/A
	IR06-SRW05	T	11	11	7.7E-02	7.1E-02	No	D	D	N/A	N/A
	IR06-SRW06	T	12	12	2.3E-01	2.3E-01	No	I	I	N/A	N/A
TRICHLOROETHYLENE (TCE)											
	IR06-82MW02	T	18	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-82MW03	T	17	1	8.2E-05	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW01	S	17	3	1.9E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW03	T	17	2	1.7E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW16	S	20	3	1.1E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW23	T	11	1	7.7E-05	2.5E-05	No	NT	D	N/A	N/A
	IR06-GW28S	S	15	11	2.6E-02	2.1E-02	No	NT	NT	N/A	N/A
	IR06-GW30	T	19	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW31	T	11	1	3.4E-05	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW32	T	19	18	4.1E-01	8.4E-02	No	NT	NT	N/A	N/A
	IR06-GW33	S	26	16	2.2E-02	3.1E-03	No	I	I	N/A	N/A
	IR06-GW41	T	13	3	1.5E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW42	S	13	2	4.5E-05	2.5E-05	No	NT	I	N/A	N/A
	IR06-MW03	T	7	2	1.7E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-SRW01	T	12	12	1.1E+00	1.2E+00	No	S	S	N/A	N/A
	IR06-SRW02	T	13	12	2.5E-01	2.3E-01	No	PI	NT	N/A	N/A
	IR06-SRW03	T	12	12	6.7E-01	4.2E-01	No	PD	D	N/A	N/A
	IR06-SRW04	T	12	12	6.6E-01	4.6E-01	No	NT	PD	N/A	N/A
	IR06-SRW05	T	10	10	2.8E-01	2.8E-01	No	D	D	N/A	N/A
	IR06-SRW06	T	11	11	1.2E+00	1.2E+00	No	S	NT	N/A	N/A
VINYL CHLORIDE											
	IR06-82MW02	T	18	3	1.7E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-82MW03	T	17	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
VINYL CHLORIDE											
	IR06-GW01	S	17	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW03	T	18	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW16	S	20	1	9.9E-05	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW23	T	11	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW28S	S	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW30	T	19	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW31	T	11	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW32	T	19	5	1.9E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW33	S	27	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW41	T	13	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW42	S	13	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-MW03	T	7	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-SRW01	T	14	4	3.1E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-SRW02	T	13	9	7.3E-03	4.0E-03	No	NT	PI	N/A	N/A
	IR06-SRW03	T	14	12	1.4E-02	1.6E-02	No	S	NT	N/A	N/A
	IR06-SRW04	T	14	12	1.1E-02	1.2E-02	No	NT	NT	N/A	N/A
	IR06-SRW05	T	12	11	4.2E-03	3.4E-03	No	PD	NT	N/A	N/A
	IR06-SRW06	T	12	9	8.8E-03	7.9E-03	No	S	S	N/A	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS COC Assessment

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Toxicity:

Contaminant of Concern	Representative Concentration (mg/L)	PRG (mg/L)	Percent Above PRG
1,1,2,2-TETRACHLOROETHANE	9.8E-01	1.4E-02	6878.1%
TRICHLOROETHYLENE (TCE)	2.3E-01	5.0E-03	4591.7%
TETRACHLOROETHYLENE(PCE)	1.1E-01	5.0E-03	2184.1%
CHLOROBENZENE	2.8E-01	1.0E-01	181.7%
cis-1,2-DICHLOROETHYLENE	1.6E-01	7.0E-02	131.8%
1,1,2-TRICHLOROETHANE	6.8E-03	5.0E-03	36.6%
VINYL CHLORIDE	2.4E-03	2.0E-03	19.5%

Note: Top COCs by toxicity were determined by examining a representative concentration for each compound over the entire site. The compound representative concentrations are then compared with the chosen PRG for that compound, with the percentage exceedance from the PRG determining the compound's toxicity. All compounds above exceed the PRG.

Prevalence:

Contaminant of Concern	Class	Total Wells	Total Exceedances	Percent Exceedances	Total detects
TRICHLOROETHYLENE (TCE)	ORG	20	9	45.0%	18
TETRACHLOROETHYLENE(PCE)	ORG	20	8	40.0%	18
cis-1,2-DICHLOROETHYLENE	ORG	20	7	35.0%	13
VINYL CHLORIDE	ORG	20	5	25.0%	9
1,1,2,2-TETRACHLOROETHANE	ORG	20	4	20.0%	13
CHLOROBENZENE	ORG	20	1	5.0%	10
1,1,2-TRICHLOROETHANE	ORG	20	1	5.0%	7

Note: Top COCs by prevalence were determined by examining a representative concentration for each well location at the site. The total exceedances (values above the chosen PRGs) are compared to the total number of wells to determine the prevalence of the compound.

Mobility:

Contaminant of Concern	Kd
VINYL CHLORIDE	0.042
cis-1,2-DICHLOROETHYLENE	0.0724
1,1,2-TRICHLOROETHANE	0.103
1,1,2,2-TETRACHLOROETHANE	0.156
TRICHLOROETHYLENE (TCE)	0.297
CHLOROBENZENE	0.434
TETRACHLOROETHYLENE(PCE)	0.923

Note: Top COCs by mobility were determined by examining each detected compound in the dataset and comparing their mobilities (Koc's for organics, assume foc = 0.001, and Kd's for metals).

Contaminants of Concern (COC's)

1,1,2,2-TETRACHLOROETHANE

TETRACHLOROETHYLENE(PCE)

TRICHLOROETHYLENE (TCE)

cis-1,2-DICHLOROETHYLENE

VINYL CHLORIDE

MAROS Sampling Location Optimization Results

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Sampling Events Analyzed: **From** November 1986 **to** August 2008

11/20/1986 8/21/2008

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
1,1,2,2-TETRACHLOROETHANE	0.3	0.1	0.75	0.75
cis-1,2-DICHLOROETHYLENE	0.3	0.1	0.75	0.75
TETRACHLOROETHYLENE(PCE	0.3	0.1	0.75	0.75
TRICHLOROETHYLENE (TCE)	0.3	0.1	0.75	0.75
VINYL CHLORIDE	0.3	0.1	0.75	0.75

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
1,1,2,2-TETRACHLOROETHANE							
IR06-82MW02	287094.72	3841973.25	☑	0.688	0.000	0.871	☐
IR06-82MW03	286732.94	3841727.50	☑	0.541	0.000	0.782	☐
IR06-GW01	287004.50	3841666.00	☑	0.651	0.000	0.897	☐
IR06-GW03	286791.00	3841553.75	☑	0.158	0.000	0.720	☑
IR06-GW16	286740.50	3841177.00	☑	0.340	0.000	0.895	☐
IR06-GW23	286800.91	3841313.00	☑	0.281	0.000	0.764	☑
IR06-GW28S	286872.50	3841824.50	☑	0.566	0.000	0.818	☐
IR06-GW30	287140.16	3842095.00	☑	0.139	0.000	0.843	☐
IR06-GW31	286578.81	3841383.00	☑	0.237	0.000	0.728	☐
IR06-GW32	286809.84	3841900.25	☑	0.672	0.000	0.901	☐
IR06-GW33	286953.19	3841768.25	☑	0.618	0.000	0.857	☐
IR06-GW41	286993.50	3841808.25	☑	0.535	0.058	0.883	☐
IR06-GW42	287099.91	3841678.75	☑	0.857	0.635	0.893	☐
IR06-MW03	287257.84	3841620.25	☑	0.639	0.548	0.710	☐
IR06-SRW01	287056.72	3841738.25	☑	0.783	0.578	0.873	☐
IR06-SRW02	287062.41	3841842.50	☑	0.459	0.148	0.872	☐
IR06-SRW03	287001.47	3841845.00	☑	0.401	0.159	0.890	☐
IR06-SRW04	286937.75	3841853.50	☑	0.667	0.333	0.792	☐
IR06-SRW05	286883.16	3841861.75	☑	0.603	0.266	0.751	☐
IR06-SRW06	286829.28	3841888.50	☑	0.837	0.608	0.915	☐
cis-1,2-DICHLOROETHYLENE							
IR06-82MW02	287094.72	3841973.25	☑	0.818	0.658	0.883	☐
IR06-82MW03	286732.94	3841727.50	☑	0.820	0.713	0.869	☐

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR06-GW01	287004.50	3841666.00	☑	0.814	0.746	0.852	☐
IR06-GW03	286791.00	3841553.75	☑	0.626	0.347	0.843	☐
IR06-GW16	286740.50	3841177.00	☑	0.415	0.000	0.873	☐
IR06-GW23	286800.91	3841313.00	☑	0.410	0.000	0.723	☐
IR06-GW28S	286872.50	3841824.50	☑	0.428	0.169	0.884	☐
IR06-GW30	287140.16	3842095.00	☑	0.681	0.000	0.914	☐
IR06-GW31	286578.81	3841383.00	☑	0.388	0.000	0.709	☐
IR06-GW32	286809.84	3841900.25	☑	0.219	0.000	0.897	☐
IR06-GW33	286953.19	3841768.25	☑	0.388	0.002	0.823	☐
IR06-GW41	286993.50	3841808.25	☑	0.710	0.207	0.914	☐
IR06-GW42	287099.91	3841678.75	☑	0.631	0.217	0.881	☐
IR06-MW03	287257.84	3841620.25	☑	0.703	0.635	0.739	☐
IR06-SRW01	287056.72	3841738.25	☑	0.646	0.497	0.905	☐
IR06-SRW02	287062.41	3841842.50	☑	0.432	0.293	0.855	☐
IR06-SRW03	287001.47	3841845.00	☑	0.458	0.240	0.723	☐
IR06-SRW04	286937.75	3841853.50	☑	0.333	0.116	0.498	☐
IR06-SRW05	286883.16	3841861.75	☑	0.220	0.095	0.671	☑
IR06-SRW06	286829.28	3841888.50	☑	0.307	0.022	0.720	☐
TETRACHLOROETHYLENE(PCE)							
IR06-82MW02	287094.72	3841973.25	☑	0.790	0.135	0.869	☐
IR06-82MW03	286732.94	3841727.50	☑	0.635	0.000	0.835	☐
IR06-GW01	287004.50	3841666.00	☑	0.711	0.000	0.860	☐
IR06-GW03	286791.00	3841553.75	☑	0.318	0.000	0.756	☐
IR06-GW16	286740.50	3841177.00	☑	0.219	0.000	0.847	☐
IR06-GW23	286800.91	3841313.00	☑	0.262	0.000	0.792	☑
IR06-GW28S	286872.50	3841824.50	☑	0.340	0.004	0.865	☐
IR06-GW30	287140.16	3842095.00	☑	0.545	0.000	0.888	☐
IR06-GW31	286578.81	3841383.00	☑	0.252	0.000	0.628	☐
IR06-GW32	286809.84	3841900.25	☑	0.543	0.059	0.902	☐
IR06-GW33	286953.19	3841768.25	☑	0.615	0.090	0.872	☐
IR06-GW41	286993.50	3841808.25	☑	0.757	0.044	0.885	☐
IR06-GW42	287099.91	3841678.75	☑	0.809	0.556	0.872	☐
IR06-MW03	287257.84	3841620.25	☑	0.615	0.451	0.715	☐
IR06-SRW01	287056.72	3841738.25	☑	0.762	0.545	0.860	☐
IR06-SRW02	287062.41	3841842.50	☑	0.297	0.007	0.477	☑
IR06-SRW03	287001.47	3841845.00	☑	0.440	0.033	0.639	☐
IR06-SRW04	286937.75	3841853.50	☑	0.372	0.211	0.829	☐
IR06-SRW05	286883.16	3841861.75	☑	0.290	0.030	0.607	☑

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR06-SRW06	286829.28	3841888.50	☑	0.496	0.205	0.756	☐
TRICHLOROETHYLENE (TCE)							
IR06-82MW02	287094.72	3841973.25	☑	0.850	0.717	0.894	☐
IR06-82MW03	286732.94	3841727.50	☑	0.764	0.334	0.878	☐
IR06-GW01	287004.50	3841666.00	☑	0.580	0.000	0.855	☐
IR06-GW03	286791.00	3841553.75	☑	0.465	0.000	0.829	☐
IR06-GW16	286740.50	3841177.00	☑	0.209	0.000	0.877	☐
IR06-GW23	286800.91	3841313.00	☑	0.283	0.000	0.711	☑
IR06-GW28S	286872.50	3841824.50	☑	0.440	0.053	0.913	☐
IR06-GW30	287140.16	3842095.00	☑	0.666	0.000	0.916	☐
IR06-GW31	286578.81	3841383.00	☑	0.252	0.000	0.690	☐
IR06-GW32	286809.84	3841900.25	☑	0.293	0.009	0.904	☐
IR06-GW33	286953.19	3841768.25	☑	0.486	0.000	0.839	☐
IR06-GW41	286993.50	3841808.25	☑	0.794	0.273	0.912	☐
IR06-GW42	287099.91	3841678.75	☑	0.807	0.553	0.879	☐
IR06-MW03	287257.84	3841620.25	☑	0.529	0.068	0.759	☐
IR06-SRW01	287056.72	3841738.25	☑	0.674	0.402	0.922	☐
IR06-SRW02	287062.41	3841842.50	☑	0.458	0.052	0.904	☐
IR06-SRW03	287001.47	3841845.00	☑	0.441	0.210	0.713	☐
IR06-SRW04	286937.75	3841853.50	☑	0.358	0.137	0.516	☐
IR06-SRW05	286883.16	3841861.75	☑	0.210	0.018	0.510	☑
IR06-SRW06	286829.28	3841888.50	☑	0.331	0.191	0.743	☐
VINYL CHLORIDE							
IR06-82MW02	287094.72	3841973.25	☑	0.615	0.000	0.822	☐
IR06-82MW03	286732.94	3841727.50	☑	0.407	0.000	0.756	☐
IR06-GW01	287004.50	3841666.00	☑	0.100	0.000	0.449	☐
IR06-GW03	286791.00	3841553.75	☑	0.031	0.000	0.518	☑
IR06-GW16	286740.50	3841177.00	☑	0.054	0.000	0.817	☐
IR06-GW23	286800.91	3841313.00	☑	0.062	0.000	0.630	☐
IR06-GW28S	286872.50	3841824.50	☑	0.645	0.000	0.827	☐
IR06-GW30	287140.16	3842095.00	☑	0.328	0.000	0.853	☐
IR06-GW31	286578.81	3841383.00	☑	0.063	0.000	0.613	☐
IR06-GW32	286809.84	3841900.25	☑	0.563	0.000	0.876	☐
IR06-GW33	286953.19	3841768.25	☑	0.493	0.000	0.743	☐
IR06-GW41	286993.50	3841808.25	☑	0.764	0.278	0.836	☐
IR06-GW42	287099.91	3841678.75	☑	0.452	0.000	0.749	☐
IR06-MW03	287257.84	3841620.25	☑	0.462	0.000	0.659	☐

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR06-SRW01	287056.72	3841738.25	☑	0.427	0.000	0.748	☐
IR06-SRW02	287062.41	3841842.50	☑	0.514	0.000	0.707	☐
IR06-SRW03	287001.47	3841845.00	☑	0.439	0.000	0.694	☐
IR06-SRW04	286937.75	3841853.50	☑	0.475	0.000	0.655	☐
IR06-SRW05	286883.16	3841861.75	☑	0.313	0.000	0.836	☐
IR06-SRW06	286829.28	3841888.50	☑	0.616	0.345	0.836	☐

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the state coordinates system (i.e., X and Y refer to Easting and Northing respectively) or local coordinates systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Location Optimization

Results by Considering All COCs

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Sampling Events Analyzed: **From** November 1986 **to** August 2008

11/20/1986 8/21/2008

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
IR06-82MW02	287094.72	3841973.25	5	0.752	☐
IR06-82MW03	286732.94	3841727.50	5	0.633	☐
IR06-GW01	287004.50	3841666.00	5	0.572	☐
IR06-GW03	286791.00	3841553.75	5	0.320	☐
IR06-GW16	286740.50	3841177.00	5	0.248	☐
IR06-GW23	286800.91	3841313.00	5	0.259	☐
IR06-GW28S	286872.50	3841824.50	5	0.484	☐
IR06-GW30	287140.16	3842095.00	5	0.472	☐
IR06-GW31	286578.81	3841383.00	5	0.238	☐
IR06-GW32	286809.84	3841900.25	5	0.458	☐
IR06-GW33	286953.19	3841768.25	5	0.520	☐
IR06-GW41	286993.50	3841808.25	5	0.712	☐
IR06-GW42	287099.91	3841678.75	5	0.711	☐
IR06-MW03	287257.84	3841620.25	5	0.589	☐
IR06-SRW01	287056.72	3841738.25	5	0.659	☐
IR06-SRW02	287062.41	3841842.50	5	0.432	☐
IR06-SRW03	287001.47	3841845.00	5	0.436	☐
IR06-SRW04	286937.75	3841853.50	5	0.441	☐
IR06-SRW05	286883.16	3841861.75	5	0.327	☐
IR06-SRW06	286829.28	3841888.50	5	0.517	☐

Note: the COC-Averaged Slope Factor is the value calculated by averaging those "Average Slope Factor" obtained earlier across COCs; to be conservative, a location is "abandoned" only when it is eliminated from all COCs; "abandoned" doesn't necessarily mean the abandon of well, it can mean that NO samples need to be collected for any COCs.

* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Frequency Optimization Results

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

The Overall Number of Sampling Events: 33

"Recent Period" defined by events: **From** November 1986 **To** August 2008

11/20/1986 8/21/2008

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
1,1,2,2-TETRACHLOROETHANE	0.014	0.007	0.014	0.028
cis-1,2-DICHLOROETHYLENE	0.07	0.035	0.07	0.14
TETRACHLOROETHYLENE(PCE	0.005	0.0025	0.005	0.01
TRICHLOROETHYLENE (TCE)	0.005	0.0025	0.005	0.01
VINYL CHLORIDE	0.002	0.001	0.002	0.004

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
1,1,2,2-TETRACHLOROETHANE			
IR06-82MW02	Biennial	Annual	Annual
IR06-82MW03	Biennial	Annual	Annual
IR06-GW01	Annual	Annual	Annual
IR06-GW03	Biennial	Annual	Annual
IR06-GW16	Annual	Annual	Annual
IR06-GW23	Biennial	Annual	Annual
IR06-GW28S	Biennial	Annual	Annual
IR06-GW30	Biennial	Annual	Annual
IR06-GW31	Biennial	Annual	Annual
IR06-GW32	Annual	Annual	Annual
IR06-GW33	Biennial	Annual	Annual
IR06-GW41	Annual	Annual	Annual
IR06-GW42	Biennial	Annual	Annual
IR06-MW03	Biennial	Annual	Annual
IR06-SRW01	Annual	Annual	Annual
IR06-SRW02	Quarterly	Quarterly	Quarterly
IR06-SRW03	Annual	Annual	Annual
IR06-SRW04	Annual	Annual	Annual
IR06-SRW05	Annual	Annual	Annual
IR06-SRW06	Quarterly	Quarterly	Quarterly

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
cis-1,2-DICHLOROETHYLENE			
IR06-82MW02	Biennial	Annual	Annual
IR06-82MW03	Biennial	Annual	Annual
IR06-GW01	Biennial	Annual	Annual
IR06-GW03	Biennial	Annual	Annual
IR06-GW16	Biennial	Annual	Annual
IR06-GW23	Biennial	Annual	Annual
IR06-GW28S	Biennial	Annual	Annual
IR06-GW30	Biennial	Annual	Annual
IR06-GW31	Biennial	Annual	Annual
IR06-GW32	SemiAnnual	SemiAnnual	SemiAnnual
IR06-GW33	Annual	Annual	Annual
IR06-GW41	Biennial	Annual	Annual
IR06-GW42	Annual	Annual	Annual
IR06-MW03	Annual	Annual	Annual
IR06-SRW01	Annual	Annual	Annual
IR06-SRW02	Annual	Annual	Annual
IR06-SRW03	Annual	Annual	Annual
IR06-SRW04	Annual	Annual	Annual
IR06-SRW05	Annual	Annual	Annual
IR06-SRW06	Annual	Annual	Annual
TETRACHLOROETHYLENE(PCE)			
IR06-82MW02	Annual	Annual	Annual
IR06-82MW03	Annual	Annual	Annual
IR06-GW01	Annual	Annual	Annual
IR06-GW03	Biennial	Annual	Annual
IR06-GW16	Annual	Annual	Annual
IR06-GW23	Biennial	Annual	Annual
IR06-GW28S	Annual	Annual	Annual
IR06-GW30	Annual	Annual	Annual
IR06-GW31	Annual	Annual	Annual
IR06-GW32	Annual	Annual	Annual
IR06-GW33	Annual	Annual	Annual
IR06-GW41	Annual	Annual	Annual
IR06-GW42	Biennial	Annual	Annual
IR06-MW03	Biennial	Annual	Annual
IR06-SRW01	Annual	Annual	Annual

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR06-SRW02	SemiAnnual	SemiAnnual	SemiAnnual
IR06-SRW03	Annual	Annual	Annual
IR06-SRW04	Annual	Annual	Annual
IR06-SRW05	Annual	Annual	Annual
IR06-SRW06	Quarterly	Quarterly	Quarterly
TRICHLOROETHYLENE (TCE)			
IR06-82MW02	Biennial	Annual	Annual
IR06-82MW03	Biennial	Annual	Annual
IR06-GW01	Biennial	Annual	Annual
IR06-GW03	Biennial	Annual	Annual
IR06-GW16	Annual	Annual	Annual
IR06-GW23	Biennial	Annual	Annual
IR06-GW28S	Annual	Annual	Annual
IR06-GW30	Biennial	Annual	Annual
IR06-GW31	Biennial	Annual	Annual
IR06-GW32	Annual	Annual	Annual
IR06-GW33	Annual	Annual	Annual
IR06-GW41	Annual	Annual	Annual
IR06-GW42	Biennial	Annual	Annual
IR06-MW03	Biennial	Annual	Annual
IR06-SRW01	Annual	Annual	Annual
IR06-SRW02	SemiAnnual	SemiAnnual	SemiAnnual
IR06-SRW03	Annual	Annual	Annual
IR06-SRW04	Annual	Annual	Annual
IR06-SRW05	Annual	Annual	Annual
IR06-SRW06	Quarterly	Quarterly	Quarterly
VINYL CHLORIDE			
IR06-82MW02	Annual	Annual	Annual
IR06-82MW03	Biennial	Annual	Annual
IR06-GW01	Biennial	Annual	Annual
IR06-GW03	Biennial	Annual	Annual
IR06-GW16	Annual	Annual	Annual
IR06-GW23	Biennial	Annual	Annual
IR06-GW28S	Biennial	Annual	Annual
IR06-GW30	Biennial	Annual	Annual
IR06-GW31	Biennial	Annual	Annual

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR06-GW32	Annual	Annual	Annual
IR06-GW33	Biennial	Annual	Annual
IR06-GW41	Biennial	Annual	Annual
IR06-GW42	Biennial	Annual	Annual
IR06-MW03	Biennial	Annual	Annual
IR06-SRW01	Annual	Annual	Annual
IR06-SRW02	Annual	Annual	Annual
IR06-SRW03	Annual	Annual	Annual
IR06-SRW04	Annual	Annual	Annual
IR06-SRW05	Annual	Annual	Annual
IR06-SRW06	Annual	Annual	Annual

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

MAROS Power Analysis for Individual Well Cleanup Status

Project: 2009 LTMO Update

User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

From Period: 11/20/1986 **to** 8/21/2008

Well	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
1,1,2,2-TETRACHLOROETHANE			Cleanup Goal (mg/L) = 0.014		Target Level (mg/L) = 0.0112		
IR06-82MW02	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-82MW03	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01	12	5.85E-03	1.81E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW03	13	1.78E-04	5.51E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW16	13	8.19E-03	1.68E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW23	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW28S	10	1.54E-04	4.07E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW30	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW31	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW32	12	7.31E-04	1.81E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW33	12	8.70E-05	2.15E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW41	9	1.94E-03	3.70E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW42	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-MW03	6	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-SRW01	10	1.94E+01	9.52E+00	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW02	9	6.17E-01	4.78E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW03	10	7.68E-02	1.72E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW04	10	4.72E-03	9.73E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW05	8	1.72E-02	4.19E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW06	9	2.16E-01	1.77E-01	Cont Sampling	Cont Sampling	0.05	0.8
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR06-82MW02	8	6.31E-05	5.43E-05	Attained	Cont Sampling	0.05	0.8
IR06-82MW03	7	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01	7	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW03	8	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW16	5	1.45E-03	1.91E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW23	3	2.50E-05	0.00E+00	N/C	N/C	0.05	0.8
IR06-GW28S	6	6.22E-03	7.65E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW30	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW31	3	2.50E-05	0.00E+00	N/C	N/C	0.05	0.8
IR06-GW32	9	1.88E-01	3.49E-01	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR06-GW33	9	1.79E-02	3.26E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW41	9	1.76E-03	4.45E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW42	9	4.11E-04	4.63E-04	Attained	Cont Sampling	0.05	0.8
IR06-MW03	2	2.50E-05	0.00E+00	N/C	N/C	0.05	0.8
IR06-SRW01	9	7.30E-01	4.36E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW02	9	3.30E-01	1.80E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW03	9	7.89E-01	4.10E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW04	9	3.46E-01	1.04E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW05	7	2.19E-01	1.31E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW06	9	5.49E-01	2.68E-01	Cont Sampling	Not Attained	0.05	0.8
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR06-82MW02	13	2.93E-04	9.67E-04	Attained	Cont Sampling	0.05	0.8
IR06-82MW03	12	2.14E-04	4.40E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW01	12	8.79E-04	1.84E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW03	13	1.17E-04	2.51E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW16	13	5.23E-04	1.14E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW23	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW28S	11	1.18E-02	1.25E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW30	13	4.67E-04	9.30E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW31	9	8.57E-04	2.50E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW32	13	1.67E-02	2.79E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW33	13	3.93E-04	7.55E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW41	9	4.21E-04	9.85E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW42	9	5.28E-05	5.53E-05	Attained	Cont Sampling	0.05	0.8
IR06-MW03	6	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-SRW01	10	1.62E+00	6.46E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW02	10	4.94E-02	4.27E-02	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW03	10	6.18E-02	3.99E-02	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW04	10	6.64E-02	1.08E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW05	8	7.99E-02	4.63E-02	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW06	9	2.34E-01	1.82E-01	Cont Sampling	Cont Sampling	0.05	0.8
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR06-82MW02	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-82MW03	12	6.56E-05	1.41E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW01	12	1.98E-04	3.35E-04	Attained	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:**

Location: Site 6 and 82 Shallow Aquifer **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR06-GW03	12	2.17E-04	6.11E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW16	13	1.50E-03	4.69E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW23	9	8.89E-05	1.92E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW28S	11	2.86E-02	3.39E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW30	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW31	9	3.56E-05	3.17E-05	Attained	Cont Sampling	0.05	0.8
IR06-GW32	13	4.05E-01	6.10E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW33	12	2.25E-02	4.09E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW41	9	1.09E-03	2.80E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW42	9	5.39E-05	5.99E-05	Attained	Cont Sampling	0.05	0.8
IR06-MW03	6	1.47E-04	1.96E-04	Attained	Cont Sampling	0.05	0.8
IR06-SRW01	10	1.20E+00	5.05E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW02	10	2.59E-01	1.36E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW03	10	6.71E-01	4.78E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW04	10	6.82E-01	7.64E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW05	8	2.76E-01	1.38E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-SRW06	9	1.15E+00	7.00E-01	Cont Sampling	Cont Sampling	0.05	0.8
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR06-82MW02	13	1.40E-04	2.42E-04	Attained	Cont Sampling	0.05	0.8
IR06-82MW03	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW03	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW16	13	6.30E-05	1.37E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW23	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW28S	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW30	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW31	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW32	13	1.72E-03	3.12E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW33	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW41	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW42	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-MW03	6	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-SRW01	10	2.67E-04	4.69E-04	Attained	Cont Sampling	0.05	0.8
IR06-SRW02	10	7.28E-03	5.45E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW03	10	1.27E-02	8.29E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW04	10	1.07E-02	6.87E-03	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update

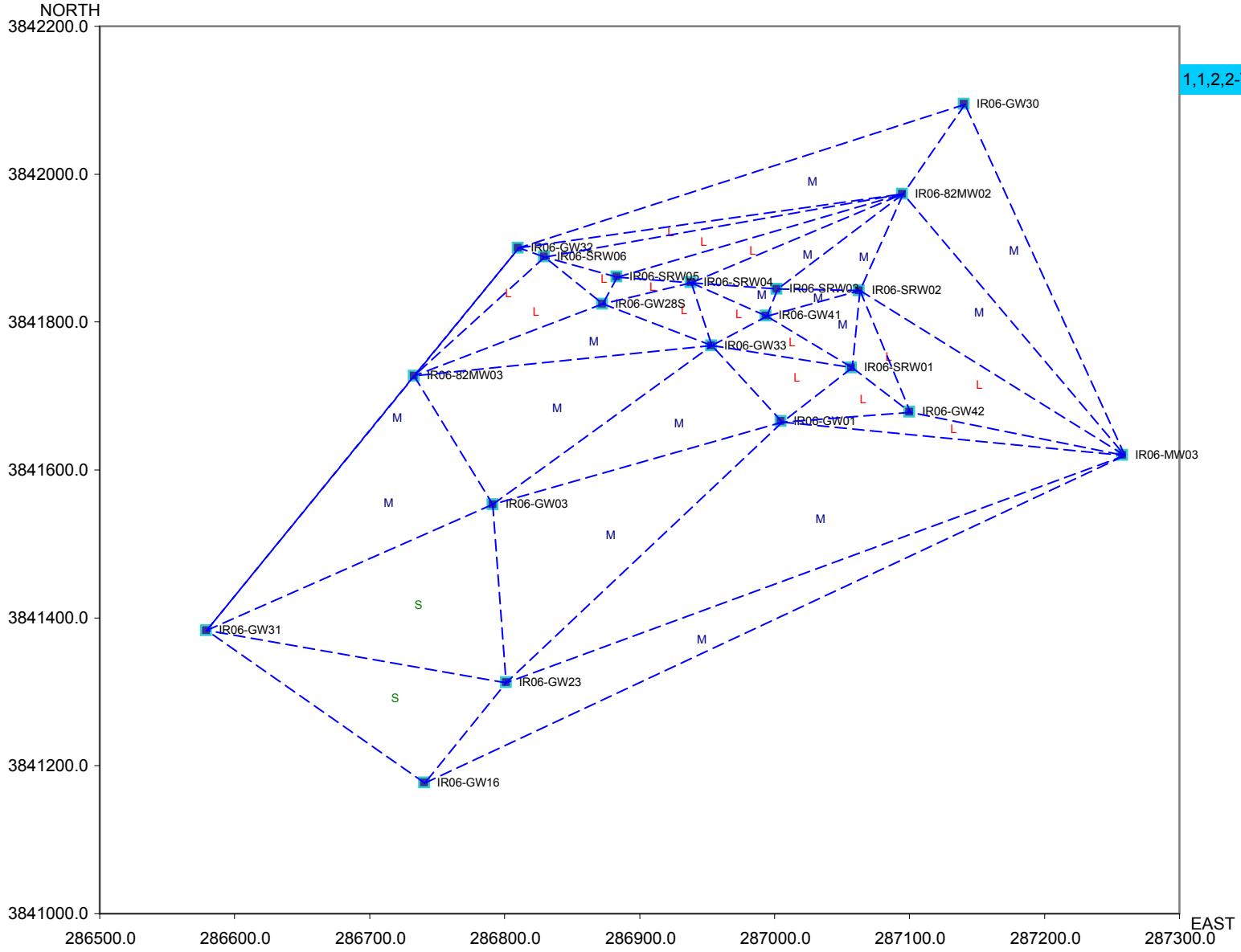
User Name:

Location: Site 6 and 82 Shallow Aquifer

State: North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR06-SRW05	8	3.74E-03	2.21E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-SRW06	9	8.04E-03	5.87E-03	Cont Sampling	Cont Sampling	0.05	0.8

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the analysis; The Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The test for evaluating attainment status is from EPA (1992). Refer to Appendix A.6 of MAROS Manual for details.



New Location Analysis for

1,1,2,2-TETRACHLOROETHANE

Existing Locations

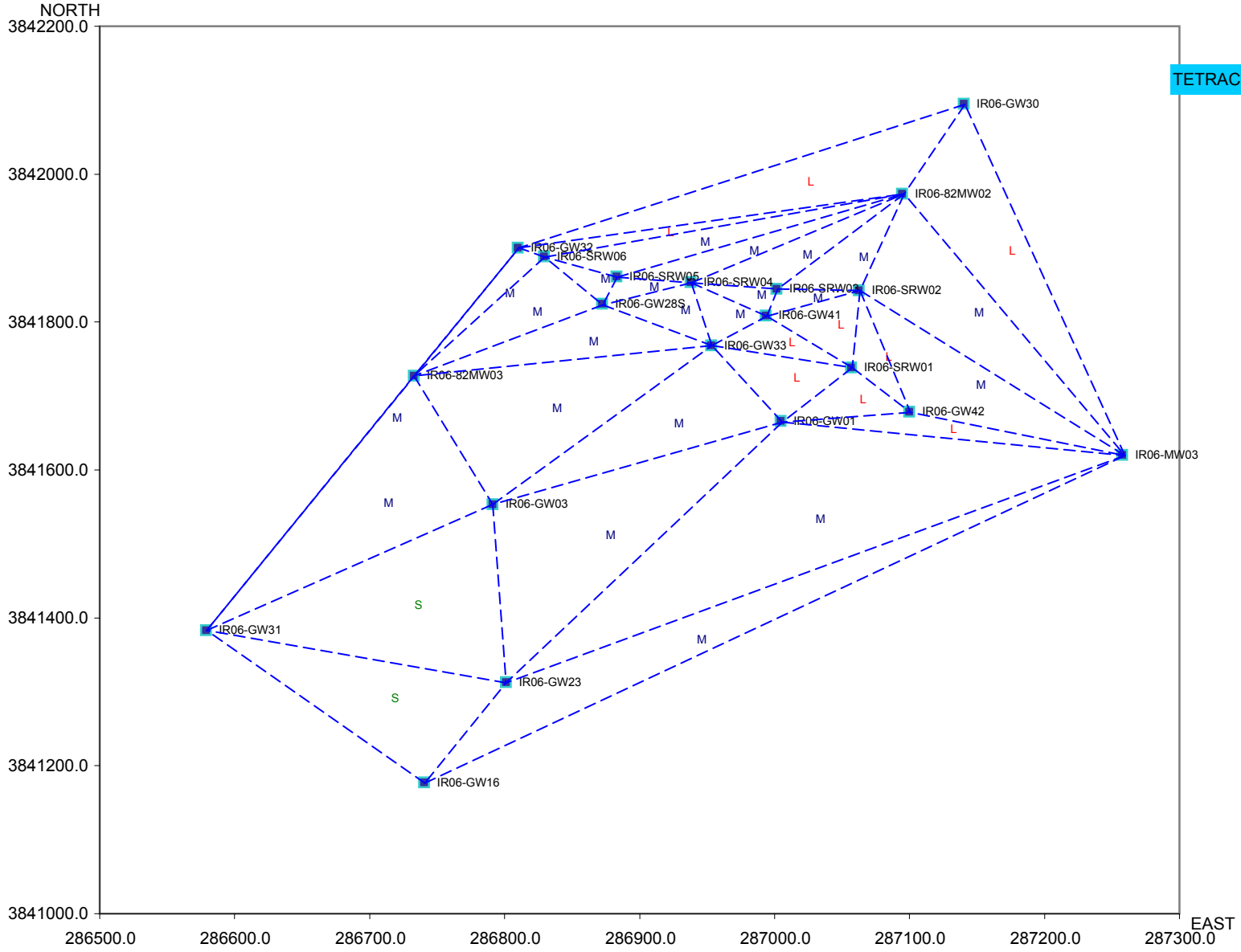
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

TETRACHLOROETHYLENE(PCE)

Existing Locations

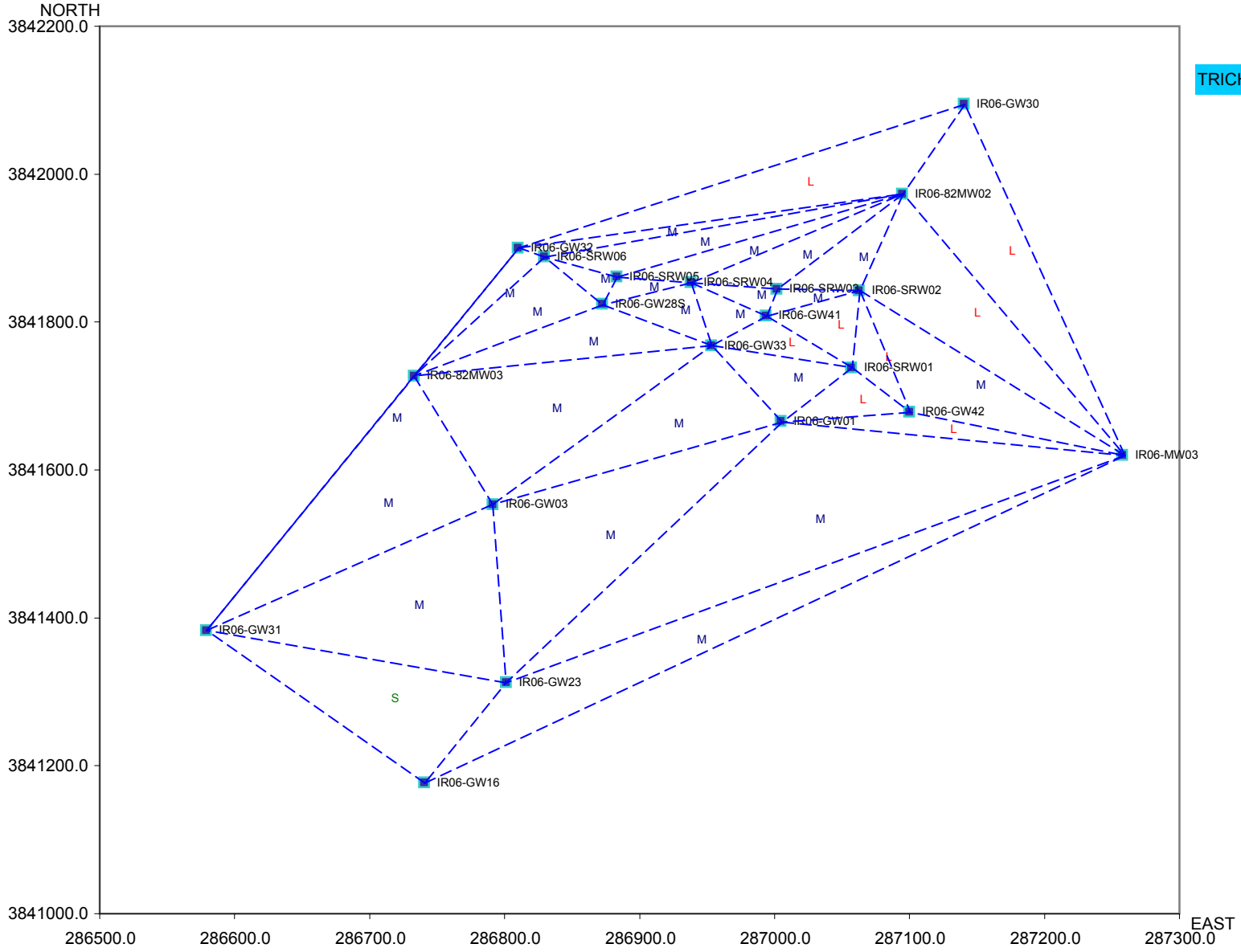
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

TRICHLOROETHYLENE (TCE)

Existing Locations

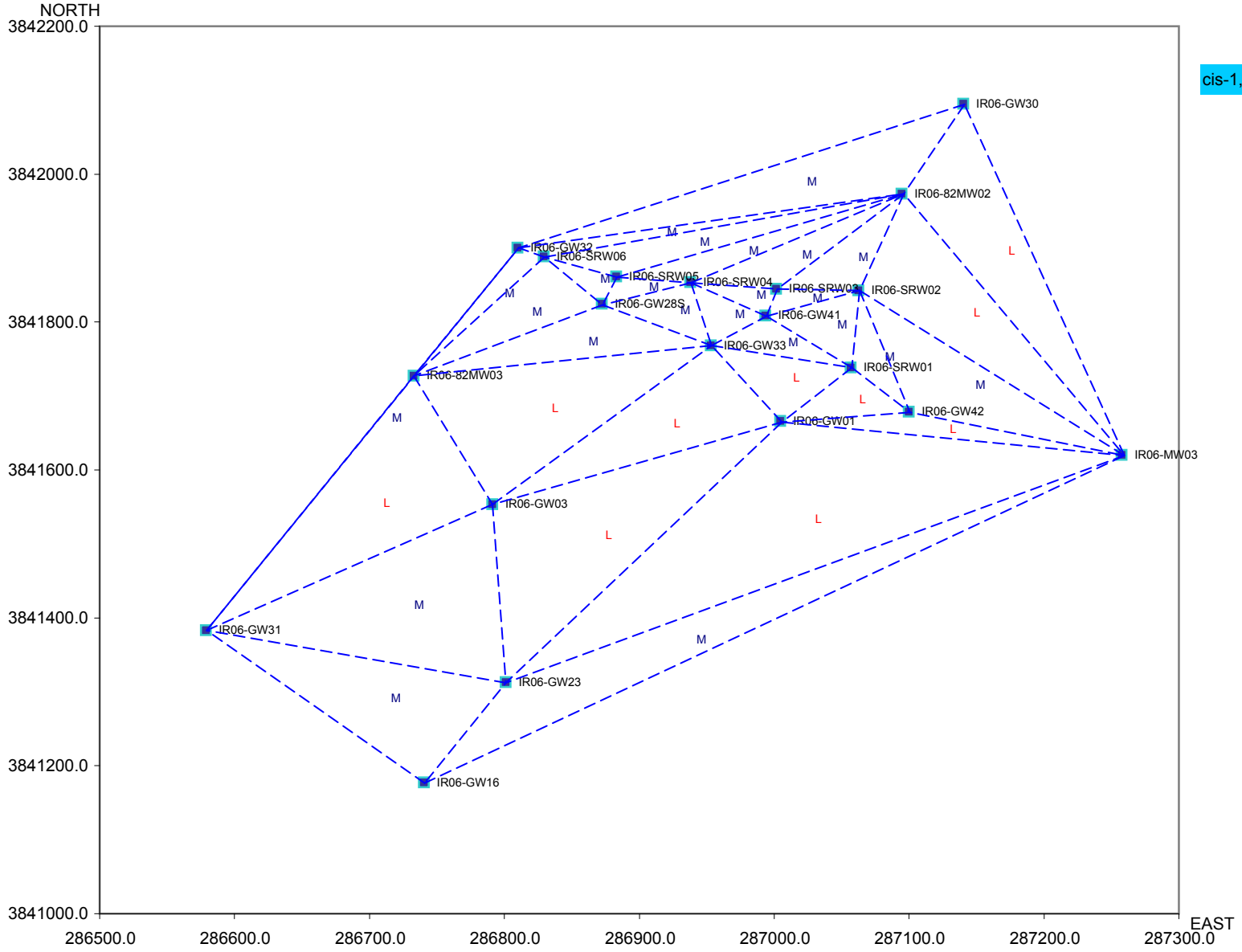
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

cis-1,2-DICHLOROETHYLENE

Existing Locations

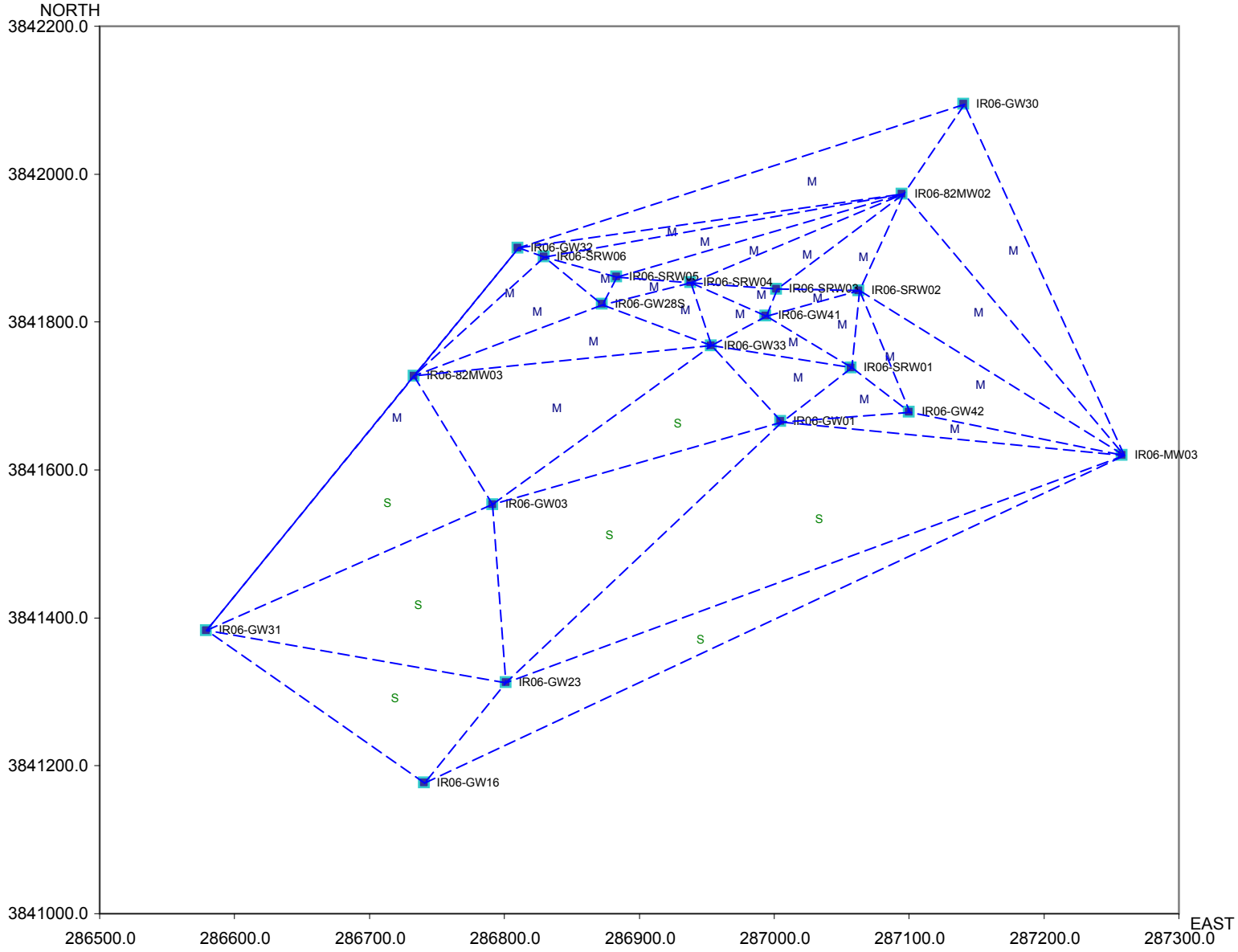
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

VINYL CHLORIDE

Existing Locations

Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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MAROS Site Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquife

State: North Carolina

User Defined Site and Data Assumptions:

Hydrogeology and Plume Information:

Groundwater Seepage Velocity: 12.26 ft/yr

Current Plume Length: 1000 ft

Current Plume Width 2500 ft

Number of Tail Wells: 8

Number of Source Wells: 11

Source Information:

Source Treatment: Pump and Treat

NAPL is not observed at this site.

Down-gradient Information:

Distance from Edge of Tail to Nearest:

Down-gradient receptor: 250 ft

Down-gradient property: 250 ft

Distance from Source to Nearest:

Down-gradient receptor: 1000 ft

Down-gradient property: 1000 ft

Data Consolidation Assumptions:

Time Period: 11/19/1986 **to** 9/17/2008
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Plume Information Weighting Assumptions:

Consolidation Step 1. Weight Plume Information by Chemical

Summary Weighting: Weighting Applied to All Chemicals Equally

Consolidation Step 2. Weight Well Information by Chemical

Well Weighting: No Weighting of Wells was Applied.
Chemical Weighting: No Weighting of Chemicals was Applied.

Note: These assumptions were made when consolidating the historical montoring data and lumping the Wells and COCs.

1. Compliance Monitoring/Remediation Optimization Results:

Preliminary Monitoring System Optimization Results: Based on site classification, source treatment and Monitoring System Category the following suggestions are made for site Sampling Frequency, Duration of Sampling before reassessment, and Well Density. These criteria take into consideration: Plume Stability, Type of Plume, and Groundwater Velocity.

COC	Tail Stability	Source Stability	Level of Effort	Sampling Duration	Sampling Frequency	Sampling Density
1,1,2,2-TETRACHLOROETHANE	D	PD	L	Continue remediation mechanism unitl reach stable trend or	No Recommendation	25
cis-1,2-DICHLOROETHYLENE	S	D	M	Remove treatment system if previously reducing concentation	No Recommendation	25
TETRACHLOROETHYLENE(PCE)	PD	S	L	Remove treatment system if previously reducing concentation	No Recommendation	25
TRICHLOROETHYLENE (TCE)	S	PD	M	Remove treatment system if previously reducing concentation	No Recommendation	25
VINYL CHLORIDE	D	PD	L	Continue remediation mechanism unitl reach stable trend or	No Recommendation	25

Note:

Plume Status: (I) Increasing; (PI)Probably Increasing; (S) Stable; (NT) No Trend; (PD) Probably Decreasing; (D) Decreasing

Design Categories: (E) Extensive; (M) Moderate; (L) Limited (N/A) Not Applicable, Insufficient Data Available

Level of Monitoring Effort Indicated by Analysi Moderate

2. Spatial Moment Analysis Results:

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	1,1,2,2-TETRACHLOROETHANE	1.64	-5	52.8%	NT
	cis-1,2-DICHLOROETHYLENE	1.71	-66	96.7%	D
	TETRACHLOROETHYLENE(PCE)	1.37	-21	63.8%	NT
	TRICHLOROETHYLENE (TCE)	1.92	-63	86.4%	NT
	VINYL CHLORIDE	1.16	-75	90.6%	PD
1st Moment: Distance to Source					
	1,1,2,2-TETRACHLOROETHANE	0.32	-3	53.0%	S
	cis-1,2-DICHLOROETHYLENE	0.17	-2	52.7%	S
	TETRACHLOROETHYLENE(PCE)	0.29	-17	72.5%	S
	TRICHLOROETHYLENE (TCE)	0.22	-26	84.6%	S
	VINYL CHLORIDE	0.21	-41	93.4%	PD
2nd Moment: Sigma XX					
	1,1,2,2-TETRACHLOROETHANE	0.60	17	72.5%	NT
	cis-1,2-DICHLOROETHYLENE	0.37	6	63.1%	NT
	TETRACHLOROETHYLENE(PCE)	0.38	19	75.0%	NT
	TRICHLOROETHYLENE (TCE)	0.63	52	98.3%	I
	VINYL CHLORIDE	0.54	39	92.4%	PI
2nd Moment: Sigma YY					
	1,1,2,2-TETRACHLOROETHANE	0.54	-23	79.5%	S
	cis-1,2-DICHLOROETHYLENE	0.55	0	47.3%	S
	TETRACHLOROETHYLENE(PCE)	0.57	-29	85.3%	S
	TRICHLOROETHYLENE (TCE)	0.62	-10	64.2%	S
	VINYL CHLORIDE	0.46	-1	50.0%	S

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.30 **Saturated Thickness:** Uniform: 175 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

MAROS Mann-Kendall Statistics Summary

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquife

State: North Carolina

Time Period: 11/19/1986 **to** 9/17/2008
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
1,1,2,2-TETRACHLOROETHANE								
IR06-DRW01	S	15	9	1.11	-70	100.0%	No	D
IR06-DRW02	S	14	12	0.85	33	96.0%	No	I
IR06-DRW03	S	14	2	3.21	-7	62.6%	No	NT
IR06-DRW04	S	14	7	2.38	-27	92.1%	No	PD
IR06-GW01	S	17	2	3.69	-31	89.0%	No	NT
IR06-GW01D	S	19	0	0.00	0	48.6%	Yes	ND
IR06-GW01DA	S	15	0	0.00	0	48.0%	Yes	ND
IR06-GW01DB	S	13	0	0.00	0	47.6%	Yes	ND
IR06-GW15D	T	15	0	0.00	0	48.0%	Yes	ND
IR06-GW27DA	S	14	0	0.00	0	47.8%	Yes	ND
IR06-GW27D	S	19	0	0.00	0	48.6%	Yes	ND
IR06-GW28D	S	26	1	2.15	5	53.5%	No	NT
IR06-GW35D	T	15	1	3.43	-10	66.9%	No	NT
IR06-GW36D	T	14	0	0.00	0	47.8%	Yes	ND
IR06-GW37D	T	18	1	4.17	-3	53.0%	No	NT
IR06-GW38D	T	14	0	0.00	0	47.8%	Yes	ND
IR06-GW40D	T	15	0	0.00	0	48.0%	Yes	ND
IR06-GW43D	T	6	0	0.00	0	42.3%	Yes	ND
IR06-MW03D	T	4	0	0.00	0	37.5%	Yes	ND
cis-1,2-DICHLOROETHYLENE								
IR06-DRW01	S	14	14	1.32	-63	100.0%	No	D
IR06-DRW02	S	11	11	0.87	-32	99.4%	No	D
IR06-DRW03	S	11	11	1.06	-47	100.0%	No	D
IR06-DRW04	S	11	11	0.92	-50	100.0%	No	D
IR06-GW01	S	10	0	0.00	0	46.4%	Yes	ND
IR06-GW01D	S	11	11	1.29	-17	89.1%	No	NT
IR06-GW01DA	S	10	0	0.00	0	46.4%	Yes	ND
IR06-GW01DB	S	9	0	0.00	0	46.0%	Yes	ND
IR06-GW15D	T	10	0	0.00	0	46.4%	Yes	ND
IR06-GW27DA	S	10	1	3.14	7	70.0%	No	NT
IR06-GW27D	S	12	11	2.66	-29	97.4%	No	D
IR06-GW28D	S	19	19	0.80	-40	91.3%	No	PD
IR06-GW35D	T	10	1	2.46	-1	50.0%	No	NT
IR06-GW36D	T	9	1	1.65	2	54.0%	No	NT
IR06-GW37D	T	13	13	0.49	14	78.2%	No	NT
IR06-GW38D	T	6	0	0.00	0	42.3%	Yes	ND
IR06-GW40D	T	10	1	2.98	-9	75.8%	No	NT

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquife

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
cis-1,2-DICHLOROETHYLENE								
IR06-GW43D	T	6	1	1.32	5	76.5%	No	NT
IR06-MW03D	T	4	0	0.00	0	37.5%	Yes	ND
TETRACHLOROETHYLENE(PCE)								
IR06-DRW01	S	12	11	1.62	-54	100.0%	No	D
IR06-DRW02	S	12	12	0.55	-32	98.4%	No	D
IR06-DRW03	S	14	12	0.77	-34	96.5%	No	D
IR06-DRW04	S	14	13	0.65	5	58.5%	No	NT
IR06-GW01	S	17	3	2.80	-31	89.0%	No	NT
IR06-GW01D	S	17	15	1.58	-32	89.8%	No	NT
IR06-GW01DA	S	15	1	3.28	-14	73.7%	No	NT
IR06-GW01DB	S	13	2	2.51	1	50.0%	No	NT
IR06-GW15D	T	15	2	2.40	-5	57.7%	No	NT
IR06-GW27DA	S	14	0	0.00	0	47.8%	Yes	ND
IR06-GW27D	S	20	5	2.72	35	86.3%	No	NT
IR06-GW28D	S	26	23	1.04	126	99.8%	No	I
IR06-GW35D	T	15	1	2.16	4	55.8%	No	NT
IR06-GW36D	T	14	1	3.35	5	58.5%	No	NT
IR06-GW37D	T	18	2	3.52	7	58.9%	No	NT
IR06-GW38D	T	14	0	0.00	0	47.8%	Yes	ND
IR06-GW40D	T	15	0	0.00	0	48.0%	Yes	ND
IR06-GW43D	T	6	0	0.00	0	42.3%	Yes	ND
IR06-MW03D	T	4	0	0.00	0	37.5%	Yes	ND
TRICHLOROETHYLENE (TCE)								
IR06-DRW01	S	15	15	1.12	-90	100.0%	No	D
IR06-DRW02	S	13	13	1.00	-70	100.0%	No	D
IR06-DRW03	S	12	12	0.97	-56	100.0%	No	D
IR06-DRW04	S	12	12	0.86	-56	100.0%	No	D
IR06-GW01	S	17	3	2.13	-9	62.7%	No	NT
IR06-GW01D	S	18	17	1.02	-92	100.0%	No	D
IR06-GW01DA	S	15	9	3.31	-22	84.8%	No	NT
IR06-GW01DB	S	13	1	3.46	-6	61.7%	No	NT
IR06-GW15D	T	15	5	3.41	-8	63.3%	No	NT
IR06-GW27DA	S	14	4	2.27	22	87.2%	No	NT
IR06-GW27D	S	19	18	2.08	-124	100.0%	No	D
IR06-GW28D	S	26	25	1.24	-115	99.5%	No	D
IR06-GW35D	T	15	1	3.44	4	55.8%	No	NT
IR06-GW36D	T	14	2	3.13	-7	62.6%	No	NT
IR06-GW37D	T	18	12	1.61	32	87.8%	No	NT
IR06-GW38D	T	14	3	2.27	0	47.8%	No	NT
IR06-GW40D	T	15	4	2.64	-8	63.3%	No	NT
IR06-GW43D	T	6	0	0.00	0	42.3%	Yes	ND
IR06-MW03D	T	4	1	1.51	-3	72.9%	No	NT
VINYL CHLORIDE								
IR06-DRW01	S	17	14	1.02	-71	99.9%	No	D
IR06-DRW02	S	13	12	0.82	-34	97.9%	No	D
IR06-DRW03	S	14	13	0.88	-69	100.0%	No	D
IR06-DRW04	S	14	13	0.67	-52	99.8%	No	D

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquife

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
VINYL CHLORIDE								
IR06-GW01	S	17	0	0.00	0	48.4%	Yes	ND
IR06-GW01D	S	19	12	2.12	-27	81.6%	No	NT
IR06-GW01DA	S	15	0	0.00	0	48.0%	Yes	ND
IR06-GW01DB	S	13	0	0.00	0	47.6%	Yes	ND
IR06-GW15D	T	15	0	0.00	0	48.0%	Yes	ND
IR06-GW27DA	S	14	1	3.66	11	70.5%	No	NT
IR06-GW27D	S	20	12	2.16	-37	87.7%	No	NT
IR06-GW28D	S	27	14	1.73	-11	58.2%	No	NT
IR06-GW35D	T	15	0	0.00	0	48.0%	Yes	ND
IR06-GW36D	T	14	0	0.00	0	47.8%	Yes	ND
IR06-GW37D	T	18	14	0.75	29	85.3%	No	NT
IR06-GW38D	T	14	0	0.00	0	47.8%	Yes	ND
IR06-GW40D	T	15	0	0.00	0	48.0%	Yes	ND
IR06-GW43D	T	6	0	0.00	0	42.3%	Yes	ND
IR06-MW03D	T	4	0	0.00	0	37.5%	Yes	ND

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Plume Analysis Summary

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquife

State: North Carolina

Time Period: 11/19/1986 **to** 9/17/2008

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
1,1,2,2-TETRACHLOROETHANE											
	IR06-DRW01	S	15	9	3.9E+00	3.9E+00	No	D	D	N/A	N/A
	IR06-DRW02	S	14	12	7.6E-02	5.0E-02	No	I	NT	N/A	N/A
	IR06-DRW03	S	14	2	2.2E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-DRW04	S	14	7	2.4E-02	1.4E-04	No	PD	D	N/A	N/A
	IR06-GW01	S	17	2	4.1E-03	2.5E-05	No	NT	D	N/A	N/A
	IR06-GW01D	S	19	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01DA	S	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01DB	S	13	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW15D	T	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW27DA	S	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW27DW	S	19	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW28DW	S	26	1	4.3E-05	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW35D	T	15	1	2.2E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW36D	T	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW37D	T	18	1	1.4E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW38D	T	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW40DW	T	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW43DW	T	6	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-MW03D	T	4	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
cis-1,2-DICHLOROETHYLENE											
	IR06-DRW01	S	14	14	2.8E+00	1.9E+00	No	D	D	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquife **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
cis-1,2-DICHLOROETHYLENE											
	IR06-DRW02	S	11	11	4.7E+00	2.7E+00	No	D	D	N/A	N/A
	IR06-DRW03	S	11	11	1.8E+00	9.4E-01	No	D	D	N/A	N/A
	IR06-DRW04	S	11	11	3.3E+00	2.1E+00	No	D	D	N/A	N/A
	IR06-GW01	S	10	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01D	S	11	11	3.1E+00	9.2E-01	No	NT	D	N/A	N/A
	IR06-GW01DA	S	10	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01DB	S	9	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW15D	T	10	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW27DA	S	10	1	4.1E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW27DW	S	12	11	1.5E-01	2.1E-02	No	D	D	N/A	N/A
	IR06-GW28DW	S	19	19	3.1E+00	2.6E+00	No	PD	D	N/A	N/A
	IR06-GW35D	T	10	1	1.1E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW36D	T	9	1	5.6E-05	2.5E-05	No	NT	I	N/A	N/A
	IR06-GW37D	T	13	13	5.4E-01	4.9E-01	No	NT	NT	N/A	N/A
	IR06-GW38D	T	6	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW40DW	T	10	1	4.2E-04	2.5E-05	No	NT	PD	N/A	N/A
	IR06-GW43DW	T	6	1	5.4E-05	2.5E-05	No	NT	PI	N/A	N/A
	IR06-MW03D	T	4	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
TETRACHLOROETHYLENE(PCE)											
	IR06-DRW01	S	12	11	8.0E-01	3.8E-01	No	D	D	N/A	N/A
	IR06-DRW02	S	12	12	8.2E-01	6.2E-01	No	D	D	N/A	N/A
	IR06-DRW03	S	14	12	1.1E-02	1.1E-02	No	D	S	N/A	N/A
	IR06-DRW04	S	14	13	1.6E-01	1.5E-01	No	NT	PI	N/A	N/A
	IR06-GW01	S	17	3	1.1E-03	2.5E-05	No	NT	D	N/A	N/A
	IR06-GW01D	S	17	15	9.7E-01	4.0E-01	No	NT	D	N/A	N/A
	IR06-GW01DA	S	15	1	1.6E-04	2.5E-05	No	NT	D	N/A	N/A
	IR06-GW01DB	S	13	2	1.1E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW15D	T	15	2	1.1E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW27DA	S	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW27DW	S	20	5	1.6E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW28DW	S	26	23	3.1E-01	2.0E-01	No	I	I	N/A	N/A
	IR06-GW35D	T	15	1	5.7E-05	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW36D	T	14	1	2.4E-04	2.5E-05	No	NT	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquife **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
TETRACHLOROETHYLENE(PCE)											
	IR06-GW37D	T	18	2	7.7E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW38D	T	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW40DW	T	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW43DW	T	6	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-MW03D	T	4	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
TRICHLOROETHYLENE (TCE)											
	IR06-DRW01	S	15	15	1.3E+01	9.6E+00	No	D	D	N/A	N/A
	IR06-DRW02	S	13	13	1.2E+01	7.0E+00	No	D	D	N/A	N/A
	IR06-DRW03	S	12	12	4.3E+00	2.1E+00	No	D	D	N/A	N/A
	IR06-DRW04	S	12	12	1.1E+01	8.1E+00	No	D	D	N/A	N/A
	IR06-GW01	S	17	3	1.9E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW01D	S	18	17	5.5E+01	4.9E+01	No	D	D	N/A	N/A
	IR06-GW01DA	S	15	9	9.4E-03	3.4E-04	No	NT	PD	N/A	N/A
	IR06-GW01DB	S	13	1	6.0E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW15D	T	15	5	2.6E-03	2.5E-05	No	NT	PD	N/A	N/A
	IR06-GW27DA	S	14	4	1.2E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW27DW	S	19	18	3.0E+00	1.1E-01	No	D	D	N/A	N/A
	IR06-GW28DW	S	26	25	7.0E+00	2.3E+00	No	D	PD	N/A	N/A
	IR06-GW35D	T	15	1	2.2E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW36D	T	14	2	5.4E-04	2.5E-05	No	NT	PD	N/A	N/A
	IR06-GW37D	T	18	12	6.5E-02	7.3E-03	No	NT	NT	N/A	N/A
	IR06-GW38D	T	14	3	3.6E-04	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW40DW	T	15	4	2.5E-03	2.5E-05	No	NT	NT	N/A	N/A
	IR06-GW43DW	T	6	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-MW03D	T	4	1	1.0E-04	2.5E-05	No	NT	NT	N/A	N/A
VINYL CHLORIDE											
	IR06-DRW01	S	17	14	3.0E-02	2.7E-02	No	D	PD	N/A	N/A
	IR06-DRW02	S	13	12	8.4E-02	7.4E-02	No	D	NT	N/A	N/A
	IR06-DRW03	S	14	13	4.9E-02	3.7E-02	No	D	D	N/A	N/A
	IR06-DRW04	S	14	13	6.8E-02	7.2E-02	No	D	NT	N/A	N/A
	IR06-GW01	S	17	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01D	S	19	12	1.0E-01	9.5E-03	No	NT	NT	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquife **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
VINYL CHLORIDE											
	IR06-GW01DA	S	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW01DB	S	13	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW15D	T	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW27DA	S	14	1	1.2E-03	2.5E-05	No	NT	PI	N/A	N/A
	IR06-GW27DW	S	20	12	2.9E-02	1.0E-03	No	NT	PD	N/A	N/A
	IR06-GW28DW	S	27	14	3.5E-02	6.6E-04	No	NT	NT	N/A	N/A
	IR06-GW35D	T	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW36D	T	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW37D	T	18	14	2.4E-02	2.7E-02	No	NT	NT	N/A	N/A
	IR06-GW38D	T	14	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW40DW	T	15	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-GW43DW	T	6	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A
	IR06-MW03D	T	4	0	2.5E-05	2.5E-05	Yes	ND	ND	N/A	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS COC Assessment

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquife **State:** North Carolina

Toxicity:

Contaminant of Concern	Representative Concentration (mg/L)	PRG (mg/L)	Percent Above PRG
TRICHLOROETHYLENE (TCE)	5.6E+00	5.0E-03	111095.2%
TETRACHLOROETHYLENE(PCE)	1.6E-01	5.0E-03	3148.0%
1,1,2,2-TETRACHLOROETHANE	2.1E-01	1.4E-02	1401.8%
cis-1,2-DICHLOROETHYLENE	1.0E+00	7.0E-02	1363.0%
VINYL CHLORIDE	2.2E-02	2.0E-03	1013.8%
trans-1,2-DICHLOROETHENE	4.6E-01	1.0E-01	362.1%
BENZENE	1.3E-03	1.0E-03	26.8%
1,1-DICHLOROETHENE	7.1E-03	7.0E-03	2.0%

Note: Top COCs by toxicity were determined by examining a representative concentration for each compound over the entire site. The compound representative concentrations are then compared with the chosen PRG for that compound, with the percentage exceedance from the PRG determining the compound's toxicity. All compounds above exceed the PRG.

Prevalence:

Contaminant of Concern	Class	Total Wells	Total Exceedances	Percent Exceedances	Total detects
TRICHLOROETHYLENE (TCE)	ORG	19	9	47.4%	18
VINYL CHLORIDE	ORG	19	8	42.1%	9
cis-1,2-DICHLOROETHYLENE	ORG	19	8	42.1%	13
trans-1,2-DICHLOROETHENE	ORG	19	7	36.8%	9
TETRACHLOROETHYLENE(PCE)	ORG	19	6	31.6%	14
1,1-DICHLOROETHENE	ORG	16	5	31.3%	10
BENZENE	ORG	19	5	26.3%	10
1,1,2,2-TETRACHLOROETHANE	ORG	19	3	15.8%	8

Note: Top COCs by prevalence were determined by examining a representative concentration for each well location at the site. The total exceedances (values above the chosen PRGs) are compared to the total number of wells to determine the prevalence of the compound.

Mobility:

Contaminant of Concern	Kd
VINYL CHLORIDE	0.042
cis-1,2-DICHLOROETHYLENE	0.0724
BENZENE	0.0984
trans-1,2-DICHLOROETHENE	0.117
1,1-DICHLOROETHENE	0.13
1,1,2,2-TETRACHLOROETHANE	0.156
TRICHLOROETHYLENE (TCE)	0.297
TETRACHLOROETHYLENE(PCE)	0.923

Note: Top COCs by mobility were determined by examining each detected compound in the dataset and comparing their mobilities (Koc's for organics, assume foc = 0.001, and Kd's for metals).

Contaminants of Concern (COC's)

1,1,2,2-TETRACHLOROETHANE

TETRACHLOROETHYLENE(PCE)

TRICHLOROETHYLENE (TCE)

cis-1,2-DICHLOROETHYLENE

VINYL CHLORIDE

MAROS Sampling Location Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer

State: North Carolina

Sampling Events Analyzed: **From** November 1986 **to** September 2008

11/19/1986 9/17/2008

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
1,1,2,2-TETRACHLOROETHANE	0.3	0.1	0.75	0.75
cis-1,2-DICHLOROETHYLENE	0.3	0.1	0.75	0.75
TETRACHLOROETHYLENE(PCE	0.3	0.1	0.75	0.75
TRICHLOROETHYLENE (TCE)	0.3	0.1	0.75	0.75
VINYL CHLORIDE	0.3	0.1	0.75	0.75

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
1,1,2,2-TETRACHLOROETHANE							
IR06-DRW01	287026.31	3841657.25	☑	0.740	0.000	0.935	☐
IR06-DRW02	286842.94	3841848.25	☑	0.729	0.000	0.906	☐
IR06-DRW03	286716.81	3841746.50	☑	0.319	0.000	0.831	☐
IR06-DRW04	286939.81	3841752.75	☑	0.406	0.000	0.907	☐
IR06-GW01	287004.50	3841666.00	☑	0.452	0.000	0.778	☐
IR06-GW01D	287012.25	3841667.25	☑	0.382	0.000	0.869	☐
IR06-GW01DA	287017.56	3841666.75	☑	0.361	0.000	0.718	☐
IR06-GW01DB	287023.38	3841667.75	☑	0.442	0.000	0.781	☐
IR06-GW15D	286949.19	3841554.75	☑	0.439	0.000	0.880	☐
IR06-GW27DA	286734.00	3841736.00	☑	0.249	0.000	0.723	☑
IR06-GW27DW	286723.56	3841734.75	☑	0.121	0.000	0.824	☑
IR06-GW28DW	286856.94	3841839.75	☑	0.630	0.000	0.888	☐
IR06-GW35D	286371.03	3842084.25	☑	0.525	0.000	0.839	☐
IR06-GW36D	286695.22	3842335.25	☑	0.540	0.000	0.815	☐
IR06-GW37D	286497.53	3841661.25	☑	0.135	0.000	0.883	☑
IR06-GW38D	286763.22	3841573.50	☑	0.195	0.000	0.644	☐
IR06-GW40DW	287067.31	3841796.75	☑	0.521	0.000	0.819	☐
IR06-GW43DW	286443.91	3841644.00	☑	0.123	0.000	0.559	☐
IR06-MW03D	287378.13	3841555.75	☑	0.217	0.000	0.866	☐
cis-1,2-DICHLOROETHYLENE							
IR06-DRW01	287026.31	3841657.25	☑	0.661	0.377	0.758	☐
IR06-DRW02	286842.94	3841848.25	☑	0.199	0.118	0.296	☑
IR06-DRW03	286716.81	3841746.50	☑	0.482	0.247	0.584	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR06-DRW04	286939.81	3841752.75	☑	0.569	0.327	0.653	☐
IR06-GW01	287004.50	3841666.00	☑	0.919	0.908	0.932	☐
IR06-GW01D	287012.25	3841667.25	☑	0.773	0.564	0.882	☐
IR06-GW01DA	287017.56	3841666.75	☑	0.831	0.218	0.913	☐
IR06-GW01DB	287023.38	3841667.75	☑	0.788	0.000	0.879	☐
IR06-GW15D	286949.19	3841554.75	☑	0.807	0.000	0.924	☐
IR06-GW27DA	286734.00	3841736.00	☑	0.848	0.399	0.922	☐
IR06-GW27DW	286723.56	3841734.75	☑	0.397	0.217	0.901	☐
IR06-GW28DW	286856.94	3841839.75	☑	0.140	0.033	0.804	☑
IR06-GW35D	286371.03	3842084.25	☑	0.865	0.484	0.927	☐
IR06-GW36D	286695.22	3842335.25	☑	0.793	0.441	0.886	☐
IR06-GW37D	286497.53	3841661.25	☑	0.474	0.183	0.822	☐
IR06-GW38D	286763.22	3841573.50	☑	0.837	0.793	0.855	☐
IR06-GW40DW	287067.31	3841796.75	☑	0.827	0.352	0.900	☐
IR06-GW43DW	286443.91	3841644.00	☑	0.860	0.692	0.923	☐
IR06-MW03D	287378.13	3841555.75	☑	0.615	0.000	0.862	☐
TETRACHLOROETHYLENE(PCE)							
IR06-DRW01	287026.31	3841657.25	☑	0.568	0.018	0.922	☐
IR06-DRW02	286842.94	3841848.25	☑	0.363	0.144	0.703	☐
IR06-DRW03	286716.81	3841746.50	☑	0.617	0.325	0.829	☐
IR06-DRW04	286939.81	3841752.75	☑	0.599	0.277	0.766	☐
IR06-GW01	287004.50	3841666.00	☑	0.748	0.014	0.928	☐
IR06-GW01D	287012.25	3841667.25	☑	0.750	0.165	0.920	☐
IR06-GW01DA	287017.56	3841666.75	☑	0.735	0.000	0.885	☐
IR06-GW01DB	287023.38	3841667.75	☑	0.652	0.024	0.854	☐
IR06-GW15D	286949.19	3841554.75	☑	0.664	0.000	0.870	☐
IR06-GW27DA	286734.00	3841736.00	☑	0.645	0.000	0.864	☐
IR06-GW27DW	286723.56	3841734.75	☑	0.488	0.000	0.879	☐
IR06-GW28DW	286856.94	3841839.75	☑	0.249	0.000	0.794	☑
IR06-GW35D	286371.03	3842084.25	☑	0.734	0.000	0.860	☐
IR06-GW36D	286695.22	3842335.25	☑	0.715	0.000	0.845	☐
IR06-GW37D	286497.53	3841661.25	☑	0.552	0.000	0.870	☐
IR06-GW38D	286763.22	3841573.50	☑	0.570	0.000	0.803	☐
IR06-GW40DW	287067.31	3841796.75	☑	0.866	0.766	0.905	☐
IR06-GW43DW	286443.91	3841644.00	☑	0.424	0.000	0.851	☐
IR06-MW03D	287378.13	3841555.75	☑	0.531	0.000	0.854	☐
TRICHLOROETHYLENE (TCE)							

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR06-DRW01	287026.31	3841657.25	☑	0.606	0.301	0.872	☐
IR06-DRW02	286842.94	3841848.25	☑	0.218	0.073	0.628	☑
IR06-DRW03	286716.81	3841746.50	☑	0.463	0.247	0.849	☐
IR06-DRW04	286939.81	3841752.75	☑	0.582	0.307	0.932	☐
IR06-GW01	287004.50	3841666.00	☑	0.883	0.675	0.939	☐
IR06-GW01D	287012.25	3841667.25	☑	0.747	0.533	0.943	☐
IR06-GW01DA	287017.56	3841666.75	☑	0.607	0.163	0.905	☐
IR06-GW01DB	287023.38	3841667.75	☑	0.794	0.000	0.904	☐
IR06-GW15D	286949.19	3841554.75	☑	0.642	0.000	0.917	☐
IR06-GW27DA	286734.00	3841736.00	☑	0.760	0.118	0.929	☐
IR06-GW27DW	286723.56	3841734.75	☑	0.445	0.088	0.915	☐
IR06-GW28DW	286856.94	3841839.75	☑	0.257	0.024	0.926	☑
IR06-GW35D	286371.03	3842084.25	☑	0.848	0.126	0.925	☐
IR06-GW36D	286695.22	3842335.25	☑	0.770	0.014	0.900	☐
IR06-GW37D	286497.53	3841661.25	☑	0.482	0.074	0.900	☐
IR06-GW38D	286763.22	3841573.50	☑	0.696	0.069	0.903	☐
IR06-GW40DW	287067.31	3841796.75	☑	0.802	0.281	0.916	☐
IR06-GW43DW	286443.91	3841644.00	☑	0.694	0.413	0.879	☐
IR06-MW03D	287378.13	3841555.75	☑	0.658	0.537	0.834	☐
VINYL CHLORIDE							
IR06-DRW01	287026.31	3841657.25	☑	0.545	0.000	0.899	☐
IR06-DRW02	286842.94	3841848.25	☑	0.404	0.083	0.848	☐
IR06-DRW03	286716.81	3841746.50	☑	0.582	0.311	0.905	☐
IR06-DRW04	286939.81	3841752.75	☑	0.626	0.000	0.904	☐
IR06-GW01	287004.50	3841666.00	☑	0.685	0.000	0.900	☐
IR06-GW01D	287012.25	3841667.25	☑	0.571	0.000	0.916	☐
IR06-GW01DA	287017.56	3841666.75	☑	0.583	0.000	0.889	☐
IR06-GW01DB	287023.38	3841667.75	☑	0.612	0.000	0.818	☐
IR06-GW15D	286949.19	3841554.75	☑	0.596	0.000	0.894	☐
IR06-GW27DA	286734.00	3841736.00	☑	0.756	0.000	0.891	☐
IR06-GW27DW	286723.56	3841734.75	☑	0.528	0.033	0.902	☐
IR06-GW28DW	286856.94	3841839.75	☑	0.381	0.000	0.885	☐
IR06-GW35D	286371.03	3842084.25	☑	0.852	0.738	0.897	☐
IR06-GW36D	286695.22	3842335.25	☑	0.627	0.000	0.819	☐
IR06-GW37D	286497.53	3841661.25	☑	0.594	0.090	0.884	☐
IR06-GW38D	286763.22	3841573.50	☑	0.684	0.000	0.798	☐
IR06-GW40DW	287067.31	3841796.75	☑	0.749	0.000	0.856	☐
IR06-GW43DW	286443.91	3841644.00	☑	0.875	0.867	0.890	☐

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer

State: North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR06-MW03D	287378.13	3841555.75	☑	0.350	0.000	0.802	☐

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the state coordinates system (i.e., X and Y refer to Easting and Northing respectively) or local coordinates systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Location Optimization

Results by Considering All COCs

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer

State: North Carolina

Sampling Events Analyzed: **From** November 1986 **to** September 2008

11/19/1986 9/17/2008

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
IR06-DRW01	287026.31	3841657.25	5	0.624	☐
IR06-DRW02	286842.94	3841848.25	5	0.383	☐
IR06-DRW03	286716.81	3841746.50	5	0.493	☐
IR06-DRW04	286939.81	3841752.75	5	0.557	☐
IR06-GW01	287004.50	3841666.00	5	0.737	☐
IR06-GW01D	287012.25	3841667.25	5	0.645	☐
IR06-GW01DA	287017.56	3841666.75	5	0.624	☐
IR06-GW01DB	287023.38	3841667.75	5	0.657	☐
IR06-GW15D	286949.19	3841554.75	5	0.630	☐
IR06-GW27DA	286734.00	3841736.00	5	0.652	☐
IR06-GW27DW	286723.56	3841734.75	5	0.396	☐
IR06-GW28DW	286856.94	3841839.75	5	0.331	☐
IR06-GW35D	286371.03	3842084.25	5	0.765	☐
IR06-GW36D	286695.22	3842335.25	5	0.689	☐
IR06-GW37D	286497.53	3841661.25	5	0.448	☐
IR06-GW38D	286763.22	3841573.50	5	0.596	☐
IR06-GW40DW	287067.31	3841796.75	5	0.753	☐
IR06-GW43DW	286443.91	3841644.00	5	0.595	☐
IR06-MW03D	287378.13	3841555.75	5	0.474	☐

Note: the COC-Averaged Slope Factor is the value calculated by averaging those "Average Slope Factor" obtained earlier across COCs; to be conservative, a location is "abandoned" only when it is eliminated from all COCs; "abandoned" doesn't necessarily mean the abandon of well, it can mean that NO samples need to be collected for any COCs.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Frequency Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer

State: North Carolina

The Overall Number of Sampling Events: 31

"Recent Period" defined by events: **From** November 1986 **To** September 2008

11/19/1986 9/17/2008

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
1,1,2,2-TETRACHLOROETHANE	0.014	0.007	0.014	0.028
cis-1,2-DICHLOROETHYLENE	0.07	0.035	0.07	0.14
TETRACHLOROETHYLENE(PCE	0.005	0.0025	0.005	0.01
TRICHLOROETHYLENE (TCE)	0.005	0.0025	0.005	0.01
VINYL CHLORIDE	0.002	0.001	0.002	0.004

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
1,1,2,2-TETRACHLOROETHANE			
IR06-DRW01	Annual	Annual	Annual
IR06-DRW02	Annual	Annual	Annual
IR06-DRW03	Annual	Annual	Annual
IR06-DRW04	Annual	Annual	Annual
IR06-GW01	Annual	Annual	Annual
IR06-GW01D	Biennial	Annual	Annual
IR06-GW01DA	Biennial	Annual	Annual
IR06-GW01DB	Biennial	Annual	Annual
IR06-GW15D	Biennial	Annual	Annual
IR06-GW27DA	Biennial	Annual	Annual
IR06-GW27DW	Biennial	Annual	Annual
IR06-GW28DW	Biennial	Annual	Annual
IR06-GW35D	Biennial	Annual	Annual
IR06-GW36D	Biennial	Annual	Annual
IR06-GW37D	Annual	Annual	Annual
IR06-GW38D	Biennial	Annual	Annual
IR06-GW40DW	Biennial	Annual	Annual
IR06-GW43DW	Biennial	Annual	Annual
IR06-MW03D	Biennial	Annual	Annual
cis-1,2-DICHLOROETHYLENE			

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR06-DRW01	Annual	Annual	Annual
IR06-DRW02	Annual	Annual	Annual
IR06-DRW03	Annual	Annual	Annual
IR06-DRW04	Annual	Annual	Annual
IR06-GW01	Biennial	Annual	Annual
IR06-GW01D	Annual	Annual	Annual
IR06-GW01DA	Biennial	Annual	Annual
IR06-GW01DB	Biennial	Annual	Annual
IR06-GW15D	Biennial	Annual	Annual
IR06-GW27DA	Annual	Annual	Annual
IR06-GW27DW	Annual	Annual	Annual
IR06-GW28DW	Annual	Annual	Annual
IR06-GW35D	Biennial	Annual	Annual
IR06-GW36D	Biennial	Annual	Annual
IR06-GW37D	Annual	Annual	Annual
IR06-GW38D	Biennial	Annual	Annual
IR06-GW40DW	Biennial	Annual	Annual
IR06-GW43DW	Biennial	Annual	Annual
IR06-MW03D	Biennial	Annual	Annual
TETRACHLOROETHYLENE(PCE)			
IR06-DRW01	Annual	Annual	Annual
IR06-DRW02	Annual	Annual	Annual
IR06-DRW03	Annual	Annual	Annual
IR06-DRW04	Annual	Annual	Annual
IR06-GW01	Annual	Annual	Annual
IR06-GW01D	Annual	Annual	Annual
IR06-GW01DA	Biennial	Annual	Annual
IR06-GW01DB	Biennial	Annual	Annual
IR06-GW15D	Biennial	Annual	Annual
IR06-GW27DA	Biennial	Annual	Annual
IR06-GW27DW	Annual	Annual	Annual
IR06-GW28DW	Quarterly	Quarterly	Quarterly
IR06-GW35D	Biennial	Annual	Annual
IR06-GW36D	Annual	Annual	Annual
IR06-GW37D	Annual	Annual	Annual
IR06-GW38D	Biennial	Annual	Annual
IR06-GW40DW	Biennial	Annual	Annual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR06-GW43DW	Biennial	Annual	Annual
IR06-MW03D	Biennial	Annual	Annual
TRICHLOROETHYLENE (TCE)			
IR06-DRW01	Annual	Annual	Annual
IR06-DRW02	Annual	Annual	Annual
IR06-DRW03	Annual	Annual	Annual
IR06-DRW04	Annual	Annual	Annual
IR06-GW01	Biennial	Annual	Annual
IR06-GW01D	Annual	Annual	Annual
IR06-GW01DA	Annual	Annual	Annual
IR06-GW01DB	Annual	Annual	Annual
IR06-GW15D	Annual	Annual	Annual
IR06-GW27DA	Annual	Annual	Annual
IR06-GW27DW	Annual	Annual	Annual
IR06-GW28DW	Annual	Annual	Annual
IR06-GW35D	Annual	Annual	Annual
IR06-GW36D	Annual	Annual	Annual
IR06-GW37D	Quarterly	Quarterly	Quarterly
IR06-GW38D	Annual	Annual	Annual
IR06-GW40DW	Annual	Annual	Annual
IR06-GW43DW	Biennial	Annual	Annual
IR06-MW03D	Biennial	Annual	Annual
VINYL CHLORIDE			
IR06-DRW01	Annual	Annual	Annual
IR06-DRW02	Annual	Annual	Annual
IR06-DRW03	Annual	Annual	Annual
IR06-DRW04	Annual	Annual	Annual
IR06-GW01	Biennial	Annual	Annual
IR06-GW01D	Annual	Annual	Annual
IR06-GW01DA	Biennial	Annual	Annual
IR06-GW01DB	Biennial	Annual	Annual
IR06-GW15D	Biennial	Annual	Annual
IR06-GW27DA	Annual	Annual	Annual
IR06-GW27DW	Annual	Annual	Annual
IR06-GW28DW	Annual	Annual	Annual
IR06-GW35D	Biennial	Annual	Annual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
IR06-GW36D	Biennial	Annual	Annual
IR06-GW37D	Annual	Annual	Annual
IR06-GW38D	Biennial	Annual	Annual
IR06-GW40DW	Biennial	Annual	Annual
IR06-GW43DW	Biennial	Annual	Annual
IR06-MW03D	Biennial	Annual	Annual

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

MAROS Power Analysis for Individual Well Cleanup Status

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer

State: North Carolina

From Period: 11/19/1986 **to** 9/17/2008

Well	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
1,1,2,2-TETRACHLOROETHANE			Cleanup Goal (mg/L) = 0.014		Target Level (mg/L) = 0.0112		
IR06-DRW01	10	3.96E+00	3.99E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW02	10	7.85E-02	5.82E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW03	10	1.52E-03	4.09E-03	Attained	Cont Sampling	0.05	0.8
IR06-DRW04	10	2.66E-02	6.06E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01	12	5.85E-03	1.81E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01D	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01DA	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01DB	10	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW15D	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW27DA	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW27DW	13	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW28DW	13	6.15E-05	1.32E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW35D	12	1.45E-04	4.15E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW36D	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW37D	12	1.07E-03	3.60E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW38D	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW40DW	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW43DW	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-MW03D	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR06-DRW01	9	2.86E+00	3.58E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW02	9	4.47E+00	4.08E+00	Cont Sampling	Not Attained	0.05	0.8
IR06-DRW03	9	1.51E+00	1.68E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW04	9	2.87E+00	2.87E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01	7	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01D	9	2.67E+00	3.68E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01DA	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01DB	8	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW15D	9	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW27DA	9	4.58E-03	1.37E-02	Attained	Cont Sampling	0.05	0.8
IR06-GW27DW	9	1.83E-01	4.57E-01	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR06-GW28DW	9	3.86E+00	2.76E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW35D	9	1.22E-04	2.92E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW36D	8	5.94E-05	9.72E-05	Attained	Cont Sampling	0.05	0.8
IR06-GW37D	9	5.54E-01	1.84E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-GW38D	5	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW40DW	9	4.67E-04	1.33E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW43DW	4	6.88E-05	8.75E-05	Attained	Cont Sampling	0.05	0.8
IR06-MW03D	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR06-DRW01	8	1.02E+00	1.53E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW02	9	7.68E-01	2.87E-01	Cont Sampling	Not Attained	0.05	0.8
IR06-DRW03	10	1.14E-02	9.58E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW04	10	1.49E-01	7.79E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01	12	8.79E-04	1.84E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW01D	14	7.11E-01	9.73E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01DA	12	1.98E-04	5.99E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW01DB	10	8.33E-05	1.54E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW15D	12	1.27E-04	2.84E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW27DA	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW27DW	14	2.18E-03	4.97E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW28DW	14	3.33E-01	3.69E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW35D	12	6.46E-05	1.37E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW36D	11	2.95E-04	8.97E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW37D	12	5.86E-04	1.66E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW38D	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW40DW	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW43DW	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-MW03D	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR06-DRW01	10	1.43E+01	1.50E+01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW02	10	1.03E+01	1.02E+01	Cont Sampling	Not Attained	0.05	0.8
IR06-DRW03	10	3.83E+00	3.71E+00	Cont Sampling	Not Attained	0.05	0.8
IR06-DRW04	10	1.06E+01	9.66E+00	Cont Sampling	Not Attained	0.05	0.8
IR06-GW01	12	1.98E-04	3.35E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW01D	14	4.88E+01	5.33E+01	Cont Sampling	Cont Sampling	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

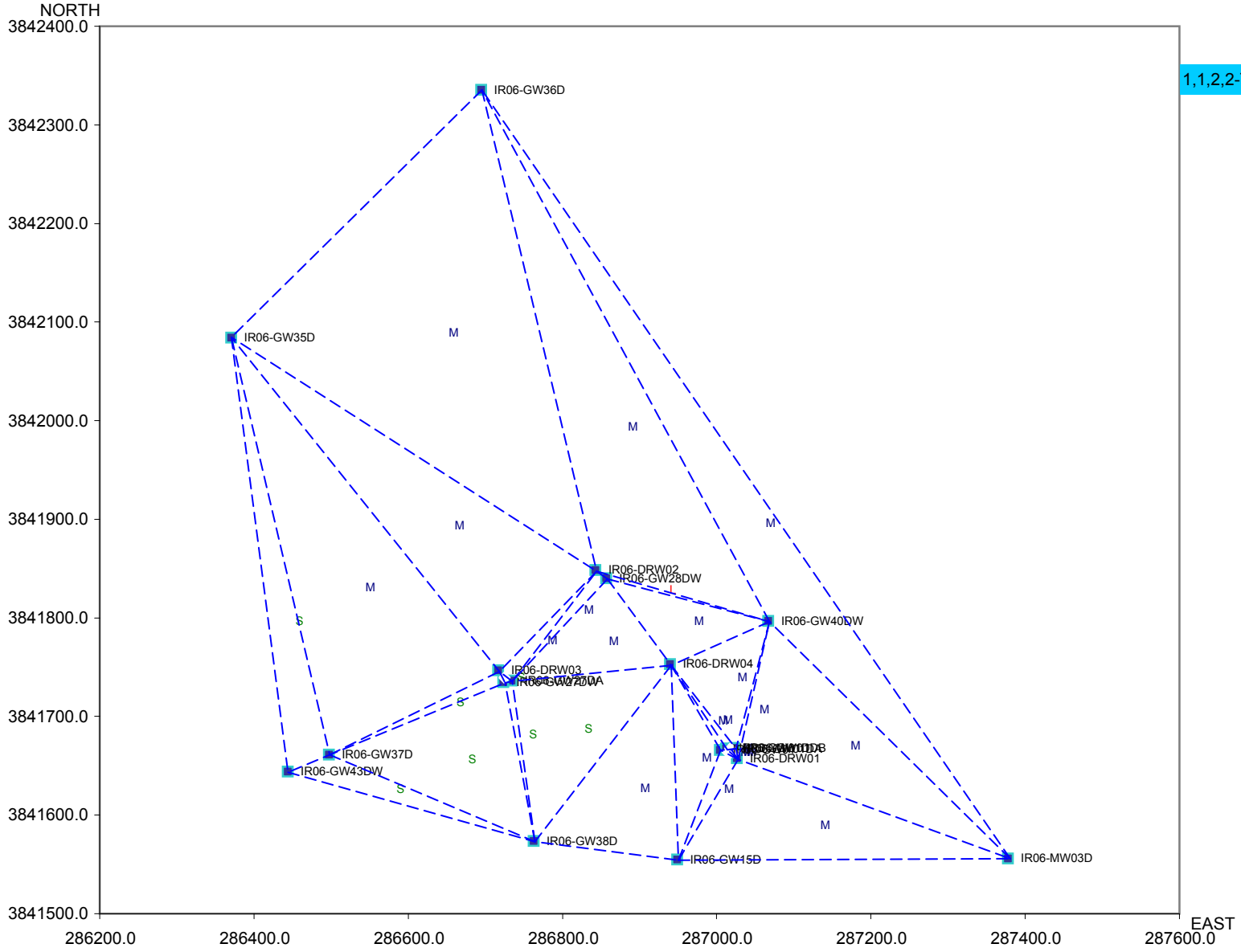
Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR06-GW01DA	12	1.11E-02	3.48E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01DB	10	3.99E-04	1.18E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW15D	12	3.16E-03	9.75E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW27DA	11	1.53E-03	3.05E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW27DW	14	3.52E+00	7.12E+00	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW28DW	14	9.27E+00	9.75E+00	Cont Sampling	Not Attained	0.05	0.8
IR06-GW35D	12	2.73E-04	8.59E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW36D	11	6.84E-04	1.91E-03	Attained	Cont Sampling	0.05	0.8
IR06-GW37D	12	8.86E-02	1.19E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW38D	11	3.35E-04	6.64E-04	Attained	Cont Sampling	0.05	0.8
IR06-GW40DW	12	3.16E-03	7.42E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW43DW	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-MW03D	4	1.01E-04	1.53E-04	Attained	Cont Sampling	0.05	0.8
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR06-DRW01	10	2.68E-02	2.88E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW02	10	8.10E-02	7.59E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW03	10	4.25E-02	3.98E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-DRW04	10	5.56E-02	4.53E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01D	14	9.88E-02	2.30E-01	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW01DA	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW01DB	10	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW15D	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW27DA	11	1.48E-03	4.82E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW27DW	14	2.99E-02	6.91E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW28DW	14	4.42E-02	6.77E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW35D	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW36D	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW37D	12	2.35E-02	1.89E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR06-GW38D	11	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW40DW	12	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-GW43DW	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8
IR06-MW03D	4	2.50E-05	0.00E+00	Attained	Attained	0.05	0.8

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 6 and 82 Intermediate Aquifer **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the analysis; The Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The test for evaluating attainment status is from EPA (1992). Refer to Appendix A.6 of MAROS Manual for details.



New Location Analysis for

1,1,2,2-TETRACHLOROETHANE

Existing Locations

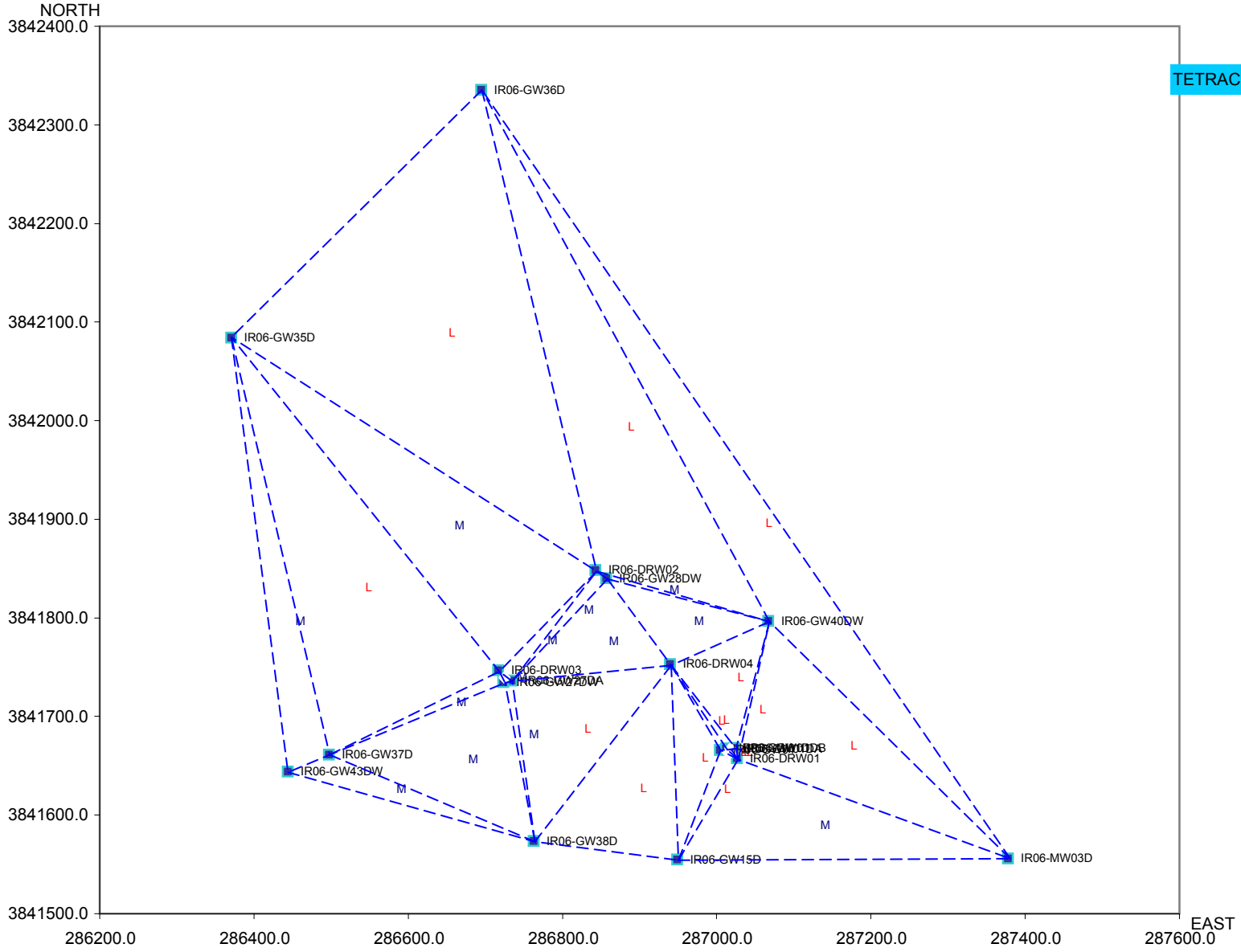
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

TETRACHLOROETHYLENE(PCE)

Existing Locations

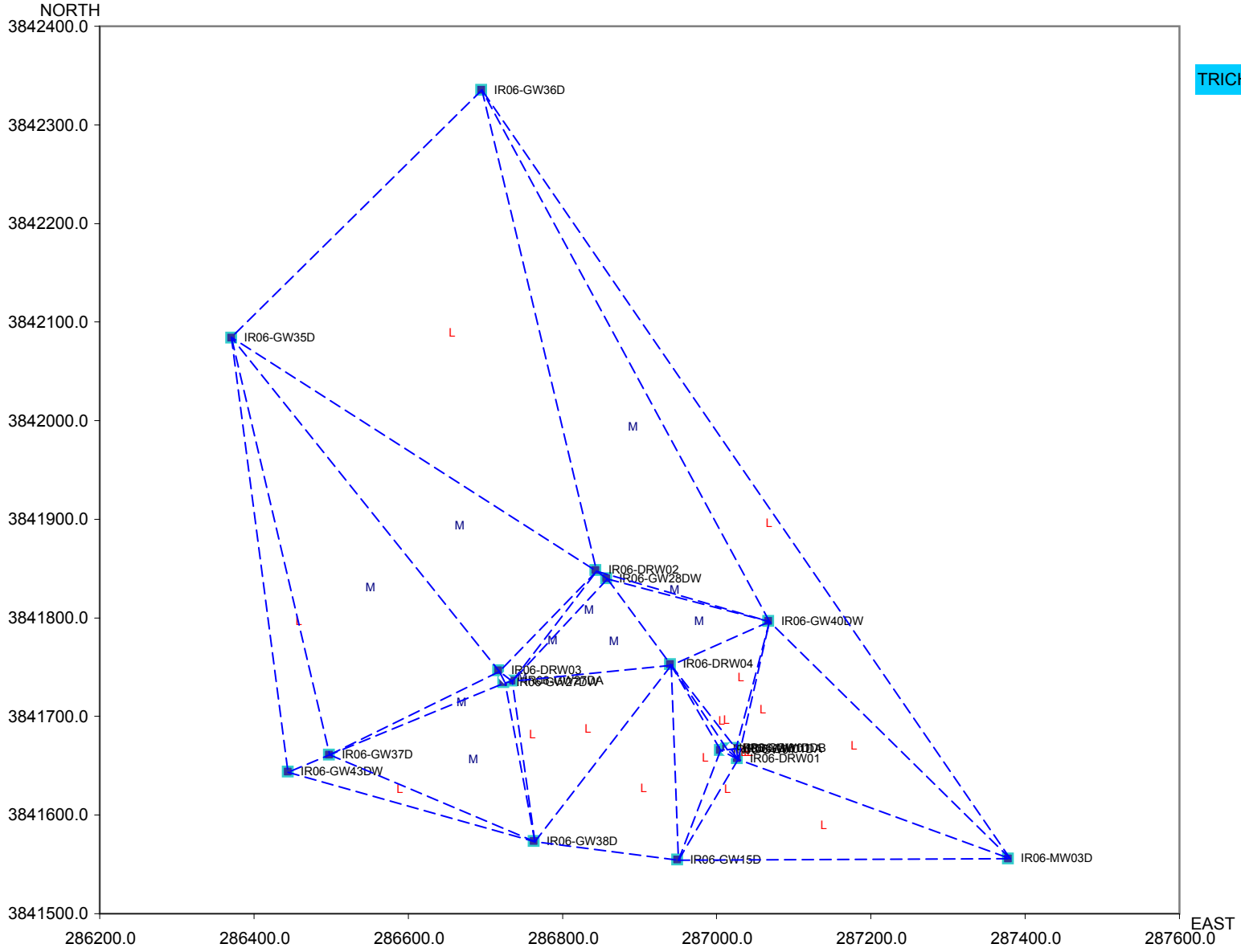
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

TRICHLOROETHYLENE (TCE)

Existing Locations

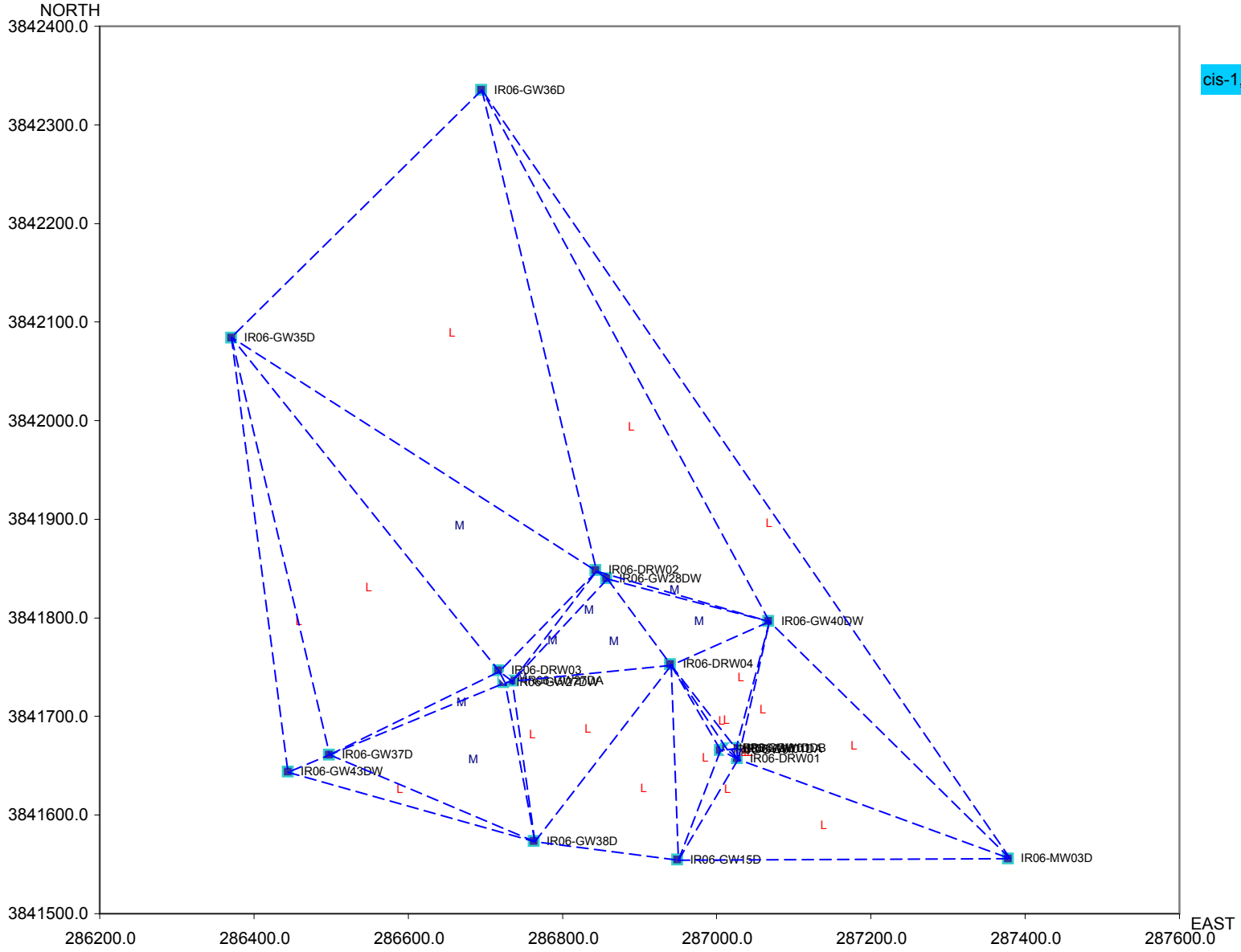
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

cis-1,2-DICHLOROETHYLENE

Existing Locations

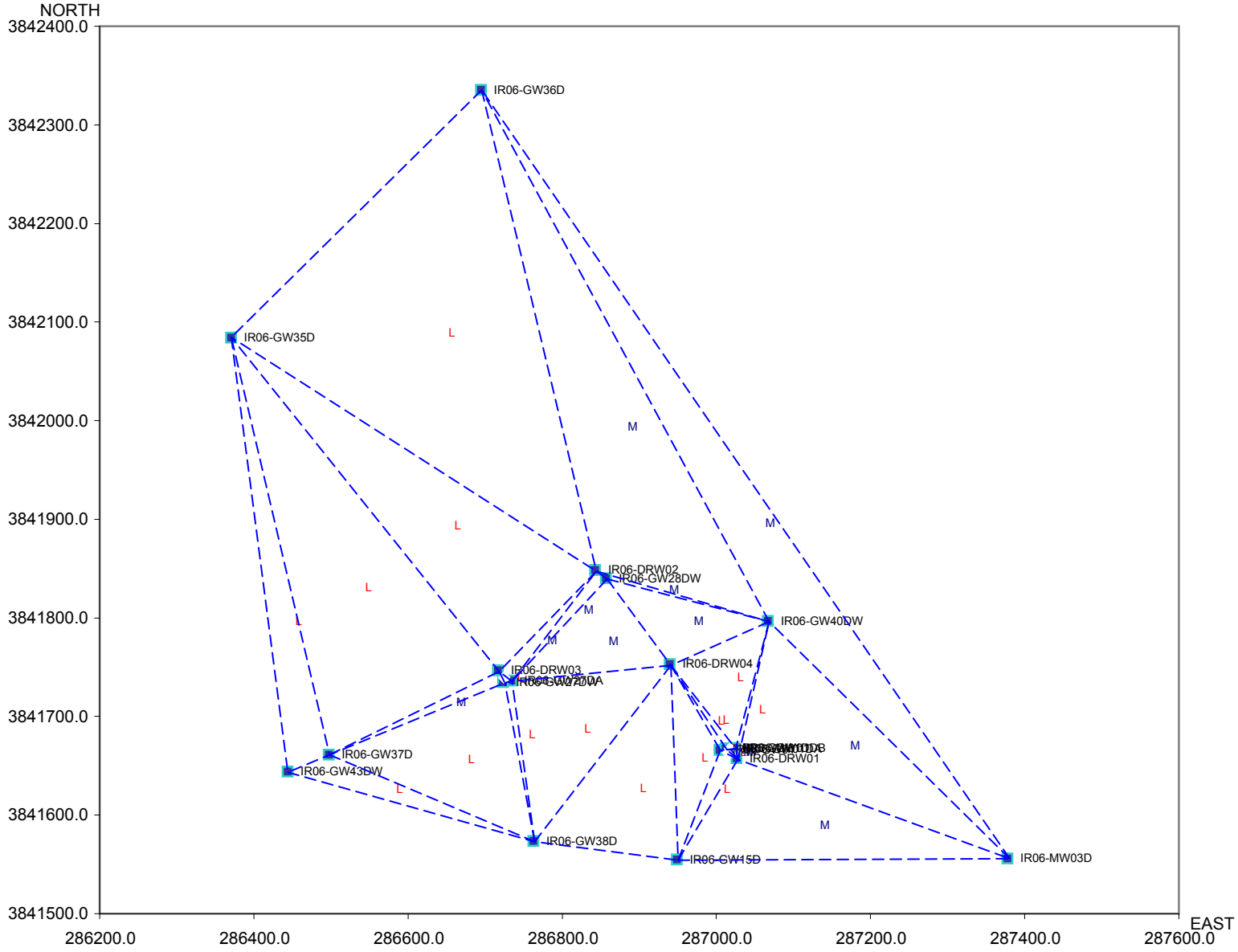
Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access



New Location Analysis for

VINYL CHLORIDE

Existing Locations

Potential areas for new locations are indicated by triangles with a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

Back to Access

MAROS Site Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

User Defined Site and Data Assumptions:

Hydrogeology and Plume Information:

Groundwater Seepage Velocity: 40.88 ft/yr

Current Plume Length: 400 ft

Current Plume Width 500 ft

Number of Tail Wells: 5

Number of Source Wells: 4

Down-gradient Information:

Distance from Edge of Tail to Nearest:

Down-gradient receptor: 100 ft

Down-gradient property: 100 ft

Distance from Source to Nearest:

Down-gradient receptor: 600 ft

Down-gradient property: 600 ft

Source Information:

Source Treatment: No Current Site Treatment

NAPL is not observed at this site.

Data Consolidation Assumptions:

Time Period: 5/30/1997 **to** 2/5/2009

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Plume Information Weighting Assumptions:

Consolidation Step 1. Weight Plume Information by Chemical

Summary Weighting: Weighting Applied to All Chemicals Equally

Consolidation Step 2. Weight Well Information by Chemical

Well Weighting: No Weighting of Wells was Applied.

Chemical Weighting: No Weighting of Chemicals was Applied.

Note: These assumptions were made when consolidating the historical montoring data and lumping the Wells and COCs.

1. Compliance Monitoring/Remediation Optimization Results:

Preliminary Monitoring System Optimization Results: Based on site classification, source treatment and Monitoring System Category the following suggestions are made for site Sampling Frequency, Duration of Sampling before reassessment, and Well Density. These criteria take into consideration: Plume Stability, Type of Plume, and Groundwater Velocity.

COC	Tail Stability	Source Stability	Level of Effort	Sampling Duration	Sampling Frequency	Sampling Density
1,1,2,2-TETRACHLOROETHANE	PD	PD	L	Sample 1 more year	Annually	17
cis-1,2-DICHLOROETHYLENE	S	S	M	Sample 2 more years	Biannually (6 months)	17
TETRACHLOROETHYLENE(PCE)	PD	PD	L	Sample 1 more year	Annually	17
TRICHLOROETHYLENE (TCE)	S	PD	M	Sample 2 more years	Biannually (6 months)	17
VINYL CHLORIDE	NT	S	M	Sample 2 more years	Biannually (6 months)	17

Note:

Plume Status: (I) Increasing; (PI)Probably Increasing; (S) Stable; (NT) No Trend; (PD) Probably Decreasing; (D) Decreasing

Design Categories: (E) Extensive; (M) Moderate; (L) Limited (N/A) Not Applicable, Insufficient Data Available

Level of Monitoring Effort Indicated by Analysi Moderate

2. Spatial Moment Analysis Results:

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	1,1,2,2-TETRACHLOROETHANE	1.11	22	87.2%	NT
	cis-1,2-DICHLOROETHYLENE	0.55	23	90.8%	PI
	TETRACHLOROETHYLENE(PCE)	0.97	14	75.8%	NT
	TRICHLOROETHYLENE (TCE)	0.82	22	87.2%	NT
	VINYL CHLORIDE	0.82	60	100.0%	I
1st Moment: Distance to Source					
	1,1,2,2-TETRACHLOROETHANE	0.21	31	99.2%	I
	cis-1,2-DICHLOROETHYLENE	0.11	43	100.0%	I
	TETRACHLOROETHYLENE(PCE)	0.18	17	89.1%	NT
	TRICHLOROETHYLENE (TCE)	0.09	21	94.0%	PI
	VINYL CHLORIDE	0.25	51	100.0%	I
2nd Moment: Sigma XX					
	1,1,2,2-TETRACHLOROETHANE	0.31	31	99.2%	I
	cis-1,2-DICHLOROETHYLENE	0.28	25	97.0%	I
	TETRACHLOROETHYLENE(PCE)	0.27	27	98.0%	I
	TRICHLOROETHYLENE (TCE)	0.30	23	95.7%	I
	VINYL CHLORIDE	0.23	21	94.0%	PI
2nd Moment: Sigma YY					
	1,1,2,2-TETRACHLOROETHANE	0.28	27	98.0%	I
	cis-1,2-DICHLOROETHYLENE	0.18	19	91.8%	PI
	TETRACHLOROETHYLENE(PCE)	0.23	19	91.8%	PI
	TRICHLOROETHYLENE (TCE)	0.35	11	77.7%	NT
	VINYL CHLORIDE	0.25	-21	94.0%	PD

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.30 **Saturated Thickness:** Uniform: 15 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

MAROS Mann-Kendall Statistics Summary

Project: 2009 LTMO Update
User Name: CH2M HILL
Location: Site 93 Shallow Aquifer
State: North Carolina

Time Period: 5/30/1997 **to** 2/5/2009
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
1,1,2,2-TETRACHLOROETHANE								
IR93-MW04	S	14	0	0.67	-36	97.3%	Yes	D
IR93-MW06	S	11	9	1.16	-25	97.0%	No	D
IR93-MW11	S	5	0	1.59	0	40.8%	Yes	NT
IR93-MW02	S	14	0	0.67	-36	97.3%	Yes	D
IR93-MW05	T	14	0	0.67	-36	97.3%	Yes	D
IR93-MW08	T	11	0	0.74	-18	90.5%	Yes	PD
IR93-MW09	T	11	0	0.74	-18	90.5%	Yes	PD
IR93-MW14	T	3	0	0.00	0	0.0%	Yes	N/A
IR93-MW12	T	5	0	1.59	0	40.8%	Yes	NT
cis-1,2-DICHLOROETHYLENE								
IR93-MW02	S	13	11	0.37	26	93.6%	No	PI
IR93-MW04	S	13	0	0.66	-24	91.8%	Yes	PD
IR93-MW06	S	11	11	0.41	-27	98.0%	No	D
IR93-MW11	S	5	5	0.39	4	75.8%	No	NT
IR93-MW09	T	11	11	1.18	-11	77.7%	No	NT
IR93-MW05	T	13	13	0.31	-54	100.0%	No	D
IR93-MW08	T	11	11	0.58	-28	98.4%	No	D
IR93-MW12	T	5	5	0.64	8	95.8%	No	I
IR93-MW14	T	3	3	0.00	0	0.0%	No	N/A
TETRACHLOROETHYLENE(PCE)								
IR93-MW04	S	14	0	0.67	-36	97.3%	Yes	D
IR93-MW06	S	11	11	0.60	-24	96.4%	No	D
IR93-MW02	S	14	13	0.54	-51	99.8%	No	D
IR93-MW11	S	5	4	0.98	1	50.0%	No	NT
IR93-MW05	T	14	6	0.92	-54	99.9%	No	D
IR93-MW14	T	3	0	0.00	0	0.0%	Yes	N/A
IR93-MW09	T	11	1	0.81	-17	89.1%	No	S
IR93-MW08	T	11	7	0.88	-29	98.7%	No	D
IR93-MW12	T	5	0	1.59	0	40.8%	Yes	NT
TRICHLOROETHYLENE (TCE)								
IR93-MW11	S	5	5	0.45	0	40.8%	No	S
IR93-MW06	S	11	11	0.39	-23	95.7%	No	D
IR93-MW02	S	14	10	0.33	2	52.2%	No	NT
IR93-MW04	S	14	0	0.67	-36	97.3%	Yes	D
IR93-MW14	T	3	3	0.00	0	0.0%	No	N/A

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TRICHLOROETHYLENE (TCE)								
IR93-MW09	T	11	10	1.39	-15	85.9%	No	NT
IR93-MW05	T	14	13	0.35	-38	97.9%	No	D
IR93-MW12	T	5	2	1.72	2	59.2%	No	NT
IR93-MW08	T	11	9	0.86	-28	98.4%	No	D
VINYL CHLORIDE								
IR93-MW02	S	14	0	1.12	-36	97.3%	Yes	D
IR93-MW11	S	5	1	1.49	-3	67.5%	No	NT
IR93-MW06	S	11	11	0.36	21	94.0%	No	PI
IR93-MW04	S	14	0	1.12	-36	97.3%	Yes	D
IR93-MW09	T	11	6	1.16	-8	70.3%	No	NT
IR93-MW12	T	5	3	0.78	-3	67.5%	No	S
IR93-MW05	T	14	10	0.76	-13	74.1%	No	S
IR93-MW08	T	11	11	0.97	27	98.0%	No	I
IR93-MW14	T	3	3	0.00	0	0.0%	No	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Plume Analysis Summary

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

Time Period: 5/30/1997 **to** 2/5/2009

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
1,1,2,2-TETRACHLOROETHANE											
	IR93-MW04	S	14	0	2.3E-03	2.5E-03	Yes	D	D	N/A	N/A
	IR93-MW06	S	11	9	3.0E-02	1.1E-02	No	D	D	N/A	N/A
	IR93-MW11	S	5	0	1.3E-03	5.0E-04	Yes	NT	D	N/A	N/A
	IR93-MW02	S	14	0	2.3E-03	2.5E-03	Yes	D	D	N/A	N/A
	IR93-MW05	T	14	0	2.3E-03	2.5E-03	Yes	D	D	N/A	N/A
	IR93-MW08	T	11	0	2.0E-03	2.5E-03	Yes	PD	D	N/A	N/A
	IR93-MW09	T	11	0	2.0E-03	2.5E-03	Yes	PD	D	N/A	N/A
	IR93-MW14	T	3	0	4.2E-04	5.0E-04	Yes	N/A	N/A	N/A	N/A
	IR93-MW12	T	5	0	1.3E-03	5.0E-04	Yes	NT	D	N/A	N/A
cis-1,2-DICHLOROETHYLENE											
	IR93-MW02	S	13	11	3.1E-03	3.0E-03	No	PI	I	N/A	N/A
	IR93-MW04	S	13	0	2.0E-03	2.5E-03	Yes	PD	D	N/A	N/A
	IR93-MW06	S	11	11	5.4E-01	5.7E-01	No	D	D	N/A	N/A
	IR93-MW11	S	5	5	1.1E-02	1.1E-02	No	NT	I	N/A	N/A
	IR93-MW09	T	11	11	5.3E-02	2.8E-02	No	NT	D	N/A	N/A
	IR93-MW05	T	13	13	6.6E-02	6.6E-02	No	D	D	N/A	N/A
	IR93-MW08	T	11	11	8.7E-02	1.1E-01	No	D	D	N/A	N/A
	IR93-MW12	T	5	5	2.2E-02	1.9E-02	No	I	I	N/A	N/A
	IR93-MW14	T	3	3	4.3E-02	3.5E-02	No	N/A	N/A	N/A	N/A
TETRACHLOROETHYLENE(PCE)											
	IR93-MW04	S	14	0	2.3E-03	2.5E-03	Yes	D	D	N/A	N/A

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 93 Shallow Aquifer **State:** North Carolina

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
TETRACHLOROETHYLENE(PCE)											
	IR93-MW06	S	11	11	6.8E-02	9.2E-02	No	D	D	N/A	N/A
	IR93-MW02	S	14	13	2.2E-03	2.5E-03	No	D	D	N/A	N/A
	IR93-MW11	S	5	4	2.2E-03	2.6E-03	No	NT	S	N/A	N/A
	IR93-MW05	T	14	6	1.8E-03	8.0E-04	No	D	D	N/A	N/A
	IR93-MW14	T	3	0	4.2E-04	5.0E-04	Yes	N/A	N/A	N/A	N/A
	IR93-MW09	T	11	1	1.8E-03	2.5E-03	No	S	D	N/A	N/A
	IR93-MW08	T	11	7	5.0E-02	4.8E-02	No	D	D	N/A	N/A
	IR93-MW12	T	5	0	1.3E-03	5.0E-04	Yes	NT	D	N/A	N/A
TRICHLOROETHYLENE (TCE)											
	IR93-MW11	S	5	5	3.6E-03	3.6E-03	No	S	S	N/A	N/A
	IR93-MW06	S	11	11	1.8E-01	1.8E-01	No	D	D	N/A	N/A
	IR93-MW02	S	14	10	2.8E-03	2.5E-03	No	NT	NT	N/A	N/A
	IR93-MW04	S	14	0	2.3E-03	2.5E-03	Yes	D	D	N/A	N/A
	IR93-MW14	T	3	3	2.9E-03	2.9E-03	No	N/A	N/A	N/A	N/A
	IR93-MW09	T	11	10	1.1E-02	3.0E-03	No	NT	D	N/A	N/A
	IR93-MW05	T	14	13	3.2E-02	3.4E-02	No	D	PD	N/A	N/A
	IR93-MW12	T	5	2	6.0E-03	5.0E-04	No	NT	NT	N/A	N/A
	IR93-MW08	T	11	9	2.9E-02	3.0E-02	No	D	D	N/A	N/A
VINYL CHLORIDE											
	IR93-MW02	S	14	0	1.4E-03	1.0E-03	Yes	D	D	N/A	N/A
	IR93-MW11	S	5	1	1.4E-03	5.0E-04	No	NT	D	N/A	N/A
	IR93-MW06	S	11	11	1.1E-02	1.0E-02	No	PI	I	N/A	N/A
	IR93-MW04	S	14	0	1.4E-03	1.0E-03	Yes	D	D	N/A	N/A
	IR93-MW09	T	11	6	3.9E-03	1.2E-03	No	NT	D	N/A	N/A
	IR93-MW12	T	5	3	2.5E-03	1.6E-03	No	S	S	N/A	N/A
	IR93-MW05	T	14	10	2.1E-03	2.0E-03	No	S	S	N/A	N/A
	IR93-MW08	T	11	11	1.2E-02	8.0E-03	No	I	I	N/A	N/A
	IR93-MW14	T	3	3	5.7E-02	4.2E-02	No	N/A	N/A	N/A	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS COC Assessment

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 93 Shallow Aquifer **State:** North Carolina

Toxicity:

Contaminant of Concern	Representative Concentration (mg/L)	PRG (mg/L)	Percent Above PRG
TRICHLOROETHYLENE (TCE)	3.0E-02	5.0E-03	500.0%
VINYL CHLORIDE	1.0E-02	2.0E-03	413.7%
TETRACHLOROETHYLENE(PCE)	1.4E-02	5.0E-03	188.0%
cis-1,2-DICHLOROETHYLENE	9.1E-02	7.0E-02	30.5%

Note: Top COCs by toxicity were determined by examining a representative concentration for each compound over the entire site. The compound representative concentrations are then compared with the chosen PRG for that compound, with the percentage excedence from the PRG determining the compound's toxicity. All compounds above exceed the PRG.

Prevalence:

Contaminant of Concern	Class	Total Wells	Total Excedences	Percent Excedences	Total detects
VINYL CHLORIDE	ORG	9	6	66.7%	7
TRICHLOROETHYLENE (TCE)	ORG	9	5	55.6%	8
TETRACHLOROETHYLENE(PCE)	ORG	9	2	22.2%	6
cis-1,2-DICHLOROETHYLENE	ORG	9	2	22.2%	8

Note: Top COCs by prevalence were determined by examining a representative concentration for each well location at the site. The total excedences (values above the chosen PRGs) are compared to the total number of wells to determine the prevalence of the compound.

Mobility:

Contaminant of Concern	Kd
VINYL CHLORIDE	0.042
cis-1,2-DICHLOROETHYLENE	0.0724
TRICHLOROETHYLENE (TCE)	0.297
TETRACHLOROETHYLENE(PCE)	0.923

Note: Top COCs by mobility were determined by examining each detected compound in the dataset and comparing their mobilities (Koc's for organics, assume foc = 0.001, and Kd's for metals).

Contaminants of Concern (COC's)

1,1,2,2-TETRACHLOROETHANE

TETRACHLOROETHYLENE(PCE)

TRICHLOROETHYLENE (TCE)

cis-1,2-DICHLOROETHYLENE

VINYL CHLORIDE

MAROS Sampling Location Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

Sampling Events Analyzed: **From** May 1997 **to** February 2009

5/30/1997 2/5/2009

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
1,1,2,2-TETRACHLOROETHANE	0.3	0.1	0.75	0.75
cis-1,2-DICHLOROETHYLENE	0.3	0.1	0.75	0.75
TETRACHLOROETHYLENE(PCE	0.3	0.1	0.75	0.75
TRICHLOROETHYLENE (TCE)	0.3	0.1	0.75	0.75
VINYL CHLORIDE	0.3	0.1	0.75	0.75

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
1,1,2,2-TETRACHLOROETHANE							
IR93-MW02	275413.50	3845793.50	☑	0.432	0.000	0.679	☐
IR93-MW04	275419.91	3845933.75	☑	0.183	0.000	0.556	☐
IR93-MW05	275528.03	3845917.00	☑	0.000	0.000	0.000	☑
IR93-MW06	275439.53	3845840.25	☑	0.515	0.000	0.801	☐
IR93-MW08	275469.03	3845866.00	☑	0.285	0.000	0.546	☐
IR93-MW09	275467.28	3845893.50	☑	0.142	0.000	0.443	☐
IR93-MW11	275416.41	3845861.75	☑	0.259	0.000	0.454	☐
IR93-MW12	275536.84	3845859.00	☑	0.141	0.000	0.284	☐
IR93-MW14	275528.59	3845891.00	☑	0.000	0.000	0.000	☐
cis-1,2-DICHLOROETHYLENE							
IR93-MW02	275413.50	3845793.50	☑	0.681	0.459	0.883	☐
IR93-MW04	275419.91	3845933.75	☑	0.716	0.430	0.814	☐
IR93-MW05	275528.03	3845917.00	☑	0.225	0.012	0.662	☐
IR93-MW06	275439.53	3845840.25	☑	0.484	0.354	0.617	☐
IR93-MW08	275469.03	3845866.00	☑	0.099	0.001	0.264	☑
IR93-MW09	275467.28	3845893.50	☑	0.153	0.021	0.485	☑
IR93-MW11	275416.41	3845861.75	☑	0.276	0.111	0.638	☐
IR93-MW12	275536.84	3845859.00	☑	0.169	0.000	0.554	☐
IR93-MW14	275528.59	3845891.00	☑	0.063	0.015	0.117	☑
TETRACHLOROETHYLENE(PCE)							
IR93-MW02	275413.50	3845793.50	☑	0.588	0.407	0.813	☐
IR93-MW04	275419.91	3845933.75	☑	0.253	0.000	0.573	☐

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 93 Shallow Aquifer **State:** North Carolina

Well	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?
IR93-MW05	275528.03	3845917.00	☑	0.343	0.000	0.616	☐
IR93-MW06	275439.53	3845840.25	☑	0.543	0.356	0.818	☐
IR93-MW08	275469.03	3845866.00	☑	0.447	0.326	0.569	☐
IR93-MW09	275467.28	3845893.50	☑	0.320	0.013	0.722	☐
IR93-MW11	275416.41	3845861.75	☑	0.393	0.050	0.787	☐
IR93-MW12	275536.84	3845859.00	☑	0.367	0.235	0.487	☐
IR93-MW14	275528.59	3845891.00	☑	0.084	0.000	0.252	☑
TRICHLOROETHYLENE (TCE)							
IR93-MW02	275413.50	3845793.50	☑	0.618	0.271	0.859	☐
IR93-MW04	275419.91	3845933.75	☑	0.570	0.199	0.752	☐
IR93-MW05	275528.03	3845917.00	☑	0.434	0.138	0.735	☐
IR93-MW06	275439.53	3845840.25	☑	0.602	0.547	0.690	☐
IR93-MW08	275469.03	3845866.00	☑	0.383	0.054	0.703	☐
IR93-MW09	275467.28	3845893.50	☑	0.285	0.076	0.739	☑
IR93-MW11	275416.41	3845861.75	☑	0.233	0.095	0.468	☐
IR93-MW12	275536.84	3845859.00	☑	0.660	0.413	1.000	☐
IR93-MW14	275528.59	3845891.00	☑	0.120	0.068	0.163	☑
VINYL CHLORIDE							
IR93-MW02	275413.50	3845793.50	☑	0.776	0.076	1.000	☐
IR93-MW04	275419.91	3845933.75	☑	0.515	0.000	1.000	☐
IR93-MW05	275528.03	3845917.00	☑	0.520	0.090	1.000	☐
IR93-MW06	275439.53	3845840.25	☑	0.478	0.024	0.784	☐
IR93-MW08	275469.03	3845866.00	☑	0.314	0.107	0.536	☐
IR93-MW09	275467.28	3845893.50	☑	0.521	0.019	1.000	☐
IR93-MW11	275416.41	3845861.75	☑	0.498	0.100	0.678	☐
IR93-MW12	275536.84	3845859.00	☑	0.351	0.066	0.802	☐
IR93-MW14	275528.59	3845891.00	☑	0.555	0.467	0.723	☐

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the state coordinates system (i.e., X and Y refer to Easting and Northing respectively) or local coordinates systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Location Optimization

Results by Considering All COCs

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

Sampling Events Analyzed: **From** May 1997 **to** February 2009

5/30/1997 2/5/2009

Well	X (feet)	Y (feet)	Number of COCs	COC-Averaged Slope Factor*	Abandoned?
IR93-MW02	275413.50	3845793.50	5	0.487	☐
IR93-MW04	275419.91	3845933.75	5	0.302	☐
IR93-MW05	275528.03	3845917.00	5	0.127	☐
IR93-MW06	275439.53	3845840.25	5	0.443	☐
IR93-MW08	275469.03	3845866.00	5	0.320	☐
IR93-MW09	275467.28	3845893.50	5	0.208	☐
IR93-MW11	275416.41	3845861.75	5	0.237	☐
IR93-MW12	275536.84	3845859.00	5	0.251	☐
IR93-MW14	275528.59	3845891.00	5	0.151	☐

Note: the COC-Averaged Slope Factor is the value calculated by averaging those "Average Slope Factor" obtained earlier across COCs; to be conservative, a location is "abandoned" only when it is eliminated from all COCs; "abandoned" doesn't necessarily mean the abandon of well, it can mean that NO samples need to be collected for any COCs.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Sampling Frequency Optimization Results

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

The Overall Number of Sampling Events: 14

"Recent Period" defined by events: **From** May 1997 **To** February 2009

5/30/1997 2/5/2009

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
1,1,2,2-TETRACHLOROETHANE	0.014	0.007	0.014	0.028
cis-1,2-DICHLOROETHYLENE	0.07	0.035	0.07	0.14
TETRACHLOROETHYLENE(PCE	0.005	0.0025	0.005	0.01
TRICHLOROETHYLENE (TCE)	0.005	0.0025	0.005	0.01
VINYL CHLORIDE	0.002	0.001	0.002	0.004

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
1,1,2,2-TETRACHLOROETHANE			
IR93-MW02	Biennial	Annual	Annual
IR93-MW04	Biennial	Annual	Annual
IR93-MW05	Biennial	Annual	Annual
IR93-MW06	Annual	Annual	Annual
IR93-MW08	Annual	Annual	Annual
IR93-MW09	Annual	Annual	Annual
IR93-MW11	Biennial	Annual	Annual
IR93-MW12	Biennial	Annual	Annual
IR93-MW14	Annual	Annual	Annual
cis-1,2-DICHLOROETHYLENE			
IR93-MW02	Biennial	Annual	Annual
IR93-MW04	Annual	Annual	Annual
IR93-MW05	Annual	Annual	Annual
IR93-MW06	Annual	Annual	Annual
IR93-MW08	Annual	Annual	Annual
IR93-MW09	Annual	Annual	Annual
IR93-MW11	Biennial	Annual	Annual
IR93-MW12	Annual	Annual	Annual
IR93-MW14	SemiAnnual	SemiAnnual	SemiAnnual

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 93 Shallow Aquifer **State:** North Carolina

Well	Recommended Sampling Frequency	Frequency Based on Recent Data	Frequency Based on Overall Data
TETRACHLOROETHYLENE(PCE)			
IR93-MW02	Annual	Annual	Annual
IR93-MW04	Annual	Annual	Annual
IR93-MW05	Annual	Annual	Annual
IR93-MW06	Annual	Annual	Annual
IR93-MW08	Annual	Annual	Annual
IR93-MW09	Annual	Annual	Annual
IR93-MW11	Annual	Annual	Annual
IR93-MW12	Annual	Annual	Annual
IR93-MW14	Annual	Annual	Annual
TRICHLOROETHYLENE (TCE)			
IR93-MW02	Annual	Annual	Annual
IR93-MW04	Annual	Annual	Annual
IR93-MW05	Annual	Annual	Annual
IR93-MW06	Annual	Annual	Annual
IR93-MW08	Annual	Annual	Annual
IR93-MW09	Annual	Annual	Annual
IR93-MW11	Annual	Annual	Annual
IR93-MW12	Annual	Annual	Annual
IR93-MW14	SemiAnnual	SemiAnnual	SemiAnnual
VINYL CHLORIDE			
IR93-MW02	Annual	Annual	Annual
IR93-MW04	Annual	Annual	Annual
IR93-MW05	Annual	Annual	Annual
IR93-MW06	Annual	Annual	Annual
IR93-MW08	Quarterly	Quarterly	Quarterly
IR93-MW09	Annual	Annual	Annual
IR93-MW11	Annual	Annual	Annual
IR93-MW12	Annual	Annual	Annual
IR93-MW14	Quarterly	Quarterly	Quarterly

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

MAROS Power Analysis for Individual Well Cleanup Status

Project: 2009 LTMO Update

User Name: CH2M HILL

Location: Site 93 Shallow Aquifer

State: North Carolina

From Period: 5/30/1997 **to** 2/5/2009

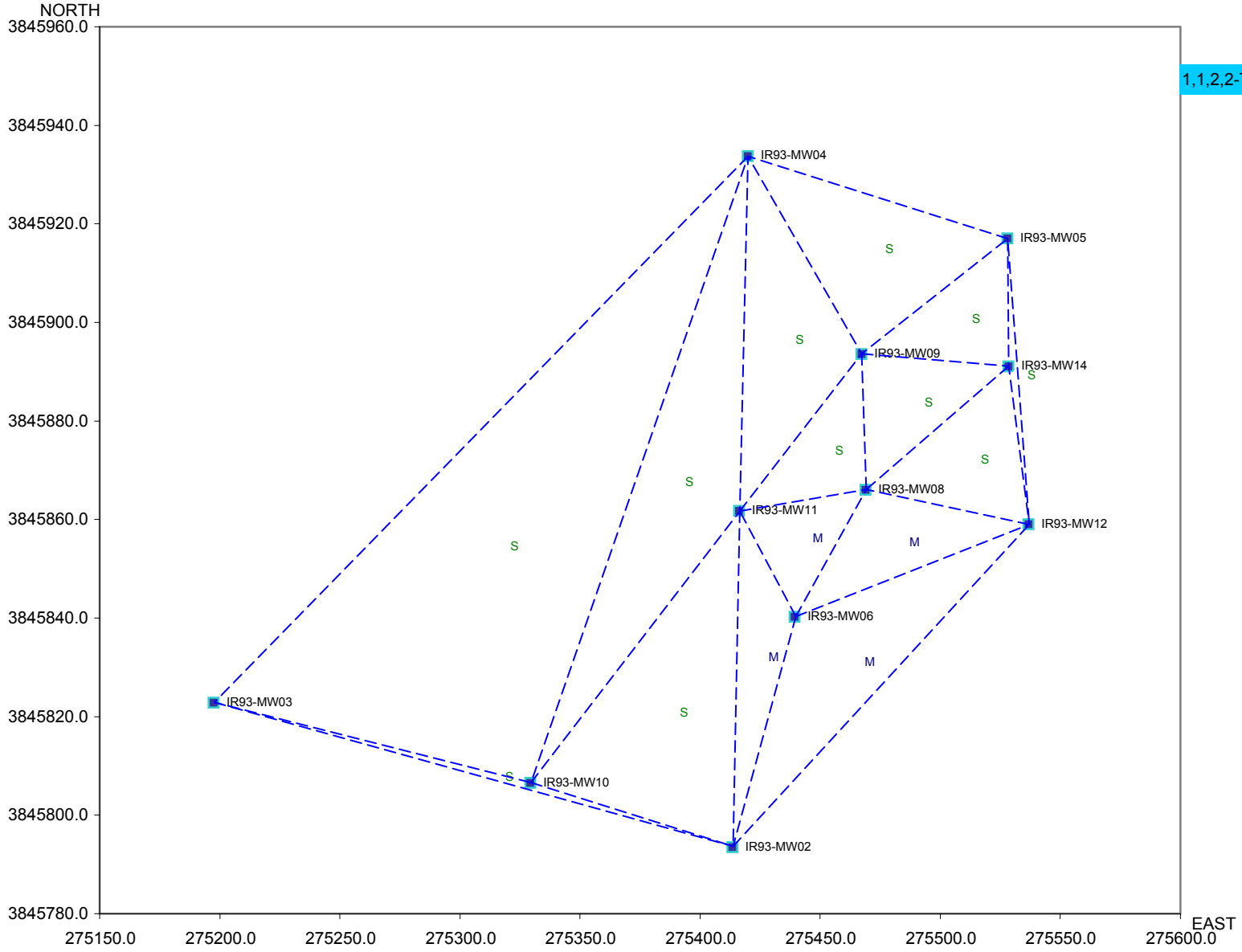
Well	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
1,1,2,2-TETRACHLOROETHANE			Cleanup Goal (mg/L) = 0.014		Target Level (mg/L) = 0.0112		
IR93-MW02	8	2.60E-03	1.74E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW04	8	2.60E-03	1.74E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW05	8	2.60E-03	1.74E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW06	6	3.58E-02	3.52E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW08	6	2.22E-03	1.70E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW09	6	2.22E-03	1.70E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW11	3	1.94E-03	2.65E-03	N/C	N/C	0.05	0.8
IR93-MW12	3	1.94E-03	2.65E-03	N/C	N/C	0.05	0.8
IR93-MW14	2	4.38E-04	8.84E-05	N/C	N/C	0.05	0.8
cis-1,2-DICHLOROETHYLENE			Cleanup Goal (mg/L) = 0.07		Target Level (mg/L) = 0.056		
IR93-MW02	7	3.04E-03	1.35E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW04	7	2.26E-03	1.56E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW05	7	6.30E-02	2.12E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW06	6	5.29E-01	2.09E-01	Cont Sampling	Not Attained	0.05	0.8
IR93-MW08	6	8.88E-02	4.78E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW09	6	5.94E-02	5.94E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW11	3	9.63E-03	4.01E-03	N/C	N/C	0.05	0.8
IR93-MW12	3	2.43E-02	1.96E-02	N/C	N/C	0.05	0.8
IR93-MW14	2	4.80E-02	1.98E-02	N/C	N/C	0.05	0.8
TETRACHLOROETHYLENE(PCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR93-MW02	8	2.14E-03	1.07E-03	Attained	Cont Sampling	0.05	0.8
IR93-MW04	8	2.60E-03	1.74E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW05	8	2.09E-03	1.94E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW06	6	7.05E-02	4.02E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW08	6	4.88E-02	4.10E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW09	6	2.13E-03	1.70E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW11	3	3.04E-03	2.28E-03	N/C	N/C	0.05	0.8
IR93-MW12	3	1.94E-03	2.65E-03	N/C	N/C	0.05	0.8
IR93-MW14	2	4.38E-04	8.84E-05	N/C	N/C	0.05	0.8
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		

Project: 2009 LTMO Update **User Name:** CH2M HILL

Location: Site 93 Shallow Aquifer **State:** North Carolina

Well	Sample Szie	Sample Mean	Sample Stdev.	Normal Distribution Assumption Cleanup Status	Lognormal Distribution Assumption Cleanup Status	Alpha Level	Expected Power
TRICHLOROETHYLENE (TCE)			Cleanup Goal (mg/L) = 0.005		Target Level (mg/L) = 0.004		
IR93-MW02	8	2.88E-03	1.07E-03	Attained	Attained	0.05	0.8
IR93-MW04	8	2.60E-03	1.74E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW05	8	3.01E-02	1.28E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW06	6	1.85E-01	6.48E-02	Cont Sampling	Not Attained	0.05	0.8
IR93-MW08	6	2.81E-02	2.25E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW09	6	1.27E-02	1.53E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW11	3	4.19E-03	1.69E-03	N/C	N/C	0.05	0.8
IR93-MW12	3	9.76E-03	1.26E-02	N/C	N/C	0.05	0.8
IR93-MW14	2	3.10E-03	7.07E-04	N/C	N/C	0.05	0.8
VINYL CHLORIDE			Cleanup Goal (mg/L) = 0.002		Target Level (mg/L) = 0.0016		
IR93-MW02	8	1.85E-03	1.96E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW04	8	1.85E-03	1.96E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW05	8	2.64E-03	1.90E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW06	6	1.09E-02	5.09E-03	Cont Sampling	Not Attained	0.05	0.8
IR93-MW08	6	1.31E-02	1.09E-02	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW09	6	4.90E-03	5.05E-03	Cont Sampling	Cont Sampling	0.05	0.8
IR93-MW11	3	1.98E-03	2.61E-03	N/C	N/C	0.05	0.8
IR93-MW12	3	2.86E-03	1.87E-03	N/C	N/C	0.05	0.8
IR93-MW14	2	6.48E-02	3.29E-02	N/C	N/C	0.05	0.8

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the analysis; The Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The test for evaluating attainment status is from EPA (1992). Refer to Appendix A.6 of MAROS Manual for details.



New Location Analysis for

1,1,2,2-TETRACHLOROETHANE

Existing Locations

Potential areas for new locations are indicated by triangles w ith a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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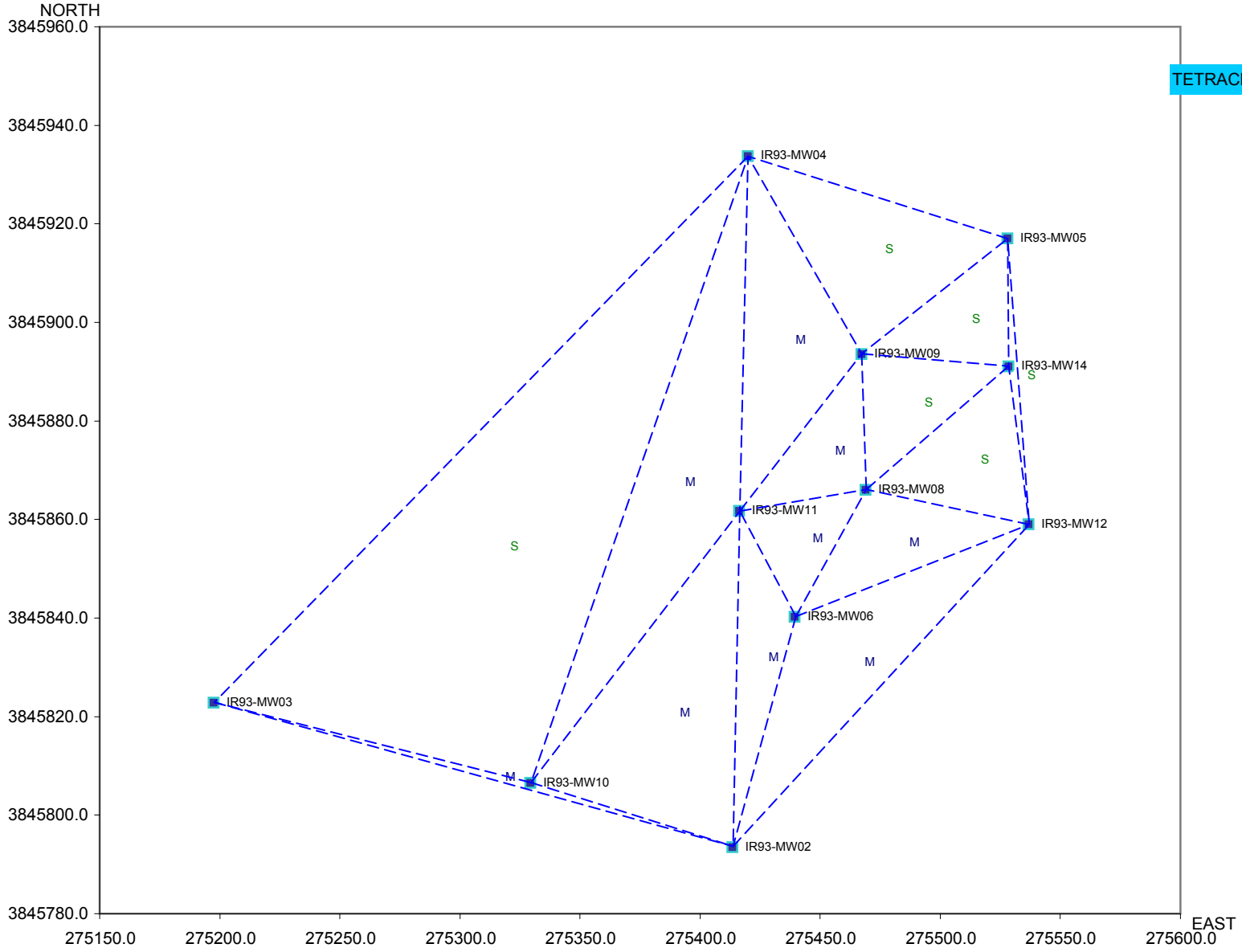

New Location Analysis for

TETRACHLOROETHYLENE(PCE)

Existing Locations

Potential areas for new locations are indicated by triangles w ith a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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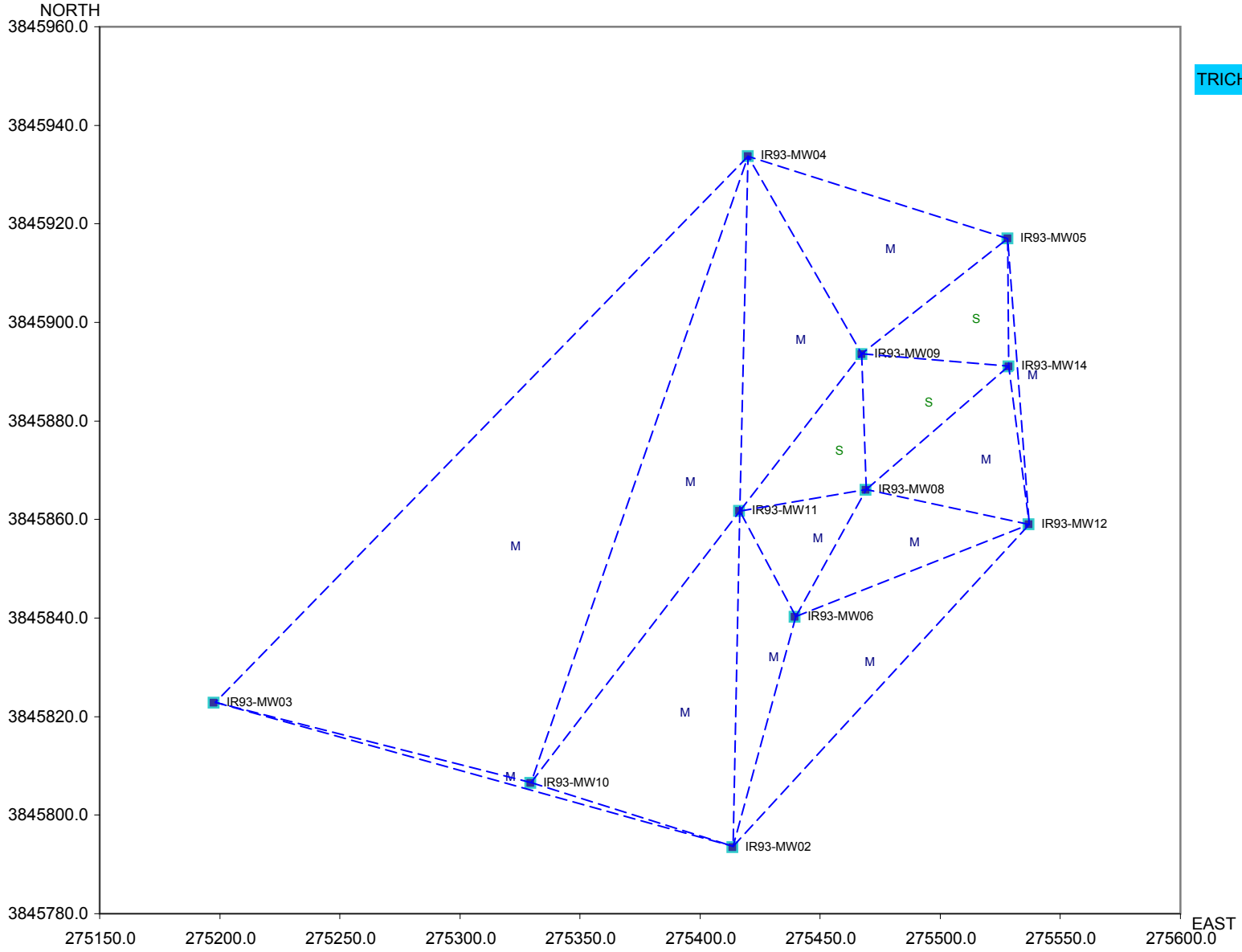

New Location Analysis for

TRICHLOROETHYLENE (TCE)

Existing Locations

Potential areas for new locations are indicated by triangles w ith a high SF level.

Estimated SF Level:
S - Small
M - Moderate
L - Large
E - Extremely large

High SF -> high estimation error -> possible need for new locations

Low SF -> low estimation error -> no need for new locations

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