

Response to Comments

From the North Carolina Department of Environment and Natural Resources (NCDENR) on the Final Record of Decision, Operable Unit 14, Site 90, Marine Corps Air Station Cherry Point

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Comment:

A verbal comment/question regarding the Final Record of Decision (ROD) for Operable Unit 14 (OU14) at MCAS Cherry Point was relayed to the Navy by George Lane of NCDENR on September 21, 2009. While Mr. Lane was reviewing the ROD with the Division Director in order to secure NCDENR's signature of concurrence, the Director indicated a concern with the origin and appropriateness of the performance standard for the organic compound *bromomethane* listed in Table 4 (Performance Standards for Chemicals of Concern [COCs]) on page 2-14 of the ROD document. The table and the text on page 2-14 indicated that the performance standard for bromomethane was calculated in the OU14 human health risk assessment as a "site-specific risk-based Remedial Goal Option" since there was no North Carolina groundwater quality standard (NC 2L standard) for bromomethane. The performance standards for the other COCs were their respective NC 2L standards.

Response:

Background and Evaluation

Bromomethane was included in the OU14 Final ROD document as one of the COCs that would need to be monitored during the long term monitoring activities included in the selected remedy for OU14. The human health risk assessment (HHRA) performed for OU14 as part of the Remedial Investigation (RI) identified bromomethane as one of several compounds that cumulatively contributed to a Hazard Index (HI) greater than the United States Environmental Protection Agency's (EPA) benchmark level of 1 for a construction worker for the inhalation exposure route. However, no individual constituents or target organs had HIs above 1. Therefore, the HHRA concluded that there were no calculated hazards or risks to a construction worker above EPA's benchmark levels. Despite the lack of human health risk at OU14 attributed to bromomethane, it was retained as a COC because it was a site-related chemical detected at OU14 and because there was no NC 2L standard for bromomethane. Due to the lack of a NC 2L standard, the performance standard for bromomethane listed in the Final ROD document (21.1 µg/L) was a calculated risk-based Remedial Goal Option (RGO) from the HHRA, presented in Table 7-6 in the OU14 RI report.

During the OU14 RI groundwater sampling activities, bromomethane was detected in only one groundwater sample out of approximately 120 monitoring wells or direct-push groundwater

sampling locations. The compound was found at an estimated concentration¹ of 1.6 µg/L in a sample collected in 2005 from monitoring well 66GW46 (located near the heavy fuel pits). An earlier sample from this same well in 2003 contained no detected bromomethane.

In evaluating the performance standard of 21.1 µg/L for bromomethane listed in the Final ROD for OU14, NCDENR independently calculated a performance standard for bromomethane based on the methodology presented in the North Carolina Administrative Code (NCAC) Title 15A, Subchapter 2L (Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina), Section .0202 (d) (1):

Systemic threshold concentration calculated as follows: [Reference Dose (mg/kg/day) x 70 kg (adult body weight) x Relative Source Contribution (.10 for inorganics; .20 for organics)] / [2 liters/day (avg. water consumption)]

Using a Reference Dose of 1.40×10^{-3} mg/kg/day² and a Relative Source Contribution of 0.20, the NCDENR-calculated performance standard was 10.0 µg/L.

Path Forward

Based on the review of the HHRA conclusions with respect to bromomethane and the fact that bromomethane was not detected in any samples of OU14 groundwater above the NCDENR-calculated performance standard of 10.0 µg/L, it was concluded by NCDENR, EPA, and the Navy (NAVFAC and MCAS Cherry Point), that bromomethane should be eliminated from the list of COCs for OU14, Site 90.

The following revisions to the Final OU14 ROD were made on September 24, 2009:

1. In the first sentence of paragraph 2 on page 2-11, the words “future construction worker” were deleted and the sentence was revised to read: “Potential risks were identified for exposure to groundwater from the surficial aquifer by a future adult resident, future child resident, and lifetime resident.”
2. In the last paragraph of text on page 2-14, the word “generally” was deleted from the 2nd sentence and the 3rd sentence was entirely deleted.
3. In Table 4 on page 2-14, the entire row beginning with “Bromomethane” was deleted and the table footnote reading “RGO – Remedial Goal Option” was deleted.
4. In Appendix A (ARARs), Table A-1, page A-1, in the row beginning with “Restoration of contaminated groundwater,” the words “Bromomethane (21.1 µg/L)” were deleted.

The attached pages show in track changes mode (redline/strikeout) the agreed upon revisions to the Final OU14 ROD.

It is important to note that these revisions to the Final ROD for OU14, Site 90 do not result in a material change to the selected remedy. The elimination of bromomethane as a COC does not alter the Land Use Controls (LUCs) incorporated in the selected remedy and the long-term monitoring requirements are the same. Therefore, the intent of the ROD is unchanged.

¹ The result of 1.6 µg/L was qualified with a “J” flag indicating the value was an estimated concentration below the practical quantitation limit for the analysis.

² Source: EPA Integrated Risk Information System (IRIS), June 13, 2007.

Chlorinated VOC contamination was below regulatory standards in soil and there are no exposure pathways to soil at OU14 (potential source areas are covered by buildings and concrete). Therefore, risk due to exposure to soil was not evaluated in the Human Health Risk Assessment (HHRA). To assess the potential for leaching of chlorinated VOCs from soil to groundwater, soil data were compared with North Carolina Soil Screening Levels (NC SSLs) for the protection of groundwater. Chlorinated VOC concentrations did not exceed any NC SSLs. No chlorinated VOCs are identified as COCs in soil at OU14.

Potential risks were identified for exposure to groundwater from the surficial aquifer by a future adult resident, future child resident, and lifetime resident, ~~and future construction worker~~. The contaminant posing unacceptable risk for the future and lifetime adult and child resident receptors driving the remedial action addressed by this ROD is the chlorinated VOC vinyl chloride. Although arsenic, iron, and manganese also contributed to the potential risks, these constituents were excluded as COCs because they are naturally-occurring constituents that were found at concentrations generally consistent with background conditions at MCAS Cherry Point, and because they are not related to historical contaminant releases that are regulated under CERCLA. Benzene also contributed to potential risk, but is not retained as a COC because the MCAS Cherry Point UST Program is responsible for addressing benzene and all other petroleum-related compounds. Table 3 presents a summary of the receptors with risk and hazard estimates above regulatory levels.

Although unacceptable risk to potential future residents through exposure to groundwater in the surficial aquifer was identified in the HHRA, this exposure scenario is unlikely to occur. OU14 is an active flightline area at MCAS Cherry Point, and there are no plans or likely future plans to change the industrial land use at the site to residential. In addition, even if the area was to become residential, human exposure to groundwater from the surficial aquifer is unlikely. Drinking water supplies in the area are typically derived from a depth greater than 190 feet bgs from aquifers that are separated by multiple clay confining units that restrict the downward migration of contaminants. Groundwater in the surficial aquifer also has elevated concentrations of naturally occurring inorganic constituents that make the groundwater quality poor for potable water use.

The HHRA also included a vapor intrusion screening evaluation to assess impacts from VOCs in the groundwater to indoor air. The vapor intrusion evaluation results showed no indication of the need to mitigate vapor issues resulting from chlorinated VOCs for existing buildings under current industrial exposure scenarios. Conservative estimates of indoor air concentrations were calculated by using the concentrations in groundwater of the surficial aquifer and comparing them to regulatory standards. The results indicated a need for further evaluation of the vapor intrusion pathway in the event that new buildings are constructed or if existing buildings are changed significantly (physical structure, occupancy, or use). Therefore, the potential for vapor intrusion will be considered in the future, if necessary, prior to new building construction or major building modifications (structure, occupancy, or use). The selected remedy for chlorinated VOCs present in groundwater will reduce the potential for vapor intrusion impacts.

The HHRA results indicated that there are no cancer risks or non-cancer hazards above acceptable ranges from exposure to surface water and sediment.

groundwater, the results of the human health and ecological risk assessments, and the unrealistic exposure scenarios to COC-impacted groundwater, there are no wastes that constitute a principal threat at OU14.

2.7 Remedial Action Objectives

Remedial action objectives are established based on attainment of regulatory requirements, standards, and guidance; contaminated media; chemicals of concern; potential receptors and exposure scenarios; and human health and ecological risks. The following remedial action objectives were developed for the groundwater contamination at OU14 to address the potential human health risk associated with future potable use of groundwater:

- Prevent human exposure to groundwater of the surficial aquifer that contains COCs above cleanup levels.
- Restore groundwater quality at OU14 to the NCGWQS and maximum contaminant level (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.
- Achieve suitability of OU14 groundwater for unlimited use with a reasonable approach and within a reasonable timeframe.
- Prevent migration or discharge of COCs in groundwater of the surficial aquifer to sediment and surface water in the unnamed stream at levels that would cause unacceptable risks to human or ecological receptors.
- Prevent unacceptable risks to human receptors from exposure to indoor air vapors that result from subsurface COCs.

Specific remediation goals (cleanup levels) were developed to meet these remedial action objectives as presented in Table 4. The remediation goals selected for the site were **generally** the NCGWQS, the most conservative chemical-specific ARAR. ~~Since there is no NCGWQS for bromomethane, the site-specific risk-based Remedial Goal Option calculated from the HHRA is used.~~

TABLE 4
Performance Standards

Chemical of Concern	Groundwater Performance Standard (µg/L)	Basis
1,1-Dichloroethane (1,1-DCA)	70	NC2L
1,2-Dichloroethane (1,2-DCA)	0.38	NC2L
Bromomethane	21.1	Calculated Site-Specific RGO
Chloromethane	2.6	NC2L
cis-1,2-Dichloroethene (cis-1,2-DCE)	70	NC2L
Methylene Chloride	4.6	NC2L
Tetrachloroethene (PCE)	0.7	NC2L
Trichloroethene (TCE)	2.8	NC2L
Vinyl Chloride	0.015	NC2L

NC2L – North Carolina 2L Groundwater Standard

~~RGO – Remedial Goal Option~~

µg/L – micrograms per liter

TABLE A-1
 Chemical-Specific ARARs
Operable Unit 14, Site 90 Record of Decision
Marine Corps Air Station Cherry Point, North Carolina

Action	Requirements	Prerequisite	Citation
Chemical-Specific ARARs			
Classification of contaminated groundwater	Groundwaters in the state naturally containing 250 mg/L or less of chloride are <i>classified as GA</i> under 15A NCAC 02L .0201(1)	Groundwaters located within the boundaries or under the extraterritorial jurisdiction of the State of North Carolina — applicable	15A NCAC 02L .0302(1)
Restoration of contaminated groundwater	Shall not exceed the groundwater quality standards ⁴ for contaminants specified in Paragraphs (g) or (h) for the site related contaminants of concern. Bromomethane (21.1 µg/L) Chloromethane (2.6 µg/L) cis-1,2-Dichloroethene (70 µg/L) 1,1-Dichloroethane (70 µg/L) 1,2-Dichloroethane (0.38 µg/L) Methylene Chloride (4.6 µg/L) Tetrachloroethene (0.7 µg/L) Trichloroethene (2.8 µg/L) Vinyl Chloride (0.015 µg/L)	Class GA or GSA groundwaters with contaminant(s) concentrations exceeding standards listed in 15A NCAC 02L .0202 — applicable	15A NCAC 02L .0202(a) and (b)
	Shall not exceed the Safe Drinking Water Act National Revised Primary Drinking Water Regulations: maximum contaminant levels (MCLs) for organic contaminants specified in 40 CFR 141.61(a).	Groundwaters classified as GA or GSA which are an existing or potential source of drinking water— relevant and appropriate	40 CFR 141.61(a) 15A NCAC 18C .1517
Protection of adjacent surface water body	Monitor and undertake management practices for sources of pollution such that water quality standards and best usage of receiving waters and all downstream waters will not be impaired.	Indirect discharges of waste or other source of water pollution into surface waters classified as Class C ⁵ — relevant and appropriate	15A NCAC 02B .0203

⁴ Groundwater quality standards established on the basis of a National secondary drinking water standards are not utilized as remediation goals since these are based on taste, odor and other considerations unrelated to human health.

⁵ The unnamed stream at OU14, Sandy Branch, and East Prong Slocum Creek are classified as Class C estuarine water by NCDENR. These waters are suitable for fish and wildlife and secondary recreation (i.e., not considered suitable for swimming or potable use).