DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:
5090/S4.7.7
Ser PRCR4/6049
10 FEB 2006

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Corrective Action Section
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center submits responses to your comments on the Draft Rockeye (Solid Waste Management Unit 10) Corrective Measures Study (CMS). The responses were previously submitted to your office via email on February 7, 2006. The hard copies along with replacement pages 3 of 7 and 4 of 7 for the October 5, 2005 responses are included as enclosure (1). The permit required Certification Statement is provided as enclosure (2).

If you require any further information, my point of contact is Mr. Thomas J. Brent, Code PRCR4-TB, at 812-854-6160, email thomas.brent@navy.mil.

Sincerely,

J. M. Hunsicker

J. M. HUNSICKER
Environmental Site Manager
By direction of the Commanding Officer

Enclosures: 1. Response to Comments for Draft Rockeye CMS
2. Certification Statement

Copy to:
ADMINISTRATIVE RECORD
SOUTHNAVFACENGCOM (Code ES31) (w/o encl)
IDEM (Doug Griffin)
TTNUS (Ralph Basinski) (w/o encl)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE

Manager, Environmental Protection
TITLE

2/10/06
DATE

RESPONSE TO US EPA COMMENTS DATED JANUARY 19, 2006 (E-MAIL) ON DRAFT RCRA CORRECTIVE MEASURES STUDY REPORT OCTOBER 4, 2005 RESPONSES FOR SWMU 10 – ROCKEYE
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Comments provided by the United States Environmental Protection Agency (US EPA) are shown in bold font. Responses following each comment are shown in regular font. Changes are italicized and enclosed in quotation marks.

Comment 1) The October 4, 2005 response to comment 4 states that the levels of RDX at 10-17 and 10C55 are 337 ug/L and 361 ug/L, respectively. This is not what is reflected in Figure 2-1. These do not appear to be part of the historical values given in Appendix A.

Response to Comment 1. The sited level in the Response to Comments (RTCs) dated October 4, 2005 for wells 10-17 and 10C55 is incorrect. The correct concentrations of RDX for the latest sample round (January 2001) at 10-17 and 10C55 are 33 and 240 µg/L as shown on Figure 2-1 and revised Appendix A. The last two paragraphs in the response to Comment 4 have been revised as follows:

> *"A new 2nd paragraph has been added to Section 3.5.1 as follows:*
>
> *"The 'hot-spot' concept was not developed to accurately delineate particular areas of contamination outside of which groundwater quality meets the cleanup criteria. Instead, this concept was meant to identify and approximately size the two general areas within the contaminant plume that contain the highest levels of groundwater contamination and would therefore benefit the most from remedial action. Therefore, the centers of Hot-Spots Nos. 1 and 2 were selected as the two monitoring wells where the highest concentrations of explosives have been detected (33 µg/L at 10-17 for Hot-Spot No. 1 and 240 µg/L at 10C55 for Hot-Spot No. 2) and the approximate boundaries of these hot spots were delineated by assuming that they extend to the eastern edge of the plume on one side and halfway towards the nearest monitoring well where much lower explosives concentrations were detected (10-18 with 127 µg/L for Hot-Spot No. 1 and 10-21 with 66 µg/L for Hot-Spot No. 2) on the other side. For both hot-spots, this corresponds to a distance of approximately 100 feet and; therefore, it was decided to identify each hot-spot as a circular area with a 100-foot diameter."*

The revised pages 3 of 7 and 4 of 7 for the October 4, 2005 RTCs are attached.

Comment 2) Referring to Figure A-1, it would be better to use 'ND' - non-detect rather than zero for wells with no RDX.

Response to Comment 2: Figure A-1 has been revised to indicate non-detection values as "ND" rather than zero for wells with RDX.

Comment 3) Referring to the second to last paragraph of page ES-3, if all groundwater values for nickel are below MCS (specifically, the RFI states that they are all below IDEM RISC closure values), why does Figure 2-1 have IDEM flags next to nickel detections?

Response to Comment 3: This section of the CMS presents a summary of the current contamination conditions for SWMU 10. Section 2.0 summarizes the findings of the RFI Report. The data presented in Figure 2-1 was taken directly from Figure 7-14 of the RFI Report and has been further evaluated in comparison to CAOs Section 3.0 of this CMS. In the case of nickel, a site specific media cleanup standard was developed. All nickel concentrations in groundwater were found to be less than the site specific cleanup level of 700 µg/L.

Furthermore, the values for nickel in groundwater presented in Figure 2-1 range from ND to 695 µg/L which is less than the site specific MCS for nickel is 700 µg/L.

The Executive Summary statement was based upon the information presented in Section 3.4.1, Subsection Nickel.

For clarification, the 2nd sentence in the 1st paragraph of Section 2.0 has been modified as follows:

> *"The information presented in this section is used as the basis for the development of site-specific media cleanup standards and CAOs which are presented in Section 3.0."*

ATTACHMENT 1

The groundwater in this plume appears to travel northeast parallel to the small ravine and eventually discharges into the ravine. The fact that explosives were not detected in wells 10C56 and 10C57 downgradient of the plume is evidence that the plume is most likely discharging to the ravine. Wells 10C60, 10-01, and 10-02 are located approximately 3,500 to 5,000 feet downstream of the plume (Figure A-2). These three wells also have historically had significant groundwater concentrations of RDX. Concentration-time graphs of RDX in wells 10-02 and 10C60 (see Appendix B) shown that the RDX concentrations have decreased over time and are now at or less than 10 µg/L. The RDX concentrations in well 10-01, however, are greater than 20 µg/L and do not appear to be decreasing over time (1983 through 1992). It is believed that RDX has been discharged directly to the ravine as surface water and/or has discharged to the ravine in the form of groundwater seepage between 1940 and the present. The RDX has traveled down the gully as surface water. Once the surface water in the gully migrated to the lower reaches, some of the surface water reenters the shallow groundwater system. This may be the reason that RDX was detected in the three wells located close to a mile downslope of the main plume area. It is not believed that the plume is continuous from the main plume area shown in Figure A-1 all the way eastward to wells 10-01 and 10-02.

The US ACE WES RFI Report (US ACE WES, 1995) reported that wells with mean concentration above the DL as follows: "...Ten wells had mean amounts of at least one explosive above the DL of 0.02 mg/l. All of the wells with amounts above DL were in the drainage way northeast and downslope of Rockeye. Referring to Plate 1, the wells with mean amounts of HMX, RDX, and TNT above DL were 10-07 and 10-08, 10-17 and 10-18, 10-21 (RDX only), 10C55 and 10C55P2, all atop the ridge, and 10C60, 10-01 and 10-02, downslope of Rockeye..." These ridge top wells are the same wells as used in the CMS discussion.

As noted in the SWMU 10 RFI (USACE, 1995), seven wells were identified on the top of the ridge as containing RDX or other explosive compounds. Time-concentration graphs for these seven wells are included in Appendix B. By visually observing these graphs, RDX concentrations in 10-07, 10-08, 10-17, 10-18, and 10C55P2 decreased over the time interval for which they were sampled. RDX concentrations in wells 10-21 and 10C55 appear to be relatively stable over time. RDX concentrations in none of the wells appear to have increased over time. Based on these graphs, the total mass of RDX in the plume and the overall size of the plume appear to have decreased slowly over time (between 1983 and 2001). RDX concentrations in 10-02 and 10C60 located east of SWMU 10 and next to the gully have also decreased over time; however, concentrations in 10-01 has remained relatively steady (see Appendix B). Overall, the wells located downslope of the plume are less affected by RDX now than they were in the 1980s and early 1990s

The following changes have been made in Appendix A to address these comments:

- Text in Appendix A has been expanded to include a discussion of how the plume area was defined and why wells 10-01, 10-02, and 10C60 are not considered to be part of the main plume area.

- The text in Appendix A has also been expanded to include a discussion of how the RDX plume size and concentrations have changed over time.

A new 2nd paragraph has been added to Section 3.5.1 as follows:

> *"The 'hot-spot' concept was not developed to accurately delineate particular areas of contamination outside of which groundwater quality meets the cleanup criteria. Instead, this concept was meant to identify and approximately size the two general areas within the contaminant plume that contain the highest levels of groundwater contamination and would therefore benefit the most from remedial action. Therefore, the centers of Hot-Spots Nos. 1 and 2 were selected as the two monitoring wells where the highest*

concentrations of explosives have been detected (33 µg/L at 10-17 for Hot-Spot No. 1 and 240 µg/L at 10C55 for Hot-Spot No. 2) and the approximate boundaries of these hot spots were delineated by assuming that they extend to the eastern edge of the plume on one side and halfway towards the nearest monitoring well where much lower explosives concentrations were detected (10-18 with 127 µg/L for Hot-Spot No. 1 and 10-21 with 66 µg/L for Hot-Spot No. 2) on the other side. For both hot-spots, this corresponds to a distance of approximately 100 feet and; therefore, it was decided to identify each hot-spot as a circular area with a 100-foot diameter."

Attachment 1 contains the revised Appendix A text, calculations, and figures.

5) Referring to Section 4.2.2.3, Effectiveness, it is stated that preliminary modelling of explosives plume degradation time is presented in Appendix A. There is no such information in Appendix A.

Text and tables have been added to Appendix A which present an evaluation of the natural attenuation processes that are operating in the RDX plume area, the overall attenuation rate that is occurring in the plume, and the estimated length of time for natural attenuation before the maximum concentrations in the groundwater reach the MCS of 0.5 µg/L. Based on the current understanding of the plume, the estimated length of time for the RDX MCS to be attained is roughly 100 years. It is not known whether a significant source of RDX is still adsorbed to the soil and/or bedrock upgradient (south) of the plume area. Therefore, it is difficult to make a reliable estimate of time to cleanup relying solely on natural attenuation.

6) There appears to be an error in the "Retain?" column on page 2 of 3 for Table 4-1 under Equalization.

Response to Comment 6: Agreed. The "2" has been changed to "$Y^{(2)}$" to represent retained for the reason presented in footnote number 2.

7) Referring to page 3 of 3 for Table 4-1, why would Direct Discharge of extracted water to the Crane industrial wastewater treatment be unacceptable to the wastewater treatment facilities? How is explosives contaminated water from SWMU 10 (or other production/active areas) currently treated and why wouldn't it be feasible or acceptable to route low-level explosives contaminated extracted groundwater to that system?

Response to Comment 7: Current SWMU 10 operations include a pre-treatment carbon filter system (pre-treatment system) for filtering explosive from wastewater. The pre-treatment carbon filter system is located in Building 3044 and designed to batch approximately 40,000 gallons per day. The explosive containing wastewater is received from various locations throughout NSWC Crane. The explosive contaminated wastewater is typically received by tank truck and batched through the carbon filter system prior to discharge into the NSWC Crane sanitary water sewer system. The water currently being treated is relatively clean (i.e., low in suspended solid).

The proposed groundwater recovery system would generate approximately 7,200 gallons per day of additional wastewater for treatment by the pre-treatment system. The pre-treatment system is capable of filtering this additional wastewater but is not operated continuously and would require additional equipment (e.g., surge tank) to be able to accept and batch the extracted groundwater.

Upon review of the existing system and the requirements of the groundwater extraction system, indirect discharge of groundwater via the existing SWMU 10 pre-treatment system is not practical for the following reason:

1. Installation of approximately 1,500 feet of piping would be required to route the extracted groundwater from the two "Hot Spots" to Building 3044. This piping would be dedicated