



Infrastructure, environment, buildings

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Subject:

Response to Comments on the Source Area Investigation and Natural Attenuation Evaluation Technical Memo, BAE Systems, North Site
BAE Systems U.S. Combat Systems, Fridley, Minnesota

Dear Ms. deAlwis:

The Minnesota Pollution Control Agency (MPCA) has provided BAE Systems comments on the Source Area Investigation and Natural Attenuation Evaluation Technical Memo dated February 13, 2009. On behalf of BAE Systems, ARCADIS has responded to each of MPCA's comments below.

General Comment: During the January 7, 2009 meeting between all involved parties, MPCA staff stated the importance of following the MPCA's guidelines for Natural Attenuation of Chlorinated Solvents in Ground Water. Please ensure that BAE and its consultant, ARCADIS U.S., follow the subject guidelines when evaluating the suitability of MNA as possible remedy for the site.

Response to General Comment: The selection of Monitored Natural Attenuation as a remedial action for the site was based on evaluation of two lines of evidence as detailed in the Resource Conservation & Recovery Act (RCRA) Facility Investigation Report (RFI) submitted to the MPCA by the previous consultant, Tetra Tech, in June 2005:

- Evaluation of contaminant trends over time to demonstrate a trend of decreasing contaminant mass and/or concentration over time.
- Hydrogeologic and geochemical data indicating appropriate conditions exist within the aquifer that is supportive of contaminant biodegradation.

The evaluation methodology detailed in the RFI and subsequently in the Source Area Investigation and Natural Attenuation Evaluation Technical memo submitted by ARCADIS conformed to the MPCA guidelines and provided strong evidence of on-

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May 19, 2009

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Our ref:
MN000598.0001

going natural attenuation at the site. ARCADIS will continue to follow the guidelines when further evaluating site data and implementing monitored natural attenuation at the site.

Comment 1: Figure 2. Please identify concentrations at the wells along with chemistry contours

Response 1: Figure 2 has been updated as requested. Note that since the trichlorethene (TCE) data were collected at different times, concentration contour lines are not included in the revised figure. For future reporting, efforts will be made to include chemistry contours where applicable.

Comment 2: On all data tables please provide the applicable Health Risk Limits for comparison to the data.

Response 2: The applicable Health Risk Limits have been added to all data tables for comparison.

Comment 3: On all figures, differentiate between the wells installed in the shallow, intermediate and deep horizons. In the text, define each of the different horizons.

Response 3: Figures and the text of the memo have been revised as requested.

Comment 4: Add/update figures showing the vertical distribution of TC) concentrations in the subsurface. Specifically, add an east-west cross section including: MW-UD-62S, MW-UD-61I, MD-UD-66I, MD-UD-65S, MD-UD-58I, MW-UD-69D, MW-UD-63S, MD-UD-59I, MW-UD-60S and USGS-9.

Response 4: An east-west cross section with TCE concentrations in monitoring wells from the most recent sampling events has been added to the Technical Memo as Figure 3. Note - USGS 9 will not be used since we believe it is not connected to the migration of contaminants from the BAE Systems property.

Comment 5: Table 1 presents data from soil samples collected at one boring location (SB-#6-01 and SB-#6-02), please add/update the figures to show the location of this boring. Additionally, was water encountered in the boring and if so was water collected and analyzed for chemicals of concern?

Response 5: The locations of Soil Borings SB-#6-01 and SB-#6-02 have been added to Figures 1 and 2. It is not certain whether water was encountered in the borings,

but a water sample was collected from a temporary well, TW-6-01, adjacent to the soil borings. Location of the temporary well and concentrations of compounds detected in the water sample are included in Figure 1 and Table 1, respectively.

Comment 6: Figure 2 presents TCE concentrations at MW-MS-32I, MW-MS-33S, and MW-MS-33I at concentrations presumably above 10,000 micrograms per liter ($\mu\text{g/L}$); however, no data is included in Table 2 or discussion in the text in relation to these impacts which are the highest reported on Figure 2. Please include a discussion regarding the relationship of these wells and trends.

Response 6: Monitoring wells shown as gray on Figures 1 and 2 are wells associated with the former Naval Industrial Reserve Ordnance Plant (NIROP). Data from some of these wells were provided on Figure 2 for informational purposes. Because these data are associated with NIROP impacts the data were not analyzed or discussed in the technical memo nor will be in future documents.

Comment 7: Downgradient plume delineation should be discussed and show separation between the BAE and NIROP plumes.

Response 7: Groundwater investigation data and interpretation of that data were provided in the two RCRA Facility Investigation (RFI) reports submitted in 2004 and 2005. The RFI reports clearly present an interpretation of the spatial separation between the NIROP plume and the Corrective Action Agreement property plume. The MPCA found the investigation and interpretation satisfactory and approved of the reports. There has been no change to site conditions since that time. Therefore, the previous interpretation of the groundwater plumes is still valid. Additionally, NIROP data are not readily available and further analysis of downgradient data will not influence remedy selection.

Comment 8: The MPCA agrees that the soil data provided is not adequate to evaluate the source area. The MPCA would like to review the proposed scope of work and boring locations prior to site work occurring. Soil and ground water samples should be collected from all borings advanced during the source area evaluation, and at a minimum analyzed for volatile organic compounds using EPA method 8260.

Response 8: A Source Area Soil Investigation Work Plan has been prepared and is scheduled for submission to the MPCA concurrently with this letter.

Comment 9: When creating the above referenced work plan, in coordination with the additional proposed ground water monitoring activities proposed for the site, please

follow the MPCA's "Natural Attenuation of Chlorinated Solvents in Ground Water" guidelines. Specific attention should be given to the "Workplan Checklist for Natural Attenuation", in the above document. These guidelines will provide a useful tool to demonstrate that natural attenuation is a potential remedy for the site as initially proposed in the RCRA Corrective Measures Study report, and discussed in the meeting with the MPCA on January 7, 2009. As stated earlier, the adherence to this document will be required for the MPCA to evaluate MNA as a remedy at this site.

Response 9: The MPCA's Natural Attenuation of Chlorinated Solvents in Ground Water guidelines will be followed whenever applicable when preparing the Source Area Soil Investigation Work Plan.

Comment 10: The MPCA agrees that additional ground water monitoring should occur at the site, at a minimum all monitoring wells should be sampled annually. Additionally, all wells with concentrations detected above regulatory reporting requirements should be sampled semi-annually (twice per year). Please see Table 1 below for the requested list of sample locations and frequency. Please review the natural attenuation guidelines as it relates to geochemical data required for a detailed demonstration that natural attenuation is an acceptable remedy for this site.

Table 1. Ground Water Monitoring Schedule:

Monitoring Well	Spring Sampling Event (May)	Fall Sampling Event (October)
MW-UD-58I	X	X
MW-UD-59I	X	X
MW-UD-60S		X
MW-UD-61I		X
MW-UD-62S	X	X
MW-UD-63S		X
MW-UD-65S	X	X
MW-UD-66I	X	X
MW-UD-67S	X	X
MW-UD-68I	X	X
MW-UD-69D	X	X
USGS-9	X	X
MW-MS-32I	X	X
MW-MS-33I	X	X
MW-MS-33S	X	X
UST MW-2		X
20-S		X

Response 10: BAE Systems will incorporate MPCA's comment regarding the groundwater sampling program by including the following monitoring wells for sampling in May and October in 2009. Recommendations for future sampling program will be based on results from the 2009 sampling events and historical data.

Monitoring Well	Spring Sampling Event (May)	Fall Sampling Event (October)
MW-UD-58I	X	X
MW-UD-59I	X	X
MW-UD-60S		X
MW-UD-61I		X
MW-UD-62S	X	X
MW-UD-63S		X
MW-UD-65S	X	X
MW-UD-66I	X	X
MW-UD-67S	X	X
MW-UD-68I	X	X
MW-UD-69D	X	X

Monitoring Wells MW-MS-32I, MW-MS-33I, MW-MS-33S, USGS-9, UST MW-2, and 20-S will not be included in the sampling program based on the following reasons:

1. MW-MS-32I, MW-MS-33I and MW-MS-33S are associated with the NIROP plume to the north and are regularly sampled by the U.S. Navy.
2. USGS-9 is located outside of the general plume area and data from this well is not representative of the plume emanating from AOC-UD03. In addition, due to its close proximity to pumping Well AT-3 for the NIROP plume, USGS-9 is likely to be hydraulically affected by groundwater pumping and not representative.
3. UST MW-2 was installed to delineate the contamination from an old underground storage tank (UST) basin in this area. No chlorinated compound impact was detected in UST MW-2 during the UST investigation in 1989. In addition, MW-UD63-S is within 60 feet of UST MW-2 and both wells are screened from 20 to 30 feet below grade. This renders sampling at UST MW-2 unnecessary.

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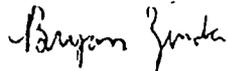
Ms. Deepa deAlwis
May 19, 2009

4. 20-S was installed as part of the NIROP investigation by the US Navy. This well is outside of the general plume area and no Health Risk Limit exceedances were detected during the 2006 and 2008 sampling events conducted by the US Navy.

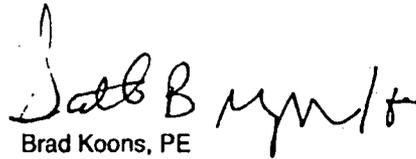
If you have any questions regarding the response to the comments, please feel free to call us at 612-339-9434.

Sincerely,

ARCADIS



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Certified Project Manager



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Senior Engineer