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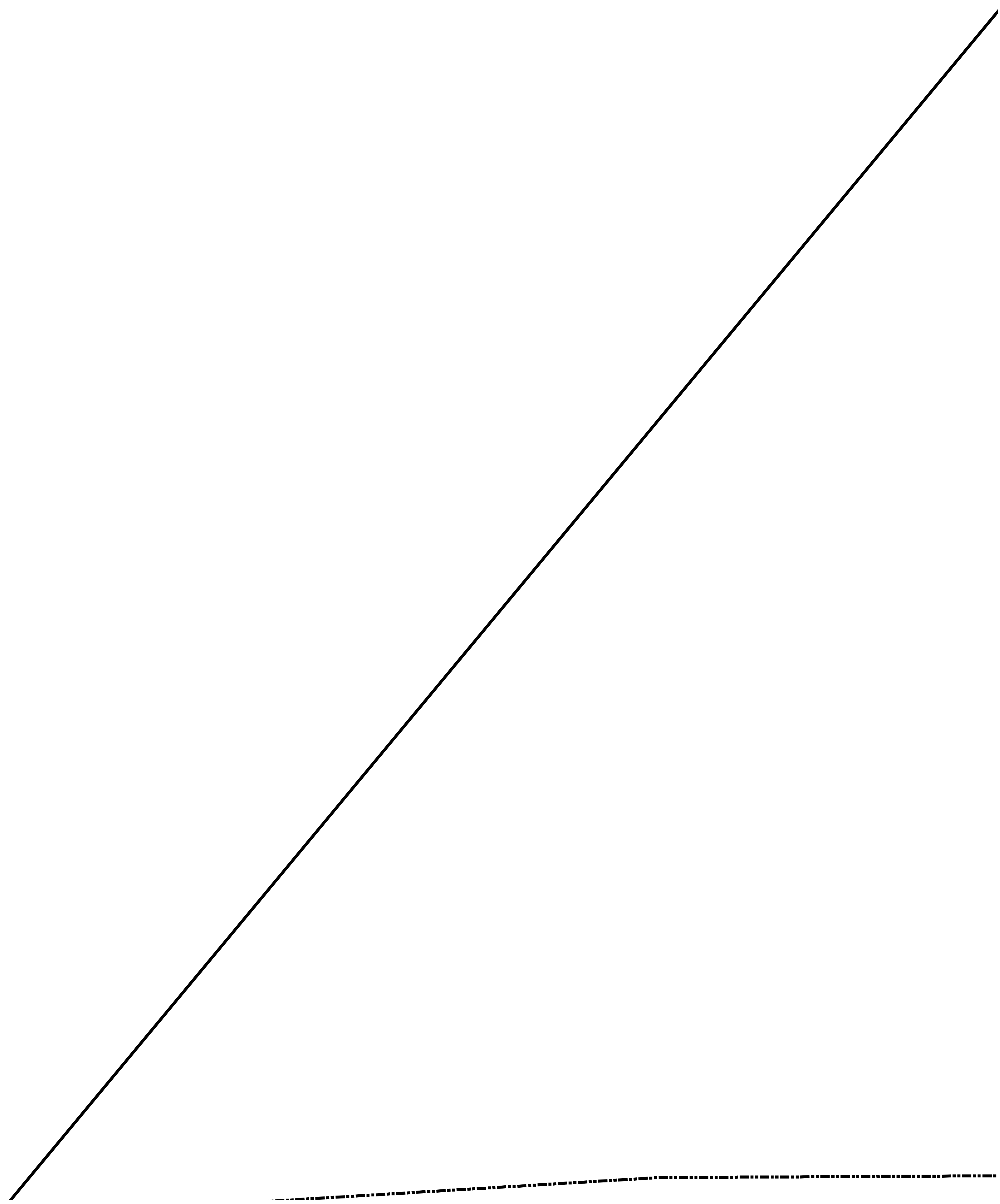
O c t o b e r

Ms. Denise Kato
Lockheed Martin Corporation
2950 N. Hollywood Way, Suite 125
Burbank, CA 91505

Tetra Tech, Inc.
301 E. Vanderbilt Way, Suite 450, San Bernardino, CA 92408
Tel 909.381.1674 Fax 909.889.1391 www.tetratech.com



During subsequent groundwater monitoring, RDX concentrations in TT-MW2-1 declined to non-detectable levels, but have remained relatively constant in TT-MW2-13.

Additional work conducted during the DSI to further characterize RDX in the vicinity of TT-MW2-13, including the following

- Installation of monitoring wells TT-MW2-33A, -33B, and -33C, and TT-MW2-34A, -34B, and -34C in the area of Labordenya Can generally upgradient of TT-MW2-13. Groundwater samples from these wells, as well as from previous upgradient well TT-MW2-14, downgradient well TT-MW2-1, and TT-MW2-13 were analyzed for RDX. RDX was only detected in TT-MW2-13. Based on these results, the location of a potential soil source for the RDX detected in TT-MW2-13 was constrained to be in the area upgradient from TT-MW2-13 and downgradient from wells TT-MW2-33A/B/C, TT-MW2-34A/B/C, and TT-MW2-14 (i.e., in the generale0.0004 Tco.7pMW2-1b8 014 Tc k condestBasy burrows (Radian, 1993). Based on the recent topographic mapping and field observations, the mounds are still present.

The lack of soil data within the footprint of the former disposal trench was considered a data gap. Additional work recommended to address this data gap included drilling two soil borings within the former disposal trench footprint, and analyzing soil samples from the borings for perchlorate, metals, petroleum hydrocarbons, VOCs, and SVOCs. The former disposal trench was also targeted for low-level N-nitrosodimethylamine (NDMA) analysis based on a 1972 report that a Lockheed safety technician was exposed to unsymmetrical dimethylhydrazine (uDMH) vapors from a pressurized gas cylinder disposed of in Area M by Ogden Labs (Radian, 1986). NDMA may be present as an impurity in uDMH. Based on the detection of chlorinated solvents in nearby monitoring well TT-MW2-10, the soil samples were also analyzed for 1,4-dioxane at the request of DTSC.

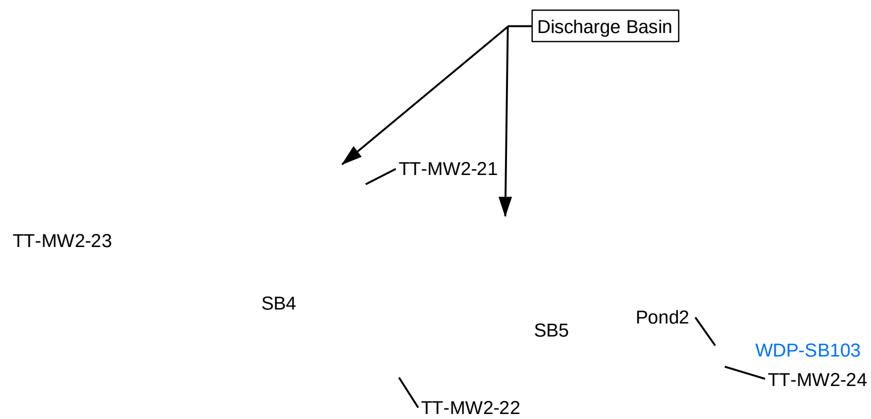
Waste Discharge Area

The Waste Discharge Area (WDA) was initially identified as a potential source area in 2007, when a copy of a permit for the discharge of industrial waste issued by the Santa Ana Regional Water Pollution Control Board (SARWPCB; pred concentrations of other contaminants were detected in soil and groundwater during the previous investigations, and analyzing the soil samples for 1,4-dioxane and RDX. Because the WDA was apparently used for the disposal of wastes, NDMA was also included in the analytical program to assess the potential presence of NDMA in soil.

METHODOLOGY

This investigation is one of a series of investigations that have been conducted at the Site since 2003. As a result, there are existing DTSC-approved work plans that detail the procedures to be followed when conducting soil and groundwater investigations. Unless otherwise stated, field activities were conducted in accordance with the previously-approved Soil Investigation Work Plan (Tetra Tech, 2003) and the DSI Work Plan (Tetra Tech, 2008), as well as the Draft Programmatic Sampling and Analytical Plan for Beaumont Sites 1 and 2 (Tetra Tech, 2010a).

The field investigation was conducted on April 12, 2010. A total of 9 soil borings were drilled to a depth of 11 feet below ground surface (bgs) using a direct-push drill rig. Drilling was conducted


Discharge Basin
TT-MW2-21
TT-MW2-23
SB4
SB5
Pond2
WDP-SB103
TT-MW2-24
TT-MW2-22

(MS/MSD) RPD results. Surrogate recoveries were examined for all organic compound analyses and compared with their control limits.

Environmental samples were analyzed by one or more of the following methods: Method SW8330A for RDX, Method SW8270C-SIM for 1,4-dioxane, Method E521 for low-level NDMA, Method E332.0 for perchlorate, Methods SW6020 and SW7471A for metals, Method SW8015B for GRO and diesel range organics (D

- With the exception of arsenic, metals concentrations were below human health-based screening levels (California Human Health Screening Levels [CHHSLs; Cal/EPA, 2005and 2009] and USEPA Region 9 Regional Screening Levels [RSLs; USEPA, 2010b] for residential and commercial industrial land use). Arsenic concentrations were below the site-specific background threshold value of 6.06 mg/kg for alluvial soils (Tetra Tech, 2010d).
- GRO was detected in two samples (M-58-SB109-5' and M-58-SB110-10', at concentrations of 2.8 and 2.7 mg/kg, respectively. Petroleum-related VOCs (for example, benzene, toluene, ethylbenzene, and xylenes) were not detected in either sample.
- Acetone (a common laboratory contaminant) was detected in all six soil samples, at concentrations ranging from 10 to 20 µg/kg. Chloromethane was detected in five of the six soil samples, at concentrations ranging from 2.2 to 3.3 µg/kg. Neither of these compounds was detected in field or laboratory blank samples. The detected acetone and chloromethane concentrations are very low (i.e., several orders of magnitude below their respective RSLs).

Waste Discharge Area

Three soil borings (WDA-SB101, WDA-SB102, and WDA-SB103) were advanced in the WDA, adjacent to existing soil borings and monitoring wells TT-MW2-21/SB1/Pond4, TT-MW2-22/SB2/Pond3, and TT-MW2-24/SB6/Pond2, respectively. Soil samples collected at depths of 0.5, 5, and 10 feet were analyzed for 1,4-dioxane, RDX, and NDMA. The boring locations are shown in Figure 5; analytical results are summarized in Table 1. 1,4-Dioxane, RDX, and NDMA were not detected in any of the soil samples analyzed.

DISCUSSION OF RESULTS

Vicinity of Well TT-MW2-13

The available groundwater monitoring results provide several constraints on the location of a possible soil source of RDX. An RDX source soil, if still present, is most likely located downgradient from wells TT-MW2-14 and TT-MW2-33A/B/C, where RDX was not detected; downgradient to crossgradient from wells TT-MW2-34A/B/C, where RDX was not detected; and upgradient from well TT-MW2-13, the only well in the area where RDX was detected. Furthermore, the hillsides adjacent to the relativ

Historical Operational Area M

Cross-section A-A' through the former disposal trench area is shown in Figure 6; the cross-section location is shown on Figure 4. Two generations of artificial fill are shown on Figure 6: fill generated during initial excavation of the disposal trench, which comprises the North and South Mounds (F1); and dark-colored sandy clay soils encountered from the surface to a depth of approximately 5.5 feet bgs in borings M-58-SB109 and M-58-SB110 (F2). The F2 sandy clay soils are underlain by light-colored silty sands with well-preserved small-scale bedding, which are interpreted as undisturbed alluvium.

In the Removal Action Report, Radian (1993) observed that debris in the disposal area extended to a maximum depth of approximately 5 feet bgs, which suggests that the original disposal trench was approximately 5 feet deep. The historical observations by Radian (1993) are in agreement with the lithologies observed during this investigation, and suggest that borings M-58-SB109 and M-58-SB110 were drilled within the footprint of the former trench.

The analytical results for borings M-58-SB109 and M-58-SB110 (Table 1) show that 1,4-dioxane, NDMA, perchlorate, DRO, and SVOCs were not detected, and that concentrations of metals, GRO, VOCs in soils beneath the former disposal trench and in soils used by Radian (1993) to backfill the excavation are below levels considered to be protective of human health. Based on these results, it is concluded that the former disposal trench does not represent a source of contamination.

Waste Discharge Area

Soil borings WDA-SB101 to WDA-SB-103 were drilled at the locations considered most likely to represent potential 1,4-dioxane, RDX, and NDMA source areas in the WDA. Soil boring WDA-SB101 (Figure 5) was drilled in a former discharge basin adjacent to previous borings Pond4 and SB1/TT-MW2-21, which had the highest perchlorate concentrations previously detected in soil within the WDA. Soil boring WDA-SB102 (Figure 5) was drilled in a shallow depression adjacent to previous borings Pond3 and SB2/TT-MW2-22, which had the highest chlorinated solvent concentrations previously detected in soil within the WDA. Boring WDA-SB103 (Figure 5) was drilled adjacent to monitoring well TT-MW2-24/SB6, which has the highest concentrations of 1,4-dioxane and RDX detected in groundwater within the WDA. 1,4-Dioxane, RDX, and NDMA were not detected in any of the soil samples analyzed. Based on these results, it appears likely that a soil source for 1,4-dioxane, RDX, and NDMA, if present at the WDA, has attenuated over time to non-detectable concentrations in soils at depths of 10 feet bgs or less.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusions of this investigation are as follows:

- A soil source for the RDX detected in monitoring well TT-M_T3 1 Tf 0.

- There is no indication of hazardous materials releases related to the former disposal trench in Area M.
- Soil sources for 1,4-dioxane, RDX, and NDMA, if still present at the WDA, have attenuated over time to non-detectable concentrations in shallow soils.

Recommendations

Based on the conclusions summarized above, the following recommendations are made:

- No further investigation for RDX is recommended in the vicinity of monitoring well TT-MW2-13.
- No further investigation is recommended for the former disposal trench in Area M.
- No further investigation of 1,4-dioxane, RDX, or NDMA is recommended for soils in the WDA.
- The data collected during this investigation, in conjunction with previously collected data, is sufficient to estimate exposure point concentrations for the purposes of human health and ecological risk assessments.

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Tetra Tech, 2005a. Low Effect Habitat Conservation Plan for the Issuance of an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act for the Federally Endangered

If you have any questions regarding this report, please call either of the undersigned at 909.381.1674.

Sincerely,

Mark Feldman
Principal Geologist

Thomas J. Villeneuve
Beaumont Program Manager

Attachments: A – Work Plan and Related Correspondence
B – Boring Logs
C – Validated Analytical Results
D – Laboratory Report

cc: Gene Matsushita, LMC
John Eisenbeis, CDM
Mike Smith, CDM

ATTACHMENT A WORK PLAN AND RELATED CORRESPONDENCE

ATTACHMENT B BORING LOGS

ATTACHMENT C VALIDATED ANALYTICAL RESULTS

ATTACHMENT D LABORATORY REPORT

ATTACHMENT E: HISTORIC DELIVERABLES