TECHNICAL BRIEFING – DRAFT REMEDIAL ACTION REPORT
MID-VALLEY GROUNDWATER - SEPTEMBER 2013

The document reviewed was a remedial action report (RAR) for Mid-Valley Groundwater. The record of decision (ROD) was signed in September 2012. The work described in the RAR was performed in accordance with the Final Remedial Design.

Remedial Action Objectives (RAOs)

The RAOs for the site are as follows:

- To prevent human exposure to contaminated ground water that would cause unacceptable risk over the duration of the remedial action; and
- To achieve the more stringent of the Federal MCLs or NJGWQS for contaminants of concern in a reasonable timeframe, thereby restoring groundwater to its beneficial use as a drinking water source.

Site Area/Conceptual Site Model

The Mid-Valley is just as it is named – the area at the middle of the valley, found at the central portion of the bases that includes groundwater beneath study Areas F, G, H, and L. At the center of the Green Pond Valley the unconfined aquifer composed of glacial valley fill sediments is found at the surface and is underlain by the upper- and lower-semiconfined aquifer units. The glacial sediment aquifers are up to 200 feet deep at the center of the valley and pinch out at the sides of the valleys. On the upland areas that form the valley walls the unconfined unit is weathered and highly fractured bedrock underlain by less fractured rock. Groundwater flows down slope toward Green Pond Brook, and then southward "down" the valley.

Plumes

There are several plumes as follows:

- VOC Plumes: Robinson Run VOC Plume, Northern VOC Plume, and Western VOC Plume; and
- RDX Plume.

The only plume being actively treated is the Robinson Run VOC Plume. The other plumes will be treated with MNA and LUCs only. Although the anticipated removal of source zone soils near Building 1071

would have been expected to prevent additional migration of explosive compounds from the soil to groundwater, the action was not required because of no detections of soil exceedances.

Activities for Remedial Action (RAs)

The RAs are as follows:

- Enhanced reductive dechlorination (ERD) using injection of carbon substrate for the volatile organic compound (VOC) hot spot;
- Monitored natural attenuation (MNA) for downgradient VOC plumes, RDX plume, and groundwater at former Defense Reutilization and Marketing Office (DRMO) yard;
- Excavation and disposal of explosives contaminated soil near Building 1071;
- Long-term monitoring for Site 5 and Site 6 shell burial areas; and
- Implementation and maintenance of land use controls (LUCs).

The RAR includes a report of the following completed actions:

- Injection well and monitoring well installation (November 2011 to March 2013);
- Injection of emulsified vegetable oil (EVO) (March 2013);
- Baseline groundwater sampling for MNA (February to June 2013);
- Characterization of explosives-contaminated soil; and
- Implementation of LUCs.

Site Cleanup Levels (SCLs)

The agreed upon SCLs are as follows:

- RDX – 2.0 ug/L
- 2,4,6 – TNT – 2.0 ug/L

Values are based on the HAL (Federal Drinking Water Lifetime Advisory Level) which is the criterion being used "consistently across numerous USEPA Regions." However, the NJDEP does have non-promulgated interim specific standards that are lower (RDX – 0.5 ug/L and 2,4,6-TNT – 1.0 ug/L).

Remediation Timeframe

The Robinson Run VOC plume is expected to have a 35-year duration of remediation. MNA for the Northern VOC Plume is expected to require 20 years in contrast to 35 years for both the Western VOC plume and for RDX in bedrock to achieve SCLs. The expected MNA time frame for RDX in the unconfined/weathered bedrock is 15 years.

Well Installation

Several types of wells were installed: shallow "hot spot" injection wells, shallow downgradient injection wells, deep downgradient injection wells, and monitoring wells. A total of six shallow "hot spot" injection wells were installed in two transects of three wells each referred to as Line 1 and Line 2. Line 3 consisted of a mix of shallow and deep wells located downgradient of the "hot spot". Six monitoring wells were installed in the injection area and two monitoring wells were installed immediately downgradient of the injection area.

Baseline Sampling Event

Wells were sampled in February 2013 to document baseline conditions for the MNA remedies being applied, and later for performance monitoring of the active remedy (ERD). The wells and parameters for each of the plumes and the former DRMO yard area are described below.

- Robinson Run VOC Plume MNA: 31 wells for VOCs and biogeochemical parameters
- Western VOC Plume MNA: Five wells for VOCs and biogeochemical parameters.
- Northern VOC Plume MNA: Five wells for VOCs and biogeochemical parameters.
- RDX Plume MNA: 25 wells for explosives and biogeochemical parameters. An additional well is to be sampled in the third quarter of 2013.
- Former DRMO Yard: Six wells for metals (arsenic, cadmium, lead, and total sodium). The same wells are also part of the RDX Plume MNA network.
- Site 5 and Site 6 Shell Burial Areas: Five wells for VOCs, explosives, and metals (aluminum, antimony, copper, lead, and zinc).
- Potable Well Sampling: Supply well PW-302D was intended for sampling but was not accessible.
- ERD Performance Monitoring: 21 wells for VOCs and ERD performance parameters (dissolved iron, dissolved organic carbon, and dissolved gases – ethane, ethene, and methane).

- Surface-Water Monitoring: 5 surface-water samples from Robinson Run for VOCs and explosives.

Results of all the sampling were included in the RAR. However, those results are not discussed herein. The significance of the results will be evident in subsequent sampling events discussed in monitoring reports where the progress of ERD and MNA in reducing groundwater contaminant concentrations will be tracked. The first quarterly sampling event occurred in June 2013.

Injection Event

From March 11 to 19, 2013 approximately 3,100 gallons of dilute EVO solution was injected into the aquifer in a full-scale event. The EVO solution was a 1 percent formulation. About one well volume (more at shallow downgradient wells with higher permeability, less at deep downgradient locations) was injected into each injection well location; adjustments were made at individual wells to keep the total volume injected across all wells the same as what was specified in the remedial design.

LUCs

LUCs include institutional restrictions, access restrictions, and public education. The existing Land Use Restrictions include MEC Clearance Procedures, Master Plan Regulations, Picatinny Geographic Information System (GIS) Database, Picatinny Base Access Restrictions, Picatinny Safety Program, and Army Military Construction Program. These controls are fully implemented at Picatinny now. The current Classification Exception Area (CEA) would continue to be maintained. The LUC certification for Mid-Valley Groundwater is to be completed annually as specified in the RD (as opposed to less stringent NJDEP requirements for a biennial basis). Public education included a news release prepared for the Voice, a Picatinny periodical, that informed about the LUCs at Mid Valley and provided a point of contact (Ted Gabel) for questions.

Site 162 Soils Characterization

Sampling and analysis of soils for explosives was completed in June 2013. Work was completed in anticipation of preparing an addendum for source removal. However, no exceedances of the RDX SCL

(26 milligrams per kilogram [mg/kg]) were detected so plans for a removal action have been abandoned and MNA will be the sole remedy for the RDX plume.