TECHNICAL BRIEFING – 2012 ANNUAL SURFACE WATER & SEDIMENT MONITORING REPORT, GREEN POND BROOK AND BEAR SWAMP BROOK (PICA 193) – JULY 2013

The document reviewed was an annual monitoring report for surface water and sediment monitoring completed in the Green Pond Brook (GPB) and Bear Swamp Brook (BSB) area – identified collectively as PICA 193. Annual sampling is completed in accordance with the Record of Decision for the site. The sampling event discussed in the report, conducted during the week of October 22, 2012, is the sixth consecutive annual monitoring event completed at the site. Chemical and biological monitoring are completed for the site on an annual basis.

Cover Letter from Army

In the cover letter accompanying the report the Army stated that they would comply with the request of the New Jersey Department of Environmental Protection (NJDEP) and sample at four locations for the 2013 sampling (to be conducted in October). The Army intends to re-evaluate the need for continued sampling based on the October 2013 results and will do so before submittal of the 2013 monitoring report. Furthermore, the Army includes the following statement: "We are still convinced that 'not sampling' these locations are not warranted and is compliant with the approved Remedial Design Workplan." Apparently the Army believes that they are compliant with the approved sampling program without the inclusion of the samples requested by the NJDEP; however, the samples are going to be collected by the Army as requested.

Sample Locations

Changes to Sampling Program: Modifications to the sampling program were made in accordance with what was proposed in the 2011 annual monitoring report. The year 2011 represented the fifth year of sampling and results of monitoring were to be assessed after that time had elapsed. The results were compared to the exit strategy decision matrix; as a result some sample locations were recommended to be discontinued and others were recommended to be continued. In addition, comments from the NJDEP requested the addition of four sample locations and those were included with the exception of one location (SDBS-23) whereat the comments arrived after the sampling had taken place. According to the report the sample will be added for the 2013 sampling.

The following sample locations were discontinued based on the exit strategy in the Bear Swamp Brook Oil/Water Separator and Tributary Stream Sediment Removal Action Work Plan (RAWP):

- Region 2 locations: 31SD-4 and SD52-5;
- Region 3 locations: BSSD-32, BSSD-29, BSSD-15, BSSD-34 and BSSD-1;
- Region 4 locations: SD34-5 and 34SD-7; and
- Area D of Region 3: SDBS-23 and SDBS-24.

The 2011 annual report recommended that the monitoring program be "extended" at the following sample locations:

- Background locations: GPB-2 and 1515R;
- Region 2 locations: GPBSD-26 and SD101-1;
- Region 3 locations: SDBS-25 and BSSD-24 (not previously addressed in the 2011 annual report; the rationale for inclusion of the sample was addressed in the current report);
- Region 4 locations: SD34-4 and SD34-3; and
- Surface-water sample location: 34SW-8.

Surface Water: A single surface-water sample was collected at 34SW-8.

Past Removal Actions

Four removal actions have taken place in Region 3 in the past. Briefly these removal actions are as follows:

1) PCB-contaminated sediment near Site 122 in 2000 – 580 tons removed
2) Sediment from sediment retention basins at Site 193 in 2003 – 632 tons of stabilized sediment (as hazardous waste) and 386 tons of excavated soils (as solid waste)
3) Sediment from oil/water separator in 2007 – 185 tons of sediment; and
4) Mercury-impacted soil from a BSB tributary within Site 128 in 2008 – 9 tons

Also at Region 2, 1700 cubic yards of metal impacted soil was removed in 2009.

Chemical Monitoring

Sediment samples were collected from locations specified above. Samples were analyzed for pesticides, PCBs, inorganic constituents, polyaromatic hydrocarbons (PAHs), and semivolatile organic compounds

(SVOCs). A single surface water sample, from Region 4 (34SW-8), was collected and analyzed for the same parameters.

Biological Monitoring

Three locations were included for biological monitoring: two were the background reference samples collected upstream of the Regions 2, 3, and 4 at locations GPB-2 and 1515R; and one was GPBSD-26, located in Region 2. The biological sample consisted of a benthic macroinvertebrate sample and surface sediment sample.

Biological evaluation consists of several components as follows:

- Habitat assessment is based on ten metrics that include an evaluation of the variety and quality of the substrate, channel morphology, bank structure, and riparian vegetation; an overall habitat score is developed from the metrics.
- Calculation of High Gradient Macroinvertebrate Index (HGMI) relies on seven metrics (total number of genera, percent genera that are not insects, percent of Ephemeroptera/Plecoptera/Trichoptera [EPT individuals – excluding Hydropsychidae, including Diplectrona], number of scraper genera, Hilsenhoff Biotic index [HBI], number of attribute 2 genera [highly sensitive and uncommon taxa], and number of attribute 3 genera [sensitive and common taxa] to identify biological degradation.
- Biological condition characterized as excellent to poor based on maintenance of native taxa and maintenance of the ecosystem with expected range of natural variability. Excellent and good condition meet the regulatory threshold (full attainment).
- HBI also includes a classification of water quality and degree of organic pollution.
- Sediment toxicity is measured through testing (*Hyalella Azteca* 28-day study and *Chironomus dilutus* long-term exposure study. In both studies growth of organisms using certain endpoints is compared to control samples in which organisms are exposed to sediment of known environmental quality. Statistical analysis is employed to determine whether differences between the control batch and the sample are meaningful. For *Hyalella azteca* the end points are mortality and growth. For the *Chironomus dilutus* the end points are adult emergence and total survival.

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Monitoring Results

Chemical: The majority of the contaminants of concern (COC) appear to be stable or decreasing. Copper concentrations have declined at most locations but metal concentrations at GPBSD-26 have "consistently shown elevated levels of metals in all historical sampling events. However, remedial actions at the Former Defense Reutilization and Marketing Office (DRMO) Yard (PICA 72) have been conducted in order to improve sediment quality at this location and copper concentrations have decreased accordingly."

Biological: Table 1 presents a summary of the results for the three biological samples. Since GPB runs through the center of Picatinny Arsenal and as such, flows through heavily industrialized area, the habitat is generally not of high quality and can thus adversely impact the macroinvertebrate community. Even the background reference locations upgradient of the GPB/BSB study area are not of optimal habitat. Habitat at GPBSD-26 is considered marginal. Sample location GPBSD-26 is also poor for water quality and fair for biological condition resulting in non-attainment for the regulatory threshold. For comparison to the control for 28-day survival and growth for the *Hyalella azteca* and for 20-day survival and growth and long-term survival and emergencey for the *Chronomus dilutus* studies, the sample location is considered statistically significant. Toxicity at GPBSD-26 was observed and may relate to the high COC concentrations.

Conclusion

The same biological and chemical sample locations (except for BSSD-24) will continue to be monitored for the same parameters as in past years. The next five-year review will be in 2016 at which time sample locations will be re-evaluated.

INDICATOR	Sample Background GPB-2	Sample Background 1515R-2	GPBSD-26
Habitat Assessment Reference Values	158 suboptimal	119 suboptimal	105 marginal
NJ High Gradient Macroinvertebrate Index (HGMI)	55.2	28.3	23.5
Hissenhoff Biotic Index	22.1	0	0
Water Quality Rating	Fair	Fairly poor	Poor
Degree of Organic Pollution	Fairly substantial likely	Substantial likely	Very substantial likely
Biological Condition	Good	Fair	Fair
Regulatory Threshold	Full attainment	Non-attainment	Non-attainment

Table 1. Summary of Selected Biological Monitoring Results.