Final
Revised Approach for Ecological Risk Issues at Site 25, IHDIV-NSWC

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This technical memorandum was prepared in response to discussions held on January 17, 2003 among the Indian Head ecological subgroup, regarding the path forward for Site 25, at the Indian Head Division-Naval Surface Warfare Center (INDIV-NSWC). The subgroup came to the preliminary conclusion that further investigation of site-specific ecological risk in the sediments of Mattawoman Creek does not appear warranted for Site 25. Therefore, this technical memorandum was prepared to summarize the information that was used to arrive at this conclusion and present the revised approach for Site 25.

Site 25 is the drainage ditch adjacent to the Rocket Motor Loading Building (Building 588). Contaminants in the Building 588 area may have been historically carried into the ditch via surface runoff. The ditch drains to the southwest toward a stormwater culvert that discharges at outfall IW46 into Mattawoman Creek (Figure 1-1).

A screening ecological risk assessment was completed for the site in August 2001 (CH2M HILL, 2001). The results of the risk assessment indicated that chemicals in the soil at Site 25 pose minimal risk to ecological receptors. However, additional information regarding a potential transport pathway became available after the start of the RI process for Site 25. The potential transport pathway involves the existence of a 6-inch terra cotta pipe that reportedly was used prior to the 1970's to discharge photographic fixer solution containing silver to Mattawoman Creek. Based on this information, a draft work plan was developed to investigate potential silver contamination in the sediments near the terminus of the terra cotta pipe and drainage ditch (CH2M HILL, 2002). The sampling at the mouth of the drainage ditch was included to confirm that silver had not historically been transported to Mattawoman Creek via the ditch. Silver had not been detected in the farthest downgradient sample, but Mattawoman Creek had never been sampled.

Since the draft work plan was prepared, silver data collected in the vicinity of Site 25 for the Mattawoman Creek Study (TTNUS, 2002) became available. In lieu of additional sampling, these data were used to evaluate the potential influence of Site 25 on sediments in Mattawoman Creek adjacent to the site.

As part of the Mattawoman Creek Study (Tetra Tech NUS, 2002), two sediment samples (MTC015 and MTC016) were collected just downgradient of Site 25 (Figure 1-2). Two additional sediment samples (MTC60 and MTC62) were collected near Site 25, but slightly upgradient, for the Pilot Study for Mattawoman Creek (SPAWAR; Neptune and Co, 2001). Additionally, for the site investigation at Site 39, several sediment samples were also collected from Mattawoman Creek, just upgradient of the Pilot Study samples (Figure 1-2). Two other sediment samples were collected near Site 39 for the Mattawoman Creek Study (MTC017 and MTC018). The table below summarized the silver data from these various investigations.

Sample	Silver (mg/kg)	TOC (mg/kg)	Grain Size		Source
Downgradient					
MTC015	2.7 J	11,300	Clay: 14.6% Silt: 60.4%	Sand: 25% Gravel: 0%	Mattawoman Creek Study
MTC016	4.8 L	42,400	Clay: 6% Silt: 9.1%	Sand: 81.9% Gravel: 3%	Mattawoman Creek Study
Upgradient					
MTC60	4.2	NA		NA	Pilot Study (Rapid Screening)
MTC62	5.0	NA		NA	Pilot Study (Rapid Screening)
MTC017	0.1 UL	2,370	Clay: 0.2% Silt: 3.2%	Sand: 52.3% Gravel: 44.3%	Mattawoman Creek Study
MTC018	1.5 J	45,700	Clay: 17.8% Silt: 27.1%	Sand: 55.1% Gravel: 0%	Mattawoman Creek Study
S39SD01	0.2 U	1,480		NA	Site 39 Investigation (1997)
S39SD02	2.6	1,070		NA	Site 39 Investigation (1997)
S39SD03	66.4	1,400		NA	Site 39 Investigation (1997)
S39SD04	308	1,460		NA	Site 39 Investigation (1997)
S39SD05	0.27	9,800		NA	Site 39 Investigation (1997)
S39SD06	1.7	29,200		NA	Site 39 Investigation (1997)
S39SD07	26.8	40,500		NA	Site 39 Investigation (1997)
S39SD08	6.8	37,700		NA	Site 39 Investigation (1997)
39DP01	12.7 J	NA		NA	Site 39 Investigation (1992)
39DP02	1.4 BJ	NA		NA	Site 39 Investigation (1992)
39DP03	3.4 UJ	NA		NA	Site 39 Investigation (1992)
39DP04	4.1 UJ	NA		NA	Site 39 Investigation (1992)
39DP05	42.7 J	NA		NA	Site 39 Investigation (1992)
39DP06	4.2 UJ	NA		NA	Site 39 Investigation (1992)

Site 39 is located approximately 1,500 ft upstream of Site 25, and is the location of an outfall where a pipe carrying wastewater from Building 497 discharged into Mattawoman Creek. Operations at Building 497 from 1961 to 1965 included formulating the propellant binder, bis-2,2-dinitropropanol acetal/format. Silver nitrate was used as a catalyst in producing the acetal/format, and one stage of the process used elemental silver. Several accidental releases of acetal/formal, silver, dinitropropanol, ethylene dichloride, methylene chloride, and formaldehyde to Mattawoman Creek reportedly occurred as a result of an improperly closed valve.

As the data show, elevated concentrations of silver exist in Mattawoman Creek directly upgradient of Site 25. The concentrations detected in the two samples collected downgradient of the site for the Mattawoman Creek study are relatively low, compared with the concentrations adjacent to Site 39, and are consistent with concentrations in this general area the creek. Based on the sample information to date and the small scale of the discharge at Site 25, it is unlikely that Site 25 represents a significant continuing source of contamination to Mattawoman Creek. Furthermore, the surface soil sampling location with the highest silver concentration at Site 25 was accidentally removed by the construction of another facility adjacent to Building 588, which further reduces the likelihood of Site 25 continuing as a source of contamination. Therefore, further evaluation of potential ecological risk specific to Site 25 does not appear warranted. In addition, this area of the creek has been evaluated from a broader perspective in the Mattawoman Creek Study and further evaluation of silver in the creek will likely occur as part of the Phase II Creek Study.

References

CH2M HILL. 2001. *Draft Site-Specific Remedial Investigation Report, Sites 11, 13, 17, 21, and 25*. Indian Head Division, Naval Surface Warface Center, Indian Head, Maryland. July, 2001.

CH2M HILL. 2002. *Draft Baseline Ecological Risk Assessment, Problem Formulation and Work Plan, Site 25*. Indian Head Division, Naval Surface Warface Center, Indian Head, Maryland. October, 2002.

Neptune and Co., Inc. 2001. Draft Plan for Conduct of Mattawoman Creek Pilot Study. Indian Head Division, Naval Surface Warface Center, Indian Head, Maryland. August, 2001.

SPAWAR (Navy's Space and Naval Warfare Systems Center). (undated) *Pilot Study for Indian Head Mattawoman Creek*. Appendix B-8, Draft Mattawoman Creek Study (TTNUS, 2002).

Tetra Tech NUS, Inc. 2002. *Draft Mattawoman Creek Study, Vol. I and II*. Indian Head Division, Naval Surface Warface Center, Indian Head, Maryland. July, 2002.