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LETTER REGARDING SAMPLING AND ANALYSIS PLAN FOR INTERIM MEASURE PERFORMANCE SPECIFICATIONS AT SOLID WASTE MANAGEMENT UNITS 4, 49 AND 50
NS MAYPORT FL
7/10/1996
ABB ENVIRONMENTAL

ABB

July 10, 1996 8534.09

Commanding Officer
Southern Division
Naval Facilities Engineering Command
Attn: Mr. David Driggers, Code 1582
2155 Eagle Drive
Charleston SC 29418

Dear Mr. Driggers:

SUBJECT: Sampling and Analysis Plan for Interim Measure Performance Specifications Solid Waste Management Units 4, 49, and 50 U.S. Naval Station, Mayport, Florida Contract No. N62467-87-D-0317 CTO#028

This Sampling and Analysis Plan describes the collection of additional environmental samples at three Group I Solid Waste Management Units (SWMUs) located at U. S. Naval Station (NAVSTA), Mayport, Florida. The three SWMUs are listed as follows:

- SWMU 4, Landfill F
- SWMU 49, Flightline Retention Pond
- SWMU 50, Dredge-Material Holding Area

The assessment of chemicals present in environmental media at these SWMUs and recommendations for additional sampling and interim measure activities are provided in the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Group I SWMUs (ABB Environmental Services, Inc. [ABB-ES], 1996) for SWMU 4 and in the RCRA Facility Assessment Sampling Visit (RFA/SV) Report, Groups I and II, (ABB-ES, 1995a) for SWMUs 49 and 50.

An interim measure has been proposed to reduce the potential for adverse ecological risk to aquatic receptors (ABB-ES, 1996) at the drainage ditch that bisects SWMU 4. Therefore, the purpose of the sampling event at SWMU 4 is to collect additional environmental samples (sediment) and use the analytical results from this and a previous sampling event (ABB-ES, 1996) to develop performance specifications for an interim measure at the drainage ditch.

Analytical results from environmental samples collected in 1992 at the two SWMUs were compared with ecological based screening guidelines (U.S. Environmental Protection Agency [USEPA], 1991; Long and others, 1993; and MacDonald, 1994). This comparison suggests that chemicals are potentially present at concentrations where adverse effects may be or are beginning to be observed in aquatic organisms.

Toxicity (survival) testing of aquatic organisms and a baseline ecological risk assessment were not conducted for SWMUs 49 and 50 during the RFA/SV (ABB-ES, 1995a).

Therefore, the purpose of the sampling events at SWMU 49 and 50 is to collect additional environmental samples (surface water and sediment) to conduct an ecological risk assessment as recommended in the RFA/SV report (ABB-ES, 1995a). The ecological risk assessment will assess whether or not surface water and/or sediment potentially contain chemicals at concentrations that would present adverse effects to the growth, reproduction and survival of aquatic organisms.

Additionally, the sampling event conducted in 1994 for the Group I landfills (SWMUs 2, 3, 4, and 5 [ABB-ES, 1996]) occurred when Mayport Turning Basin was being dredged. The placement of dredge-material from Mayport Turning Basin into SWMU 50, the western and eastern dredge-material holding areas, contributed to the discharge of surface water runoff and groundwater into drainage ditches adjacent to SWMUs 2, 3, 4, and 5. This may have biased analytical results of surface water and sediment samples collected during 1994. Therefore, additional surface water and sediment samples are proposed to be collected from the ditches during a period when dredging is not being conducted. Analytical and benthic toxicity (survival) testing results from this and previous sampling events will be used to assess whether or not dredging may have contributed to the adverse ecological effects observed in the 1994 samples (ABB-ES, 1996).

The results of this sampling event will be presented as a technical memorandum for review by the U. S. Navy, the Florida Department of Environmental Protection (FDEP), and the USEPA. Pertinent data from previous reports will be incorporated, as necessary, to depict the nature and extent of chemicals present at the sites. Below is the rationale for the sampling activities at SWMUs 4, 49, and 50.

Rationale for Additional Sampling Activities at SWMU 4. The ecological risk assessment determined that adverse risk is possible for aquatic receptors utilizing the ditch that bisects SWMU 4. The risk may be manifested by effecting growth, reproduction, and survival of individual aquatic organisms (ABB-ES, 1996). The possibility of this risk occurring is based on the concentration of chemicals detected in sediment samples, benthic organism toxicity (survival) testing results, and the occurrence, distribution, and concentration of ecological chemicals of potential concern in surface water.

Sample locations proposed for the drainage ditch bisecting SWMU 4 are based on results from the 1994 sampling event (ABB-ES, 1995a), as summarized here. The results for sampling location MPT-2-SD17 were a toxicity testing mortality of 77 percent for *Ampelisca abdita* and the detection of silver, cadmium, and mercury at concentrations exceeding benchmark values (Long and others, 1993; and MacDonald, 1994). The results for sampling location MPT-2-SD32 were a toxicity testing mortality of 67 percent for *Ampelisca abdita* and the detection of silver and mercury at concentrations exceeding benchmark values (Long and others, 1993; and MacDonald, 1994). Toxicity testing was not conducted for sampling location MPT-2-SD33, and only one chemical, arsenic, was detected at a concentration exceeding its benchmark value (Long and others, 1993; and MacDonald, 1994).

Sediment samples are to be collected at a location between the three previously described sample locations. Because collecting sediment samples at SWMU 4 is to focus on data for the interim measure, the identifier proposed for sample locations will be modified to its specific SWMU designation. Sampling location MPT-4-SD01 will be between MPT-2-SD17 and MPT-2-SD32, and MPT-4-SD02 will be between MPT-2-SD32 and MPT-2-SD33 (Plate 1).

The sampling intervals at location MPT-4-SD01 will be from 1 to 2 feet and 3 to 4 feet below the sediment and surface water interface to assess the vertical extent of the chemicals detected at sampling

locations MPT-2-SD17 and MPT-2-SD32. This is based on the detection of similar chemicals at concentrations exceeding benchmarks at sampling locations MPT-2-SD17 and MPT-2-SD32 and the assumption that the chemicals are present to a depth of 1 foot beneath the surface water sediment interface between the two sampling locations.

The sampling intervals at location MPT-4-SD02 will be from the sediment and surface water interface to a depth of 1 foot, and a depth of 3 to 4 feet to assess the horizontal and vertical extent of the chemicals detected at sampling locations MPT-2-SD32 and MPT-2-SD33. This is based on the detection of different chemicals at concentrations exceeding benchmarks at sampling locations MPT-2-SD32 and MPT-2-SD33, and the assumption that the chemicals present at a depth of 1 foot beneath the surface water sediment interface between the two sampling locations has not been adequately defined.

The sediment samples will be analyzed for target analytes selected from the groundwater monitoring list contained in Appendix IX, 40 CFR, Part 264, and USEPA Contract Laboratory Program (CLP) target compound list and target analyte list, including volatile organic compounds (VOCs) semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, magnesium, manganese, mercury, nickel, selenium, silver, sodium, thallium, tin, vanadium, and zinc) (Table 1). The sample containing the highest concentrations of inorganic chemicals will also be analyzed by the toxic characteristic leaching procedure.

Rationale for Additional Sampling Activities at SWMU 49. Eight inorganic analytes were detected in surface water samples at concentrations exceeding background screening criteria (ABB-ES, 1995a). Concentrations of six inorganic analytes (arsenic, beryllium, lead, mercury, nickel, and zinc) were detected in surface water samples at concentrations exceeding their respective ambient water quality criteria (USEPA, 1993) for protection of aquatic life (acute). Five inorganic analytes (beryllium, lead, mercury, nickel, and zinc) were detected in surface water samples at concentrations exceeding Florida's Class III marine surface water standard. VOCs, SVOCs, pesticides, and PCBs were not detected in the surface water samples.

Currently, there are no ecological benchmark criteria to assess four VOCs (acetone, acetonitrile, 2-butanone, and carbon disulfide), an SVOC (butylbenzylphthalate), and a pesticide (heptachlor) detected in sediment samples.

Two SVOCs (bis(2-ethylhexyl)phthalate and 2-methylnaphthalene), three pesticides (chlordane, 4,4-dichlorodiphenyldichloroethane and 4,4-dichlorodiphenyldichloroethene [DDE]), and eight metals (arsenic, cadmium, copper, lead, mercury, nickel, silver, and zinc) were detected in the sediment samples at concentrations exceeding ecological based guidance values (Long and others, 1993; and MacDonald, 1994). Concentrations of chlordane, 4,4-DDE, cadmium, nickel, silver and zinc exceeded their respective ecological benchmark values (Long and others, 1993; and MacDonald, 1994) where biological effects are beginning to be observed (ABB-ES, 1995a). PCBs were not detected in sediment samples.

Aquatic organism toxicity (survival) testing was not conducted during the RFA/SV (ABB-ES, 1995a) to assess whether or not the site-specific combinations and concentrations of chemicals detected in sediment samples at SWMU 49 have the potential to cause adverse risk to benthic receptors. This information is required by the ecological risk assessment to adequately assess whether or not adverse risk to aquatic receptors is possible. Below is the sampling approach to obtain this information.

Four sampling locations, MPT-49-SW/SD18, MPT-49-SW/SD19, MPT-49-SW/SD20, and MPT-49-SW/SD21, are proposed for surface water and sediment samples (Plate 1). These proposed sample

locations represent a subset of previous sampling locations where chemicals were detected at concentrations above the ecological screening criteria (Long and others, 1993; and MacDonald, 1994).

The surface water and sediment samples will be analyzed for target analytes selected from the groundwater monitoring list contained in Appendix IX, 40 Code of Federal Regulations (CFR), Part 264, and USEPA CLP target compound list and target analyte list, including VOCs, SVOCs, pesticides, PCBs, and metals (Table 1). Toxicity testing of benthic organisms (survival of *Hyalella azteca* in freshwater and *Ampelisca abdita* in marine or estuarine water) will also be conducted using sediment samples collected from the four locations. The benthic species used will be based on results of surface water quality indicator parameters.

Rationale for Additional Sampling Activities at SWMU 50. The western and eastern dredge-material holding areas are considered by the Navy to be mission essential components for operation of ships assigned to or visiting NAVSTA Mayport. The western and eastern dredge-material holding areas are upland areas that were created to contain material (sand, silt, and clay) dredged from Mayport Turning Basin. Without routine dredging, Mayport Turning Basin would not be accessible to ships.

Currently, the western and eastern dredge-material holding areas are at capacity. The Navy and U.S. Army Corps of Engineers (USACE) are exploring alternatives for creating additional capacity by excavation and removal or consolidation. Until the decision is made, offshore disposal will be used to dispose of dredge material.

Additionally, this upland area, SWMU 50, is currently in a regulatory dilemma between the USACE and the USEPA. Nationwide, the USACE permits the use of upland dredge-material areas for the routine maintenance of sand, silt, and clay, which reduces the operational depth of shipping channels and berthing areas. The USEPA interprets such upland dredge-material areas to be a solid waste disposal area.

Based on the USEPA's interpretation, the upland areas at NAVSTA Mayport are considered SWMUs and are required under the Station's Hazardous and Solid Waste Amendment permit to assess whether or not there has been a release to the environment from the SWMU. The first sampling event to make this assessment was conducted in 1992 and consisted of collecting surface water and sediment samples from accessible parts of the western and eastern dredge-material holding areas (ABB-ES, 1995a). Below is a summary of the analytical results from a sampling event conducted in 1992.

Eight inorganic chemicals, arsenic, barium, cobalt, lead, nickel, tin, vanadium and zinc were detected in surface water samples at concentrations that exceeded either background screening values or benchmark values. SVOCs, pesticides, and PCBs were not detected in the surface water samples. The surface water samples were not analyzed for VOCs (ABB-ES, 1995a).

Benzo(k)fluoranthene, butylbenzylphthalate, di-n-octylphthalate, antimony, beryllium, selenium, and cyanide were target analytes detected in sediment samples that do not have benchmark values established by Long and others (1993) and MacDonald (1994) (ABB-ES, 1995a). Therefore, the concentration where effects to aquatic organisms are observed has not been adequately documented for these chemicals.

Benzo(a)anthracene, benzo(a)pyrene, chrysene, and pyrene were detected in sediment samples at concentrations that exceed the threshold effects level (TEL) (ABB-ES, 1995a). The TEL is a concentration at which no effects were observed in test species or biological communities (MacDonald, 1994). Fluoranthene, cadmium, and lead were detected in sediment samples at concentrations that exceed the effects range low, a concentration intended to estimate conditions where effects would rarely be observed (Long and others, 1993), and the TEL (ABB-ES, 1995a).

None of the target analytes detected in sediment samples exceeded values for the effects range median (ER-M) or probable effects level (PEL) (ABB-ES, 1995a). The ER-M is a concentration intended to estimate conditions were effects would occasionally occur (Long and others, 1993) and the PEL is the lower concentration limit at which effects may be first observed (MacDonald, 1994).

Observation of the two sites suggests that surface water contained in the western and eastern dredge-material holding areas is an ephemeral feature that is present during dredging activities and may also be present depending on the frequency and amount of rainfall. The concentrations of target analytes detected in surface water samples are expected to have considerable variation because of the type of water placed in the holding areas (e.g., sea water, brackish water) and the frequency and amount of rainfall.

Surface water contained by each dredge-material holding area is channeled through weir systems, which are used to control the water-level elevation in the holding area and the amount of water discharging into sediment retention ponds. The water level and amount of water discharging from the sediment retention ponds are also controlled by a weir system. The water in the sediment retention ponds discharges to adjacent marsh areas. The discharge also occurs during periods when dredging is not being conducted. It should be noted that water was pumped from the sediment retention pond to Mayport Turning Basin during the 1993 and 1994 dredging events.

Water flowing into the sediment retention ponds during the various dredging events likely contained sediment (predominantly silts and clays). The silt and clay size particles from an estuarine environment are more likely to have adsorbed inorganic chemicals (Schropp and Windom, 1988).

It should be noted that dredging events conducted in 1993 and 1994 buried the locations sampled in 1992 beneath approximately 5 to 10 feet of dredge material. Therefore, it is proposed that surface water and sediment samples collected in 1992 be considered representative of chemicals that may be detected in the various layers of dredge material at the western and eastern dredge-material holding areas. This assumption suggests that the sediment in the western and eastern dredge-material holding areas could potentially contain chemicals that may result in adverse risk to an ecological receptor(s).

The sampling program at the western and eastern dredge-material holding areas will include collecting surface water and sediment samples from their respective sediment retention ponds. These sediment retention ponds are used to minimize the amount of sediment laden water discharging to the adjacent marsh areas. Additionally, sediment samples should be collected for toxicity (survival) testing using the appropriate benthic organism.

The samples collected in 1992, along with environmental samples collected from the sediment retention ponds should be utilized to assess whether or not there is a potential or actual release from SWMU 50. Additionally, some of the surface water and sediment sampling locations where toxicity (survival) testing was conducted for the assessment of the Group I landfills (SWMUs 2, 3, 4 and 5) should also be resampled to reevaluate whether or not the dredging event may have resulted in the mortalities observed.

Groundwater discharges directly to drainage ditches in the vicinity of the western and eastern dredge-material holding areas (ABB-ES, 1996); therefore, sampling ditches (surface water and sediment samples) in the vicinity of SWMU 50 and the Group I landfills (SWMUs 2, 3, 4, and 5) should provide a direct measure of chemicals being released to the environment. Groundwater sampling is not proposed.

Surface water and sediment contained within the western and eastern dredge-material holding areas are not proposed to be sampled. The basis for this is that the interior of the holding areas is in a constant state of flux as it transitions between each dredging event from a saltwater or brackish-water flat to a

grassy field. During this time, the concentrations of chemicals present in the sediment and those that leach to surface water are expected to change as the western and eastern dredge-material holding areas evolve through the various habitat successions. Additionally, the requirements for sampling of surface water and/or sediment within the western and eastern dredge-material holding areas should not be determined until the Navy decides how they will utilize the western and eastern dredge-material holding areas.

Based on the above rationale, 13 surface water, sediment, and toxicity (survival) testing sampling locations are proposed for SWMU 50 (Plate 1). The sampling locations will be used to assess whether or not there has been a release to the environment and to conduct the ecological risk assessment. Two of the 13 sampling locations will be at the western and eastern dredge-material holding area sediment retention ponds, MPT-50-SW/SD13 and MPT-50-SW/SD14, respectively. The other 11 sampling locations will be at drainage ditches located adjacent to the western and eastern dredge-material holding areas. The 11 locations are a subset of the toxicity (survival) testing samples collected in 1994 (ABB-ES, 1996).

The 11 sampling locations were selected to provide a current representative characterization of the area during a period when dredge materials were not being placed in the western and eastern dredge-material holding areas. A background sample is also to be collected from the same location utilized during the 1994 sampling event. The sediment sample will provide a current reference sample for the toxicity (survival) testing.

Three of the 11 surface water and sediment samples, MPT-2-SW/SD22, MPT-2-SW/SD23 and MPT-2-SW/SD26, will be collected from drainage ditches located along the southern boundary of the eastern dredge-material holding area. Four of the 11 surface water and sediment samples, MPT-2-SW/SD20, MPT-2-SW/SD28, MPT-2-SW/SD33, and MPT-2-SW/SD34, will be collected from drainage ditches located between the western and eastern dredge-material holding areas. Two of the 11 surface water and sediment samples, MPT-2-SW/SD31 and MPT-2-SW/SD39, will be collected from a drainage ditch located on the northwest side of SWMU 4. Two samples, MPT-2-SW/SD37 and MPT-2-SW/SD38, will be collected from drainage ditches located along the southeast and northwest boundary of the western dredge-material holding area.

Sampling location MPT-B-SW/SD05 will be collected as a toxicity (survival) testing reference sample. The background sampling location is not provided on Plate 1, but is located approximately 600 feet southeast of the western dredge-material holding area on the south side of Sherman Creek. The location of this sample is provided on Plate 1 of the NAVSTA Mayport GIR (ABB-ES, 1995a).

The environmental samples will be analyzed for target analytes selected from the groundwater monitoring list contained in Appendix IX, 40 CFR, Part 264, and USEPA CLP target compound list and target analyte list, including VOCs, SVOCs, pesticides, PCBs, and metals (Table 1). Toxicity testing of benthic organisms (survival of *Hyalella azteca* in freshwater and *Ampelicsa abdita* in marine or estuarine water) will also be conducted using sediment samples collected from the four locations. The benthic species used will be based on results of surface water quality indicator parameters.

Environmental Sample Laboratory Analysis and Data Validation. Environmental samples will be placed in a cooler, refrigerated with ice, and sent overnight under chain-of-custody protocol to an offsite laboratory for analysis. The environmental samples will be analyzed using SW-846 methodology (USEPA, 1986) for analysis of VOCs, SVOCs, polynuclear aromatic hydrocarbons, pesticides, and metals. The laboratory program for the RFI at NAVSTA Mayport is described in more detail in Section

2.2 of the NAVSTA Mayport GIR (ABB-ES, 1995a). Analytical results obtained for this sampling event will be a Naval Energy and Environmental Support Activity (NEESA) Level C (USEPA Level III) package (NEESA, 1988).

After laboratory analysis, the data will be validated by conducting a technical review of individual analytical results relative to the following criteria:

- Data quality objectives (DQOs) and the Quality Assurance Project Plan (QAPP) in the NAVSTA Mayport RFI Workplan (ABB-ES, 1991)
- NEESA guidance document 20.2-047B, Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program (NEESA, 1988)
- Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (USEPA, 1988)
- National Functional Guidelines for Organic Data Review (USEPA, 1990)

The data validation process is described in Section 2.3 of the NAVSTA Mayport GIR (ABB-ES, 1995a).

After validation, the data will be reviewed, validated, and evaluated using the precision, accuracy, representativeness, comparability, and completeness criteria (PARCC) specified in the DQOs. PARCC criteria are described in Section 2.3 of the NAVSTA Mayport GIR (ABB-ES, 1995b).

Quality Assurance and Quality Control (QA/QC). QA/QC standards and procedures will comply with the approved QAPP and Site Specific Quality Assurance Plan contained in Appendix A and B, respectively, of the RFI Workplan, Volume II (ABB-ES, 1991). QC samples will be collected in accordance with Chapter 11.0 of the QAPP. Decontamination of field sampling equipment will be in accordance with Section 6.3 of the QAPP and the Technical Memorandum, Decontamination Procedures, located in Appendix D of the RFI Workplan, Volume II (ABB-ES, 1991). Sample handling and project documentation will be in accordance with Section 3.1 of the RFI and referenced sections of the QAPP. Laboratory QA/QC will be in accordance with the laboratory QAPP located in Appendix C of the RFI Workplan, Volume II (ABB-ES, 1991).

Health and Safety. Health and safety precautions will be followed in accordance with the general Health and Safety Plan located in Volume III of the NAVSTA Mayport RFI Workplan (ABB-ES, 1991).

Schedule. Sampling of SWMUs 4, 49, and 50 is scheduled to begin after August 5, 1996. The schedule assumes ready access to all sites and no delays due to securing access to the munitions bunker area (Plate 1).

If you have any questions, please call me at 904-656-1293.

Sincerely

ABB ENVIRONMENTAL SERVICES INC.

Francis K. Lesesne, P.G.
Principal Geologist

Terry J. Hansen, P.G.
Project Manager

Attachments:
Attachment A Figures
Attachment B Tables
Attachment C References

cc: Cheryl Mitchell, NAVSTA Mayport
Ms. Martha Berry, USEPA
Mr. Jim Cason, FDEP

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ATTACHMENT A

FIGURES

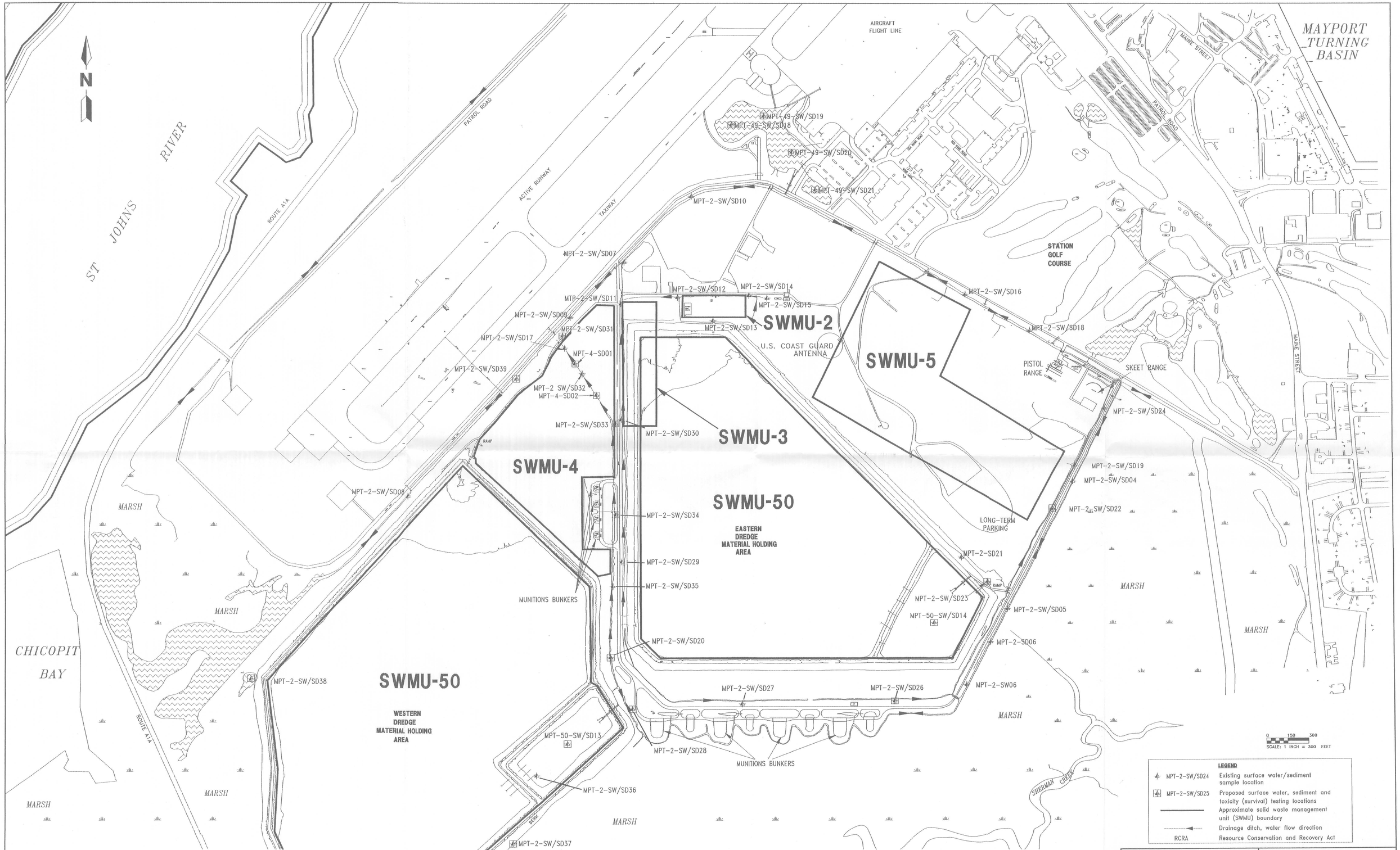

PLATE 1
PROPOSED SURFACE WATER AND SEDIMENT TOXICITY (SURVIVAL) TESTING SAMPLE LOCATIONS AT GROUP I SWMUs

SAMPLING AND ANALYSIS PLAN
GROUP I SWMUs

U.S. NAVAL STATION
MAYPORT, FLORIDA

ATTACHMENT B

TABLES

Table 1
Environmental Samples to be Collected at SWMU 4, Landfill; SWMU 50, Dredge-Material Holding Area; and SWMU 49, the Flightline Retention Pond

Group I Solid Waste Management Units
U.S. Naval Station
Mayport, Florida

Proposed Sample Designation	Analytical Methods[1]				Sediment Sample Depth[2] (feet)	Comment
	Appendix IX (SW/SD)	Benthic Toxicity	Water Quality	TCLP		
MPT-B-SW/SD05	1/1	1	1	0	0 to 1	Proposed Background Sample
MPT-4-SD01	0/1	--	--	[3]1	1 to 2	Interim Measure for SWMU 4
MPT-4-SD01	0/1	--	--	[3]1	3 to 4	Interim Measure for SWMU 4
MPT-4-SD02	0/1	--	--	[3]1	0 to 1	Interim Measure for SWMU 4
MPT-4-SD02	0/1	--	--	[3]1	3 to 4	Interim Measure for SWMU 4
MPT-49-SW/SD18 through MPT-49-SW/SD21	4/4	4	4	0	0 to 1	Proposed SWMU 49 Samples
MPT-50-SW/SD13	1/1	1	1	--	0 to 1	West Dredge-Material Holding Area (DMHA)
MPT-50-SW/SD14	1/1	1	1	--	0 to 1	East DMHA
MPT-2-SW/SD22	1/1	1	1	--	0 to 1	Ditch south of the Eastern DMHA
MPT-2-SW/SD23	1/1	1	1	--	0 to 1	Ditch south of the Eastern DMHA
MPT-2-SW/SD26	1/1	1	1	--	0 to 1	Ditch south of the Eastern DMHA
MPT-2-SW/SD20	1/1	1	1	--	0 to 1	Ditch between Western and Eastern DMHAs
MPT-2-SW/SD28	1/1	1	1	--	0 to 1	Ditch between Western and Eastern DMHAs
MPT-2-SW/SD33	1/1	1	1	--	0 to 1	Ditch between Western and Eastern DMHAs
MPT-2-SW/SD34	1/1	1	1	--	0 to 1	Ditch between Western and Eastern DMHAs
MPT-2-SW/SD31	1/1	1	1	--	0 to 1	Ditch northwest of SWMU 4
MPT-2-SW/SD39	1/1	1	1	--	0 to 1	Ditch northwest of SWMU 4
MPT-2-SW/SD37	1/1	1	1	--	0 to 1	Ditch southeast of Western DMHAs
MPT-2-SW/SD38	1/1	1	1	--	0 to 1	Ditch northwest of Western DMHAs
Equipment Rinsate	1/1	--	--	--	N/A	Quality Control Samples
Duplicate, Matrix Spike and Matrix Spike Duplicate	5/5	--	--	--	TBD	Quality Control Samples
Total Samples	24/28	18	18	1		

See notes at end of table.

Table 1 (Continued)
Environmental Samples to be Collected at SWMU 4, Landfill; SWMU 50,y Dredge-Material Holding Area; and SWMU 49, the Flightline Retention Pond

Group I Solid Waste Management Units
U.S. Naval Station
Mayport, Florida

[1] Analysis of environmental samples using SW-846 methodology (USEPA, 1986).
[2] Sampling depth interval below the surface water and sediment interface.
[3] The sample containing the highest concentrations of inorganic chemicals will be selected for analysis.

Appendix IX, volatile organic compounds analysis by U.S. Environmental Protection Agency (USEPA) Method 8240; semivolatile organic compounds analysis by USEPA Method 8270; organochlorine pesticides and polychlorinated biphenyls analysis by USEPA Method 8080; and metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, and zinc) analysis by USEPA Methods 6000 and 7000.

Notes: SWMU = Solid Waste Management Unit.
SW/SD = surface water and sediment samples, respectively.
Benthic Toxicity = benthic organism survival testing over a 14-day period using *Hyalella azteca* for freshwater and *Ampelisca abdita* for marine or estuarine water.
Water Quality = Alkalinity (reported as $CaCO_3$), ammonia (reported as nitrogen), chloride, hardness (reported as $CaCO^3$), phosphorous, sulfate, sulfide, total dissolved solids, total kjeldahl nitrogen, total organic carbon, color, and pH.
TCLP = toxicity characteristic leaching procedure.
-- = Analytical method not being conducted.
N/A = Sampling depth not applicable, sample is a liquid quality control sample.
TBD = Sampling depth to be determined in the field at the time of sampling.

ATTACHMENT C

REFERENCES

REFERENCES

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7/11/96

Sampling Analysis Plan
Im
SWMUs 4, 49 and 50

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