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FAX, 20 Sheets
Environmental Quality Division
Atlantic Division, Naval Facilities Engineering Command

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Date:	**28 Apr 95**		

Tom,

As we discussed yesterday, LANTDIV's comments to the Draft RFI Project Plans conducted under CTO-0223.

Thanks,
Art

1.0 INTRODUCTION

This Project Management Plan has been prepared by Baker Environmental, Inc. (Baker) for the Atlantic Division (LANTDIV) as Naval Facilities Engineering Command Contract Task Order (CTO) 0223 under the LANTDIV Comprehensive Long-Term Environmental Action Navy Program (Navy CLEAN), Contract Number N62470-89-D-4814.

In November, 1984, Congress passed the Hazardous and Solid Waste Amendments (HSWA) to the 1976 Resource Conservation and Recovery Act (RCRA). One provision of these amendments specifically addresses corrective action for continuing releases from hazardous waste treatment, storage or disposal facilities. Under this provision, any facility applying for a RCRA Part B permit will be subject to an assessment by the regulatory agency when the application is submitted. If any solid waste management unit (SWMU) or area of concern (AOC) is suspected to be the source of a contaminant release to the environment, the owner or operator of the facility may be required to perform a RCRA Facility Investigation (RFI) to define the nature and extent of the release. This information will be used to determine the need for corrective measures and to aid in their formulation and implementation (USEPA, 1986).

A Final RCRA Part B permit has been issued by USEPA Region II to Naval Station Roosevelt Roads (NSRR). This permit contains requirements for RFI activities at 22 SWMUs and 2 AOCs. These SWMUs and AOCs are presented in Table 1-1. RFI activities at these SWMUs/AOCs will include soil, groundwater, and surface water/sediment investigations as appropriate and as directed by the permit.

This Project Management Plan provides the technical approach and scope of the RFI for NSRR, the overall schedule of the identified tasks, and the project management team to be utilized in accomplishing the objectives of the RFI.

This Project Management Plan is one of five project plans associated with the RFI. Other RFI project plans include:

- Data Collection Quality Assurance Plan (DCQAP)
- Data Management Plan (DMP)

for each SWMU/AOC is presented in Section 4.0 (Data Collection Strategy and Requirements) of the DCQAP.

2.2.1 Soil Investigations

Soil investigations will be conducted to assess whether releases of hazardous waste or hazardous constituents have occurred and, if so, to identify the source and extent of contaminants in the soil at the SWMUs/AOC. The potential for migration of contaminants in the soil or to other media (groundwater, surface water/sediment) will be evaluated. The investigations will involve collection of surface and subsurface soil samples and submission of the samples for laboratory analysis. Analytical parameters will be dependent on the operational history of each SWMU/AOC and other available information which may provide evidence regarding potential contaminants.

2.2.2 Groundwater Investigations

Groundwater investigations will be conducted as required to assess whether releases of hazardous waste or hazardous constituents to groundwater have occurred and, if so, to identify the source and extent of contaminants in the groundwater. These investigations will involve collection of groundwater samples from existing or newly-installed monitoring wells. Analytical parameters will be dependent on the operational history of each SWMU/AOC and other available information which may provide evidence regarding potential contaminants.

2.2.3 Surface Water/Sediment Investigations

Surface water/sediment investigations will be conducted to assess whether releases of hazardous water or hazardous constituents to surface water/sediments have occurred and, if so, to identify the source and extent of contaminants in the surface water/sediment at the SWMUs and AOC. The investigation will include collection of surface water and sediment samples. Analytical parameters will be dependent on the operational history of each SWMU/AOC and other available information which may provide evidence regarding potential contaminants.

3.0 DESCRIPTION OF CURRENT CONDITIONS

This section contains information regarding facility background, previous investigations, and the nature and extent of contamination of SWMUs/AOC. This information was originally submitted in the Pre-Investigation Corrective Measures Screening Evaluation Report (Baker, 1994). It is included in the Project Management Plan in order to fulfill the requirements listed in the Draft Corrective Action Permit, Section III, of Appendix A.

Permit is now final

3.1 Facility Background

This facility background section includes a description of the NSRR facility, a summary of the general physical setting, and descriptions of the individual SWMUs/AOC included in this RFI.

3.1.1 Description of the Facility

NSRR occupies part of the northern side of the east coast of Puerto Rico, along Vieques Passage with Vieques Island lying to the east about 10 miles off the harbor entrance. Figure 3-1 is a facility map depicting SWMU/AOC locations. The north entrance to NSRR is about 35 miles east along the coast road (Route 3) from San Juan. The closest large town is Fajardo (population about 37,000), which is about 10 miles north of NSRR off Route 3. Ceiba (population about 17,000) adjoins the west boundary of NSRR.

The NSRR occupies over 33,500 acres, with some of the holdings being prepared for release to the Commonwealth of Puerto Rico. NSRR has administrative and command responsibilities for some operations separated from the main base on Vieques Island.

NSRR was commissioned in 1943 as a Naval Operating Base, and finally redesignated a naval station in 1957. The primary mission of NSRR today is provision of full support for Atlantic Fleet weapons training and development activities.

- Confirmation Study
- RCRA Facility Assessment (RFA)
- RI/FS at Site 15 (SWMU 10)
- RI/FS at Site 16 (SWMUs 11 and 45)
- Supplemental Investigation
- Summary and Technical Evaluation Review of Work Performed at SWMUs/AOC (RFA Reinspection)

Each of these investigations is discussed below.

3.1.3.1 Initial Assessment Study (IAS)

As part of a Navy-wide program to manage past disposal sites through the NACIP initiated in September 1980, NSRR was designated for an Initial Assessment Study (IAS) of its environment in March 1982 by the Naval Energy and Environmental Support Activity (NEESA), Port Hueneme, California.

Is there a table that shows these 16 sites ?

The IAS was conducted in 1983 and 1984 by Greenleaf/Telesca Planners, Engineers, Architects (Miami, Florida) and by Ecology and Environment (Buffalo, New York). The IAS consisted of a records search at various government agencies, national and regional archives, and USGS; an on site survey; and personnel interviews. The study identified 16 sites that warranted further study under the NACIP Program.

3.1.3.2 Confirmation Study (CS)

In May 1986, the CS was performed by Environmental Science and Engineering (ESE) of Gainesville, Florida. Fifteen (15) of the 16 potentially contaminated sites identified in the IAS were investigated as part of this study; the last site had been cleaned up prior to this study. Two rounds of samples were collected from these sites by ESE. The Confirmation Study Report was completed by April 1988 and indicated that 14 sites required additional effort under the NACIP program.

3.1.3.3 RCRA Facility Assessment (RFA)

A RFA was conducted at NSRR in 1988 by A.T. Kearney, Inc. (Alexandria, Virginia) for the USEPA to identify SWMUs and AOC and assess the potential for release of hazardous wastes and hazardous constituents from these units to the environment. The description of SWMUs and AOC and the assessment of potential for release was based upon a Preliminary Review (PR) of existing information and a VSI of the facility. The primary source of existing information was the Region II office of the Environmental Protection Agency in New York City, New York. The VSI was conducted August 15 through 22, 1988.

Roosevelt Roads covers an area greater than 33,500 acres and provides general support for numerous tenant activities. Those SWMUs and AOC identified in this report were concluded to be representative of waste management activities at NSRR. Areas (including process areas, storage facilities, etc.) not observed during the VSI were situated indoors (i.e., fully enclosed) which prevents any possible releases to environmental pathways, and/or had no documented release to the environment.

Further actions were suggested at 25 of the 47 SWMUs and 4 AOCs. Suggested further actions included soil sampling, groundwater investigations, surface water, and sediment sampling, verification of unit integrity, requests for additional information, and suggestions of better facility management.

3.1.3.4 Remedial Investigation/Feasibility Study (RI/FS) at IR Site 15 (SWMU 10)

An RI/FS was conducted at IR Site 15 by Versar, Inc. (Versar) in 1992. Versar performed the RI/FS to develop viable remedial alternatives for known polychlorinated biphenyl-contaminated (PCB-contaminated) soil at IR Site 15. This RI/FS was performed according to criteria in the National Contingency Plan (NCP) and guidelines stipulated by the U.S. Environmental Protection Agency (USEPA) in RI/FS guidance documents.

IR Site 1 (Quebrada Disposal Site) and IR Site 2 (Mangrove Disposal Site) are both located on Vieques Island. These sites were investigated as part of the Supplemental Investigation; however, the sites are regulated under CERCLA and therefore are not included in the Draft RCRA Part B Permit, Corrective Action Module III. Therefore, no further discussion will be included on these sites.

The Supplemental Investigation included the following activities:

- Photo-interpretation and map analysis
- Geophysical investigation
- Wellhead tests
- Soil sampling and analysis
- Groundwater sampling and analysis
- Surface water/sediment sampling and analysis
- Quantitative risk assessment

The analytical sequences for each matrix, regardless of site, included VOC - volatile organic compounds of the Target Compound List (TCL); SVOC - semivolatile organic compounds of the TCL; P/PCB - pesticide and polychlorinated biphenyl compounds of the TCL; Target Analyte List (TAL) - metals and cyanide. Quality control of analyses was specified at NEESA Level D, equivalent to CLP procedures at EPA Level 4.

3.1.3.7 Summary and Technical Review of Work Performed at SWMUs/AOC Report

TRC Environmental Corporation (TRC) prepared this report for USEPA in 1993 to assess the investigation and/or remedial work done on the 51 SWMUs and AOC at NSRR. This has been referred to as the RFA reinspection. This included a review of all available technical documents presenting the remedial investigation and corrective measures conducted at the facility and a site visit (conducted June 1-4, 1993).

3.2.2 SWMU 2 - Langley Drive Disposal Site

The Langley Disposal Site, which is located along Langley Drive approximately 2,000 feet north of the Navy Exchange Complex and 300 feet east of the drive towards Ensenada Honda, operated as a landfill from approximately 1939 to 1959 (NEESA, 1984). The Navy documents this unit as having been used for the disposal of both hazardous and nonhazardous wastes (A.T. Kearney, Inc., 1988). A site map for this SWMU is presented on Figure 3-3.

In 1984, the IAS team performed a site inspection. During the inspection, the IAS team observed partially buried metal and concrete objects, old fuel lines, flexible metal hoses, small containers containing pellets, steel cables, hardened tar, rubble, and ten to fifteen 55 gallon drums that were corroded. The drum contents, generally consisting of a whitish solid with a green outer crust, were exposed (NEESA, 1984). The IAS team estimated the volume of disposed waste to be approximately 1,700 cubic yards, of which approximately 20,000 pounds could be hazardous material.

In 1988, ESE produced a report that evaluated data from two rounds of sampling. Thirty-two soil samples, six sediment, six surface water and one groundwater sample were collected during the two rounds of sampling. Elevated levels of lead were found in some soil samples (Technical Review Committee Meeting Minutes, 1989). During Round 2, two soil samples were analyzed for EP Toxicity for lead only. The results of these analyses indicated that the soil samples did not exhibit sufficient levels of lead in the extract to be classified as hazardous waste. Elevated levels of total chromium, copper and selenium were detected in surface water samples (Technical Review Committee Meeting Minutes, 1989). Table 3-4 presents a summary of analytical results from ESE report.

In 1988, a RFA was performed at this site. The VSI team observed a dump site covering an area of approximately 40 feet x 150 feet. Within the perimeter were lengths of thick cable, broken concrete blocks, ringed metal hoses, and six severely corroded drums. At least one of the drums was filled with a white, damp chalky substance (A.T. Kearney, Inc., 1988).

A total of 16 soil samples and one groundwater sample were collected at this SWMU during the Supplemental Investigation (Baker, 1993). Organic contaminants were detected in each media. The results of a risk assessment conducted as part of the Supplemental Investigation indicate that there

is no threat to human health or the environment associated with these media. A summary of the analytical results is presented on Table 3-5.

Dense vegetation prevented a detailed inspection during the 1993 RFA reinspection (TRC, 1993).

3.2.3 SWMU 3 - Base Landfill

The Base Landfill (IR Site 7) is located south of the Industrial Area Wastewater Plant (Building 1758) and has operated since the early 1960s. The landfill is still operating and accepting wastes in accordance with the Puerto Rico Environmental Quality Board (EQB) regulations.

The landfill covers 85 acres, and is separated into several different disposal areas (A.T. Kearney, Inc., 1988). A site map of this SWMU is presented on Figure 3-4.

Based on the limited amount of information that exists with regard to the landfill, discrete areas were identified in the IAS as disposal areas. Some of these "areas" are undetectable from the ground. Methods of disposal involved the excavation of a trench to the water table, filling the trench with waste, spreading and compacting the waste with a bulldozer, then covering the waste with soil. It is estimated that from 40 to 60 tons of waste per day were disposed of in the past (A.T. Kearney, Inc., 1988). Wastes that were disposed of at this SWMU include, residential wastes, scrap metal, cables, paint waste, solvents, PCBs, OTTO Fuel II, Agentine, Askarel, pesticides, lubricating oil, unlabeled 55-gallon drums, dead animals, inert ordnance, digested sludge, construction debris, asbestos, and possibly Super Tropical Bleach (STB), a decontaminating agent (NEESA, 1984).

(what type of decontamination

In 1988, ESE produced a report evaluating two rounds of verification sampling and analysis. Eight groundwater monitoring wells were installed, and samples of groundwater were collected and analyzed from each well. In addition, three composite soil samples were collected from the drum ditch (ESE 1988). The ESE report indicates that only low levels of oil and grease were detected in the soil samples. The report also indicated that low levels of organic compounds, as well as metals concentrations exceeding drinking water criteria were detected in the groundwater samples collected during both rounds of sampling (ESE 1988). Table 3-6 presents a summary of the analytical results.

or not commercially available for testing or destroying PCB solid waste; or technology potentially applicable, but requires a successful laboratory or pilot field tests to demonstrate viability.

The remedial technology Versar recommended for Site 15 was Alternative B - soil excavation, shipment, and off-site landfill.

3.2.7 SWMU 11 - Old Power Plant/Building 38

According to the 1984 RFA report, Building 38 was a 60-megawatt steam turbine facility that generated power from the early 1940s through 1949. The facility used Bunker C fuel, which was stored in two 50,000-gallon reinforced concrete tanks located directly northwest of the building. (NEESA, 1984). In 1979, Bunker C fuel was observed in manholes near Building 38 during heavy rainfalls. Bunker C fuel was also discharged to the Enlisted Beach through the old cooling water outlet for the Power Plant (NEESA, 1984). A site map of this SWMU is presented on Figure 3-8.

In 1988, ESE collected 38 soil samples from the site (9 in Round 1 and 29 in Round 2). These samples were analyzed for PCBs, oil and grease, volatile organic compounds (VOC), ethylene dibromide (EDB), xylenes, methyl ethyl ketone (MEK), and methyl isobutyl ketone (MIBK). In Round 2, an EP toxicity test for lead was completed. The analytical results indicated the presence of PCB and lead contamination at the site. Lead concentrations were less than the EP toxicity standard for lead. Other constituents detected, but not at levels of concern, were MEK as well as oil and grease (Technical Review Committee Meeting Minutes, 1989).

The 1988 RFA report states that this SWMU is TSCA regulated. This was told to the VSI team by a facility representative. Located inside Building 38 is a cyclone fence which surrounds a curbed 8-inch concrete pad. PCB-contaminated items (e.g., old transformers and full 55-gallon drums) are temporarily stored on the concrete pad inside the cyclone fence (A.T. Kearney, Inc., 1988). A Defense Reutilization and Marketing Office (DRMO) contractor disposes these items. The VSI team observed drums that they believed to contain PCB contaminated soil outside the cyclone fence. The VSI team also observed oil contaminated sorbent inside the fence on the concrete pad (NEESA, 1984). A facility representative told the VSI team that the oil spill inside the fence was from a non-PCB transformer (<50 ppm PCBs) and that laboratory results were pending regarding the contents of the drums located outside of the fence (NEESA, 1984).

The RI determined that concrete surfaces, and sediment and soil surrounding the immediate area of the Old Power Plant and the transformer pads were contaminated with PCBs at concentrations exceeding ARARs. Additionally, surface water and wipe samples collected from the cooling water tunnel and underground storage tank manways clearly indicate that these areas were contaminated with PCBs and required further investigation as separate operable units. The depth of contamination is at least 1 foot; however, the presence of coral at a depth of 1 foot prevented deeper sampling at that time. The RI/FS focused on the soil/sediment operable unit. An estimated 986 cubic yards of soil/sediment were reported to require remediation; 20,000 square feet of concrete were reported to require remediation.

The FS for Site 16 identified three remedial alternatives that survived screening for all nine CERCLA criteria for evaluating and selecting remedial alternatives: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; cost; local government acceptance; and community acceptance. Those alternatives that survived screening are: Alternative A - soil excavation, shipment, and off-site incineration; Alternative B - soil excavation, shipment, and off-site landfill, and Alternative C - soil excavation and on site incineration.

Other alternatives were eliminated from consideration for the following reasons: technology not proven at or near full scale; technology not feasible; technology not applicable, not demonstrated, or not commercially available for testing or destroying PCB solid waste; or technology potentially applicable, but requires a successful laboratory or pilot field tests to demonstrate viability.

The remedial technology Versar recommended for Site 16 was Alternative B - soil excavation, shipment, and off-site landfill. Currently, soils outside Building 38 are being remediated. Further remediation of this media is contingent upon the results of the IRP.

Seven surface water and six sediment samples were collected from this SWMU during the Supplemental Investigation (Baker, 1993). Organic contaminants were detected in both media.

The 1993 RFA reinspection indicated conditions within the building were similar to those seen in 1988 (TRC, 1993).

4.0 SCHEDULE

The purpose of this section is to present project schedules for the seven Operable Units at the Activity. These schedules will be adjusted annually as necessary.

Those SWMUs included in Operable Unit 1 are presented on Table 4-1. Operable Unit 2 includes SWMUs 7, 8, and 9. SWMUs 11 and 45 are included in Operable Unit 3. The Base Landfill comprises Operable Unit 4. Operable Unit 5 includes SWMUs 1 and 2. AOC B - Building 25 comprises Operable Unit 6 and Operable Unit 7 is comprised of AOC D Ensenada Honda sediments.

The project schedules are depicted on Figures 4-2 through 4-5.

How were the operable units divided? by contamination? by media? by area?

TABLE 4-1

SWMUs COMPRISING OPERABLE UNIT 1

SWMU	Name
6	Building 145
12	Fire Training Pit Oil/Water Separator
13	Old Pest Control Shop/Building 258
14	Fire Training Pit Area
23	Oil Spill Separator Tanks
24	Oil Spill Oil/Water Separator and Adjoining Pad
25	DRMO Storage Yard
26	Building 544 Area
29	Industrial Area Wastewater Plant
30	Former Incinerator Area
31	Waste Oil Collection Area/Buildings 31 and 2022
32	PWD Storage Yard/Battery Collection Area/ Building 31
33	AIMD Storage Pad/Building 379
37	Waste Oil Storage Area/Building 200
41	Seabee Pesticide Rinse Rack
46	Pole Storage Yard Covered Pad
50	Storage Area Behind Building 6166
51	New AIMD Storage Pad/Building 379
52	Drum Storage Pad Near Building 3158
55	Area of Concern C

This table requires updating. Remove SWMUs and include #39.

Add SWMU #39

Delete others

- Project Organization
- Sample and Document Custody
- Calibration Procedures and Frequency
- Analytical Procedures
- Data Reduction, Validation, and Reporting
- Internal QC Checks
- Performance and System Audits
- Preventative Maintenance
- Data Measurement Assessment Procedure
- Corrective Action
- Quality Assurance Reporting Procedures

Established PQLs, MDLs, IRL's

3.0 SWMU/AOC STATUS

This section presents a summary of SWMU/AOC status with respect to existing information. A detailed description of the previous investigations which generated this information is presented in Section 3.0 of the Project Management Plan. It also includes a discussion of media requiring corrective measures (if any) at each SWMU/AOC.

3.1 First Phase RFI SWMUs/AOCs

There are a number of SWMUs/AOCs at NSRR that, according to the RCRA Corrective Action Permit, will require a first phase RFI. These SWMUs/AOCs are listed on Table 3-1. They were selected for first phase RFI due to the limited information regarding possible releases at these sites.

First phase RFIs are limited to sampling and analysis of certain environmental media, primarily soil. The purpose of the first phase RFI is to assess whether there have been releases from these SWMUs/AOCs. The first phase RFI differs from a full RFI in the extent and degree of investigations required. Pending the results of the first phase RFI, a full RFI may be required for the SWMUs/AOCs listed in Table 3-1.

3.2 SWMU 1 - Army Cremator Disposal Site (IR Site 5)

3.2.1 Site Status

The RCRA Corrective Action Permit has identified this SWMU as requiring a full RFI including soil, groundwater, and surface water/sediment samples. Soil and groundwater samples were collected from this SWMU during the Supplemental Investigation. The sample analytical results indicate the following:

what is the comparison?

Groundwater

Volatile organic compounds (VOCs) were not detected. Semivolatile organic compounds (SVOCs) data do not indicate significantly high concentrations. Pesticides were found as a trace concentration

of heptachlor. Inorganic cations of the Target Analyte List (TAL) in the dissolved fraction (the part of the sample relevant to groundwater transport and to consumption of groundwater) are in the range expected to be seen in groundwaters occupying shoreline deposits developed from a ferromanganous, igneous rock.

Soil

VOCs were found in trace to moderate concentrations (acetone, carbon disulfide and methylene chloride) in all samples from the disposal area; the highest concentrations (station 05SS104 with samples 05SS133 and 05SS134) were found near the disposal trenches identified in the aerial photographs, by the geophysical survey and by inspection of the ground. Acetone, carbon disulfide and methylene chloride are common laboratory contaminants. SVOC data do not indicate significantly high concentrations. Pesticides were found in trace to high concentrations; the highest concentration (4,4'-DDT) was found at one station (05SS103 with samples 05SS130 and 05SS131) sited in a disposal trench. Inorganic cations of the TAL are in the range expected to be seen in unconsolidated material developed from a ferromanganous, igneous rock.

3.2.2 Media Potentially Requiring Corrective Measures

In accordance with the RCRA Corrective Action Permit (Module III, Section A.4, page 23) results of the Supplemental Investigation can be used to satisfy RFI requirements for this SWMU. The results of these analyses indicate the following:

- Soil at this SWMU has been adequately characterized. Twenty-one soil samples were collected. Laboratory analytical results indicate that there is no risk to human health or the environment associated with this media.

- Groundwater at this SWMU has not been adequately characterized. One groundwater sample was collected. A trace level of heptachlor (0.0032J) was the only organic contaminant detected in this sample. Additional groundwater samples will be required to fully characterize this media.

6.0 PROJECT ORGANIZATION

Key personnel responsible for quality assurance throughout the duration of the RFI are identified below. Subcontractors will be used to perform laboratory analysis, data validation, drilling and monitoring well installation, and surveying. Specific subcontractors have not yet been identified. Figure 4-1 shows the project organization, lines of authority, and support personnel/organizations. Resumes of key project personnel are provided as Appendix B.

The responsibilities of some key personnel are presented below:

- The Program Manager, Mr. John W. Mentz, has final responsibility and authority for all work performed under the project. He will manage the day-to-day operations of the entire contract and the Navy CLEAN Program Management Office. He will provide overall program direction, client contact, and quality assurance. From a quality perspective, the Program Manager is responsible for:

  - Ensuring, through an effective quality assurance program, that program and project direction is implemented and accomplished
  - Approving and funding the quality assurance program
  - Participating actively in the quality assurance process
  - Assisting the Quality Assurance Officers, as necessary

  Mr. Mentz is with Baker Environmental, Inc., Coraopolis, Pennsylvania and can be reached at (412) 269-2007.

- The Deputy Program Manager, Mr. Raymond P. Wattras will serve as the primary technical contact with responsibilities for budget and schedule control, project management, and health and safety issues. From a quality perspective, the Deputy Program Manager has responsibilities similar to those outlined above for the

Is this still true?

This five point calibration is performed daily or before each use for metals analysis by ICP. For metals analysis by AA, the five point calibration is performed whenever new calibration standards are prepared.

Method of Standard Addition ?

Correlation Coefficient Calculation

The data points of the blank and the five calibration standards are utilized to calculate the slope, the intercept, and the correlation coefficient of the best fit line. An acceptable correlation coefficient must be achieved before sample analysis may begin. An acceptable correlation coefficient is >0.997 for AA analyses and >0.9999 for ICP analysis.

Calibration Verification

The initial calibration curve is verified on each working day by the measurement of one mid-range calibration standard. For analysis by AA or ICP, the acceptance criterion for the recovery of the verification standards is ±15 percent of the expected recovery for all metal standards except for the standard for mercury. The acceptance criterion for the recovery of the mercury standard is ±20 percent of the expected recovery. When measurements exceed the control limits, the analysis is terminated, the problem corrected, the instrument recalibrated, and the calibration reverified.

8.2.4 System Calibration Procedure for Inorganic Analyses

This section outlines the requirements that are used for calibration of colorimetric systems for analyses of inorganic parameters. The following are performed in support of these requirements:

- Documentation of standard response
- Correlation coefficient monitoring

The system is initially calibrated with a blank and five calibration standards. Standard concentrations are one standard at a concentration near, but above, the MDL with additional concentrations corresponding to the expected range of concentrations found in actual samples.

11.0 INTERNAL QUALITY CONTROL CHECKS

11.1 Field Internal Quality Control Checks

Field internal quality control checks to be used during the RFI include field duplicates, equipment rinsates, field blanks, and trip blanks. A breakdown by type of sample with which the QA/QC samples will be submitted to the laboratories is given in Table 11-1.

Media	Trip Blanks	Equipment Rinsates	Field Blanks	Field Duplicates
Water	One per cooler containing VOAs	5 percent or one per day of sampling (~~analyze every other day~~)	One per source [1] per event	5 percent
Soil, Sediment, Wipe	One per cooler containing VOAs	5 percent or one per day of sampling (~~analyze every other day~~)	One per source [1] per event	5 percent

requirement was changed to every day

11.2 Types of QC Samples

Documentation of the analyses of the following types of QC samples is maintained in the laboratory bench notebooks and/or the specific client or project files.

Trip Blank

Analysis of trip blanks is performed to monitor possible contamination during shipment and collection of samples. Trip blanks are initiated in the laboratory prior to the shipping of sample packs. A corresponding trip blank is prepared for each set of samples to be analyzed for volatile organic compounds.

MS/MSD 20%

TABLE 11-2

QA/QC ANALYSIS FREQUENCY

Parameter	Replicate	Spike
Organic		
All analyses by GC	10%	10%
All analyses by GC/MS	10%	10%
Metals		
Liquids by flame AA or ICP	10%	10%
Solids by flame AA or ICP	10%	10%
All analyses by furnace AA	10%	10%
General Chemistry		
Cation Exchange Capacity	10%	10%
Oil and Grease	10%	10%
Total Organic Carbon	10%	10%
Total Petroleum Hydrocarbons	10%	10%

Surrogate Standards

Surrogate standard analysis is performed to monitor the preparation and analyses of samples. All samples and blanks analyzed by GC/MS are fortified with a surrogate spiking solution prior to extraction or purging.

Internal Standards

Internal standard analyses are performed to monitor system stability. Prior to injection or purging, internal standards are added to all blanks and samples analyzed by GC/MS.

11.3 Laboratory Control Limits

Control limits are established for QC checks (spikes, duplicates, blanks, etc.). CLP control limits for surrogate standards spikes, and duplicates associated with GC/MS analyses and Pesticide/PCB analyses are adopted. Control limits for spikes, duplicates, and reference samples are determined internally through statistical analysis.