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Northern and Central California, Nevada, and Utah
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Prepared for

DEPARTMENT OF THE NAVY
Naval Facilities Engineering Command
Southwest Division
San Diego, California

FINAL FIELD SAMPLING PLAN / QUALITY ASSURANCE PROJECT PLAN ADDENDUM ADDITIONAL POLYCHLORINATED BIPHENYL INVESTIGATION OF THE FORMER STORAGE YARD NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

November 14, 2001

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Prepared by

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FINAL
FIELD SAMPLING PLAN/ QUALITY ASSURANCE PROJECT PLAN FOR ADDITIONAL POLYCHLORINATED BIPHENYL INVESTIGATION OF THE FORMER STORAGE YARD

DATED 31 MAY 2001

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ACRONYMS AND ABBREVIATIONS

A2LA	American Association for Laboratory Accreditation
AOC	Area of concern
bgs	Below ground surface
°C	Degrees Celsius
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action Navy
CoC	Chain-of-custody
CPR	Cardiopulmonary Resuscitation
CTO	Contract task order
DHS	Department of Health Services
DQO	Data Quality Objective
EDD	Electronic data deliverable
EPA	U.S. Environmental Protection Agency
FDS	Field data sheet
FSP	Field sampling plan
FSY	Former storage yard
Geomatrix	Geomatrix Consultants, Inc.
GIS	Geographic information system
HEPA	High efficiency particulate arrestance
HRMS	High resolution gas chromatograph/mass spectrometer
HSP	Health and safety plan
IC	Installation coordinator
ID	Identification
IDL	Instrument detection limit
IDW	Investigation-derived waste
IR	Installation restoration
IT	International Technology Corporation
LCS	Laboratory control spike
LIMS	Laboratory information management system
L/min	Liter per minute
mg/kg	Milligrams/kilogram
MDL	Method detection limit
NAVSTA TI	Naval Station Treasure Island
NEDTS	Navy environmental data transfer standards
OSHA	Occupational safety and health administration
PAH	Polycyclic aromatic hydrocarbons

ACRONYMS AND ABBREVIATIONS (Continued)

PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	Polychlorinated biphenyl
PPE	Personal protective equipment
ppm	Parts per million
PRG	Preliminary remediation goal
PRRL	Project-required reporting limit
PUF	Polyurethane foam
QA/QC	Quality assurance and quality control
QAO	Quality assurance officer
QAPP	Quality assurance project plan
QCSR	Quality control summary report
RI	Remedial investigation
RPD	Relative percent difference
RPM	Remedial project manager
SDG	Sample delivery group
SOP	Standard operating procedure
SOW	Statement of work
SQL	Sample quantitation limit
SWDIV	Naval Facilities Engineering Command Southwest Division
TI	Treasure Island
TtEMI	Tetra Tech EM Inc.
YBI	Yerba Buena Island

1.0 PROJECT DESCRIPTION AND MANAGEMENT

Tetra Tech EM Inc. (TtEMI), formerly known as PRC Environmental Management, Inc., received Contract Task Order (CTO) 314 under Comprehensive Long-term Environmental Action Navy Contract No. N62474-94-D-7609 (CLEAN II) from the Department of the Navy (Navy), Naval Facilities Engineering Command, Southwest Division. The CTO entails additional characterization of the Former Storage Yard (FSY) adjacent to Installation Restoration (IR) Site 12 at Naval Station Treasure Island (NAVSTA TI) in San Francisco, California (Figure 1 of the original FSP/QAPP). This field sampling plan and quality assurance project plan (FSP/QAPP) addendum is a supplement to the "Final Field Sampling Plan / Quality Assurance Project Plan for Additional Polychlorinated Biphenyl Investigation of the Former Storage Yard, Naval Station Treasure Island" approved by the Navy on May 31, 2001. With the exception of the updated Table 8, all other tables, figures, and appendices referenced in this addendum refer to the original FSP/QAPP (TtEMI 2001). Only sections requiring changes are presented. Sections not requiring change are noted with "No change". This addendum was developed to guide additional characterization of PCBs in indoor air in the buildings surrounding Bigelow and Halyburton Courts at IR Site 12.

Table 1 of the original FSP/QAPP presents a comparison of the elements of a QAPP as specified in U.S. Environmental Protection Agency (EPA) QA/R-5 (EPA 1997) and the corresponding sections of the FSP/QAPP (TtEMI 2001) and this addendum.

1.1 PROBLEM DEFINITION AND BACKGROUND

This section describes the requirements for the following:

- Purpose of the Investigation (Section 1.1.1)
- Problem to be Solved (Section 1.1.2)
- Facility Background (Section 1.1.3)
- Site Description (Section 1.1.4)
- Physical Setting (Section 1.1.5)
- Summary of Previous Investigations (Section 1.1.6)
- Principal Decision Makers (Section 1.1.7)
- Technical or Regulatory Standards (Section 1.1.8)

1.1.1 Purpose of the Investigation

The purpose of this investigation is to evaluate whether polychlorinated biphenyls (PCBs) are present in indoor air due to potential vapor intrusion from soils beneath the buildings at concentrations that pose an unacceptable risk to human health. To achieve this goal, additional data on indoor air will be collected to supplement information obtained in October 2000, January 2001, and June 2001.

1.1.2 Problem To Be Solved

Previous investigations and confirmation sampling during a soil removal action indicate that it is very likely that PCBs remain in soil beneath buildings in the eastern portion of the FSY (Figure 1 of the original FSP/QAPP). It is possible that the levels of PCBs in the soils may be high enough to contribute to indoor air contamination within the buildings. PCBs were detected in indoor air in Building 1100 in Halyburton Court in October 2000. During that event and a subsequent event in January 2001, a limited number of buildings in Bigelow and Halyburton Courts were tested. Indoor air results for these other buildings indicated that PCBs are not present at detectable concentrations in indoor air. In December 2000, Geomatrix Consultants (Geomatrix) acting on behalf of the city of San Francisco conducted an additional round of sampling in a sub-set of units from the buildings surrounding Bigelow Court. Detected concentrations were found in all samples collected. In June 2001 the Navy collected samples from all of the units of Bigelow Court. Detected concentrations were found in the majority of the units tested. It is believed that during both the December 2000 and June 2001 sampling events anomalous results were obtained. A discussion of these anomalies is presented in Section 1.1.6. Because of this, additional data are needed to determine whether PCBs detected are in fact present. Once the presence of PCBs is determined, additional questions must be answered: are they at concentrations that pose an unacceptable risk to human health and what is the source (vapor or particulate) of the PCBs. Indoor air samples will be obtained from all units in Bigelow Court that exhibited PCB concentrations greater than 3.4 ng/m^3 (the preliminary remediation goal for PCBs in indoor air). After completing the investigation, the data generated will then be used to generate a risk assessment.

1.1.3 Facility Background

No Change.

1.1.4 Site Descriptions

No Change.

1.1.5 Physical Setting

No Change.

1.1.6 Summary of Previous Investigations

Previous investigations at the site have involved collection of soil and grab groundwater samples and studies of ambient air in buildings. These investigations are described in detail in the paragraphs that follow. During the initial investigation process, the preliminary remediation goal for residential soil (0.22 mg/kg) was used as a screening criterion. Once the focused PCB removal action began a screening level of 1 mg/kg was used.

Soil and Grab Groundwater Investigations

On October 18,1999, soil samples were collected at 17 locations in the FSY (KC-1 through KC-17, depicted in Figure 2 of the original FSP/QAPP) at depths of 0.5 to 1.0 foot bgs and 3.5 to 4.0 feet bgs. Samples were obtained with a Geoprobe® and were analyzed for a broad suite of constituents, as described in the sampling plan for the activity (TtEMI 1999b). Data obtained through that investigation indicated concentrations of polycyclic aromatic hydrocarbons (PAHs) and PCBs exceeding U.S. Environmental Protection Agency (EPA) preliminary remediation goals (PRGs) for residential soil, primarily in samples from the southeastern portion of the investigation area. Soil samples from four locations (KC-6, KC-8, KC-14, and KC-15) contained PCBs at concentrations higher than the PRG for residential soil. The highest concentration of Aroclor 1260, 48 mg/kg, was detected in a sample from location KC-8 collected at 3.5 to 4.0 feet bgs. The EPA PRG for Aroclor 1260 is 0.22 mg/kg. Samples from four locations (KC-5, KC-6, KC-9, and KC-12) contained concentrations of PAHs higher than the PRG; the highest concentration of benzo(a)pyrene, 7.2 mg/kg (EPA PRG 0.062 mg/kg), was detected in a sample from location KC-6 at 3.5 to 4.0 feet bgs. Additional data indicated that no further investigation was needed in the vicinity of location KC-12 and the area southwest of location KC-6.

On November 18 and 20, 1999, 23 locations were sampled (KC-18 through KC-40, depicted in Figure 2 of the original FSP/QAPP) to further define areas where concentrations of PCBs and PAHs are elevated. Concentrations of Aroclor 1260 in samples from four of the additional locations near the margins of the study area, KC-29, KC-31, KC-36, and KC-37, exceeded the residential soil PRG of 0.22 mg/kg.

Ten additional sampling locations (KC-41 to KC-50, depicted in Figure 2 of the original FSP/QAPP) were proposed to define the boundaries of contamination (PCBs in excess of the residential soil PRGs) in the FSY. The 10 locations were sampled on December 18, 1999. Results of that round of sampling showed that low levels of PAHs and PCBs are present at several of the locations. All concentrations of PCBs were below PRGs. Samples from two of the locations, KC-43 and KC-49, contained benzo(a)pyrene at concentrations above the PRG, at 0.062 and 0.11 mg/kg.

On May 1 and 2, 2000, 45 locations in the FSY (KC-51 through KC-95, depicted in Figure 2 of the original FSP/QAPP) were each sampled at three intervals: 0.5 to 1.0, 1.5 to 2.0, and 3.5 to 4.0 feet bgs. Four of the 45 locations were also sampled at 7.5 to 8.0 feet bgs, and a grab groundwater sample was collected at those four locations at 8 feet bgs. Samples from 31 of the 45 locations contained PCBs at concentrations above PRGs, and samples from two locations (KC-66 and KC-86, depicted in Figure 2 of the original FSP/QAPP) contained high levels of PAHs. Three of the four groundwater samples contained low levels of PCBs; the fourth was non-detect for PCBs.

On June 12, 2000, 18 additional locations in the FSY (KC-96 through KC-113, depicted in Figure 2) were each sampled at three intervals: 0.5 to 1.0, 1.5 to 2.0, and 3.5 to 4.0 feet bgs. Sample from four of the 18 locations contained PCBs at concentrations above the 1-mg/kg action level; all of these detects were in the 0.5- to 1.0-foot-bgs sample (KC-103, KC-106, KC-107, and KC-112, depicted in Figure 2 of the original FSP/QAPP).

IT completed a removal action in July and August 2000. All soil containing PCBs at levels in excess of the screening level of 1 milligram per kilogram (mg/kg) and where buildings or other structures such as transformer pads did not impede access was removed to 4 feet bgs (Figure 3 of the original FSP/QAPP). Soil was removed to the maximum extent possible without damaging the building foundations. Soil beneath each building was left in place to avoid damaging the buildings. During this removal action, the Navy collected confirmation samples from the sidewalls and floor of the excavation. Based on these sample results, it was determined that PCBs were left in place under buildings at concentrations that exceeded 1 mg/kg. Soil concentrations in sections of the sidewall near Building 1100 contained concentrations that exceeded 120 mg/kg.

The Johnson and Ettinger model for subsurface vapor intrusion into buildings (Environmental Quality Management, Inc. 1997) was used to screen potential concentrations of PCBs in indoor air on the basis of concentrations of PCBs in soil adjacent to buildings in the FSY. The Johnson and Ettinger model is a one-dimensional analytical solution that provides a conservative estimate of vapor concentrations indoors based on concentrations in soil. The model was applied to date for each building, using the highest PCB concentration detected in soils adjacent to each building.

The Johnson and Ettinger model estimated an excess cancer risk exceeding $1.0E^{-04}$ resulting from volatilization of PCBs for Building 1100 based on a concentration of 139 mg/kg of Aroclor 1260 directly below the slab foundation. 139 mg/kg is the soil saturation concentration for Aroclor 1260 as calculated by the Johnson Ettinger model. Estimated excess cancer risks were between $1.0E^{-04}$ and $1.0E^{-05}$ for Buildings 1102, 1110, 1104, and 1101. Estimated excess cancer risks were less than $1.0E^{-05}$ for the remaining buildings. Highly conservative default assumptions were used in the Johnson and Ettinger model. Therefore, because of the highly conservative default assumptions used, the results probably significantly overestimate the potential risk posed by vapor intrusion from volatilization of PCBs into the buildings. Based on the results of this model, indoor ambient air samples were collected to provide actual data on PCB concentrations in indoor ambient air.

Investigations of Indoor Ambient Air

In October 2000, eight samples of indoor ambient air and two outdoor ambient air samples were collected near Halyburton and Bigelow Courts in the FSY. One indoor air sample was collected from each of the six units in Building 1100 (Halyburton Court), the seventh and eighth samples were collected in Unit 1103-A and Unit 1103-B (Bigelow Ct.). Samples from the units in Building 1103 were collected for quality control purposes because Building 1103 is outside the area of PCB soil contamination. Outdoor ambient air samples were also collected outside of and near Buildings 1100 and 1103 (Figure 2 of the original FSP/QAPP). PCBs were detected in four units within Building 1100, with the highest concentrations in unit C (Table 2 of the original FSP/QAPP). These indoor air sampling results show remarkably good correlation with the soil sampling results; the highest concentration of PCBs in soils was detected adjacent to Building 1100-C. The majority of the detections were mono-chlorinated biphenyl congeners, which are generally expected to be more volatile than the more chlorinated PCB congeners.

In December 2000, Geomatrix Consultants Inc. (Geomatrix) on behalf of the City of San Francisco collected indoor air samples from the following units of buildings in Bigelow Court: 1101-A, 1101-B, 1103-A, 1105-G, 1105-H, 1107-B, and 1107-C, as well as unit 1100-C in Halyburton Court. One sample of outdoor air also was collected between Buildings 1101 and 1103. The results of this investigation indicate the presence of PCBs in all samples collected. The majority of the PCB congeners detected were not mono-chlorinated biphenyls, however, they were di- through penta-chlorinated biphenyls (CB) (Table 3 of the original FSP/QAPP). Only samples collected in Building 1100-C contained detectable concentrations of mono-chlorinated biphenyls. As this does not fit the conceptual site model, the validity of these results has come into question. After researching this anomaly further, Geomatrix discovered the following deviations from the sampling plan: proper cleaning of the sampling media was not performed, no trip blank was collected, and the sampling media was left unused for a period of 3 weeks after pre-spiking by the laboratory. This discovery, coupled with the detected concentrations in every sample, including samples collected in areas considered outside of the area of known soil contamination, and the specific congeners detected, brings this data set into question.

As a result of the Geomatrix findings, the Navy in January 2001 collected indoor ambient air samples from Units 1101-A, 1101-B, 1103-A, 1105-G, 1105-H, 1107-B, and 1107-C in Bigelow Court, along with Unit 1100C in Halyburton Court, and between Buildings 1100 and 1103, repeating the Geomatrix study.

The results of this study were nearly identical to the original Navy study of October 2000, showing detected concentrations of principally mono-chlorinated biphenyls only in samples collected at Building 1100 (Table 4 of the original FSP/QAPP).

At the request of regulatory agencies, in June 2001 the Navy collected samples from all units in Buildings 1101, 1103, 1105, and 1107 as well as Unit 1100 C in Halyburton Court. The results from this round showed detected concentrations in all units, outdoor air samples, and trip blanks. The majority of the PCB congeners detected were penta-CBs. During a review of the analytical procedures it was determined that the sampling media had not been pre-cleaned as requested. For this reason, the make-up of the PCBs detected in the four trip blanks was examined. It was determined that only a small percentage of the penta-CBs detected could be attributed to the uncleaned sampling media. The PCBs detected, though penta-CBs, were not the same PCBs as found to be the majority of the PCBs in the actual samples. A further confounding factor was the fact the outdoor air samples collected upwind of Bigelow Court and at the Northern edge of the island showed the highest concentrations of penta-CBs. Of the 34 units of Bigelow Court sampled, 17 exhibited concentrations greater than 3.4 ng/m^3.

The congeners detected consistently in unit 1100C, were primarily mono-chlorobiphenyls (MCB) with minor quantities of di-, tri-, and hexa-chlorobiphenyls. This is consistent with a conceptual site model in which the more volatile congeners are more likely to be present as vapors in air. Other congeners were also detected in samples collected from unit 1100C and other units; however the congener patterns are inconsistent with that conceptual site model, and were not consistent among different sampling events. Those results suggest the hypothesis that the inconsistent congener patterns represent artifacts of sampling, transportation, storage, analysis, etc. The purpose of this sampling is to gather additional data to evaluate that hypothesis.

1.1.7 Principal Decision Makers

No change.

1.1.8 Technical or Regulatory Standards

Regulatory action levels or cleanup goals have not been fully established for PCB congeners in indoor air at Treasure Island. Following EPA guidance, the appropriate PRG will be determined based on the congener make-up of all samples collected. Project-required reporting limits (PRRLs) are below the most conservative anticipated technical or regulatory standards (Table 6 of the original FSP/QAPP).

1.2 PROJECT AND TASK DESCRIPTION

The following subsections discuss the objectives and measurements of the project and contain a schedule of field activities.

1.2.1 Project Objectives and Description

As stated in Section 1.1.1, the primary objective of the additional investigation is to obtain indoor air data to allow a comparison to human health criteria for inhalation of PCBs from vapor intrusion. In order to meet this objective, the following field activities will be carried out:

- Indoor air samples will be collected from the following units: Building 1100 unit C, Building1101 units A, B, D, E, and F, Building 1103 units A, C, D, E, and F, Building 1105 units A, E, G, and H, and Building 1107 units B, C, D, and E. A total of 19 indoor air samples will be collected and analyzed for PCB congeners by EPA Method 1668. The same units will then be resampled within 1 week. Samples will be analyzed on a 2 week turn-around-time. Additional units of Bigelow and Halyburton Courts may be sampled based on the findings of this study.
- If PCBs are detected at concentrations exceeding 3.4 ng/m^3 a subset of these units will be rigorously cleaned and re-sampled to verify that the detections originated from vapor and not PCBs sorbed to particulate matter.
- Outdoor air samples will be collected from the center of Bigelow Court during the 24-hour period during which the buildings are left open, and during the 8-hour indoor air sampling events. An outdoor sample will also be collected from the berm behind Building 1123 during the 8-hour events.

1.2.2 Project Measurements

No Change.

1.3 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

The following sections present the data quality objectives (DQOs) identified for this additional investigation. The DQOs are summarized in Table 8.

1.3.1 Data Quality Objectives

No change.

1.3.1.1 Step 1 - State the Problem

Step 1 of the DQO process identifies the specific problems to be solved during the field activities. The overall problem to be addressed in this investigation is that PCBs are present in soil beneath some buildings at the FSY. Additional data are needed to evaluate whether the PCBs are migrating from the soil to indoor air in the buildings at concentrations that pose an unacceptable risk to human health.

1.3.1.2 Step 2 - Identify the Decisions

Step 2 of the DQO process identifies the decisions the investigation will attempt to make. The decisions were formulated based on the overall problem presented in Step 1. The decisions to be made are:

- Is the proper slope factor being applied to the PRG calculation?
- Are PCBs present in indoor air at concentrations that pose an unacceptable risk to human health and therefore not available for residential use?
- Are outdoor air PCB concentrations contributing to the indoor air results?
- If PCBs are present at detectable concentrations in indoor air, are they the result of vapor intrusion from the soil?

1.3.1.3 Step 3 - Identify Inputs to the Decisions

Step 3 of the DQO process describes the information needed to resolve the decision statements identified in Step 2. For this project, indoor and outdoor air samples will be collected for chemical analysis. The data for samples of indoor air will be compared to the appropriate PRG. PRRLs must be at levels that allow for comparison to screening criteria.

Other inputs to the decision include:

- Risk based screening criteria that have been accepted by all stakeholders
- Historical analytical results for soil and indoor air
- Risk assessment guidelines
- Validated, defensible data for PCBs in indoor air

1.3.1.4 Step 4 – Define the Study Boundaries

Step 4 of the DQO process describes the spatial and temporal boundaries of the proposed investigation. For this investigation, indoor air will be collected from 19 residential units. Sections 2.1 and 2.2 present a detailed sampling design and rationale, and Section 2.6 presents field procedures that will be used to obtain the data. The same 19 units will be resampled within 1 week. Volatilization of PCBs in the soil can be expected to increase with soil temperature. Therefore, the highest PCB concentrations in indoor air would be obtained when soil temperatures are highest. In order to obtain the most conservative results, an attempt will be made to collect the indoor air samples when soil temperatures are at the highest point during the sampling window.

1.3.1.5 Step 5 – Develop a Decision Rule

Step 5 integrates each study output into a single statement that describes the logical basis for choosing among alternative actions. Step 5 essentially delineates the consequences of results of the study. Decision rules are formulated as "if, then" statements, in which the outcome of the investigation provides direction for the next stage of problem resolution. For each decision identified in Step 2, a decision rule is presented in Step 5. These decision rules are:

- If the PCB congener pattern is consistent with the use of an alternate slope factor for the calculation of the PRG, the alternate slope factor will be used.
- If the results from each individual unit for all sampling events taken as a whole in a weight of evidence approach are below the PRG, then indoor air will not be considered a residential risk. The weight of evidence approach assigns more weight to samples collected during the November 2001 round where the sampling plan has been updated to limit possible interferences and will be stringently followed.
- If indoor air results are greater than the established PRG, then the concentration and congener pattern will be studied to determine whether outdoor ambient air can be considered as a likely source. If outdoor ambient air is considered the likely source of concentrations above the PRG, then indoor air will not be considered a residential risk.
- If indoor air results are greater than the established PRG and outdoor air is not considered the likely source, then additional action will be considered.

For example, if the results indicate that dust residues in the buildings may be the source of the PCBs measured in air, cleaning of the buildings and re-sampling of indoor air will be considered. If the buildings are cleaned and re-sampled and the results of the re-sampling are below the established PRG, then the source of the PCBs will be considered to have been from residual dust/particulate matter and indoor air will not be considered a barrier to residential use. Otherwise, if following cleaning, the PCBs are detected at concentrations that pose an unacceptable risk to human health, and outdoor air has been eliminated as a source, then further action will be considered.

After completing the investigation, the data generated will then be used to generate a risk assessment that will be used to determine if the buildings are suitable for residential use. Results will be discussed with the BCT.

1.3.1.6 Step 6 – Specify Limits on Decision Errors

Data from this investigation may be strongly indicative of site conditions, but not absolutely definitive; therefore, decisions based on the data could be in error. This is known as the decision error. This step discusses the limits on decision errors for this investigation.

Background

The following two types of errors are associated with data collection and may lead to decision error:

- **Sampling error** occurs because it is impossible for a sampling effort to measure conditions at every point of each unit or at every point in time. Sampling error occurs when the sample is not representative of true conditions of the environment at a site. Sampling error may be biased on the side of safety by selection of the "worst-case" scenario for location of sampling media.

- **Measurement error** occurs because of the random and systematic errors associated with sample collection, handling, preparation, analysis, data reduction, and data handling. Measurement error is minimized by close adherence to the sampling and analysis procedures outlined in Section 2.1.

These errors may lead to incorrect decisions or recommendations. In general, decision errors are controlled by adopting a scientific approach that minimizes the potential for decision errors through the use of hypothesis testing. EPA guidance (EPA 1994) suggests the following steps to identify and control decision errors:

- Define the possible range of the parameter of interest.
- Define both types of decision error and the consequences of each.
- Specify a range of values for parameters for which the consequences of decision errors are relatively minor.
- Check the limits on decision errors to ensure that they accurately reflect the decision-maker's concerns about the relative consequences for each type of decision error.

Hypothesis and Types of Decision Errors

Decision errors are evaluated through hypothesis testing. The general hypothesis used in this study will be as follows: the analytical methods selected are appropriate to evaluate whether PCBs are present in indoor air at levels that pose an unacceptable risk to human health within the area of investigation. There are two types of decision errors, as follows:

- **False negative error** occurs when the hypothesis is rejected when it is, in fact, true. In the case of this investigation, this error would occur when the decision-maker determines that PCBs are not present at levels that pose an unacceptable risk to human health based on the results of the analytical data, when in fact, PCBs are present at levels that pose an unacceptable risk to human health.
- **False positive error** occurs when the hypothesis is not rejected when it is false. In the case of this investigation, this error would occur when the decision-maker determines that PCBs are present at levels that pose an unacceptable risk to human health based on the results of the analytical data, when in fact, PCBs are not present at levels that pose an unacceptable risk to human health.

As a result of a false negative error, the potential human health risks of a unit will not be evaluated. As a result of a false positive error, unnecessary resources are spent through possible remedial alternatives.

Acceptable Error

Proposed sampling locations were selected for this investigation based on previous chemical data for soil. Because of this judgmental sampling approach, limits on decision errors cannot be specified. False positive and false negative error is minimized by adherence to selected sampling and analytical methods.

Details of the sampling and analysis methods are outlined Section 2.1.

1.3.1.7 Step 7 – Optimize the Design for Obtaining Data

Step 7 of the DQO process optimizes the sampling design based on current information. Because of the uncertainty inherent in the PCB contamination at the FSY, no units within the removal area of Halyburton and Bigelow Courts can be excluded from further study. For this investigation however, indoor air will be collected from the 19 residential units in which PCB concentrations have been previously detected at concentrations exceeding the residential PRG. This approach reflects a "worst-case" scenario for locating the sampling points within the FSY and within each individual unit. For indoor air sampling, an area with the greatest possibility of soil vapor intrusion was targeted. The plumbing enters the buildings through the slab in the first floor bathrooms and it is expected that this plumbing would provide a preferential pathway for soil vapor intrusion into the building. This bathroom is also centrally located and will yield the most conservative estimate of PCBs in indoor air.

1.3.2 Project Quality Assurance Objectives (PARCC Parameters)

No change.

1.4 PROJECT AND TASK ORGANIZATION

No change.

1.5 SPECIAL TRAINING AND CERTIFICATION

No change.

1.6 DOCUMENTS AND RECORDS

No change.

2.0 DATA GENERATION AND ACQUISITION

This section describes the requirements for the following:

- Sampling Process Design (Section 2.1)
- Sampling Methods (Section 2.2.)
- Sample Handling and Custody (Section 2.3)
- Analytical Methods (Section 2.4)
- Quality Control (Section 2.5)
- Equipment Testing, Inspection, and Maintenance (Section 2.6)
- Instrument Calibration and Frequency (Section 2.7)
- Inspection and Acceptance of Supplies and Consumables (Section 2.8)
- Non-direct Measurements (Section 2.9)
- Data Management (Section 2.10)

2.1 SAMPLING PROCESS DESIGN

The data for indoor air samples will provide the basis for a comparison to relevant risk-based levels for human health. The following subsections present the proposed sample locations, the analytical parameters, and a summary of the rationale for the selection of analytical parameters.

2.1.1 Sample Locations

Indoor Air

Results of the analysis of indoor air will be used as a basis for developing risk-based levels for human health. Two samples will be collected from each of the following units (Figure 4 of the original FSP/QAPP): Building 1100 unit C, Building1101 units A, B, D, E, and F, Building 1103 units A, C, D, E, and F, Building 1105 units A, E, G, and H, and Building 1107 units B, C, D, and E. The second sample will be collected within one week of the original. This investigation proposes that 38 indoor ambient air samples be collected in the units that surround Halyburton and Bigelow Courts and that 3 outdoor ambient air samples be collected daily from locations both within and outside of the FSY.

Four of the indoor air samples will be collected in triplicate with one sample being analyzed at a second laboratory. The units where samples are to be collected in triplicate are: 1100C, 1101D, 1101E, and 1105G.

Outdoor Air

Results of outdoor air analysis will be used to determine whether the ambient air is influencing the detected concentrations within the buildings. The concentration and congener pattern will both be used in this determination. One outdoor ambient air sample will be collected during the same 8-hour period as the indoor samples on each day of the indoor air sampling from the berm behind Building 1123 and from the center of Bigelow Court. One additional outdoor ambient air sample will be collected to encompass the entire 24-hour period during which the buildings are left open prior to sampling. The outdoor air samples will all be collected in duplicate. Any evaluation of outdoor air results will consider the location and time of sample collection.

2.1.2 Sample Analysis

No change.

2.1.3 Selection of and Rationale for Analytical Parameters

No change.

2.1.4 Building Cleaning

If results show PCB in air concentrations greater than the established PRG, an outside contractor will clean the interior of a subset of the buildings. This cleaning process will include vacuuming of the floors, windowsills, HVAC ducts, and countertops using high efficiency particulate arrestance (HEPA) filtration. The indoor air in these buildings will then be resampled for PCBs in air.

2.1.5 Management of Investigation–Derived Waste

No change.

2.2 SAMPLING METHODS

This section describes the procedures for sample collection, including sampling methods and equipment, sample preservation requirements, decontamination procedures, and any materials needed. Prior to sample collection and building cleaning activities, a job hazard analysis will be conducted and submitted to the HSM for evaluation. Upon examination of the job hazard analysis, the HSM will determine the level of PPE required for each stage of the investigation.

2.2.1 Sampling Methods and Equipment

The units to be sampled will be opened to allow air to flow through the building for a period of 24 hours and then closed for 72 hours before sampling begins to represent normal living conditions. To avoid contamination of the samples, access to the housing units will be limited during the sampling interval. Samples of ambient air will be collected by placing a polyurethane foam (PUF) cartridge and a pump in each location for 8 hours to allow collection of a representative ambient air sample. Indoor ambient air samples will be collected in the first floor bathrooms of each unit.

Samples will be collected according to the methods described in the FSP/QAPP (TtEMI 2001), this addendum, and in EPA's Compendium Method TO-10A (EPA 1999d). Indoor ambient air samples will be collected using PUF cartridges. Samples will be collected by means of a low-volume sampling technique. High-volume sampling will not be used, because the creation of a large vacuum would generate unnatural conditions in an enclosed indoor space. Each sampling cartridge consists of a glass tube containing a single 76-millimeter PUF sorbent ring (SKC Inc. Catalog no. 226-92 or equivalent). The sampling cartridge will be connected with flexible tubing to a Model 224-PCXR4 Personal or Area

Air Sampling Pump (SKC Inc. Catalog no. 224-PCXR4 or equivalent). This is a continuous-flow air-sampling pump, with a flow range of 0.005 to 5 liters per minute (L/min).

Sampling Procedure:

- The laboratory will clean the cartridges to levels consistent with the PRRLs. A GC/MS report must be received from the laboratory certifying that the cleaning of each batch of cartridges was effective.
- The cartridges will then be pre-spiked with ^{13}C-22'55'-tetra-chlorinated biphenyl (PCB-52) and ^{13}C-22'33'55'6-hepta chlorinated biphenyl. Other congeners may be added if technically feasible. These spike compounds will be used to monitor the recovery of the PCBs.
- Cartridges are sent from the laboratory to the field wrapped tightly in aluminum foil to prevent degradation by ultraviolet light.
- Prepared sample cartridges will be used within 30 days of certification and handled only with latex or precleaned cotton gloves.
- Prior to sampling:
    - All windows and doors of each unit will be opened for a 24-hour period.
    - Following the 24-hour "airing-out" of the units, the units will be closed for a period of 72 hours before initiation of sampling.
    - Sampling pumps will be calibrated following the manufacturers recommendations
    - Sampling pumps will be pre-cleaned with an alconox wash and a final rinse with organic-free water
    - Once the pumps have dried, the intake manifold filter will be replaced
    - A 24-inch length of new tygon tubing will be cut and placed on the pump
    - A wipe, moistened with hexane will be used to wipe the surface of the pump. This wipe will then be placed in a 4-ounce glass jar and refrigerated.
    - The entire pump/tubing apparatus will be sealed in a zip-lock bag for delivery to the sampling location
- Prior to entering each building unit, Tyvek boot covers will be donned.
- To collect a sample:
    - The cartridge is removed from the glass jar, the aluminum foil is carefully removed and returned to the glass jar and re-sealed.
    - The cartridge is then attached to the tygon tubing/ continuous-flow sampling pump
    - The pump is placed in the sink and the tubing is allowed to hang out of the sink positioning the sampling cartridge 1 meter above ground level, with the cartridge intake

in a downward position. The cartridge will be located in an unobstructed area at least 0.5 meter from any obstacle to airflow.

  - The power switch to the pump is then turned on, the flow rate adjusted to 4 to 5 L/min. The elapsed time meter is activated.
  - After 8 hours, the power will be turned off, and the PUF cartridge will be removed from the sampler and wrapped with the original aluminum foil. Cartridges will be placed in sealed, labeled containers with ice for transport to the laboratory. Sealed containers will be shipped directly from the site, with a chain-of-custody (CoC) form, to the analytical laboratory. All samples will be labeled and documented on CoC forms.
- Duplicate samples will be collected using separate pumps. The units will be placed in such a way as to avoid the collecting the exhaust of other pumps. In the majority of case the pumps will be placed in the sink in the bathroom and the tubing will be placed in such as way as to allow the PUF cartridges to hang below the sink at the proper height.
- The following information will be recorded on the field data sheet (FDS) during sampling:
  - Pump ID
  - Sample ID
  - Start time
  - Meteorological conditions including temperature, humidity, wind speed and direction
  - Flow rate will be recorded at the start of sampling, and every 2 hours
  - The condition of the building including broken window/doors, graffiti, evidence of intruders
  - A diagram of the sampling apparatus location and set-up
- Outdoor samples will be collected in the same manner. Duplicate samples will be collected as close as possible to each other, sharing the same tri-pod. Care will be taken to avoid collection of the pump exhaust.
- For the 24-hour outdoor air samples, the pumps will be changed after each 8-hour period
- A passive field blank will be collected from the same location as the outdoor sample in Bigelow Court. A cartridge will be removed from the glass container, removed from the aluminum foil, and allowed to sit for 1 minute. The cartridge will then be resealed. This will allow for the field sample handling, independent of pumps and tubing to be studied.

2.2.2 Decontamination

No change.

2.2.3 Disposal of Investigation-Derived Waste

No change.

2.2.4 Sample Containers and Holding Times

No change.

2.3 SAMPLE HANDLING AND CUSTODY

No change.

2.4 ANALYTICAL METHODS

No change.

2.5 QUALITY CONTROL

The main functions of any sampling and analysis program are to obtain accurate, representative environmental samples and to provide valid analytical data. A program to evaluate field and laboratory data was developed to achieve these goals. Quality of the field data will be assessed through collection and analysis of field QC samples on a regularly scheduled basis. Laboratory QC samples will also be analyzed in accordance with referenced analytical method protocols to ensure that laboratory procedures and analyses are conducted properly.

The following subsections discuss the types of QC samples collected and analyzed for this project and their role in the assurance of acceptable project data. QC procedures are not limited to those discussed in this section. Field and laboratory personnel implement additional procedures in accordance with specific method protocols. The following subsections discuss field QC samples, laboratory QC samples, and laboratory QC procedures.

2.5.1 Field Quality Control Samples

QC samples are collected in the field and used to evaluate the validity of the field sampling effort. Field QC samples are collected for laboratory analysis to check sampling and analytical precision, accuracy, and representativeness. The following section discusses the types and purposes of field QC samples that will be collected for this project. Table 10 of the original FSP/QAPP provides a summary of the types and frequency of collection of field QC samples.

2.5.1.1 Field Duplicates

Field duplicate samples are two samples collected at the same time and from the same source that are submitted as separate samples to one laboratory for analysis. Field duplicates will be collected from units 1100C, 1101D, 1101E, and 1105G, as well as all of the outdoor samples. Both samples will be assigned unique sample identification numbers. Field duplicates will be collected only to determine the extent of inherent sample variation and not for sampling precision.

2.5.1.2 Trip Blanks

The trip blank for this investigation is used to demonstrate that contamination is not originating from the sampling media. A pre-cleaned and spiked PUF cartridge, supplied by the laboratory will serve as the trip blank for ambient air samples. Trip blanks are transported to the site with the PUF cartridges that will be used for sample collection. The trip blanks are stored at the site until the proposed field samples have been collected. Trip blanks are required for each day of sampling within the buildings. One trip blank will accompany the transport container used to ship ambient air samples back to the laboratory for each day of sampling within the buildings. The trip blank is not opened until it is returned to the laboratory. Trip blanks are analyzed in the same manner as the actual samples.

2.5.1.3 Equipment Rinsates

No change.

2.5.1.4 Laboratory Split Samples

Laboratory split samples will be collected during this investigation to monitor the accuracy of the analytical results. Samples will be collected in duplicate and sent to 2 separate laboratories for analysis. The results will be compared and used to monitor the accuracy of the results. No accuracy goals have been established for laboratory duplicates.

2.5.1.5 Field Blank

A passive field blank will be collected from the same location as the outdoor sample in the center of Bigelow Court. Using the sample procedures as employed during sampling, a cartridge will be removed from the glass container, removed from the aluminum foil, and allowed to sit for 1 minute. The cartridge will then be resealed. This will allow for the field sample handling, independent of pumps and tubing to be studied.

2.5.2 Quality Control Procedures for Field Sampling

No change.

2.5.3 Laboratory Quality Control Samples

No change

2.5.4 Laboratory Control Procedures

No change.

2.6 EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

No change.

2.7 INSTRUMENT CALIBRATIONS AND FREQUENCY

Following manufacturers recommendations, sampling pumps will be calibrated daily using a certified NIST-traceable flowmeter (SKC Scientific DryCal® flowmeter, Catalog # 717-04 or equivalent).

2.8 INSPECTION AND ACCEPTANCE OF SUPPLIES AND CONSUMABLES

No change.

2.9 NON-DIRECT MEASUREMENTS

No change.

2.10 DATA MANAGEMENT

No change.

3.0 ASSESSMENT AND OVERSIGHT

No change.

4.0 DATA VALIDATION AND USABILITY

No Change

5.0 REFERENCES

Environmental Quality Management, Inc. 1997. "User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings." September.

PRC Environmental Management, Inc. (PRC). 1995. "CLEAN II Program Health and Safety Plan." Revision I. June 19.

PRC. 1997. "Draft Final Onshore RI Report, NAVSTA TI, California." September.

PRC. 1998. "Final Base-wide Health and Safety Plan, NAVSTA TI, California." July 7.

Tetra Tech EM Inc. (TtEMI). 1999a. "Remedial Investigation Report, Site 12 Operable Unit, NAVSTA TI, Draft." June 1.

TtEMI. 1999b. "Final Sampling Plan Addendum for Site Investigation of the Former Storage Yard, NAVSTA TI." October 15.

TtEMI. 2001. "Final Field Sampling Plan / Quality Assurance Project Plan, Additional Polychlorinated Biphenyl Investigation of the Former Storage Yard, Naval Station Treasure Island." May

U.S. Environmental Protection Agency (EPA). 1994. EPA Guidance for the Data Quality Objectives Process. EPA QA/G-4. September.

EPA. 1997. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. EPA QA/R-5. October.

EPA. 1999a. Data Quality Objectives Process for Hazardous Waste Site Investigations. EPA/QA/G-4HW. Peer Review Draft.

EPA. 1999b. National Functional Guidelines for Organic Data Review. EPA 540/R-94/013.

EPA. 1999c. "Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS" Office of Water. EPA-821-R-00-002.

EPA 1999d. "Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)." EPA/625/R-96/010b.

EPA. 2000. Data Quality Objectives Process for Hazardous Waste Site Investigations (EPAQA/G-4HW). Office of Environmental Information. Washington, D.C. EPA/600/R-00/007. January.

TABLES

TABLE 8
DATA QUALITY OBJECTIVES SUMMARY
FORMER STORAGE YARD
NAVAL STATION TREASURE ISLAND

Step 1 **State the Problem**	Step 2 **Identify the Decision**	Step 3 **Identify Inputs to the Decision**	Step 4 **Define the Study Boundaries**	Step 5 **Develop Decision Rules**	Step 6 **Specify Acceptable Tolerable Limits on Decision Errors**	Step 7 **Optimize the Sampling Design**
• PCBs are present in the soil beneath the buildings of the FSY that could volatilize into soil gas and enter the buildings at concentrations that pose a risk to human health.	• Are PCBs present in indoor air at detectable concentrations ? • If PCBs are present at detectable concentrations in indoor air, are they the result of vapor intrusion from the soils?	• Risk based screening criteria that has been agreed upon by all stakeholders • Historical soil and indoor air analytical results • Physical parameters of the various lithologic zones • Risk assessment guidelines • Validated, defensible analytical data for PCBs in indoor air	• Indoor air will be collected from the 19 residential units in which PCB concentrations have been previously detected at concentrations exceeding the residential PRG. • In order to obtain the most conservative results, an attempt will be made to collect the indoor air samples when soil temperatures are at the highest point of the season.	• If the PCB congener breakdown is consistent with the use of an alternate slope factor for the calculation of the PRG, the alternate slope factor will be used. • If the results from all sampling events from each unit taken as a whole in a weight of evidence approach are below the PRG, then indoor air will not be considered a barrier to occupancy of the buildings. The weight of evidence approach assigns more weight to samples collected during the November 2001 round where the sampling plan has been updated to limit possible interferences and will be stringently followed.	• For this investigation, proposed sampling locations were based on previous chemical data in soil. Because of this judgmental sampling approach, limits on decision errors cannot be specified. False positive and negative error is minimized by adherence to selected sampling and analytical methods.	• Indoor air will be collected from the 19 residential units in which PCB concentrations have been previously detected at concentrations exceeding the residential PRG. Future step-out samples may include additional sampling in these units or units in buildings in Halyburton Court. • The indoor air samples will be collected in the bathrooms where pipes enter the slab foundation and represent the potential worst-case scenario for intrusion of soil gas from beneath the slab. • One outdoor air control samples will be collected daily on the berm behind Building 1123 and from the center of Bigelow Court. • All samples will be analyzed for PCBs using EPA Method 1668.

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Step 1 State the Problem	Step 2 Identify the Decision	Step 3 Identify Inputs to the Decision	Step 4 Define the Study Boundaries	Step 5 Develop Decision Rules	Step 6 Specify Acceptable Tolerable Limits on Decision Errors	Step 7 Optimize the Sampling Design
				• If indoor air results are greater than the established PRG, then the concentration and congener pattern will be studied to determine whether outdoor ambient air can be considered as a likely source. If outdoor ambient air is considered the likely source of concentrations above the PRG, then indoor air will not be considered a barrier to occupation of the buildings. • If indoor air results are greater than the established PRG and outdoor ambient air is not considered the likely source, then additional action will be considered.		

Notes:

BCT = Base Closure Team
EPA = U.S. Environmental Protection Agency
FSY = Former storage yard
PCB = Polychlorinated biphenyl