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RADIOLOGICAL CHARACTERIZATION SURVEY REPORT

September 28, 2007

RADIOLOGICAL SURVEY AT IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2 ALAMEDA POINT ALAMEDA, CALIFORNIA

DCN: ECSD-2201-0008-0001

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ABBREVIATIONS AND ACRONYMS

μCi	microcurie
μCi/mL	microcurie per milliliter
μR/h	microroentgen per hour
μrem	microrem
μRem/h	microroentgen-equivalent-man per hour
AEC	Atomic Energy Commission
ARAR	applicable or relevant and appropriate requirement
ATV	all-terrain vehicle
avg	average
BEI	Bechtel Environmental, Inc.
bgs	below ground surface
BRA	Background Reference Area
BRAC	Base Realignment and Closure
CCS	California Coordinate System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
cm	centimeter
cm^2	square centimeter
cpm	count per minute
CQC	Contractor Quality Control
CRZ	contamination reduction zone
^{137}Cs	cesium-137
CSO	Caretaker Site Office
CTO	Contract Task Order
DAC	derived air concentration
DBH	diameter at breast height
DFW	definable feature of work
DGPS	differential global positioning system
DHS	Department of Health Services

ABBREVIATIONS AND ACRONYMS
(Continued)

DOA	Department of the Army
DoD	Department of Defense
DON	Department of the Navy
dpm	disintegrations per minute
DQO	data quality objective
E&E	Ecology and Environment
EPA	U.S. Environmental Protection Agency
FCR	Field Change Request
FD	field duplicate
FWENC	Foster Wheeler Environmental Corporation
GIS	Geographic Information System
HPGe	high-purity Germanium
h	hour
IDW	investigation-derived waste
IR	Installation Restoration
keV	kiloelectron volt
LARADS	Laser-assisted Ranging and Data System
LLRW	low-level radioactive waste
m^2	square meter
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCL	maximum contaminant level
MDA	minimum detectable activity
MDC	minimum detectable concentration
MDCR	minimum detectable count rate
MDER	minimum detectable exposure rate
MEC	munitions and explosives of concern
MeV	megaelectron volt
mL	milliliter
MPPEH	material potentially presenting an explosive hazard
mm	millimeter

ABBREVIATIONS AND ACRONYMS
(Continued)

NAD	North American Datum
NaI	sodium iodide
NAS	Naval Air Station
NAVFAC SW	Naval Facilities Engineering Command, Southwest
NCR	Nonconformance Report
NGS	National Geodetic Survey
NGVD	National Geodetic Vertical Datum
NRC	Nuclear Regulatory Commission
OEW	ordnance and explosives waste
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picocurie per gram
pCi/L	picocurie per liter
PE	Professional Engineer
PESM	Project Environmental and Safety Manager
PHP	Project Health Physicist
PIC	pressurized ion chamber
PjM	Project Manager
PPE	personal protective equipment
PQCM	Project Quality Control Manager
PRC	PRC Environmental Management, Inc.
PRG	Preliminary Remediation Goal
QA	quality assurance
QC	quality control
^{226}Ra	radium-226
RASO	Radiological Affairs Support Office
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROICC	Resident Officer in Charge of Construction

ABBREVIATIONS AND ACRONYMS
(Continued)

RPM	Remedial Project Manager
s	second
SAP	Sampling and Analysis Plan
^{125}Sb	antimony-125
Shaw	Shaw Environmental & Infrastructure, Inc.
SHSP	Site Health and Safety Plan
SHSS	Site Health and Safety Specialist
SOP	Standard Operating Procedure
^{90}Sr	strontium-90
SSPORTS	Supervisor of Shipbuilding, Conversion and Repair, Portsmouth
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	semivolatile organic compound
TCRA	time-critical removal action
TLD	thermoluminescent dosimeters
TPH	total petroleum hydrocarbons
TtEC	Tetra Tech EC, Inc.
TtEMI	Tetra Tech EM, Inc.
TtFW	Tetra Tech FW, Inc.
U	not detected
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
VOC	volatile organic compound

EXECUTIVE SUMMARY

This Radiological Characterization Report describes the radiological survey activities performed at Installation Restoration (IR) Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area located at Alameda Point, Alameda, California. The Naval Facilities Engineering Command, Southwest (NAVFAC SW) authorized Tetra Tech EC, Inc. (TtEC) to plan and implement the radiological survey. The radiological survey was performed in accordance with the Final Radiological Survey Work Plan (TtEC, 2006a), which was contingent on access to shoreline areas, required vegetation clearance, and munitions and explosives of concern (MEC) safety. The Naval Sea Systems Command Detachment, Radiological Affairs Support Office (RASO), the U.S. Environmental Protection Agency (EPA), the United States Fish and Wildlife Service (USFWS) and the California Department of Health Services (DHS) reviewed the Final Radiological Survey Work Plan (TtEC, 2006a), and the RASO and USFWS visited the site during survey activities. Mobilization activities commenced August 28, 2006, and survey-related activities continued through November 22, 2006. The team performed surveys of IR Site 32 and the shorelines of IR Site 1 and 2 that included visual and geophysical search for unexploded ordnance (UXO), vegetation removal, as necessary, and radiological survey measurements.

IR Site 32 and the shorelines of IR Sites 1 and 2 are located in the northwest corner of Alameda Point. IR Site 1 was operated between 1943 and 1956 as the former Naval Air Station (NAS) Alameda's main site for waste disposal. IR Site 2 was used as a disposal area for Alameda Point from approximately 1952 through 1978. IR Site 32 was historically used for ordnance storage. An open space area in the eastern portion of IR Site 32 was used for equipment, vehicle, and aircraft storage.

NAS Alameda had a radium paint shop that repaired and maintained radioluminescent devices in the 1940s, 1950s, and early 1960s. Disposal of radioluminescent devices containing radium was not controlled by specific procedures until the late 1960s. Before that time, it was common practice throughout private industry and the military to dispose of radioluminescent instruments and articles by burial in landfills. Other radionuclides were used in radioluminescent devices, but radium-226 (^{226}Ra) is the primary radionuclide of concern. This survey and previous radiation surveys by PRC Environmental Management, Inc. (PRC) and Supervisor of Shipbuilding, Conversion and Repair, Portsmouth (SSPORTS) substantiated these conclusions.

Preliminary radiological surveys were completed at IR Sites 1 and 2 in September 1995. In June 1996, a second preliminary radiological survey was conducted at a different area within IR Site 1. Based on results from the preliminary surveys, the SSPORTS Environmental Detachment conducted a more comprehensive radiological survey at IR Sites 1 and 2 in 1998 and 1999. The results of these surveys showed that ^{226}Ra was present at IR Sites 1 and 2 in soils at levels above

background. In 2004, Tetra Tech FW, Inc. (TtFW) conducted a radiological characterization survey at IR Sites 1 and 2. The primary objective of the survey was to characterize the potential ^{226}Ra contamination that might be present by performing a 100 percent surface scan using 2-inch by 2-inch sodium iodide (NaI) detectors, as well as fixed gamma and exposure rate surveys, gamma energy analysis with a portable high-purity Germanium (HPGe) system, and soil sampling. However, due to accessibility issues, neither the shorelines of IR Site 1 and 2 nor the former Radiological Shack area located within IR Site 2 were surveyed. During the radiological survey of IR Site 1, an elevated radiological reading was identified on the eastern boundary, which borders IR Site 32.

The primary objective of this survey was to determine if elevated levels of radioactive material are present within IR Site 32, the former Radiological Shack area at IR Site 2 and along the shorelines of IR Sites 1 and 2. The work performed included surface scans using 2-inch by 2-inch sodium iodide (NaI) detectors, static gamma measurements, exposure rate surveys by instrumentation and thermoluminescent dosimeters (TLDs), gamma energy analysis with a portable high-purity Germanium (HPGe) system, and soil sampling.

TtEC performed a land survey and vegetation clearance before proceeding with the radiological characterization survey. A number of measures were implemented during site activities to minimize adverse impacts to local biological resources, including a biological survey prior to fieldwork and worker education to avoid and minimize potential impacts on special-status species and communities of concern. Portable lapel air samplers were used to collect both background and breathing zone air samples during soil sampling activities. The calculated concentration of the air samples was not above 10 percent of the derived air concentration (DAC) (3×10^{-10} microcuries per milliliter [μCi/mL]) for ^{226}Ra.

A Senior UXO Supervisor conducted a delineation of the former pistol range area within IR Site 1 where material potentially presenting an explosive hazard (MPPEH) had been uncovered due to soil erosion prior to radiological survey activities. There was no collection or storage of MPPEH associated with this scope of work.

Fifteen soil samples and two duplicate soil samples were collected at 15 locations within IR Site 32, the former Radiological Shack area within IR Site 2, and the shorelines of IR Sites 1 and 2. The sample locations were selected based on the results of the radiological surveys and represented those locations where survey data indicated the greatest elevation of radiation above established background levels. Soil samples were collected from zero to 20 inches below ground surface (bgs) using a hand auger. Independent laboratory analysis indicate all but three samples had ^{226}Ra concentrations at or above the investigation level 0.559 picocurie per gram (pCi/g). The highest concentration of ^{226}Ra was 753 pCi/g. Two of the five soil samples also had strontium-90 (^{90}Sr) concentrations reported greater than the method detection limit. The highest concentration of ^{90}Sr was 0.211 pCi/g, which is below the EPA Preliminary Remedial Goal for

^{90}Sr (0.331 pCi/g). In the reference background soil samples, ^{90}Sr was not found to be present in concentrations greater than the method detection limit.

In situ gamma spectroscopy was used to analyze the soil at the 15 locations with the highest elevated survey measurements. A review of these spectra indicated the presence of ^{226}Ra, which was substantiated by the laboratory sample results.

Static measurements of the shorelines of IR Sites 1 and 2 were collected using a 2-inch by 2-inch NaI scintillator encased in a polyvinyl chloride capsule. Ten-second static measurements were collected from the edge of the riprap to the current water level at the grid points of the 10-foot grid projected on the shoreline. Scan measurements using the towed array or backpack system were performed at IR Site 32 and the former Radiological Shack area in IR Site 2. Scan measurements were also conducted in IR Sites 1 and 2 to fill in data gaps between the 2004 radiological characterization survey conducted by TtFW and this survey.

Upon completion of field activities, support facilities were demobilized and radiological release surveys were performed on equipment and instruments used inside the IR Sites 1, 2, and 32 controlled area. Non-Resource Conservation and Recovery Act wastes generated during site activities were disposed of off site at an approved landfill.

1.0 INTRODUCTION

This Radiological Characterization Report describes the specific activities pertaining to the radiological survey performed at Installation Restoration (IR) Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area located at Alameda Point (formerly Naval Air Station [NAS] Alameda), Alameda, California (Figure 1-1). The radiological survey of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack in IR Site 2 were conducted to identify areas of elevated radioactivity. Radium-226 (Ra^{226}) is the primary radionuclide of concern at IR Sites 1, 2 and 32 and Strontium-90 (^{90}Sr) is designated as a potential secondary radionuclide of concern.

IR Sites 1 and 32 are located in the northwest corner of Alameda Point, while IR Site 2 is located in the southwest corner (Figure 1-2). IR Site 1 was operated between 1943 and 1956 as the former NAS Alameda's main site for waste disposal. IR Site 2 was used as a disposal area for Alameda Point from approximately 1952 through 1978. IR Site 32 was historically used for ordnance storage. An open space area in the eastern portion of IR Site 32 was used for equipment, vehicle, and aircraft storage.

In 2004, Tetra Tech FW, Inc. (TtFW) conducted a radiological characterization survey at IR Sites 1 and 2. The primary objective of the survey was to characterize the potential radium-226 (^{226}Ra) contamination that might be present. The survey included a 100 percent surface scan using 2-inch by 2-inch sodium iodide (NaI) detectors, as well as fixed gamma and exposure rate surveys, gamma energy analysis with a portable high-purity Germanium (HPGe) system, and soil sampling. However, because of accessibility issues, neither the shorelines of IR Sites 1 and 2 nor the former Radiological Shack area located within IR Site 2 were surveyed. During the radiological survey of IR Site 1, an elevated radiological reading was identified on the eastern boundary that borders IR Site 32. To address these data gaps, this radiological survey included a near 100 percent surface scan of IR Site 32 (excluding the concrete runways and locations of permanent facility structures), the shorelines of IR Sites 1 and 2, and the former Radiological Shack in IR Site 2.

Former NAS Alameda had a radium paint shop that repaired and maintained radioluminescent devices in the 1940s, 1950s, and early 1960s. Disposal of radioluminescent devices was not controlled by specific procedures until the late 1960s. Before that time, it was common practice throughout private industry and the military to dispose of radioluminescent instruments and articles by burial in landfills. Over the years, low-level radioactive wastes (LLRW) (mainly ^{226}Ra from the rework of dials and gauges (Ecology and Environment, 1983) were deposited at IR Sites 1 and 2. Starting in the early 1950s, other radionuclides, including ^{90}Sr, were used in radioluminescent devices. Of the radionuclides used in radioluminescent devices, those still of concern are ^{226}Ra (1,600-year half-life) and ^{90}Sr (29.1-year half-life).

This Radiological Characterization Report discusses the results of the characterization survey performed as described in the Final Radiological Survey Work Plan (TtEC, 2006a). The survey performed measurements of the shorelines of IR Sites 1 and 2, IR Site 32, the former Radiological Shack area (excluding the concrete runways), locations of permanent facility structures, and inaccessible areas. Concrete areas and permanent facilities were excluded as a result of equipment limitations in detecting any anomalies beyond the effective depth of the equipment. Inaccessible areas were primarily shoreline riprap on the western boundary of the former target practice berm at IR Site 1. The width of the existing berm coupled with a concrete gutter feature restricted access by the man lift during static surveys of the shoreline adjacent to the water's edge.

1.1 SCOPE OF WORK

In accordance with the Final Radiological Survey Work Plan (TtEC, 2006a), a radiological survey of IR Site 32, the former Radiological Shack area within IR Site 2, and the shorelines of IR Sites 1 and 2 were conducted to characterize the contamination, if present. Work was conducted using guidance from the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) (Department of Defense [DoD] et al., 2000). MARSSIM provides processes and procedures for survey and sample collection using data quality objectives (DQOs), quality assurance/quality control (QA/QC), and data quality assurance guidelines. This Radiological Characterization Report summarizes the activities completed in association with the survey including:

- Mobilization
- Background instrument readings
- Environmental resource survey
- Vegetation clearance
- Radiological survey (except in concrete runway areas or where there are permanent facility structures) of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area in IR Site 2
- Subsurface soil sampling and gamma energy analysis for discrete survey areas
- Dosimetry study at IR Sites 1, 2, and 32
- Demobilization

1.2 PROJECT MANAGEMENT AND ORGANIZATION

The Department of the Navy (DON) Remedial Project Manager (RPM) for this project was Mr. Andrew Baughman. Mr. Baughman was responsible for project management, budget control, schedule maintenance, and contacting regulatory agencies. Mr. Baughman was also responsible for community relations and ensuring that the radiological survey activities are in

compliance with the applicable rules and regulations. Mr. Doug DeLong of the Caretaker Site Office (CSO) was responsible for coordinating the survey activities with different DON and city of Alameda departments and personnel. Mr. Gregory Grace, the Resident Officer in Charge of Construction (ROICC), was responsible for the technical oversight and QC. Mr. Matthew Slack, the technical representative for the Radiological Affairs Support Office (RASO), was responsible for the technical oversight and review of the project documents and all issues related to radiological activities.

TtEC's Deputy Program Manager, Dr. Jamshid Sadeghipour, Professional Engineer (PE), was responsible for general project administration and ensured the quality of all project activities and deliverables. TtEC's Project Manager (PjM), Mr. Abram Eloskof, was responsible for general project administration. Mr. Eloskof oversaw budget, schedule, document preparation, and ensured the quality of all project activities and deliverables. Ms. Jennifer Dessort acted as the Project Quality Control Manager (PQCM) and was responsible for managing the field activities, providing oversight to the subcontractors, and coordinating with the CSO, ROICC, and the PjM. As the PQCM, Ms. Dessort coordinated with the QC Program Manager (Ms. Mary Schneider) to ensure that all field activities were in compliance with the project specifications. Ms. Dessort was also the Site Health and Safety Specialist (SHSS) on site and was responsible for ensuring that field activities were conducted in compliance with the Site Health and Safety Plan. As the SHSS, she coordinated with the Project Environmental and Safety Manager (PESM), Mr. Roger Margotto, Certified Industrial Hygienist (CIH). A project organization chart showing the relationship among select team members is provided as Figure 1-3.

The following is a list of the key project, DON, and regulatory contacts:

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Tetra Tech EC, Inc. 1940 E. Deere Ave., Suite 200 Santa Ana, CA 92705-5718	Mr. Abram Eloskof (949) 756-7521 (714) 620-5530 (cellular) abram.eloskof@tteci.com	PjM
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Tetra Tech EC, Inc. 3200 George Washington Way, Suite G Richland, WA 99352-3429	Mr. Cliff Stephan (509) 371-0140 (509) 430-4655 (cellular) cliff.stephan@tteci.com	Project Health Physicist (PHP)
Tetra Tech EC, Inc. 1940 E. Deere Ave, Suite 200 Santa Ana, CA 92705-5718	Ms. Emily Festger (949) 756-7523 (714) 478-7171 (cellular) emily.festger@tteci.com	Project Biologist
Tetra Tech EC, Inc. 1940 E. Deere Ave, Suite 200 Santa Ana, CA 92705-5718	Ms. Jennifer Dessort (949) 756-7541 (949) 466-7573 (cellular) jennifer.dessort@tteci.com	PQCM/SHSS
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The Final Radiological Survey Work Plan (TtEC, 2006a) was reviewed by the appropriate TtEC technical staff and the PjM, as well as peer-reviewed prior to being submitted to the Navy and regulatory agencies for review. The DON Remedial Technical Manager, DON RPM, RASO, EPA, USFWS, and Department of Health Services (DHS) reviewed the document and their comments were incorporated, as appropriate. The DON approved the Final Radiological Survey Work Plan (TtEC, 2006a) prior to its field implementation.

1.2.1 Project Management Responsibilities

The Site Superintendent, PQCM, and PHP were instrumental in managing the survey activities. The responsibilities of each and the elements of the survey they were responsible for managing are summarized below.

Project Quality Control Manager

The PQCM, Ms. Jennifer Dessort, was responsible for overall management of project QC and reported to the QC Program Manager. The PQCM or an alternate PQCM was on site at all times during field activities. The PQCM was responsible for the following:

- Monitoring activities to ensure conformance with the Work Plan and that policies, procedures, contract specifications, and sound practices are followed
- Preparing the Daily QC Reports
- Ensuring that the three phases of inspection (preparatory, initial, and follow-up) are implemented for all definable features of work (DFW)
- Ensuring that required tests and inspections are performed and the results reported
- Attending required meetings, including the pre-construction conference, weekly QC meetings, pre- and post-construction site inspections, and other scheduled and unscheduled meetings
- Issuing and maintaining Field Change Requests (FCRs) and Nonconformance Reports (NCRs) for project activities (construction- and radiological-related)
- Maintaining an NCR and FCR log
- Ensuring that planning documents are current and controlled
- Maintaining the Submittal Register and a Submittal Log
- Stopping work not in compliance with the contract

Project Health Physicist

The PHP, Mr. Cliff Stephan, was responsible for implementing, directing, and supervising all radiological project-related activities. The PHP was responsible for the following:

- Assisting in the development and approval of the SHSP
- Assisting in identifying radiological analysis needs
- Providing technical support in subcontractor selection
- Providing health physics guidance on an as-needed basis
- Providing radiological control protection services, if required
- Directing and assisting project personnel in proper completion of radiological records
- Ensuring that the required radiological safety training is provided to project personnel
- Reviewing and approving project field procedures that involve the handling of radioactive materials or access to radiological areas
- Ensuring timely and thorough review of records in accordance with Appendix D-9, Radiological Records, of the Final Radiological Survey Work Plan (TtEC, 2006a) prior to approval
- Approving records with verifiable signature and date once records meet the quality standards as described in Appendix D-9, Radiological Records, of the Final Radiological Survey Work Plan (TtEC, 2006a)
- Conducting radiation incident investigations

- Conducting radiological project inspections
- Conducting data assessment

1.2.2 Data Quality and Reporting

A coordination and mutual understanding meeting was conducted during mobilization. Attendance included the ROICC, the ROICC's Construction Management Technician, the Base Realignment and Closure (BRAC) Environmental Compliance Manager, the PQCM/SHSS, the PHP, and the radiological subcontractor. The purpose of the meeting was to develop a mutual understanding of the QC details of the work, including coordination of the field activities, production, and the PQCM duties.

As part of the three-tiered QC process (preparatory, initial, and follow-up phase inspections), individuals performing survey-related activities were informed of the procedures related to the specific task they were to perform. This included reviewing the Final Radiological Survey Work Plan (TtEC, 2006a), including Standard Operating Procedures (SOPs), drawings, and Activity Hazard Analyses.

The three-tiered QC process was implemented for each DFW in order to verify both the quality of work performed and compliance with specified requirements. The DFWs for this project included:

- Mobilization
- Environmental resources survey of the areas where work was to be performed
- Vegetation clearance where necessary
- Land and geophysical survey
- Background area static measurements
- Radiological survey (except runway areas and permanent facility structures) of IR Site 32, the Radiological Shack within IR Site 2, and the shorelines of IR Sites 1 and 2
- Subsurface soil sampling and gamma energy analysis for discrete survey areas
- Dosimetry study at IR Sites 1, 2, and 32
- Waste profiling and off-site disposal of decontamination water
- Demobilization

In order to make defensible project decisions, the data collected during the radiological characterization survey needed to be of sufficient quantity and adequate quality. Therefore, during the implementation and assessment phases of this project, the following quality system was applied.

Prior to data collection, the PQCM verified that all field personnel had required trainings, and had read and understood the entire Final Radiological Survey Work Plan (TtEC, 2006a). All personnel collected data and calibrated equipment in accordance with applicable SOPs and the Final Radiological Survey Work Plan (TtEC, 2006a). The PHP, who is a Certified Health Physicist, reviewed field data collected each day to determine its usability and identify data gaps. The PQCM verified that data collection was performed in accordance with the SOPs [Appendix D of the Final Radiological Survey Work Plan (TtEC, 2006a)], and data collection activities were documented on a daily basis. Data was provided to and reviewed by the RASO on a daily and/or weekly basis.

After data collection was completed, both field and laboratory data were reviewed and assessed by the PHP team. The review of data during the survey process ensured that data anomalies and missed data were corrected in the field. Field teams downloaded their electronic files and provided them on a daily basis along with completed Daily Survey Log Forms to the Subcontractor's Radiation Control Supervisor. The PQCM and PHP reviewed this daily log within one work day of receiving it.

1.3 PROJECT SCHEDULE

The radiological survey involved four main stages as follows:

- **Stage 1 – Preparatory activities.** (March 21 to September 11, 2006) This stage included preparation of the project submittals including the Radiological Survey Work Plan, notifications, and procurement. This stage also included mobilization, a delineation of an area within IR Site 1 with visible surface UXO, a land survey, and vegetation clearance activities.
- **Stage 2 – Background static measurements and sampling.** (September 11 to September 28, 2006) This stage included radiological sampling in five background areas, and placement of dosimeters along the shoreline edge of IR Sites 1, 2, and 32 for dosimeter study.
- **Stage 3 – Radiological survey and sampling.** (September 12 to November 17, 2006) This stage included conducting surface radiological survey of IR Site 32, the former Radiological Shack area within IR Site 2, and the shorelines of IR Sites 1 and 2.
- **Stage 4 – Demobilization.** (November 18 to November 22, 2006) This stage included decontamination of all project equipment, followed by demobilization of all equipment and materials, and preparation of the Radiological Characterization Report that documents the results of the survey.

1.4 REPORT ORGANIZATION

This Radiological Characterization Report has been structured to provide details on the major aspects of the radiological survey. This report is organized into 11 sections and 14 appendices (Appendices A through N). Section 1.0 provides an introduction. Section 2.0 presents the

background and past operational history of the site; the physical, chemical, and radiological characteristics of the site; and a brief discussion of the results of previous surveys and removal actions. The survey objectives, pre-survey, and survey activities are presented in Section 3.0, the survey instrumentation used and procedures are included in Section 4.0, and Section 5.0 discusses the minimum detectable activity (MDA)/minimum detectable concentration (MDC) determination. The data results and analysis are presented in 6.0, the photographic log is discussed in Section 7.0, and field changes are documented in Section 8.0. A discussion of demobilization activities is provided in Section 9.0, Section 10.0 summarizes waste management activities, and References are included in Section 11.0.

The following appendices are included to provide additional details regarding the IR Site 1, 2, 32 and former Radiological Shack area radiological survey and sampling activities:

- Appendix A Land Survey Data
- Appendix B Field Change Request Forms
- Appendix C UXO Waiver of Explosive Safety Submission
- Appendix D Biological Survey Summary Report
- Appendix E Chain-of-Custody and Laboratory Analytical Reports
- Appendix F Survey Area Gamma Spectroscopy Data
- Appendix G Photographic Log
- Appendix H Instrument Calibration and Performance Check Data
- Appendix I Background Reference Area Static Survey Data
- Appendix J MicroShield Modeling Results
- Appendix K Survey Area LARADS Data
- Appendix L Survey Area Static Survey Data
- Appendix M Unconditional Release Data Sheets
- Appendix N Waste Manifests

2.0 SITE DESCRIPTION AND HISTORY

Background information pertinent to the radiological survey includes the site-specific features, history of land usage, site geology and hydrogeology, and previous investigations describing the chemical and radiological characteristics of the site.

Several investigations have been performed to assess the physical and environmental conditions at IR Sites 1, 2, and 32. Descriptions of these investigations and additional Alameda Point site information are provided in several reports including:

- *Work Plan for Remedial Investigation IR Site 32, Northwest Ordinance Storage Area, Alameda Point, Alameda, California* (Bechtel, 2005)
- *Final Radiological Survey Work Plan, Radiological Survey at IR Site 32 and the Shorelines of IR Sites 1 and 2, Former Naval Air Station Alameda, Alameda Point, Alameda, California* Tetra Tech EC, Inc. (TtEC, 2006a)
- *Final Radiological Support Report, Installation Restoration Site 32 Activities, March 31, 2006 Alameda Point, Alameda, California* (TtEC, 2006b)
- *Draft Alameda Basewide Annual Groundwater Monitoring Report, Alameda Point, Alameda, California* (Innovative Technical Solutions, Inc. 2005)
- *Evaluation of Alameda NAS Winter, 2003 Radiological Data.* Memorandum (Shaw Environmental & Infrastructure, Inc. [Shaw], 2004)
- *Final Installation Restoration Site 1 Radiological Characterization Survey Report, Revision 0, Alameda Point, Alameda, California* (TtFW, 2005a)
- *Final Installation Restoration Site 2 Radiological Characterization Survey Report, Revision 0, Alameda Point, Alameda, California* (TtFW, 2005b)
- *Final Ordnance and Explosives/Geotechnical Characterization Report, Ordnance and Explosives Waste Characterization, and Geotechnical and Seismic Evaluations at Installation Restoration Site 1, Alameda Point, Alameda, California* (Foster Wheeler Environmental Corporation [FWENC], 2002)
- *OU-3 Remedial Investigation* [RI] *Report, Final, Alameda Point, Alameda, California.* Volumes 1 – 3. (Tetra Tech EM Inc. [TtEMI], 1999)
- *Alameda Naval Air Station Landfill #1 and #2 Final Radiological Survey Report* (SSPORTS, 1999)
- *OU-3 Remedial Investigation Addendum, Final.* Volume 1. (TtEMI, 2001)
- *Addendum to the Remedial Investigation/Feasibility Study, Data Transmittal Memorandum, Site 1 and Site 2, Radiation Survey Report, Naval Air Station Alameda, Alameda, California* (PRC Environmental Management, Inc. [PRC] and Uribe and Associates, 1997)

- *Initial Assessment Study of Naval Air Station, Alameda, California, Final Report* (Ecology and Environment [E&E], 1983)

2.1 SITE DESCRIPTION

IR Site 1

IR Site 1 encompasses approximately 78 acres. San Francisco Bay borders the site to the north and west. IR Site 2, which consists of a former disposal area and wetlands, and Runway 7 are located to the south, and the remaining section of Runway 13 and a former sewage pump station are located east of the site.

IR Site 1 is relatively flat with slight depressions that sometimes flood during the winter rains. Shoreline slopes exist on the northern and western boundary and are currently stabilized by large boulders (riprap). The site was previously used as a waste disposal site and consisted of several disposal areas. An earthen berm (dike) 10 to 15 feet high is located adjacent to the shoreline near the former small arms range area. There are several paved roads that run through the site. Public access to IR Site 1 is currently restricted and a chain-link fence west of Runway 13 restricts access to the main portion of the site.

IR Site 2

IR Site 2 encompasses approximately 110 acres and is bordered by San Francisco Bay to the south and west. The disposal area at IR Site 2 covers approximately 77 acres in the most southwestern portion of Alameda Point. A wetland covers approximately 30 acres and the wetland is bounded by the disposal area within IR Site 2 to the north and east and by the coastal margin adjacent to San Francisco Bay on the south and west. The former Radiological Shack is located on the west side of the northern boundary.

The thin strip of land between the disposal area or wetland and the Bay is referred to as the coastal margin. It acts as a buffer for the disposal area and the wetland and is composed of the perimeter dike and riprap seawall. Subsurface materials in the coastal margin differ from those in the disposal area and wetland.

IR Site 32

IR Site 32 is approximately 5.8 acres in size and includes three environmental baseline survey subparcels (Subparcels 8A, 5E, and a portion of 5D). The site was previously referred to as the Northwestern Ordnance Storage Area. Recently, the DON expanded the boundaries of IR Site 32 north to the Oakland Inner Harbor by annexing the northern portion of Subparcel 5D.

Most of IR Site 32 is open space covered with asphalt, gravel, weeds, and brush. Structures on the site include two buildings: Building 594, the Physical Section Reaction Force Facility, and Building 82, a guard shack.

2.2 SITE HISTORY

IR Site 1

IR Site 1 was mainly used for waste disposal at former NAS Alameda from 1943 to 1956. Prior to 1940, early maps show that the disposal area at IR Site 1 was underwater (San Francisco Bay) at a depth of approximately 20 feet along the current western shoreline of the site. This area was reclaimed by dredging operations that involved the placement of sunken barges and pontoons on the western edge of the disposal area and clay and silt sediments in the disposal area. These operations are visible in aerial photographs taken in the 1940s. A jetty was later transformed into a seawall protecting the harbor entrance, which is now the northern edge of the disposal area. New taxiways and runways were extended over the disposal area in the 1950s.

Information regarding the history of disposal area contents is limited. The primary method used by NAS Public Works to dispose of wastes was to bulldoze trenches to the water table, fill them with waste, and then compact the surface. In the early years of operation, the waste was simply pushed into the water. There are no records of placement of any liners in the disposal area. Soil cover material was applied to the disposal area in later years.

Accurate estimates of the types and amounts of wastes deposited at IR Site 1 over the years are not available, but are believed to be approximately 15,000 to 200,000 tons of assorted refuse and debris, including scrap metal, waste oil, aircraft engines, LLRW (mainly ^{226}Ra from the rework of dials and gauges), solvents, paint wastes, cleaning compounds, creosote, waste medicines, reagents, asbestos, pesticides, mercury, and construction debris. Other naval installations, including Oak Knoll Naval Hospital, Naval Supply Center Oakland, and Treasure Island, also used the site for waste disposal.

IR Site 2

IR Site 2 was used as the main disposal area for Alameda Point from approximately 1952 through 1978. An estimated 1.6-million tons of waste were deposited (E&E, 1983). The wastes included municipal solid waste, waste chemical drums (contents unknown), solvents, oily waste and sludge, paint waste, plating wastes, industrial strippers and cleaners, acids, mercury, polychlorinated biphenyl (PCB)-containing liquids, batteries, low-level radiological waste from radium dials and dial painting, scrap metal, inert ordnance, asbestos, several pesticides (solid and liquid), tear gas agent, biological waste from the Oak Knoll Naval Hospital, creosote, dredge spoils, and waste medicines and reagents (E&E, 1983). Ordnance and explosives waste (OEW) may have also been deposited in the 2.5-acre (approximate) Possible OEW Burial Site located in the southern part of

the disposal area. A seawall was constructed along the southern and western edges of the site, and a 36-inch culvert was installed in the seawall to hydraulically connect San Francisco Bay to waters within the seawall. A substantial (10- to 15-foot) dike was installed around the perimeter of the site when disposal operations ceased.

IR Site 32

The historical use for IR Site 32 was ordnance storage. An open space area in the eastern portion of the site was used for equipment, vehicle, and aircraft storage. Two buildings are located within IR Site 32: Buildings 594 and 82. Building 594 contains dormitory rooms, a kitchen, and a security-monitoring panel and was previously used as a storage and repair shop for underwater weapons. Building 82 is a concrete guard shack. Buildings 594 and 82 were constructed in 1979. There are no documented releases of hazardous substances in either of these buildings.

In 1883, the South Coast Pacific Railroad constructed a rail causeway over 2 miles long that extended into San Francisco Bay from the northwest corner of Alameda Island (Bechtel, 2005). The former causeway crossed the northern portion of present-day IR Site 32 and consisted of railroad tracks built on a mud- and rubble-filled double-rock wall, with a rail yard and a passenger terminal built on a trestle at the end. A fire destroyed the original rail line in 1902; a second line was built parallel to the original rail path. Based on aerial photographs, it appears that all railroad tracks in the vicinity of and at IR Site 32 were removed by 1960; no surface evidence of the former railroad is visible at IR Site 32.

Fill activities at IR Site 32 began in 1919 and the area was completely filled by 1936. It is suspected that the fill material was dredge material from San Francisco Bay. Except for an area at the northwestern tip of Alameda Point previously occupied by a former pier and ferry terminal, referred to as the Alameda Mole, the site had been entirely under water prior to 1919.

IR Site 32 was identified as an IR site after evaluation of data resulting from soil and groundwater sampling performed during previous investigations.

2.3 SITE PHYSICAL CHARACTERISTICS

Alameda Point is located on Alameda Island, at the base of a gently sloping plain that extends from the Berkley Hills on the east to the shore of the San Francisco Bay on the west. Alameda Island is a low-lying flat area composed partly of artificial fill and partly of tidal-flat marshy sediments. Originally, the island was a peninsula connected to land on the southeast, but dredging in the late 19th century and the early part of the 20th century deepened and extended the San Antonio Creek channel southeasterly to form the Oakland Inner Harbor, thus creating the island. The island was enlarged by extending it northwesterly with materials dredged from the surrounding San Francisco Bay and Oakland Inner Harbor. IR Sites 1, 2, and 32 are located entirely over this dredged material.

2.3.1 Geologic Setting

IR Sites 1, 2, and 32 at Alameda Point are located on Alameda Island on the eastern side of the central San Francisco Bay. The San Francisco Bay region is located within an elongated basin or valley that extends southeasterly to the Santa Clara Valley. San Francisco Bay and Santa Clara Valley are bounded by the Santa Cruz Mountains to the southwest and the East Bay Hills and Diablo Range to the northeast.

There are no known faults directly at or in the near vicinity of the subject sites. No earthquake fault zones (Alquist-Priolo Zones) have been designated at the sites. The nearest active fault is the Hayward Fault, which is about 6.5 miles east of the site. Another nearby active fault is the San Andreas Fault within the hills on the west side of San Francisco Bay at a distance of about 12 miles. Other major faults in the region include the Calaveras Fault system on the east side of the East Bay Hills and the Green Valley and Greenville Fault systems located farther to the east.

Five Quaternary time (within the past two million years) sedimentary rock units have been identified as underlying IR Sites 1, 2, and 32. These sedimentary units record a sequence of fillings and evacuations of San Francisco Bay in response to global glacial/climate changes and local tectonics. The five rock units, from oldest to youngest, are the Alameda Formation, the Yerba Buena Mud, the San Antonio Formation, the Merritt Sand, and the Young Bay Mud. These sedimentary units are overlain by artificial fill deposited by mechanical processes.

A brief geological description specific to each site is provided below.

IR Site 1

The artificial fill comprising most of IR Site 1 is composed of mixtures of sand, silt, and clay dredged from the surrounding bay and a rock dike to retain the fill in place. The fill ranges in thickness from about 10 to 30 feet. The fill is thinnest in the eastern part of the site. The varying thickness is a result of natural variation in the depth of the estuary before filling, which began in the late 1800s. Throughout most of the site, the bottom of the fill is near sea level. The fill is predominantly a sandy silt similar to the Merritt Sand that served as the primary source of the fill. The fill typically has abundant shell fragments and debris including gravel. As reported earlier, the fill area incorporates the 1943–1956 Disposal Area. Due to lack of sufficient waste disposal characterization information, the lateral and vertical extent of existing waste material in the fill is not well defined. Refuse was observed under a thin cover of fill in selected test pits during the geotechnical investigation (FWENC, 2002) and included items such as cables, plexiglass, wire, asphalt, and miscellaneous wood, aluminum, and metal objects.

IR Site 2

The Young Bay Mud is thinnest in the eastern and southern parts of IR Site 2 and is thickest in the northern part of IR Site 2 where it appears to represent an ancient channel fill. In previous

reports (TtEMI, 1999), the Young Bay Mud unit was considered to consist of both the mud (clay, silty clay, clayey silt) and some of the underlying sands, and these were combined into a unit called Bay Sediments. Recent geotechnical investigations revealed that most of the sands underlying the upper soft mud are generally soft to moderately dense sands, silts, and clayey sands and these appear to also be Holocene-age bay deposits. Adopting the terminology from previous reports, these are Bay Sediments and range from about zero to 50 feet thick and also appear to represent an ancient channel. Both the Young Bay Mud and the Bay Sediments appear to pinch out to the south, where they may have been removed by dredging in the offshore area (TtFW, 2004).

The Merritt Sand shows indications of marine reworking during the most recent sea level rise. The unit has been entirely removed by erosion in the northern part of IR Site 2. The Merritt Sand is up to 25 feet in thickness in the south and pinches out toward the northern part of the site. The underlying Upper San Antonio Formation is also discontinuous at IR Site 2. Broad channels were eroded within the surface of the upper San Antonio Formation. It is present in the southern portion of the site, but absent through the erosional channeling to the north.

The fill encountered at most of the site is composed of mixtures of sand, silt, and clay dredged from the surrounding bay and a rock dike to retain the fill in place. The fill ranges in thickness from about 25 feet in the northwest to 45 feet in the southwest part of IR Site 2. The varying thickness is a result of natural variation in the depth of the estuary before filling that began in the late 1800s. The lower Young Bay Mud and Merritt Sand served as primary sources of the fill. The fill typically has abundant shell fragments and debris including gravel. The strength of the fill varies widely because of the wide variety of materials it contains. The existing waste material in the fill is not well-defined due to lack of sufficient information on the waste disposal history at the site. Solid wastes deposited in the disposal area included dredge spoils, batteries, ordnance, radiological materials (instrument dials with radium paint), asbestos, scrap metal, and spent sandblast abrasives. Liquid wastes placed in the disposal area include solvents, paints, plating bath sludge, waste oil, PCBs, pesticides, and medical wastes (TtEMI, 1999; E&E, 1983). Also, the existence of OEW at the site has been a major concern and a critical part of recent investigation and remediation activities.

IR Site 32

The fill material that comprises IR Site 32 is composed of mixtures including sand, silt, and clay dredged from the surrounding bay. A rock dike serves as the northernmost boundary of IR Site 32 adjacent to the Oakland Inner Harbor. The fill ranges in thickness from about 10 to 30 feet. The fill is thinnest in the eastern part of the site. Throughout most of the site, the bottom of the fill is near sea level. The fill is predominantly silty sand similar to the Merritt Sand that served as the primary source of the fill. Due to lack of sufficient information on the waste disposal history at the site, the existing waste material in the fill is not well defined.

2.3.2 Hydrogeologic Setting

Two aquifer zones specific to remedial investigations have been identified beneath IR Sites 1, 2, and 32 by others (TtEMI, 1999). The first water-bearing zone is unconfined and present in the artificial fill. Depth to water ranges from 2 to 8 feet bgs. The Young Bay Mud situated beneath the artificial fill acts as a semi-confining layer that separates the first water-bearing zone from the second water-bearing zone. The second water-bearing zone is situated in the lower portion of the Young Bay Mud unit and top of the Merritt Sand and extends into the San Antonio Formation. The Yerba Buena Mud unit acts as an aquitard. Previous site investigations by others suggest that a vertical gradient between the first and second water-bearing units is minimal.

Groundwater flow in the first water-bearing zone is horizontal and flows radially from the center portion of Alameda Point toward Oakland Inner Harbor, San Francisco Bay, and Seaplane Lagoon. In the vicinity of IR Sites 1 and 32, groundwater flow is generally west toward San Francisco Bay and north and northwest into the Oakland Inner Harbor. In the vicinity of IR Site 2, groundwater flow is generally west and south toward San Francisco Bay. The first water-bearing zone is tidally influenced and seawater intrusion is a consequence of climatic variations. Investigators report that the first water-bearing zone at the site is characterized by thin lenses of freshwater recharged by precipitation floating on brackish to saline water.

2.4 CHEMICAL AND RADIOLOGICAL CHARACTERISTICS

The nature and extent of the chemical and radiological contamination at IR Sites 1, 2, and 32 have been investigated and are detailed in various site investigation reports as mentioned above.

The following sections summarize the findings of the previous investigations but are not intended to provide the complete detailed history. Readers are directed to review the referenced reports for more detailed information. The information provided has been used to define the scope of the radiological survey completed for the site.

2.4.1 Chemical Characteristics

IR Site 1

Soil and groundwater chemical investigations were conducted at various locations on IR Site 1 in 1985, 1990, 1991, 1994, 1995, 1996, 1998, and 1999. Two documents (TtEMI, 1999; 2001) contain various information including geology, hydrogeology, background chemical concentrations, sample collection, soil and groundwater analyses, applicable or relevant and appropriate requirements (ARARs), and human health and ecological risk assessments.

Soil investigation activities showed that total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, radionuclides, and metals are present in IR Site 1 soils. The most prominent chemicals are SVOCs of the

polynuclear aromatic hydrocarbons (PAHs) class detected at several locations. Metals and radionuclides were also detected at various locations and depths. TPH, pesticides, and PCBs were detected in shallow soil samples. Although no apparent distribution pattern was identified for these chemicals, many of the highest concentrations were detected in samples collected at soil boring clusters along the western boundary near the shoreline extending from the "former burn area" to south of the pistol range (TtEMI, 1999).

Based on the IR Site 1 RI Report (TtEMI, 1999), the following chemicals in soil at IR Site 1 pose a human health cancer risk exceeding 1 in a million: chromium, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, indeno[1,2,3-cd]pyrene, and dibenzo[a,h]anthracene. According to site historical information, the disposal area was originally filled with dredge spoils from the Bay before wastes were placed in the area. When the construction of Runways 13 and 7 began, spoils stockpiled during dredging operations were used again as fill. The origin of some of the detected chemicals is believed to be the hydraulic fill. However, because the highest chemical concentrations are at locations adjacent to the disposal area, the disposal activities are also likely to have contributed to the elevated chemical concentrations detected. The consistently elevated concentrations of soil borings located in the burn area suggest that refuse burning in the early 1950s contributed to both the SVOCs and metals detected.

A radiological groundwater evaluation on data collected from IR Site 1 and IR Site 2 in winter 2003 indicated that uranium was naturally occurring and that it was not possible to determine if the source of radium is natural or contamination (Shaw, 2004).

Radiological groundwater data for eight rounds of sampling (June 2002 through April 2004) at IR Sites 1 and 2 were evaluated by Shaw to determine whether the source of detected radiological activity is naturally occurring or attributable to activities at these sites. The data set for IR Site 1, which included 195 samples from 29 wells, was evaluated for anomalies and compared to maximum contaminant levels (MCLs). Results were presented in a December 2004 memorandum (Shaw, 2004). The evaluation did not suggest any significant anomalies in the first water-bearing zone.

IR Site 2

Soil and groundwater chemical investigations have been conducted at various locations on IR Site 2. Based on historical information, contaminants detected in soil at IR Site 2 include volatile organic substances, TPH, SVOCs, PAHs, PCBs, and ^{226}Ra.

Metals, pesticides, and PCBs were detected in the sediments from ponds associated with the wetlands. Pesticides and PCBs were detected in soil above 1996 EPA Region 9 Preliminary Remediation Goals (PRGs). The presence of these constituents in soil, although not necessarily found in groundwater, identifies them as potential constituents of concern (Shaw, 2004).

According to site historical information, the disposal area was originally filled with dredge spoils from the Bay before wastes were placed in the area. When the construction of Runways 13 and 7 began, spoils stockpiled during dredging operations were used again as fill. The origin of some of the detected chemicals is believed to be the hydraulic fill. However, because the highest chemical concentrations are at locations adjacent to the disposal areas, the disposal activities are also likely to have contributed to the elevated chemical concentrations detected.

Radiological groundwater data for eight rounds of sampling (June 2002 through April 2004) at IR Sites 1 and 2 were evaluated by Shaw to determine whether the source of detected radiological activity is natural or attributable to activities at these sites. The data set for IR Site 1, which included 195 samples from 29 wells, was evaluated for anomalies and compared to MCLs. Results were presented in a December 2004 memorandum (Shaw, 2004). The evaluation did not suggest any significant anomalies in the first water-bearing zone.

IR Site 32

IR Site 32 was identified as an IR site after the evaluation of data resulting from soil and groundwater sampling performed during previous investigations. These investigations identified VOCs at levels above California MCLs in shallow groundwater in the vicinity of Building 594. Soil and groundwater samples were analyzed for VOCs, TPH, SVOCs, pesticides, PCBs, metals, gross alpha and beta, and radium. Analytical results for soil samples were compared to residential PRGs and metals results in soil were also compared to Alameda Point background ranges. The only analyte with results that exceeded the corresponding PRG was arsenic. However, naturally occurring arsenic concentrations in soil exceeded the PRG throughout Alameda Point, and arsenic results for soil at IR Site 32 were within the background range.

Groundwater samples from IR Sites 1 and 32 contain levels of a variety of analytes exceeding MCLs, including aromatic and chlorinated VOCs, SVOCs, metals, and radionuclides (Innovative Technical Solutions, Inc., 2005). The highest concentrations are generally found in the first water-bearing zone and along the western shoreline of the former IR Site 1 landfill. A smaller area of trichloroethene (TCE) contamination exists along the northern shoreline of IR Site 1, and a low-concentration VOC plume is found in the area east of IR Site 32.

2.4.2 Radiological Characteristics

IR Site 1

Over 3 million NaI measurements were collected during the scan survey of IR Site 1 performed by TtFW in 2004 (TtFW, 2005a). These measurements represent 919,602 geographic coordinate pairs. A threshold value of 4,000 counts per minute (cpm) net was used to filter the data to facilitate identifying areas of potential interest. Of the 919,602 discrete locations, only 2,091 locations exhibited a net cpm greater then 4,000 cpm. The 2,091 data points were generally

located in clusters in IR Site 1. The majority of the locations were located along the west side of IR Site 1 in the area of the former pistol and skeet ranges. The majority of the data points, roughly 57 percent, were in the <10,000 cpm net range. Likewise, only 7 percent of the data points were in the >50,000 cpm net range representing approximately seven distinct locations within IR Site 1.

IR Site 2

Over 3 million NaI measurements were collected during the scan survey of IR Site 2 performed by TtFW in 2004 (TtFW, 2005b). These measurements represent 992,594 geographic coordinate pairs. A threshold value of 4,000 cpm net was used to filter the data to facilitate identifying areas of potential interest. Of the 922,594 discrete locations, only 891 locations exhibited a net cpm greater then 4,000 cpm. The majority of the locations were located along the north and east side of IR Site 2 in and around the magazines. Most of the data points, roughly 75 percent, were in the <10,000 cpm net range. Likewise, only three data points were in the >15,000 cpm net range representing approximately three distinct locations within IR Site 2.

IR Site 32

IR Site 32 is not considered to be a source of radiological constituents based on historical site usage. However, an elevated radiological reading was found to exist along the border between IR Sites 1 and 32 during the IR Site 1 radiological characterization survey conducted in 2004 (TtFW, 2005a). While performing chemical sampling in 2005 at IR Site 32, Bechtel Environmental, Inc. (BEI) conducted radiological screening during sampling activities as a precaution due to the potential for surface contamination associated with disposal activities at IR Site 1. Bechtel documented elevated ambient gamma measurements at three sample locations within IR Site 32. Subsurface activity was also located near a sample location with a measured contact reading of 70,000 – 80,000 cpm using a 2-inch by 2-inch NaI detector (TtEC, 2006b) during a radiological survey conducted by TtEC (TtEC, 2006b).

See section 6.0 for measurement data and discrete locations of elevated measurements collected during the radiological characterization survey of IR Site 32 conducted by TtEC in 2006.

2.5 PREVIOUS RADIOLOGICAL SURVEYS

IR Sites 1 and 2

Preliminary radiological surveys were completed at IR Sites 1 and 2 in September 1995. In June 1996, a second preliminary radiological survey was conducted at a different area within IR Site 1. Details on the methodology used during the preliminary surveys and the data results are presented in the IR Sites 1 and 2 radiation survey report (PRC, 1997). Based on results from the preliminary surveys, a comprehensive radiological survey was initiated by the DON in September 1998. The SSPORTS Environmental Detachment conducted a more comprehensive

radiological survey at IR Sites 1 and 2 in 1998 and 1999. The details of this survey are provided in the *Alameda Naval Air Station Landfill #1 and #2 Final Radiological Survey Report* (SSPORTS, 1999).

In 2004, TtFW conducted a radiological characterization survey at IR Sites 1 and 2. The primary objective of the survey was to characterize the potential presence of ^{226}Ra contamination. The survey included a 100 percent surface scan using 2-inch by 2-inch NaI detectors, as well as fixed gamma and exposure rate surveys, gamma energy analysis with a portable HPGe system, and soil sampling. However, due to accessibility issues, neither the shorelines of IR Sites 1 and 2 nor the former Radiological Shack area located within IR Site 2 were surveyed. The findings of the radiological characterization surveys are presented in the *Final Installation Restoration Site 1 Radiological Characterization Survey Report* (TtFW, 2005a) and the *Final Installation Restoration Site 2 Radiological Characterization Survey Report* (TtFW, 2005b).

IR Site 32

The DON is currently within the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) RI process for IR Site 32. IR Site 32 has no historical indications of being radiologically impacted. However, during the IR Site 1 radiological characterization survey conducted in 2004, an elevated radiological reading was found to exist along the border between IR Sites 1 and 32 (TtFW, 2005a). Sampling activities were performed by BEI in support of the RI to further characterize soil and groundwater contamination at IR Site 32 from October 3, 2005, to October 13, 2005. The RI sampling activities included a collection of soil samples to define the nature and extent of contamination in shallow soil, sampling of bedding material near underground utility lines, discrete groundwater samples from new monitoring wells installed in the first and second water bearing zones at the site, and groundwater sampling of the new monitoring wells. TtEC was contracted by the DON to support BEI IR Site 32 field activities by providing radiological screening of equipment and soil during the planned field activities (TtEC, 2006b).

3.0 RADIOLOGICAL SURVEYS

TtEC conducted a radiological characterization survey of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack in IR Site 2. The survey methodology used included scan measurements, static measurements, in-situ gamma energy analysis, exposure rate measurements by instrumentation and TLD, and soil sampling. The areas to be surveyed were cleared of vegetation before the survey, and reference areas were established to compare against the survey results.

3.1 OBJECTIVE OF SURVEY

The objective of the survey was to determine if radioactive material distinguishable from background is present at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area in IR Site 2. The survey was conducted following the MARSSIM guidelines (DoD et al., 2000). The intent was to perform a characterization survey such that the data could be used to support future Final Status Surveys.

3.2 SURVEY CRITERION

The survey criterion for this project was to identify areas of elevated radioactivity distinguishable from background and identify the radionuclide contributing to the increased radioactivity. The characterization survey identified locations where residual ^{226}Ra activity was distinguishable from ^{226}Ra naturally occurring in the background reference areas.

3.3 MOBILIZATION

Site mobilization began on August 28, 2006, for the radiological survey portion of the fieldwork. Clearing and grubbing of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area took place from August 31, 2006, to September 26, 2006. A project support area was assembled between the IR Site 1 and IR Site 2 work zones using the existing fence lines and access gates to provide security for the support areas. A 40-foot office trailer, a 20-foot storage Conex, two portable toilets, a hand-wash station, and a 3-yard dumpster for refuse were mobilized to the site. A portable 25-kilowatt generator supplied power.

On September 6, 2004, a pre-construction conference was held at the Alameda Point ROICC office. The TtEC PHP, radiological subcontractor superintendent, PQCM/SHSS, the BRAC Environmental Compliance Manager, the ROICC, and the ROICC's Construction Management Technician participated in the meeting. The purpose of the pre-construction conference was to discuss and develop a mutual understanding of the following activities:

- Scope of survey activities
- Site health and safety requirements
- Contractor Quality Control (CQC) submittals
- Approach and execution of the Contract Task Order (CTO)
- Coordination between parties

Additional mobilization activities included installation of site controls and conducting required radiation, and biological training for TtEC and their subcontractors. Additionally, Eberline Services, the radiological survey subcontractor, spent the first week mobilizing and calibrating radiological equipment and establishing survey control for IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area.

3.4 SURVEY PREPARATION

A land survey and vegetation clearance activities were conducted in preparation for the radiological survey at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area.

3.4.1 Land Survey

Coast Surveying, Inc., a licensed California land surveyor, performed land survey services at Alameda Point for the purpose of identifying the sample locations at the original three Background Reference Areas (BRAs), and providing accurate topographic reference points for the radiological survey with Laser-assisted Ranging and Data System (LARADS) technology.

The primary survey control for the site is based on a monument located at the northwest corner of Main Street and Atlantic Avenue in the city of Alameda. The location of the monument was provided by the DON and described by the National Geodetic Survey (NGS) as "Main/Atl." The NGS defines and manages the National Spatial Reference System — the framework for latitude, longitude, height, scale, gravity, orientation, and shoreline throughout the United States.

Coast Surveying, Inc. performed the survey using third-order, Class I accuracy. Horizontal control (northings and eastings) was tied to the California Coordinate System (CCS) Zone III, North American Datum (NAD) of 1927. The NAD27 value for "Main/Atl" was derived from the NAD conversion of the published NAD83 coordinates. The coordinates for the control point at "Main/Atl" based on NAD27 are provided as follows:

- Northing – 471,068.97
- Easting – 1,482,604.56

The site elevations are based on the National Geodetic Vertical Datum (NGVD) of 1929. The published elevation of the "Main/Atl" is provided as follows:

- Elevation – 6.69 feet

Appendix A of this report contains the survey coordinate information stamped by a California-licensed surveyor. The final survey data has been converted to California State Plane Coordinate System, NAD 83, Lambert Zone 3, and North American Vertical Datum 1988 for input into the DON database.

3.4.2 Vegetation Clearance and Associated Environmental Protection

To facilitate the radiological survey of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area within IR Site 2, vegetation was cut/removed to an approximate height of 2 inches, since the mobile LARADS equipment used for the radiological survey was anticipated to be positioned approximately 4 inches above the ground. Clearance activities were conducted from August 31 to September 26, 2006, in accordance with the *Final Vegetation Clearance Plan, Radiological Survey at Installation Restoration Site 32 and the Shorelines of IR Sites 1 and 2, Alameda Point, Alameda, California* (TtEC, 2006c).

During clearance activities, TtEC determined that additional clearance of vegetation and debris would be required at the southern shoreline margin of IR Site 2 to allow safe access for the man lift during shoreline static surveys. The DON agreed to the additional clearance work and an FCR form was prepared to document the activity in accordance with the Final Vegetation Clearance Plan (TtEC, 2006c). A summary of the FCR forms is provided in Appendix B.

A tree survey was conducted in April 2006 to identify trees potentially requiring pruning to facilitate radiological survey activities in the former Radiological Shack area within IR Site 2 and along the shoreline of IR Site 1. To the maximum extent practicable, large brush/woody multi-stemmed shrubs (stems 2 inches to 10 inches in diameter at breast height [DBH]) were not impacted. However, in some specific circumstances during vegetation clearance activities, the biological monitors were required to employ appropriate pruning to allow the survey equipment to pass under the crowns of targeted specimens without obstruction. Tree pruning is discussed further is Section 3.4.4.

Delineation of potentially jurisdictional wetland boundaries within IR Sites 1 and 2 were previously surveyed during the radiological surveys conducted in 2004, and are discussed in the Vegetation Clearance Plan (TtEC, 2006c). No surveys were conducted within the delineated boundaries of the previously established wetlands during activities associated with the radiological characterization of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area within IR Site 2.

All cut vegetation was either left in place or hauled to areas within the IR site limits. Mature trees (dominant and co-dominant crown class), as identified by the TtEC Biologist, were hand-pruned around the individual base of the tree to a 3-foot height off the ground to facilitate radiological surveys and equipment clearance. No trees were removed during the course of this vegetation clearance. No off-site disposal of vegetation was conducted.

Access to the former pistol range area within IR Site 1 was restricted during vegetation clearance activities. UXO was identified in the former pistol range area and delineated with caution tape (see Section 3.5 for details).

On September 18, 2006, the areas cleared of vegetation were inspected by the radiological subcontractor, Eberline Services, and found to be acceptable. These areas were also inspected by the ROICC and found to be acceptable. Machinery used for the vegetation cutting was decontaminated, sampled, and monitored for radiation before being unconditionally released for demobilization. All of the equipment and supplies associated with vegetation clearance activities were then demobilized.

3.4.3 Biological Monitoring

Prior to initiation of vegetation mowing, the TtEC Biologist examined all areas proposed for vegetation clearance (Appendix D).

Before the start of each new field activity, all on-site personnel and any subsequent personnel that came on site were briefed on the protection of natural resources, including compliance with the intent of state and federal applicable and relevant regulatory requirements. The PQCM/SHSS performed the worker education briefing and emphasized the need for minimizing impacts on local biological resources, as well as methods for avoiding and minimizing potential impact on special-status species and communities of concern. It was required that all personnel on the project site be alert to the possibility of finding a nesting bird or other locally sensitive biological resource on or near the project area.

Prior to initiation of vegetation clearance activities, a TtEC Biologist conducted a biological survey of all areas proposed for vegetation clearance in April 2006, including mowing and tree pruning. Active species nests were discovered and documented in Table 3-1. The PQCM/SHSS briefed all workers on actions to take if nests were encountered while cutting targeted vegetation. Due to the August start date (non-nesting/breeding season) of the survey activities, no active nests previously documented during the biological survey conducted in April 2006 were encountered upon mobilization to the site. No nests were encountered during the course of any survey activities.

3.4.4 Tree Evaluation and Pruning

In order to complete the radiological survey at IR Site 1, 2, 32 and the former Radiological Shack area, pruning of on-site trees was conducted during September 2006. A total of seven trees were evaluated, of which four required pruning. Trees were pruned so that no lateral branches extended from the ground surface to a height of 3 feet to the maximum extent practicable.

Most specimens needed minimal pruning to allow the radiological survey to proceed and to promote good tree health and vigor. Dead wood, torn limbs from past failures/pruning events, co-dominant forks, end-weighted laterals, and limbs with bark/stubs required appropriate removal to increase tree health and symmetry.

Three Toyon trees (*Heteromeles arbutifolia)* and an ornamental landscape planting required minor pruning to a remove dead wood, torn limbs from past failures, end-weighted laterals, and limbs with bark/stubs within 6 to 7 feet of the ground. The pruning of these trees will likely result in increased tree health and vigor, and it allowed the radiological survey equipment to pass under the crown without obstruction.

3.5 MUNITIONS AND EXPLOSIVES OF CONCERN

A complete MEC surface sweep of IR Site 1 was conducted in June 2001. No live MEC items were encountered during the sweep. A small amount of 20 millimeter (mm) target practice rounds, some MEC scrap, and other non-MEC debris were encountered. A surface sweep for MEC was performed at IR Site 2 in 2002. In addition to these surface characterization activities within IR Site 2, a time-critical removal action (TCRA) to excavate OEW to a depth of 1 foot from the Possible OEW Burial Site was performed in 2002 (FWENC, 2002). An OEW characterization was also conducted (TtFW, 2004). An MEC sweep of IR Site 32 has not been conducted.

MEC was encountered at the former pistol range area within IR Site 1. An area around the MEC was delineated with stakes and caution tape prior to the start of survey activities by the Senior Unexploded Ordnance Supervisor (SUXOS), Lance Humphrey, and then designated as restricted during the course of all survey activities. Although FWENC had conducted an OEW surface clearance activity of this area in 2001 (FWENC, 2002) and removed surface occurrences of OEW, FWENC was not authorized to remove buried material under the scope of that contract task order. Erosional forces (rain and high tide events) since 2001 exposed the OEW encountered in the former pistol range area.

The SUXOS requested and received a Waiver to the Explosives Safety Submission (Appendix C) because of the inert characteristics of the MEC (20mm trainer projectiles). The planned recovery, processing, and disposition of recovered MEC will be performed as part of the TCRA at IR Site 1 scheduled for spring 2007.

Prior to beginning the radiological survey, all site personnel were given a MEC briefing by the SUXOS in order to describe likely shapes and sizes of MEC items that may be encountered during survey activities, and procedures to follow if any were located. The SUXOS was present during all intrusive soil sampling activities and investigated each proposed sample location with a Schonstedt magnetometer to determine if metallic debris was present before hand augering. No metallic debris was encountered during soil sampling activities. No MEC items encountered were moved or relocated during the course of radiological characterization activities at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area within IR Site 2.

3.6 BACKGROUND REFERENCE AREAS

In accordance with MARSSIM (DoD et al., 2000) guidance, determining background levels for comparison with the conditions determined in a specific survey area requires performing surveys in one or more reference areas to define the background radiological conditions of the site. The reference areas provide a location for the collection of background measurements used for comparison with the survey area being evaluated. As detailed in the Final Radiological Survey Work Plan (TtEC, 2006a), three 2,000-square meter (m^2) reference areas were originally identified for background determination.

The locations of the reference areas were selected a minimum of 200 feet outside any environmentally impacted areas within Alameda Point. A map locating Operable Units (OUs) and CERCLA sites at Alameda Point was reviewed (TtEMI, 2003) to identify potential reference areas. The locations selected had not been impacted by site activities and were therefore representative of background levels. The reference areas are located upgradient or cross-gradient from IR Sites 1, 2, and 32 and are physically separated from the site.

Shoreline riprap within the boundaries of IR Sites 1, 2 and 32 were built from varying natural and man-made materials (i.e., concrete, rubble, granite, basalt, and asphalt). Two separate reference areas were required since the riprap along the shorelines is heterogeneous and a single reference area was not found that had the same material makeup as that of the riprap found along the shorelines. An area located north of the baseball field was selected as the reference area since it contained the basalt and some granite elements of the riprap. An area approximately 1,600 feet east of IR Site 32 was selected as the second reference area since it contained similar concrete, rubble, and granite components to that found in the riprap along the shoreline. These two additional reference areas were established in collaboration with the DON to collect background reference measurements for the riprap material along the shorelines. During the course of survey activities, background reference measurements for the shoreline riprap material were taken from a location selected by the PHP. FCR Form 004 was generated to document the need for the two riprap reference areas and is provided in Appendix B. The locations of the five background reference areas are identified on Figure 3-1.

3.6.1 Background Measurements

The ambient gamma background was established for the NaI detectors, TLDs and the ambient dose rate was established for each individual pressurized ion chamber (PIC) and the MicroREM meter. The standard deviation of these fixed readings in the background areas is used for determining the investigation criterion of 3 sigma above background by summing the measurements from the background areas, and calculating the average and standard deviation of the measurements.

Nine static background measurements and one field duplicate were collected from the three soil BRAs. These measurements were obtained to establish the average background count rate for the NaI detector, exposure rate for the PIC, and dose rate for the MicroREM meter. Five 10-second stationary readings were taken at a distance of 6 inches above the ground at each of the locations within a reference area using a 2-inch by 2-inch NaI detector. The average of the NaI readings were then recorded for each sample location. In addition, the exposure rate was obtained 3 feet (waist high) above the ground at each of the 10 locations within a reference area using the PIC and MicroREM meter.

The towed array and backpack-based systems were used to perform 10-minute scan surveys in each reference area to establish the background count rate during a surface scan survey. Surveying at a speed of 1 foot per second for 10 minutes yielded upward of 600 data points, which is sufficient to statistically determine a scanning background count rate for each of the systems.

The background soil concentration of ^{226}Ra (0.365 pCi/g) was determined during the radiological characterization surveys conducted at IR Sites 1 and 2 performed in 2004 (TtFW, 2005a; 2005b). This concentration was used to determine if ^{226}Ra is present in soil samples at concentrations greater than 3 sigma above background (0.559 pCi/g) within IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area.

Nine static background measurements and one field duplicate were also collected from the two riprap background reference areas. Static NaI and TLD measurements were collected from the selected background reference areas for riprap. Five, 10-second stationary readings were taken at a distance of 6 inches above the ground from the manlift at each of the locations within each riprap reference area using a 2-inch by 2-inch NaI detector. One TLD was placed in each riprap background reference area for a 3-month period from September 28, 2006, until January 19, 2007, and then analyzed by an off-site laboratory. Results of background measurements collected during the survey are discussed and summarized in Section 6.1.

3.6.2 Riprap Source Study

A cesium-137 (^{137}Cs) sealed check source was placed in an area of riprap and 10-second static measurements were collected using a NaI detector at 1-foot intervals to a distance of 10 feet, moving in a lateral direction away from the check source. These measurements were collected to

evaluate the shielding effects of the riprap, and were performed in two separate shoreline areas designated by the PHP. One area was selected visually representative of typical "small" riprap, while a second area was selected as representative of "large" riprap. The results are discussed and summarized in Section 6.2.5.

3.7 SURVEY AREA

The radiological survey conducted at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area was performed to determine the presence of ^{226}Ra contamination on the surface and subsurface (to approximately 12 inches bgs for scans and 20 inches bgs for soil samples). If an anomalous location was identified at the edge of an IR boundary, a step-out procedure was implemented as described in the Final Radiological Survey Work Plan (TtEC, 2006a). At the location of the anomaly, the survey stepped 10 feet outside the current boundary in each direction to identify any discrete sources. If an additional anomaly was identified within this area, the survey area was extended in 10-foot increments until no further anomalies were encountered.

The radiological surveys for each identified area included both static and scan surveys, as well as a dosimetry study, soil sampling, and gamma energy analysis using a portable HPGe system. The survey methods used are described in the following subsections.

3.7.1 LARADS Scanning (vehicle-based)

High-density radiation surveys were performed over the majority of IR Site 32 using LARADS technology coupled to a linear array of four 2-inch by 2-inch NaI high-sensitivity scintillation detectors. The detectors were mounted so that the detector surface was approximately 6 inches from the ground, depending on the terrain being surveyed. This arrangement is capable of surveying a path approximately 4 feet wide and providing reliable survey data to a depth of approximately 12 inches.

The vehicle-based LARADS was operated with a speed control to maintain an approximate speed of 1 foot per second. Operating at this speed resulted in a generation of more than 40,000 data points per acre. This equates to an average of one data point per square foot. The scan speed can affect the scan MDC when attempting to measure gamma radiation from discrete sources. This is due to the amount of time the active area of the detector is over the discrete source. At slower speeds, the active area of the detector is over the discrete source longer than at faster speeds.

Due to access restrictions, the vehicle-based LARADS was not used at the former Radiological Shack area or the shoreline riprap along IR Sites 1, 2, and 32. In these areas, a LARADS hand-held device with a NaI detector was used, or a NaI detector mounted from a man lift as discussed below.

3.7.2 LARADS Scanning (hand-held)

The high-density survey performed using the LARADS mounted on a vehicle/cart will result in a 100 percent scan survey when terrain is reasonably smooth and clear of obstructions. For those areas where terrain did not allow the vehicle-based LARADS to safely operate (the shorelines of IR Sites 1, 2, and 32 and the former Radiological Shack in IR Site 2), the survey was performed using a single NaI high-resolution scintillator detector connected to a backpack-based LARADS. The surveyor scanned the terrain by suspending the detector approximately 6 inches above the ground surface. The backpack unit worn by the surveyor contained the LARADS equipment. The survey speed for this method was an average of one data point collected per square foot.

Section 6.1.2 provides a discussion of the survey results from the backpack-based LARADS scan survey.

3.7.3 Static Surveys

Static surveys were performed along the shoreline of IR Site 1, 2, 32 and the former Radiological Shack Area. For the areas along the shoreline where towed or hand-held surveys could not be performed, the following survey approach was used. A 10-foot by 10-foot grid was established along the shoreline from the end of the previous survey to the mean low tide elevation. Static 10-second surveys were then performed at each grid point (e.g., on 10-foot centers). This was accomplished using an articulating man lift and a NaI detector attached to a retractable line, with LARADS mounted in the man lift bucket. The detector was lowered in a protective capsule to within 6 inches of the shoreline riprap surface and a measurement collected. LARADS was used to geo-reference these static measurements. An FCR form was generated to clarify that the shoreline static surveys would be performed along a 10-foot by 10-foot grid established along the shoreline from the edge of the 2004 survey to the interface of the shoreline riprap with water's edge. This was necessary because of submergence of the mean low tide elevation at certain times of the survey work day due to the tidal cycle. The NaI detector capsule used on the manlift would have been required to be submerged under the waterline to access certain grid points dependent on tidal elevation. Gamma attenuation by contact with sea water would have required two separate data sets for shoreline areas specific to data acquired above water and a data set for below water surface.

Static surveys were also performed at each soil sample location using a 2-inch by 2-inch NaI high-resolution scintillator detector. The sample location was surveyed to identify the area of greatest activity. The NaI reading was then recorded for this location and a soil sample collected.

The scope of work for this characterization survey required the collection of precision dose rate measurements using a PIC, with location coordinates of the site(s) and a survey density equal to approximately one dose rate reading per every grid point of a surveyed 10 foot by 10 foot surface area grid. Ten-minute PIC measurements were collected on 10-foot centers at IR Site 32, except

along the shoreline and/or where the use of a man lift was required. One-hour PIC measurements were also performed along the shorelines of IR Site 1, 2, and 32 at 50-foot intervals where the TLDs associated with the dosimetry study (refer to Section 6.2.7) were located.

3.7.4 Alpha/Beta Surveys

Alpha and beta surveys were conducted using a portable Eberline E600/SHP380AB 100-square centimeters (cm^2) scintillation detector. Additionally, an Eberline HandECount alpha/beta sample counter was used for evaluation of wipe and air filter samples in accordance with the procedures outlined in the Final Radiological Work Plan (TtEC, 2006a).

Each sample container was also required to be checked for beta/gamma and alpha contamination prior to packaging for shipment and release for shipment to the laboratory, per Appendix D-4, Sampling Procedures for Radiological Surveys, of the Final Radiological Work Plan (TtEC, 2006a).

As part of demobilization activities, free-release surveys were conducted on all equipment, tools, and storage units prior to their demobilization and decommissioning. Free-release surveys were performed using both an alpha survey meter and a beta-gamma survey meter. A radiological release survey was also performed on all equipment for removable radioactive material by evaluating collected swipe samples for alpha and beta-gamma activity in a low-background scaler. These surveys verified release of equipment in accordance with radiological release limits based on Atomic Energy Commission (AEC) Regulatory Guide 1.86 (AEC, 1974). Results of alpha/beta surveys are discussed and summarized in Section 6.3.

3.7.5 Exposure Rate Surveys

Exposure rate surveys were conducted during invasive soil sampling using an Eberline MicroRem meter. Exposure rate surveys were performed to measure the ambient exposure rate at a given sample location within each site. Results of exposure rate surveys are discussed and summarized in Section 6.2.3.

Exposure rates were also collected using a PIC, which is an argon-filled ionization chamber with a diameter of 7.32 cm (2.88 inches) and a volume of 220 cubic centimeters (cm^3) (13.4 cubic inches). A total of four PICs were used during radiological surveys, which included ten-minute PIC measurements collected on 10-foot centers at IR Site 32, except along the shoreline and/or where the use of a man lift was required. One-hour PIC measurements were also performed along the shorelines of IR Sites 1, 2, and 32 at 50-foot intervals where the environmental TLDs associated with the dosimetry study (refer to Section 6.2.7) were located.

NaI static cpm data were correlated to the PIC exposure rate measurements and TLD readings. This allowed estimates of exposure rates based on the NaI measurements collected throughout the site (Section 6.2.3).

3.7.6 Soil Sampling

Fifteen composite soil samples and two duplicate soil samples were collected from 15 locations within IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. These samples were collected and controlled in accordance with the Final Sampling and Analysis Plan (SAP), Appendix B of the Final Radiological Survey Work Plan (TtEC, 2006a).

The sample locations were selected based on the PHP's analysis of the radiological surveys with concurrence from the RASO. The sample locations represented those locations where data indicated levels of ^{226}Ra above background. Soil samples were collected at each location and analyzed for ^{226}Ra and ^{90}Sr. Table 3-2 cross references the soil sample locations with the respective in-situ gamma spectroscopy file number. Gamma spectroscopy files are provided in Appendix F (folders: Field Spectra_PDF). Soil samples were collected from zero to 20 inches bgs using a hand auger. The composite soil samples were approximately 500 milliliters (mL) each and were collected in accordance with the Final SAP, Appendix B of the Final Radiological Survey Work Plan (TtEC, 2006a). Eberline Services/Richmond Laboratory performed the analyses on the soil samples. Soil sample results are discussed in Section 6.2.4 of this report and presented in Appendix E.

3.7.7 Gamma Spectroscopy

A HPGe detector-based gamma spectroscopy system was used to identify the radionuclide present in the areas of elevated readings identified during the scan surveys. The HPGe used was a commercially available coaxial detector-based system configured for in-situ broad field-type measurements. The electronics package used to supply power to the detector and process incoming signals was an Ortec DigiDart hand-held field multichannel analyzer. Final data processing and reporting was performed by Eberline using multichannel spectra analysis software, RobWin Version 1.0.

The HPGe based system consisted of a 70 percent efficient[1] (relative to NaI) HPGe detector, pre-amplifier, 48-hour liquid nitrogen dewar, and cryostat. The detector and integral dewar were mounted on a mobile platform (Ortec's ISO-CART) designed specifically for in-situ measurements. The HPGe detector was fitted into a cylindrical collimating shield and consisted of ⅝-inch lead encased in aluminum. The front end of the detector was recessed into the shield by ¾ inch. The outer diameter of the detector assembly was 3 inches. Therefore, the shield formed a collimator that allowed the detector to observe a 5-foot-diameter area of soil from a height of 30 inches.

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[1] HPGe detector efficiency is given in terms of relative full-energy peak referenced in terms of the absolute efficiency of a standard 3-inch by 3-inch (7.62-cm by 7.36-cm) cylindrical NaI(Tl) scintillation crystal. Full-energy peak efficiency of HPGe detectors is typically between 40 percent and 70 percent of that for the NaI(Tl) scintillation crystal. Lower efficiency, however, is more than compensated for by the better energy resolution.

In this shielded configuration, the solid angle viewed by the detector is approximately a circular area of diameter equivalent to the distance between the detector and the ground. This equated to a 4-inch diameter circle when the detector was 4 inches above ground surface, making it difficult to accurately locate the detector. By raising the detector height to 30 inches above ground surface, the detector had a greater field of view (e.g., 30-inch-diameter circle), which facilitated detector placement.

In-situ gamma spectroscopy measurements were taken at each sample location before the core samples were collected.

Analysis of Soil Core Material

Seventeen (which includes two field duplicates) 2-inch-diameter soil core samples were collected using a 5-foot hand auger device from designated locations within IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. Collected soil material was then prepared for analysis using the following methodology:

1. After pouring the soil material into a clean aluminum tray and generally distributing to a thin even layer, the soil was described in the field notes, and surveyed for radioactivity using a hand-held alpha/beta detector. Selected samples were photographed. The available screening data can be found in Table 3-3.
2. Using the alpha/beta hand-held survey instrument and a small trowel and fork, the material was closely examined for point sources, which were not identified in any of the collected soil samples.
3. Large rocks, excessive vegetative debris, pieces of glass, and so forth, obviously not part of the matrix, were scanned by hand and removed if readings were not above background. The remaining soil material was transferred to a 500-mL plastic Marinelli beaker with a sealed lid. In every case, the volume of the beaker was sufficient to contain a representative quantity of soil material.

Every precaution was taken during sample preparation to prevent cross-contamination between samples through the use of aggressive cleaning of all sample preparation equipment.

Following preparation, each filled Marinelli beaker was placed on the unshielded HPGe detector. A Marinelli beaker is manufactured with a well in the bottom center of the beaker with a slightly larger diameter as the external diameter of the HPGe detector being used for gamma spectral analysis. The beaker is configured so that equivalent quantities of soil are located above and to all sides of the detector. The resulting spectra were reviewed and analyzed by the PHP.

After the field HPGe assessments of each sample were completed, a wipe sample was taken from the outside surface of each Marinelli beaker before any decontamination was performed. Wipe samples were checked for alpha/beta contamination using an Eberline HandECount alpha/beta sample counter. Decontamination was not required for soil sample containers based on an action

level of less than 20 dpm/100 cm^2 alpha, and less than 100 dpm/100 cm^2 beta removable activity. The unconditional release of equipment or material forms for the Marinelli beakers is presented in Table 3-3. Next, the beakers were packaged and delivered to Eberline Services/Richmond Laboratory in Richmond, California, for ^{226}Ra and ^{90}Sr analysis.

A mixed gamma standard with the following isotopes and their respective concentrations was analyzed prior to sample measurements each day: Eu-155 194.7 pCi/g, Co-57 46.2 pCi/g, Sn-113 8.0 pCi/g, Cs-137 105.8 pCi/g, Mn-54 47.7 pCi/g, Zn-65 72.0 pCi/g, K-40 81.8 pCi/g, Sb-125 0.3 pCi/g. This was a gamma standard containing exempt quantities of the radium nuclides dispersed in a sandy soil matrix, and sealed in a standard Marinelli beaker.

3.8 DOSIMETRY STUDY

As required by DHS, an environmental dosimetry study of the coastal area of IR Site 1 was performed for a period of approximately 3 months. This study was expanded to include the shorelines of both IR Site 2 and IR Site 32. The study was performed using TLDs to determine if there was a measurable difference between exposure rate measurements along the shorelines of IR Sites 1, 2, and 32 and background area measurements. The TLDs were placed every 50 linear feet along the respective shorelines. A total of 200 TLDs were installed in the field as part of this survey. The TLD results are discussed in Section 6.2.7 of this report and presented in Appendix E.

3.9 MATERIALS, EQUIPMENT AND PERSONNEL SURVEYS

Radiological release surveys were performed on equipment and materials leaving the controlled work area to verify the absence of contamination. Materials and equipment radiological release surveys were conducted in accordance with SOP 5, Release of Materials and Equipment from Radiologically Controlled Areas, and personnel surveys were conducted in accordance with SOP 8, Radiological Protective Clothing Selection, Monitoring, and Decontamination.

The following limits were applied to release of equipment and material:

1. Removable contamination, determined by wiping with a dry filter: 20 dpm/100 cm^2 (alpha) and 200 dpm/100 cm^2 (beta)
2. Average, (fixed and removable) based on a maximum area of 1 square meter (m^2): 100 dpm/100 cm^2 (alpha) and 1,000 dpm/100 cm^2 (beta)

Equipment and material surfaces were scanned using portable alpha/beta monitoring equipment.

Equipment and material released from the shorelines of IR Sites 1 and 2, IR Site 32, and the former Radiological Shack area were surveyed using a swipe sample to verify that no removable radioactive material was present. Swipe samples were collected over a 100 cm^2 of surface area by wiping the area with a dry filter or soft absorbent paper and evaluating the wipe for alpha and beta-gamma activity using a low-background scaler.

Personnel were surveyed when exiting IR Sites 1 and 2, IR Site 32, and the former Radiological Shack area during invasive soil sampling to verify the absence of any radiological contamination. The surveys were performed using portable alpha/beta monitoring equipment. No radioactive contamination was found during any of the personnel surveys. Results of material, equipment, and personnel release surveys are discussed and summarized in Section 6.3.1.

3.10 AIR MONITORING

Portable lapel air samplers were calibrated and used to collect both background and breathing zone air samples during invasive soil sampling activities. An Eberline HandECount alpha/beta sample counter was used to analyze the air samples for alpha activity. The DAC for ^{226}Ra is 3×10^{-10} µCi/mL as established in Title 10 Code of Federal Regulations (CFR), Part 20. The calculated concentration of the air samples was not above 10 percent of the DAC for ^{226}Ra. Lapel air sample results are reported in Table 3-4.

4.0 INSTRUMENTATION

In support of the radiological survey performed, radiation detection instruments suitable for the physical and environmental conditions at the site were selected. The instruments selected were capable of detecting ^{226}Ra contamination, the primary radionuclide of concern.

4.1 SURVEY INSTRUMENT INFORMATION AND PROCEDURES

A LARADS was the primary field survey system used for radiological characterization surveys performed at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. Several types of other portable field survey instruments were used to conduct the radiation surveys, provide analytical data, and monitor radiation control practices. The types of survey instruments used and a description are provided in the subsections below and in Table 4-1.

4.1.1 LARADS Survey

LARADS used the Eberline E600. This count rate meter contains circuitry that may be configured to support a wide variety of detector types. NaI (2-inch by 2-inch) detectors were used for the radiological land surveys. The LARADS systems used four NaI (2-inch by 2-inch) detectors positioned in a linear array spaced approximately 1 foot apart (see Figure 3-2). The detectors were not in a shielded configuration. The minimum detectable count rate (MDCR) used for the NaI detectors is presented in Section 5.0.

The system collected and stored the positional coordinates and radiological readings on a point-per-second basis in electronic files. These field files were downloaded and processed with Geographic Information System (GIS) software. Additional information regarding LARADS is provided in Section 3.7.1.

4.1.2 Scan Gamma Surveys

An Eberline Model E600 portable radiation monitor equipped with a NaI (2-inch by 2-inch) detector was used for scan gamma surveys. Scan measurements were obtained by traversing a path at a maximum speed (scan rate) of approximately 0.5 meters per second (m/s) and slowly sweeping the detector assembly in a serpentine (snakelike, S-shaped) pattern, while maintaining the detector 2.5 to 4 inches (6 to 10 cm) above the area surveyed. These measurements were always made with the instrument audio "on" to facilitate rapid detection of changes in instrument count rate. NaI scintillation detectors are very sensitive to gamma radiation and are ideal for locating elevated radiation levels above background. The instruments were used with the detection discriminator set to full open.

4.1.3 Static Gamma Surveys

Surveys for gamma (photon) radiation were performed using an Eberline Model E600 portable radiation monitor equipped with a NaI (2-inch by 2-inch) detector. Static measurements were performed by positioning the detector assembly approximately 6 inches (approximately 15.2 cm) above the designated surveillance surface and completing a static 1-minute survey.

4.1.4 Gamma Spectroscopy

In situ or field sample gamma energy analysis was performed using a portable HPGe detector system. The system used a 70 percent efficient coaxial HPGe detector coupled to a 48-hour liquid nitrogen dewar. An adjustable mobile platform cart held the detector and the 2-inch-thick circular lead collar for shielding unwanted background gamma rays from the sides and behind. The detector was operated using a portable ORTEC DigiDART module connected to a laptop computer running ORTEC's GammaVision acquisition software.

4.1.5 Exposure Rate Surveys

Exposure rate surveys, obtained approximately 3 feet from contact with area surfaces, were conducted using a MicroRem meter. Compatible with anticipated exposure rates, the instrument is equipped with an internally mounted tissue equivalent scintillation detector integral to the meter housing. The MicroRem meter measures low-level gamma photon radiation and provides an output in units of microroentgen-equivalent-man per hour (μRem/h). Readings were obtained after allowing the instrument to stabilize.

Exposure rate surveys, obtained approximately 3 feet from the ground, were conducted using a PIC. The PIC measures low-level gamma photon radiation and provides an output in units of microroentgen per hour (μR/h). Exposure rate surveys were also performed using TLDs, which were located approximately 3 feet from the ground and placed every 50 feet along the shoreline. The TLDs provide a measurement of the exposure rate in μR/h based on deployment duration.

4.1.6 Materials, Equipment and IDW Screening

Materials, equipment, and investigation-derived waste (IDW) were scanned using an Eberline Model E600 with a SHP380AB 100-cm^2 scintillation detector to verify the absence of detectable radioactive contamination. The Eberline SHP380AB scintillation detector measures alpha and beta radiation levels and presents data in a scaler (digital display) or rate meter (analog display) mode.

4.2 INSTRUMENT CALIBRATION AND QUALITY ASSURANCE PROCEDURES

Instrument calibration was verified and QA procedures were implemented prior to equipment use as discussed herein.

4.2.1 Instrument Calibration

The equipment supplier provided calibration documentation for each radiological instrument supplied. The PQCM or designee reviewed the calibration documentation prior to the instrument being used. Certificates of calibration and calibration data for each instrument are provided in Appendix H.

4.2.2 QA/QC Procedures

The following QA/QC procedures for instruments were used during survey activities.

Field Instruments

Prior to the daily use of the radiological instruments, calibration verification, physical inspection, battery check, and source response check were performed. Physical inspection of the instrument included:

- Inspection of the general physical condition of the instrument and detector prior to each use
- Inspection for loose, damaged knobs, buttons, cables, connectors, broken/damaged meter movements/displays, dented or corroded instrument cases, punctured/deformed probe/probe window(s), cables, and any other physical impairments that potentially affected the proper operation of the instrument or detector

A battery check was performed to ensure that sufficient voltage was being supplied to the detector and instrument circuitry for proper operation.

On a daily basis, the instruments were exposed to the check source to verify that the instrument response was within the +/- 20 percent range determined during the initial response check. Field instrument operation check forms are presented in Appendix H.

Field Gamma Spectroscopy System

Daily QC checks were performed each day before and after completion of field measurements. The source for quality control checks was a National Institute of Standards and Technology (NIST) traceable ^{137}Cs (source number 51723), and was used to ensure the following:

- ^{137}Cs photo peak at 661.62 keV to check for instrument drift
- The 661.62 keV primary photo peak was at full-width half maximum height (FWHM)
- Net area of the 661.62 keV peak (precision)
- Count rate (precision)

Also, repeatable geometry measurements were made of a 2-inch by 1 3/8-inch by 6-inch piece of ceramic tile coated with a uranium oxide-based orange glaze. This very active source was used to

generate photo peaks covering the entire energy spectrum of interest. The data from these measurements were used to monitor the relative day-to-day sensitivity and drift of the instrument, and are presented under operation check forms in Appendix H.

In the case of the measurements collected at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area, no significant problems were observed during the review of the daily QC checks or during the review of the gamma spectroscopy files. Upon successful completion of the daily QC checks, the gamma spectroscopy system was positioned directly over the area of interest. The HPGe detector was rotated such that the open face of the shield/collimator was facing directly down at the soil. Once the detector was properly positioned, an integrated count was started. Data is displayed in real time on the hand-held DigiDart unit and is recorded in the DigiDart memory upon count completion. Measurement times varied between 10 min and 2 hours (h), depending on the gamma intensity at each location. The count times were documented by the gamma spectroscopy operator on spectrum acquisition forms generated in the field. These forms are included in Appendix F.

5.0 MINIMUM DETECTABLE COUNT RATE DETERMINATION

Detection sensitivity can be expressed in terms of net counts detectable above background levels. The radiological survey performed used both static and scan survey methods. The following subsections provide an evaluation of the calculated static and scan MDCRs for the NaI detectors used during the survey.

5.1 STATIC MDCR

Background measurements were collected for five background reference areas (three soil area and two riprap areas) with each high-resolution NaI detector to be used during the radiological characterization survey. Nine background measurements, and one duplicate measurement, were collected at each of the reference areas and are provided in Appendix I. The locations of the measurements were collected at the locations identified on Figure 3-1. The background measurements from each reference area were averaged for each detector to get a detector-specific background count rate.

For gamma surveys, MDCR is calculated in cpm using the following equation:

$$MDCR = \frac{3 + 3.29\sqrt{R_B T_{S+B}\left(1 + \frac{T_{S+B}}{T_B}\right)}}{T_{S+B}}$$

Where:

R_B = background count rate (cpm)
T_B = background counting time (min)
T_{S+B} = sample counting time (min)

For calculating the MDCR, the following values for R_B, T_B, and T_{S+B} were used:

R_B = mean cpm
T_B = 1 min
T_{S+B} = 1 min

This equation is taken from Table 3-1 in NUREG-1507, *Minimum Detectable Concentrations with Typical Radiation Survey Instrument from Various Contaminants and Field Conditions*, (Nuclear Regulatory Commission [NRC], 1997). The derivation of the equation and history of the development of the 3+3.29 constants used in the equation is provided in Section 3.1, *MDC Fundamental Concepts*, of NUREG-1507 (NRC, 1997). Table 5-1 provides the background count rate and static MDCR for each detector. The DON reviewed and approved the static MDCR calculation prior to commencement of the survey.

5.2 SCAN MDC FOR UNIFORM ^{226}RA CONTAMINATION

Background measurements were collected as discussed in Section 5.1 above.

The MDCR was calculated by multiplying the square root of the number of background counts (in the scan interval) by the detectability value associated with the desired performance (as reflected in d') as shown in the equation below.

$$MDCR = d'\sqrt{b_i} \times 60/i$$

Where:

d' = index of sensitivity (α and β error)
b_i = number of background counts in scan time interval (count)
i = scan or observation interval (second [s])

For calculating the MDCR, the following values for d', b_i, and i were used:

d' = 1.38 (α = 95 percent and β = 60 percent)
b_i = 68.8 (detector-specific mean 4,130 cpm x [1/60])
i = 1 s

$$MDCR = 1.38 \times \sqrt{68.8} \times 60/1$$

$$MDCR = 687\,cpm$$

The MDCR is based on an ideal surveyor for a given level of performance. To account for a non-ideal surveyor, the MDCR is divided by the surveyor efficiency (p). The following equation was used to calculate the $MDCR_{surveyor}$.

$$MDCR_{surveyor} = MDCR/\sqrt{p}$$

The surveyor efficiency of 0.7 vs. 0.5 was selected based on guidance from NUREG-1507 (NRC, 1997) since the detector distance above the land surface was fixed and automated data logging was used during the survey.

$$MDCR_{surveyor} = 687/\sqrt{0.7}$$

$$MDCR_{surveyor} = 821\,cpm$$

The minimum detectable exposure rate (MDER) is the net exposure rate that would be distinguishable from background. The MDER is calculated by the following equation:

$$MDER = MDCR_{surveyor} \div 760 \frac{cpm}{uR/hr}$$

$$MDER = 821 \div 760 \frac{cpm}{uR/hr}$$

$$MDER = 1.08 \ uR/hr$$

The conversion factor of 760 cpm/uR/hr is from Table 6.4 of NUREG-1507 (NRC, 1997). It is the weighted cpm/uR/hr for a 2-inch by 2-inch NaI detector relative to ^{226}Ra in equilibrium with progeny. This conversion factor was appropriate for the radiological characterization surveys since ^{226}Ra was the contaminant of concern and 2-inch by 2-inch NaI detectors were used for the survey.

The relationship between the radionuclide concentration and exposure rate is accomplished by modeling (using MicroShield®) to determine the net exposure rate produced by the radionuclide at a distance above the ground. The factors considered in the modeling included:

- The dose point of 19 cm (7.5 inches) above the soil was used.
- The density of 1.6 grams per cubic centimeter (g/cm^3) was used for soil.
- ^{226}Ra concentration of 2.0 pCi/g was used.
- The depth of the area of elevated activity was 15 cm (6 inches).
- The circular dimension of the cylindrical area of elevated activity was 1.8 m^2.

The calculated exposure rate at a point centered 19 cm (7.5 inches) above the area of contamination is 2.02 μR/h for ^{226}Ra (which accounts for buildup).

The radionuclide concentration of ^{226}Ra (scan MDC) necessary to yield the MDER may be calculated by taking the ratio of the MDER to the exposure rate calculated by MicroShield®, as shown below:

$$Scan\ MDC(pCi/g) = \frac{2.0\ pCi/g * MDER\ (\mu R/hr)}{2.02\ \mu R/hr}$$

$$Scan\ MDC(pCi/g) = \frac{2.0\ pCi/g * 1.3\ \mu R/hr}{2.02\ \mu R/hr}$$

$$Scan\ MDC(pCi/g) = 1.07$$

Table 5-2 provides the calculated MDCR, $MDCR_{surveyor}$, MDER, and scan MDC for the individual detectors and for the overall average of detectors. Table 5-3 shows that at a scan observation interval of 1 s and a surveyor efficiency of 0.7, the target source can be observed at the maximum detector offset of 10 inches for both detector height configurations (3 inches and 7.5 inches).

6.0 DATA ANALYSIS AND RESULTS

The radiological characterization of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area consisted of static NaI surveys, scan NaI surveys, exposure rate surveys using PICs and TLDs, as well as soil sampling and gamma energy analysis using a portable HPGe system. The survey results are described in the following subsections.

6.1 BACKGROUND REFERENCE AREAS

Three BRAs identified previously during the 2004 radiological surveys establish soil and soil background levels established for static NaI measurements, scan NaI measurements, PIC measurements, and MicroRem measurements. Two additional BRAs were identified along the shorelines and riprap background levels for static NaI measurements and TLDs. Background measurements were collected at nine locations in each reference area. A duplicate measurement was collected in each reference area resulting in ten background measurements for each reference area.

6.1.1 Static Measurements

Five 10-second stationary readings were taken at a distance of 6 inches above the ground at each of the locations within the three soil reference areas using a 2-inch by 2-inch NaI detector. Each reading was recorded and a mean background was calculated for the NaI detectors. In addition, the exposure rate was obtained at 3 feet above the ground at each of the 10 locations within a reference area using the PIC and MicroREM.

A summary of the average background measurements for the NaI detectors, MicroRem detector, and PICs are provided below.

Soil Reference Area Static NaI Detector, MicroR Meter and PIC Measurements

Reference Area	NaI Detector Mean (cpm)	MicroRem Meter Mean (μRem/h)	PIC Mean (μR/h)
1	5578	6.0	6.5
2	5163	4.7	6.5
3	5518	5.4	7.0
Overall Mean	5486	5.3	6.6
Standard Deviation	416	1.0	0.8

Five 10-second stationary readings were taken at a distance of 6 inches above the ground at each of the locations within the two riprap reference areas using a 2-inch by 2-inch NaI detector. Since the riprap along the shoreline was heterogeneously composed of both riprap types, the background

measurements from both riprap reference areas were averaged. A summary of the average riprap background measurements for the NaI detectors are provided below.

Riprap Reference Area Static NaI Detector Measurements

Reference Area	NaI Detector Mean (cpm)
1	2338
2	5357
Overall Mean	3847
Standard Deviation	1590

Appendix I provides the data collected for static NaI measurements for each riprap BRA.

The two background reference areas surveyed as representative of shoreline riprap resulted in marginal levels of radiological activity in comparison with the riprap material encountered during the course of the shoreline survey. This could be indicative of the heterogenous makeup of the shoreline riprap, which was comprised of quarried rocks and man-made debris similar to those found in the background reference areas. However a large quantity of shoreline riprap exhibited elevated radiological activity greater than the rocks and debris in the background reference areas. A sample of shoreline riprap (e.g., a small-size rock easily carried) was examined by an alpha/beta probe, as well as by field gamma spectroscopy. This particular sample of riprap exhibited a distinguishable increase above the ambient background gamma radiation on the order of 200 cpm. Based on visual observation of this type of riprap, the increase in count rate is not expected to be due radioactive contamination and is most likely due to naturally occurring radioactivity within the rock. Gamma spectroscopy analysis of this riprap rock also indicated the presence of naturally occurring radioactivity. Gamma spectroscopy measurements collected in the field are provided in Appendix F, Survey Area Gamma Spectroscopy, File_Field Spectra_PDF.

6.1.2 Scan Measurements

The towed array and backpack-based systems performed ten-minute scan surveys in each reference area to establish the background count rate during a surface scan survey. Scan surveys were conducted at a speed of 1 foot per second for 10 minutes, which generated upward of 600 data points in order to statistically determine a scanning background count rate for the systems.

A summary of the average background measurements for the towed array is provided below.

Reference Area Towed Array Scan NaI Detector Measurements

Reference Area	NaI Detector Mean (cpm)
1	4660
2	4236
3	4402
Overall Mean	4433
Standard Deviation	393

Appendix I provides the data collected for towed array scan NaI measurements for each BRA.

6.2 SURVEY AREA

The results of the gamma scans, static gamma and exposure rate surveys, soil sampling, and gamma spectroscopy conducted are discussed below.

6.2.1 Gamma Scans

High-resolution NaI scintillators in combination with a differential global positioning system (DGPS) and LARADS were the primary field survey systems used for the land area survey performed at IR Site 32, shorelines of IR Sites 1 and 2, and the former Radiological Shack area. The combination of GPS and LARADS allowed for a near 100 percent high-density coverage. Those areas inaccessible to the all terrain vehicle (ATV)-mounted survey arrays were scanned using backpack-based systems connected to a single high-resolution NaI detector.

The site scan data is provided in Appendix K (folder: Field Files [RAW]) and in Figures 6-1 through 6-8, which present plots of data points by location and provide overall coverage at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area from the scan survey.

The NaI scan measurements collected along the shorelines (from the edge of the shoreline to the 2004 survey area) of IR Sites 1 and 2 identified four locations in IR Site 1 where net measurements were greater than 4,000 cpm. No net measurements greater than 4,000 cpm were identified in IR Site 2 as shown in Figure 6-7. Figure 6-6 identifies the elevated measurements within IR Site 1. The NaI scan measurements collected at the former Radiological Shack area within IR Site 2 identified three areas with net measurements greater than 4,000 cpm. Figure 6-8 provides these locations.

The NaI scan measurements collected at IR Site 32 identified approximately nine areas of elevated radioactivity (excluding the gravel areas) as shown in Figure 6-5. Three of these elevated areas were identified south of IR Site 32 while implementing the step-out procedure discussed in Section 3.7. The scan also confirmed that the gravel fill material located in between the two fences at IR

Site 32 contains elevated naturally occurring radioactivity. A sample of the gravel was collected during the IR Site 32 RI field activities conducted by BEI in 2005 and the results identified elevated levels, relative to the local soil, of naturally occurring radionuclides (TtEC, 2006b).

6.2.2 Static Gamma

A review of the scan data identified locations with elevated radiological readings that warranted further investigation (see Figures 6-5 through 6-8). At each area of interest, a series of static NaI measurements were taken to best characterize the contamination. Appendix L provides the coordinates of areas of interest and the static measurements taken at the locations.

For the areas along the shoreline where towed or hand-held surveys could not be performed, a 10-foot by 10-foot grid was established along the shoreline from the end of the previous survey to the mean low tide elevation. Static 10-second surveys were then performed at each grid point (e.g., on 10-foot centers). This was accomplished using an articulating man lift and a NaI detector attached to a retractable line with the LARADS mounted in the man-lift bucket. The detector was lowered in a protective capsule from the man-lift bucket to within 6 inches of the shoreline riprap surface, and a measurement collected. LARADS was then used to geo-reference these static measurements. Figure 6-9 provides the IR Sites 1, 2, and 32 shoreline riprap static coverage.

The survey methodology for the shoreline riprap resulted in approximately 5,100 static measurements. The maximum NaI measurement observed was a net count rate of approximately 16,000 cpm. This location was at the southeast corner of IR Site 2. Figure 6-10 provides the IR Sites 1, 2, and 32 shoreline riprap measurements that resulted in a net count rate greater than 4,000 cpm to be consistent with the 2004 survey data representation.

The radiological control technician performing the survey became familiar with the composition of the riprap and was able to predict which locations would exhibit an elevated count rate. A specific type of rock was present in the riprap that exhibited an elevated background radiation. This was verified by surveying the rock with an alpha/beta probe and performing field gamma spectroscopy analysis of the rock sample. The areas with the greatest increase in count rate were areas where the riprap was predominantly comprised of this type of rock.

The rocks' influence on the background count rate was directly proportional to the distance to the detector. This finding was supported by the associated shoreline static NaI measurements collected every ten feet along the shoreline and the PIC measurements collected every 50 feet along the shoreline.

Ten-minute PIC measurements were collected on 10-foot centers at IR Site 32, except along the shoreline and/or where the use of a man lift was required. A static measurement was also taken at each PIC location within IR Site 32. These measurements were then correlated to the PIC

exposure rate measurements and the TLD readings. This allowed exposure rates to be estimated, based on the NaI measurements collected throughout the site. Figure 6-11 provides the IR Site 32 static measurements that resulted in a net count rate greater than 4,000 cpm.

6.2.3 Exposure Rate Surveys

One-hour exposure rate measurements using PICs were collected along the shorelines of IR Sites 1, 2, and 32 every 50 feet. Ten-minute exposure rate measurements were collected at IR Site 32 at the grid points of a 10-foot by 10-foot grid. These measurements are plotted in Figures 6-12 and 6-13, respectively.

The exposure rate measurements collected along the shoreline were generally consistent with the background exposure rates measured in the background reference areas. The highest reading was 10 microrem (μrem) per hour. The table below summarizes the shoreline exposure rate measurements.

Shoreline Exposure Rate			
Average mrem/hr	**St Dev μrem/hr**	**Max μrem/hr**	**Min μrem/hr**
6.1	0.5	10	4.9

The exposure rate measurements collected at IR Site 32 are provided in Figure 6-13. It appears from the figure that the fill between the two fences at IR Site 32 displays an elevated background exposure rate. This was first observed and documented during the Bechtel field investigation in 2005 (TtEC, 2006b). The table below provides a summary of the IR Site 32 exposure rate measurements.

IR Site 32 Exposure Rate			
Average μrem/hr	**St Dev μrem/hr**	**Max μrem/hr**	**Min μrem/hr**
6.8	0.9	12.6	5.0

6.2.4 Soil Sampling

Seventeen soil samples (includes two duplicate samples) were collected at 15 locations within IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. These samples were sent to the Eberline Services/Richmond Laboratory for ^{226}Ra and ^{90}Sr analysis. Figure 6-14 identifies the locations of the soil samples collected and associated static measurements taken at each sample location. The validated laboratory results for the soil samples are provided in Appendix E. A summary of the laboratory results is provided in Table 6-1.

Two of the six samples analyzed for ^{90}Sr reported ^{90}Sr present greater than the MDA of the analytical method. Sample location 08-IR32-012 reported the highest concentration of ^{90}Sr at

0.221 pCi/g. Fourteen out of the seventeen samples reported ^{226}Ra concentrations at or above the investigation concentration level of 0.559 pCi/g. Sample location 08-IR32-015 reported the highest concentration of ^{226}Ra at 753 pCi/g. Soil sample results for ^{226}Ra concentrations are provided in Table 6-1.

6.2.5 Riprap Study

To address comments provided by DHS during the course of field activities and to evaluate effectiveness of riprap shielding, a ^{137}Cs sealed check source was placed in an area of riprap and 10-second static measurements were collected using a typical NaI detector (e.g. 2-inch by 2-inch crystal) at one-foot intervals (laterally) to a distance of 10 feet away (laterally) from the check source. The measurements were collected to evaluate the shielding effects of the riprap. This process was performed in two areas. One area was selected that represented the typical "small" riprap and a second area was selected that represented "large" riprap. The study showed that the source became indistinguishable from background around 5 feet from the detector in the small riprap and around three feet from the detector in the large riprap. Therefore, for the static measurements of the shorelines where the riprap was typically small, the survey coverage was nearly 100 percent and for the areas of large riprap, the coverage was approximately 60 percent. The difference in the percent coverage between the small riprap and large riprap is attributed to the large riprap providing more shielding than the small riprap at distances of 3 feet and greater. The results of the study are provided in Table 6-2.

6.2.6 Gamma Spectroscopy

Field gamma spectroscopy was used to characterize the elevated areas identified during the scan survey and to characterize the soil samples prior to being sent to an off-site laboratory. Hot spots were identified during the scan survey and were characterized by performing an in-situ gamma spectroscopy analysis, with locations and associated NaI static measurements provided in Figure 6-15. Table 6-3 provides the coordinates and file name for each in-situ gamma spectroscopy analysis performed. The results of these analyses are provided in Appendix F (folders: Field Spectra_PDF). Reviews of the spectra show only the presence of ^{226}Ra.

6.2.7 Dosimetry Study

As required by DHS, an environmental dosimetry study of the coastal area of IR Site 1 was performed for a period of approximately 3 months. This study was expanded to include the shorelines of both IR Site 2 and IR Site 32. The study was performed using TLDs to determine if there was measurable difference between exposure rate measurements along the shorelines of IR Sites 1, 2, and 32 and background area measurements. A total of 200 TLDs were placed every 50 linear feet along the respective shorelines (Table 6-4 and Figure 6-16). Three of the TLDs were placed at the two selected reference background areas of the riprap. One control TLD was placed at each riprap background reference area. The TLDs were deployed from September 28, 2006,

until January 19, 2007. The TLD results did not indicate that any area along the shoreline exhibited an exposure rate greater than 3-sigma above the control (e.g., background) TLD result. The average net TLD result (e.g., TLD result with the control TLD result subtracted) was -0.79 μR/h. The table below provides a summary of the TLD results.

TLD	mrem	μrem/h	Net
Maximum	30.6	11.09	3.00
Average	26.81	9.71	-0.79
Standard deviation	1.73	0.63	1.73

6.3 INVESTIGATION-DERIVED WASTE, MATERIALS, EQUIPMENT, AND PERSONNEL SURVEYS

Alpha and beta surveys were conducted using a portable Eberline E600/Pancake Geiger-Mueller (G-M) detector or an Eberline E600/SHP380AB 100-cm^2 scintillation detector. Additionally, an Eberline Hand ECount alpha/beta sample counter was used for evaluation of wipe specimens and air samples. Alpha and beta surveys were used to evaluate radioactive contamination on surfaces.

A radiological survey was performed on all IDW generated as a result of radiological characterization activities. Radiological samples of IDW were collected, specifically the decontamination water required after sampling. The results are provided in Appendix E, EberlineReport_Decon Water.pdf. In addition, surveys were conducted to ensure that contamination was not leaving the site by contact with personnel or vehicles. Surveys were also conducted to assess internal exposure potential and characterize the nature and extent of radioactive surface contamination within the site boundary. No detectable contamination was observed during these surveys.

6.3.1 Personnel and Unconditional Release Surveys

Personnel dose rate surveys were conducted during the course of radiological field survey activities. No dose rate readings were observed that indicated dose rates greater than 0.002 rem per hour.

During invasive soil sampling, workers collecting samples stayed within the controlled sample location area to minimize the spread of potential contamination. Personnel survey requirements were performed in accordance with Appendix D-7, Radiological Protective Clothing Selection, Monitoring, and Decontamination of the Final Radiological Survey Work Plan (TtEC, 2006a).

As part of demobilization activities, unconditional release surveys were conducted on all equipment and instruments prior to their demobilization. Unconditional Release Data Sheets are provided in Appendix M. Surveys performed prior to the unconditional release of equipment and vehicles disclosed no detectable radioactivity appearing on equipment and vehicles exiting the controlled work area.

6.4 CONCLUSION

Scan and static NaI, PIC, and TLD measurements were collected during the radiological characterization survey of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. The detector-specific background value for each NaI detector was subtracted from each reading to yield the net count. A threshold value of 4,000 cpm net was used to filter the data to facilitate identifying areas of potential interest. This approach is consistent with the approach used during the 2004 radiological characterization survey of IR Sites 1 and 2 (TtFW, 2005a; 2005b).

Three areas of elevated radiological activity were identified during the scan survey of the former Radiological Shack area within IR Site 2. These elevated areas are recommended for removal.

The gravel areas within IR Site 32 showed elevated radiological activity; however, the scan survey confirmed that the gravel fill material located within the boundaries of the fenced area at IR Site 32 contains elevated, naturally occurring radioactive material. The NaI scan measurements collected at IR Site 32 identified approximately nine areas of elevated radioactivity (excluding the naturally occurring gravel areas). Three of these elevated areas were identified south of IR Site 32. These nine areas of elevated reading are recommended for removal.

NaI scan measurements were also collected along the shorelines (from the edge of the shoreline to the 2004 survey area) of IR Sites 1 and 2. Four locations in IR Site 1 where net measurements were greater than 4,000 cpm were identified and are recommended for removal. No elevated readings were identified in IR Site 2.

In addition to the scan survey, 15 biased soil samples (plus two duplicate samples) were collected from IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. These samples were analyzed for ^{226}Ra and ^{90}Sr. Two of the six samples analyzed for ^{90}Sr reported ^{90}Sr present greater than the MDA of the analytical method. Sample location 08-IR32-012 reported the highest concentration of ^{90}Sr at 0.221 pCi/g. Fourteen out of the seventeen samples reported ^{226}Ra concentrations at or above the investigation concentration level of 0.559 pCi/g. Sample location 08-IR32-015 reported the highest concentration of ^{226}Ra at 753 pCi/g.

The dosimetry study along with the PIC and static NaI measurements collected along the shoreline resulted in no elevated radiological activity. Therefore, no action is recommended for the shorelines of IR Sites 1, 2, and 32. Static NaI measurements collected over the riprap resulted in elevated radiological measurements. However, measurements indicate that elevated readings are naturally occurring due to geologic composition of the riprap, and are not assumed as originating from man-made sources. No removal action is warranted for the riprap areas with elevated readings.

The results of this radiological characterization survey have been incorporated into the Final Work Plan for the Time Critical Removal Action (TtEC, 2007) for IR Sites 1, 2, and 32. This additional characterization data will ensure a comprehensive radiological removal action is conducted for IR Sites 1, 2, and 32.

7.0 PHOTOGRAPHIC LOG

Photographs were taken to document field activities. The photographs illustrate typical examples of the work performed during the execution of the survey at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area, including vegetation clearance, soil sampling, radiological surveys, and site features. The photographs and logs are presented in Appendix G of this report.

8.0 FIELD CHANGES

Variances to the Final Radiological Survey Work Plan (TtEC, 2006a) were necessary to address unforeseen circumstances encountered during field activities at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. Appendix B provides a description of these approved field changes.

9.0 DEMOBILIZATION

Demobilization consisted of the breakdown and removal of support facilities located in the support area, including the trailer, Conex boxes, and portable toilets. Demobilization began on November 18, 2006.

9.1 SITE FACILITIES

Between November 20 and November 22, 2006, two portable toilets, a hand-wash station, 25 kilovolt (kV) electrical generator, 3-cubic-yard trash bin, an 8-foot by 20-foot Conex storage container, and a 10-foot by 40-foot office trailer were removed from the support area. Rental equipment including a man lift and site truck were also removed from the site during this time. Eberline Services demobilized their personnel and equipment on November 19, 2006.

On November 22, 2006, the PQCM/SHSS terminated field activities and transported selected field supplies and files to the Santa Ana, California, office.

9.2 COMPLETION INSPECTION

On November 21, 2006, a final site inspection was conducted with a representative of the ROICC's office joined by TtEC's PQCM/SHSS. All areas impacted by and associated with the radiological characterization activities of IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack were examined for potential impact and verified as remaining in a satisfactory condition. During the inspection, the ROICC requested that metal t-stakes used as TLD stands for the dosimeter study be removed. This item was included on the final site punchlist, and will be resolved during TCRA activities scheduled for 2007.

10.0 WASTE MANAGEMENT

There were several waste streams that resulted from the radiological characterization activities. These waste streams included miscellaneous solid waste, debris removed from the survey area surface, used personal protective equipment (PPE), and decontamination water. This section describes the collection disposal method for each waste stream generated during removal action activities. Table 10-1 presents a summary of the waste streams, and Appendix N provides copies of the manifest generated during the project.

10.1 USED PERSONAL PROTECTIVE EQUIPMENT COLLECTION AND DISPOSAL

The on-site survey activities were performed in modified Level D PPE and included gloves and Tyvek® or rubber over-booties. All used PPE was scanned for radiological activity and placed into 55-gallon drums at the contamination reduction zone (CRZ). During the November 2006 invasive soil sampling activities, one drum of used PPE was generated. At the time of demobilization, the drum was transferred to Building 112 for temporary storage until March 2007, at which time it was transported to Altamont Landfill for disposal. The waste manifest is provided in Appendix N.

10.2 DECONTAMINATION WATER COLLECTION AND DISPOSAL

Decontamination water consisted of the wash water generated from the soil sample collection activities. During soil sampling activities conducted November 14 and 15, 2006, 20 gallons of water were generated from the equipment decontamination procedures. The water was placed in a 55-gallon drum and stored in the CRZ. On November 18, 2006, the water was originally sampled and sent for laboratory analysis. On November 22, 2006, the drum of water was moved to Building 112 until final results were available January 2007 (Appendix E).

EPA Method 901.1 was the preliminary analysis specified in the CTO 008 SAP as an EPA-approved method for detection of radioactive cesium in water; however, this method is not an approved method for radioactive radium. EPA Method 901.1 typically does not result in an MDA below the 5 pCi/l MCL for radium. Thus an FCR was drafted on February 12, 2007, to revise the SAP to specify analyzation of decontamination water using EPA Method 903.1, which is the EPA confirmatory analysis for radium. EPA Method 903.1 typically will provide an MDA of 0.5 picocurie per liter (pCi/L), which is well below the 5 pCi/L MCL for radium. Results from the Method 903.1 analysis were received March 8, 2007, and indicated that the decontamination water was non-hazardous. The drum was subsequently removed from the site and transported to the Altamont Landfill for disposal. The waste manifest is provided in Appendix N.

10.3 MEC GEOPHYSICAL CLEARANCE

A UXO Specialist was present during radiological survey soil sampling activities conducted in IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area. The UXO Specialist conducted geophysical clearance with a magnetometer prior to invasive soil sampling activities. No MEC were collected or stored during radiological survey activities.

10.4 POINT SOURCES COLLECTION AND DISPOSAL

No point sources were discovered during the course of radiological characterization activities at IR Site 32, the shorelines of IR Sites 1 and 2, and the former Radiological Shack area.

11.0 REFERENCES

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TABLES

TABLE 3-1

APRIL 2006 AND AUGUST 2006 BIOLOGICAL MONITORING SUMMARY RESULTS

Nest ID	Common Name	Scientific Name	Area	Veg Type	STATUS	
					4/6/2006	8/28/2006
1	Canada Goose	*Branta canadensis*	Interior fenceline of IR Site 32 NE corner	Ground	Goose incubating eggs in a defensive posture	No evidence of original nest
2	Canada Goose	*Branta canadensis*	Outside fenceline of IR Site 32, adjacent to runway	Ground	Goose incubating eggs in a defensive posture, 1 egg visible	No evidence of original nest
3	Canada Goose	*Branta canadensis*	IR Site 1, riprap at shoreline at NW corner of the point	Ground	Active nest with 2 eggs	No evidence of original nest
4	Canada Goose	*Branta canadensis*	IR Site 1, former target practice berm	Ground	Active nest with 7 eggs	No evidence of original nest
5	Canada Goose	*Branta canadensis*	IR Site 1, former target practice berm	Ground	Active nest with 6 eggs	No evidence of original nest
6	Canada Goose	*Branta canadensis*	IR Site 1, former target practice berm	Ground	Active nest with 5 eggs	No evidence of original nest
7	Canada Goose	*Branta canadensis*	IR Site 2, wetlands berm, west facing	Ground	Active nest with 8 eggs	No evidence of original nest
8	Canada Goose	*Branta canadensis*	IR Site 2, wetlands berm, west facing at southern corner of IR Site 2	Ground	Active nest with 8 eggs	No evidence of original nest
9	Canada Goose	*Branta canadensis*	IR Site 2, wetlands berm, south facing at SW corner of IR Site 2	Ground	Active nest with 6 eggs	No evidence of original nest
10	Canada Goose	*Branta canadensis*	IR Site 2, wetlands berm, south facing at IR Site 2	Ground	Abandoned nest	No evidence of original nest
11	Canada Goose	*Branta canadensis*	IR Site 2, shoreline margin adjacent to riprap, south facing at IR Site 2	Ground	Active nest with 5 eggs	No evidence of original nest

Notes:

IR – Installation Restoration

NW – northwest

SW – southwest

TABLE 3-2

SOIL SAMPLE AND FIELD GAMMA SCAN CROSS REFERENCE

Soil Core ID	Gamma Scan No.	Assay Date	Hot Spot Location	In-Situ Gamma Scan No.	NaI Net cpm	Date *
08-IR2-001	111606 08-IR2-001	16-Nov-06	IR-02	111306 08-IR2-001	-726	13-Nov-06
08-IR2-002	111606 08-IR2-002	16-Nov-06	IR-02	111206 08-IR2-002	418	12-Nov-06
08-IR2-003	111606 08-IR2-003	16-Nov-06	IR-02	111206 08-IR2-003	303	12-Nov-06
08-IR2-004	111606 08-IR2-004	16-Nov-06	IR-02	111106 08-IR2-004	165	11-Nov-06
08-IR2-005	111606 08-IR2-005	16-Nov-06	IR-02	111106 08-IR2-005	-27	11-Nov-06
08-IR2-006	111706 08-IR2-006	17-Nov-06	IR-02/RS	111306 08-IR2-006	2,956	13-Nov-06
08-IR1-007	111806 08-IR1-007	18-Nov-06	IR-01	111206 08-IR1-007	6,521	12-Nov-06
08-IR1-008	111806 08-IR1-008	18-Nov-06	IR-01	111206 08-IR1-008	8,797	12-Nov-06
08-IR1-009	111806 08-IR1-009	18-Nov-06	IR-01	111206 08-IR1-009	34,837	12-Nov-06
08-IR1-010	111806 08-IR1-010	18-Nov-06	IR-01	111206 08-IR1-010	34,841	12-Nov-06
08-IR32-011	111706 08-IR32-011	17-Nov-06	IR-32	111206 08-IR32-011	113,923	12-Nov-06
08-IR32-012	111706 08-IR32-012	17-Nov-06	IR-32	111106 08-IR32-012	43,013	11-Nov-06
08-IR32-013	111706 08-IR32-013	17-Nov-06	IR-32	111106 08-IR32-013	33,174	11-Nov-06
08-IR32-014	111706 08-IR32-014	17-Nov-06	IR-32	111106 08-IR32-014	42,293	11-Nov-06
08-IR32-015	111606 08-IR32-015	16-Nov-06	IR-32	111106 08-IR32-015	84,854	11-Nov-06
08-IR2-016	111806 08-IR2-016	18-Nov-06	IR-02	111706 08-IR2-016	15,076	17-Nov-06
08-IR32-017	111806 08-IR32-017	18-Nov-06	IR-32	111606 08-IR32-017	7,181	16-Nov-06

Notes:

* field hot spot first analyzed on this date

cpm – count per minute

NaI – sodium iodide

IR – Installation Restoration

RS – former radiological shack

TABLE 3-3

SAMPLE CONTAINERS SCREENING DATA

Soil Core ID	Beaker Wipes		Gamma Scan No.
	beta (cpm)	alpha (cpm)	
08-IR2-001	34.0	1.23	111606 08-IR2-001
08-IR2-002	88.0	0.00	111606 08-IR2-002
08-IR2-003	23.0	1.23	111606 08-IR2-003
08-IR2-004	43.0	0.00	111606 08-IR2-004
08-IR2-005	12.0	0.62	111606 08-IR2-005
08-IR2-006	95.0	1.85	111706 08-IR2-006
08-IR1-007	33.0	1.85	111806 08-IR1-007
08-IR1-008	108.0	2.46	111806 08-IR1-008
08-IR1-009	26.0	1.23	111806 08-IR1-009
08-IR1-010	32.0	0.62	111806 08-IR1-010
08-IR32-011	60.0	0.62	111706 08-IR32-011
08-IR32-012	110.0	1.23	111706 08-IR32-012
08-IR32-013	14.0	22.00	111706 08-IR32-013
08-IR32-014	22.0	1.85	111706 08-IR32-014
08-IR32-015	64.0	1.85	111606 08-IR32-015
08-IR2-016	59.0	0.62	111806 08-IR2-016
08-IR32-017	71.0	17.30	111806 08-IR32-017

Notes:
cpm – counts per minute
IR – Installation Restoration

TABLE 3-4

LAPEL AIR SAMPLE RESULTS FOR INVASIVE SOIL SAMPLING

Date	Sample (net cpm)	Sample (dpm)	Concentration (μCi/cm3)	Location	Sample Rate (lpm)	Sample Time (min)	Sample Volume (liters)	Sample Count Time (min)
11/15/2006	3.7	10.9	4.0E-12	IR Site 2/IR Site 32	3.9	315	1214	2
11/15/2006	1.2	3.5	1.3E-12	IR Site 2/Rad Shack	3.8	315	1191	2

Notes:

Lapel air samples were analyzed using a HandeCount Bench Scaler

Alpha efficiency – 34 percent

μCi/cm^3 – microcurie per cubic centimeter

cpm – count per minute

dpm – disintegrations per minute

IR – Installation Restoration

lpm – liters per minute

min – minute

TABLE 4-1

SURVEY INSTRUMENT INFORMATION

ESID No.	Instrument (Serial No.)	Probe (Serial No.)	Instrument (Barcode No.)	Probe (Barcode No.)	Use	Efficiency-fixed Mode (percent)	Minimum Detectable Scan/Fixed Activities and Concentrations	Calibration Date	Calibration Due Date
	Eberline E-600 Smart Portable	***Eberline SPA-3 2x2 NaI***			Gamma scan and static surveys				
0001	*968*	*461*	*1056*	*236*	*Not used in survey*	*12.9*	Scan MDCs:	08/23/06	08/23/07
0002	1089	462	1120	233		15.1	2.8 pCi/g (^{226}Ra)	08/21/06	08/21/07
0003	1041	66574	1123	244		15.4	1.8 pCi/g (^{232}Th)	08/22/06	08/22/07
0004	*1052*	*15040*	*1135*	*241*	*Not used in survey*	*16.9*		*08/24/06*	*08/24/07*
0005	1068	760	1141	238		13.6		08/23/06	08/23/07
0006	1080	521	1156	237		13.6		08/23/06	08/23/07
0007	1213	623	1239	240		12.8		08/22/06	08/22/07
0008	1206	3874205	1242	224		11.4		08/22/06	08/22/07
	Eberline E-600 Smart Portable	***Eberline 380AB Large-area scintillation, 100 cm^2***			Surface contamination measurments		Fixed MDA (beta) 1,000 dpm/100 cm^2 [NUREG-5849]		
011	1262	314	1596	1614		12		08/21/06	08/21/07
012	941	271	1071	1580		11	Scan MDC (beta) 3,000 dpm/100 cm^2 [NUREG-5849]	08/21/06	08/21/07
	Reuter Stokes PIC RSS-112	***Reuter Stokes Probe RSS-112***			Gamma dose rate measurments				
013	95100184	V-4055	N/A	N/A			100 mR/h	03/22/06	03/22/07
014	K-211	V-4023	N/A	N/A			500 μR/h	02/11/06	02/11/07
017	L-223	L-2079	N/A	N/A			100 mR/h	03/22/06	03/22/07
018	K-200	K-6905	N/A	N/A			100 mR/h	03/27/06	03/27/07
		Bicron μR Meter NaI			Gamma dose rate measurments		5 μR/h	02/21/06	02/21/07
015	0123	1699	N/A	N/A		N/A			

TABLE 4-1

SURVEY INSTRUMENT INFORMATION

ESID No.	Instrument (Serial No.)	Probe (Serial No.)	Instrument (Barcode No.)	Probe (Barcode No.)	Use	Efficiency-fixed Mode (percent)	Minimum Detectable Scan/Fixed Activities and Concentrations	Calibration Date	Calibration Due Date
		Eberline HandeCount Bench Scaler			Surface contamination measurments				
016	604	0060	N/A	N/A		81.6		05/19/04	05/19/05
		Ortec DigiDart Portable HPGe System			Radionuclide identification and gamma spectroscopy measurements		Peak 1 Energy Range (±keV): 1173.2, Peak 2 Energy Range (+keV): 1332.5	11/4/2006 through 11/18/06	N/A
N/A	Daffy	N/A	N/A	N/A		N/A		11/4/2006 through 11/18/07	N/A
		Data RAM PDR-1000							
N/A	4537		N/A	N/A	Aerosol particle monitor	N/A	1 $\mu R/m^3$	08/30/06	08/30/07

Notes:

μR – microroentgen
μR/h – microroentgen per hour
^{226}Ra – radium-226
^{232}Th – thorium-232
cm^2 – square centimeter
dpm – disintegrations per minute
ESID –
HPGe – high-purity Germanium
keV – kiloelectron volt
MDA – minimum detectable activity
MDC – minimum detectable concentration
mR/h – milliRoentgen per hour
N/A – not applicable
NaI – sodium iodide
NUREG – Nuclear Regulatory Commission
pCi/g – picocurie per gram
PIC – pressurized ion chamber
RAM –

TABLE 5-1

STATIC BACKGROUND AND MDCR FOR NAI DETECTORS

NaI #	Soil Mean (cpm)	Soil MDCR (cpm)	Ripap 1 Mean (cpm)	Riprap 1 MDCR (cpm)	Riprip 2 Mean (cpm)	Riprip 2 MDCR (cpm)
240	2,463	583	2,494	587	5,454	859
224	2,834	624	2,061	535	5,015	825
233	2,699	610	2,398	576	5,179	838
244	2,757	616	2,272	561	5,522	864
237	2,773	618	2,357	571	5,522	864
238	2,752	615	2,444	581	5,449	859
241	5,243	843	na	na	na	na
Ave NaI	5,486	862	2,338	569	5,357	852

Notes:
ave – average
cpm – count per minute
MDCR – minimum detectable count rate
NaI – sodium iodide

TABLE 5-2

SCAN SENSITIVITY PARAMETERS FOR NAI DETECTORS

NaI Detector #	Mean (cpm)	Scan MDCR Ideal (cpm)	$MDCR_{surveyor}$ (cpm)	MDER (μR/h)
224	4,130	687	981	1.1
233	4,478	715	1,022	1.1
244	4,478	715	1,022	1.1
238	4,527	719	1,027	1.1
237	4,578	723	1,033	1.1
241	4,474	715	1,021	1.1
240	4,363	706	1,009	1.1
Avg NaI	**4,433**	**712**	**1,017**	**1.1**

Notes:
μR/h – microroentgen per hour
avg – average
cpm – count per minute
MDCR – minimum detectable count rate
MDER – minimum detectable exposure rate
NaI – sodium iodide

TABLE 5-3

MICROSHIELD RESULTS OF DETECTOR OFFSET

Offset (inch)	µR/h (3 inches)	cpm (3 inches)	µR/h (7.5 inches)	cpm (7.5 inches)
0	3.2	2,456	2.0	1,487
1	3.2	2,453	2.0	1,487
2	3.2	2,394	1.9	1,465
3	3.0	2,299	1.9	1,430
4	2.9	2,176	1.8	1,381
5	2.7	2,029	1.7	1,322
6	2.5	1,867	1.7	1,256
7	2.2	1,696	1.6	1,181
8	2.0	1,524	1.5	1,104
9	1.8	1,355	1.3	1,022
10	1.6	1,194	1.2	942

Notes:
µR/h – microroentgen per hour
cpm – count per minute

TABLE 5-4

COMPARISON OF MICROSHIELD RESULTS AND $MDCR_{SURVEYOR}$

Offset (inches)	cpm (3 inches)	$>MDCR_{surveyor}$	cpm (7.5 inches)	$>MDCR_{surveyor}$
0	2456	Pass	1487	Pass
1	2453	Pass	1487	Pass
2	2394	Pass	1465	Pass
3	2299	Pass	1430	Pass
4	2176	Pass	1381	Pass
5	2029	Pass	1322	Pass
6	1867	Pass	1256	Pass
7	1696	Pass	1181	Pass
8	1524	Pass	1104	Pass
9	1355	Pass	1022	Pass
10	1194	Pass	942	Pass

Notes:
cpm – count per minute
MDCR – minimum detectable count rate
$MDCR_{surveyor}$ – 885 cpm

TABLE 6-1

SUMMARY OF SOIL SAMPLES RADIOCHEMISTRY RESULTS

Sample Number		08-IR2-001		08-IR2-002		08-IR2-003		08-IR2-004		08-IR2-005		08-IR2-006		08-IR1-007		08-IR1-008		08-IR1-009		08-IR1-010		08-IR32-011		08-IR32-012	
Sample Location		IR-02		IR-02		IR-02		IR-02		IR-02		IR-02 (RAD Shack)		IR-01		IR-01		IR-01		IR-01		IR-32		IR-32	
Sample Date		11/14/2006		11/14/2006		11/14/2006		11/14/2006		11/14/2006		11/14/2006		11/14/2006		11/14/2006		11/15/2006		11/15/2006		11/15/2006		11/15/2006	
Analyte	**Units**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**
DOE SR-01/02																									
SR90	pCi/g	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.181	-0.039	0.156	0.211
EPA Method 901.1																									
AM241	pCi/g	0.44	U	0.231	U	0.044	U	0.034	U	0.125	U	0.051	U	0.395	U	0.537	U	0.295	U	0.042	U	0.568	U	3.89	U
CO60	pCi/g	0.043	U	0.032	U	0.037	U	0.024	U	0.023	U	0.033	U	0.054	U	0.051	U	0.037	U	0.033	U	0.077	U	0.312	U
CS137	pCi/g	0.088	U	0.086	U	0.142	U	0.077	U	0.031	U	0.118	U	0.109	U	0.05	U	0.041	U	0.218	U	0.073	U	0.308	U
EU152	pCi/g	0.415	U	0.3	U	0.335	U	0.194	U	0.186	U	0.219	U	0.442	U	0.487	U	0.309	U	0.272	U	0.613	U	2.28	6.36
EU154	pCi/g	0.145	U	0.114	U	0.128	U	0.072	U	0.067	U	0.102	U	0.165	U	0.179	U	0.12	U	0.106	U	0.24	U	1.1	U
K40	pCi/g	1.44	13.5	0.214	7.53	0.338	15	0.231	9.12	0.201	7.39	0.397	8.41	0.734	9.07	0.356	13.5	0.461	7.58	0.382	11.4	0.863	8.62	3.34	10.9
RA226	pCi/g	0.075	0.495	0.065	0.195	0.068	0.571	0.045	0.316	0.041	0.292	0.05	2.55	0.112	12.1	0.094	0.998	0.077	1.98	0.07	1.18	0.172	24.4	0.628	221
TH230	pCi/g	15.6	U	9.78	U	2.55	U	1.9	U	6.21	U	2.88	U	18.9	U	18.8	U	11.9	U	2.56	U	27	U	143	U
TH232	pCi/g	0.189	0.849	0.147	0.326	0.163	0.803	0.101	0.503	0.09	0.348	0.132	0.361	0.228	0.479	0.219	0.654	0.164	0.468	0.142	0.648	0.311	0.464	1.23	U

TABLE 6-1

SUMMARY OF SOIL SAMPLES RADIOCHEMISTRY RESULTS

Sample Number		08-IR32-013		08-IR32-014		08-IR32-015		08-IR2-016		08-IR32-017	
Sample Location		IR-32		IR-32		IR-32		IR-02 (FD)		IR-32 (FD)	
Sample Date		11/15/2006		11/15/2006		11/15/2006		11/14/2006		11/15/2006	
Analyte	**Units**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**	**MDA**	**Result**
DOE SR-01/02											
SR90	pCi/g	N/A	N/A	0.165	0.021	0.159	0.166	N/A	N/A	0.171	0.038
EPA Method 901.1											
AM241	pCi/g	0.887	U	0.182	U	0.638	U	0.456	U	0.449	U
CO60	pCi/g	0.109	U	0.032	U	0.469	U	0.044	U	0.058	U
CS137	pCi/g	0.104	U	0.027	U	0.48	U	0.046	U	0.056	U
EU152	pCi/g	0.87	U	0.235	U	3.73	U	0.429	U	0.454	U
EU154	pCi/g	0.322	U	0.091	U	1.41	U	0.152	U	0.184	U
K40	pCi/g	1.31	12.6	0.328	10.6	4.52	5.51	1.53	15.9	0.703	9.24
RA226	pCi/g	0.242	23.6	0.058	0.892	1.38	753	0.074	0.567	0.12	19.1
TH230	pCi/g	37.6	U	8.35	U	1940	U	16.4	U	21.4	U
TH232	pCi/g	0.406	0.67	0.118	0.474	2.02	U	0.162	U	0.284	0.551

Notes:
DOE – Department of Energy
EPA – U. S. Environmental Protection Agency
FD – field duplicate
IR – Installation Restoration
MDA – minimum detectable activity
N/A – not applicable, sample not designated for 90SR analysis
pCi/g – picocurie per gram
U – not detected

TABLE 6-2

SOURCE SHIELDING RIPRAP STUDY

Instrument Distance (ft)	Runway BKG (kcpm)	Runway Source (kcmp)	Sm RiprRap BKG (kcpm)	Sm Riprap Source (kcmp)	Lg Riprap BKG (kcpm)	Lg Riprap Source (kcmp)
0	6.1	153.4	4.6	130.6	5.4	181.1
1	6.2	47.6	4.4	47.0	4.6	20.2
2	5.7	18.0	4.3	16.5	4.2	8.3
3	5.8	10.6	4.1	10.7	4.3	5.0
4	5.6	8.8	4.2	7.2	5.3	5.2
5	6.0	7.4	4.4	4.9	4.1	4.7
6	5.7	7.2	4.5	4.5	4.7	4.3
7	5.6	6.6	4.5	4.2	4.5	4.4
8	5.8	6.3	4.5	4.6	4.9	5.0
9	5.4	6.2	4.6	4.5	4.8	4.7
10	5.5	6.2	4.7	4.6	4.3	3.9

Notes:
BKG – background
ft – foot
kcpm – one thousand counts per minute
Lg – Large
Sm – small

TABLE 6-3

IN-SITU GAMMA SPECTROSCOPY LOCATIONS

Date	Spectrum ID	Description	X-Coordinate	Y-Coordinate
11/13/06	08-IR2-001	Designated in-situ hot spot, IR-02	1472018.3	471712.85
11/12/06	08-IR2-002	Designated in-situ hot spot, IR-02	1470928.13	472574.95
11/12/06	08-IR2-003	Designated in-situ hot spot, IR-02	1470930.52	472704.96
11/11/06	08-IR2-004	Designated in-situ hot spot, IR-02	1470963.98	472849.42
11/11/06	08-IR2-005	Designated in-situ hot spot, IR-02	1471234.26	474323.28
11/13/06	08-IR2-006	Designated in-situ hot spot, IR-02	1471594.52	474390.62
11/12/06	08-IR1-007	Designated in-situ hot spot, IR-01	1471402.09	475716.95
11/12/06	08-IR1-008	Designated in-situ hot spot, IR-01	1471295.86	476374.05
11/12/06	08-IR1-009	Designated in-situ hot spot, IR-01	1471096.81	476856.35
11/12/06	08-IR1-010	Designated in-situ hot spot, IR-01	1471316.68	477367.56
11/12/06	08-IR32-011	Designated in-situ hot spot, IR-32	1472777.48	476539.53
11/12/06	08-IR32-012	Designated in-situ hot spot, IR-32	1472858.78	476602.46
11/11/06	08-IR32-013	Designated in-situ hot spot, IR-32	1472956.57	476608.69
11/11/06	08-IR32-014	Designated in-situ hot spot, IR-32	1473113.83	476394.81
11/11/06	08-IR32-015	Designated in-situ hot spot, IR-32	1473164.65	476287.91
11/17/06	08-IR2-016	Spectrum shot of riprap taken from man lift	1472842.81	471565.19
11/16/06	08-IR2-017	Spectrum shot of riprap taken from man lift	1471843.88	471690.04
11/14/06	08-RUN7-018	Spectrum shot of riprap taken from man lift	1471214.05	475023.14
11/14/06	08-RUN7-019	Spectrum shot of riprap taken from man lift	1471214.19	475086.68
11/15/06	08-IR1-020	Spectrum shot of riprap taken from man lift	1471313.17	477405.81
11/15/06	08-IR1-021	Spectrum shot of riprap taken from man lift	1471430.10	477495.18
11/15/06	08-IR1-022	Spectrum shot of riprap taken from man lift	1472525.70	477097.39

Notes:

IR – Installation Restoration

TABLE 6-4

THERMOLUMINESCENT DETECTOR LOCATIONS
DOSIMETRY STUDY

Location No.	TLD Identification	Installation Date	Easting	Northing	Elevation
00001	22105	9/27/06	1473289.44	476830.87	7.75
00002	22210	9/27/06	1473241.45	476844.83	7.74
00003	22209	9/27/06	1473191.14	476859.81	7.43
00004	22208	9/27/06	1473143.40	476875.02	7.65
00005	22207	9/27/06	1473095.73	476890.12	7.74
00006	22206	9/27/06	1473047.84	476904.48	7.61
00007	22205	9/27/06	1472999.98	476918.86	7.80
00008	22204	9/27/06	1472952.21	476934.02	7.88
00009	22203	9/27/06	1472904.66	476948.99	7.73
00010	22202	9/27/06	1472856.95	476964.31	8.06
00011	22104	9/27/06	1472809.67	476980.40	8.24
00012	22133	9/27/06	1472761.65	476994.39	8.00
00013	22134	9/27/06	1472713.77	477008.61	8.15
00014	22135	9/27/06	1472665.93	477023.21	8.36
00015	22136	9/27/06	1472617.89	477037.10	8.33
00016	22137	9/27/06	1472570.03	477051.83	8.47
00017	22138	9/27/06	1472522.47	477067.04	8.26
00018	22139	9/27/06	1472474.67	477082.06	8.28
00019	22140	9/27/06	1472427.12	477097.34	8.50
00020	22141	9/27/06	1472379.33	477111.91	8.60
00021	22142	9/27/06	1472331.65	477127.25	8.39
00022	22143	9/27/06	1472283.95	477142.03	8.15
00023	22144	9/27/06	1472235.95	477156.16	9.02
00024	22145	9/27/06	1472192.57	477184.86	8.03
00025	22146	9/27/06	1472146.27	477203.72	9.01
00026	22147	9/27/06	1472098.68	477219.19	8.41
00027	22148	9/27/06	1472050.67	477233.58	8.23
00028	22149	9/27/06	1472002.06	477245.74	8.84
00029	22150	9/27/06	1471955.77	477265.12	8.12
00030	22151	9/27/06	1471908.81	477282.36	8.96
00031	22152	9/27/06	1471863.46	477304.06	7.49
00032	22153	9/27/06	1471816.20	477320.50	7.62
00033	22154	9/27/06	1471770.48	477340.97	7.65
00034	22155	9/27/06	1471725.81	477363.67	8.60
00035	22156	9/27/06	1471678.74	477380.78	8.46
00036	22157	9/27/06	1471632.17	477399.08	8.71
00037	22158	9/27/06	1471584.15	477413.69	8.72
00038	22159	9/27/06	1471539.24	477435.90	8.55
00039	22160	9/27/06	1471494.02	477457.55	9.17
00040	22161	9/27/06	1471447.55	477475.93	8.56
00041	22162	9/27/06	1471398.67	477486.31	7.92
00042	22163	9/27/06	1471363.71	477450.63	8.35
00043	22164	9/27/06	1471333.32	477410.54	7.37
00044	22165	9/27/06	1471309.70	477365.57	7.42
00045	22166	9/27/06	1471270.62	477332.72	7.36

TABLE 6-4

THERMOLUMINESCENT DETECTOR LOCATIONS
DOSIMETRY STUDY

Location No.	TLD Identification	Installation Date	Easting	Northing	Elevation
00046	22167	9/27/06	1471221.35	477324.61	7.35
00047	22168	9/27/06	1471187.50	477287.92	6.50
00048	22169	9/27/06	1471156.01	477248.86	5.89
00049	22170	9/27/06	1471115.57	477218.16	7.11
00050	22171	9/27/06	1471082.13	477180.94	7.39
00051	22172	9/27/06	1471049.44	477143.07	7.86
00052	22173	9/27/06	1471043.13	477093.39	7.55
00053	22174	9/27/06	1471040.33	477043.58	7.46
00054	22175	9/27/06	1471035.51	476993.66	10.33
00055	22176	9/27/06	1471040.43	476943.19	9.88
00056	22177	9/27/06	1471058.58	476896.57	11.05
00057	22343	9/27/06	1471078.07	476846.99	8.44
00058	22179	9/27/06	1471084.39	476799.67	11.54
00059	22180	9/27/06	1471106.94	476754.53	10.67
00060	22181	9/27/06	1471138.89	476713.40	11.15
00061	22182	9/27/06	1471160.34	476668.07	11.59
00062	22183	9/27/06	1471184.18	476624.06	9.37
00063	22184	9/27/06	1471208.66	476580.26	9.97
00064	22185	9/27/06	1471243.40	476541.58	7.04
00065	22186	9/27/06	1471257.32	476492.70	7.15
00066	22187	9/27/06	1471272.66	476444.62	6.96
00067	22188	9/27/06	1471290.05	476397.60	6.70
00068	22189	9/27/06	1471296.85	476345.96	7.81
00069	22190	9/27/06	1471306.11	476296.82	6.64
00070	22191	9/27/06	1471308.12	476246.77	7.16
00071	22332	9/28/06	1471370.24	476184.41	8.30
00072	22333	9/28/06	1471332.43	476142.20	8.92
00073	22334	9/28/06	1471328.10	476093.21	8.50
00074	22335	9/28/06	1471327.05	476044.95	7.95
00075	22336	9/28/06	1471321.70	475992.55	8.37
00076	22337	9/28/06	1471315.69	475944.68	8.46
00077	22338	9/28/06	1471313.96	475894.97	9.25
00078	22339	9/28/06	1471319.68	475845.73	8.11
00079	22340	9/28/06	1471328.53	475795.79	7.52
00080	22341	9/28/06	1471316.49	475741.70	7.52
00081	22342	9/28/06	1471291.15	475695.46	6.90
00082	22212	9/28/06	1471250.88	475660.23	10.30
00083	22213	9/28/06	1471260.13	475611.73	6.28
00084	22214	9/28/06	1471268.18	475562.34	6.23
00085	22215	9/28/06	1471257.80	475510.81	6.57
00086	22216	9/28/06	1471246.27	475462.14	6.11
00087	22217	9/28/06	1471258.84	475410.83	6.26
00088	22218	9/28/06	1471255.43	475360.81	6.43
00089	22219	9/28/06	1471251.37	475310.91	6.83
00090	22220	9/28/06	1471244.84	475261.14	7.25

TABLE 6-4

THERMOLUMINESCENT DETECTOR LOCATIONS DOSIMETRY STUDY

Location No.	TLD Identification	Installation Date	Easting	Northing	Elevation
00091	22221	9/28/06	1471245.44	475211.09	7.21
00092	22222	9/28/06	1471244.29	475161.08	7.49
00093	22223	9/28/06	1471245.20	475110.99	7.81
00094	22224	9/28/06	1471244.55	475060.95	8.20
00095	22225	9/28/06	1471241.61	475011.20	7.57
00096	22226	9/28/06	1471243.57	474961.02	6.98
00097	22227	9/28/06	1471244.51	474910.98	6.24
00098	22228	9/28/06	1471244.49	474860.91	5.72
00099	22229	9/28/06	1471245.49	474810.88	5.67
00100	22230	9/28/06	1471247.66	474760.87	5.22
00101	22231	9/28/06	1471247.70	474710.80	5.69
00102	22232	9/28/06	1471244.19	474660.81	6.77
00103	22233	9/28/06	1471241.52	474611.05	6.62
00104	22234	9/28/06	1471233.93	474561.12	8.57
00105	22235	9/28/06	1471242.57	474510.89	7.57
00106	22236	9/28/06	1471227.10	474461.27	9.91
00107	22237	9/28/06	1471225.75	474411.34	8.14
00108	22238	9/28/06	1471235.56	474360.80	7.55
00109	22239	9/28/06	1471209.63	474310.85	12.02
00110	22240	9/28/06	1471191.65	474262.46	10.57
00111	22241	9/28/06	1471203.23	474211.99	7.77
00112	22242	9/28/06	1471191.32	474162.35	6.66
00113	22243	9/28/06	1471167.49	474113.69	8.62
00114	22244	9/28/06	1471159.01	474064.14	7.31
00115	22245	9/28/06	1471143.53	474015.14	7.37
00116	22246	9/28/06	1471117.64	473967.16	7.97
00117	22247	9/28/06	1471112.63	473917.50	6.82
00118	22248	9/28/06	1471099.38	473868.89	6.91
00119	22249	9/28/06	1471093.17	473819.12	6.58
00120	22250	9/28/06	1471088.73	473769.18	5.79
00121	22251	9/28/06	1471070.08	473721.70	5.70
00122	22252	9/28/06	1471060.56	473672.73	5.68
00123	22253	9/28/06	1471054.92	473622.77	5.46
00124	22254	9/28/06	1471041.49	473574.49	5.40
00125	22344	9/28/06	1471033.63	473525.90	4.79
00126	22345	9/28/06	1471026.86	473475.93	5.04
00127	22346	9/28/06	1471020.80	473425.72	4.91
00128	22347	9/28/06	1471008.32	473378.47	5.36
00129	22348	9/28/06	1470997.79	473328.05	5.25
00130	22260	9/28/06	1470996.69	473277.70	5.44
00131	22261	9/28/06	1470991.83	473227.75	5.80
00132	22262	9/28/06	1470982.87	473178.62	5.89
00133	22349	9/28/06	1470972.16	473129.27	4.70
00134	22350	9/28/06	1470961.89	473081.30	5.12
00135	22265	9/28/06	1470959.23	473030.43	6.27

TABLE 6-4

THERMOLUMINESCENT DETECTOR LOCATIONS DOSIMETRY STUDY

Location No.	TLD Identification	Installation Date	Easting	Northing	Elevation
00136	22351	9/28/06	1470944.10	472982.21	6.15
00137	22267	9/28/06	1470938.01	472932.60	5.95
00138	22268	9/28/06	1470929.20	472883.48	6.73
00139	22269	9/28/06	1470919.86	472834.27	7.48
00140	22352	9/28/06	1470908.89	472785.60	7.99
00141	22271	9/28/06	1470902.57	472735.78	7.70
00142	22272	9/28/06	1470891.95	472686.83	7.97
00143	22353	9/28/06	1470881.79	472638.05	8.33
00144	22274	9/28/06	1470874.25	472588.53	7.86
00145	22275	9/28/06	1470869.39	472538.60	8.07
00146	22354	9/28/06	1470858.56	472489.64	8.44
00147	22355	9/28/06	1470847.13	472440.37	8.57
00148	22278	9/28/06	1470847.56	472390.12	8.32
00149	22356	9/28/06	1470835.60	472341.55	8.65
00150	22280	9/28/06	1470832.72	472291.16	8.96
00151	22281	9/28/06	1470828.79	472241.16	8.70
00152	22357	9/28/06	1470825.71	472189.86	9.12
00153	22283	9/28/06	1470817.84	472141.54	9.19
00154	22284	9/28/06	1470819.82	472090.59	9.53
00155	22285	9/28/06	1470834.94	472042.90	9.31
00156	22286	9/28/06	1470859.53	471998.88	9.26
00157	22287	9/28/06	1470888.59	471957.20	9.17
00158	22288	9/28/06	1470917.02	471915.73	9.03
00159	22289	9/28/06	1470946.96	471875.34	9.02
00160	22290	9/28/06	1470976.82	471834.97	9.12
00161	22291	9/28/06	1471010.48	471797.14	9.43
00162	22292	9/28/06	1471058.84	471784.22	8.62
00163	22293	9/28/06	1471108.51	471776.99	8.49
00164	22294	9/28/06	1471159.15	471777.35	8.54
00165	22295	9/28/06	1471208.95	471772.32	8.67
00166	22296	9/28/06	1471258.47	471764.88	8.63
00167	22358	9/28/06	1471308.23	471761.79	8.79
00168	22359	9/28/06	1471357.04	471758.73	8.56
00169	22360	9/28/06	1471404.73	471748.16	6.87
00170	22361	9/28/06	1471457.59	471754.85	9.07
00171	22362	9/28/06	1471505.86	471750.04	8.78
00172	22363	9/28/06	1471570.20	471738.48	8.07
00173	22364	9/28/06	1471653.33	471733.67	8.76
00174	22365	9/28/06	1471706.40	471726.72	9.24
00175	22366	9/28/06	1471753.65	471720.70	8.85
00176	22367	9/28/06	1471802.58	471717.94	9.36
00177	22368	9/28/06	1471848.88	471717.94	9.80
00178	22369	9/28/06	1471898.90	471704.41	10.02
00179	22370	9/28/06	1471944.34	471697.60	9.28
00180	22371	9/28/06	1472006.02	471699.27	9.32

TABLE 6-4

THERMOLUMINESCENT DETECTOR LOCATIONS DOSIMETRY STUDY

Location No.	TLD Identification	Installation Date	Easting	Northing	Elevation
00181	22372	9/28/06	1472045.27	471695.31	8.59
00182	22373	9/28/06	1472095.55	471704.52	9.03
00183	22374	9/28/06	1472144.30	471686.16	8.38
00184	22375	9/28/06	1472196.39	471686.53	8.62
00185	22376	9/28/06	1472249.30	471679.12	7.72
00186	22317	9/28/06	1472303.29	471682.85	8.83
00187	22318	9/28/06	1472352.62	471674.88	8.63
00188	22319	9/28/06	1472402.86	471673.61	9.15
00189	22320	9/28/06	1472452.74	471669.55	9.35
00190	22321	9/28/06	1472502.45	471664.92	9.13
00191	22377	9/28/06	1472554.23	471652.90	7.78
00192	22378	9/28/06	1472600.48	471648.47	8.09
00193	22324	9/28/06	1472652.20	471654.65	9.06
00194	22379	9/28/06	1472703.24	471641.64	9.37
00195	22380	9/28/06	1472751.25	471636.23	10.01
00196	22328	9/28/06	1472800.32	471627.55	10.98
00197	22381	9/28/06	1472848.04	471600.56	8.37
00198	N/A	10/5/06	1474868.27	476182.11	-0.10
00199	N/A	10/5/06	1478971.41	475063.67	-0.10
00200	N/A	10/5/06	1479008.27	475043.39	-0.10

Notes:

N/A – not applicable

TLD – thermoluminscent detector

TABLE 10-1

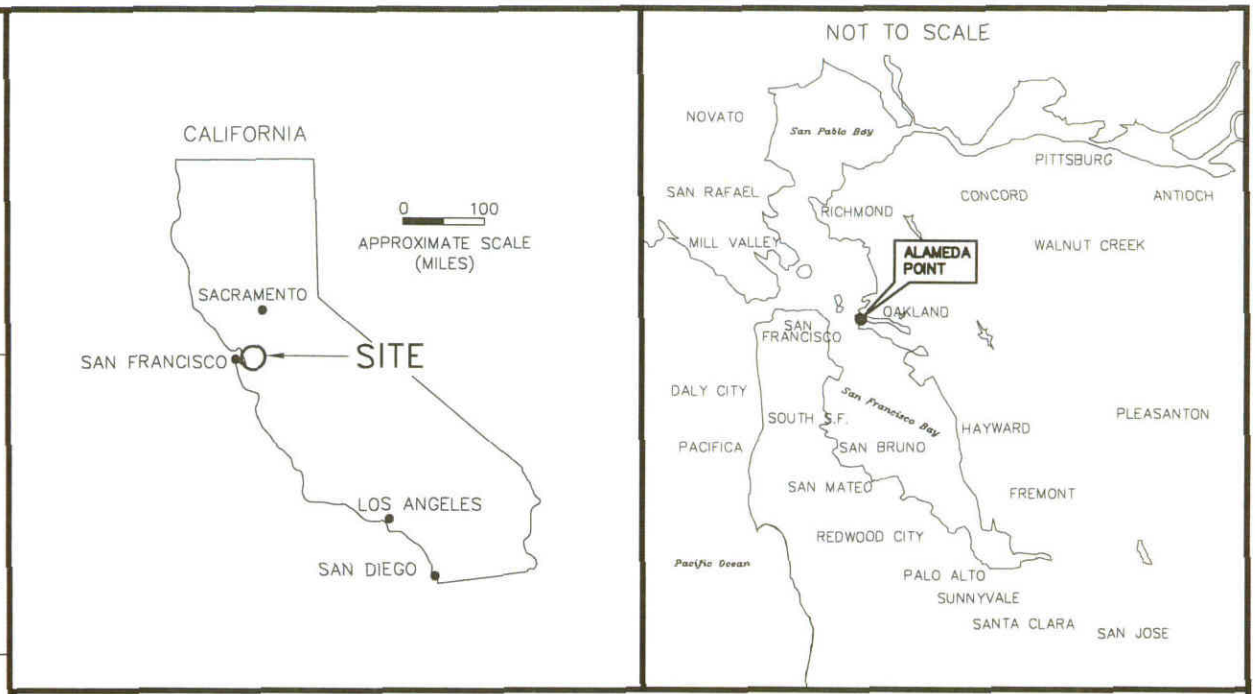
SUMMARY OF NON-RCRA WASTE STREAMS

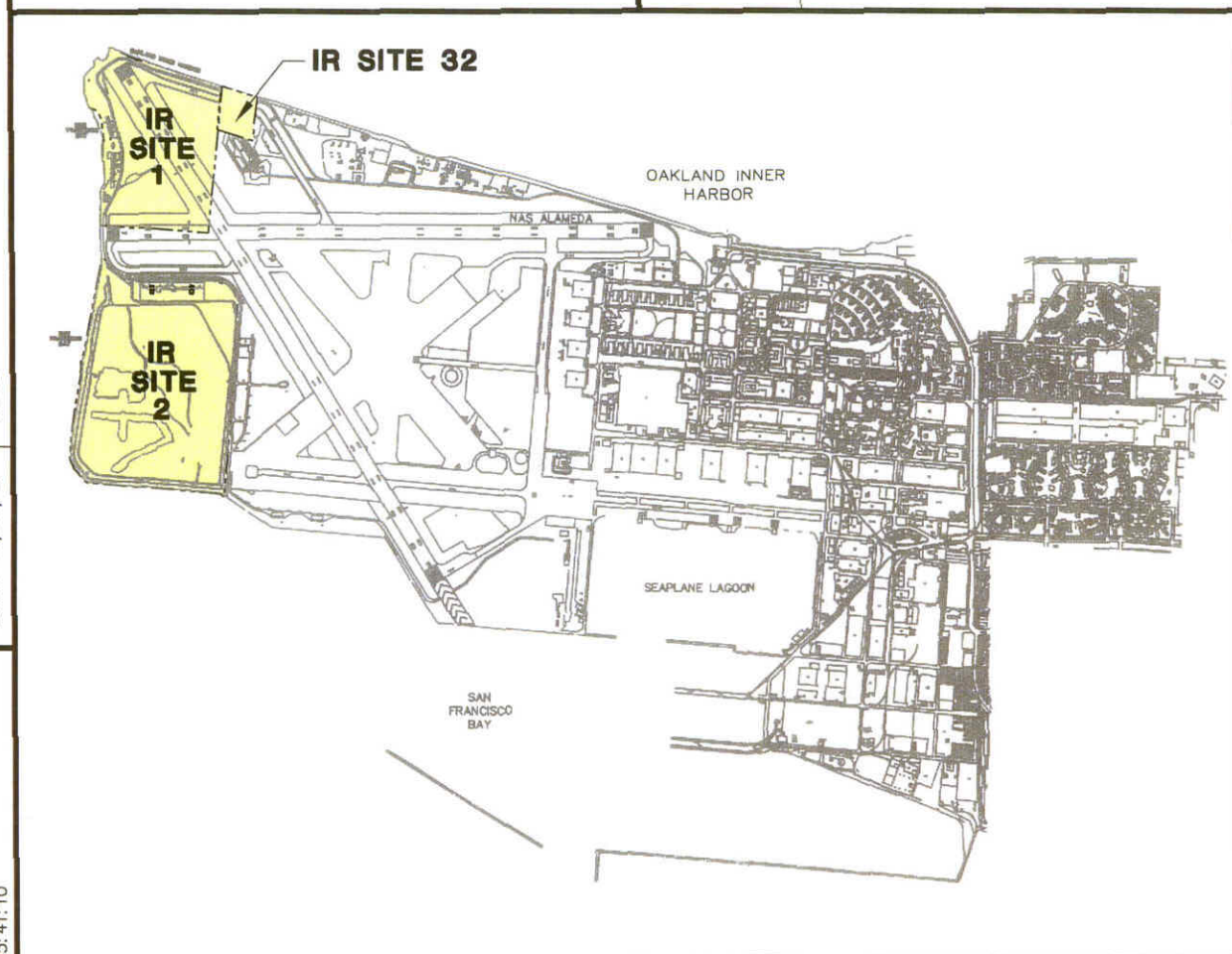
Date	Man. Doc. No.	Description	Approximate Weight/Volume	Transp. Name	Transp. EPA No.	Facility Name	Facility ID
5/9/2007	A03279-000183	Non-hazardous Solid (PPE)	55-Gallon Drum	Eighteen Trucking	CAR000143875	Altamont Landfill	CAD981382732
		Non-hazardous Liquid (Decontamination Water)	15 Gallons				

Notes:

EPA – U.S. Environmental Protection Agency
PPE – personal protective equipment
RCRA – Resource Conservation and Recovery Act

FIGURES





N

N.T.S.

Figure 1-1
SITE VICINITY MAP

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWING NO: 000111.DWG
DCN: ECSD-2201-0008-0001
CTO: #0008
APPROVED BY: AE
CHECKED BY: JD
REVISION: 0
DRAWN BY: MD
DATE: 09/24/07

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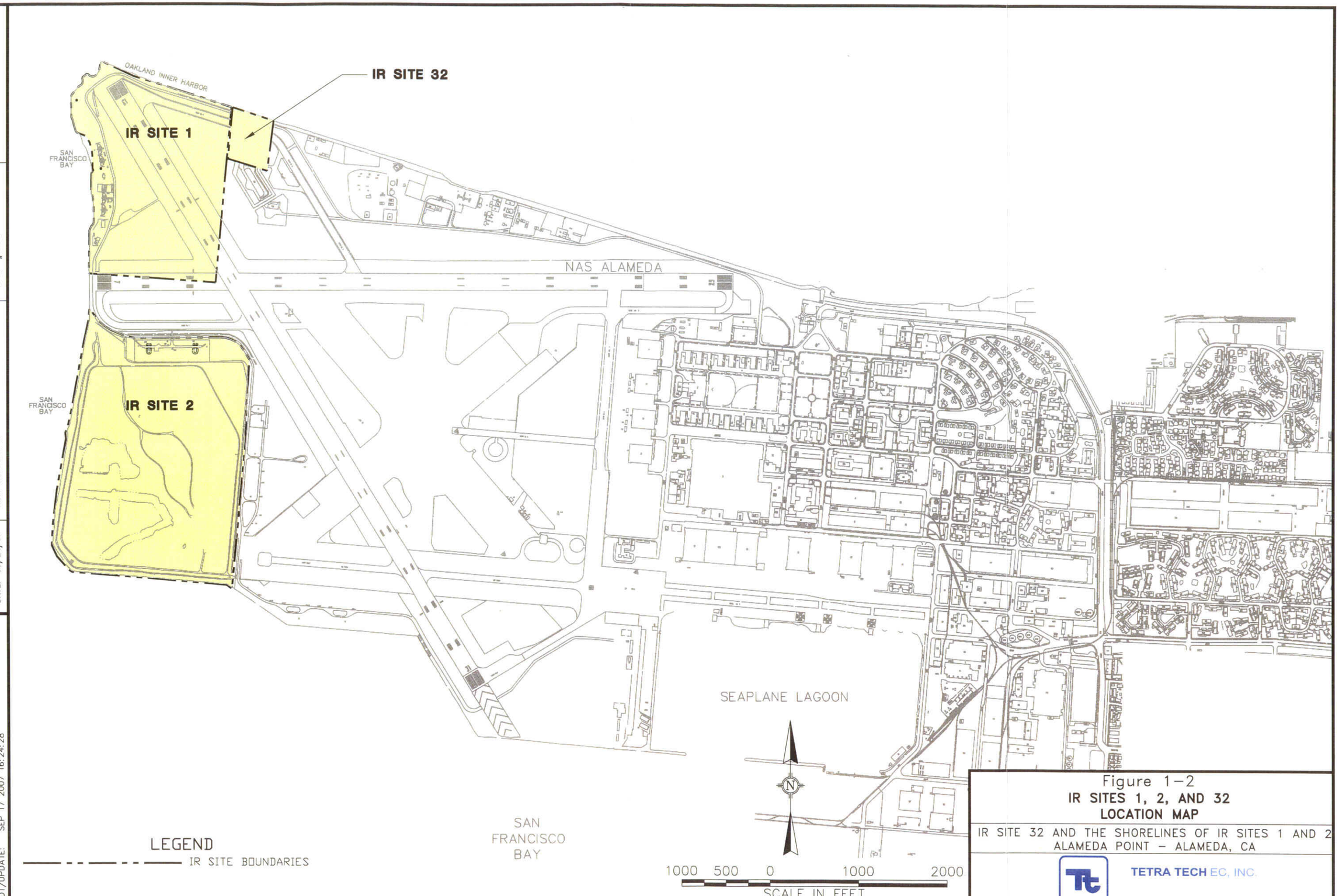

Figure 1-2
IR SITES 1, 2, AND 32
LOCATION MAP

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWING NO: 000112.DWG
DCN: ECSD-2201-0008-0001
CTO: #0008
APPROVED BY: AE
CHECKED BY: JD
REV: REVISION 0
DRAWN BY: MD
DATE: 09/24/07

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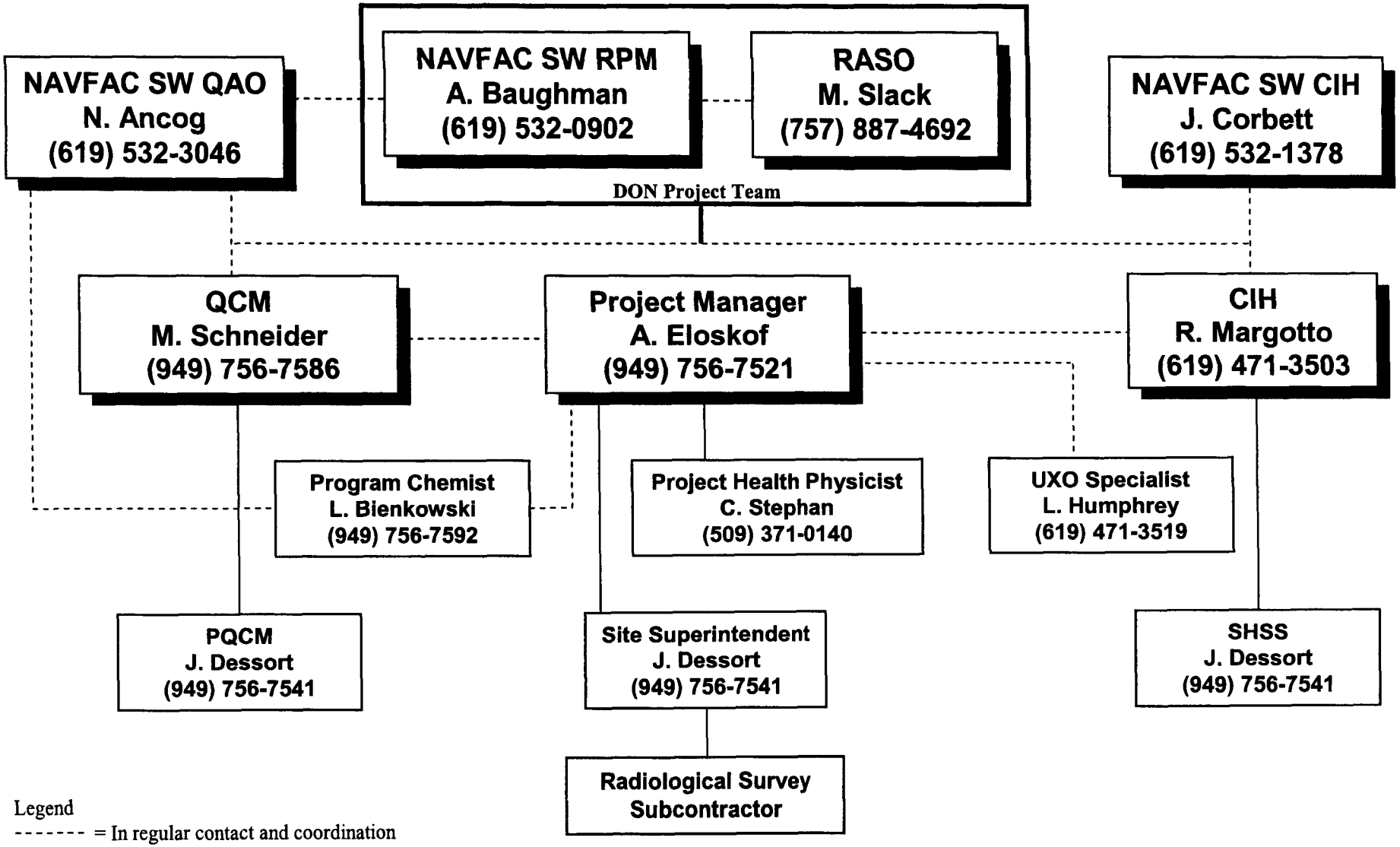
Figure 1-3

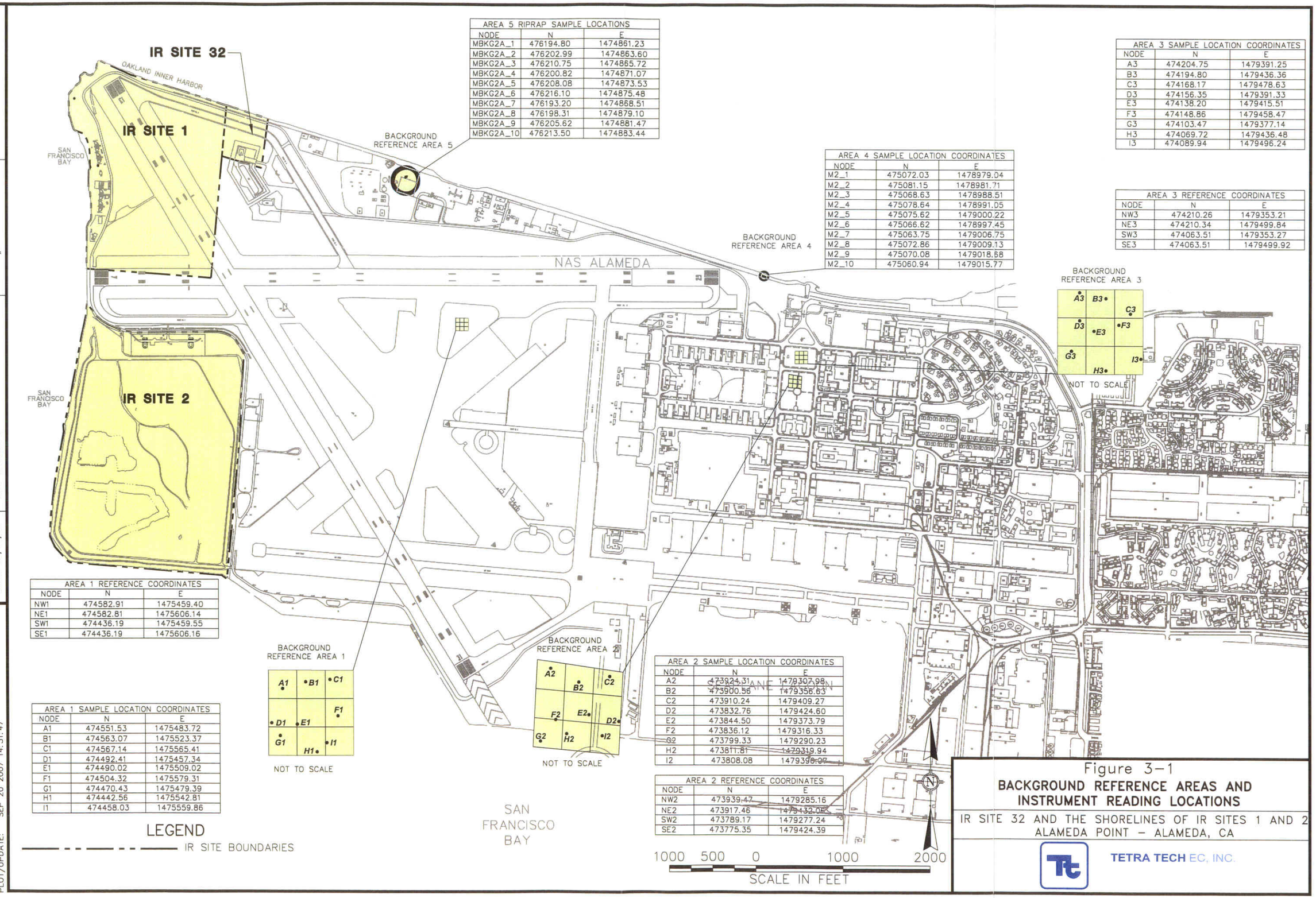
Project Organization Chart



Legend

------- = In regular contact and coordination

——— = Directly reports to above



AREA 5 RIPRAP SAMPLE LOCATIONS		
NODE	N	E
MBKG2A_1	476194.80	1474861.23
MBKG2A_2	476202.99	1474863.60
MBKG2A_3	476210.75	1474865.72
MBKG2A_4	476200.82	1474871.07
MBKG2A_5	476208.08	1474873.53
MBKG2A_6	476216.10	1474875.48
MBKG2A_7	476193.20	1474868.51
MBKG2A_8	476198.31	1474879.10
MBKG2A_9	476205.62	1474881.47
MBKG2A_10	476213.50	1474883.44

AREA 4 SAMPLE LOCATION COORDINATES		
NODE	N	E
M2_1	475072.03	1478979.04
M2_2	475081.15	1478981.71
M2_3	475068.63	1478988.51
M2_4	475078.64	1478991.05
M2_5	475075.62	1479000.22
M2_6	475066.62	1478997.45
M2_7	475063.75	1479006.75
M2_8	475072.86	1479009.13
M2_9	475070.08	1479018.68
M2_10	475060.94	1479015.77

AREA 3 SAMPLE LOCATION COORDINATES		
NODE	N	E
A3	474204.75	1479391.25
B3	474194.80	1479436.36
C3	474168.17	1479478.63
D3	474156.35	1479391.33
E3	474138.20	1479415.51
F3	474148.86	1479458.47
G3	474103.47	1479377.14
H3	474069.72	1479436.48
I3	474089.94	1479496.24

AREA 3 REFERENCE COORDINATES		
NODE	N	E
NW3	474210.26	1479353.21
NE3	474210.34	1479499.84
SW3	474063.51	1479353.27
SE3	474063.51	1479499.92

AREA 1 REFERENCE COORDINATES		
NODE	N	E
NW1	474582.91	1475459.40
NE1	474582.81	1475606.14
SW1	474436.19	1475459.55
SE1	474436.19	1475606.16

AREA 1 SAMPLE LOCATION COORDINATES		
NODE	N	E
A1	474551.53	1475483.72
B1	474563.07	1475523.37
C1	474567.14	1475565.41
D1	474492.41	1475457.34
E1	474490.02	1475509.02
F1	474504.32	1475579.31
G1	474470.43	1475479.39
H1	474442.56	1475542.81
I1	474458.03	1475559.86

AREA 2 SAMPLE LOCATION COORDINATES		
NODE	N	E
A2	473924.31	1479307.98
B2	473900.56	1479356.63
C2	473910.24	1479409.27
D2	473832.76	1479424.60
E2	473844.50	1479373.79
F2	473836.12	1479316.33
G2	473799.33	1479290.23
H2	473811.81	1479319.94
I2	473808.08	1479396.07

AREA 2 REFERENCE COORDINATES		
NODE	N	E
NW2	473939.47	1479285.16
NE2	473917.46	1479432.06
SW2	473789.17	1479277.24
SE2	473775.35	1479424.39

Figure 3-1

BACKGROUND REFERENCE AREAS AND INSTRUMENT READING LOCATIONS

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWING NO: 000131.DWG
DCN: ECSD-2201-0008-0001
CTO: #0008
APPROVED BY: AE
DRAWN BY: MD
CHECKED BY: JD
DATE: 09/24/07
REV: REVISION 0

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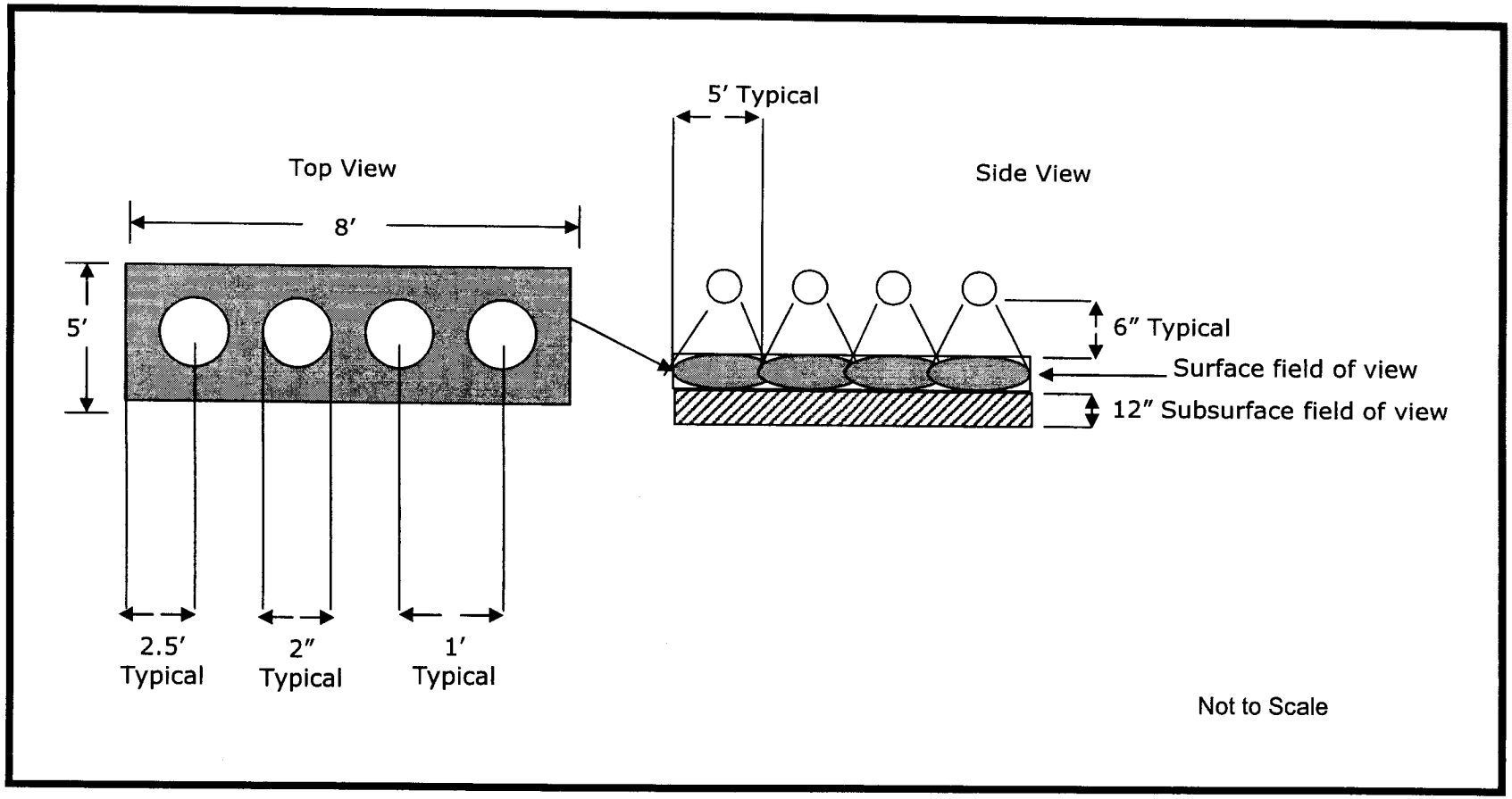
FIGURE 3-2

DETECTOR ARRAY



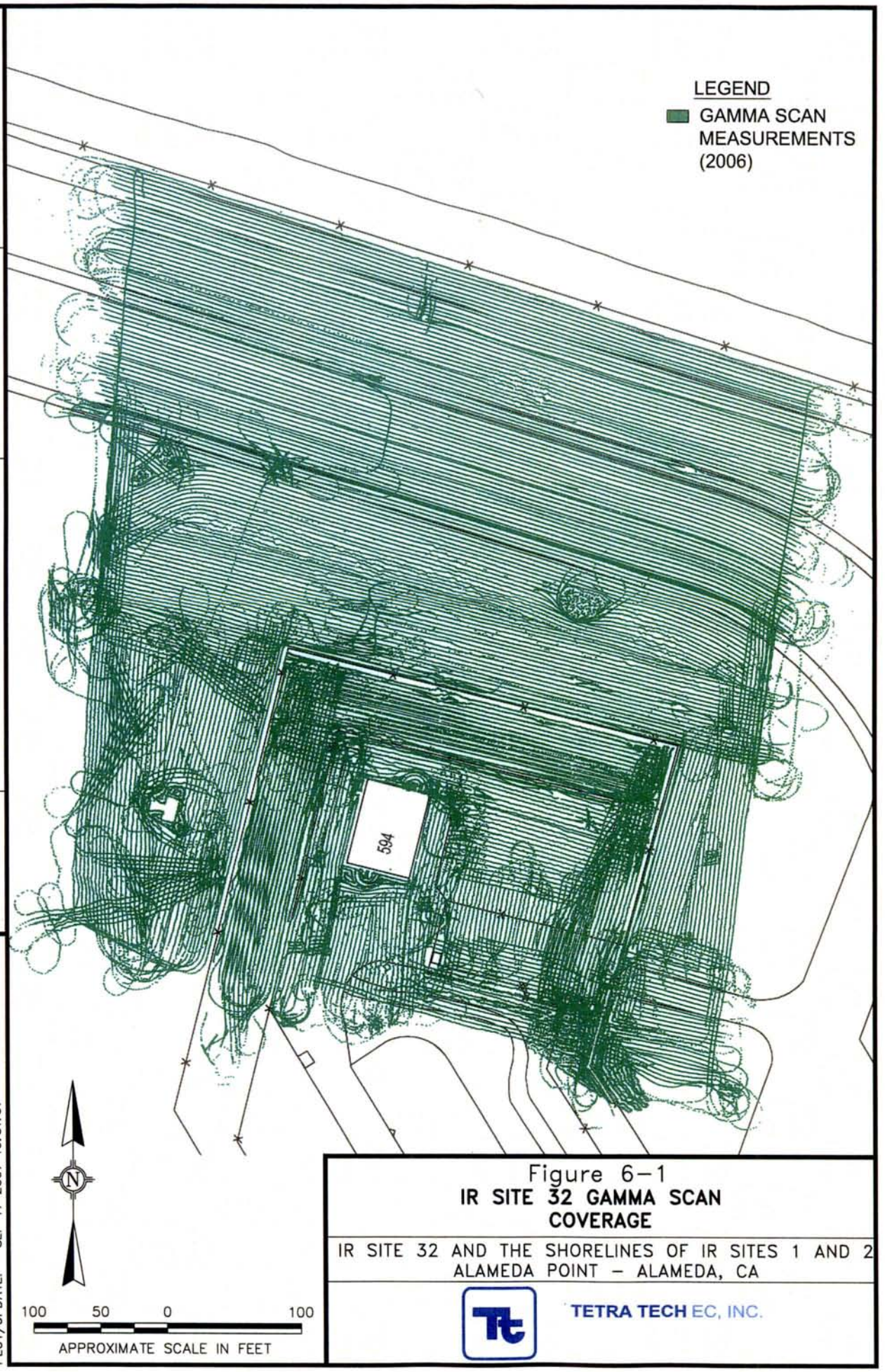


Figure 6-1
IR SITE 32 GAMMA SCAN COVERAGE

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWN BY: MD	CHECKED BY: JD	APPROVED BY: AE	DCN: ECSD-2201-0008-0001	DRAWING NO: 000161.DWG
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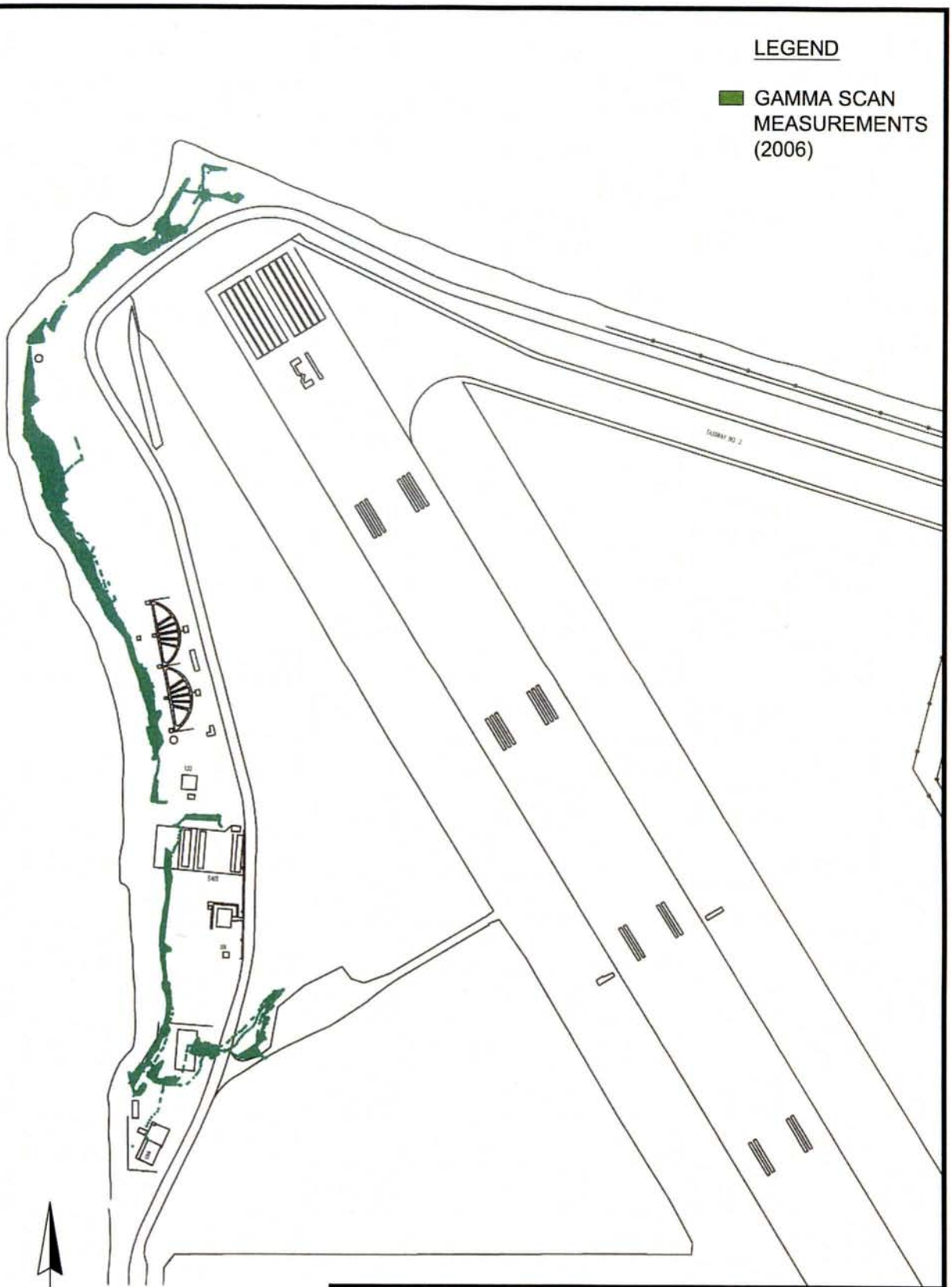

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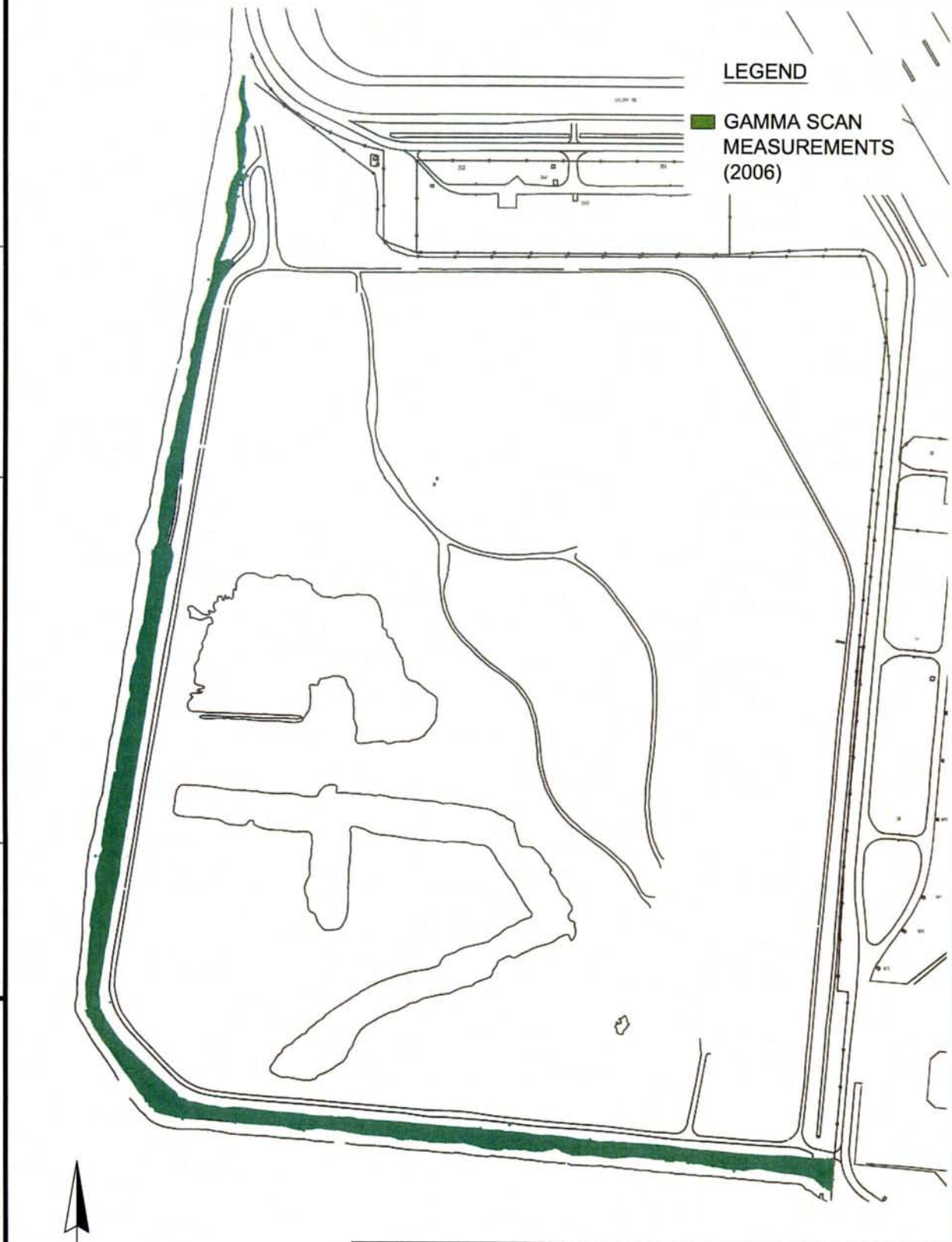
Figure 6-2

IR SITE 1 DATA GAPS GAMMA SCAN COVERAGE

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.



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DATE: 09/24/07	REVISION: 0		CTO: #0008	

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PLOT/UPDATE: SEP 17 2007 17:34:48

N

400 200 0 400

APPROXIMATE SCALE IN FEET

Figure 6-3

IR SITE 2 DATA GAPS GAMMA SCAN COVERAGE

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWN BY: MD	CHECKED BY: JD	APPROVED BY: AE	DCN: ECSD-2201-0008-0001	DRAWING NO:
DATE: 09/24/07	REVISION: 0		CTO: #0008	000164.DWG

LEGEND

GAMMA SCAN MEASUREMENTS (2006)

50 25 0 50

APPROXIMATE SCALE IN FEET

Figure 6-4

RAD SHACK GAMMA SCAN COVERAGE

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT - ALAMEDA, CA

TETRA TECH EC, INC.

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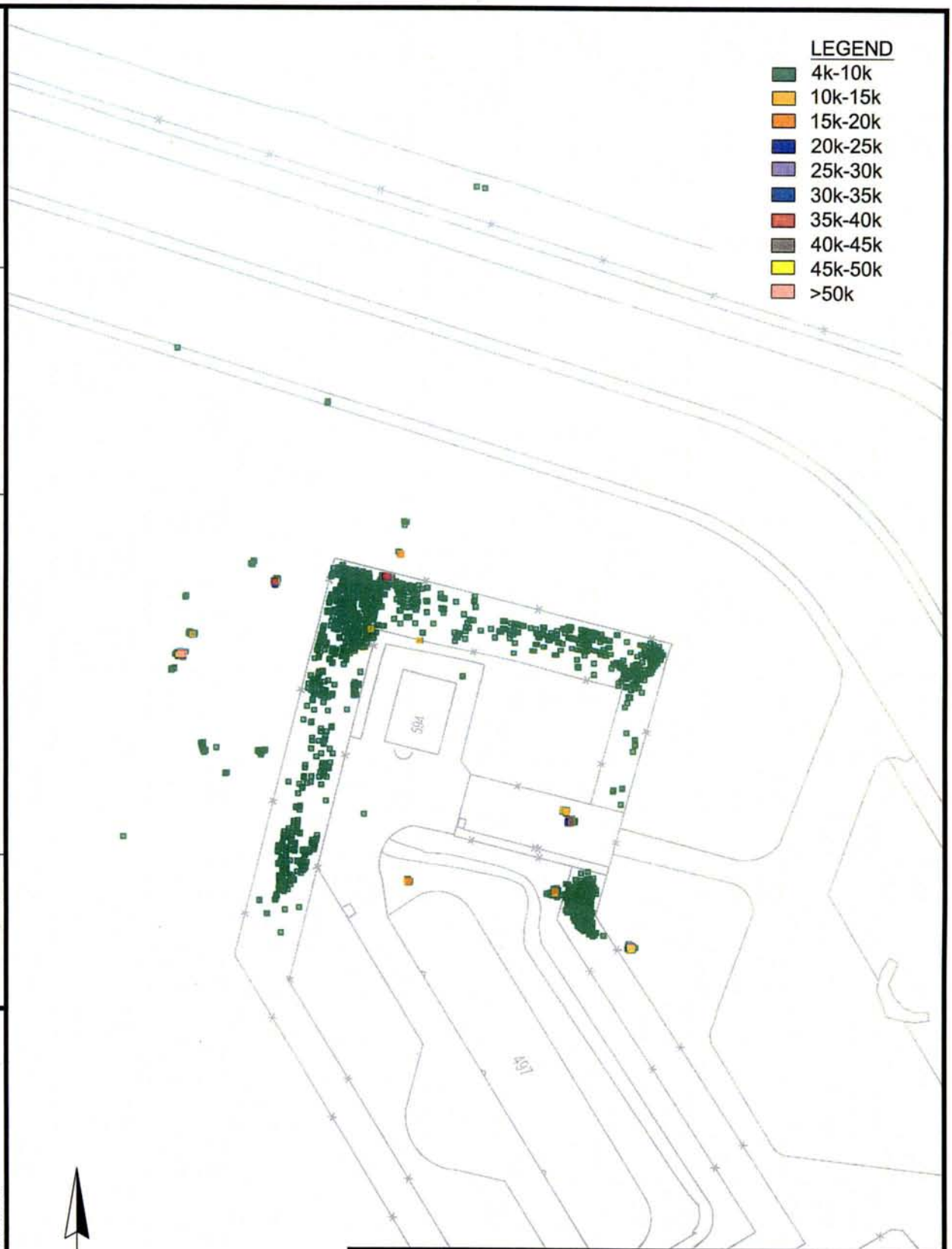

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PLOT/UPDATE: SEP 17 2007 17:50:19

N

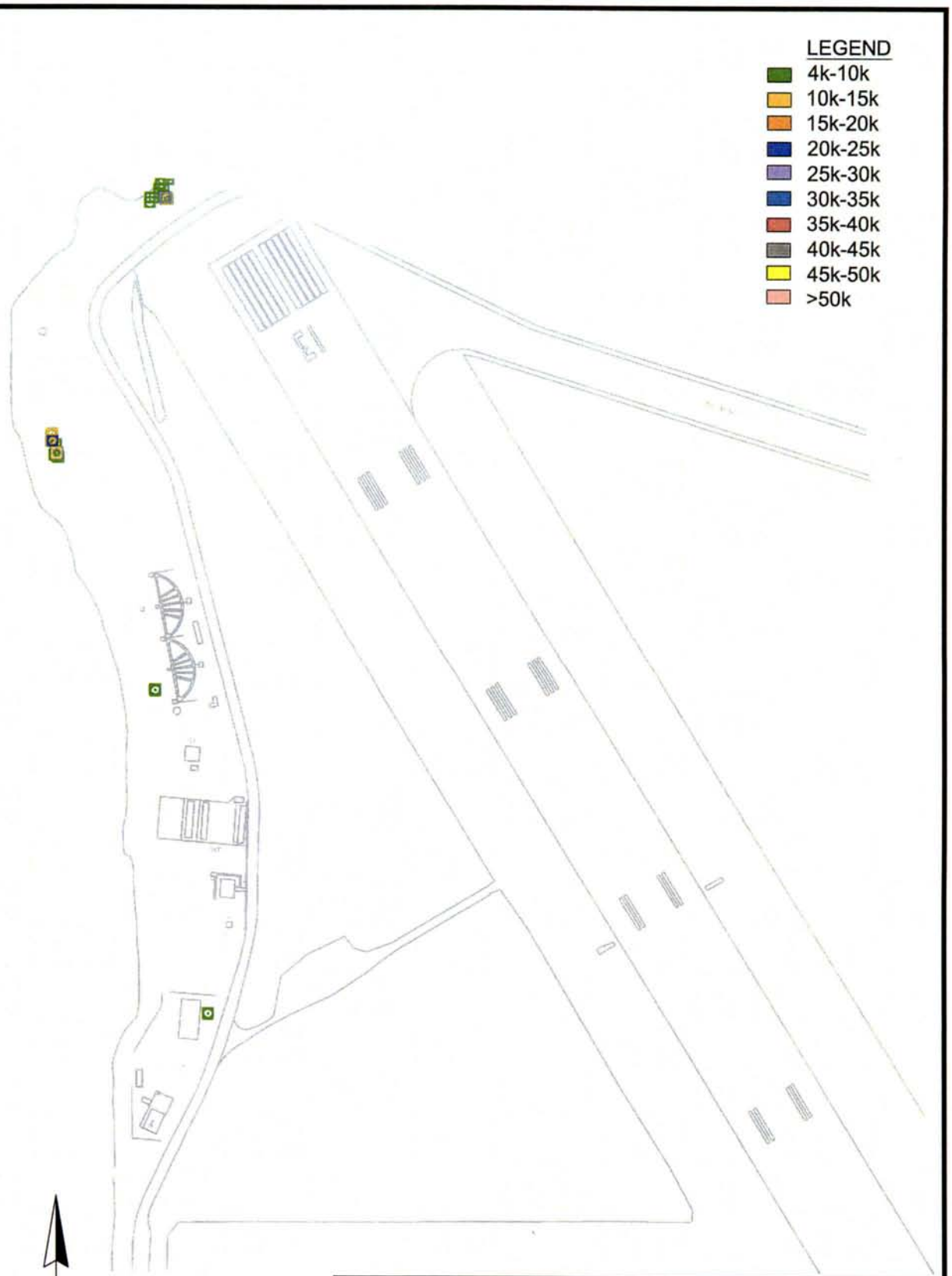
125 67.5 0 125

APPROXIMATE SCALE IN FEET

Figure 6-5
IR SITE 32 GAMMA SCAN, ELEVATED LEVELS OF RADIOLOGICAL ACTIVITY >4,000 NET CPM

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.



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DATE: 09/24/07	REVISION: 0		CTO: #0008	

N

300 150 0 300

APPROXIMATE SCALE IN FEET

Figure 6-6

IR SITE 1 GAMMA SCAN, ELEVATED LEVELS OF RADIOLOGICAL ACTIVITY >4,000 NET CPM

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

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PLOT/UPDATE: SEP 17 2007 17:52:08

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DATE: 09/24/07	REVISION: 0		CTO: #0008	

N

400 200 0 400

APPROXIMATE SCALE IN FEET

Figure 6-7

IR SITE 2 GAMMA SCAN, ELEVATED LEVELS OF RADIOLOGICAL ACTIVITY >4,000 NET CPM

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

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PLOT/UPDATE: SEP 17 2007 17:53:10

DRAWN BY: MD | CHECKED BY: JD | APPROVED BY: AE | DCN: ECSD-2201-0008-0001 | DRAWING NO: 000168.DWG

DATE: 09/24/07 | REVISION: 0 | CTO: #0008

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PLOT/UPDATE: SEP 17 2007 17:55:26

Figure 6-8
RAD SHACK GAMMA SCAN, ELEVATED LEVELS OF RADIOLOGICAL ACTIVITY >4,000 NET CPM

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWN BY: MD	CHECKED BY: JD	APPROVED BY: AE	DCN: ECSD-2201-0008-0001	DRAWING NO: 000169.DWG
DATE: 09/24/07	REVISION: 0		CTO: #0008	

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PLOT/UPDATE: SEP 17 2007 17:57:11

N

800 400 0 800

APPROXIMATE SCALE IN FEET

Figure 6-9
IR SITE 1, 2, AND 32
SHORELINE STATICS COVERAGE

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

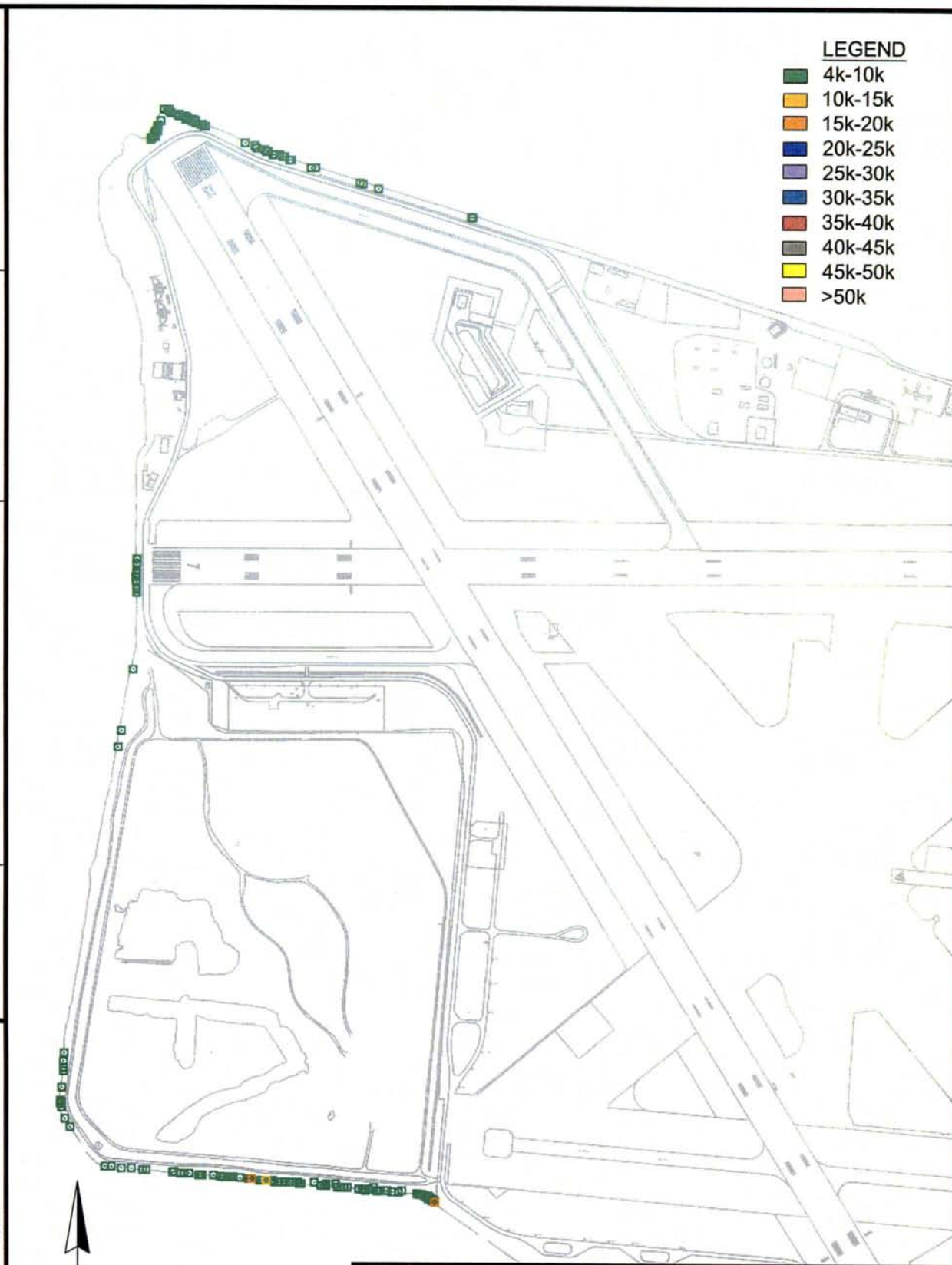

Figure 6-10
IR1, 2 AND 32 SHORELINE STATICS, ELEVATED LEVELS RADIOLOGICAL ACTIVITY >4,000 NET CPM

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWN BY: MD	CHECKED BY: JD	APPROVED BY: AE	DCN: ECSD-2201-0008-0001	DRAWING NO: 0001610.DWG
DATE: 09/24/07	REVISION: 0		CTO: #0008	

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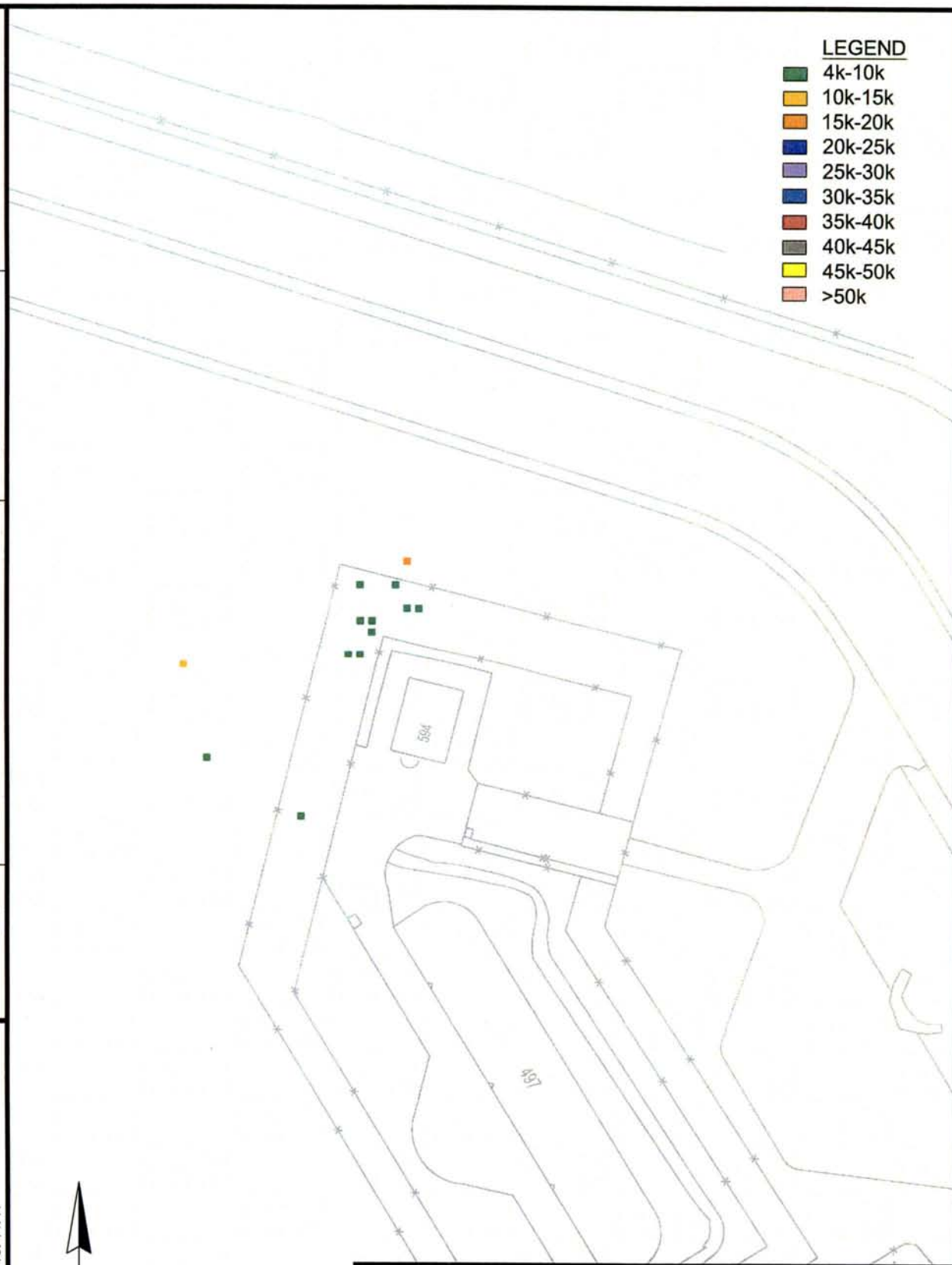

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DATE: 09/24/07	REVISION: 0		CTO: #0008	

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PLOT/UPDATE: SEP 17 2007 16:44:11

Figure 6-11
IR SITE 32 STATICS, ELEVATED LEVELS OF RADIOLOGICAL ACTIVITY >4,000 NET CPM

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

Figure 6-12
IR SITE 1, 2, AND 32 SHORELINE PIC MEASUREMENTS

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWN BY: MD	CHECKED BY: JD	APPROVED BY: AE	DCN: ECSD-2201-0008-0001	DRAWING NO: 0001612.DWG
DATE: 09/24/07	REVISION: 0		CTO: #0008	

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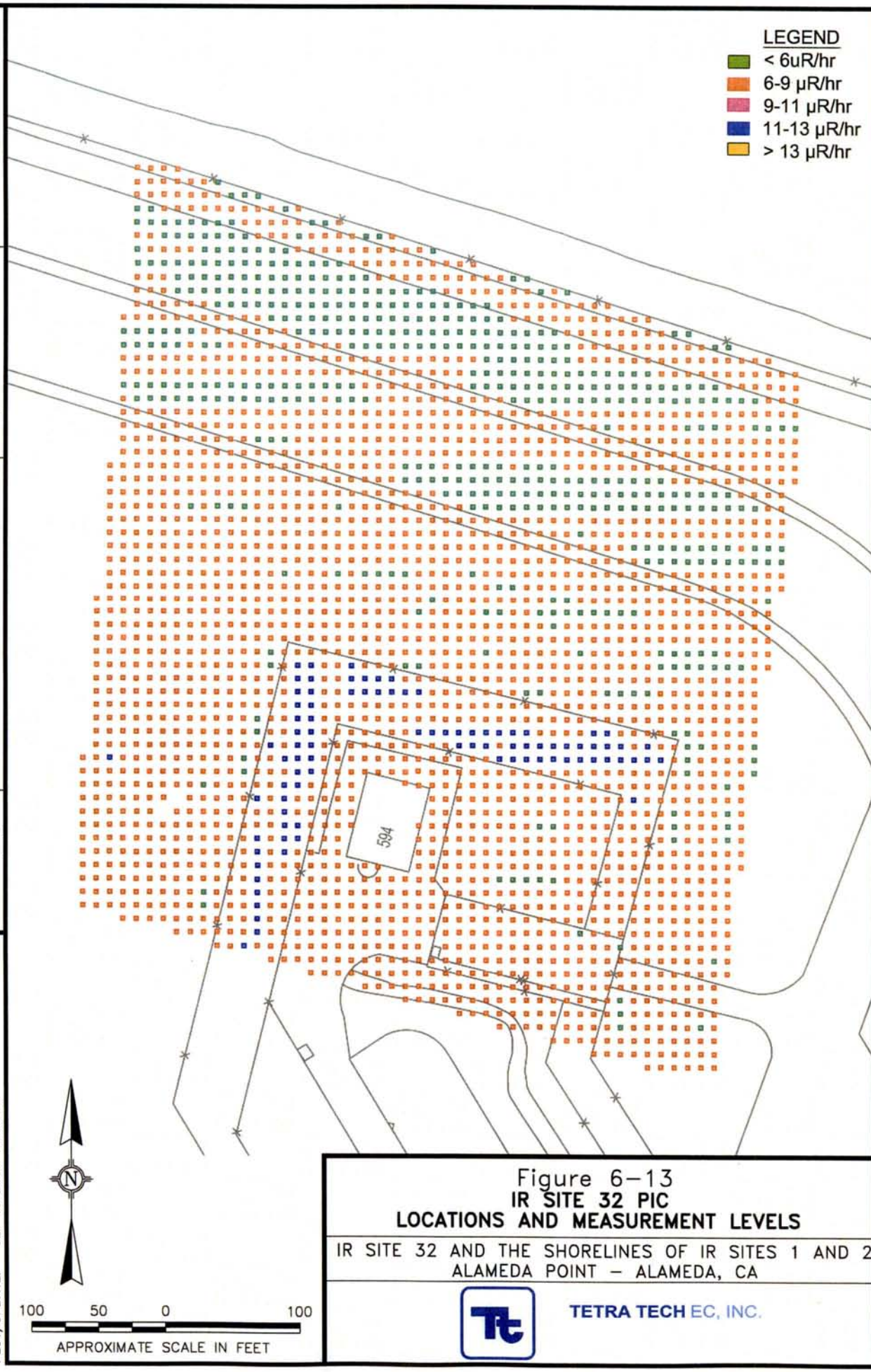

Figure 6-13
IR SITE 32 PIC
LOCATIONS AND MEASUREMENT LEVELS

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWN BY: MD	CHECKED BY: JD	APPROVED BY: AE	DCN: ECSD-2201-0008-0001	DRAWING NO: 0001613.DWG
DATE: 09/24/07	REVISION: 0		CTO: #0008	

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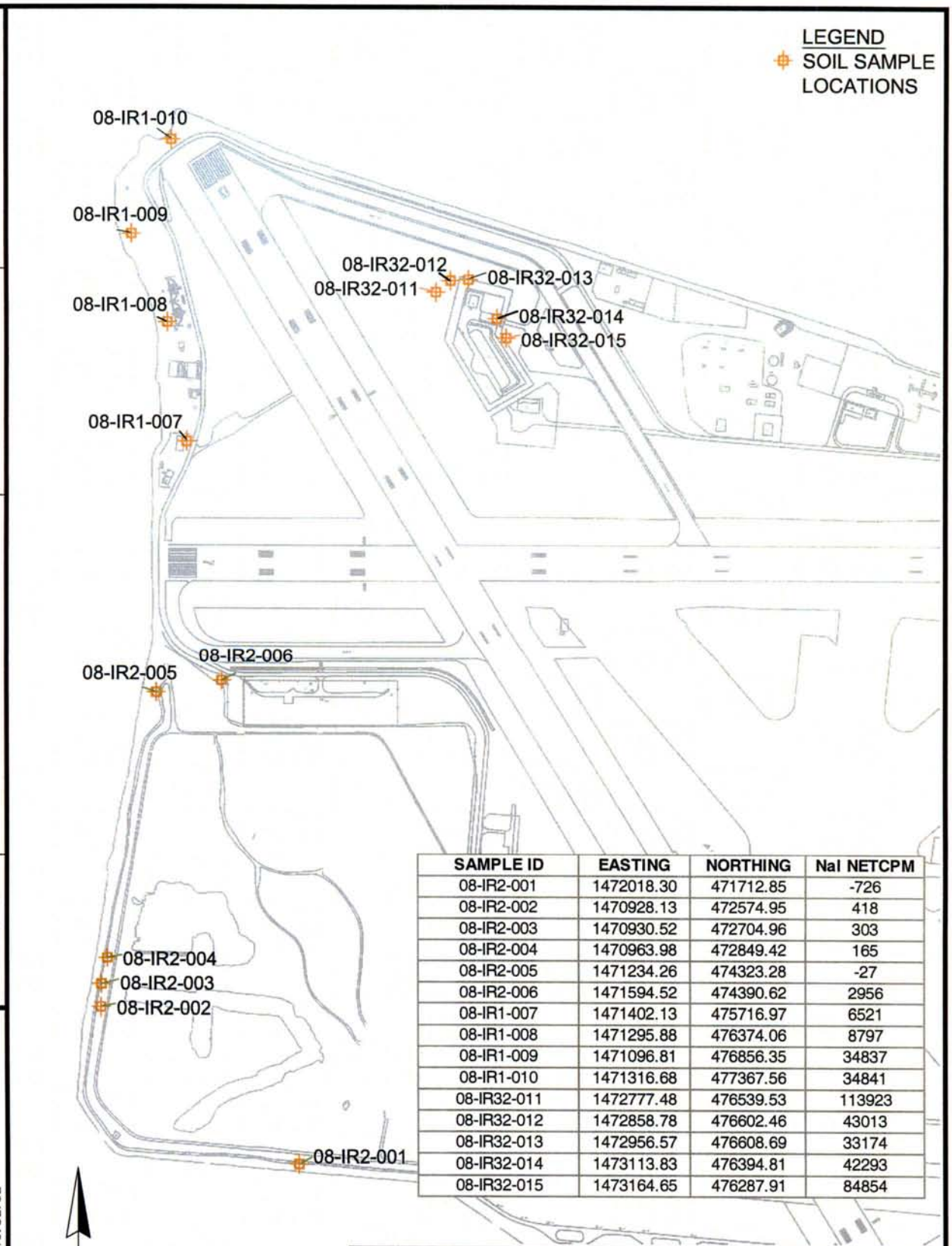

SAMPLE ID	EASTING	NORTHING	NaI NETCPM
08-IR2-001	1472018.30	471712.85	-726
08-IR2-002	1470928.13	472574.95	418
08-IR2-003	1470930.52	472704.96	303
08-IR2-004	1470963.98	472849.42	165
08-IR2-005	1471234.26	474323.28	-27
08-IR2-006	1471594.52	474390.62	2956
08-IR1-007	1471402.13	475716.97	6521
08-IR1-008	1471295.88	476374.06	8797
08-IR1-009	1471096.81	476856.35	34837
08-IR1-010	1471316.68	477367.56	34841
08-IR32-011	1472777.48	476539.53	113923
08-IR32-012	1472858.78	476602.46	43013
08-IR32-013	1472956.57	476608.69	33174
08-IR32-014	1473113.83	476394.81	42293
08-IR32-015	1473164.65	476287.91	84854

Figure 6-14
NAI STATIC MEASUREMENTS AND SOIL SAMPLE LOCATIONS

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWING NO: 0001614.DWG
DCN: ECSD-2201-0008-0001
CTO: #0008
APPROVED BY: AE
CHECKED BY: JD
REVISION: 0
DRAWN BY: MD
DATE: 09/24/07

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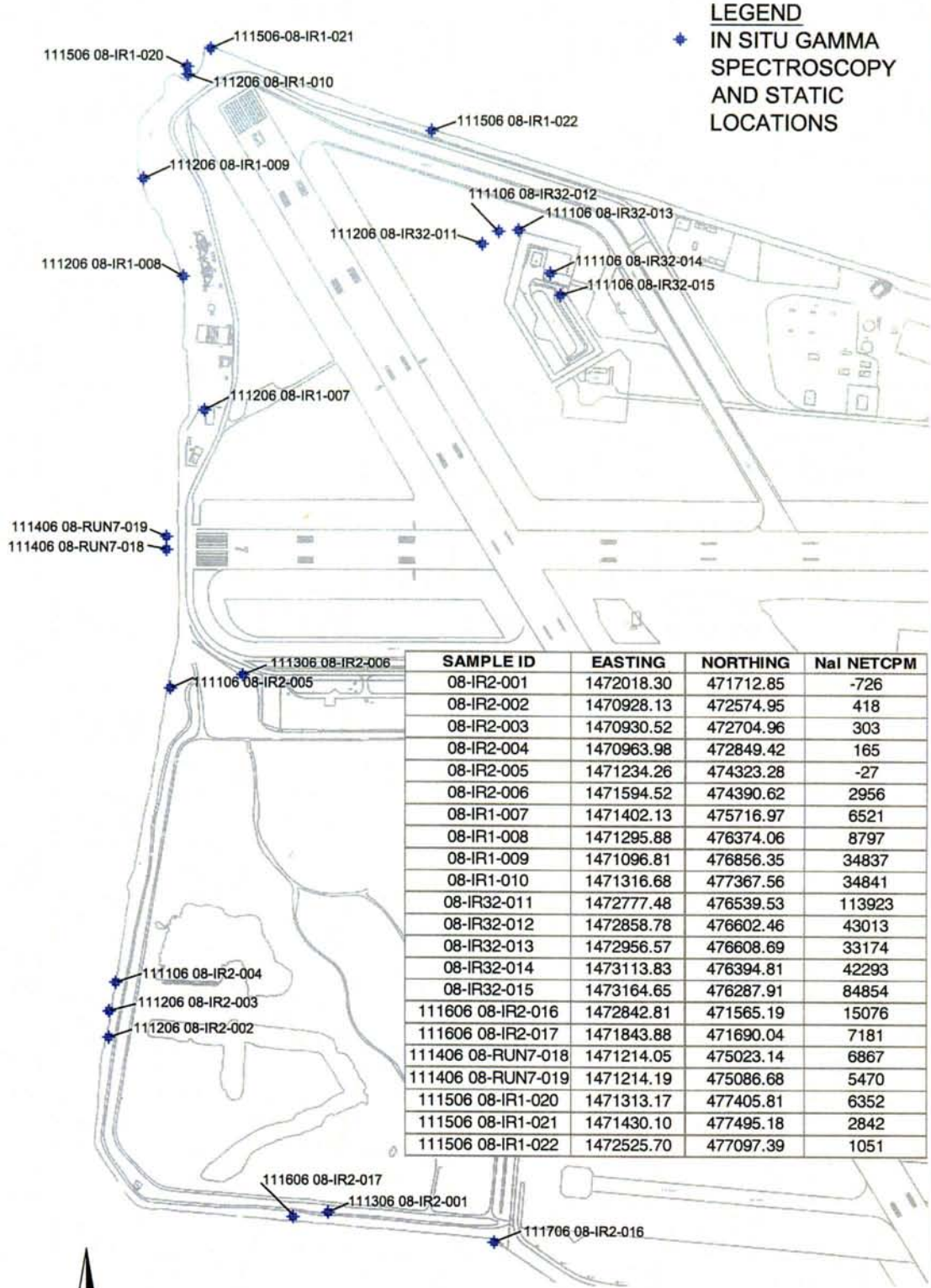

SAMPLE ID	EASTING	NORTHING	NaI NETCPM
08-IR2-001	1472018.30	471712.85	-726
08-IR2-002	1470928.13	472574.95	418
08-IR2-003	1470930.52	472704.96	303
08-IR2-004	1470963.98	472849.42	165
08-IR2-005	1471234.26	474323.28	-27
08-IR2-006	1471594.52	474390.62	2956
08-IR1-007	1471402.13	475716.97	6521
08-IR1-008	1471295.88	476374.06	8797
08-IR1-009	1471096.81	476856.35	34837
08-IR1-010	1471316.68	477367.56	34841
08-IR32-011	1472777.48	476539.53	113923
08-IR32-012	1472858.78	476602.46	43013
08-IR32-013	1472956.57	476608.69	33174
08-IR32-014	1473113.83	476394.81	42293
08-IR32-015	1473164.65	476287.91	84854
111606 08-IR2-016	1472842.81	471565.19	15076
111606 08-IR2-017	1471843.88	471690.04	7181
111406 08-RUN7-018	1471214.05	475023.14	6867
111406 08-RUN7-019	1471214.19	475086.68	5470
111506 08-IR1-020	1471313.17	477405.81	6352
111506 08-IR1-021	1471430.10	477495.18	2842
111506 08-IR1-022	1472525.70	477097.39	1051

800 400 0 800

APPROXIMATE SCALE IN FEET

Figure 6-15

GAMMA SPECTROSCOPY AND NAI STATIC MEAUREMENT LOCATIONS

IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

DRAWING NO: 0001615.DWG

DCN: ECSD-2201-0008-0001

CTO: #0008

APPROVED BY: AE

CHECKED BY: JD

REVISION: 0

DRAWN BY: MD

DATE: 09/24/07

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DATE: 09/24/07	REVISION: 0		CTO: #0008	0001616.DWG

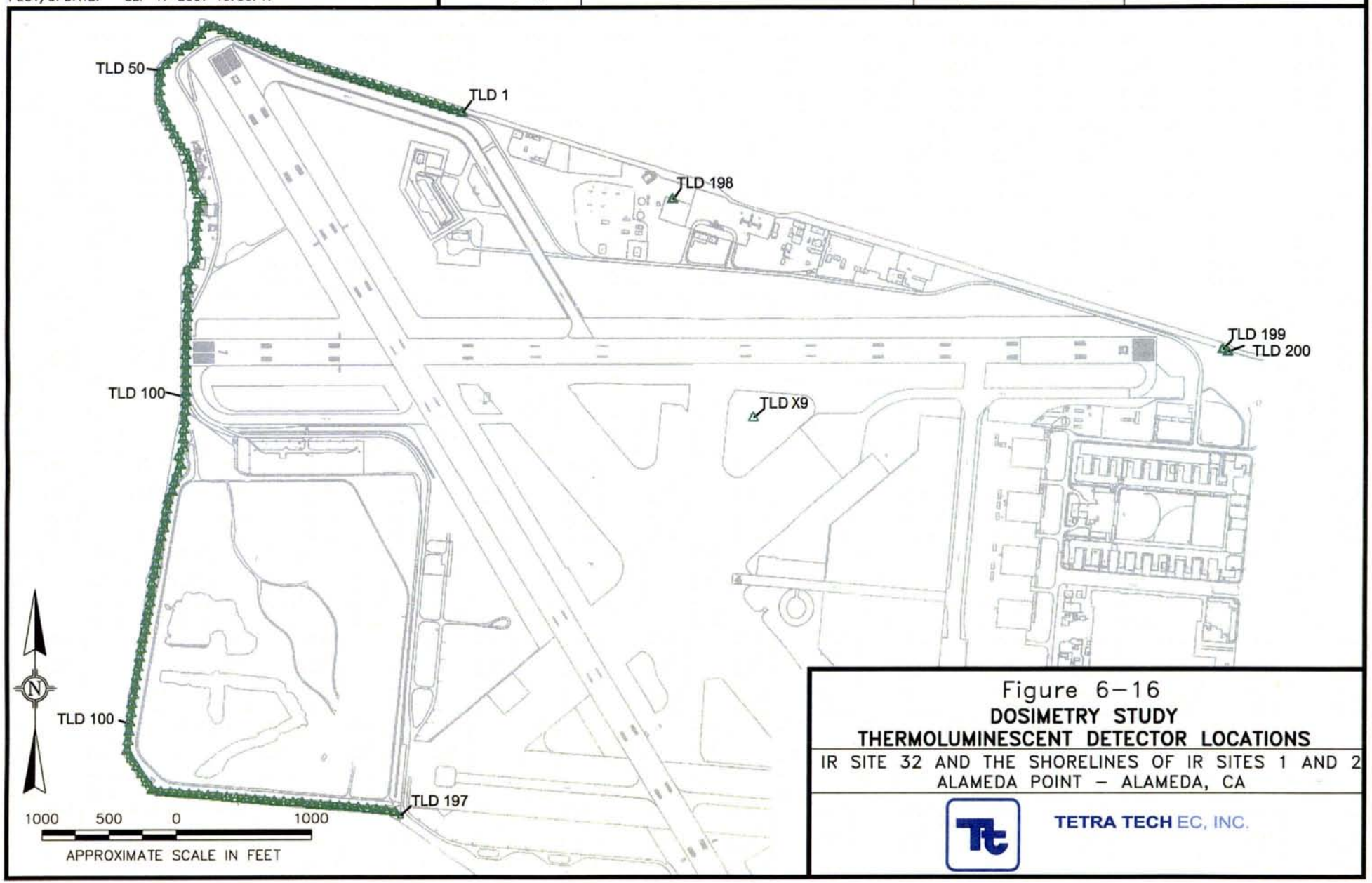

Figure 6-16
DOSIMETRY STUDY
THERMOLUMINESCENT DETECTOR LOCATIONS
IR SITE 32 AND THE SHORELINES OF IR SITES 1 AND 2
ALAMEDA POINT – ALAMEDA, CA

TETRA TECH EC, INC.

APPENDIX A

LAND SURVEY DATA

COAST **SURVEYING, INC.**

15031 PARKWAY LOOP, SUITE B, TUSTIN, CA 92780-6527 • (714) 918-6266 • FAX (714) 918-6277

Alameda Point IR Sites 1 & 2 Shoreline, Site 32 and RAD Shack.

Temporary survey control points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
1000	474952.97	1475777.31	9.93	2115360.41	6037144.21	12.63	P-K NAIL #200
1001	474951.07	1475182.78	10.80	2115358.52	6036549.68	13.50	P-K NAIL #800
1002	474960.00	1474257.11	8.48	2115367.47	6035624.02	11.18	MAG NAIL RUNWAY
1003	475313.55	1472798.61	9.88	2115721.05	6034165.54	12.58	MAG NAIL #775
1004	476347.71	1471893.92	9.10	2116755.22	6033260.87	11.80	FND AT FX1
1339	474239.08	1480058.25	5.92	2114646.45	6041425.09	8.62	CHIS X
1340	474273.89	1479169.75	4.86	2114681.27	6040536.60	7.56	CHIS X
1341	474232.47	1479599.08	5.26	2114639.85	6040965.92	7.96	CHIS X
1342	474290.06	1478837.38	5.48	2114697.45	6040204.23	8.18	CHIS X
1371	473967.94	1478293.10	7.89	2114375.34	6039659.96	10.59	REBAR
1372	473900.33	1479163.20	5.07	2114307.72	6040530.05	7.77	CHIS X

Area 32 Limits

Point #	NAD27 North	NAD27 East	NGVD29 Elevation		NAD83 North	NAD83 East	NAVD88 Elevation	Description
22059	476429.79	1472761.52	4.85	22059	2116837.28	6034128.47	7.55	AREA 32
22060	476300.48	1473218.47	5.41	22060	2116707.96	6034585.40	8.11	AREA 32
22104	476980.40	1472809.67	8.24	22104	2117387.88	6034176.61	10.94	AREA 32
22105	476830.87	1473289.44	7.75	22105	2117238.35	6034656.38	10.45	AREA 32

RAD Shack Limits

Point #	NAD27 North	NAD27 East	NGVD29 Elevation		NAD83 North	NAD83 East	NAVD88 Elevation	Description
22113	474401.99	1471589.73	7.98	22113	2114809.51	6032956.66	10.68	RAD SHACK
22114	474402.07	1471614.56	7.44	22114	2114809.59	6032981.49	10.14	RAD SHACK
22115	474370.21	1471614.45	6.66	22115	2114777.74	6032981.39	9.36	RAD SHACK
22116	474370.23	1471589.75	7.09	22116	2114777.76	6032956.69	9.79	RAD SHACK

Background Reference Areas and Sample Locations

Area 1

Point #	NAD27 North	NAD27 East	NGVD29 Elevation		NAD83 North	NAD83 East	NAVD88 Elevation	Description
22065	474582.91	1475459.40	9.56	22065	2114990.36	6036826.30	12.26	A1 LIMITS
22066	474582.81	1475606.14	8.98	22066	2114990.26	6036973.04	11.68	A1 LIMITS
22067	474436.19	1475606.16	9.30	22067	2114843.64	6036973.06	12.00	A1 LIMITS
22068	474436.09	1475459.55	9.73	22068	2114843.54	6036826.44	12.43	A1 LIMITS
22069	474551.53	1475483.72	9.49	22069	2114958.98	6036850.62	12.19	SAMPLE A1
22070	474563.07	1475523.37	9.69	22070	2114970.52	6036890.27	12.39	SAMPLE B1
22071	474567.14	1475565.41	9.27	22071	2114974.59	6036932.30	11.97	SAMPLE C1
22072	474492.41	1475457.34	9.52	22072	2114899.86	6036824.23	12.22	SAMPLE D1
22073	474490.02	1475509.02	9.96	22073	2114897.47	6036875.91	12.66	SAMPLE E1
22074	474504.32	1475579.31	9.47	22074	2114911.77	6036946.20	12.17	SAMPLE F1
22075	474470.43	1475479.39	9.62	22075	2114877.88	6036846.28	12.32	SAMPLE G1
22076	474442.56	1475542.81	9.66	22076	2114850.01	6036909.70	12.36	SAMPLE H1
22077	474458.03	1475559.86	9.55	22077	2114865.48	6036926.75	12.25	SAMPLE I1

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Alameda Point IR Sites 1 & 2 Shoreline, Site 32 and RAD Shack.

Background Reference Areas and Sample Locations

Area 2

	NAD27	NAD27	NGVD29		NAD83	NAD83	NAVD88	
Point #	North	East	Elevation		North	East	Elevation	Description
22091	473819.47	1478359.51	8.80	22091	2114226.88	6039726.36	11.50	A2 LIMITS
22092	473819.60	1478506.22	8.41	22092	2114227.00	6039873.07	11.11	A2 LIMITS
22093	473672.89	1478506.18	8.31	22093	2114080.29	6039873.03	11.01	A2 LIMITS
22094	473672.89	1478359.57	8.18	22094	2114080.30	6039726.42	10.88	A2 LIMITS
22095	473816.43	1478384.75	8.38	22095	2114223.83	6039751.60	11.08	SAMPLE A2
22096	473802.84	1478454.91	8.39	22096	2114210.24	6039821.76	11.09	SAMPLE B2
22097	473774.14	1478468.88	8.08	22097	2114181.54	6039835.73	10.78	SAMPLE C2
22098	473724.36	1478374.74	7.99	22098	2114131.77	6039741.59	10.69	SAMPLE D2
22099	473731.15	1478451.53	7.99	22099	2114138.55	6039818.38	10.69	SAMPLE E2
22100	473747.38	1478493.36	7.89	22100	2114154.78	6039860.21	10.59	SAMPLE F2
22101	473679.39	1478360.84	8.16	22101	2114086.80	6039727.70	10.86	SAMPLE G2
22102	473712.93	1478426.45	8.09	22102	2114120.33	6039793.30	10.79	SAMPLE H2
22103	473699.63	1478473.76	8.31	22103	2114107.03	6039840.61	11.01	SAMPLE I2

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Alameda Point IR Sites 1 & 2 Shoreline, Site 32 and RAD Shack.

Background Reference Areas and Sample Locations

Area 3

Point #	NAD27 North	NAD27 East	NGVD29 Elevation		NAD83 North	NAD83 East	NAVD88 Elevation	Description
22078	474210.26	1479353.21	6.39	22078	2114617.64	6040720.06	9.09	A3 LIMITS
22079	474210.34	1479499.84	6.45	22079	2114617.72	6040866.69	9.15	A3 LIMITS
22080	474063.51	1479499.92	6.31	22080	2114470.89	6040866.76	9.01	A3 LIMITS
22081	474063.51	1479353.27	5.99	22081	2114470.89	6040720.11	8.69	A3 LIMITS
22082	474204.75	1479391.25	6.46	22082	2114612.13	6040758.10	9.16	SAMPLE A3
22083	474194.80	1479436.36	6.39	22083	2114602.18	6040803.21	9.09	SAMPLE B3
22084	474168.17	1479478.63	6.45	22084	2114575.55	6040845.48	9.15	SAMPLE C3
22085	474156.35	1479391.33	6.37	22085	2114563.73	6040758.18	9.07	SAMPLE D3
22086	474138.20	1479415.51	6.17	22086	2114545.58	6040782.36	8.87	SAMPLE E3
22087	474148.86	1479458.47	6.36	22087	2114556.24	6040825.31	9.06	SAMPLE F3
22088	474103.47	1479377.14	6.29	22088	2114510.85	6040743.99	8.99	SAMPLE G3
22089	474069.72	1479436.48	6.29	22089	2114477.10	6040803.32	8.99	SAMPLE H3
22090	474089.94	1479496.24	6.53	22090	2114497.32	6040863.08	9.23	SAMPLE I3

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Alameda Point IR Sites 1 & 2 Shoreline, Site 32 and RAD Shack.

Background Reference Areas and Sample Locations

Area P

	NAD27	NAD27	NGVD29		NAD83	NAD83	NAVD88	
Point #	North	East	Elevation		North	East	Elevation	Description
22120	473939.47	1479285.16	5.91	22120	2114346.86	6040652.00	8.61	AREA P LIMITS
22124	473917.46	1479432.06	5.91	22124	2114324.84	6040798.90	8.61	AREA P LIMITS
22128	473789.18	1479277.24	6.26	22128	2114196.57	6040644.08	8.96	AREA P LIMITS
22132	473775.35	1479424.39	6.44	22132	2114182.73	6040791.23	9.14	AREA P LIMITS
22121	473924.31	1479307.98	6.10	22121	2114331.70	6040674.82	8.80	SAMPLE PA
22122	473900.56	1479356.63	6.04	22122	2114307.94	6040723.47	8.74	SAMPLE PB
22123	473910.24	1479409.27	5.93	22123	2114317.63	6040776.11	8.63	SAMPLE PC
22125	473832.76	1479424.60	6.17	22125	2114240.15	6040791.44	8.87	SAMPLE PD
22126	473844.50	1479373.79	6.22	22126	2114251.89	6040740.63	8.92	SAMPLE PE
22127	473836.12	1479316.33	6.45	22127	2114243.50	6040683.17	9.15	SAMPLE PF
22129	473799.33	1479290.23	6.25	22129	2114206.72	6040657.07	8.95	SAMPLE PG
22130	473811.81	1479319.94	6.32	22130	2114219.19	6040686.78	9.02	SAMPLE PH
22131	473808.08	1479396.07	6.48	22131	2114215.46	6040762.91	9.18	SAMPLE PI

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Alameda Point IR Sites 1 & 2 Shoreline, Site 32 and RAD Shack.

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22016	474654.14	1471251.42	4.53	2115061.67	6032618.36	7.23	GRID CPT
22017	474554.63	1471242.28	4.91	2114962.16	6032609.23	7.61	GRID CPT
22018	474456.46	1471221.44	9.72	2114863.99	6032588.38	12.42	GRID CPT
22019	474355.47	1471223.45	11.84	2114763.00	6032590.39	14.54	GRID CPT
22020	474256.89	1471204.31	8.25	2114664.43	6032571.25	10.95	GRID CPT
22021	474159.04	1471181.21	8.34	2114566.58	6032548.15	11.04	GRID CPT
22022	474062.45	1471151.58	7.19	2114469.98	6032518.51	9.89	GRID CPT
22023	474055.04	1471217.26	13.41	2114462.57	6032584.20	16.11	GRID CPT
22024	473761.44	1471155.38	12.21	2114168.98	6032522.31	14.91	GRID CPT
22025	473662.73	1471139.23	12.75	2114070.27	6032506.17	15.45	GRID CPT
22026	473367.04	1471088.82	12.88	2113774.58	6032455.76	15.58	GRID CPT
22027	473268.21	1471072.21	12.92	2113675.75	6032439.15	15.62	GRID CPT
22028	472972.99	1471019.58	11.51	2113380.53	6032386.51	14.21	GRID CPT
22029	472874.51	1471002.37	11.81	2113282.05	6032369.30	14.51	GRID CPT
22030	472578.27	1470954.27	14.57	2112985.82	6032321.20	17.27	GRID CPT
22031	472479.70	1470937.25	14.50	2112887.25	6032304.18	17.20	GRID CPT
22032	472184.13	1470885.88	14.53	2112591.69	6032252.81	17.23	GRID CPT
22033	472084.23	1470889.50	14.88	2112491.78	6032256.42	17.58	GRID CPT
22034	471856.65	1471085.03	14.90	2112264.21	6032451.95	17.60	GRID CPT
22035	471824.82	1471180.01	14.47	2112232.37	6032546.92	17.17	GRID CPT
22036	471797.86	1471478.79	14.01	2112205.40	6032845.70	16.71	GRID CPT
22037	471790.91	1471578.60	14.30	2112198.45	6032945.51	17.00	GRID CPT
22038	471770.69	1471877.88	15.25	2112178.23	6033244.79	17.95	GRID CPT
22039	471758.68	1471977.20	14.75	2112166.22	6033344.11	17.45	GRID CPT
22040	471731.64	1472276.11	14.78	2112139.17	6033643.01	17.48	GRID CPT
22041	471725.54	1472375.86	15.52	2112133.07	6033742.77	18.22	GRID CPT
22042	471702.39	1472675.00	15.50	2112109.92	6034041.89	18.20	GRID CPT
22043	471692.09	1472774.44	11.75	2112099.62	6034141.33	14.45	GRID CPT
22044	475354.16	1471253.78	4.36	2115761.68	6032620.73	7.06	GRID CPT
22045	475453.65	1471264.78	4.25	2115861.17	6032631.73	6.95	GRID CPT
22046	475654.26	1471253.40	8.21	2116061.78	6032620.36	10.91	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22047	475737.94	1471308.11	9.68	2116145.46	6032675.07	12.38	GRID CPT
22048	476037.89	1471300.40	16.36	2116445.41	6032667.36	19.06	GRID CPT
22049	476137.72	1471294.34	15.56	2116545.24	6032661.30	18.26	GRID CPT
22050	476437.72	1471299.13	6.72	2116845.24	6032666.09	9.42	GRID CPT
22051	476533.52	1471270.50	6.14	2116941.04	6032637.46	8.84	GRID CPT
22052	476770.17	1471102.50	7.15	2117177.69	6032469.46	9.85	GRID CPT
22053	476866.51	1471075.80	7.26	2117274.03	6032442.77	9.96	GRID CPT
22054	477066.38	1471054.15	5.29	2117473.89	6032421.12	7.99	GRID CPT
22133	476994.39	1472761.65	8.00	2117401.87	6034128.60	10.70	GRID CPT
22134	477008.61	1472713.77	8.15	2117416.10	6034080.72	10.85	GRID CPT
22135	477023.21	1472665.93	8.36	2117430.70	6034032.88	11.06	GRID CPT
22136	477037.10	1472617.89	8.33	2117444.59	6033984.84	11.03	GRID CPT
22137	477051.83	1472570.03	8.47	2117459.32	6033936.98	11.17	GRID CPT
22138	477067.04	1472522.47	8.26	2117474.52	6033889.42	10.96	GRID CPT
22139	477082.06	1472474.67	8.28	2117489.55	6033841.63	10.98	GRID CPT
22140	477097.34	1472427.12	8.50	2117504.83	6033794.08	11.20	GRID CPT
22141	477111.91	1472379.33	8.60	2117519.41	6033746.28	11.30	GRID CPT
22142	477127.25	1472331.65	8.39	2117534.74	6033698.60	11.09	GRID CPT
22143	477142.03	1472283.95	8.15	2117549.52	6033650.91	10.85	GRID CPT
22144	477156.16	1472235.95	9.02	2117563.65	6033602.91	11.72	GRID CPT
22145	477184.86	1472192.57	8.03	2117592.35	6033559.53	10.73	GRID CPT
22146	477203.72	1472146.27	9.01	2117611.21	6033513.23	11.71	GRID CPT
22147	477219.19	1472098.68	8.41	2117626.69	6033465.64	11.11	GRID CPT
22148	477233.58	1472050.67	8.23	2117641.08	6033417.63	10.93	GRID CPT
22149	477245.74	1472002.06	8.84	2117653.23	6033369.02	11.54	GRID CPT
22150	477265.12	1471955.77	8.12	2117672.62	6033322.73	10.82	GRID CPT
22151	477282.36	1471908.81	8.96	2117689.86	6033275.77	11.66	GRID CPT
22152	477304.06	1471863.46	7.49	2117711.56	6033230.42	10.19	GRID CPT
22153	477320.50	1471816.20	7.62	2117728.00	6033183.17	10.32	GRID CPT

22154	477340.97	1471770.48	7.65	2117748.47	6033137.44	10.35	GRID CPT
22155	477363.67	1471725.81	8.60	2117771.17	6033092.78	11.30	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22156	477380.78	1471678.74	8.46	2117788.28	6033045.70	11.16	GRID CPT
22157	477399.08	1471632.17	8.71	2117806.58	6032999.13	11.41	GRID CPT
22158	477413.69	1471584.15	8.72	2117821.20	6032951.12	11.42	GRID CPT
22159	477435.90	1471539.24	8.55	2117843.40	6032906.21	11.25	GRID CPT
22160	477457.55	1471494.02	9.17	2117865.05	6032860.99	11.87	GRID CPT
22161	477475.93	1471447.55	8.56	2117883.44	6032814.52	11.26	GRID CPT
22162	477486.31	1471398.67	7.92	2117893.82	6032765.64	10.62	GRID CPT
22163	477450.63	1471363.71	8.35	2117858.14	6032730.68	11.05	GRID CPT
22164	477410.54	1471333.32	7.37	2117818.05	6032700.29	10.07	GRID CPT
22165	477365.57	1471309.70	7.42	2117773.08	6032676.67	10.12	GRID CPT
22166	477332.72	1471270.62	7.36	2117740.23	6032637.59	10.06	GRID CPT
22167	477324.61	1471221.35	7.35	2117732.12	6032588.32	10.05	GRID CPT
22168	477287.92	1471187.50	6.50	2117695.43	6032554.47	9.20	GRID CPT
22169	477248.86	1471156.01	5.89	2117656.37	6032522.98	8.59	GRID CPT
22170	477218.16	1471115.57	7.11	2117625.67	6032482.54	9.81	GRID CPT
22171	477180.94	1471082.13	7.39	2117588.45	6032449.10	10.09	GRID CPT
22172	477143.07	1471049.44	7.86	2117550.59	6032416.41	10.56	GRID CPT
22173	477093.39	1471043.13	7.55	2117500.90	6032410.10	10.25	GRID CPT
22174	477043.58	1471040.33	7.46	2117451.10	6032407.30	10.16	GRID CPT
22175	476993.66	1471035.51	10.33	2117401.18	6032402.48	13.03	GRID CPT
22176	476943.19	1471040.43	9.88	2117350.71	6032407.40	12.58	GRID CPT
22177	476896.57	1471058.58	11.05	2117304.09	6032425.55	13.75	GRID CPT
22178	476846.33	1471065.21	12.66	2117253.85	6032432.17	15.36	GRID CPT
22179	476799.67	1471084.39	11.54	2117207.19	6032451.36	14.24	GRID CPT
22180	476754.53	1471106.94	10.67	2117162.05	6032473.91	13.37	GRID CPT
22181	476713.40	1471138.89	11.15	2117120.91	6032505.85	13.85	GRID CPT
22182	476668.07	1471160.34	11.59	2117075.59	6032527.31	14.29	GRID CPT
22183	476624.06	1471184.18	9.37	2117031.58	6032551.15	12.07	GRID CPT
22184	476580.26	1471208.66	9.97	2116987.78	6032575.63	12.67	GRID CPT
22185	476541.58	1471243.40	7.04	2116949.09	6032610.36	9.74	GRID CPT
22186	476492.70	1471257.32	7.15	2116900.22	6032624.28	9.85	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22187	476444.62	1471272.66	6.96	2116852.14	6032639.62	9.66	GRID CPT
22188	476397.60	1471290.05	6.70	2116805.12	6032657.02	9.40	GRID CPT
22189	476345.96	1471296.85	7.81	2116753.47	6032663.81	10.51	GRID CPT
22190	476296.82	1471306.11	6.64	2116704.33	6032673.07	9.34	GRID CPT
22191	476246.77	1471308.12	7.16	2116654.29	6032675.08	9.86	GRID CPT
22192	476195.84	1471294.96	7.77	2116603.36	6032661.92	10.47	GRID CPT
22193	476146.04	1471291.23	17.52	2116553.56	6032658.19	20.22	GRID CPT
22194	476096.19	1471287.00	17.46	2116503.70	6032653.96	20.16	GRID CPT
22195	476046.22	1471284.33	15.77	2116453.74	6032651.29	18.47	GRID CPT
22196	475996.08	1471289.66	14.71	2116403.60	6032656.62	17.41	GRID CPT
22197	475946.06	1471294.48	15.27	2116353.58	6032661.44	17.97	GRID CPT
22198	475896.02	1471299.59	16.79	2116303.54	6032666.55	19.49	GRID CPT
22199	475845.72	1471302.80	14.65	2116253.24	6032669.75	17.35	GRID CPT
22200	475796.24	1471312.89	14.51	2116203.76	6032679.84	17.21	GRID CPT
22201	475746.05	1471301.19	10.99	2116153.58	6032668.14	13.69	GRID CPT
22202	476964.31	1472856.95	8.06	2117371.80	6034223.90	10.76	GRID CPT
22203	476948.99	1472904.66	7.73	2117356.47	6034271.61	10.43	GRID CPT
22204	476934.02	1472952.21	7.88	2117341.50	6034319.16	10.58	GRID CPT
22205	476918.86	1472999.98	7.80	2117326.34	6034366.93	10.50	GRID CPT
22206	476904.48	1473047.84	7.61	2117311.96	6034414.78	10.31	GRID CPT
22207	476890.12	1473095.73	7.74	2117297.60	6034462.68	10.44	GRID CPT
22208	476875.02	1473143.40	7.65	2117282.50	6034510.35	10.35	GRID CPT
22209	476859.81	1473191.14	7.43	2117267.28	6034558.08	10.13	GRID CPT
22210	476844.83	1473241.45	7.74	2117252.31	6034608.40	10.44	GRID CPT
22211	475700.10	1471281.70	10.96	2116107.62	6032648.65	13.66	GRID CPT
22212	475660.58	1471249.12	10.47	2116068.10	6032616.07	13.17	GRID CPT
22213	475611.73	1471260.13	6.28	2116019.25	6032627.08	8.98	GRID CPT

22214	475562.34	1471268.18	6.23	2115969.86	6032635.13	8.93	GRID CPT
22215	475510.81	1471257.80	6.57	2115918.33	6032624.75	9.27	GRID CPT
22216	475462.14	1471246.27	6.11	2115869.66	6032613.22	8.81	GRID CPT
22217	475410.83	1471258.84	6.26	2115818.35	6032625.79	8.96	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22218	475360.81	1471255.43	6.43	2115768.34	6032622.38	9.13	GRID CPT
22219	475310.91	1471251.37	6.83	2115718.43	6032618.32	9.53	GRID CPT
22220	475261.14	1471244.84	7.25	2115668.66	6032611.79	9.95	GRID CPT
22221	475211.09	1471245.44	7.21	2115618.61	6032612.39	9.91	GRID CPT
22222	475161.08	1471244.29	7.49	2115568.60	6032611.24	10.19	GRID CPT
22223	475110.99	1471245.20	7.81	2115518.52	6032612.14	10.51	GRID CPT
22224	475060.95	1471244.55	8.20	2115468.48	6032611.50	10.90	GRID CPT
22225	475011.20	1471241.61	7.57	2115418.73	6032608.56	10.27	GRID CPT
22226	474961.02	1471243.57	6.98	2115368.55	6032610.51	9.68	GRID CPT
22227	474910.98	1471244.51	6.24	2115318.50	6032611.46	8.94	GRID CPT
22228	474860.91	1471244.49	5.72	2115268.44	6032611.44	8.42	GRID CPT
22229	474810.88	1471245.49	5.67	2115218.40	6032612.44	8.37	GRID CPT
22230	474760.87	1471247.66	5.22	2115168.40	6032614.61	7.92	GRID CPT
22231	474710.80	1471247.70	5.69	2115118.33	6032614.64	8.39	GRID CPT
22232	474660.81	1471244.19	6.77	2115068.34	6032611.13	9.47	GRID CPT
22233	474611.05	1471241.52	6.62	2115018.58	6032608.46	9.32	GRID CPT
22234	474561.12	1471233.93	8.57	2114968.65	6032600.88	11.27	GRID CPT
22235	474510.89	1471242.57	7.57	2114918.43	6032609.52	10.27	GRID CPT
22236	474461.27	1471227.10	9.91	2114868.81	6032594.04	12.61	GRID CPT
22237	474411.34	1471225.75	8.14	2114818.87	6032592.69	10.84	GRID CPT
22238	474360.80	1471235.56	7.55	2114768.33	6032602.50	10.25	GRID CPT
22239	474310.85	1471209.63	12.02	2114718.38	6032576.57	14.72	GRID CPT
22240	474262.46	1471191.65	10.57	2114669.99	6032558.59	13.27	GRID CPT
22241	474211.99	1471203.23	7.77	2114619.52	6032570.17	10.47	GRID CPT
22242	474162.35	1471191.32	6.66	2114569.88	6032558.26	9.36	GRID CPT
22243	474113.69	1471167.49	8.62	2114521.22	6032534.43	11.32	GRID CPT
22244	474064.14	1471159.01	7.31	2114471.68	6032525.95	10.01	GRID CPT
22245	474015.14	1471143.53	7.37	2114422.67	6032510.47	10.07	GRID CPT
22246	473967.16	1471117.64	7.97	2114374.70	6032484.58	10.67	GRID CPT
22247	473917.50	1471112.63	6.82	2114325.03	6032479.56	9.52	GRID CPT
22248	473868.89	1471099.38	6.91	2114276.43	6032466.32	9.61	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22249	473819.12	1471093.17	6.58	2114226.66	6032460.10	9.28	GRID CPT
22250	473769.18	1471088.73	5.79	2114176.71	6032455.67	8.49	GRID CPT
22251	473721.70	1471070.08	5.70	2114129.24	6032437.02	8.40	GRID CPT
22252	473672.73	1471060.56	5.68	2114080.27	6032427.50	8.38	GRID CPT
22253	473622.77	1471054.92	5.46	2114030.31	6032421.85	8.16	GRID CPT
22254	473574.49	1471041.49	5.40	2113982.03	6032408.43	8.10	GRID CPT
22255	473522.89	1471045.97	5.65	2113930.43	6032412.91	8.35	GRID CPT
22256	473472.61	1471043.80	4.97	2113880.16	6032410.73	7.67	GRID CPT
22257	473423.18	1471036.16	5.01	2113830.72	6032403.09	7.71	GRID CPT
22258	473375.00	1471020.58	5.48	2113782.55	6032387.51	8.18	GRID CPT
22259	473327.34	1471002.55	5.49	2113734.88	6032369.49	8.19	GRID CPT
22260	473277.70	1470996.69	5.44	2113685.24	6032363.62	8.14	GRID CPT
22261	473227.75	1470991.83	5.80	2113635.29	6032358.77	8.50	GRID CPT
22262	473178.62	1470982.87	5.89	2113586.16	6032349.80	8.59	GRID CPT
22263	473128.77	1470977.28	5.40	2113536.31	6032344.21	8.10	GRID CPT
22264	473080.16	1470965.23	5.36	2113487.71	6032332.16	8.06	GRID CPT
22265	473030.43	1470959.23	6.27	2113437.98	6032326.16	8.97	GRID CPT
22266	472981.15	1470950.90	5.78	2113388.70	6032317.83	8.48	GRID CPT
22267	472932.60	1470938.01	5.95	2113340.14	6032304.94	8.65	GRID CPT
22268	472883.48	1470929.20	6.73	2113291.03	6032296.13	9.43	GRID CPT
22269	472834.27	1470919.86	7.48	2113241.81	6032286.79	10.18	GRID CPT
22270	472784.65	1470913.67	7.52	2113192.20	6032280.60	10.22	GRID CPT
22271	472735.78	1470902.57	7.70	2113143.33	6032269.50	10.40	GRID CPT
22272	472686.83	1470891.95	7.97	2113094.38	6032258.87	10.67	GRID CPT
22273	472637.10	1470886.25	7.64	2113044.65	6032253.18	10.34	GRID CPT

22274	472588.53	1470874.25	7.86	2112996.08	6032241.17	10.56	GRID CPT
22275	472538.60	1470869.39	8.07	2112946.15	6032236.32	10.77	GRID CPT
22276	472489.32	1470860.81	8.60	2112896.87	6032227.73	11.30	GRID CPT
22277	472440.34	1470850.25	8.75	2112847.90	6032217.17	11.45	GRID CPT
22278	472390.12	1470847.56	8.32	2112797.67	6032214.49	11.02	GRID CPT
22279	472340.66	1470840.37	8.48	2112748.21	6032207.30	11.18	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22280	472291.16	1470832.72	8.96	2112698.71	6032199.65	11.66	GRID CPT
22281	472241.16	1470828.79	8.70	2112648.71	6032195.71	11.40	GRID CPT
22282	472190.54	1470829.13	9.01	2112598.10	6032196.06	11.71	GRID CPT
22283	472141.54	1470817.84	9.19	2112549.09	6032184.77	11.89	GRID CPT
22284	472090.59	1470819.82	9.53	2112498.15	6032186.74	12.23	GRID CPT
22285	472042.90	1470834.94	9.31	2112450.46	6032201.86	12.01	GRID CPT
22286	471998.88	1470859.53	9.26	2112406.43	6032226.45	11.96	GRID CPT
22287	471957.20	1470888.59	9.17	2112364.76	6032255.51	11.87	GRID CPT
22288	471915.73	1470917.02	9.03	2112323.29	6032283.94	11.73	GRID CPT
22289	471875.34	1470946.96	9.02	2112282.89	6032313.88	11.72	GRID CPT
22290	471834.97	1470976.82	9.12	2112242.53	6032343.74	11.82	GRID CPT
22291	471797.14	1471010.48	9.43	2112204.70	6032377.40	12.13	GRID CPT
22292	471784.22	1471058.84	8.62	2112191.77	6032425.76	11.32	GRID CPT
22293	471776.99	1471108.51	8.49	2112184.54	6032475.43	11.19	GRID CPT
22294	471777.35	1471159.15	8.54	2112184.90	6032526.07	11.24	GRID CPT
22295	471772.32	1471208.95	8.67	2112179.87	6032575.86	11.37	GRID CPT
22296	471764.88	1471258.47	8.63	2112172.43	6032625.39	11.33	GRID CPT
22297	471802.87	1471310.48	10.42	2112210.42	6032677.39	13.12	GRID CPT
22298	471795.51	1471359.99	9.78	2112203.06	6032726.91	12.48	GRID CPT
22299	471790.94	1471409.83	9.18	2112198.48	6032776.75	11.88	GRID CPT
22300	471786.28	1471459.55	9.57	2112193.83	6032826.47	12.27	GRID CPT
22301	471782.77	1471509.52	10.09	2112190.31	6032876.43	12.79	GRID CPT
22302	471778.31	1471559.31	9.98	2112185.86	6032926.23	12.68	GRID CPT
22303	471774.69	1471609.09	9.84	2112182.23	6032976.00	12.54	GRID CPT
22304	471769.68	1471658.93	9.83	2112177.22	6033025.84	12.53	GRID CPT
22305	471767.10	1471708.84	9.80	2112174.64	6033075.75	12.50	GRID CPT
22306	471765.24	1471758.92	10.78	2112172.78	6033125.83	13.48	GRID CPT
22307	471755.29	1471808.22	9.66	2112162.83	6033175.13	12.36	GRID CPT
22308	471754.93	1471858.43	10.37	2112162.47	6033225.34	13.07	GRID CPT
22309	471750.54	1471908.22	9.87	2112158.08	6033275.13	12.57	GRID CPT
22310	471747.48	1471958.10	10.01	2112155.01	6033325.01	12.71	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22311	471744.07	1472008.08	10.15	2112151.60	6033374.99	12.85	GRID CPT
22312	471736.52	1472057.59	10.20	2112144.05	6033424.50	12.90	GRID CPT
22313	471732.06	1472107.30	9.63	2112139.59	6033474.20	12.33	GRID CPT
22314	471726.65	1472157.09	9.60	2112134.19	6033523.99	12.30	GRID CPT
22315	471721.05	1472206.72	10.21	2112128.59	6033573.62	12.91	GRID CPT
22316	471719.29	1472256.77	10.26	2112126.82	6033623.67	12.96	GRID CPT
22317	471682.85	1472303.29	8.83	2112090.38	6033670.19	11.53	GRID CPT
22318	471674.88	1472352.62	8.63	2112082.41	6033719.52	11.33	GRID CPT
22319	471673.61	1472402.86	9.15	2112081.14	6033769.76	11.85	GRID CPT
22320	471669.55	1472452.74	9.35	2112077.07	6033819.64	12.05	GRID CPT
22321	471664.92	1472502.45	9.13	2112072.45	6033869.35	11.83	GRID CPT
22322	471661.81	1472552.40	8.81	2112069.34	6033919.30	11.51	GRID CPT
22323	471657.77	1472602.20	8.81	2112065.29	6033969.09	11.51	GRID CPT
22324	471654.65	1472652.20	9.06	2112062.17	6034019.10	11.76	GRID CPT
22325	471652.56	1472702.18	9.46	2112060.08	6034069.08	12.16	GRID CPT
22327	471645.11	1472751.71	10.22	2112052.63	6034118.61	12.92	GRID CPT
22328	471627.55	1472800.32	10.98	2112035.07	6034167.21	13.68	GRID CPT
22329	475017.62	1478910.40	5.44	2115425.00	6040277.26	8.14	GRID CPT
22330	474945.92	1479347.18	4.85	2115353.29	6040714.04	7.55	GRID CPT
22332	476184.41	1471370.24	8.30	2116591.93	6032737.20	11.00	GRID CPT
22333	476142.20	1471332.43	8.92	2116549.72	6032699.39	11.62	GRID CPT
22334	476093.21	1471328.10	8.50	2116500.73	6032695.06	11.20	GRID CPT
22335	476044.95	1471327.05	7.95	2116452.47	6032694.01	10.65	GRID CPT

22336	475992.55	1471321.70	8.37	2116400.07	6032688.66	11.07	GRID CPT
22337	475944.68	1471315.69	8.46	2116352.19	6032682.65	11.16	GRID CPT
22338	475894.97	1471313.96	9.25	2116302.49	6032680.91	11.95	GRID CPT
22339	475845.73	1471319.68	8.11	2116253.25	6032686.63	10.81	GRID CPT
22340	475795.79	1471328.53	7.52	2116203.31	6032695.49	10.22	GRID CPT
22341	475741.70	1471316.49	7.52	2116149.22	6032683.45	10.22	GRID CPT
22342	475695.46	1471291.15	6.90	2116102.98	6032658.11	9.60	GRID CPT
22343	476846.99	1471078.07	8.44	2117254.50	6032445.04	11.14	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22344	473525.90	1471033.63	4.79	2113933.44	6032400.57	7.49	GRID CPT
22345	473475.93	1471026.86	5.04	2113883.48	6032393.79	7.74	GRID CPT
22346	473425.72	1471020.80	4.91	2113833.26	6032387.73	7.61	GRID CPT
22347	473378.47	1471008.32	5.36	2113786.01	6032375.25	8.06	GRID CPT
22348	473328.05	1470997.79	5.25	2113735.59	6032364.72	7.95	GRID CPT
22349	473129.27	1470972.16	4.70	2113536.82	6032339.10	7.40	GRID CPT
22350	473081.30	1470961.89	5.12	2113488.84	6032328.82	7.82	GRID CPT
22351	472982.21	1470944.10	6.15	2113389.76	6032311.03	8.85	GRID CPT
22352	472785.60	1470908.89	7.99	2113193.15	6032275.82	10.69	GRID CPT
22353	472638.05	1470881.79	8.33	2113045.60	6032248.72	11.03	GRID CPT
22354	472489.64	1470858.56	8.44	2112897.19	6032225.49	11.14	GRID CPT
22355	472440.37	1470847.13	8.57	2112847.92	6032214.06	11.27	GRID CPT
22356	472341.55	1470835.60	8.65	2112749.10	6032202.53	11.35	GRID CPT
22357	472189.86	1470825.71	9.12	2112597.41	6032192.63	11.82	GRID CPT
22358	471761.79	1471308.23	8.79	2112169.34	6032675.14	11.49	GRID CPT
22359	471758.73	1471357.04	8.56	2112166.27	6032723.95	11.26	GRID CPT
22360	471748.16	1471404.73	6.87	2112155.71	6032771.64	9.57	GRID CPT
22361	471754.85	1471457.59	9.07	2112162.40	6032824.50	11.77	GRID CPT
22362	471750.04	1471505.86	8.78	2112157.58	6032872.77	11.48	GRID CPT
22363	471738.48	1471570.20	8.07	2112146.02	6032937.11	10.77	GRID CPT
22364	471733.67	1471653.33	8.76	2112141.22	6033020.24	11.46	GRID CPT
22365	471726.72	1471706.40	9.24	2112134.26	6033073.31	11.94	GRID CPT
22366	471720.70	1471753.65	8.85	2112128.24	6033120.56	11.55	GRID CPT
22367	471717.94	1471802.58	9.36	2112125.48	6033169.49	12.06	GRID CPT
22368	471717.94	1471848.88	9.80	2112125.48	6033215.78	12.50	GRID CPT
22369	471704.41	1471898.90	10.02	2112111.94	6033265.80	12.72	GRID CPT
22370	471697.60	1471944.34	9.28	2112105.13	6033311.25	11.98	GRID CPT
22371	471699.27	1472006.02	9.32	2112106.80	6033372.93	12.02	GRID CPT
22372	471695.31	1472045.27	8.59	2112102.85	6033412.18	11.29	GRID CPT
22373	471704.52	1472095.55	9.03	2112112.06	6033462.45	11.73	GRID CPT
22374	471686.16	1472144.30	8.38	2112093.69	6033511.20	11.08	GRID CPT

Sample Grid Control Points

Point #	NAD27 North	NAD27 East	NGVD29 Elevation	NAD83 North	NAD83 East	NAVD88 Elevation	Description
22375	471686.53	1472196.39	8.62	2112094.06	6033563.29	11.32	GRID CPT
22376	471679.12	1472249.30	7.72	2112086.65	6033616.20	10.42	GRID CPT
22377	471652.90	1472554.23	7.78	2112060.43	6033921.13	10.48	GRID CPT
22378	471648.47	1472600.48	8.09	2112055.99	6033967.38	10.79	GRID CPT
22379	471641.64	1472703.24	9.37	2112049.16	6034070.14	12.07	GRID CPT
22380	471636.23	1472751.25	10.01	2112043.76	6034118.15	12.71	GRID CPT
22381	471600.56	1472848.04	8.37	2112008.09	6034214.94	11.07	GRID CPT
22382	476228.75	1474707.62	7.47	2116636.21	6036074.54	10.17	GRID CPT
22383	476192.01	1474818.16	8.13	2116599.47	6036185.08	10.83	GRID CPT
22384	476180.84	1474851.76	7.70	2116588.29	6036218.67	10.40	GRID CPT
22385	476166.08	1474899.55	7.83	2116573.53	6036266.47	10.53	GRID CPT
22386	476141.00	1474981.72	7.92	2116548.45	6036348.64	10.62	GRID CPT
22014a	475187.58	1471256.55	7.42	2115595.11	6032623.49	10.12	GRID CPT
22015a	474787.44	1471254.05	5.32	2115194.97	6032621.00	8.02	GRID CPT
22016a	474659.99	1471248.95	6.54	2115067.52	6032615.89	9.24	GRID CPT
22017a	474560.62	1471239.85	6.97	2114968.15	6032606.79	9.67	GRID CPT
22018a	474462.38	1471218.91	11.82	2114869.91	6032585.85	14.52	GRID CPT
22019a	474361.42	1471221.03	13.86	2114768.95	6032587.97	16.56	GRID CPT
22020a	474262.84	1471201.85	10.23	2114670.37	6032568.79	12.93	GRID CPT
22021a	474164.99	1471178.80	10.22	2114572.52	6032545.74	12.92	GRID CPT
22022a	474068.41	1471149.10	9.20	2114475.94	6032516.04	11.90	GRID CPT

22023a	474060.97	1471214.82	15.47	2114468.51	6032581.76	18.17	GRID CPT
22024a	473767.37	1471152.95	14.35	2114174.91	6032519.89	17.05	GRID CPT
22025a	473668.65	1471136.78	14.94	2114076.19	6032503.71	17.64	GRID CPT
22026a	473372.90	1471086.34	14.87	2113780.45	6032453.27	17.57	GRID CPT
22027a	473274.24	1471069.82	15.10	2113681.79	6032436.76	17.80	GRID CPT
22028a	472978.91	1471017.13	13.65	2113386.46	6032384.06	16.35	GRID CPT
22029a	472880.46	1470999.94	13.90	2113288.00	6032366.87	16.60	GRID CPT
22030a	472584.28	1470951.82	16.53	2112991.83	6032318.74	19.23	GRID CPT
22031a	472485.68	1470934.82	16.51	2112893.23	6032301.74	19.21	GRID CPT
22032a	472190.12	1470883.49	16.36	2112597.67	6032250.42	19.06	GRID CPT

Sample Grid Control Points

	NAD27	NAD27	NGVD29	NAD83	NAD83	NAVD88	
Point #	North	East	Elevation	North	East	Elevation	Description
22033a	472090.14	1470887.09	16.97	2112497.70	6032254.01	19.67	GRID CPT
22034a	471862.64	1471082.66	17.02	2112270.19	6032449.58	19.72	GRID CPT
22035a	471830.68	1471177.51	16.65	2112238.23	6032544.42	19.35	GRID CPT
22036a	471803.85	1471476.34	15.97	2112211.40	6032843.25	18.67	GRID CPT
22037a	471796.82	1471576.08	16.38	2112204.36	6032943.00	19.08	GRID CPT
22038a	471776.63	1471875.44	17.19	2112184.17	6033242.35	19.89	GRID CPT
22039a	471764.63	1471974.77	16.74	2112172.17	6033341.67	19.44	GRID CPT
22040a	471737.62	1472273.73	16.86	2112145.15	6033640.64	19.56	GRID CPT
22041a	471731.38	1472373.43	17.47	2112138.91	6033740.34	20.17	GRID CPT
22042a	471708.42	1472672.58	17.47	2112115.95	6034039.48	20.17	GRID CPT
22043a	471698.10	1472771.97	13.81	2112105.62	6034138.87	16.51	GRID CPT
22044a	475360.88	1471255.41	6.46	2115768.40	6032622.36	9.16	GRID CPT
22045a	475459.53	1471262.33	6.50	2115867.06	6032629.28	9.20	GRID CPT
22046a	475660.23	1471250.88	10.30	2116067.75	6032617.83	13.00	GRID CPT
22047a	475743.86	1471305.69	11.67	2116151.38	6032672.65	14.37	GRID CPT
22048a	476043.81	1471297.88	18.39	2116451.33	6032664.83	21.09	GRID CPT
22049a	476143.61	1471291.89	17.61	2116551.13	6032658.85	20.31	GRID CPT
22050a	476443.68	1471296.66	8.75	2116851.20	6032663.62	11.45	GRID CPT
22051a	476539.50	1471268.00	8.16	2116947.01	6032634.96	10.86	GRID CPT
22052a	476776.12	1471100.09	9.24	2117183.64	6032467.06	11.94	GRID CPT
22053a	476872.42	1471073.31	9.36	2117279.94	6032440.28	12.06	GRID CPT
22061a	476823.49	1473284.61	7.61	2117230.96	6034651.56	10.31	GRID CPT
22062a	476888.85	1473067.58	7.86	2117296.33	6034434.53	10.56	GRID CPT
22063a	476960.40	1472829.74	8.43	2117367.89	6034196.69	11.13	GRID CPT

COAST **SURVEYING, INC.**

15031 PARKWAY LOOP, SUITE B, TUSTIN, CA 92780-6527 • (714) 918-6266 • FAX (714) 918-6277

Alameda Point IR Sites 1 & 2 Shoreline, Site 32 and RAD Shack.

Horizontal control is based on NGS monument "MAIN/ALT" (PID = HT0880) located at the northwest corner of Main Street and Atlantic Avenue in the City of Alameda. Coordinates are based on the Califrornia Coordinate System (CCS) Zone III, and given in both NAD 27 and NAD83. The NAD27 value for "Main/Atl" was derived from the NADCON conversion of the published NAD83 coordinates.

Elevations are based on the NGS monument "MAIN ALT" (PID = HT0880), a NGS horizontal control disk stamped "MAIN ALT 1947" set in a 6" by 6" concrete post, 1.2' below an 8" cast iron monument cover, in the northwest corner of the intersection of Main Street and Atlantic Avenue.
Elev. = 6.69 Feet (NGVD 29) and Elev.=9.39 Feet (NAVD88).

	NAD27	NAD27	NGVD29	NAD83	NAD83	NAVD88
Point #	North	East	Elevation	North	East	Elevation
MAIN/ALT	471068.97	1482604.56	6.69	2111476.32	6043971.33	9.39

Prepared by me or under my direct supervision
this 20th day of December, 2006.

LICENSED LAND SURVEYOR
RUEL DEL CASTILLO
EXP. 6/30/08
L.S. 4212
STATE OF CALIFORNIA

Original Signed by Ruel del Castillo
RUEL DEL CASTILLO, PLS 4212
REGISTRATION EXPIRES 6/30/08

APPENDIX B

FIELD CHANGE REQUEST FORMS

APPENDIX B

FIELD CHANGE REQUESTS

FCRF	Reason for Change	Disposition
FCRF-001 Static Measurement Techniques and Data Interpretation September 06, 2006 LARADS Scanning (vehicle-based)	**Section 5.4.4., 1st Paragraph, 1st sentence** Revise "One-minute stationary readings will be taken at a distance of approximately "…" to "Ten-second stationary readings will be taken at a distance of approximately 6"…" **Section 7.3.1, 3rd Paragraph, 1st sentence** Revise "Due to access restrictions, the vehicle-based LARADS will not be used along the shorelines of IR Sites 1, 2 and 32 or the former Radiological Shack area." to "Due to access restrictions, the vehicle-based LARADS may not be used along the shorelines of IR Sites 1, 2 and 32 or the former Radiological Shack area."	Stated stationary reading interval of one-minute in Work Plan Text is contradictory to other sections of the Work Plan that call out ten-second stationary readings. Text will be changed to correct. Use of vehicle-based LARADS may be used on a limited basis along the shorelines of IR Sites 1, 2 and 32 or the former Radiological Shack area if access permits
FCRF-002 Vegetation Clearance September 19, 2006	**Section 11.2, Vegetation Clearance, 3rd Paragraph, 2nd sentence** Add the following sentence "Clearance of large debris and vegetation using heavy equipment may be required along areas of coastal margin In the event manlift access for shoreline static surveys is restricted." **Section 2.1, Vegetation Clearance, 4th Paragraph, 2nd sentence** Add the following sentence "Clearance of large debris and vegetation using heavy equipment may be required along areas of coastal margin In the event manlift access for shoreline static surveys is restricted.	Debris and vegetation along the coastal margin of IR Site 2 prohibit safe access by manlift to shoreline areas at IR Site 2 that require static surveys in accordance with the Final Radiological Survey Work Plan. Heavy equipment will be necessary to clear large debris and vegetation along these areas of coastal margin.

APPENDIX B

FIELD CHANGE REQUESTS

FCRF	Reason for Change	Disposition
FCRF-003 Section 7.3.3. Static Surveys Spetember 20, 2006	Work plan calls for shoreline 10' static measurements out to Mean Low Tide. This will create substantial cost\schedule impacts as the farthest shoreline rip-rap locations plotted on a 10' by 10' positioning grid will be below water at certain times of the day in accordance with Alameda tidal projections. The NaI detector capsule used on the manlift would be required to be submerged under the waterline dependent on the mean low tide elevation at certain times of the survey work day. Gamma attenuation by the sea water would require two separate data sets for shoreline areas specific to data acquired above water and a data set for below water surface.	**Section 7.3.3, 1st Paragraph, 2nd sentence** Revise "A 10-foot by 10-foot grid will be established along the shoreline from the end of the previous survey to the mean low tide elevation. "...to "A 10-foot by 10-foot grid will be established along the shoreline from the end of the previous survey to the interface of the shoreline rip-rap with waters edge."
FCRF-004 Identification of Reference Areas September 27, 2006	**Section 7.1 Identification of Reference Areas** "Shoreline rip-rap within the boundaries of IR Sites 1, 2 and 32 were built from varying natural and man-made materials (i.e. concrete, granite, basalt, asphalt). Due to the heterogenous nature of the material, selection of additional shoreline background reference areas may be required to obtain representative background level measurements. Any additional reference areas will be established in collaboration with the DON prior to collecting background level data."	Add the additional sentence following 2nd paragraph, 1st sentence: Background Reference Areas and Instrument Reading Locations, will be as-built to document any additional shoreline background reference areas for the final project survey report following completion of fieldwork.
FCRF-005 Section 7.3.3 Static Surveys October 30, 2006	To address comments received from DHS and to evaluate effectiveness of rip-rap shielding.	**Section 7.1, 2nd Paragraph 1st sentence** Add the additional text to end of the section: "Place a ^{137}Cs sealed check source in an area of rip-rap and collect 10-second static measurements, within six inches of the shoreline (e.g., rip-rap) using the NaI detector at one foot intervals to a distance of 10 feet away from the check source. Measures will be taken to ensure that the source is retrieved from the rip-rap."

APPENDIX B

FIELD CHANGE REQUESTS

FCRF	Reason for Change	Disposition
FCRF-006 Appendix D-1, SOP -1 Gamma Spectroscopy System November 30, 2006	To address use of the specific gamma spectroscopy system provided in accordance with the CTO 008 radiological survey scope of work.	Replace Appendix D-1, SOP -1 Gamma Spectroscopy System in the Final Survey Radiological Work Plan with Eberline Services Operating Procedure No. OP-09-10, Revision No. 1 (01/09/04), Operation of the Gamma Spectroscopy System.
FCRF-007 Final Radiological Section Work Plan, Appendix B, Final Sampling and Analysis Plan, Section 5.1 February 12, 2007	Approve replacement of Final Sampling and Analysis Plan Section 5.1 Analytical Methods, Water Samples, with replacement of EPA Method 901.1 is with Method 903.1 as the method that should be used for confirmatory analysis for radium in decontamination water.	Replace text in Section 5.1, Analytical Methods, Water Samples (for waste characterization purposes), first bullet from • "Gamma spectroscopy by EPA Method 901.1 or equivalent" to • "Gamma spectroscopy by EPA Method 903.1 or equivalent"

Notes:

AHA – Activity Hazard Analysis
ATV – all-terrain vehicle
FCRF – Field Change Request Form
IR – Installation Restoration
LARADS – Laser-assisted Ranging and Data System
mm – millimeter
NaI – sodium iodine
SOP – standard operating procedure
TtEC– Tetra Tech EC, Inc.

APPENDIX C

UXO WAIVER OF EXPLOSIVE SAFETY SUBMISSION

DEPARTMENT OF THE NAVY
NAVAL ORDNANCE SAFETY & SECURITY ACTIVITY
FARRAGUT HALL BLDG D-323
23 STRAUSS AVENUE
INDIAN HEAD MD 20640-5555

8020
Ser N539/663
24 Apr 06

From: Commanding Officer, Naval Ordnance Safety and Security Activity
To: Director, Base Realignment and Closure Program Management Office West

Subj: EXPLOSIVES SAFETY SUBMISSION WAIVER REQUEST FOR SITES 1 AND 2 AT (FORMER) NAVAL AIR STATION ALAMEDA, ALAMEDA, CALIFORNIA

Ref: (a) E-mail TTECI Mr. L. Humphrey/NOSSA (N539) Mr. D. Murray of 19 Apr 06 (w/encl)
(b) NOSSAINST 8020.15, Military Munitions response Program Oversight of 8 Mar 04
(c) NAVSEA OP 5, Revision 7

1. The Naval Ordnance Safety and Security Activity (NOSSA) reviewed the reference (a) request to waive the Explosives Safety Submission (ESS) for the vegetation removal, radiological survey of the shoreline areas and soil sampling at various locations within Sites 1 and 2, and a surface search of the small arms range berm. Based on the information presented in reference (a), and on the ESS criteria in references (b) and (c), NOSSA waives the requirement.

2. NOSSA understands that your operational risk/hazard assessment of the proposed actions concluded the probability of encountering Munitions and Explosives of Concern (MEC) is negligible. NOSSA further understands that you are providing Unexploded Ordnance (UXO) technician support as a conservative measure, although not required for a negligible risk/hazard.

3. Avoid intentional physical contact with any MEC encountered during the Site Inspection. If you should discover MEC, however, note its type and location and request that the responsible Explosive Ordnance Disposal (EOD) unit respond. Then report the finding to NOSSA using Enclosure (1) of reference (b).

Subj: EXPLOSIVES SAFETY SUBMISSION WAIVER REQUEST FOR SITES 1 AND 2 AT (FORMER) NAVAL AIR STATION ALAMEDA, ALAMEDA, CALIFORNIA

4. The NOSSA point of contact for this ESS waiver is Mr. Douglas Murray, who can be contacted at DSN 354-4450 or commercial at 301-744-4450.

Pamela G. Clements

PAMELA G. CLEMENTS
By direction

Copy to:
CNO (N411; N45C)
NOSSA ESSOPAC (N5P)

REQUEST FOR NOSSA DETERMINATION THAT EXPLOSIVES SAFETY SUBMISSION IS NOT REQUIRED

Instructions for use:

The Navy project manager or other cognizant official may request NOSSA determination that an ESS is not required for a MRS and/or MRA by completing the following. This, as a PDF fill-in form, may be downloaded from https://intranet.nossa.navsea.navy.mil.

Date submitted:	19 April, 2006	Supporting EOD unit and/or UXO contractor:	Tetratech EC, Inc. 1230 Columbia Street, Suite 500, San Diego, CA 92110 POC: Lance Humphrey; 619-471-3519
MRS/MRA identifier: (activity, City and State)	IR Sites 1 and 2, (former) Naval Air Station Alameda, Alameda, CA		
POC name and activity:	Ms. Claudia Richardson Base Realignment and Closure Program Management Office West	POC phone, fax, e-mail:	619-532-0953 (tel) 619-532-0995 (fax) Claudia.richardson.ctr@navy.mil.
Site history: (briefly describe past site use; discuss why MEC are known or suspected to be present)	The IR Site 1 landfill was used as a solid waste disposal site between 1943 and 1956, and anecdotal information indicates that fired 20mm projectiles from aircraft gun testing were buried near the small arms range on the site. A live, 20mm projectile was encountered near the small arms range during a radiological survey in 1998, and a later emergency removal action recovered 335 high-explosive-filled 20mm projectiles, and over 14,000 inert target practice (TP) rounds. Over 300 additional TP rounds have been located during subsequent projects on IR Site 1, and a burial pit containing those rounds is known to exist on the northwestern side of the small arms range backstop berm. IR Site 2 was used as a landfill between 1952 and 1978 and inert ordnance was reported to have been buried there. A Time Critical Removal Action of an identified "Area of Concern" within IR Site 2 in 2002 recovered nearly 9,000 -20mm TP rounds and an inert AT/AP landmine.		
MEC encountered or believed to be present: identify quantity, type/ nomenclature, and condition)	Since the completion of the IR Site 1 emergency removal action in 1998, only 20mm TP projectiles (M99 typical) have been encountered (over 300 of them in about 3 visits to the site). All were recovered in the area immediately northwest of the small arms range backstop berm that is situated on the western coastline of the site. Based on the history of the site, anticipate 10 – 50, 20mm TP rounds will be present on the ground surface in that area. No additional MPPEH of any type has been found in IR Site 2 since the completion of the removal action there and none is anticipated to be encountered.		
Proposed operation: (describe on-call construction support or anomaly avoidance activities; identify if operation is encumbered by existing ESQD arc)	Planned activities include the vegetation removal and radiological survey of the shoreline on both sites, and some soil sampling (to a depth of 20 inches) at various locations within the sites. A surface search of the small arms range berm is planned to remove 20mm TP projectiles that are anticipated to exist there, followed by a 100% visual inspection of the items by 2 UXO Technicians to certify and verify their explosive safety status as "*Safe*", and their explosives contamination category as *5X*. Proper attestation and chain of custody documents will be established and maintained in the project files until the completion of additional intrusive work on IR Site 1 planned to begin in October 2006. An Explosives Safety Submission will be prepared for that work. Anomaly avoidance procedures will be employed for the soil sample collection to ensure no subterranean metal exists in the areas planned for sample removal.		

Risk Assessment Code from page 2:[1]

A Risk Assessment Code (RAC) of 5, (Negligible), is assigned, based on the 20mm TP projectile as the Munition with the Greatest Fragmentation Distance (MGFD), a Mishap Probability Code of **D**, (Unlikely to Occur) and a Hazard Severity Code of **IV**, (Presents a Minimal Threat).

Risk/hazard assessment. All Navy activities must incorporate the principles of operational risk management into all phases of planning, operations, and training.[2] This includes munitions response actions taken by the Navy and its contractors. Since waiving the requirement to submit an ESS carries with it inherent risks, the Navy project manager or other cognizant official submitting this request must evaluate those risks using facts, prudence, experience, judgment, intuition, and situational awareness. The table below can serve as a tool in this assessment. Once obtained, transcribe the overall risk assessment code to the front page of this enclosure.

		Mishap Probability[3]			
		A	**B**	**C**	**D**
Hazard Severity[4]	**I**	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5

Mishap Probability[3]:	Hazard Severity[4]:	Risk Assessment Codes:
A Likely to occur immediately **B** Probably will occur in time **C** May occur in time **D** Unlikely to occur	**I** May cause death **II** May cause severe injury **III** May cause minor injury **IV** Presents a minimal threat	**1** Critical } High **2** Serious **3** Moderate **4** Minor } Low **5** Negligible

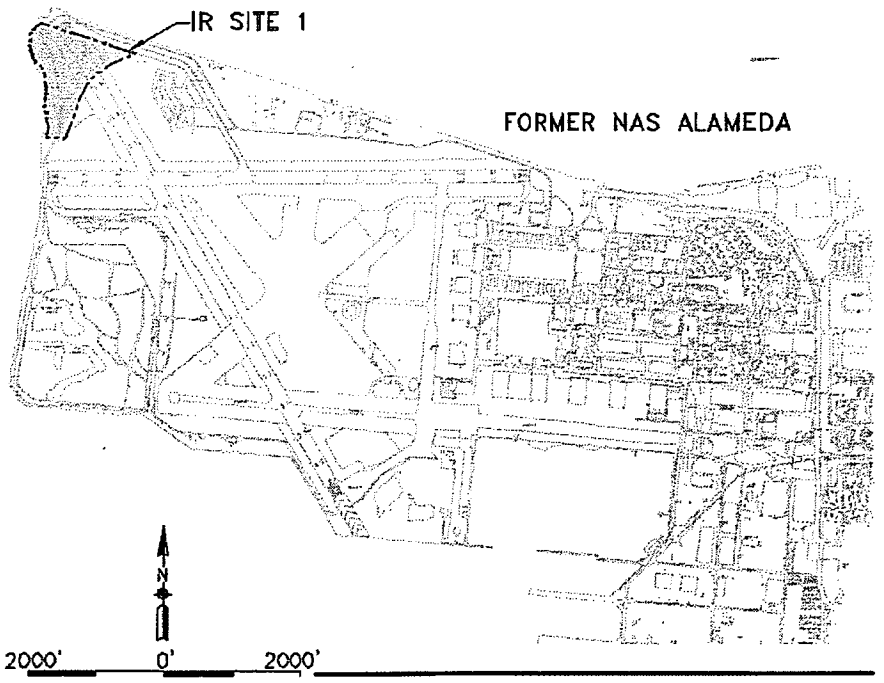
A completed request may be submitted via:

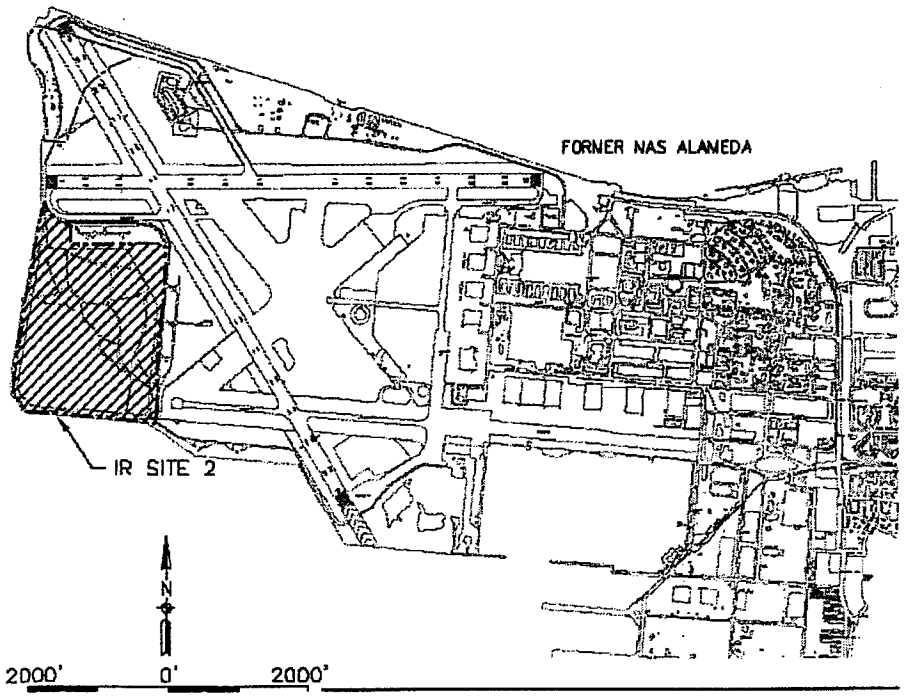
- Fax: 301-744-6749 (DSN 354);

[1] Note: NOSSA will only consider determining that an ESS is not required when the Risk Assessment Codes are 4 (minor) or 5 (negligible).
[2] See OPNAVINST 3500.39A, Operational Risk Management.
[3] "Mishap Probability" is the probability that a hazard will result in a mishap or loss, based on an assessment of such factors as location exposure, affected populations, experience, or previously established statistical information.
[4] "Hazard Severity" is an assessment of the worst credible consequence that can occur as a result of a hazard. Severity is defined by potential degree of injury, illness, property damage, loss of assets, or effect on mission. The combination of two or more hazards may increase the overall level of risk. For the munitions encountered or believed to be present, consider the munitions and fuzing type and configuration, and its armed/unarmed status.

- E-mail: (call 301-744-4450 for e-mail address);
- Mail: COMMANDING OFFICER
  NAVAL ORDNANCE SAFETY AND SECURITY ACTIVITY
  ATTN: CODE N53
  23 STRAUSS AVE, BLDG D327
  INDIAN HEAD, MD 20640-5555

Site Locations





APPENDIX D

BIOLOGICAL SURVEY SUMMARY REPORT

TETRA TECH EC, INC.

INTEROFFICE CORRESPONDENCE

TO: Abram Eloskof, PjM CTO 008, RAC IV

FROM: Ken Hashagen, Senior TtEC Biologist

DATE: April 6, 2006

SUBJECT: Initial Biological Survey, Shoreline of IR Sites 1 and 2, IR Site 32 and the former Radiological Shack area, former Naval Air Station Alameda

On 6 April 2006, I conducted a preliminary biological survey at Alameda Naval Air Station, specifically areas IR 32, the shorelines of IR 1 and IR 2, and the former Radiological Shack Area. Area 32 was walked in its entirety, and IR 1 and IR 2 walked from the shoreline to approximately 20 yards inland, which included the former Radiological Shack area within IR Site 2.

Each survey was conducted as a wandering transect, as opposed to a formal transect with a certain length and/or width. With the wandering transect, I walked to each potential habitat feature (rocks, trees or shrubs, or high grass) and examined it for nests, birds or mammals, or other signs of biological activity. Jennifer Dessort, TTECI, took photos of each nest found.

Observations

Area 32 – Area 32 was characterized by short grass, indispersed with clumps of ice plant. Two active Canada Goose nests were found. One was slightly outside Area 32, but right next to the road accessing the site. A Black Phoebe nest was found in a small concrete block building on the site. Other paired Canada Geese were on the site but had not yet begun to nest.

Area IR 1 – Area IR 1 was characterized by a rocky shoreline, extensive clumps of ice plant, and storm debris. Several active Canada Goose nests were found in Area IR 1, on the shoreline, in clumps of ice plant. Eggs ranged from 4 to 8 eggs per nest. Black Phoebes and Barn Swallows had built nests inside the two small buildings on the site. Goose nests were located in the ice plant, adjacent to the water. No nests were found in the trees or shrubs at this time; nesting has occurred in these areas in previous years.

Area IR 2 – Area IR 2 was characterized by a rocky shoreline, extensive clumps of ice plant, an old, unused access road at sea level, and storm debris. Several active Canada Goose nests were also found in Area IR 2.

At least three pairs of Canada Geese had already hatched young this season, with broods of 2, 3, and 4 goslings observed. No other nests were found along the shoreline, although Western Gulls and Killdeer have nested in this area in the past.

The large trees near the entry gate and the location of the former Radiological Shack area shack were checked for nests and birds. House Finches were found in the trees, but no nests or nesting activity were observed. Identification of these two types of trees is pending.

Comments

Canada Geese typically lay between 4 and 7 eggs. The female incubates the eggs for 25 to 30 days, with the young leaving the nest 1 or 2 days after hatching.

Killdeer lay 3 to 5 eggs in a very sketchy nest, right on the gravel on roads or the shoulder of roads. Both the male and the female incubate the eggs for 24 to 28 days. Young leave the nest shortly after hatching and are tended by the parents.

Western Gulls lay 1 to 6 eggs and incubate them for 25 to 32 days. Young stay around the nest site for an additional 29 to 32 days.

House Finch lay 2 to 6 eggs and incubate them for 12 to 14 days. Young stay in the nest for an additional 11 to 19 days, fed by the parents.

The above species of birds may be nesting or are known to nest within the survey areas.

Large, feral rabbits and black-tailed jack rabbits are also found on the site. Ground squirrels live in the ice plant and along the rocky shoreline.

Recommendations

Active nests should be buffered with stakes and flagging. The buffer should be established around the nest at a distance of 100 feet from the nest. The buffered area should be off limits to all activity until the eggs have hatched and the young have left the nest. Each new nest, when discovered, should also be buffered.

All workers on the site should be briefed on the birds, nests, life histories, and the reason for the buffers.

Additional surveys may be conducted immediately prior to the start of work (24 to 48 hours), and before work begins in any new area.

APPENDIX E

CHAIN-OF-CUSTODY AND LABORATORY ANALYTICAL REPORTS

E.1 SOIL RESULTS

E.2 DECONTAMINATION WATER RESULTS

BC LABORATORIES, INC.

Date of Report: 12/08/2006

Lynn Jefferson

Tetra Tech

1940 E. Deere Ave. Suite 200
Santa Ana, CA 92605

RE: Rad Survey

BC Lab Number: 0612230

Enclosed are the results of analyses for samples received by the laboratory on 11/21/06 11:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Molly Meyers

Contact Person: Molly Meyers
Client Service Rep

Authorized Signature

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BC Laboratories, Inc.

Chain of Custody Form

28865

PLEASE COMPLETE: BCL QUOTE ID:

Page 1 of 1

Report To:
Client: TETRA TECH EC
Attn: LYNN JEFFERSON
Street Address: ~~HC STIES 1, 2, 33~~
City, State, Zip: ~~ALAMEDA, CA~~ Santa Ana, CA
Phone: 949 756 7558 Fax: 949 756 7583
Email Address: Lynn.Jefferson@TTEC.com
Submittal #: 06-12230

Project #: CTO 008
Project Name: RAD SURVEY
Project Code: 3210.008D
Sampler(s): J. DESSART

Analysis Requested

Please refer to the back of this page for description of analyses and method used.

Comments:

Sample #	Description	Date Sampled	Time Sampled	VOCs, 8260B	SVOCs, 8270C	PESTICIDES, 8081A	PCBs, 8082	METALS, 6010B/6020	MERCURY, 7471A	Soil	Sludge	Drinking Water	Ground Water	Waste Water	Other	Turnaround # of work days*	Notes
3-1	40-mL VOA VIALS, 08-ST-019	11/18/06	14:22	X										X		14	
2-2	1-L GLASS AMBER, 08-ST-020	11/18/06	14:34		X									X		14	
2-3	1-L GLASS AMBERS, 08-ST-021	11/18/06	14:38			X								X		14	
2-4	1-L GLASS AMBERS, 08-ST-022	11/18/06	14:47				X							X		14	
1-5	500-mL HDPE, 08-ST-023	11/18/06	14:55					X	X					X		14	

Are there any tests with holding times less than or equal to 48 hours? ☐ Yes ☒ No

* Standard Turnaround = 15 work days

CHK BY SLT

DISTRIBUTION ~~[illegible]~~ SUB-OUT

Billing ☐ Same as above

Client: TETRA TECH EC
Address: 1230 COLUMBIA STR. SUITE 750
City: SAN DIEGO State CA Zip 92101
Attn: KATARINA CAULDER
PO#: 60837

Report Drinking Waters on State Form? ☐ Yes ☒ No

Send Copy to State of CA? ☐ Yes ☒ No

Sample Disposal: ☐ Return to Client ☒ Disposal by lab ☐ Archive: Months ____

Special Reporting: ☐ QC ☐ WIP ☐ Raw Data

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	11/20/06	11:13	Kristy Lawrence	11/21/06	11:00
2.						
3.						

BC LABORATORIES INC. **SAMPLE RECEIPT FORM** Rev. No. 10 01/21/04 Page 1 Of 1

Submission #: 06-12230 | Project Code: | TB Batch #

SHIPPING INFORMATION
Federal Express ☒ UPS ☐ Hand Delivery ☐
BC Lab Field Service ☐ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☒ None ☐
Box ☐ Other ☐ (Specify)_____

Refrigerant: Ice ☒ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☒ Comments:

All samples received? Yes ☒ No ☐ All samples containers intact? Yes ☒ No ☐ Description(s) match COC? Yes ☒ No ☐

COC Received ☒ YES ☐ NO

Ice Chest ID_____ Temperature: 3.7 °C Thermometer ID 4518 Emissivity .98 Container QT AM

Date/Time 11/21/06 11: Analyst Init KLL

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS					A					
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
100ml TOTAL ORGANIC CARBON										
QT TOX										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL	A-3									
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT QA/QC										
QT AMBER		B,A	B,A	B,A						
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments:_____

Sample Numbering Completed By: [illegible] Date/Time: 11/21/06 1219

BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
0612230-01	COC Number:	28865	Receive Date:	11/21/06 11:00
	Project Number:	---	Sampling Date:	11/18/06 14:22
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	08-ST-019	Sample Matrix:	Water
	Sampled By:	J. Dessort		
0612230-02	COC Number:	28865	Receive Date:	11/21/06 11:00
	Project Number:	---	Sampling Date:	11/18/06 14:34
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	08-ST-020	Sample Matrix:	Water
	Sampled By:	J. Dessort		
0612230-03	COC Number:	28865	Receive Date:	11/21/06 11:00
	Project Number:	---	Sampling Date:	11/18/06 14:38
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	08-ST-021	Sample Matrix:	Water
	Sampled By:	J. Dessort		
0612230-04	COC Number:	28865	Receive Date:	11/21/06 11:00
	Project Number:	---	Sampling Date:	11/18/06 14:47
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	08-ST-022	Sample Matrix:	Water
	Sampled By:	J. Dessort		
0612230-05	COC Number:	28865	Receive Date:	11/21/06 11:00
	Project Number:	---	Sampling Date:	11/18/06 14:55
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	08-ST-023	Sample Matrix:	Water
	Sampled By:	J. Dessort		

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 0612230-01 | **Client Sample Name:** 08-ST-019, 11/18/2006 2:22:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Benzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Bromobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Bromochloromethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Bromodichloromethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Bromoform	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Bromomethane	ND	ug/L	10		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	V11, S05
n-Butylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
sec-Butylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
tert-Butylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Carbon tetrachloride	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Chlorobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Chloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Chloroform	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Chloromethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
2-Chlorotoluene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
4-Chlorotoluene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Dibromochloromethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2-Dibromo-3-chloropropane	ND	ug/L	10		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2-Dibromoethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Dibromomethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2-Dichlorobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,3-Dichlorobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,4-Dichlorobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 0612230-01 | **Client Sample Name:** 08-ST-019, 11/18/2006 2:22:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Dichlorodifluoromethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1-Dichloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2-Dichloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1-Dichloroethene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
cis-1,2-Dichloroethene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
trans-1,2-Dichloroethene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2-Dichloropropane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,3-Dichloropropane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
2,2-Dichloropropane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1-Dichloropropene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
cis-1,3-Dichloropropene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
trans-1,3-Dichloropropene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Ethylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Hexachlorobutadiene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Isopropylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
p-Isopropyltoluene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Methylene chloride	ND	ug/L	10		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Methyl t-butyl ether	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Naphthalene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	V11, S05
n-Propylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Styrene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1,1,2-Tetrachloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 0612230-01 **Client Sample Name:** 08-ST-019, 11/18/2006 2:22:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Tetrachloroethene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Toluene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2,3-Trichlorobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2,4-Trichlorobenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1,1-Trichloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1,2-Trichloroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Trichloroethene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Trichlorofluoromethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2,3-Trichloropropane	ND	ug/L	10		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2,4-Trimethylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,3,5-Trimethylbenzene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Vinyl chloride	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
Total Xylenes	ND	ug/L	10		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
p- & m-Xylenes	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
o-Xylene	ND	ug/L	5.0		EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082	ND	S05
1,2-Dichloroethane-d4 (Surrogate)	117	%	76 - 114	(LCL - UCL)	EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082		S09
Toluene-d8 (Surrogate)	100	%	88 - 110	(LCL - UCL)	EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082		
4-Bromofluorobenzene (Surrogate)	89.5	%	86 - 115	(LCL - UCL)	EPA-8260	12/04/06	12/04/06 17:36	TLF	MS-V4	10	BPL0082		

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 0612230-02 | **Client Sample Name:** 08-ST-020, 11/18/2006 2:34:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Acenaphthene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Acenaphthylene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Aldrin	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Aniline	ND	ug/L	100		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Anthracene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzidine	ND	ug/L	400		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzo[a]anthracene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzo[b]fluoranthene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzo[k]fluoranthene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzo[a]pyrene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzo[g,h,i]perylene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11, V11
Benzoic acid	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzyl alcohol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Benzyl butyl phthalate	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
alpha-BHC	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
beta-BHC	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
delta-BHC	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11, V11
gamma-BHC (Lindane)	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
bis(2-Chloroethoxy)methane	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
bis(2-Chloroethyl) ether	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
bis(2-Chloroisopropyl)ether	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
bis(2-Ethylhexyl)phthalate	ND	ug/L	100		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4-Bromophenyl phenyl ether	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 0612230-02 | **Client Sample Name:** 08-ST-020, 11/18/2006 2:34:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
4-Chloroaniline	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Chloronaphthalene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4-Chlorophenyl phenyl ether	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Chrysene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4,4'-DDD	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4,4'-DDE	ND	ug/L	60		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4,4'-DDT	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Dibenzo[a,h]anthracene	ND	ug/L	60		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11, V11
Dibenzofuran	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
1,2-Dichlorobenzene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
1,3-Dichlorobenzene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
1,4-Dichlorobenzene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
3,3-Dichlorobenzidine	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Dieldrin	ND	ug/L	60		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Diethyl phthalate	68	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Dimethyl phthalate	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Di-n-butyl phthalate	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,4-Dinitrotoluene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,6-Dinitrotoluene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Di-n-octyl phthalate	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
1,2-Diphenylhydrazine	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Endosulfan I	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Endosulfan II	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 0612230-02 | **Client Sample Name:** 08-ST-020, 11/18/2006 2:34:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Endosulfan sulfate	ND	ug/L	60		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Endrin	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Endrin aldehyde	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Fluoranthene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Fluorene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Heptachlor	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Heptachlor epoxide	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Hexachlorobenzene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Hexachlorobutadiene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Hexachlorocyclopentadiene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Hexachloroethane	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Indeno[1,2,3-cd]pyrene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11, V11
Isophorone	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Methylnaphthalene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Naphthalene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Naphthylamine	ND	ug/L	400		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11, V11
2-Nitroaniline	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
3-Nitroaniline	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4-Nitroaniline	ND	ug/L	100		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Nitrobenzene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
N-Nitrosodimethylamine	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
N-Nitrosodi-N-propylamine	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
N-Nitrosodiphenylamine	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 0612230-02 | **Client Sample Name:** 08-ST-020, 11/18/2006 2:34:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Phenanthrene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Pyrene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
1,2,4-Trichlorobenzene	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4-Chloro-3-methylphenol	ND	ug/L	100		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Chlorophenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,4-Dichlorophenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,4-Dimethylphenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4,6-Dinitro-2-methylphenol	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,4-Dinitrophenol	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Methylphenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
3- & 4-Methylphenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Nitrophenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
4-Nitrophenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Pentachlorophenol	ND	ug/L	200		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
Phenol	ND	ug/L	40		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,4,5-Trichlorophenol	ND	ug/L	100		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2,4,6-Trichlorophenol	ND	ug/L	100		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678	ND	A11
2-Fluorophenol (Surrogate)	22.3	%	28 - 87 (LCL - UCL)		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678		A11, S09
Phenol-d5 (Surrogate)	17.6	%	18 - 55 (LCL - UCL)		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678		A11, S09
Nitrobenzene-d5 (Surrogate)	38.0	%	40 - 121 (LCL - UCL)		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678		A11, S09
2-Fluorobiphenyl (Surrogate)	42.4	%	42 - 128 (LCL - UCL)		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678		A11
2,4,6-Tribromophenol (Surrogate)	37.9	%	44 - 137 (LCL - UCL)		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678		A11, S09
p-Terphenyl-d14 (Surrogate)	24.4	%	43 - 154 (LCL - UCL)		EPA-8270C	11/22/06	11/29/06 22:07	SKC	MS-B1	20	BPK1678		A11, S09

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 0612230-03 | **Client Sample Name:** 08-ST-021, 11/18/2006 2:38:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Aldrin	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
alpha-BHC	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
beta-BHC	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
delta-BHC	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
gamma-BHC (Lindane)	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Chlordane (Technical)	ND	ug/L	10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
4,4'-DDD	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
4,4'-DDE	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
4,4'-DDT	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Dieldrin	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Endosulfan I	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Endosulfan II	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Endosulfan sulfate	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Endrin	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Endrin aldehyde	ND	ug/L	0.20		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Heptachlor	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Heptachlor epoxide	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Methoxychlor	ND	ug/L	0.10		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
Toxaphene	ND	ug/L	40		EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		
TCMX (Surrogate)	52.5	%	54 - 137	(LCL - UCL)	EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		S09
Dibutyl chlorendate (Surrogate)	22.2	%	50 - 153	(LCL - UCL)	EPA-8081	11/21/06	12/05/06 03:07	hks	GC-1	20	BPL0197		S09

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

PCB Analysis (EPA Method 8082)

BCL Sample ID: 0612230-04 | **Client Sample Name:** 08-ST-022, 11/18/2006 2:47:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
PCB-1016	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
PCB-1221	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
PCB-1232	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
PCB-1242	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
PCB-1248	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
PCB-1254	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
PCB-1260	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
Total PCB's (Summation)	ND	ug/L	4.0		EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254	ND	
Decachlorobiphenyl (Surrogate)	11.0	%	38 - 135	(LCL - UCL)	EPA-8082	11/22/06	12/06/06 20:38	HKS	GC-6	20	BPL0254		S09

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Water Analysis (Metals)

BCL Sample ID: 0612230-05 | **Client Sample Name:** 08-ST-023, 11/18/2006 2:55:00PM, J. Dessort

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Total Antimony	ND	ug/L	100		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Arsenic	ND	ug/L	50		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Barium	66	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Beryllium	ND	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Cadmium	11	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Chromium	37	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Cobalt	ND	ug/L	50		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Copper	51	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Lead	71	ug/L	50		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Mercury	ND	ug/L	0.20		EPA-7470A	11/30/06	12/01/06 11:45	PRA	CETAC1	1	BPK1708	ND	
Total Molybdenum	ND	ug/L	50		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Nickel	32	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Selenium	ND	ug/L	100		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Silver	ND	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Thallium	ND	ug/L	100		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Vanadium	22	ug/L	10		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	
Total Zinc	380	ug/L	50		EPA-6010B	11/22/06	11/27/06 11:26	ARD	PE-OP1	1	BPK1372	ND	

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

PCB Analysis (EPA Method 8082)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
PCB-1260	BPL0254	Matrix Spike	0610676-08	ND	2.1330	2.5000	ug/L		85.3		40 - 141	
		Matrix Spike Duplicate	0610676-08	ND	2.1430	2.5000	ug/L	0.468	85.7	30	40 - 141	
Decachlorobiphenyl (Surrogate)	BPL0254	Matrix Spike	0610676-08	ND	0.077000	0.10000	ug/L		77.0		38 - 135	
		Matrix Spike Duplicate	0610676-08	ND	0.083000	0.10000	ug/L		83.0		38 - 135	

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Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Benzene	BPL0082	Matrix Spike	0612554-01	ND	32.080	25.000	ug/L		128		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	31.050	25.000	ug/L	3.17	124	20	70 - 130	
Bromodichloromethane	BPL0082	Matrix Spike	0612554-01	ND	24.840	25.000	ug/L		99.4		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	22.450	25.000	ug/L	10.1	89.8	20	70 - 130	
Chlorobenzene	BPL0082	Matrix Spike	0612554-01	ND	28.060	25.000	ug/L		112		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	26.420	25.000	ug/L	5.50	106	20	70 - 130	
Chloroethane	BPL0082	Matrix Spike	0612554-01	ND	30.080	25.000	ug/L		120		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	29.330	25.000	ug/L	2.53	117	20	70 - 130	
1,4-Dichlorobenzene	BPL0082	Matrix Spike	0612554-01	ND	25.110	25.000	ug/L		100		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	24.120	25.000	ug/L	3.56	96.5	20	70 - 130	
1,1-Dichloroethane	BPL0082	Matrix Spike	0612554-01	ND	31.700	25.000	ug/L		127		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	30.920	25.000	ug/L	2.39	124	20	70 - 130	
1,1-Dichloroethene	BPL0082	Matrix Spike	0612554-01	ND	30.710	25.000	ug/L		123		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	29.670	25.000	ug/L	3.31	119	20	70 - 130	
Toluene	BPL0082	Matrix Spike	0612554-01	0.28000	26.310	25.000	ug/L		104		70 - 130	
		Matrix Spike Duplicate	0612554-01	0.28000	24.640	25.000	ug/L	6.55	97.4	20	70 - 130	
Trichloroethene	BPL0082	Matrix Spike	0612554-01	ND	27.810	25.000	ug/L		111		70 - 130	
		Matrix Spike Duplicate	0612554-01	ND	25.770	25.000	ug/L	7.48	103	20	70 - 130	
1,2-Dichloroethane-d4 (Surrogate)	BPL0082	Matrix Spike	0612554-01	ND	9.4000	10.000	ug/L		94.0		76 - 114	
		Matrix Spike Duplicate	0612554-01	ND	9.8500	10.000	ug/L		98.5		76 - 114	
Toluene-d8 (Surrogate)	BPL0082	Matrix Spike	0612554-01	ND	9.7300	10.000	ug/L		97.3		88 - 110	
		Matrix Spike Duplicate	0612554-01	ND	9.5700	10.000	ug/L		95.7		88 - 110	
4-Bromofluorobenzene (Surrogate)	BPL0082	Matrix Spike	0612554-01	ND	9.2200	10.000	ug/L		92.2		86 - 115	
		Matrix Spike Duplicate	0612554-01	ND	9.5200	10.000	ug/L		95.2		86 - 115	

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Acenaphthene	BPK1678	Matrix Spike	0610676-45	ND	64.288	80.000	ug/L		80.4		39 - 121	
		Matrix Spike Duplicate	0610676-45	ND	65.675	80.000	ug/L	2.09	82.1	22	39 - 121	
1,4-Dichlorobenzene	BPK1678	Matrix Spike	0610676-45	ND	60.617	80.000	ug/L		75.8		31 - 106	
		Matrix Spike Duplicate	0610676-45	ND	61.900	80.000	ug/L	2.09	77.4	22	31 - 106	
2,4-Dinitrotoluene	BPK1678	Matrix Spike	0610676-45	ND	70.312	80.000	ug/L		87.9		20 - 129	
		Matrix Spike Duplicate	0610676-45	ND	71.612	80.000	ug/L	1.80	89.5	21	20 - 129	
Hexachlorobenzene	BPK1678	Matrix Spike	0610676-45	ND	84.572	80.000	ug/L		106		45 - 117	
		Matrix Spike Duplicate	0610676-45	ND	87.225	80.000	ug/L	2.79	109	21	45 - 117	
Hexachlorobutadiene	BPK1678	Matrix Spike	0610676-45	ND	65.136	80.000	ug/L		81.4		27 - 94	
		Matrix Spike Duplicate	0610676-45	ND	66.610	80.000	ug/L	2.31	83.3	29	27 - 94	
Hexachloroethane	BPK1678	Matrix Spike	0610676-45	ND	60.325	80.000	ug/L		75.4		23 - 95	
		Matrix Spike Duplicate	0610676-45	ND	61.162	80.000	ug/L	1.45	76.5	25	23 - 95	
Nitrobenzene	BPK1678	Matrix Spike	0610676-45	ND	60.141	80.000	ug/L		75.2		31 - 124	
		Matrix Spike Duplicate	0610676-45	ND	61.694	80.000	ug/L	2.50	77.1	23	31 - 124	
N-Nitrosodi-N-propylamine	BPK1678	Matrix Spike	0610676-45	ND	69.621	80.000	ug/L		87.0		24 - 115	
		Matrix Spike Duplicate	0610676-45	ND	69.896	80.000	ug/L	0.459	87.4	24	24 - 115	
Pyrene	BPK1678	Matrix Spike	0610676-45	ND	72.576	80.000	ug/L		90.7		48 - 139	
		Matrix Spike Duplicate	0610676-45	ND	73.864	80.000	ug/L	1.75	92.3	24	48 - 139	
1,2,4-Trichlorobenzene	BPK1678	Matrix Spike	0610676-45	ND	68.411	80.000	ug/L		85.5		26 - 113	
		Matrix Spike Duplicate	0610676-45	ND	69.016	80.000	ug/L	0.931	86.3	24	26 - 113	
4-Chloro-3-methylphenol	BPK1678	Matrix Spike	0610676-45	ND	69.728	80.000	ug/L		87.2		31 - 139	
		Matrix Spike Duplicate	0610676-45	ND	73.479	80.000	ug/L	5.14	91.8	23	31 - 139	
2-Chlorophenol	BPK1678	Matrix Spike	0610676-45	ND	63.727	80.000	ug/L		79.7		30 - 105	
		Matrix Spike Duplicate	0610676-45	ND	64.994	80.000	ug/L	1.86	81.2	22	30 - 105	
2-Methylphenol	BPK1678	Matrix Spike	0610676-45	ND	62.565	80.000	ug/L		78.2		31 - 93	
		Matrix Spike Duplicate	0610676-45	ND	63.811	80.000	ug/L	2.03	79.8	17	31 - 93	

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
3- & 4-Methylphenol	BPK1678	Matrix Spike	0610676-45	ND	89.495	80.000	ug/L		112		34 - 165	
		Matrix Spike Duplicate	0610676-45	ND	91.400	80.000	ug/L	1.77	114	22	34 - 165	
4-Nitrophenol	BPK1678	Matrix Spike	0610676-45	ND	48.175	80.000	ug/L		60.2		12 - 75	
		Matrix Spike Duplicate	0610676-45	ND	48.760	80.000	ug/L	1.32	61.0	27	12 - 75	
Pentachlorophenol	BPK1678	Matrix Spike	0610676-45	ND	88.705	80.000	ug/L		111		22 - 123	
		Matrix Spike Duplicate	0610676-45	ND	88.152	80.000	ug/L	0.905	110	20	22 - 123	
Phenol	BPK1678	Matrix Spike	0610676-45	ND	29.908	80.000	ug/L		37.4		18 - 44	
		Matrix Spike Duplicate	0610676-45	ND	30.829	80.000	ug/L	2.90	38.5	22	18 - 44	
2,4,6-Trichlorophenol	BPK1678	Matrix Spike	0610676-45	ND	71.704	80.000	ug/L		89.6		32 - 128	
		Matrix Spike Duplicate	0610676-45	ND	74.333	80.000	ug/L	3.62	92.9	25	32 - 128	
2-Fluorophenol (Surrogate)	BPK1678	Matrix Spike	0610676-45	ND	52.511	80.000	ug/L		65.6		28 - 87	
		Matrix Spike Duplicate	0610676-45	ND	53.002	80.000	ug/L		66.3		28 - 87	
Phenol-d5 (Surrogate)	BPK1678	Matrix Spike	0610676-45	ND	36.687	80.000	ug/L		45.9		18 - 55	
		Matrix Spike Duplicate	0610676-45	ND	37.901	80.000	ug/L		47.4		18 - 55	
Nitrobenzene-d5 (Surrogate)	BPK1678	Matrix Spike	0610676-45	ND	68.086	80.000	ug/L		85.1		40 - 121	
		Matrix Spike Duplicate	0610676-45	ND	69.334	80.000	ug/L		86.7		40 - 121	
2-Fluorobiphenyl (Surrogate)	BPK1678	Matrix Spike	0610676-45	ND	63.908	80.000	ug/L		79.9		42 - 128	
		Matrix Spike Duplicate	0610676-45	ND	66.931	80.000	ug/L		83.7		42 - 128	
2,4,6-Tribromophenol (Surrogate)	BPK1678	Matrix Spike	0610676-45	ND	96.331	80.000	ug/L		120		44 - 137	
		Matrix Spike Duplicate	0610676-45	ND	98.303	80.000	ug/L		123		44 - 137	
p-Terphenyl-d14 (Surrogate)	BPK1678	Matrix Spike	0610676-45	ND	35.820	40.000	ug/L		89.6		43 - 154	
		Matrix Spike Duplicate	0610676-45	ND	36.115	40.000	ug/L		90.3		43 - 154	

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Water Analysis (Metals)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Total Antimony	BPK1372	Duplicate	0612143-02	44.930	36.430		ug/L	20.9		20		A02
		Matrix Spike	0612143-02	44.930	464.35	400.00	ug/L		105		75 - 125	
		Matrix Spike Duplicate	0612143-02	44.930	472.65	400.00	ug/L	1.89	107	20	75 - 125	
Total Arsenic	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	182.08	200.00	ug/L		91.0		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	195.55	200.00	ug/L	7.20	97.8	20	75 - 125	
Total Barium	BPK1372	Duplicate	0612143-02	39.959	37.456		ug/L	6.47		20		
		Matrix Spike	0612143-02	39.959	255.02	200.00	ug/L		108		75 - 125	
		Matrix Spike Duplicate	0612143-02	39.959	257.18	200.00	ug/L	0.922	109	20	75 - 125	
Total Beryllium	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	210.39	200.00	ug/L		105		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	212.59	200.00	ug/L	0.948	106	20	75 - 125	
Total Cadmium	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	214.21	200.00	ug/L		107		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	214.73	200.00	ug/L	0.00	107	20	75 - 125	
Total Chromium	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	200.89	200.00	ug/L		100		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	200.61	200.00	ug/L	0.00	100	20	75 - 125	
Total Cobalt	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	219.68	200.00	ug/L		110		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	223.81	200.00	ug/L	1.80	112	20	75 - 125	
Total Copper	BPK1372	Duplicate	0612143-02	ND	1.4531		ug/L			20		
		Matrix Spike	0612143-02	ND	209.08	200.00	ug/L		105		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	207.48	200.00	ug/L	0.957	104	20	75 - 125	
Total Lead	BPK1372	Duplicate	0612143-02	16.969	16.953		ug/L	0.0943		20		
		Matrix Spike	0612143-02	16.969	448.17	400.00	ug/L		108		75 - 125	
		Matrix Spike Duplicate	0612143-02	16.969	460.39	400.00	ug/L	2.74	111	20	75 - 125	

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Water Analysis (Metals)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Total Molybdenum	BPK1372	Duplicate	0612143-02	9.7053	9.7956		ug/L	0.926		20		
		Matrix Spike	0612143-02	9.7053	217.37	200.00	ug/L		104		75 - 125	
		Matrix Spike Duplicate	0612143-02	9.7053	219.88	200.00	ug/L	0.957	105	20	75 - 125	
Total Nickel	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	435.09	400.00	ug/L		109		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	442.96	400.00	ug/L	1.82	111	20	75 - 125	
Total Selenium	BPK1372	Duplicate	0612143-02	38.376	40.465		ug/L	5.30		20		
		Matrix Spike	0612143-02	38.376	215.56	200.00	ug/L		88.6		75 - 125	
		Matrix Spike Duplicate	0612143-02	38.376	221.52	200.00	ug/L	3.33	91.6	20	75 - 125	
Total Silver	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	98.205	100.00	ug/L		98.2		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	98.259	100.00	ug/L	0.102	98.3	20	75 - 125	
Total Thallium	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	380.33	400.00	ug/L		95.1		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	389.99	400.00	ug/L	2.49	97.5	20	75 - 125	
Total Vanadium	BPK1372	Duplicate	0612143-02	3.7267	3.5612		ug/L	4.54		20		
		Matrix Spike	0612143-02	3.7267	216.47	200.00	ug/L		106		75 - 125	
		Matrix Spike Duplicate	0612143-02	3.7267	217.32	200.00	ug/L	0.939	107	20	75 - 125	
Total Zinc	BPK1372	Duplicate	0612143-02	ND	ND		ug/L			20		
		Matrix Spike	0612143-02	ND	218.80	200.00	ug/L		109		75 - 125	
		Matrix Spike Duplicate	0612143-02	ND	221.13	200.00	ug/L	1.82	111	20	75 - 125	
Total Mercury	BPK1708	Duplicate	0612070-01	ND	ND		ug/L			20		
		Matrix Spike	0612070-01	ND	0.92000	1.0000	ug/L		92.0		70 - 130	
		Matrix Spike Duplicate	0612070-01	ND	0.99500	1.0000	ug/L	7.83	99.5	20	70 - 130	

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BC LABORATORIES, INC.

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PCB Analysis (EPA Method 8082)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
PCB-1260	BPL0254	BPL0254-BS1	LCS	2.2650	2.5000	0.20	ug/L	90.6		52 - 128		
Decachlorobiphenyl (Surrogate)	BPL0254	BPL0254-BS1	LCS	0.087000	0.10000		ug/L	87.0		40 - 134		

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Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Benzene	BPL0082	BPL0082-BS1	LCS	31.360	25.000	0.50	ug/L	125		70 - 130		
Bromodichloromethane	BPL0082	BPL0082-BS1	LCS	25.860	25.000	0.50	ug/L	103		70 - 130		
Chlorobenzene	BPL0082	BPL0082-BS1	LCS	27.040	25.000	0.50	ug/L	108		70 - 130		
Chloroethane	BPL0082	BPL0082-BS1	LCS	29.870	25.000	0.50	ug/L	119		70 - 130		
1,4-Dichlorobenzene	BPL0082	BPL0082-BS1	LCS	25.100	25.000	0.50	ug/L	100		70 - 130		
1,1-Dichloroethane	BPL0082	BPL0082-BS1	LCS	31.320	25.000	0.50	ug/L	125		70 - 130		
1,1-Dichloroethene	BPL0082	BPL0082-BS1	LCS	32.110	25.000	0.50	ug/L	128		70 - 130		
Toluene	BPL0082	BPL0082-BS1	LCS	28.160	25.000	0.50	ug/L	113		70 - 130		
Trichloroethene	BPL0082	BPL0082-BS1	LCS	27.310	25.000	0.50	ug/L	109		70 - 130		
1,2-Dichloroethane-d4 (Surrogate)	BPL0082	BPL0082-BS1	LCS	9.5600	10.000		ug/L	95.6		76 - 114		
Toluene-d8 (Surrogate)	BPL0082	BPL0082-BS1	LCS	10.300	10.000		ug/L	103		88 - 110		
4-Bromofluorobenzene (Surrogate)	BPL0082	BPL0082-BS1	LCS	9.6000	10.000		ug/L	96.0		86 - 115		

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Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Acenaphthene	BPK1678	BPK1678-BS1	LCS	58.519	80.000	2.0	ug/L	73.1		47 - 121		
1,4-Dichlorobenzene	BPK1678	BPK1678-BS1	LCS	55.996	80.000	2.0	ug/L	70.0		36 - 109		
2,4-Dinitrotoluene	BPK1678	BPK1678-BS1	LCS	62.108	80.000	2.0	ug/L	77.6		36 - 120		
Hexachlorobenzene	BPK1678	BPK1678-BS1	LCS	80.317	80.000	2.0	ug/L	100		44 - 122		
Hexachlorobutadiene	BPK1678	BPK1678-BS1	LCS	61.024	80.000	2.0	ug/L	76.3		26 - 100		
Hexachloroethane	BPK1678	BPK1678-BS1	LCS	55.541	80.000	2.0	ug/L	69.4		28 - 96		
Nitrobenzene	BPK1678	BPK1678-BS1	LCS	55.458	80.000	2.0	ug/L	69.3		43 - 122		
N-Nitrosodi-N-propylamine	BPK1678	BPK1678-BS1	LCS	61.061	80.000	2.0	ug/L	76.3		37 - 111		
Pyrene	BPK1678	BPK1678-BS1	LCS	67.202	80.000	2.0	ug/L	84.0		51 - 140		
1,2,4-Trichlorobenzene	BPK1678	BPK1678-BS1	LCS	62.837	80.000	2.0	ug/L	78.5		33 - 116		
4-Chloro-3-methylphenol	BPK1678	BPK1678-BS1	LCS	66.912	80.000	5.0	ug/L	83.6		37 - 141		
2-Chlorophenol	BPK1678	BPK1678-BS1	LCS	57.136	80.000	2.0	ug/L	71.4		29 - 110		
2-Methylphenol	BPK1678	BPK1678-BS1	LCS	56.734	80.000	2.0	ug/L	70.9		27 - 100		
3- & 4-Methylphenol	BPK1678	BPK1678-BS1	LCS	80.936	80.000	2.0	ug/L	101		24 - 174		
4-Nitrophenol	BPK1678	BPK1678-BS1	LCS	40.190	80.000	2.0	ug/L	50.2		15 - 74		
Pentachlorophenol	BPK1678	BPK1678-BS1	LCS	76.340	80.000	10	ug/L	95.4		22 - 127		
Phenol	BPK1678	BPK1678-BS1	LCS	27.142	80.000	2.0	ug/L	33.9		18 - 46		
2,4,6-Trichlorophenol	BPK1678	BPK1678-BS1	LCS	64.795	80.000	5.0	ug/L	81.0		44 - 124		
2-Fluorophenol (Surrogate)	BPK1678	BPK1678-BS1	LCS	47.447	80.000		ug/L	59.3		28 - 87		
Phenol-d5 (Surrogate)	BPK1678	BPK1678-BS1	LCS	33.588	80.000		ug/L	42.0		18 - 55		
Nitrobenzene-d5 (Surrogate)	BPK1678	BPK1678-BS1	LCS	61.423	80.000		ug/L	76.8		40 - 121		
2-Fluorobiphenyl (Surrogate)	BPK1678	BPK1678-BS1	LCS	59.875	80.000		ug/L	74.8		42 - 128		
2,4,6-Tribromophenol (Surrogate)	BPK1678	BPK1678-BS1	LCS	89.132	80.000		ug/L	111		44 - 137		
p-Terphenyl-d14 (Surrogate)	BPK1678	BPK1678-BS1	LCS	32.605	40.000		ug/L	81.5		43 - 154		

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Water Analysis (Metals)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Total Antimony	BPK1372	BPK1372-BS1	LCS	425.11	400.00	100	ug/L	106		85 - 115		
Total Arsenic	BPK1372	BPK1372-BS1	LCS	218.28	200.00	50	ug/L	109		85 - 115		
Total Barium	BPK1372	BPK1372-BS1	LCS	222.40	200.00	10	ug/L	111		85 - 115		
Total Beryllium	BPK1372	BPK1372-BS1	LCS	206.33	200.00	10	ug/L	103		85 - 115		
Total Cadmium	BPK1372	BPK1372-BS1	LCS	206.31	200.00	10	ug/L	103		85 - 115		
Total Chromium	BPK1372	BPK1372-BS1	LCS	205.59	200.00	10	ug/L	103		85 - 115		
Total Cobalt	BPK1372	BPK1372-BS1	LCS	214.39	200.00	50	ug/L	107		85 - 115		
Total Copper	BPK1372	BPK1372-BS1	LCS	204.11	200.00	10	ug/L	102		85 - 115		
Total Lead	BPK1372	BPK1372-BS1	LCS	428.40	400.00	50	ug/L	107		85 - 115		
Total Molybdenum	BPK1372	BPK1372-BS1	LCS	202.18	200.00	50	ug/L	101		85 - 115		
Total Nickel	BPK1372	BPK1372-BS1	LCS	457.94	400.00	10	ug/L	114		85 - 115		
Total Selenium	BPK1372	BPK1372-BS1	LCS	215.13	200.00	100	ug/L	108		85 - 115		
Total Silver	BPK1372	BPK1372-BS1	LCS	102.71	100.00	10	ug/L	103		85 - 115		
Total Thallium	BPK1372	BPK1372-BS1	LCS	404.25	400.00	100	ug/L	101		85 - 115		
Total Vanadium	BPK1372	BPK1372-BS1	LCS	210.12	200.00	10	ug/L	105		85 - 115		
Total Zinc	BPK1372	BPK1372-BS1	LCS	229.65	200.00	50	ug/L	115		85 - 115		
Total Mercury	BPK1708	BPK1708-BS1	LCS	0.88500	1.0000	0.20	ug/L	88.5		85 - 115		

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PCB Analysis (EPA Method 8082)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
PCB-1016	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.034	
PCB-1221	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.089	
PCB-1232	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.090	
PCB-1242	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.095	
PCB-1248	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.025	
PCB-1254	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.042	
PCB-1260	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.043	
Total PCB's (Summation)	BPL0254	BPL0254-BLK1	ND	ug/L	0.20	0.10	
Decachlorobiphenyl (Surrogate)	BPL0254	BPL0254-BLK1	87.0	%	38 - 135 (LCL - UCL)		

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Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Benzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.14	
Bromobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.17	
Bromochloromethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
Bromodichloromethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	
Bromoform	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.22	
Bromomethane	BPL0082	BPL0082-BLK1	ND	ug/L	1.0	0.31	
n-Butylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
sec-Butylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.076	
tert-Butylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.093	
Carbon tetrachloride	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.14	
Chlorobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
Chloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
Chloroform	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.076	
Chloromethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.14	
2-Chlorotoluene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
4-Chlorotoluene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.14	
Dibromochloromethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
1,2-Dibromo-3-chloropropane	BPL0082	BPL0082-BLK1	ND	ug/L	1.0	0.37	
1,2-Dibromoethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.22	
Dibromomethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.36	
1,2-Dichlorobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	
1,3-Dichlorobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.073	
1,4-Dichlorobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.099	
Dichlorodifluoromethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.17	
1,1-Dichloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.10	

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Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
1,2-Dichloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
1,1-Dichloroethene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
cis-1,2-Dichloroethene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.20	
trans-1,2-Dichloroethene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.18	
1,2-Dichloropropane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.069	
1,3-Dichloropropane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
2,2-Dichloropropane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	
1,1-Dichloropropene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	
cis-1,3-Dichloropropene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.075	
trans-1,3-Dichloropropene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
Ethylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.094	
Hexachlorobutadiene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.28	
Isopropylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
p-Isopropyltoluene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.081	
Methylene chloride	BPL0082	BPL0082-BLK1	ND	ug/L	1.0	0.16	
Methyl t-butyl ether	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.13	
Naphthalene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	
n-Propylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.091	
Styrene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.089	
1,1,1,2-Tetrachloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
1,1,2,2-Tetrachloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.14	
Tetrachloroethene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.18	
Toluene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.12	
1,2,3-Trichlorobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.15	
1,2,4-Trichlorobenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	

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Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
1,1,1-Trichloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.27	
1,1,2-Trichloroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.14	
Trichloroethene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.18	
Trichlorofluoromethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.13	
1,2,3-Trichloropropane	BPL0082	BPL0082-BLK1	ND	ug/L	1.0	0.42	
1,1,2-Trichloro-1,2,2-trifluoroethane	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.11	
1,2,4-Trimethylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.086	
1,3,5-Trimethylbenzene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.087	
Vinyl chloride	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.16	
Total Xylenes	BPL0082	BPL0082-BLK1	ND	ug/L	1.0	0.31	
p- & m-Xylenes	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.23	
o-Xylene	BPL0082	BPL0082-BLK1	ND	ug/L	0.50	0.096	
1,2-Dichloroethane-d4 (Surrogate)	BPL0082	BPL0082-BLK1	94.2	%	76 - 114 (LCL - UCL)		
Toluene-d8 (Surrogate)	BPL0082	BPL0082-BLK1	102	%	88 - 110 (LCL - UCL)		
4-Bromofluorobenzene (Surrogate)	BPL0082	BPL0082-BLK1	89.3	%	86 - 115 (LCL - UCL)		

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	Reported: 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Acenaphthene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.35	
Acenaphthylene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.32	
Aldrin	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.47	
Aniline	BPK1678	BPK1678-BLK1	ND	ug/L	5.0	1.8	
Anthracene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.27	
Benzidine	BPK1678	BPK1678-BLK1	ND	ug/L	20	4.7	
Benzo[a]anthracene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.34	
Benzo[b]fluoranthene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.38	
Benzo[k]fluoranthene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.47	
Benzo[a]pyrene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.45	
Benzo[g,h,i]perylene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.56	
Benzoic acid	BPK1678	BPK1678-BLK1	ND	ug/L	10	0.61	
Benzyl alcohol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.44	
Benzyl butyl phthalate	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.32	
alpha-BHC	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.42	
beta-BHC	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.46	
delta-BHC	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.28	
gamma-BHC (Lindane)	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.35	
bis(2-Chloroethoxy)methane	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	1.6	
bis(2-Chloroethyl) ether	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.49	
bis(2-Chloroisopropyl)ether	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.57	
bis(2-Ethylhexyl)phthalate	BPK1678	BPK1678-BLK1	ND	ug/L	5.0	0.98	
4-Bromophenyl phenyl ether	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.40	
4-Chloroaniline	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.99	
2-Chloronaphthalene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.41	

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BC LABORATORIES, INC.

Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
4-Chlorophenyl phenyl ether	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.33	
Chrysene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.30	
4,4'-DDD	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.38	
4,4'-DDE	BPK1678	BPK1678-BLK1	ND	ug/L	3.0	0.52	
4,4'-DDT	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.36	
Dibenzo[a,h]anthracene	BPK1678	BPK1678-BLK1	ND	ug/L	3.0	0.48	
Dibenzofuran	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.37	
1,2-Dichlorobenzene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.35	
1,3-Dichlorobenzene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.35	
1,4-Dichlorobenzene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.25	
3,3-Dichlorobenzidine	BPK1678	BPK1678-BLK1	ND	ug/L	10	1.5	
Dieldrin	BPK1678	BPK1678-BLK1	ND	ug/L	3.0	0.52	
Diethyl phthalate	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.34	
Dimethyl phthalate	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.32	
Di-n-butyl phthalate	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.40	
2,4-Dinitrotoluene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.39	
2,6-Dinitrotoluene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.48	
Di-n-octyl phthalate	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.41	
1,2-Diphenylhydrazine	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.38	
Endosulfan I	BPK1678	BPK1678-BLK1	ND	ug/L	10	2.3	
Endosulfan II	BPK1678	BPK1678-BLK1	ND	ug/L	10	1.6	
Endosulfan sulfate	BPK1678	BPK1678-BLK1	ND	ug/L	3.0	0.67	
Endrin	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.68	
Endrin aldehyde	BPK1678	BPK1678-BLK1	ND	ug/L	10	3.6	
Fluoranthene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.30	

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Fluorene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.36	
Heptachlor	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.53	
Heptachlor epoxide	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.24	
Hexachlorobenzene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.35	
Hexachlorobutadiene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.40	
Hexachlorocyclopentadiene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.36	
Hexachloroethane	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.29	
Indeno[1,2,3-cd]pyrene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.47	
Isophorone	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.31	
2-Methylnaphthalene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.27	
Naphthalene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.30	
2-Naphthylamine	BPK1678	BPK1678-BLK1	ND	ug/L	20	5.3	
2-Nitroaniline	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.82	
3-Nitroaniline	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	1.6	
4-Nitroaniline	BPK1678	BPK1678-BLK1	ND	ug/L	5.0	0.44	
Nitrobenzene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.37	
N-Nitrosodimethylamine	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.53	
N-Nitrosodi-N-propylamine	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.88	
N-Nitrosodiphenylamine	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.42	
Phenanthrene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.29	
Pyrene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.29	
1,2,4-Trichlorobenzene	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.26	
4-Chloro-3-methylphenol	BPK1678	BPK1678-BLK1	ND	ug/L	5.0	0.39	
2-Chlorophenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.39	
2,4-Dichlorophenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.37	

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
2,4-Dimethylphenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	1.5	
4,6-Dinitro-2-methylphenol	BPK1678	BPK1678-BLK1	ND	ug/L	10	2.5	
2,4-Dinitrophenol	BPK1678	BPK1678-BLK1	ND	ug/L	10	0.35	
2-Methylphenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	1.3	
3- & 4-Methylphenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	1.4	
2-Nitrophenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.33	
4-Nitrophenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.35	
Pentachlorophenol	BPK1678	BPK1678-BLK1	ND	ug/L	10	0.55	
Phenol	BPK1678	BPK1678-BLK1	ND	ug/L	2.0	0.30	
2,4,5-Trichlorophenol	BPK1678	BPK1678-BLK1	ND	ug/L	5.0	0.37	
2,4,6-Trichlorophenol	BPK1678	BPK1678-BLK1	ND	ug/L	5.0	0.47	
2-Fluorophenol (Surrogate)	BPK1678	BPK1678-BLK1	58.7	%	28 - 87 (LCL - UCL)		
Phenol-d5 (Surrogate)	BPK1678	BPK1678-BLK1	41.2	%	18 - 55 (LCL - UCL)		
Nitrobenzene-d5 (Surrogate)	BPK1678	BPK1678-BLK1	75.6	%	40 - 121 (LCL - UCL)		
2-Fluorobiphenyl (Surrogate)	BPK1678	BPK1678-BLK1	79.2	%	42 - 128 (LCL - UCL)		
2,4,6-Tribromophenol (Surrogate)	BPK1678	BPK1678-BLK1	115	%	44 - 137 (LCL - UCL)		
p-Terphenyl-d14 (Surrogate)	BPK1678	BPK1678-BLK1	87.0	%	43 - 154 (LCL - UCL)		

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BC LABORATORIES, INC.

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Water Analysis (Metals)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Total Antimony	BPK1372	BPK1372-BLK1	ND	ug/L	100	7.1	
Total Arsenic	BPK1372	BPK1372-BLK1	ND	ug/L	50	18	
Total Barium	BPK1372	BPK1372-BLK1	ND	ug/L	10	1.4	
Total Beryllium	BPK1372	BPK1372-BLK1	ND	ug/L	10	0.77	
Total Cadmium	BPK1372	BPK1372-BLK1	ND	ug/L	10	3.2	
Total Chromium	BPK1372	BPK1372-BLK1	ND	ug/L	10	1.7	
Total Cobalt	BPK1372	BPK1372-BLK1	ND	ug/L	50	1.2	
Total Copper	BPK1372	BPK1372-BLK1	ND	ug/L	10	1.3	
Total Lead	BPK1372	BPK1372-BLK1	ND	ug/L	50	4.5	
Total Molybdenum	BPK1372	BPK1372-BLK1	ND	ug/L	50	2.6	
Total Nickel	BPK1372	BPK1372-BLK1	ND	ug/L	10	3.5	
Total Selenium	BPK1372	BPK1372-BLK1	ND	ug/L	100	9.7	
Total Silver	BPK1372	BPK1372-BLK1	ND	ug/L	10	1.4	
Total Thallium	BPK1372	BPK1372-BLK1	ND	ug/L	100	16	
Total Vanadium	BPK1372	BPK1372-BLK1	ND	ug/L	10	2.5	
Total Zinc	BPK1372	BPK1372-BLK1	ND	ug/L	50	7.3	
Total Mercury	BPK1708	BPK1708-BLK1	ND	ug/L	0.20	0.026	

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Tetra Tech 1940 E. Deere Ave. Suite 200 Santa Ana CA, 92605	Project: Rad Survey Project Number: Rad Survey Project Manager: Lynn Jefferson	**Reported:** 12/08/06 16:23

Notes and Definitions

V11	The Continuing Calibration Verification (CCV) recovery is not within established control limits.
S09	The surrogate recovery on the sample for this compound was not within the control limits.
S05	The sample holding time was exceeded.
J	Estimated value
A11	PQL's and/or MDL's were raised due to inadequate sample size received.
A02	The difference between duplicate readings is less than the PQL.
ND	Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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INVOICE NO

B023963

BC LABORATORIES, INC.

J.J. Eglin, Reg. Chem. Engr.
4100 Atlas Court, Bakersfield, California 93308 Phone (661) 327-4911; Fax (661) 327-1918

Client No. TRTSD

Tetra Tech
1230 Columbia St. Suite 750
San Diego, CA 92101
Attn: Katarina Caulder

PO Number:
Invoice Date: 12/14/06
Lab Number: 0612230
Submitted On: 11/21/06
Submitted By: Lynn Jefferson

Payment Due: 01/15/07
Terms: Net 30 days

Quantity	Description of Service	Dept.	Unit	Amount
	0612230-01 08-ST-019, 11/18/2006 2:22:00 PM, J. Dessort			
	0612230-02 08-ST-020, 11/18/2006 2:34:00 PM, J. Dessort			
	0612230-03 08-ST-021, 11/18/2006 2:38:00 PM, J. Dessort			
	0612230-04 08-ST-022, 11/18/2006 2:47:00 PM, J. Dessort			
	0612230-05 08-ST-023, 11/18/2006 2:55:00 PM, J. Dessort			
1	Water: EPA 8081 - Organo-Chlorine Pesticides - (Samples 0612230-03)	205	$200.00	$200.00
1	Water: EPA 8082 - PCB Analysis - (Samples 0612230-04)	205	$100.00	$100.00
1	Water: EPA 8260 - Purgeable Halogenated & Aromatics - (Samples 0612230-01)	206	$275.00	$275.00
1	Water: EPA 8270 - Acid Extractables and Base Neutrals - (Samples 0612230-02)	205	$400.00	$400.00
1	Water: Total 17 Metals (6010/7470) - (Samples 0612230-05)	207	$300.00	$300.00
			Subtotal	$1,275.00
				$1,275.00

Please refer to the invoice number above when making your payment.

E.1 SOIL RESULTS

N00236.002967
ALAMEDA POINT
SSIC NO. 5090.3

SECTION E.1 – SOIL RESULTS

THIS SECTION IS CONTAINED IN ELECTRONIC FORMAT ONLY

TO VIEW THE DATA, CONTACT:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

DECON WATER

N00236.002967
ALAMEDA POINT
SSIC NO. 5090.3

SECTION E.2 – DECONTAMINATION RESULTS

THIS RECORD CONTAINS LARGE VOLUMES OF DATA AND IS NOT REQUIRED TO BE PHYSICALLY LOCATED WITH THE ADMINISTRATIVE RECORD DOCUMENT.

DUE TO EXTENSIVE VOLUME, THIS DATA WILL NOT BE IMAGED.

TO VIEW THE DATA, CONTACT:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

APPENDIX F

SURVEY AREA GAMMA SPECTROSCOPY DATA

N00236.002967
ALAMEDA POINT
SSIC NO. 5090.3

APPENDIX F – SURVEY AREA GAMMA SPECTROSCOPY DATA

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TO VIEW THE DATA, CONTACT:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

FIELD SPECTRA

N00236.002967
ALAMEDA POINT
SSIC NO. 5090.3

FIELD SPECTRA

THIS RECORD CONTAINS LARGE VOLUMES OF DATA AND IS NOT REQUIRED TO BE PHYSICALLY LOCATED WITH THE ADMINISTRATIVE RECORD DOCUMENT.

DUE TO EXTENSIVE VOLUME, THIS DATA WILL NOT BE IMAGED.

TO VIEW THE DATA, CONTACT:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

APPENDIX G

PHOTOGRAPHIC LOG

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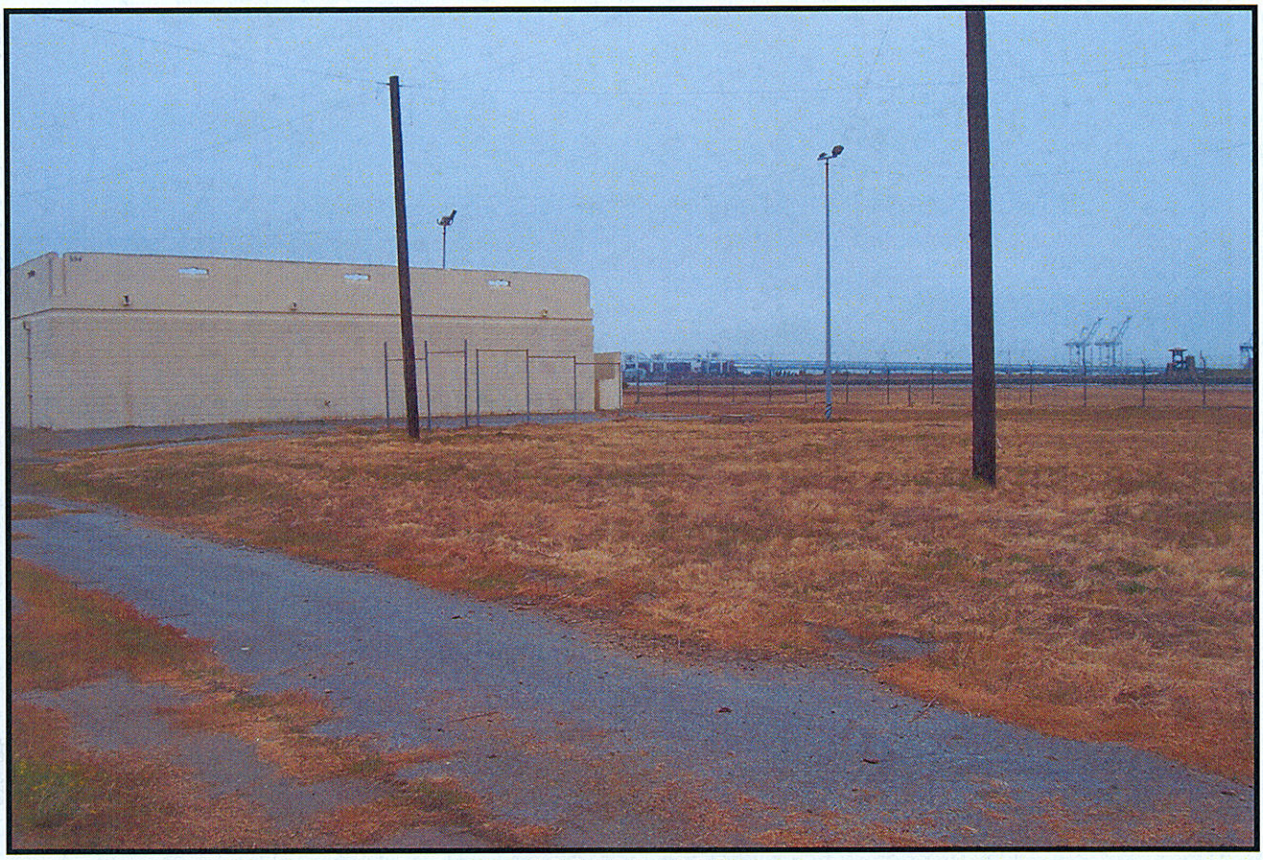
090106_002.JPG

090106_003.JPG

090106_004.JPG

090506_001.JPG

090606_001



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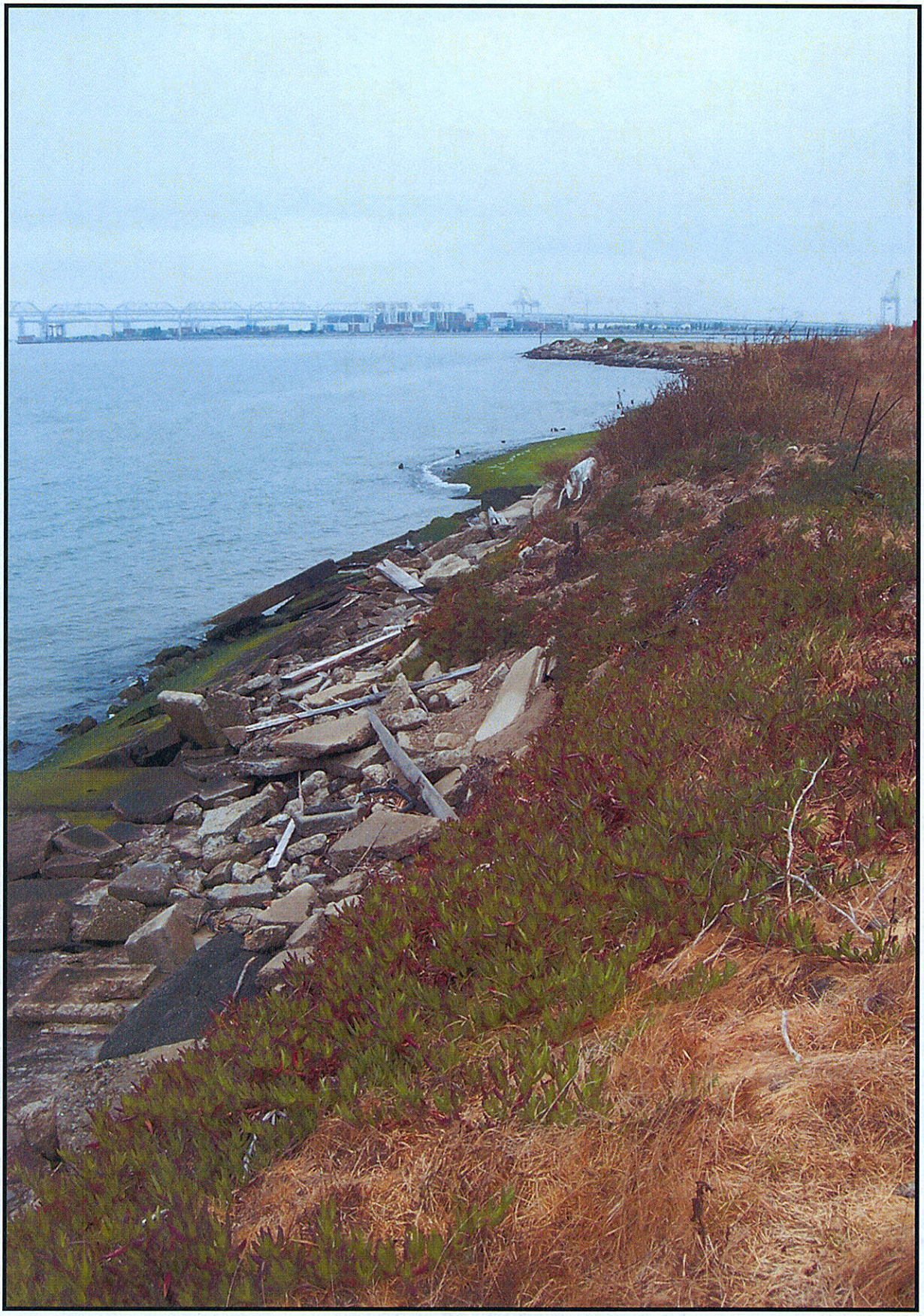

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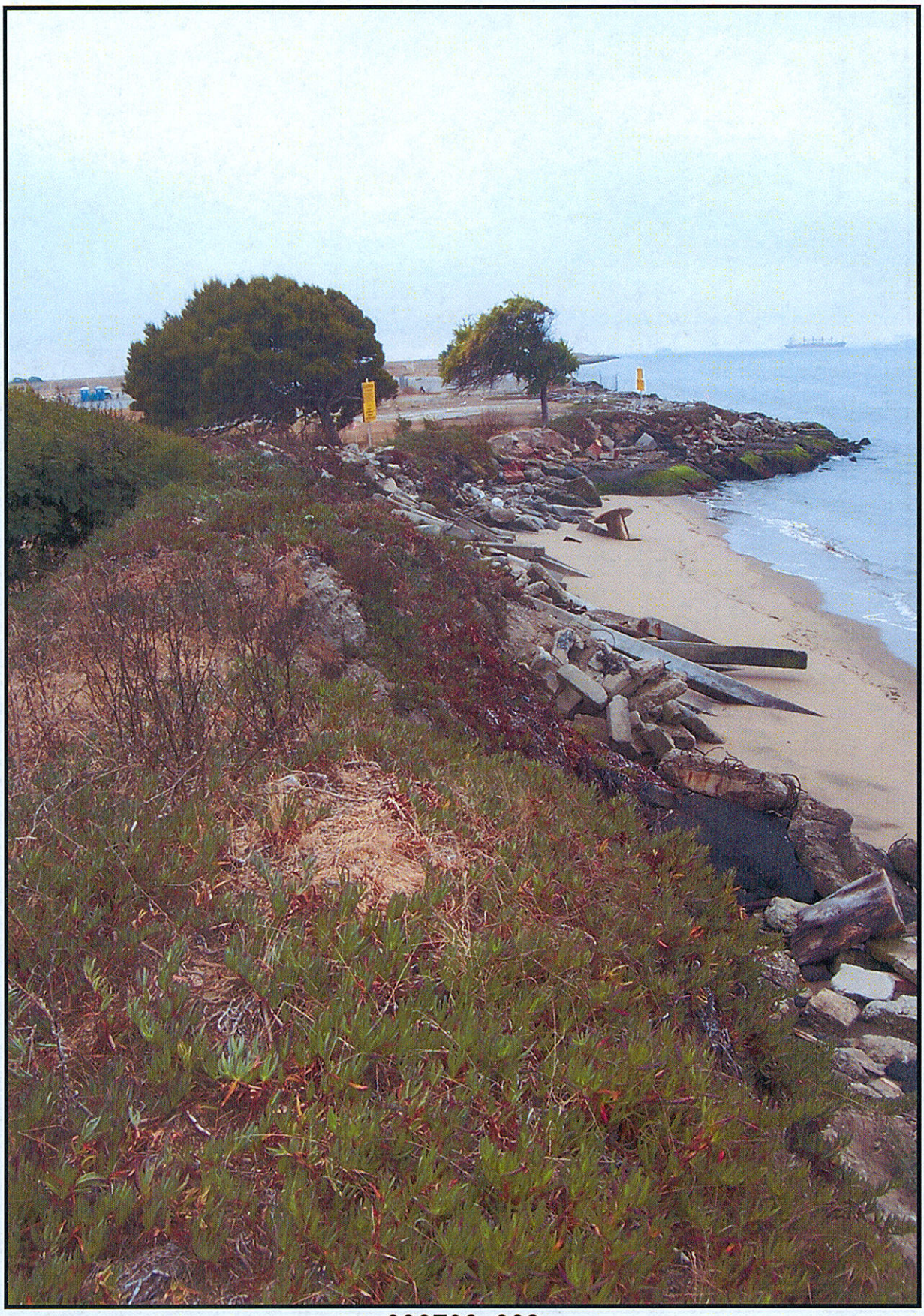

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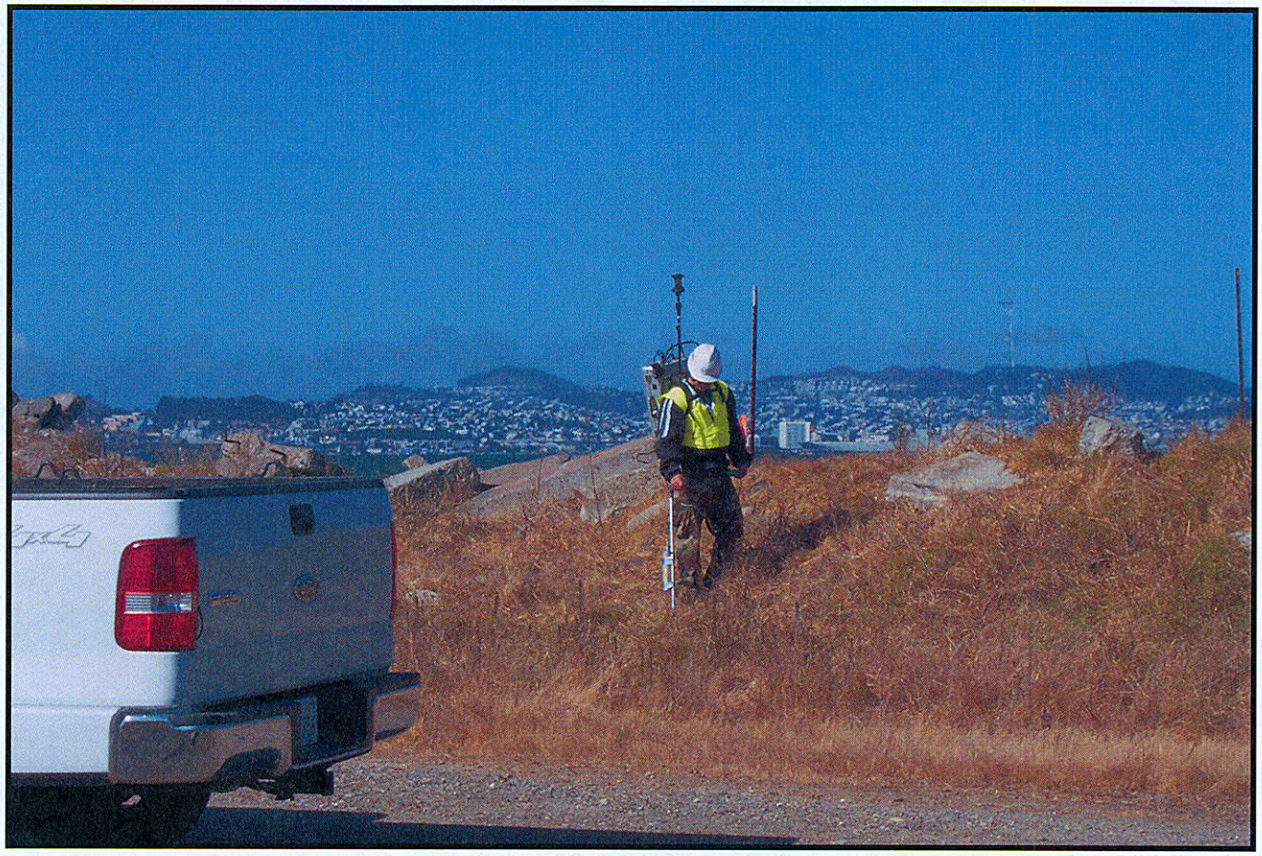

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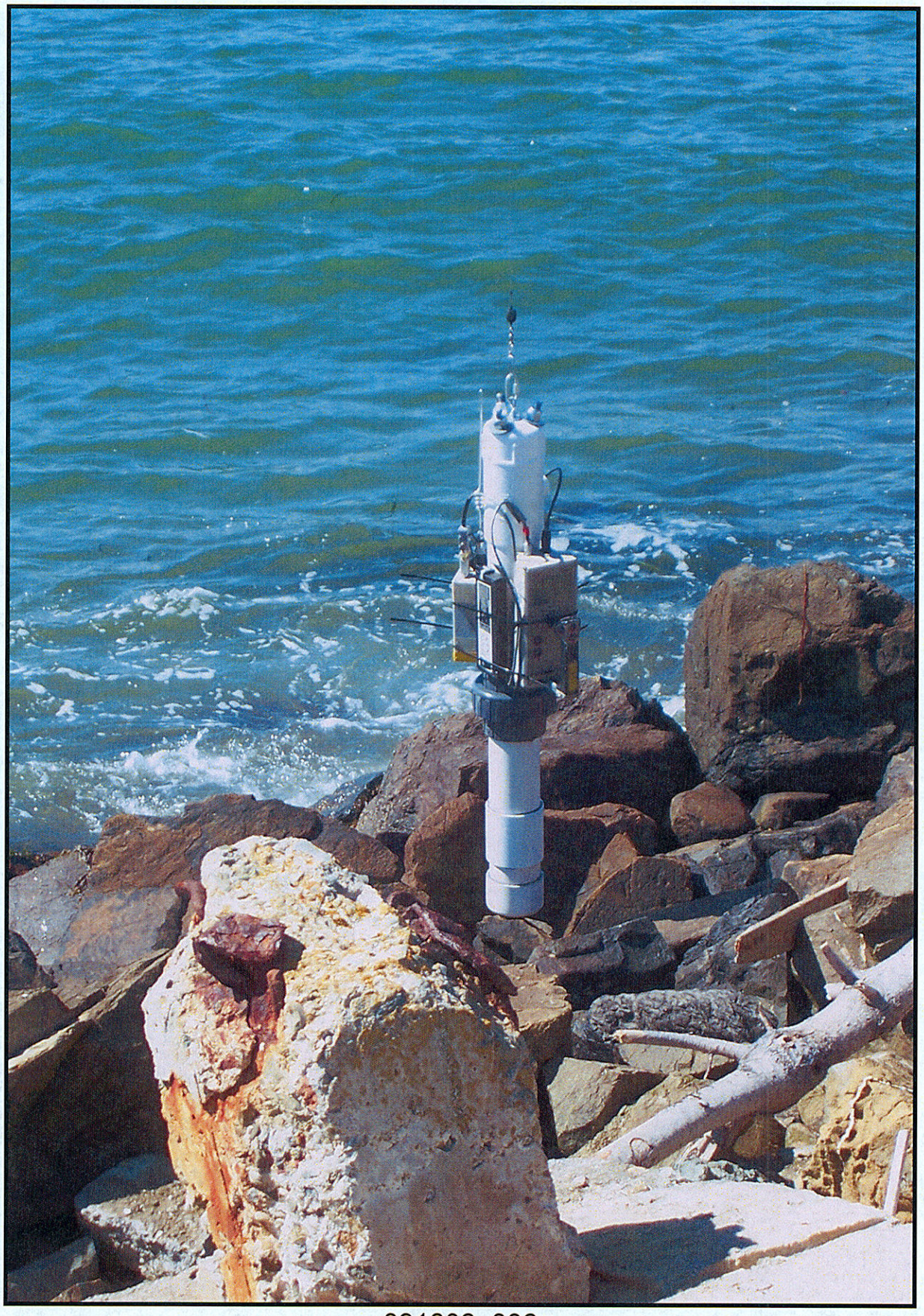

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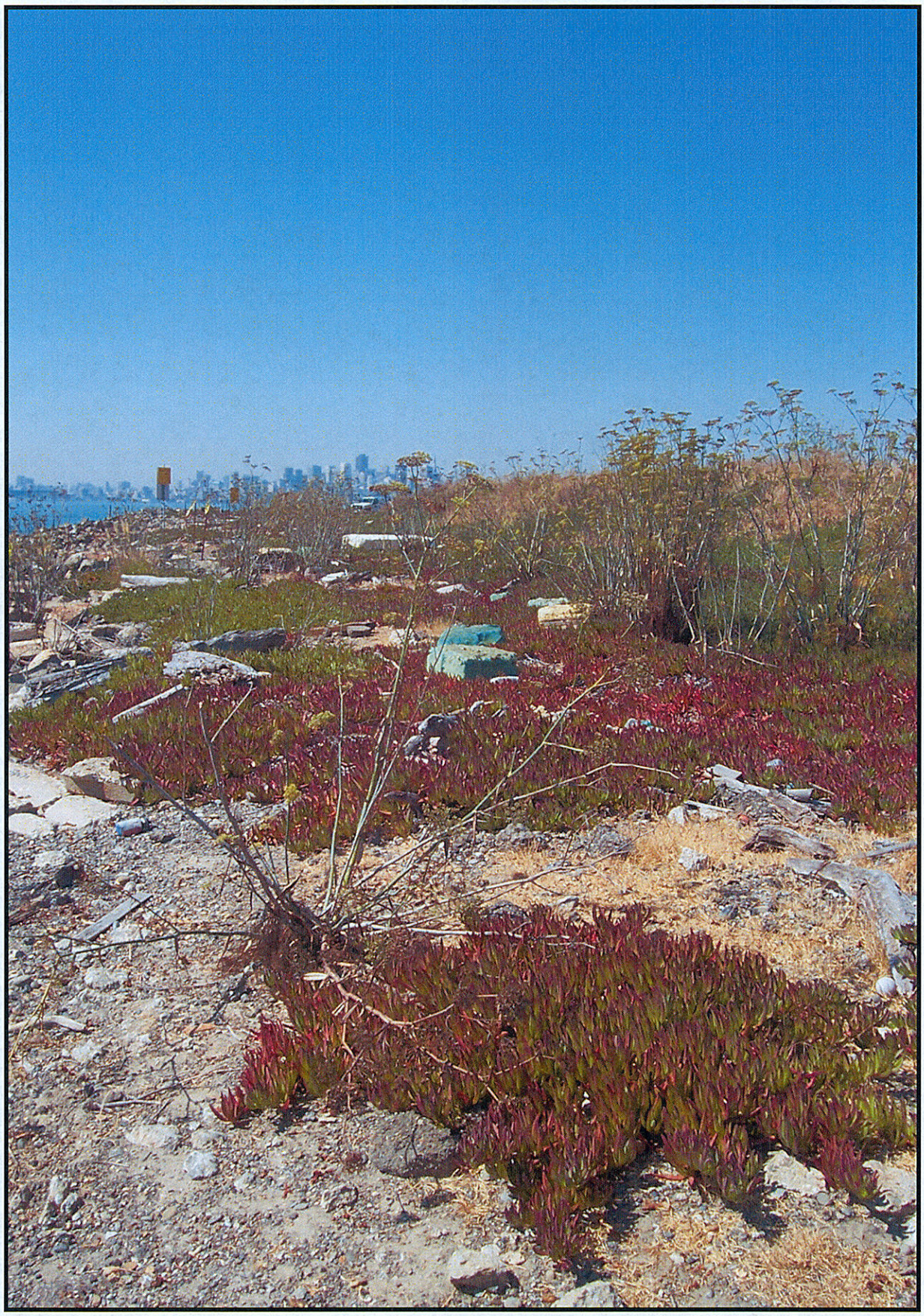
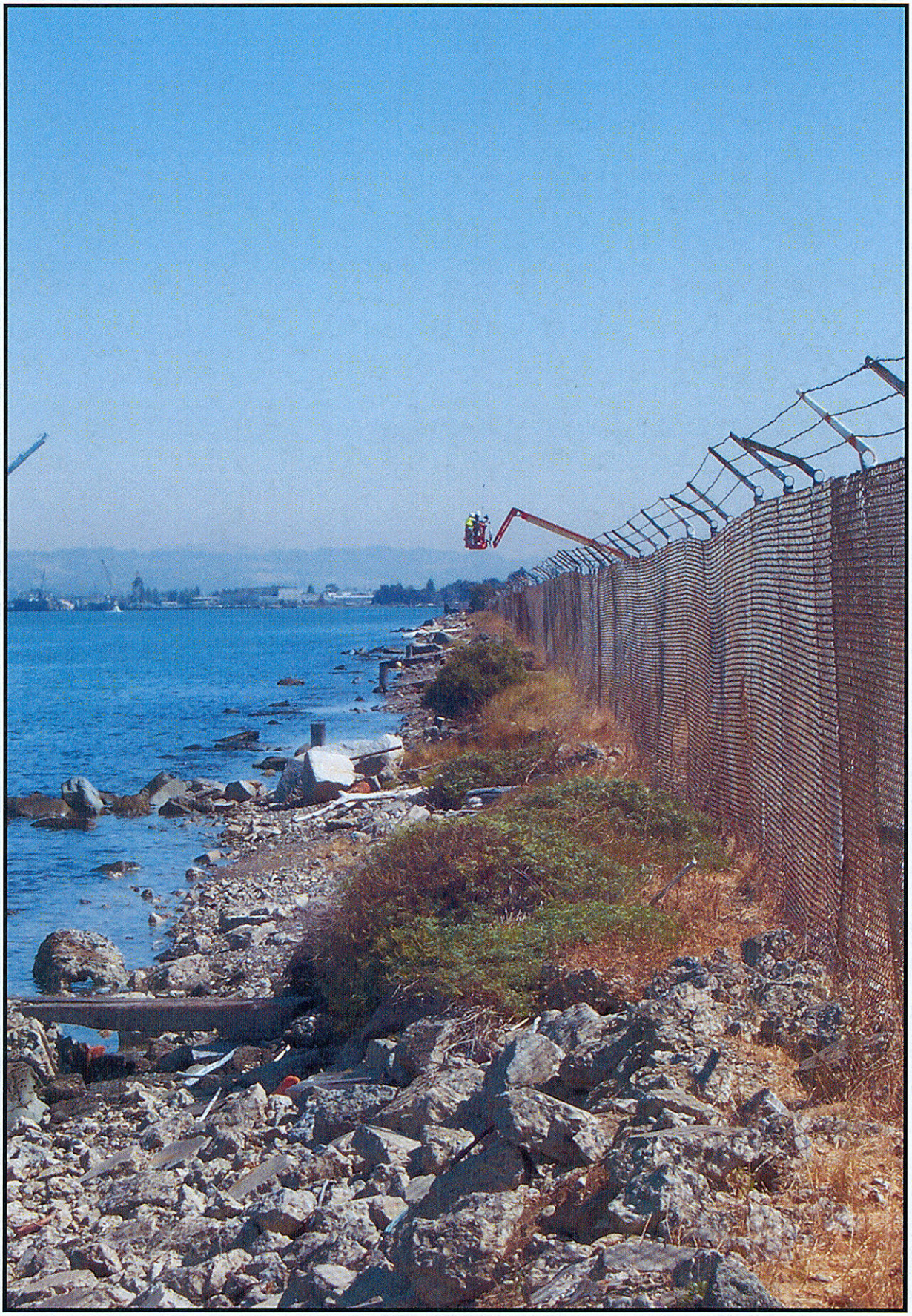
092506_004

092506_005



092506_006



092506_007

092606_001

092906_001

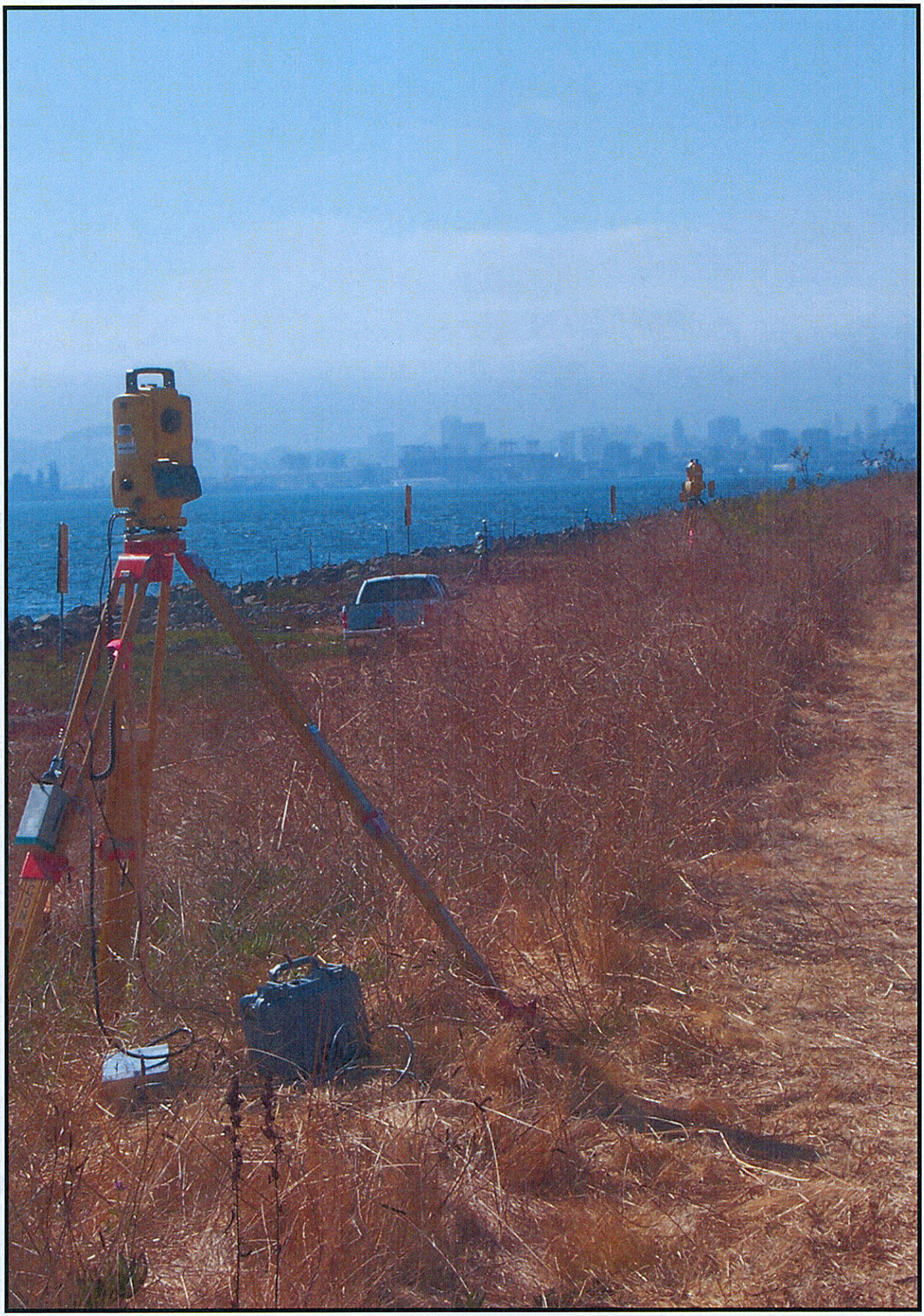
092906_002

092906_003

092906_004

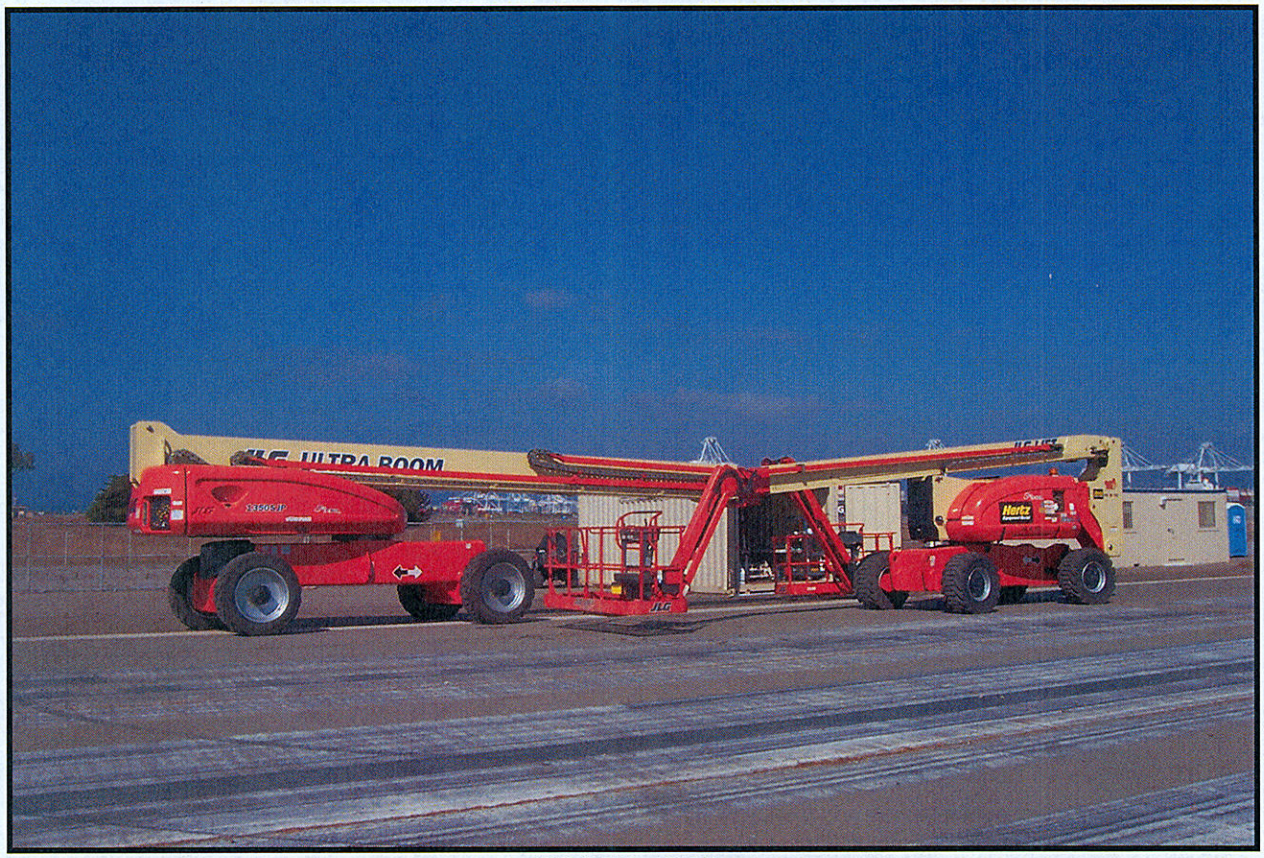
092906_005

092906_006



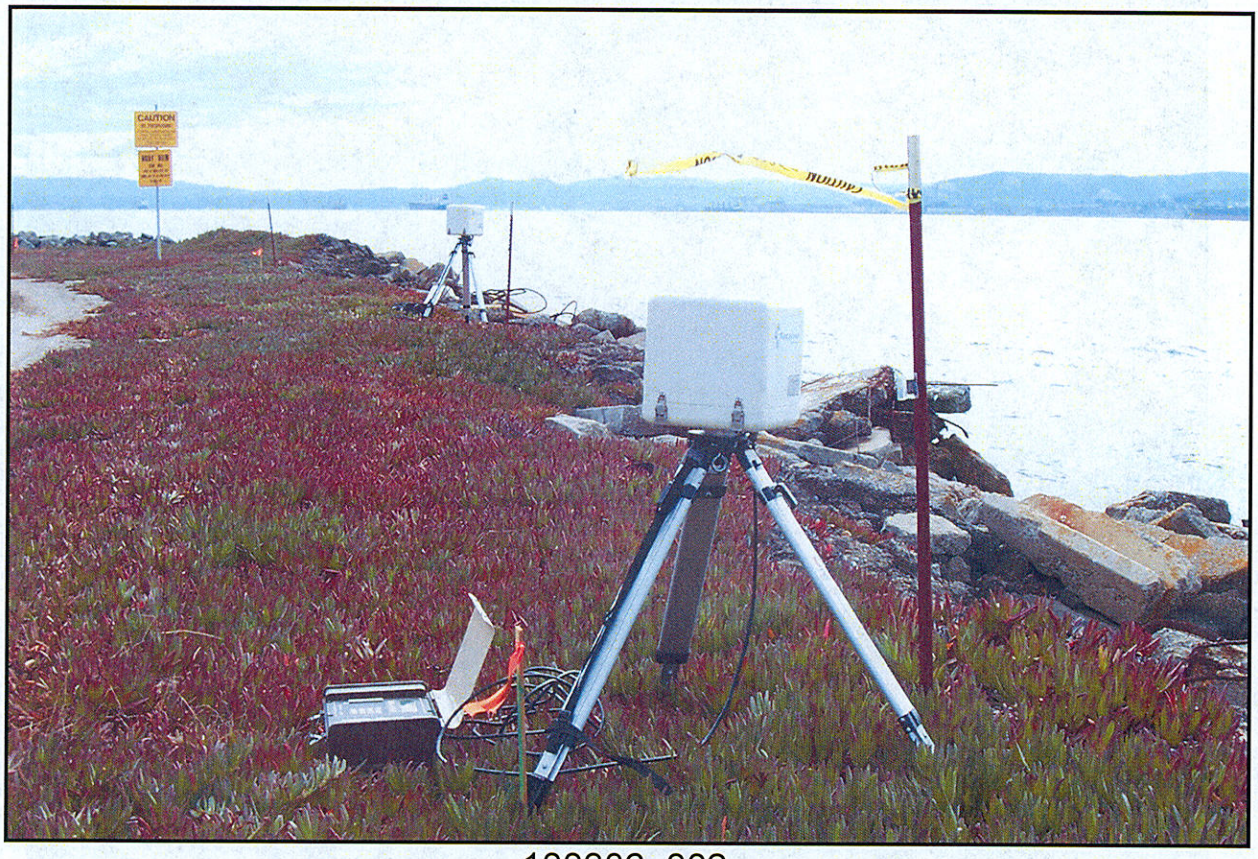
092906_007

092906_008



92906_008

100306_001



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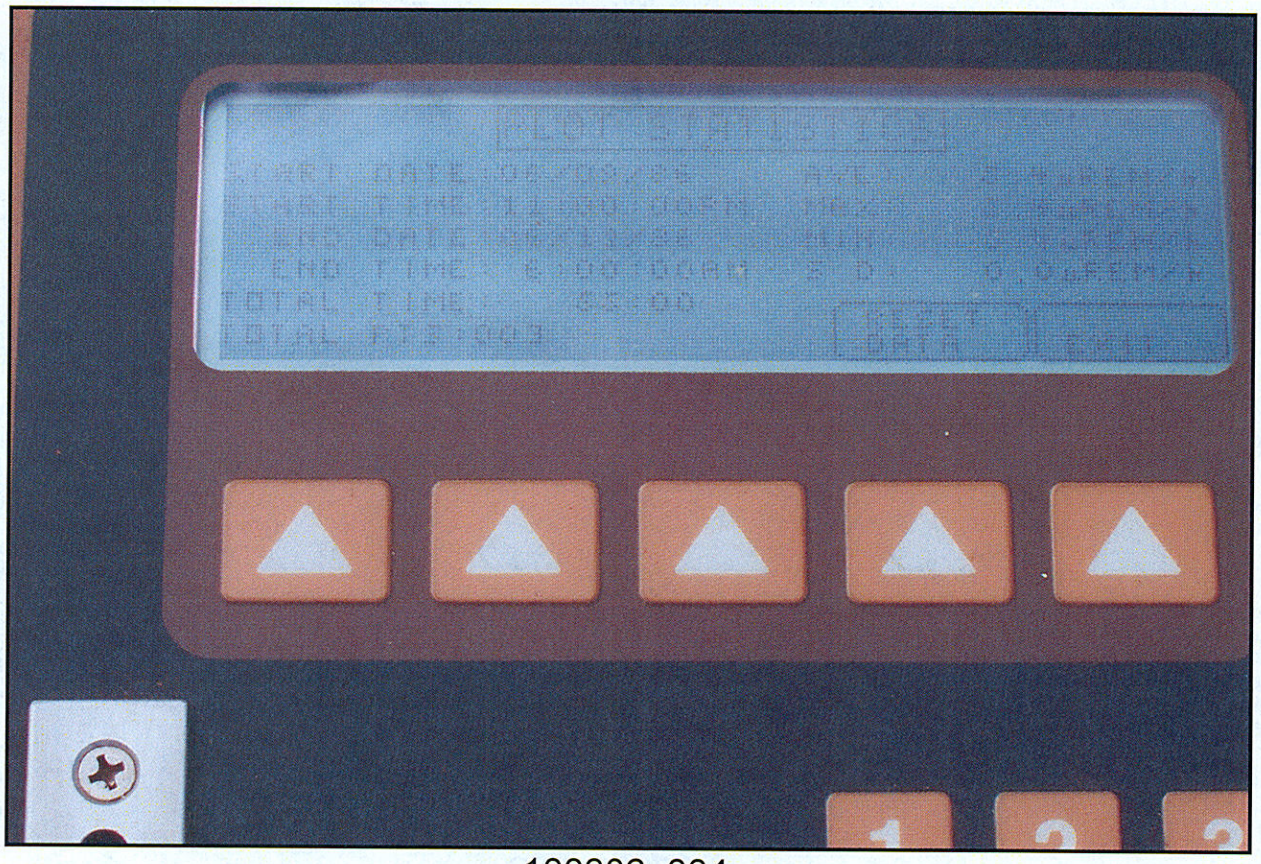
100306_003



100306_004

100306_005

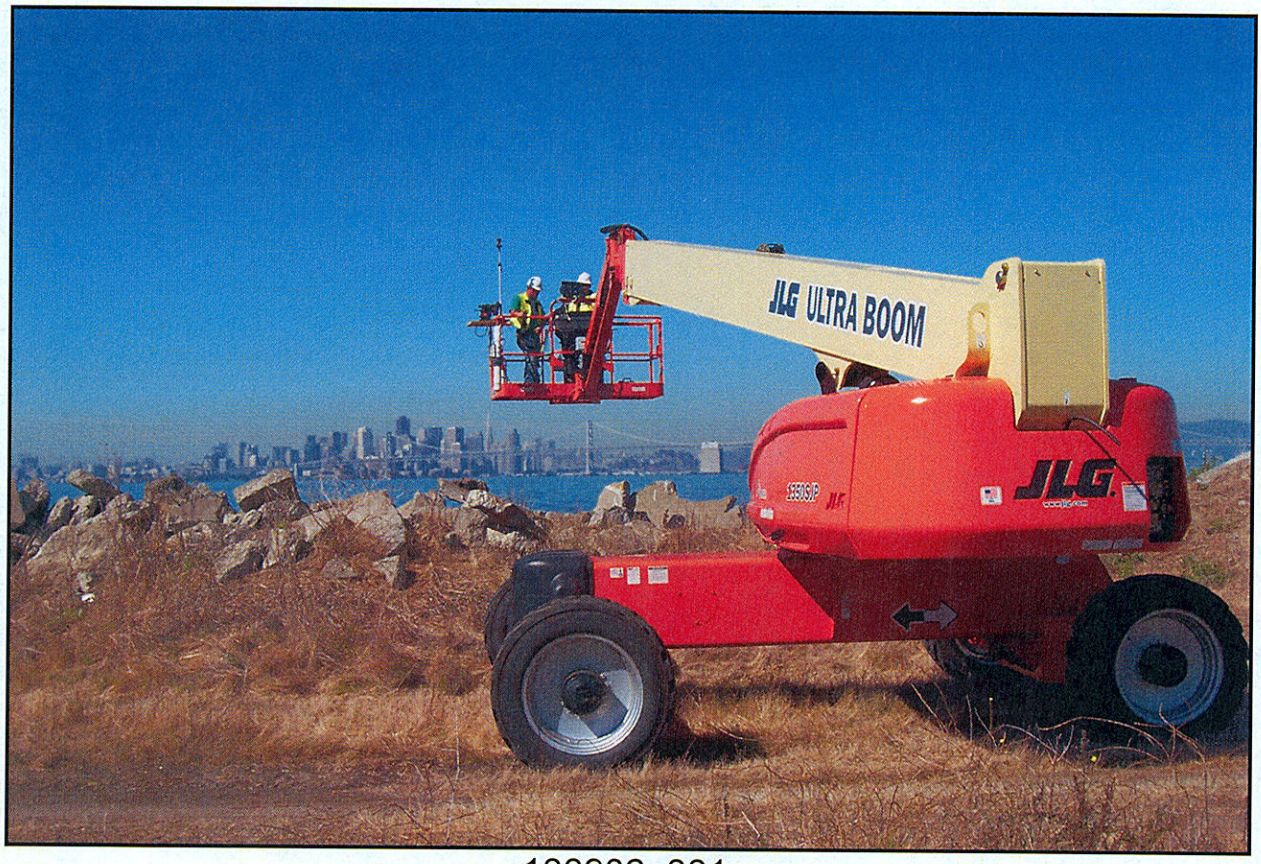
100306_006

100406_001

100406_002

100606_001

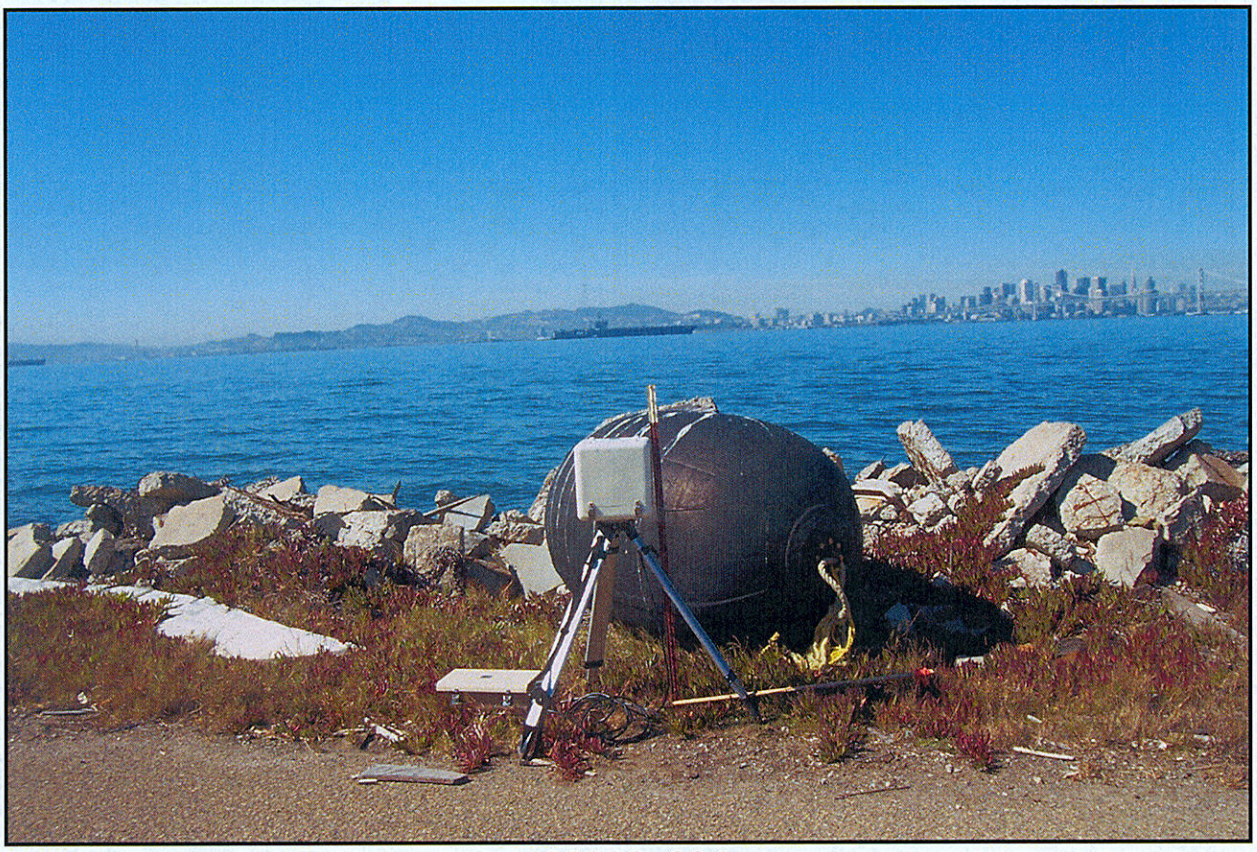
100606_002



100906_001

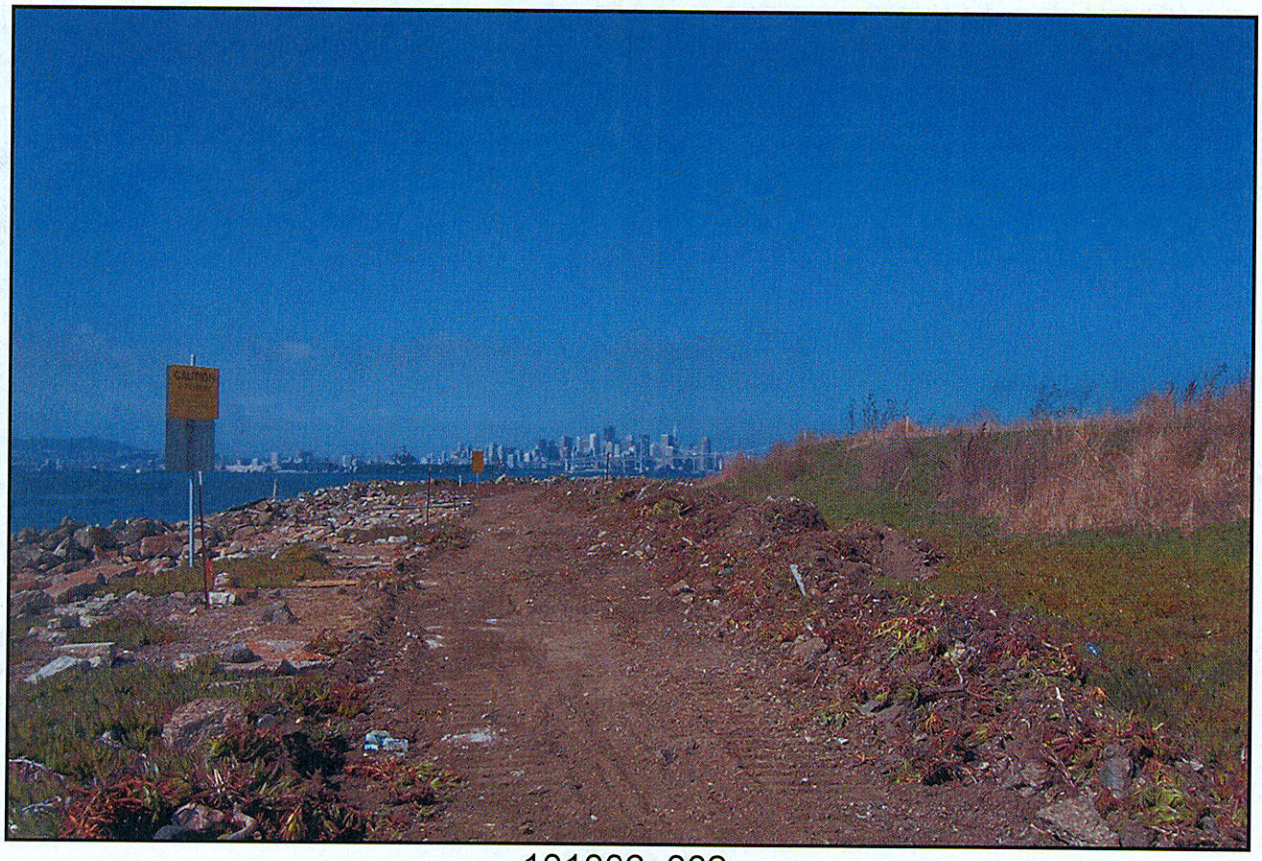
100906_002

100906_003



100906_004

101006_001



101006_002

101006_003

101006_004

101106_001

101106_002

101106_003

101206_001

101206_002

101206_003

101206_004

101306_001

101306_002

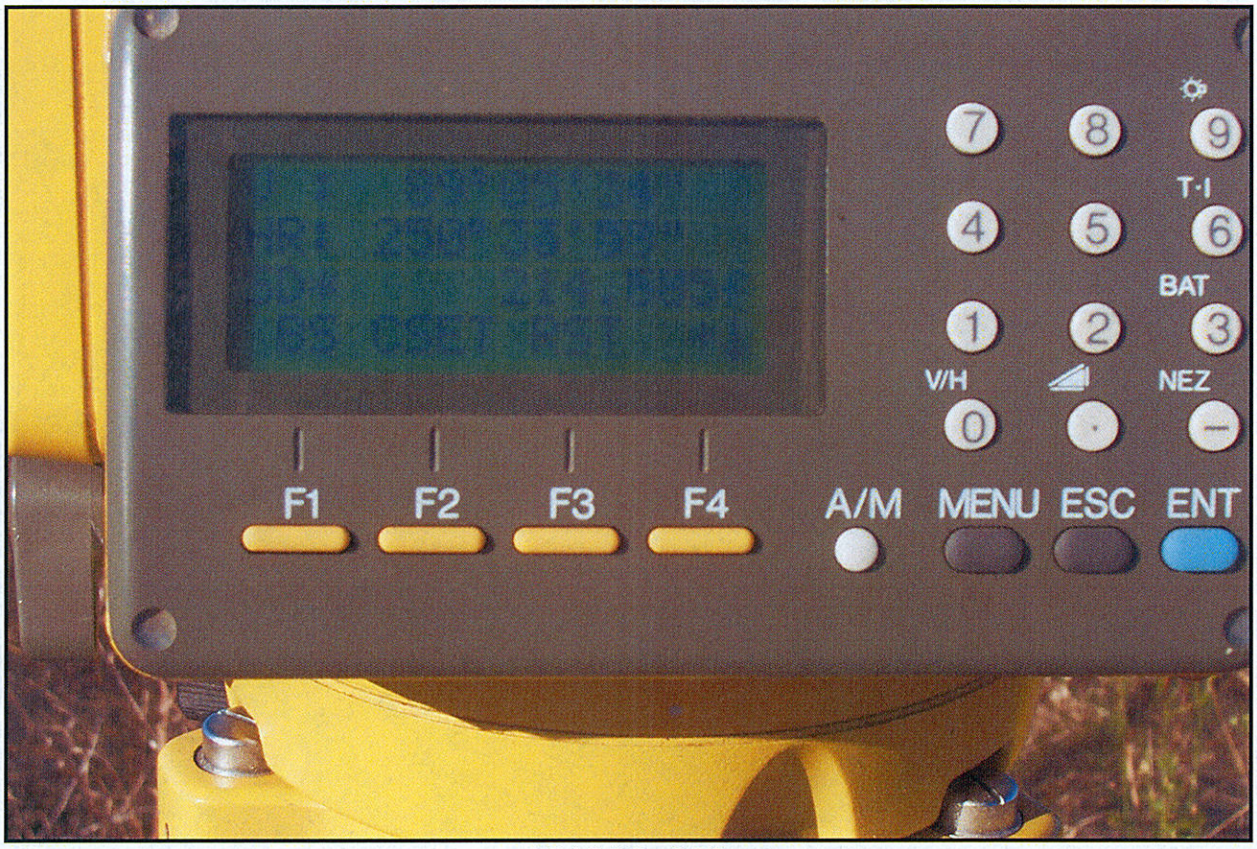
101606_001

101706_001

101706_002

101706_003

101806_001



101806_002

101806_003

101906_001

101906_002

102006_001

102306_001

102306_002

102306_004

102506_002

102506_003

102606_001

103106_001

103106_002

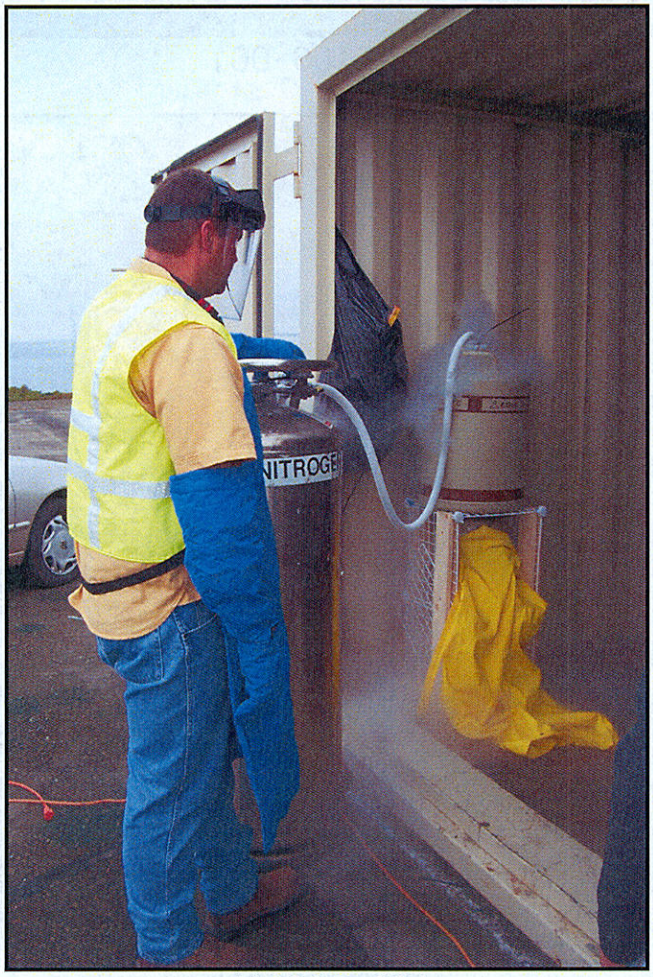
103106_003

103106_004

110106_001

110206_001

110206_002



110306_001

110606_001

110606_002

110606_003

110706_001

110706_002

110906_001

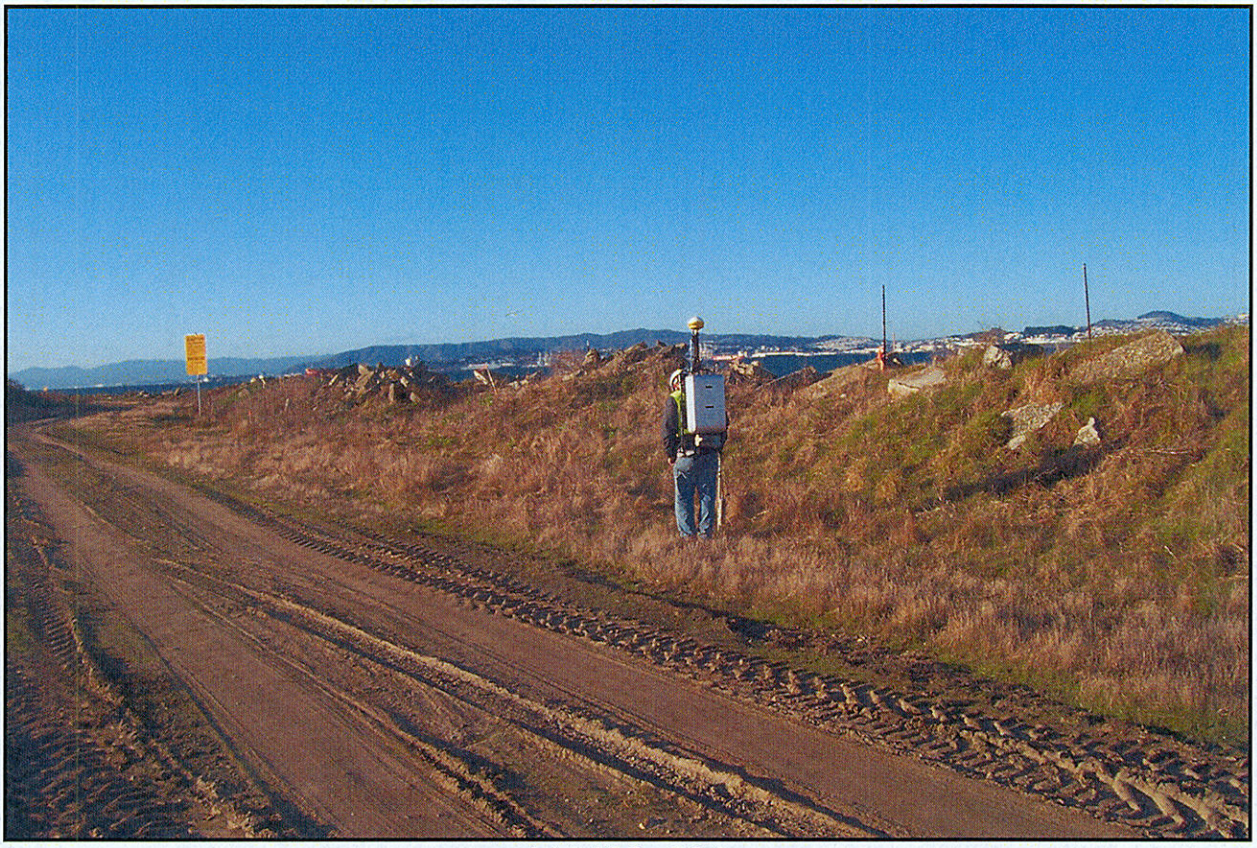
110906_002

110906_003

111306_001

111306_002

111306_003



111406_001

111406_002

111406_003

111406_004

111406_005

111406_006

111406_007

111406_008

111406_009

111506_001

111506_002

111506_003

111506_004

111506_005

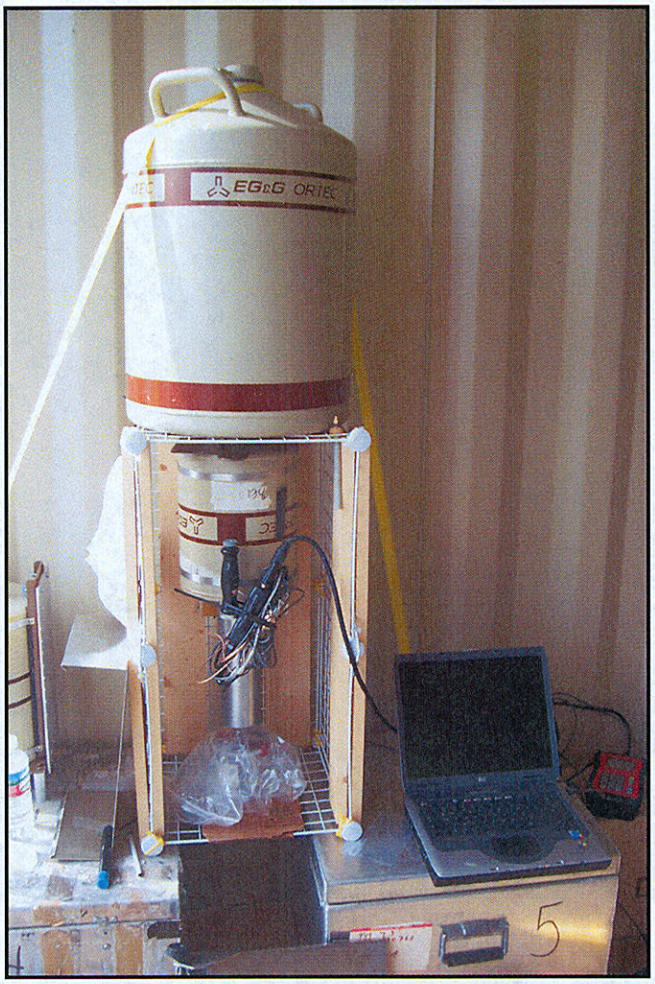
111506_006

111606_001

111606_002

111606_003

111606_004



111706_001

111706_002

111806_001

111806_002

111806_003

APPENDIX H

INSTRUMENT CALIBRATION AND PERFORMANCE CHECK DATA

H.1 INSTRUMENT CALIBRATION RECORDS

H.2 PERFORMANCE CHECK DATA

N00236.002967
ALAMEDA POINT
SSIC NO. 5090.3

APPENDIX H – INSTRUMENT CALIBRATION AND PERFORMANCE CHECK DATA

SECTION H.1 – INSTRUMENT CALIBRATION RECORDS

RADIOLOGICAL CHARACTERIZATION SURVEY REPORT

DATED 28 SEPTEMBER 2007

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 968

Barcode: CMEBD-1056

Barcode: DTEBG-0236

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 461

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEBI-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200		190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			1.99K			1.9 K to 2.1K
800 X 10	7.98K			7.98K			7.6K to 8.4K
200 X 100	19.98K			19.98K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1251 V	1247 V	1246 ± 20V
2250 ±5V	2259 V	2249 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: None

COPY

Calibrated By: Jeff B. [illegible] 8-23-06 Calibration Date 8-23-07 Due for Recalibration

Signatures indicate acceptability of

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 968 N/A ☐

Model: SPA-3 S/N 461 Smart Pack ☐

Barcode: CMEBD-1056

Barcode: DTEBG-0236

M&TE

E-600: S/N — Barcode — Cal. Exp. Date — N/A ☑

Isotope 137CS S/N ZEO 570 Activity 1.48E6 d/m Cert. Date 4-27-06

Source to Detector Geometry

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	8%	6.48K	127.2K	8.2%	5.08K	195.8K	12.9%
2	N/A						
3	N/A						

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: NONE

EBERLINE

Calibrated By

8-23-06
Calibration Date

8-23-07
Due for Recalibration

Reviewed and Approved By

Date AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

EBERLINE E-600 CALIBRATION REPORT - V4.02

AS FOUND

CMEBD-1056/DTEBG-0236

08/23/06 10:11:18

E-600 Serial Number	: 968
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8571
Lower Threshold Intercept	: -0.0952 mV
Lower Threshold Span	: 0.1111 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9222
Upper Threshold Intercept	: -0.7556 mV
Upper Threshold Span	: 0.8193 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

EBERLINE

Conventional Probe Serial Number	: 461
Type	: SPA-3
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 461 continued...

Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 830 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 60.0 mV
Selected Window	: Lower
Lower Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

COPY

CAL968
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1056/DTEBG-0236

AS Left

08/23/06

E-600 Serial Number	: 968
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8810
Lower Threshold Intercept	: -0.1238 mV
Lower Threshold Span	: 0.1405 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9481
Upper Threshold Intercept	: -0.8593 mV
Upper Threshold Span	: 0.9063 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

EBERLINE

Conventional Probe Serial Number	: 461
Type	: SPA-3
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 461
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 811 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

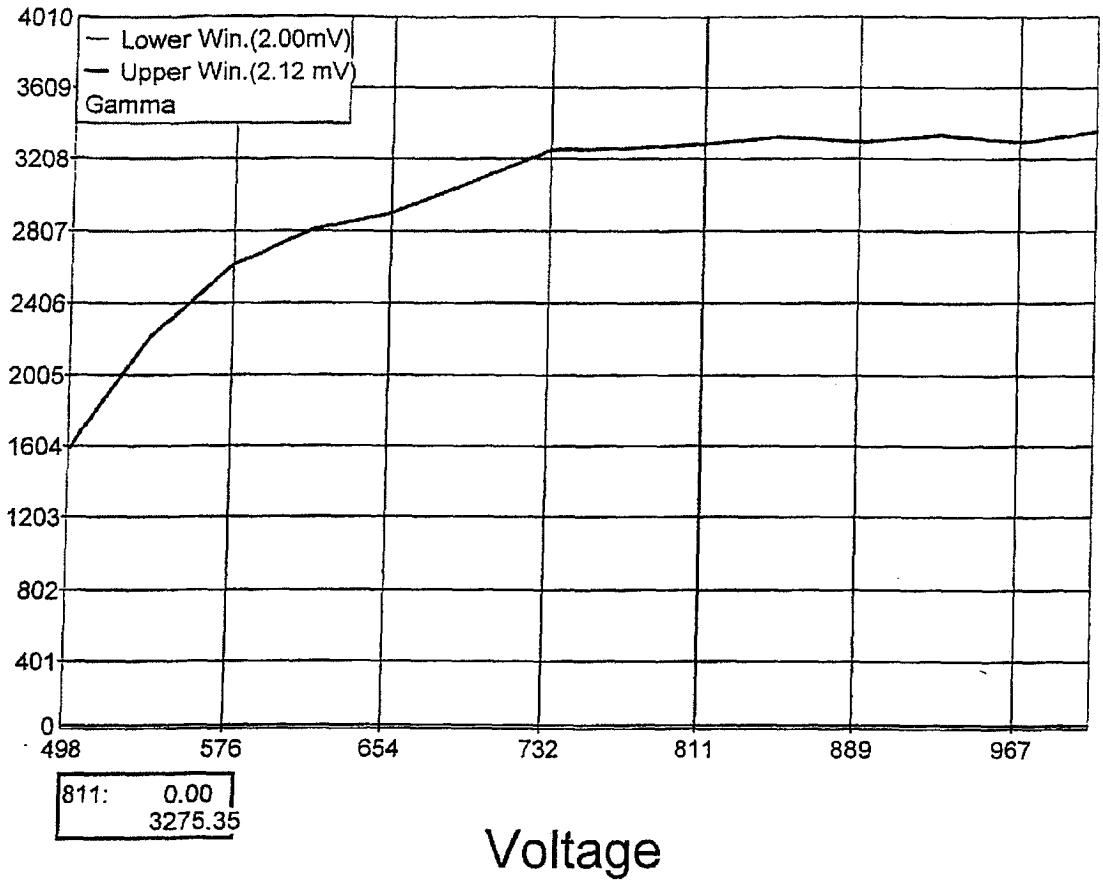
Signature: [signature] Date: 8-23-06

COPY

SPA-3.GRF

08/23/06

461
Voltage Plateau Curve



CMEBD-1056
DTEBG-0236

EBERLINE

COPY

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1089

Barcode: CMEBD-1120

Barcode: DTEBG-0233

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 462

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEB1-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			2.00K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	1.99K			19.97K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] *Midpoint of most commonly used scale: ANSI N323-1978*

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1245 V	1245 V	1246 ± 20V
2250 ±5V	2248 V	2248 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

COPY

nments: NONE

Calibrated By [signature] 8-21-06 Calibration Date 8-21-07 Due for Recalibration

Signatures indicate acceptability of

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1089 N/A ☐

Model: SPA-3 S/N 462 Smart Pack ☐

Barcode: CMEBD-1120

Barcode: DTEBG-0233

M&TE

E-600: S/N — Barcode — Cal. Exp. Date — N/A ☑

Isotope 137Cs S/N IFED 570 Activity 1.48E6 d/m Cert. Date 4-27-06

Source to Detector Geometry Contact

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	14.8%	5.41K	233K	15.4	5.06K	229K	15.1%
2	N/A						
3	N/A						

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

EBERLINE

Comments: None

Calibrated By

8-21-06
Calibration Date

8-21-07
Due for Recalibration

Reviewed and Approved By

Date AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

CAL1089

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1120/DTEBG-0233

08/21/06

E-600 Serial Number	: 1089
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/21/06 to 08/21/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8810
Lower Threshold Intercept	: -0.1905 mV
Lower Threshold Span	: 0.2162 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9556
Upper Threshold Intercept	: -0.8889 mV
Upper Threshold Span	: 0.9302 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 462
Type	: SPA-3
Calibration Date/Due Date	: 08/21/06 to 08/21/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 462

Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 947 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

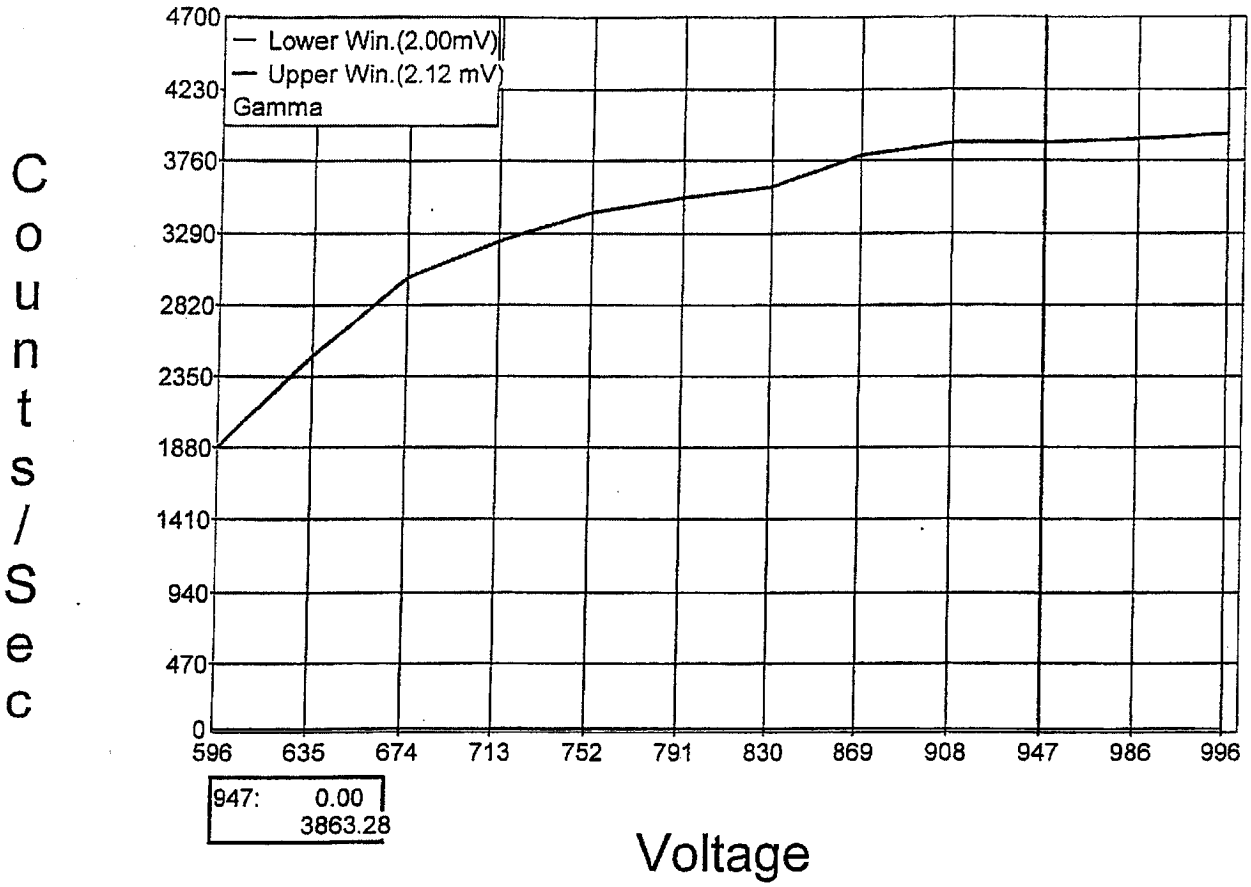
Cable Length: -96 inches

Signature: [illegible] Date: 8-21-06

COPY

462

Voltage Plateau Curve



EBERLINE

CMEBD-1120
DTEBG-0233

COPY

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1041

Barcode: CMEBD-1123

Barcode: DTEBG-0244

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 66574

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEBI-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

EBERLINE

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			1.99K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	19.99K			19.98K			19K to 21K
800 X 100	79.8K			79.9K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	798K	798K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

COPY

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1294 V	1249 V	1246 ± 20V
2250 ±5V	2321 V	2242 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: NONE

Calibrated By [signature] 8/22/06 Calibration Date 8/22/07 Due for Recalibration

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1041 N/A ☐

Model: SPA-3 S/N 66574 Smart Pack ☐

Barcode: CMEBD-1123

Barcode: DTEBG-0244

M&TE

E-600: S/N ——— Barcode ——— Cal. Exp. Date ——— N/A ☑

Isotope 137Cs S/N IT-ED 510 Activity 1.78E6 dpm Cert. Date 4-27-06

Source to Detector Geometry Contact

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	15.4%	10.14K	240K	15.5%	5.26K	233K	15.4%
2							
3							

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: NONE

EBERLINE

COPY

Calibrated By

8/22/06
Calibration Date

8/22/07
Due for Recalibration

Reviewed and Approved By

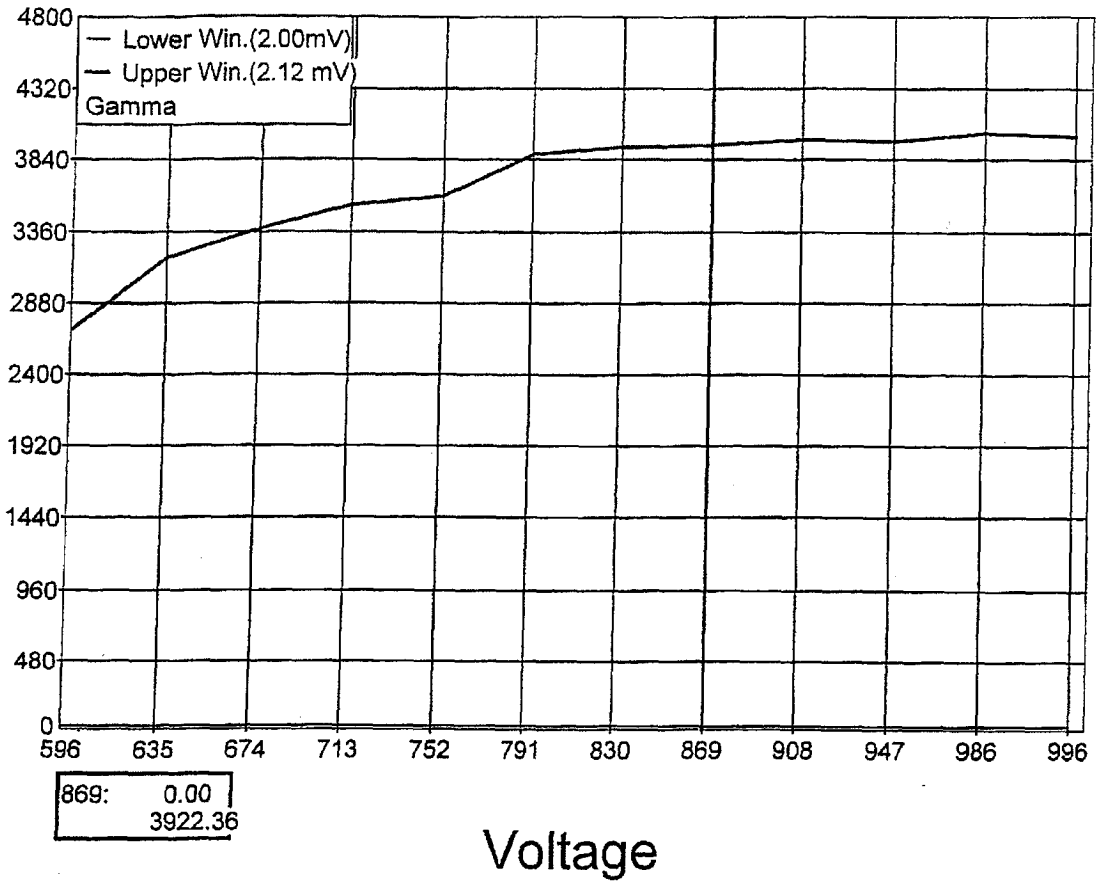
Date AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

SPA-3.GRF

08/22/06

66574
Voltage Plateau Curve



CMEBD-1123
DTEBG-0244

EBERLINE

COPY

AS FOUND

EBERLINE

CAL1041
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1123/DTEBG-0244

08/22/06

E-600 Serial Number	: 1041
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8810
Lower Threshold Intercept	: -0.1238 mV
Lower Threshold Span	: 0.1405 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9556
Upper Threshold Intercept	: -0.8889 mV
Upper Threshold Span	: 0.9302 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 66574
Type	: SPA-3
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 66574
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 869 Vdc
Lower Threshold	: 0.0667 mV
Upper Threshold	: 5.33 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

COPY

Cable Length: 100 inches

Signature: [signature] Date: 8-22-06

CAL1041

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1123/DTEBG-0244

EBERLINE

As Left

08/22/06

E-600 Serial Number	: 1041
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8810
Lower Threshold Intercept	: -0.1238 mV
Lower Threshold Span	: 0.1405 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9556
Upper Threshold Intercept	: -0.8889 mV
Upper Threshold Span	: 0.9302 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 66574
Type	: SPA-3
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 66574

Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 850 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

COPY

Cable Length: 60 inches

Signature: [signature] Date: 8-22-06

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5

EBERLINE

Eberline Model E-600 SN 1052

Barcode: CMEBD-1135

Barcode: DTEBG-0241

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 015040

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEB1-0004 Cal. Expires 4/07

DMM: Model Fluke 77 Barcode MMFLB-0061 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			1.99K			1.9 K to 2.1K
800 X 10	7.99K			7.98K			7.6K to 8.4K
200 X 100	19.96K			19.99K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	798K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1283 V	1250 V	1246 ± 20V
2250 ±5V	−2309 V	2249 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: E-600 calibration expired 9/03. Previously meter/detector not calibrated together.

Calibrated By — Calibration Date 8-24-06 — Due for Recalibration 8-24-07

Reviewed and Approved By/Date

Signatures indicate acceptability of calibration data as recorded above.

EBERLINE

CAL1052
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1135/DTEBG-0241

08/24/06

E-600 Serial Number	: 1052
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/24/06 to 08/24/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8333
Lower Threshold Intercept	: -0.1333 mV
Lower Threshold Span	: 0.1600 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.8963
Upper Threshold Intercept	: -0.6519 mV
Upper Threshold Span	: 0.7273 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 15040
Type	: SPA-3
Calibration Date/Due Date	: 08/24/06 to 08/24/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 15040
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 732 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

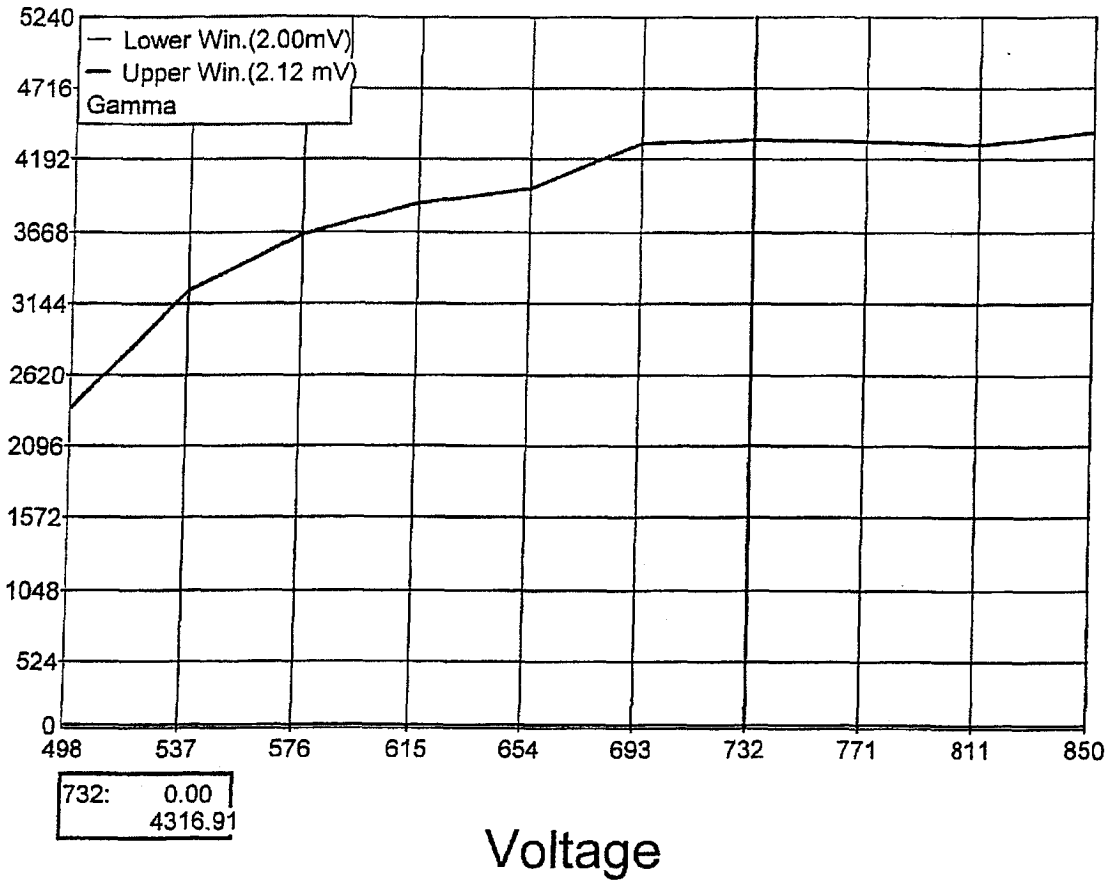
Cable Length: 60 inches

Signature: [illegible] Date: 8-24-06

SPA-3.GRF

08/24/06

15040
Voltage Plateau Curve



QMEBD-1135
DTEBG-0241

BERLINE

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1052 N/A ☐

Model: SPA-3 S/N 015040 Smart Pack ☐

Barcode: CMEBD-1135

Barcode: DTEBG-0241

M&TE

E-600: S/N — Barcode — Cal. Exp. Date — N/A ☑

Isotope 137Cs S/N DEO510 Activity 1.48E6 d/m Cert. Date 4-27-06

Source to Detector Geometry Contact

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	N/A				5.44K	255K	16.9%
2	N/A						
3	N/A						

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: None

BERLIN

Calibrated By

8-24-06
Calibration Date

8-24-07
Due for Recalibration

Reviewed and Approved By

Date AUG 24 2006

Signatures indicate acceptability of calibration data as recorded above.

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1068

Barcode: CMEBD-1141

Barcode: DTEBG-0238

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 760

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MPZ Barcode PGEB1-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			2.00K			1.9 K to 2.1K
800 X 10	7.95K			7.96K			7.6K to 8.4K
200 X 100	19.96K			19.99K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

COPY

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	-1248 V	1248 V	1246 ± 20V
2250 ±5V	2250 V	2250 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: None

Calibrated By [signature] 8-23-06 Calibration Date 8-23-07 Due for Recalibration

Signatures indicate acceptability of

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1068 N/A ☐

Model: SPA-3 S/N 760 Smart Pack ☐

Barcode: CMEBD-1141

Barcode: DTEBG-0238

M&TE

E-600: S/N — Barcode — Cal. Exp. Date — N/A ☑

Isotope 137Cs S/N BE0510 Activity 1.48E6 d/m Cert. Date 4-27-06

Source to Detector Geometry Contact

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	14%	6.57K	208K	13.6%	5.31K	206K	13.6%
2	N/A						
3	N/A						

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: NONE

COPY

Calibrated By

8-23-06
Calibration Date

8-23-07
Due for Recalibration

Reviewed and Approved By

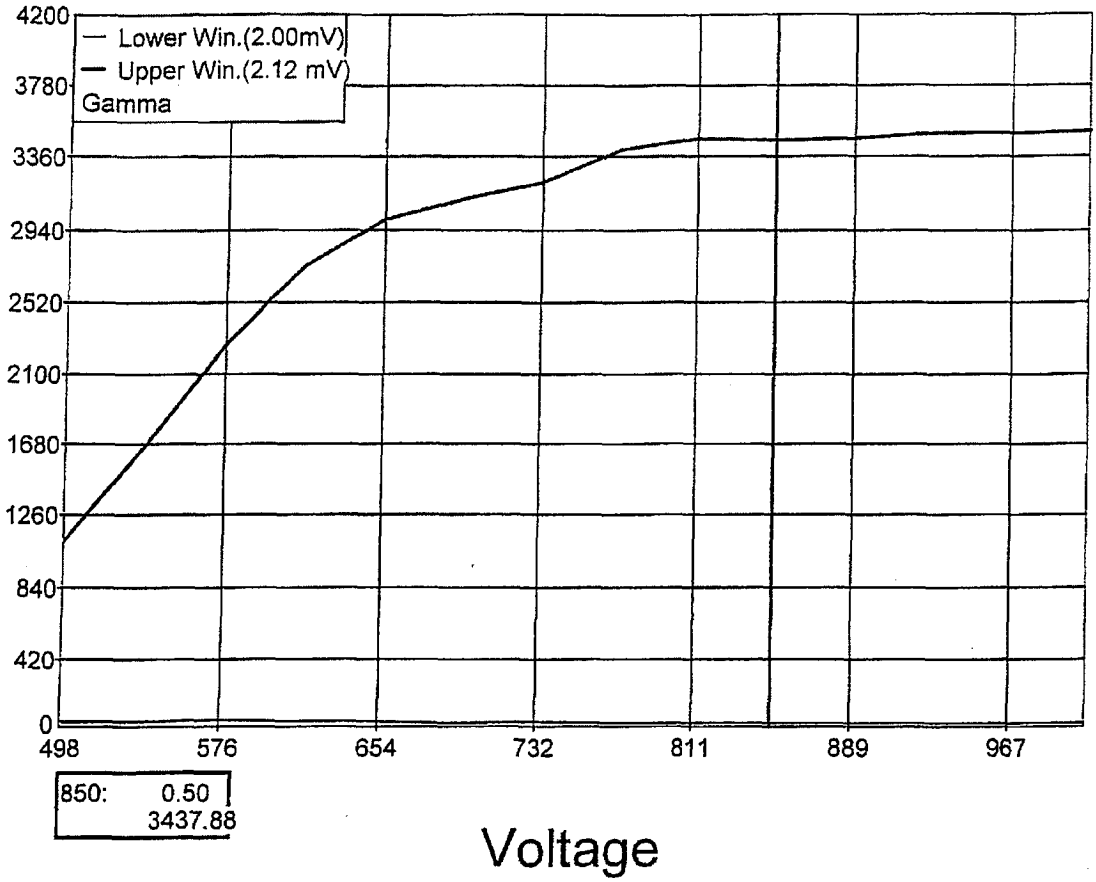
Date AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

SPA-3.GRF

08/23/06

760
Voltage Plateau Curve



EBERLINE

CMEBD-1141
DTEBG-0238

COPY

CAL1068

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1141/DTEBG-0238

AS FOUND

08/23/06 07:07:33

E-600 Serial Number	: 1068
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.9286
Lower Threshold Intercept	: -0.1143 mV
Lower Threshold Span	: 0.1231 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9889
Upper Threshold Intercept	: -0.7556 mV
Upper Threshold Span	: 0.7641 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Disabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

EBERLINE

Conventional Probe Serial Number	: 720
Type	: SPA-3
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Page 2

Probe SPA-3 720 continued...

Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 791 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 60.0 mV
Selected Window	: Lower
Lower Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

COPY

Cable Length: 84 inches

Signature: [signature] Date: 8-23-06

As Left

CAL1068
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1141/DTEBG-0238

08/23/06

E-600 Serial Number	: 1068
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8810
Lower Threshold Intercept	: -0.1238 mV
Lower Threshold Span	: 0.1405 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9407
Upper Threshold Intercept	: -0.5630 mV
Upper Threshold Span	: 0.5985 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

EBERLINE

Conventional Probe Serial Number	: 720 6 gs 8-23-06
Type	: SPA-3
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 760
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 850 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

COPY

Cable Length: 84 inches

Signature: [signature] Date: 8-23-06

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1050

Barcode: CMEBD-1156

Barcode: DTEBG-0237

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 521

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEB1-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			1.99K			1.9 K to 2.1K
800 X 10	7.99K			8.00K			7.6K to 8.4K
200 X 100	19.95K			19.95K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1245 V	1245 V	1246 ± 20V
2250 ±5V	2254 V	2254 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: NONE

Calibrated By — Calibration Date 8-23-06 — Due for Recalibration 8-23-07

Reviewed and Approved By/Date

Signatures indicate acceptability of calibration data as recorded above.

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1086 N/A ☐

Model: SPA-3 S/N 521 Smart Pack ☐

Barcode: CMEBD-1156

Barcode: DTEBG-0237

M&TE

E-600: S/N ——— Barcode ——— Cal. Exp. Date ——— N/A ☑

Isotope 137Cs S/N IT-E0 510 Activity 1.48E6 d/m Cert. Date 4-27-06

Source to Detector Geometry Contact

Channel #	Eff. From Prev. Cal.	As-Found (DTEBG-0239)			As-Left (DTEBG-0237)		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	12.3%	4.99K	187.7K	12.4%	5.30K	207K	13.6%
2	N/A						
3	N/A						

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: Detector DTEBG-0239 returned to Thermo Eberline due to diminished resolution.

EBERLINE

Calibrated By

8-23-06
Calibration Date

8-23-07
Due for Recalibration

Reviewed and Approved By

Date AUG 24 2006

Signatures indicate acceptability of calibration data as recorded above.

CAL1080

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1156/DTEBG-0237

08/23/06

E-600 Serial Number	: 1080
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8571
Lower Threshold Intercept	: -0.1619 mV
Lower Threshold Span	: 0.1889 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9296
Upper Threshold Intercept	: -0.7852 mV
Upper Threshold Span	: 0.8447 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 521
Type	: SPA-3
Calibration Date/Due Date	: 08/23/06 to 08/23/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 521

Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 820 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

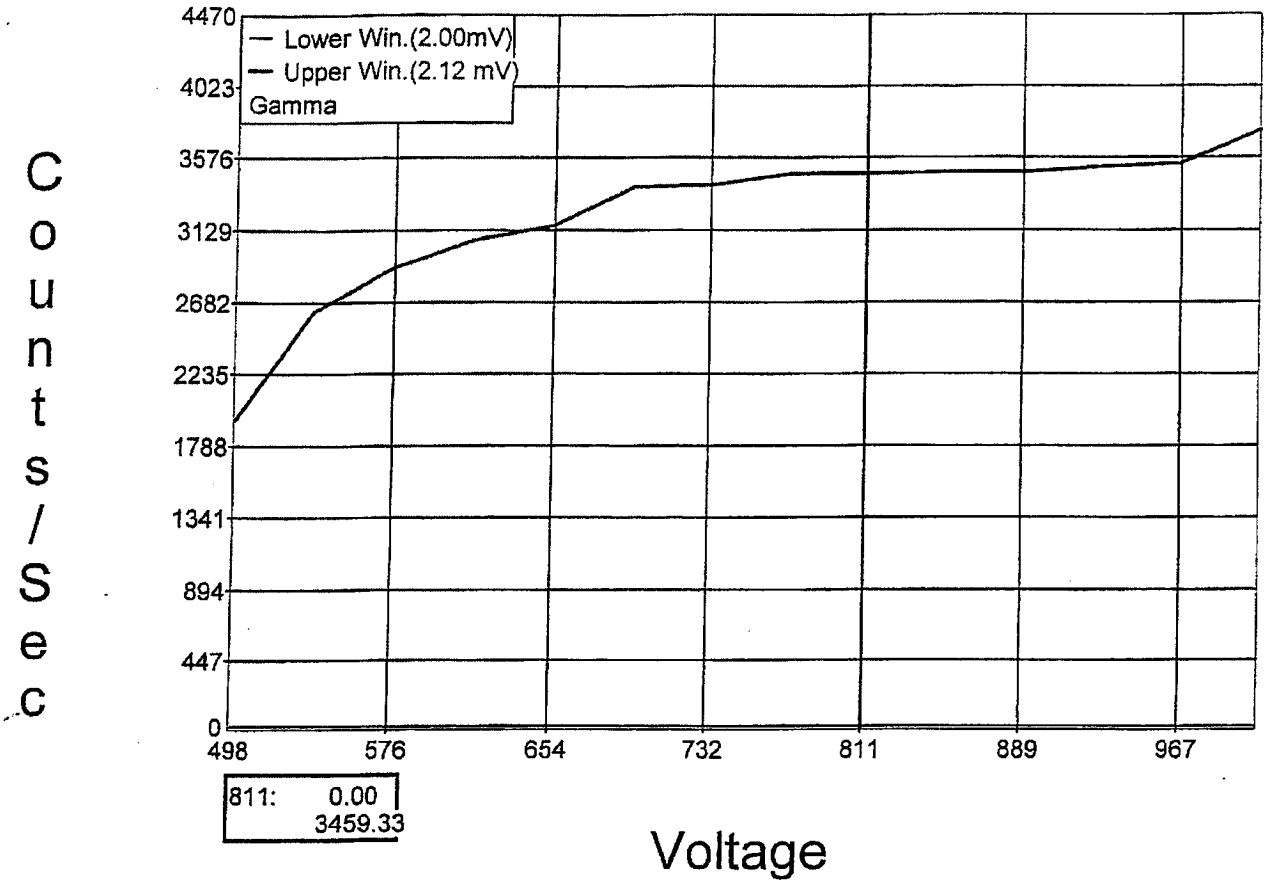
Cable Length: 60 inches

Signature: [signature] Date: 8-23-06

SPA-3.GRF

08/23/06

521
Voltage Plateau Curve



CMEBD-1156
DTEBG-0237

EBERLINE

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1213

Barcode: CMEBD-1239

Barcode: DTEBG-0240

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 467623

CALIBRATION STANDARDS:

Pulser Mft/Model Eberline MD2 Barcode ~~Eberline~~ PGEB1-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFLB-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			1.99K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	19.95K			19.97K			19K to 21K
800 X 100	79.8K			79.9K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

COPY

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	-1254 V	1254 V	1246 ± 20V
2250 ±5V	2259 V	2259 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: NONE

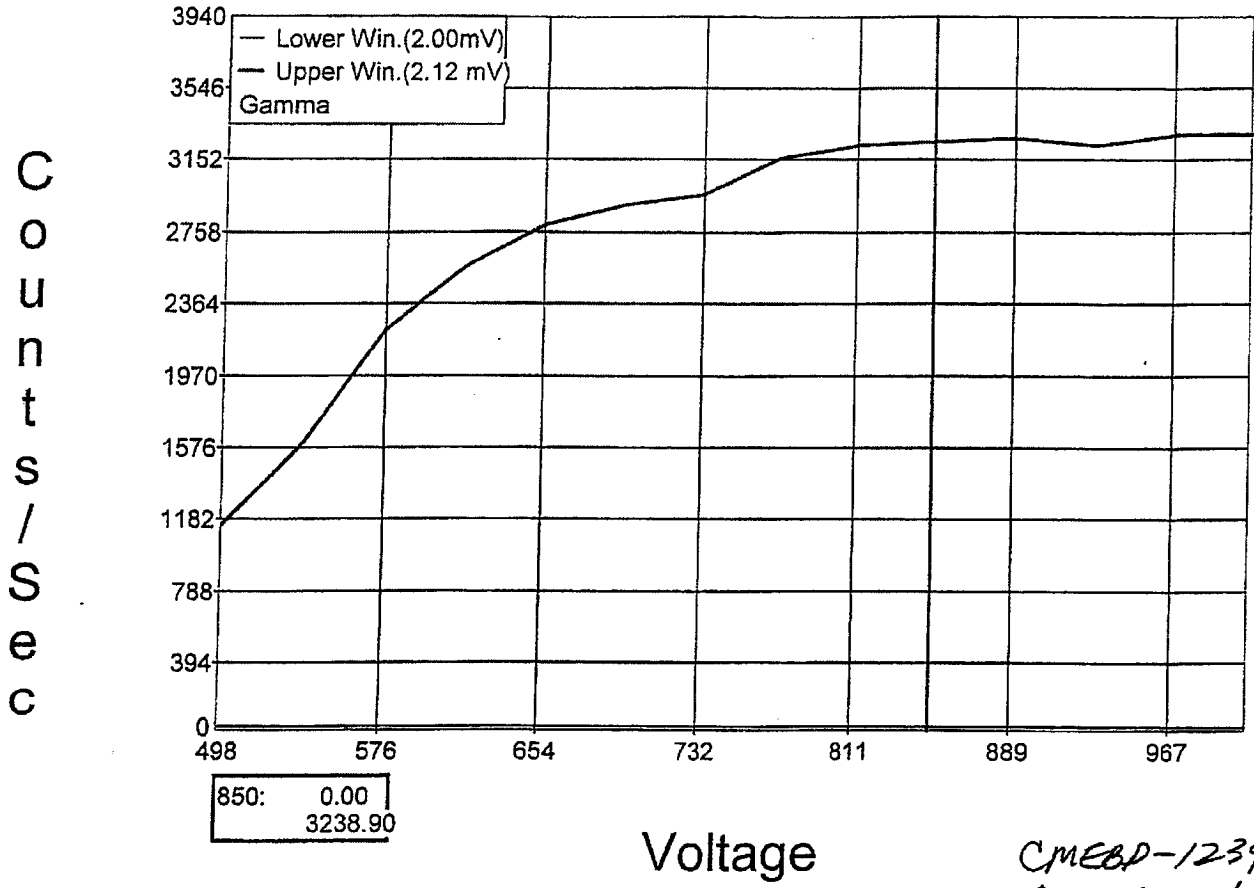
Calibrated By [signature] Calibration Date 8-22-06 Due for Recalibration 8-22-07

Signatures indicate acceptability of

SPA-3.GRF

08/21/06

1239
Voltage Plateau Curve



CMEBD-1239
DTEBG-0240

IBERLINE

COPY

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1213 N/A ☐

Model: SPA-3 S/N 623 Smart Pack ☐

Barcode: CMEBD-1239

Barcode: DTEBG-0240

M&TE

E-600: S/N — Barcode — Cal. Exp. Date — N/A ☑

Isotope 137CS S/N IFED 570 Activity 1.48E6 d/m Cert. Date 4-27-06

Source to Detector Geometry

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	13%	5.17K	196.7K	12.9%	5.27K	195.0K	12.8%
2	N/A						
3	N/A						

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: NONE

Calibrated By

8-22-06
Calibration Date

8-22-07
Due for Recalibration

Reviewed and Approved By

Date AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

CAL1213
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1239/DTEBG-0240

08/22/06

E-600 Serial Number	: 1213
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8571
Lower Threshold Intercept	: -0.0952 mV
Lower Threshold Span	: 0.1111 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9556
Upper Threshold Intercept	: -0.8889 mV
Upper Threshold Span	: 0.9302 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 623
Type	: SPA-3
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 623
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 850 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

Signature: Jeff Brady Date: 8-22-06

COPY

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1206

Barcode: CMEBD-1242

Barcode: DTEBG-0224

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model Eberline SPA-3 SN 3874205

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEB1-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			2.00K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	19.97K			19.96K			19K to 21K
800 X 100	79.8K			79.9K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	798K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1246 V	1247 V	1246 ± 20V
2250 ±5V	2248 V	2248 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

mments: NONE

COPY

Calibrated By: [signature] 8/23/06

8-22-06 Calibration Date

8-22-07 Due for Recalibration

Signatures indicate acceptability of

SODIUM IODIDE FOR USE WITH E-600 CALIBRATION PROCEDURE DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5

Procedure: 3.9.8 Issued: 05/01 Supersedes: 02/00 Rev.2, Page 1 of 1

E-600: S/N 1206 N/A ☐

Model: SPA-3 S/N 3874225 Smart Pack ☐

Barcode: CMEBD-1242

Barcode: DTEBG-0224

M&TE

E-600: S/N — Barcode — Cal. Exp. Date — N/A ☑
Isotope 137Cs S/N IFED 510 Activity 1.48E6d/m Cert. Date 4-27-06

Source to Detector Geometry Contact

Channel #	Eff. From Prev. Cal.	As-Found			As-Left		
		Bkg, cpm	Gross, cpm	Eff.	Bkg, cpm	Gross, cpm	Eff.
1	11.1%	4.87K	170.3K	11.2	4.76K	173.0K	11.4%
2							
3							

NOTES: **An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.**

Comments: None

EBERLINE

Calibrated By

8-22-06
Calibration Date

8-22-07
Due for Recalibration

Reviewed and Approved By
Date AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

CAL1206
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1242/DTEBG-0224

As left

08/22/06

E-600 Serial Number	: 1206
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8571
Lower Threshold Intercept	: -0.0952 mV
Lower Threshold Span	: 0.1111 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9407
Upper Threshold Intercept	: -0.9630 mV
Upper Threshold Span	: 1.02 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

EBERLINE

Conventional Probe Serial Number	: 3874205
Type	: SPA-3
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 3874205
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 811 Vdc
Lower Threshold	: 2.00 mV
Upper Threshold	: 2.12 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 10 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

Signature: [illegible] Date: 8-22-06

COPY

CAL1206
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1242/DTEBG-0224

08/22/06

AS FOUND

E-600 Serial Number	: 1206
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8571
Lower Threshold Intercept	: -0.0952 mV
Lower Threshold Span	: 0.1111 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9407
Upper Threshold Intercept	: -0.9630 mV
Upper Threshold Span	: 1.02 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

EBERLINE

Conventional Probe Serial Number	: 3874205
Type	: SPA-3
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 20.0 usec
Surface Area	: 20.0 cm2
Max High Voltage	: 1600 Vdc
Overrange	: 48000 cps

Probe SPA-3 3874205
Channel 1

Channel Type	: Gamma
Rate Units	: cpm
Response Times	: 20,10,3 secs
High Voltage	: 752 Vdc
Lower Threshold	: 0.1333 mV
Upper Threshold	: 4.13 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

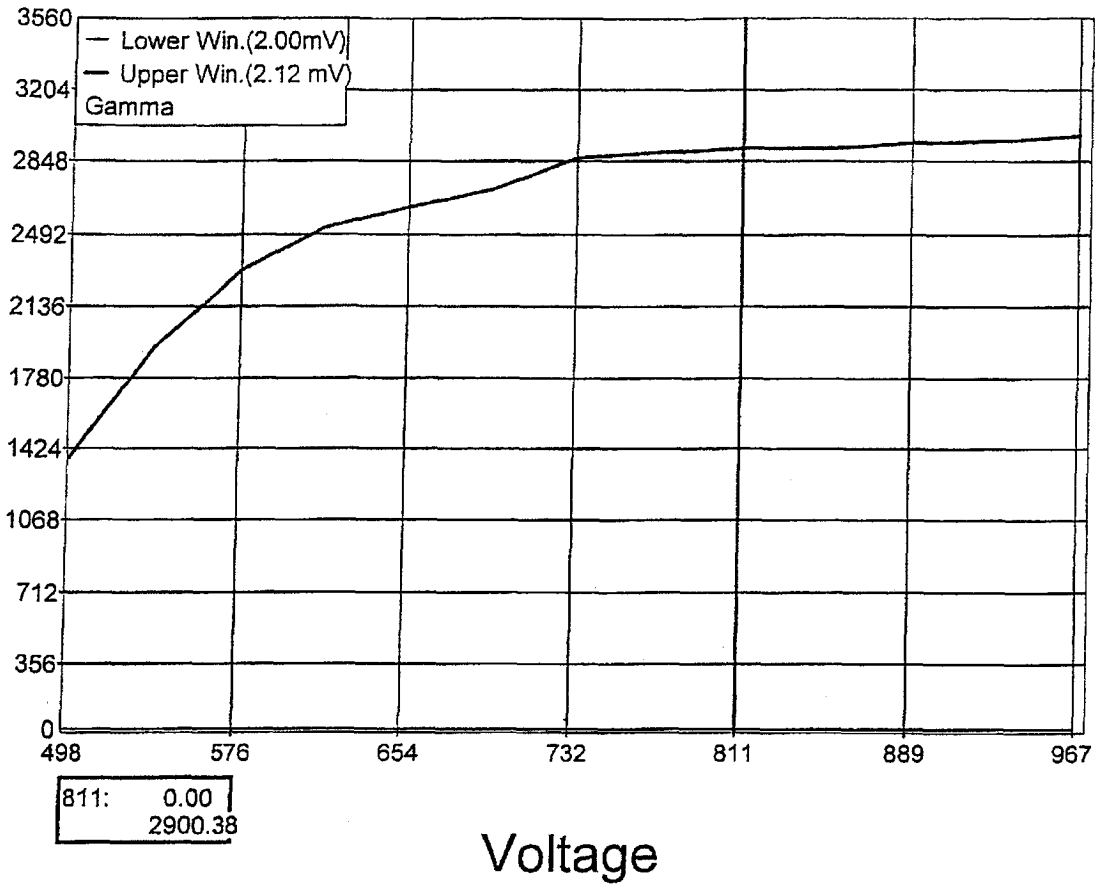
Signature: [illegible] Date: 8-22-06

COPY

SPA-3.GRF

08/22/06

0224
Voltage Plateau Curve



EBERLINE

CMEBD-1242
DTEBG-0224

COPY

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1014

Barcode: CMEBD-1127

Barcode: N/A

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model N/A SN N/A

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEBI-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	2.00K			1.99K			1.9 K to 2.1K
800 X 10	7.99K			7.98K			7.6K to 8.4K
200 X 100	19.96K			19.97K			19K to 21K
800 X 100	79.8K			79.9K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	798K	798K	799K	798K	798K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☐ yes ☑ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1252 V	1251 V	1246 ± 20V
2250 ±5V	2252 V	2245 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

nments: Audio inoperative. Customer will accept in this cond. from. See attached e-mail. Will be used with SHP380AB.

Calibrated By [signature] 8/23/06

8-22-06 Calibration Date

8-22-07 Due for Recalibration

COPY

Signatures indicate acceptability of

CAL1014

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1127

08/22/06

E-600 Serial Number	: 1014
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.9048
Lower Threshold Intercept	: -0.1524 mV
Lower Threshold Span	: 0.1684 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9815
Upper Threshold Intercept	: -0.7259 mV
Upper Threshold Span	: 0.7396 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 0
Type	: HP 360
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 100 usec
Surface Area	: 15.0 cm2
Max High Voltage	: 900 Vdc
Overrange	: 58000 cps

Probe HP 360 0

Channel 2

Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 898 Vdc
Lower Threshold	: 5.00 mV
Upper Threshold	: 10.1 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

Signature: [signature] Date: 8-22-06

COPY

Breault, Jeff J CMEBD-1127

From: bdickenson@eberlineservices.com
Sent: Tuesday, August 22, 2006 9:56 AM
To: james.breault@pnl.gov
Subject: E600 audible

James,

I understand that an E600 you are calibrating has a problem with the audible. We do not use the audible at all. The E600 is wired into our computer logging system. The system itself has an audible alarm limit. It is ok to calibrate it without the audible.

Bob Dickenson
Lead RCT
Eberline Services Inc.

EBERLINE

COPY

EBERLINE SHP-380A(B) DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5

Procedure: 3.9.6 Issued: 06/06 Supersedes: 12/01 Rev.6.1, Page 1 of 2

~~(Circle One)~~ SHP380AB or SHP380A SN 856

Barcode: DTEBY- 1686

Calibration Standards Eberline E-600 SN 1603 Cal. Expires 08/06

Isotope	Barcode	Activity	Cal. Exp. Date
^{90}Sr(Y)	SRAM7-0003	91,800 dpm	04/07
^{239}Pu	SRAM7-0001	52,900 dpm	04/07
^{137}Cs	SRAM7-0004	90,500 dpm	04/07

EBERLINE

AS-FOUND

Isotope	Background (Channel)	Gross, cpm	Efficiency	Previous Efficiency	HV
^{90}Sr(Y)	197 β	20.8K	22.4	—	635
^{239}Pu	1 α	5.72K	10.8	—	635

RADIOLOGICAL CALIBRATION Source/Detector Distance 1/4 inch HV 645

Isotope	Activity (dpm)	Gross count rate (cpm) α Ch.	Gross count rate (cpm) β Ch.	Efficiency 100*(cpm/dpm)	Acceptance Criteria	
Background		2	192		150 to 350 cpm β, ≤ 3 cpm α	
					Rugged Window*	Regular Window
^{90}Sr(Y)	91,800	156	21.3K	23 β	≥ 15% β	≥ 20% β, ≤ 0.2% α
^{137}Cs	90,500	61	16.33K	18 β	≥ 10% β	≥ 15% β
^{239}Pu	52,900	6.10K	1.85K	12 α	≥ 10% α	≥ 10% α
				α or β		

Disabled Channels: 1 ☐ 2 ☐ 3 ☐ None ☑

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10%.

Comments: NA

*Minimum efficiency for beta-only probes with rugged windows have tyvek, extra screen or other material to protect window. Alpha cross talk is not a concern for these type detectors since they are calibrated for beta only and only use one channel.

A. Utter — Calibrated By

8/21/06 — Calibration Date

8/21/07 — Due for Recalibration

Reviewed and Approved By Date

AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

CAL1603.TXT

EBERLINE E-600 CALIBRATION REPORT - V4.02

DTEBY-1686

08/21/06 11:42:13 Probe Only

E-600 Serial Number	: 1603
Smart Probe Serial Number	: 856
Type	: SHP380AB
Calibration Date/Due Date	: 08/21/06 to 08/21/07
Dead Time	: 8.00 usec
Surface Area	: 100 cm2
Max High Voltage	: 1000 Vdc
Overrange	: 80000 cps
Channel 1	
Channel Type	: Alpha
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0
Channel 2	
Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Lower
Lower Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0
Channel 3	
Channel Type	: Alpha/Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Both
Lower Cal. Constant	: 1.00 counts/count
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

EBERLINE

Cable Length: 30 inches

Signature: [illegible] Date: 8/21/06

COPY

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 966

Barcode: CMEBD-1066

Barcode: N/A

Conventional Channel Calibrated With: Pancake GM ☑ Other ☐

If other is checked, Model N/A SN N/A

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEB1-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Stat ok gs 8-22-

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			2.00K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	19.99K			19.96K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	798K	799K	799K	798K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1256 V	1251 V	1246 ± 20V
2250 ±5V	2258 V	2250 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than 40 volts from the displayed value corresponding to a >20% reduction in radiological response.

nments: Cal expired 4-23-03, Will be used with SHP380AB.

COPY

Calibrated By [signature] 8-22-06 Calibration Date 8-22-07 Due for Recalibration

Signatures indicate acceptability of

CAL966

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1066

08/22/06

E-600 Serial Number	: 966
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8810
Lower Threshold Intercept	: -0.1238 mV
Lower Threshold Span	: 0.1405 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9444
Upper Threshold Intercept	: -0.8444 mV
Upper Threshold Span	: 0.8941 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Disabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: Yes
Ignore Probe Cal. Date	: Yes
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 0
Type	: HP 360
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 100 usec
Surface Area	: 15.0 cm2
Max High Voltage	: 900 Vdc
Overrange	: 58000 cps

Probe HP 360 0

Channel 2

Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 898 Vdc
Lower Threshold	: 5.00 mV
Upper Threshold	: 10.1 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

Signature: [signature] Date: 8-22-06

EBERLINE

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EBERLINE SHP-380A(B) DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5

(Circle One) SHP380AB or SHP380A SN 433

Barcode: DTEBY- 1577

Calibration Standards Eberline E-600 SN 1603 Cal. Expires 08/06

Isotope	Barcode	Activity	Cal. Exp. Date
^{90}Sr(Y)	SRAM7-0003	91,800 dpm	04/07
^{239}Pu	SRAM7-0001	52,900 dpm	04/07
^{137}Cs	SRAM7-0004	90,500 dpm	04/07

EBERLINE

AS-FOUND

Isotope	Background (Channel)	Gross, cpm	Efficiency	Previous Efficiency	HV
^{90}Sr(Y)	182 β	18.54K	19.9	—	635
^{239}Pu	2 α	5.54K	10.4	—	635

RADIOLOGICAL CALIBRATION Source/Detector Distance 1/4 inch HV 654

Isotope	Activity (dpm)	Gross count rate (cpm) α Ch.	Gross count rate (cpm) β Ch.	Efficiency 100*(cpm/dpm)	Acceptance Criteria	
Background		0	227		150 to 350 cpm β, ≤ 3 cpm α	
					Rugged Window*	Regular Window
^{90}Sr(Y)	91,800	92	20.5K	22 β	≥ 15% β	≥ 20% β, ≤ 0.2% α
^{137}Cs	90,500	26	15.17K	17 β	≥ 10% β	≥ 15% β
^{239}Pu	52,900	5.96K	2.20K	11 α	≥ 10% α	≥ 10% α
				α or β		

Disabled Channels: 1 ☐ 2 ☐ 3 ☐ None ☑

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10%.

Comments: NA

*Minimum efficiency for beta-only probes with rugged windows have tyvek, extra screen or other material to protect window. Alpha cross talk is not a concern for these type detectors since they are calibrated for beta only and only use one channel.

A. Uttke — Calibrated By

8/21/06 — Calibration Date

8/21/07 — Due for Recalibration

Reviewed and Approved By Date

AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

CAL1603.TXT
EBERLINE E-600 CALIBRATION REPORT - V4.02

DTEBy-1577

08/21/06 12:57:01 Probe Only

E-600 Serial Number	: 1603
Smart Probe Serial Number	: 433
Type	: SHP380AB
Calibration Date/Due Date	: 08/21/06 to 08/21/07
Dead Time	: 8.00 usec
Surface Area	: 100 cm2
Max High Voltage	: 1000 Vdc
Overrange	: 80000 cps
Channel 1	
Channel Type	: Alpha
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 654 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0
Channel 2	
Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 654 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Lower
Lower Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0
Channel 3	
Channel Type	: Alpha/Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 654 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Both
Lower Cal. Constant	: 1.00 counts/count
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

EBERLINE

Cable Length: 30 inches

Signature: Alice Utter Date: 8/21/06

COPY

EBERLINE

EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563

Project # 98106:06 File Class: T6.5

Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 1262

Barcode: CMEBD-1596

Barcode: N/A

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑

If other is checked, Model N/A SN N/A

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEBI-0002 Cal. Expires 11/06

DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06

Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	2.00K			1.99K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	19.98K			19.96K			19K to 21K
800 X 100	79.9K			79.9K			76K to 84K
200 X 1K	199.8K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	800K	800K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1255 V	1253 V	1246 ± 20V
2250 ±5V	2258 V	2250 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: Will be used with Eberline SHP380AB.

COPY

Calibrated By [signature] 8-22-06 Calibration Date 8-22-07 Due for Recalibration

Signatures indicate acceptability of

CAL1262

EBERLINE E-600 CALIBRATION REPORT - V4.02

CMEBD-1596

EBERLINE

08/22/06

E-600 Serial Number	: 1262
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.9048
Lower Threshold Intercept	: -0.1524 mV
Lower Threshold Span	: 0.1684 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 0.9630
Upper Threshold Intercept	: -0.6519 mV
Upper Threshold Span	: 0.6769 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 0
Type	: HP 360
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 100 usec
Surface Area	: 15.0 cm2
Max High Voltage	: 900 Vdc
Overrange	: 58000 cps

Probe HP 360 0

Channel 2

Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 898 Vdc
Lower Threshold	: 5.00 mV
Upper Threshold	: 10.1 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

Signature: [signature] Date: 8-22-06

COPY

EBERLINE SHP-380A(B) DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5

Procedure: 3.9.6 Issued: 06/06 Supersedes: 12/01 Rev.6.1, Page 1 of 2

(Circle One)
SHP380AB or SHP380A SN 314

Barcode: DTEBY- 1614

Calibration Standards Eberline E-600 SN 1603 Cal. Expires 08/06

Isotope	Barcode	Activity	Cal. Exp. Date
$^{90}Sr(Y)$	SRAM7-0003	91,800 dpm	04/07
^{239}Pu	SRAM7-0001	52,900 dpm	04/07
^{137}Cs	SRAM7-0004	90,500 dpm	04/07

EBERLINE

AS-FOUND

Isotope	Background (Channel)	Gross, cpm	Efficiency	Previous Efficiency	HV
$^{90}Sr(Y)$	223 β	21.2k	22.8	—	635
^{239}Pu	0 α	5.83k	11.0	—	635

RADIOLOGICAL CALIBRATION Source/Detector Distance 1/4 inch HV 645

Isotope	Activity (dpm)	Gross count rate (cpm) α Ch.	Gross count rate (cpm) β Ch.	Efficiency 100*(cpm/dpm)	Acceptance Criteria: Rugged Window*	Acceptance Criteria: Regular Window
Background		2	234		150 to 350 cpm β, ≤ 3 cpm α	
$^{90}Sr(Y)$	91,800	124	22.0k	24 β	≥ 15% β	≥ 20% β, ≤ 0.2% α
^{137}Cs	90,500	7	15.85k	17 β	≥ 10% β	≥ 15% β
^{239}Pu	52,900	6.11k	637	12 α	≥ 10% α	≥ 10% α
				α or β		

Disabled Channels: 1 ☐ 2 ☐ 3 ☑ None ☐

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10%.

Comments: NA

*Minimum efficiency for beta-only probes with rugged windows have tyvek, extra screen or other material to protect window. Alpha cross talk is not a concern for these type detectors since they are calibrated for beta only and only use one channel.

A. Utter — Calibrated By
8/21/06 — Calibration Date
8/21/07 — Due for Recalibration

Reviewed and Approved By Date
AUG 23 2006

Signatures indicate acceptability of calibration data as recorded above.

COPY

CAL1603.TXT

EBERLINE E-600 CALIBRATION REPORT - V4.02

DTEBY-1614

08/21/06 11:16:08 Probe Only

E-600 Serial Number	: 1603
Smart Probe Serial Number	: 314
Type	: SHP380AB
Calibration Date/Due Date	: 08/21/06 to 08/21/07
Dead Time	: 8.00 usec
Surface Area	: 100 cm2
Max High Voltage	: 1000 Vdc
Overrange	: 80000 cps
Channel 1	
Channel Type	: Alpha
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0029
Upper to Lower Crossover	: 0.1447
Channel 2	
Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Lower
Lower Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0029
Upper to Lower Crossover	: 0.1447

EBERLINE

Cable Length: 30 inches

Signature: [illegible] Date: 8/21/06

COPY

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EBERLINE MODEL E-600 COUNT RATE METER CALIBRATION RECORD
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5
Procedure: 3.9.5 Issued: 07/06 Supersedes: 11/04 Rev. 6, Page 1 of 2

Eberline Model E-600 SN 941

Barcode: CMEBD-1071
Barcode: N/A

Conventional Channel Calibrated With: Pancake GM ☐ Other ☑
If other is checked, Model N/A SN N/A

CALIBRATION STANDARDS:

Pulser Mfr/Model Eberline MP2 Barcode PGEB1-0002 Cal. Expires 11/06
DMM: Model Fluke 77 Barcode MMFL6-0001 Cal. Expires 10/06
Pancake GM Detector S/N — Barcode — Cal. Expires — N/A ☑

Pulser C/m	As-Found c/m			As-Left c/m			Acceptable Range c/m
	Channel 1	Channel 2	Channel 3	Channel 1	Channel 2	Channel 3	
200 X 1	200	200	200	200	200	200	190 to 210
400 X 1 [1]	400			400			380 to 420
800 X 1	800			800			760 to 840
200 X 10	1.99K			2.00K			1.9 K to 2.1K
800 X 10	7.99K			7.99K			7.6K to 8.4K
200 X 100	19.98K			20.0K			19K to 21K
800 X 100	79.8K			79.8K			76K to 84K
200 X 1K	199.7K			199.7K			190K to 210K
800 X 1K	799K	799K	799K	799K	799K	799K	760K to 840K
SCALER CHECK (counts/1 minute)							
800 X 100	79.8K			79.8K			78400 to 81600
				Audio ☑ yes ☐ no		Light ☑ yes ☐ no	

[1] Midpoint of most commonly used scale: ANSI N323-1978

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±5% for meter readings and ±2% for scaler readings.

HIGH VOLTAGE CALIBRATION

High Voltage Setting (E-600)	As-Found	As-Left	Acceptable Range (DMM)*
1246 ±5V	1250 V	1249 V	1246 ± 20V
2250 ±5V	2248 V	2253 V	2250 ± 20V

* An out of tolerance report is issued when the as-found voltage is more than -40 volts from the displayed value corresponding to a >20% reduction in radiological response.

Comments: Will be used with SHP380AB.

COPY

Calibrated By [signature] 8-22-06 Calibration Date 8-22-07 Due for Recalibration

Signatures indicate acceptability of

CAL941
EBERLINE E-600 CALIBRATION REPORT - V4.02
CMEBD-1071

EBERLINE

08/22/06

E-600 Serial Number	: 941
Program Version	: E600 V4.01
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Scaler Precision	: 10%
Lower Threshold Cal. Points	: 1.80 mV and 6.00 mV
Upper Threshold Cal. Points	: 6.00 mV and 60.0 mV
Lower Threshold Slope	: 0.8571
Lower Threshold Intercept	: -0.1619 mV
Lower Threshold Span	: 0.1889 mV (<=0.5) to 5.10 mV (>=5.0)
Upper Threshold Slope	: 1.01
Upper Threshold Intercept	: -0.5926 mV
Upper Threshold Span	: 0.5867 mV (<=1.5) to 60.0 mV (>=50.0)
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Enabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Start Scaler
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time

Conventional Probe Serial Number	: 0
Type	: HP 360
Calibration Date/Due Date	: 08/22/06 to 08/22/07
Dead Time	: 100 usec
Surface Area	: 15.0 cm2
Max High Voltage	: 900 Vdc
Overrange	: 58000 cps

Probe HP 360 0
Channel 2

Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 898 Vdc
Lower Threshold	: 5.00 mV
Upper Threshold	: 10.1 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0
Upper to Lower Crossover	: 0.0

Cable Length: 60 inches

Signature: [signature] Date: 8-22-06

COPY

EBERLINE SHP-380A(B) DATA SHEET
RADIOLOGICAL CALIBRATION PROCEDURES, MANUAL MA-563
Project # 98106:06 File Class: T6.5

Procedure: 3.9.6 Issued: 06/06 Supersedes: 12/01 Rev.6.1, Page 1 of 2

(Circle One)
SHP380AB or SHP380A SN 271

Barcode: DTEBY- 1580

Calibration Standards Eberline E-600 SN 1603 Cal. Expires 08/06

Isotope	Barcode	Activity	Cal. Exp. Date
^{90}Sr(Y)	SRAM7-0003	91,800 dpm	04/07
^{239}Pu	SRAM7-0001	52,900 dpm	04/07
^{137}Cs	SRAM7-0004	90,500 dpm	04/07

EBERLINE

AS-FOUND

Isotope	Background (Channel)	Gross, cpm	Efficiency	Previous Efficiency	HV
^{90}Sr(Y)	117 β	15.85K	17%	—	596
^{239}Pu	1 α	4.76K	9%	—	596

RADIOLOGICAL CALIBRATION Source/Detector Distance 1/4 in. HV 645

Isotope	Activity (dpm)	Gross count rate (cpm) α Ch.	Gross count rate (cpm) β Ch.	Efficiency 100*(cpm/dpm)	Acceptance Criteria: Rugged Window*	Acceptance Criteria: Regular Window
Background		1	202		150 to 350 cpm β, ≤ 3 cpm α	
^{90}Sr(Y)	91,800	127	21.1K	23 β	≥ 15% β	≥ 20% β, ≤ 0.2% α
^{137}Cs	90,500	17	15.97K	17 β	≥ 10% β	≥ 15% β
^{239}Pu	52,900	5.82K	994	11 α	≥ 10% α	≥ 10% α
				α or β		

Disabled Channels: 1 ☐ 2 ☐ 3 ☐ None ☑

NOTES: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10%.

Comments: NA

*Minimum efficiency for beta-only probes with rugged windows have tyvek, extra screen or other material to protect window. Alpha cross talk is not a concern for these type detectors since they are calibrated for beta only and only use one channel.

A. Utter — Calibrated By
8/21/06 — Calibration Date
8/21/07 — Due for Recalibration

Reviewed and Approved By Date

Signatures indicate acceptability of calibration data as recorded above.

AUG 23 2006

COPY

CAL1603.TXT
EBERLINE E-600 CALIBRATION REPORT - V4.02

DTEBY-1580

08/21/06 10:57:09 Probe Only

E-600 Serial Number	: 1603
Smart Probe Serial Number	: 271
Type	: SHP380AB
Calibration Date/Due Date	: 08/21/06 to 08/21/07
Dead Time	: 8.00 usec
Surface Area	: 100 cm2
Max High Voltage	: 1000 Vdc
Overrange	: 80000 cps
Channel 1	
Channel Type	: Alpha
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Upper
Upper Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0048
Upper to Lower Crossover	: 0.1296
Channel 2	
Channel Type	: Beta
Rate Units	: cpm
Response Times	: 20,20,20 secs
High Voltage	: 645 Vdc
Lower Threshold	: 1.60 mV
Upper Threshold	: 33.2 mV
Selected Window	: Lower
Lower Cal. Constant	: 1.00 counts/count
Scaler Time	: 60 secs
Lower to Upper Crossover	: 0.0048
Upper to Lower Crossover	: 0.1296

EBERLINE

Cable Length: 30 inches

Signature: Alice Utter Date: 8/21/06

COPY

BICRON MICRO REM METER CALIBRATION DATA SHEET

Micro Rem Meter: S/N 1699 Barcode: LMBC3-0123

Calibraion Standards

Pulser	PGLL1-0004	Barcode	15973	Cal Exp. Date	07/2006
DVM	MMFL1-0001	Barcode	34664726	Cal Exp. Date	07/2006
^{137}Cs Well #1	Barcode #	SRTM1-0003	Cal Exp. Date	09/2006	
^{137}Cs Well #2	Barcode #	SRAM8-0002	Cal Exp. Date	12/2006	
^{241}Am 1X source	Barcode #	318-299	Cal Exp. Date	02/2006	
^{241}Am 10X source	Barcode #	04-166	Cal Exp. Date	02/2006	

Range	Exposure Rate	Source	As Found mrem/h	As Left, mrem/h	Acceptable Range
X1000	40 mrem/h	Cs Well #2	New	38	36 to 44 mrem/h
	160 mrem/h	Cs Well #2	New	160	140 to 180 mrem/h
X100	4 mrem/h	Cs Well #1	New	3.8	3.6 to 4.4 mrem/h
	16 mrem/h	Cs Well #1	New	16	14 to 18 mrem/h
X10	0.4 mrem/h	Cs Well #1	New	0.38	0.36 to 0.44 mrem/h
	1.6 mrem/h	Cs Well #1	New	1.6	1.4 to 1.8 mrem/h
X1	0.1 mrem/h	Cs Well #1	New	0.11	0.09 to 0.11 mrem/h
	0.16 mrem/h	Cs Well #1	New	0.16	0.14 to 0.18 mrem/h
X1000	≥ 400 mrem/h	Cs Well #2	New	OS	Offscale High
X10	1670 µrem/h	^{241}Am 318-299 at 44 cm	New	1,120	N/A
X1	143 µrem/h	^{241}Am 04-166 at 30 cm	New	95	N/A
	The X0.1 scale is calibrated electronically				
X0.1	4 µrem/h	Pulser	New	3.8	3.6 to 4.4 µrem/h
X0.1	16 µrem/h	Pulser	New	16	14 to 18 µrem/h

1X ^{241}Am CF =143/"as-left"= 1.505 10X ^{241}Am CF =1670/"as-left"= 1.491

☑ check mechanical zero As-Left HV check 1,169 ☑ HV indicator check

Geotropism: ☑ Sat ☐ Unsat

Notes: An "S" in the as-found column indicates no as-found readings available due to instrument repairs. All radiation standards used in this calibration are traceable to NIST. Calibration of M&TE is traceable to NIST. The acceptable tolerance for as-left readings is ±10% or ±20% if a correction factor chart is provided.

COPY

Michael D. Hamilton MDH — Calibrated By

2/21/2006 — Calibration Date

2/21/2007 — Due for Recalibration

EBERLINE

Reviewed and Approved By

Signatures indicate acceptability of calibration data as recorded above.

Thermo Eberline

CALIBRATION REPORT

Hand$_E$Count

Serial No. 604

Calibration Date: 3/30/06

High Voltage: 869.1 V

Lower Threshold Setting: 1.8 mV

Upper Threshold Setting: 25.4 mV

Alpha Background: ~~25.4~~ 2.00 cpm JP 3/30/06

Beta Background: 60.00 cpm

Alpha-Beta Crossover: 0.8 %

Beta-Alpha Crossover: 0.0 %

Alpha Source ID: 2696-00
Isotope: Pu239
Emission Rate: 18,300 dpm
Source Calib. Date 3-1-00

Alpha Efficiency: 81.6 %

Beta Source ID: 2695-00 [MODEL DNS-12]
Isotope: Tc 99
Emission Rate: 18,400 dpm
Source Calib. Date 3-1-00

Beta Efficiency: 49.9 %

Signature: [signature]
GRIFFIN INSTRUMENTS
865-376-1313

Thermo Electron RM&P
504 Airport Road, Santa Fe, NM 87507 USA
Phone: (800) 234-4212
Fax: (505) 428-3530
Email: salesinfo@thermoeberline.com
Internet: www.thermo.com/rmp

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitoring Station, identified below, has been calibrated with standards traceable to the National Institute of Standards and Technology.

Model #: RSS-112

Serial Number: 95I00184

Calibration Date: 3/23/2006

AS Found: **SEE ATTACHED**

Ken Lambrech
Product Engineer

Procedure used: SOP-238.3

Reuter-Stokes

Customer Reference:	Eberline Services 200640227
Model:	RSS-112
S/N:	95I00184

RSS-112 ELECTRONIC CALIBRATION

	As Found	After Adjustment
A/D Reference (CH: 007) (1.000 V applied)	1.000	N/A
Chamber Signal (CH: 000) (10.000 V applied)	2.000	N/A
Channel 003 (CH: 003) (5.000 V applied)	1.000	N/A

STANDARDS USED:

R/S SN:	Nomenclature:	MFGR:	Model:	Cal Due Date
B-147	DC Voltage Std	Analogic	AN 3100	6/10/06
A-1648	Digital Voltmeter	Agilent	34401A	06/09/06

Wm Ladwanski

Level 2 Nuclear / Electrical Inspector

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique*, and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

Sensor Type: 100 mR/Hr

Serial Number: V-4055

Calibration Date: 3/22/06

Sensitivity: 20.14 mV/μR/h

Ken Lambach
Authorized Signature

*Calibration Procedure: RS-SOP 238.1

As found conditions are the same as, as left conditions.

Reuter-Stokes

Calibration Data

Sensor Type:	100 mR/Hr	Source (CS-137):	BB-400
Serial Number:	V-4055	Date of Certification:	12/1/94
Calibration Date:	3/22/06	Exposure Rate at 1 meter:	4.226 mR/h
Customer Name:	EBERLINE		
Sensitivity (Ra-226):	20.14 mV/μR/h		

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	238.892	6.200	1.315	4.884	20.45
14	427	174.786	4.720	1.156	3.564	20.39
16	488	133.267	3.740	1.030	2.710	20.33
18	549	104.862	3.060	0.935	2.125	20.26

k(CS-137) = 20.36 mv/μR/h

k(Ra-226) = .9892 k(CS-137)

k(Ra-226) = 20.14 mv/μR/h

$\bar{k}$ = 20.36 mv/μR/h

σ = .079 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.390%

By: Wm Radwanski Date: 3/23/06

As found conditions are the same as, as left conditions.

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitoring Station, identified below, has been calibrated with standards traceable to the National Institute of Standards and Technology.

Model #: RSS-112

Serial Number: K-211

Calibration Date: 2/15/2006

AS Found: **SEE ATTACHED**

Ken Lambach
Product Engineer

Procedure used: SOP-238.3

Reuter-Stokes

Customer	Eberline Services
Reference:	RMA # 200640028
Model:	RSS-112
S/N:	K-211

RSS-112 ELECTRONIC CALIBRATION

	As Found	After Adjustment
A/D Reference (CH: 007) (1.000 V applied)	0.999	1.000
Chamber Signal (CH: 000) (10.000 V applied)	2.000	N/A
Channel 003 (CH: 003) (5.000 V applied)	1.000	N/A

STANDARDS USED:

R/S SN:	Nomenclature:	MFGR:	Model:	Cal Due Date
B-147	DC Voltage Std	Analogic	AN 3100	6/10/06
A-1648	Digital Voltmeter	Agilent	34401A	06/09/06

Kim Radwanski

Level 2 Nuclear / Electrical Inspector

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique*, and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

Sensor Type: 500 μR/Hr

Serial Number: V-4023

Calibration Date: 2/15/06

Sensitivity: 20. mV/μR/h

Ken Lambach
Authorized Signature

*Calibration Procedure: RS-SOP 238.1

As left conditions.

Reuter-Stokes

Calibration Data

Sensor Type:	500 μR/Hr	Source (CS-137):	BB-400
Serial Number:	V-4023	Date of Certification:	12/1/94
Calibration Date:	2/15/06	Exposure Rate at 1 meter:	4.226 mR/h
Customer Name:	EBERLINE		
Sensitivity (Ra-226):	20. mV/μR/h		

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	239.421	6.157	1.298	4.859	20.29
14	427	175.174	4.687	1.140	3.547	20.25
16	488	133.563	3.716	1.019	2.697	20.19
18	549	105.094	3.042	0.926	2.116	20.14

k(CS-137) = 20.22 mv/μR/h

k(Ra-226) = .9892 k(CS-137)

k(Ra-226) = 20. mv/μR/h

$\bar{k}$ = 20.22 mv/μR/h

σ = .069 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.342%

By: Wm Radwanski

Date: 2/15/06

As left conditions.

Reuter-Stokes

Calibration Data

Sensor Type:	500 μR/Hr	Source (CS-137):	BB-400
Serial Number:	V-4023	Date of Certification:	12/1/94
Calibration Date:	2/15/06	Exposure Rate at 1 meter:	4.226 mR/h

Customer Name: EBERLINE

Sensitivity (Ra-226): 19.41 mV/μR/h

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	239.421	5.968	1.257	4.711	19.68
14	427	175.174	4.543	1.107	3.436	19.62
16	488	133.563	3.607	0.989	2.617	19.60
18	549	105.094	2.955	0.897	2.057	19.58

k(CS-137) = 19.62 mv/μR/h

k(Ra-226) = .9892 k(CS-137)

k(Ra-226) = 19.41 mv/μR/h

$\bar{k}$ = 19.62 mv/μR/h

σ = .043 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.222%

By: Wm Radwanski

Date: 2/15/06

As found conditions after the initial repair. Requires a calibration resistor change.

REPAIR REPORT

Customer: Eberline Services
Reference: RMA# 200640028 & 200640190
Range: 500 uR/hr
S/N: V-4023 & V-4017

PROBLEM DESCRIPTION:

V-4023 and V-4017 were sent in for evaluation, repair, and calibration.

AS FOUND CONDITIONS:

Customer sent V-4023 in for evaluation and it was found to have a damaged electrometer (blown FET & OP amp) that required replacement and is obsolete. V-4017 was sent in to see if parts from the two HPIC could be used to make one working unit. V-4017 was found to be operating erratically. It was found to have a damaged ceramic to metal seal on the HPIC but the electrometer is functioning properly.

CORRECTIVE ACTION TAKEN:

Removed the electrometer from V-4017 and tested OK. Cleaned V-4023 and placed in the dry box with the electrometer. Assembled the electrometer from V-4017 onto HPIC V-4023, tested the assembly OK, and placed on calibration.

RECOMMENDATIONS:

Due to the damaged ceramic to metal seal on the V-4017 HPIC, Reuter-Stokes recommends this unit be scrapped out. The seal cannot be repaired and the unit will not operate properly in this condition. The condition of this seal is a personnel safety concern.

Electrical Inspector

Pine Environmental Services, Inc

4037 Darling Court, Suite D, Lilburn, GA 30047
800-842-1088(Toll-Free)
770-925-2855(Phone)
770-925-2811(Fax)
pine-ga@pine-environmental.com

Certificate of PDR Calibration

This is to certify that the PDR 1000 Serial Number 4537 was calibrated with standard units traceable to manufacturer's specification

Model: 1000
Pine No: 2254
Serial No: 4537

Calibration Ratio	1 µg/m³
Average PDR Concentration	218 µg/m³
Calibration Master Average Concentration	229 µg/m³
PDR Background Concentration	144 µg/m³

Environmental Conditions of Test Area:
Temprature Degree F: %Relative Humidity

Calibrated By: Ronnie Smith **Date:** 8/30/2006 2:08:00 PM

All instrument are calibrated according to manufacturer's specifications

Customer must notify PES of any defect within 24 hours of receipt of equipment
Please call 800-842-1088 for Technical Assistance

See Attach Packing List

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitoring Station, identified below, has been calibrated with standards traceable to the National Institute of Standards and Technology.

Model #: RSS-112

Serial Number: L-223

Calibration Date: 3/28/2006

AS Found: **SEE ATTACHED**

Ken Lambach
Product Engineer

Procedure used: SOP-238.3

4/10/06

Reuter-Stokes

Customer	Duratek Services
Reference:	200640226
Model:	RSS-112
S/N:	L-223

RSS-112 ELECTRONIC CALIBRATION

	As Found	After Adjustment
A/D Reference (CH: 007) (1.000 V applied)	1.000	N/A
Chamber Signal (CH: 000) (10.000 V applied)	2.000	N/A
Channel 003 (CH: 003) (5.000 V applied)	1.000	N/A

STANDARDS USED:

R/S SN:	Nomenclature:	MFGR:	Model:	Cal Due Date
B-147	DC Voltage Std	Analogic	AN 3100	6/10/06
A-1648	Digital Voltmeter	Agilent	34401A	06/09/06

Wm Ladwanski

Level 2 Nuclear / Electrical Inspector

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique*, and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

Sensor Type: 100 mR/Hr

Serial Number: L-2079

Calibration Date: 3/22/06

Sensitivity: 20.08 mV/μR/h

Ken Lambach

Authorized Signature

*Calibration Procedure: RS-SOP 238.1

As found conditions are the same as, as left conditions.

4/10/06

Reuter-Stokes

Calibration Data

Sensor Type:	100 mR/Hr	Source (CS-137):	BB-400
Serial Number:	L-2079	Date of Certification:	12/1/94
Calibration Date:	3/22/06	Exposure Rate at 1 meter:	4.226 mR/h
Customer Name:	DURATEK		
Sensitivity (Ra-226):	20.08 mV/μR/h		

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	238.892	6.180	1.314	4.866	20.37
14	427	174.786	4.704	1.151	3.553	20.33
16	488	133.267	3.723	1.023	2.700	20.26
18	549	104.862	3.050	0.927	2.123	20.24

k(CS-137) = 20.3 mv/μR/h

k(Ra-226) = .9892 k(CS-137)

k(Ra-226) = 20.08 mv/μR/h

$\bar{k}$ = 20.3 mv/μR/h

σ = .059 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.289%

By: Wm Radwanski Date: 3/28/06

As found conditions are the same as, as left conditions.

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitoring Station, identified below, has been calibrated with standards traceable to the National Institute of Standards and Technology.

Model #: RSS-112

Serial Number: K-200

Calibration Date: 3/28/2006

AS Found: **SEE ATTACHED**

Ken Lambrah
Product Engineer

Procedure used: SOP-238.3

4/10/06

Reuter-Stokes

Customer Reference:	Duratek Services 200640226
Model:	RSS-112
S/N:	K-200

RSS-112 ELECTRONIC CALIBRATION

	As Found	After Adjustment
A/D Reference (CH: 007) (1.000 V applied)	1.000	N/A
Chamber Signal (CH: 000) (10.000 V applied)	2.000	N/A
Channel 003 (CH: 003) (5.000 V applied)	1.000	N/A

STANDARDS USED:

R/S SN:	Nomenclature:	MFGR:	Model:	Cal Due Date
B-147	DC Voltage Std	Analogic	AN 3100	6/10/06
A-1648	Digital Voltmeter	Agilent	34401A	06/09/06

Ken Radwanski

Level 2 Nuclear / Electrical Inspector

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique*, and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

Sensor Type: 100 mR/Hr

Serial Number: K-6905

Calibration Date: 3/27/06

Sensitivity: 20.04 mV/μR/h

Ken Lambach
Authorized Signature

*Calibration Procedure: RS-SOP 238.1

As left conditions.

3/10/06

Reuter-Stokes

Calibration Data

Sensor Type:	100 mR/Hr	Source (CS-137):	BB-400
Serial Number:	K-6905	Date of Certification:	12/1/94
Calibration Date:	3/27/06	Exposure Rate at 1 meter:	4.226 mR/h

Customer Name: DURATEK

Sensitivity (Ra-226): 20.04 mV/μR/h

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	238.816	6.162	1.304	4.859	20.34
14	427	174.731	4.691	1.146	3.545	20.29
16	488	133.225	3.717	1.024	2.693	20.21
18	549	104.829	3.046	0.929	2.117	20.19

k(CS-137) = 20.26 mv/μR/h

k(Ra-226) = .9892 k(CS-137)

k(Ra-226) = 20.04 mv/μR/h

$\bar{k}$ = 20.26 mv/μR/h

σ = .07 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.345%

By: Wm Radwanski Date: 3/28/06

As left conditions.

Thermo Eberline

CALIBRATION REPORT

HandECount

Serial No. 604

Calibration Date: 3/30/06

High Voltage: 869.1 V

Lower Threshold Setting: 1.8 mV

Upper Threshold Setting: 25.4 mV

Alpha Background: ~~25.4~~ 2.00 cpm
JP 3/30/06

Beta Background: 60.00 cpm

Alpha-Beta Crossover: 0.8 %

Beta-Alpha Crossover: 0.0 %

Alpha Source ID: 2696-00
Isotope: Pu239
Emission Rate: 18,300 dpm
Source Calib. Date 3-1-00

Alpha Efficiency: 81.6 %

Beta Source ID: 2695-00 [MODEL DNS-12]
Isotope: Tc99
Emission Rate: 18,400 dpm
Source Calib. Date 3-1-00

Beta Efficiency: 49.9 %

Signature: [signature]
GRIFFIN INSTRUMENTS
865-376-1313

Thermo Electron RM&P
504 Airport Road, Santa Fe, NM 87507 USA
Phone: (800) 234-4212
Fax: (505) 428-3530
Email: salesinfo@thermoeberline.com
Internet: www.thermo.com/rmp

N00236.002967
ALAMEDA POINT
SSIC NO. 5090.3

APPENDIX H – INSTRUMENT CALIBRATION AND PERFORMANCE CHECK DATA

SECTION H.2 – PERFORMANCE CHECK DATA

RADIOLOGICAL CHARACTERIZATION SURVEY REPORT

DATED 28 SEPTEMBER 2007

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-10-06	ESID Number: 002

Instrument/Probe Information

Instrument Serial Number: 1120	Instrument Type: E600	Calibration Date: 8-21-06	Calibration Due Date: 8-21-07		
Probe Serial Number: 0233	Probe Type/Model: SPA-3	Calibration Date: 8-21-06	Calibration Due Date: 8-21-07	Alpha Eff: N/A	Beta/Gamma Eff: 15.1 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: Co 60	Source Activity: 947.4 nCi	Assay Date: 06-01-04

Instrument Response Check

Date: 09-01-06	Time: 0930	RCT Name/Signature: [signature]	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 5.41 K	Beta/Gamma Count Time (min): 10 sec.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	347.59 K
2	N/A	348.59 K
3	N/A	345.59 K
4	N/A	346.59 K
5	N/A	347.59 K
6	N/A	346.59 K
7	N/A	345.59 K
8	N/A	345.59 K
9	N/A	347.59 K
10	N/A	348.59 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
346.99 K	416.39 K	277.59 K

Reviewed By (print and sign)	Date
Clifford Stephan [signature]	12/1/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-3-06	ESID Number: 002	Probe Serial Number: 0233

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0700	N/A	N/A	N/A	3.68K	346.32K	P	DG
Post	9/7	0700	N/A	N/A	N/A	4.87K	357.13K	P	DG
Pre	9/7	0700	N/A	N/A	N/A	4.87K	357.13K	P	DG
Post	9/8	0700	N/A	N/A	N/A	4.43K	357.57K	P	DG
Pre	9/8/06	0700	N/A	N/A	N/A	4.43K	357.57K	P	DG
Post	9-11-06	0730	N/A	N/A	N/A	4.86K	352.14K	P	DG
Pre	9-11-06	0730	N/A	N/A	N/A	4.86K	352.14K	P	DG
Post	9-12-06	0650	N/A	N/A	N/A	4.39K	352.61K	P	DG
Pre	9-12-06	0650	N/A	N/A	N/A	4.39K	352.61K	P	DG
Post	9-13-06	0705	N/A	N/A	N/A	4.95K	351.05K	P	DG
Pre	9-13-06	0705	N/A	N/A	N/A	4.95K	351.05K	P	DG
Post	9-14-06	0650	N/A	N/A	N/A	4.39K	348.61K	P	DG
Pre	9-14-06	0650	N/A	N/A	N/A	4.39K	348.61K	P	DG
Post	9-15-06	0650	N/A	N/A	N/A	5.39K	356.61K	P	DG
Pre	9-15-06	0650	N/A	N/A	N/A	5.39K	356.61K	P	DG
Post	9-18-06	0700	N/A	N/A	N/A	5.2K	~~352K~~ DG	P	DG
Pre	9-18-06	0700	N/A	N/A	N/A	5.2K	346.8 K	P	DG
Post	N/A →		N/A	N/A	N/A	N/A	→		→
Pre	9-19-06	1000	N/A	N/A	N/A	4.9K	349.1K	P	DG
Post	9-20-06	0715	N/A	N/A	N/A	5.10K	350.9K	P	DG
Pre	9-26-06	0700	N/A	N/A	N/A	4.28K	361.72K	P	DG
Post	9-28-06	0700	N/A	N/A	N/A	3.93K	352.07K	P	DG
Pre	9-28-06	0700	N/A	N/A	N/A	3.93K	352.07K	P	DG
Post	9-29-06	0645	N/A	N/A	N/A	3.75K	359.25K	P	DG
Pre	9-29-06	0645	N/A	N/A	N/A	3.75K	359.25K	P	DG
Post	10-2-06	0700	N/A	N/A	N/A	4.11K	358.47K	P	DG
Pre	10-2-06	0700	N/A	N/A	N/A	4.11K	358.47K	P	DG
Post	10-3-06	0700	N/A	N/A	N/A	2.79K	357.21K	P	DG

Reviewed By (print and sign)	Date
Clifford Stark	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-3-06 To: 10-20-06	002	0233

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-3-06	0700	N/A	N/A	N/A	2.79K	352.21K	P	DG
Post	10-4-06	0705	N/A	N/A	N/A	3.72K	353.28K	P	DG
Pre	10-4-06	0705	N/A	N/A	N/A	3.72K	353.28K	P	DG
Post	10-5-06	0705	N/A	N/A	N/A	4.13K	346.87K	P	DG
Pre	10-5-06	0705	N/A	N/A	N/A	4.13K	346.87K	P	DG
Post	10-6-06	0700	N/A	N/A	N/A	4.35K	355.65K	P	DG
Pre	10-6-06	0700	N/A	N/A	N/A	4.35K	355.65K	P	DG
Post	10-9-06	0700	N/A	N/A	N/A	4.71K	352.29K	P	DG
Pre	10-9-06	0700	N/A	N/A	N/A	4.71K	352.29K	P	DG
Post	10-10-06	0700	N/A	N/A	N/A	4.71K	345.29K	P	DG
Pre	10-11-06	1315	N/A	N/A	N/A	5.74K	355.26K	P	DG
Post	10-12-06	0700	N/A	N/A	N/A	4.58K	350.42K	P	DG
Pre	10-12-06	0700	N/A	N/A	N/A	4.58K	350.42K	P	DG
Post	10-13-06	0700	N/A	N/A	N/A	5.13K	352.87K	P	DG
Pre	10-13-06	0700	N/A	N/A	N/A	5.13K	352.87K	P	DG
Post	10-16-06	0650	N/A	N/A	N/A	3.65K	354.35K	P	DG
Pre	10-16-06	0650	N/A	N/A	N/A	3.65K	354.35K	P	DG
Post	10-17-06	0650	N/A	N/A	N/A	4.51K	348.49K	P	DG
Pre	10-17-06	0650	N/A	N/A	N/A	4.51K	348.49K	P	DG
Post	10-18-06	0700	N/A	N/A	N/A	3.56K	361.44K	P	DG
Pre	10-18-06	0700	N/A	N/A	N/A	3.56K	361.44K	P	DG
Post	10-19-06	0650	N/A	N/A	N/A	3.94K	347.06K	P	DG
Pre	10-19-06	0650	N/A	N/A	N/A	3.94K	347.06K	P	DG
Post	10-20-06	0700	N/A	N/A	N/A	3.84K	341.16K	P	DG

Reviewed By (print and sign)	Date
Clifford Stephan	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
Nanedo 06	From: 10-20-06 To: 11-10-06	002	0233

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-20-06	0700	N/A	N/A	N/A	3.84K	341.16K	P	DG
Post	10-23-06	0700	N/A	N/A	N/A	3.49K	341.51K	P	DG
Pre	10-23-06	0700	N/A	N/A	N/A	3.49K	341.51K	P	DG
Post	10-24-06	0700	N/A	N/A	N/A	3.73K	348.27K	P	DG
Pre	10-24-06	0700	N/A	N/A	N/A	3.73K	348.27K	P	DG
Post	10-25-06	0700	N/A	N/A	N/A	4.03K	351.97K	P	DG
Pre	10-26-06	0800	N/A	N/A	N/A	4.76K	351.24K	P	DG
Post	10-27-06	0650	N/A	N/A	N/A	4.11K	353.89K	P	DG
Pre	10-27-06	0650	N/A	N/A	N/A	4.11K	353.89K	P	DG
Post	10-30-06	0630	N/A	N/A	N/A	3.69K	349.31K	P	DG
Pre	11-6-06	0730	N/A	N/A	N/A	4.23K	340.77K	P	DG
Post	11-7-06	0530	N/A	N/A	N/A	4.75K	322.25K	P	DG
Pre	11-7-06	0530	N/A	N/A	N/A	4.75K	322.25K	P	DG
Post	11-8-06	0600	N/A	N/A	N/A	4.77	343.23K	P	DG
Pre	11-8-06	0600	N/A	N/A	N/A	4.77	343.23K	P	DG
Post	11-9-06	0600	N/A	N/A	N/A	3.83K	305.17K	P	DG
Pre	11-9-06	0600	N/A	N/A	N/A	3.83K	305.17K	P	DG
Post	11-10-06	0600	N/A	N/A	N/A	4.16	341.84K	P	DG
Pre									
Post									
Pre									
Post									
Pre									
Post									

N/A

Reviewed By (print and sign)	Date
Clifford Stephens	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-17-06	ESID Number: 003

Instrument/Probe Information

Instrument Serial Number: 1123	Instrument Type: E600	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07		
Probe Serial Number: 0244	Probe Type/Model: SPA-3	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07	Alpha Eff: N/A	Beta/Gamma Eff: 15.4 %

Alpha Source Information

Source Number: N/A ~~51529~~ DG	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: CO-60	Source Activity: 947.4 nCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 0945	RST Name/Signature: [signature]	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background (CPM) 4.88 K	Beta/Gamma Count Time (min): 1 MIN.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	349.12 K
2	N/A	351.12 K
3	N/A	350.12 K
4	N/A	348.12 K
5	N/A	348.12 K
6	N/A	348.12 K
7	N/A	348.12 K
8	N/A	349.12 K
9	N/A	350.12 K
10	N/A	349.12 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
349.12 K	418.94 K	279.29 K

Reviewed By (print and sign)	Date
Clifford Stephan [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-2-06	ESID Number: 003	Probe Serial Number: 0244

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0700	N/A	N/A	N/A	4.62K	350.38 K	P	DG
Post	9/7	0700	N/A	N/A	N/A	4.63K	360.37 K	P	DG
Pre	9/7	0700	N/A	N/A	N/A	4.63K	360.37 K	P	DG
Post	9/8	0700	N/A	N/A	N/A	4.12K	359.88 K	P	DG
Pre	9/8	0700	N/A	N/A	N/A	4.12K	359.88 K	P	DG
Post	9-11-06	0730	N/A	N/A	N/A	3.94K	347.06 K	P	DG
Pre	9-12-06	1300	N/A	N/A	N/A	4.61K	356.39K	P	DG
Post	9-13-06	0710	N/A	N/A	N/A	4.06K	358.94 K	P	DG
Pre	9-14-06	1640	N/A	N/A	N/A	3.95K	344.05 K	P	DG
Post	9-15-06	0750	N/A	N/A	N/A	4.89K	360.11 K	P	DG
Pre	9-15-06	0750	N/A	N/A	N/A	4.89K	360.11 K	P	DG
Post	9-19-06	0745	N/A	N/A	N/A	4.06K	357.94 K	P	DG
Pre	9/9-06	0745	N/A	N/A	N/A	4.06K	357.94K	P	DG
Post	9-20-06	0720	N/A	N/A	N/A	4.23K	352.77K	P	DG
Pre	9-20-06	0720	N/A	N/A	N/A	4.23K	352.77K	P	DG
Post	9/21/06	0645	N/A	N/A	N/A	5.09K	353.91K	P	DG
Pre	9/21/06	0645	N/A	N/A	N/A	5.09K	353.91K	P	DG
Post	9/22/06	0650	N/A	N/A	N/A	4.01K	350.99K	P	DG
Pre	9-22-06	0650	N/A	N/A	N/A	4.01K	350.99K	P	DG
Post	9-25-06	0645	N/A	N/A	N/A	4.01K	349.99K	P	DG
Pre	9-25-06	0645	N/A	N/A	N/A	4.01K	349.99K	P	DG
Post	9-26-06	0700	N/A	N/A	N/A	5.08K	360.92K	P	DG
Pre	9-26-06	0700	N/A	N/A	N/A	5.08K	360.92K	P	DG
Post	9-28-06	0700	N/A	N/A	N/A	4.42K	361.58K	P	DG
Pre	9/28/06	0700	N/A	N/A	N/A	4.42K	361.58K	P	DG
Post	9-29-06	0650	N/A	N/A	N/A	3.36K	361.64K	P	DG
Pre	9/29-06	0650	N/A	N/A	N/A	3.36K	361.64K	P	DG
Post	10-2-06	0700	N/A	N/A	N/A	4.43K	366.57K	P	DG

Reviewed By (print and sign)	Date
Clifford Stephen	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-2-06 To: 10-20-06	603	0244

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-2-06	0700	N/A	N/A	N/A	4.43K	356.57K	P	DG
Post	10-3-06	0700	N/A	N/A	N/A	3.67K	363.33K	P	DG
Pre	10-3-06	0700	N/A	N/A	N/A	3.67K	368.33K	P	DG
Post	10-4-06	0705	N/A	N/A	N/A	4.18K	356.82K	P	DG
Pre	10-4-06	0705	N/A	N/A	N/A	4.18K	356.82K	P	DG
Post	10-5-06	0710	N/A	N/A	N/A	3.77K	355.23K	P	DG
Pre	10-5-06	0710	N/A	N/A	N/A	3.77K	355.23K	P	DG
Post	10-6-06	0700	N/A	N/A	N/A	4.87K	348.13K	P	DG
Pre	10-6-06	0700	N/A	N/A	N/A	4.87K	348.13K	P	DG
Post	10-9-06	0700	N/A	N/A	N/A	4.95K	352.05K	P	DG
Pre	10-11-06	1315	N/A	N/A	N/A	6.33K	356.67K	P	DG
Post	10-12-06	0705	N/A	N/A	N/A	4.51K	360.49K	P	DG
Pre	10-12-06	0705	N/A	N/A	N/A	4.51K	360.49K	P	DG
Post	10-13-06	0700	N/A	N/A	N/A	5.54K	365.46K	P	DG
Pre	10-13-06	0700	N/A	N/A	N/A	5.54K	365.46K	P	DG
Post	10-16-06	0700	N/A	N/A	N/A	4.27K	364.73K	P	DG
Pre	10-16-06	0700	N/A	N/A	N/A	4.27K	364.73K	P	DG
Post	10-17-06	0700	N/A	N/A	N/A	4.62K	356.38K	P	DG
Pre	10-17-06	0700	N/A	N/A	N/A	4.62K	356.38K	P	DG
Post	10-18-06	0700	N/A	N/A	N/A	4.29K	351.71K	P	DG
Pre	10-18-06	0700	N/A	N/A	N/A	4.29K	351.71K	P	DG
Post	10-19-06	0655	N/A	N/A	N/A	3.82K	342.18K	P	DG
Pre	10-19-06	0655	N/A	N/A	N/A	3.82K	342.18K	P	DG
Post	10-20-06	0700	N/A	N/A	N/A	3.93K	353.07K	P	DG

Reviewed By (print and sign)	Date
C.L. Hurd Steph	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Page 1 of 1

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-20-06 To: 11-7-06	003	0244

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-20-06	0700	N/A	N/A	N/A	3.93K	353.07K	P	DG
Post	10-23-06	0700	N/A	N/A	N/A	3.86K	359.14K	P	DG
Pre	10-23-06	0700	N/A	N/A	N/A	3.86K	359.14K	P	DG
Post	10-24-06	0700	N/A	N/A	N/A	3.87K	350.13K	P	DG
Pre	10-24-06	0700	N/A	N/A	N/A	3.87K	350.13K	P	DG
Post	10-25-06	0700	N/A	N/A	N/A	3.63K	345.37K	P	DG
Pre	10-25-06	0700	N/A	N/A	N/A	3.63K	345.37K	P	DG
Post	10-26-06	0700	N/A	N/A	N/A	4.00K	350.00K	P	DG
Pre	10-26-06	0700	N/A	N/A	N/A	4.00K	350.00K	P	DG
Post	10-27-06	0700	N/A	N/A	N/A	4.03K	340.97K	P	DG
Pre	10-27-06	0700	N/A	N/A	N/A	4.03K	340.97K	P	DG
Post	10-30-06	0630	N/A	N/A	N/A	4.30K	361.70K	P	DG
Pre	10-30-06	0630	N/A	N/A	N/A	4.30K	361.70K	P	DG
Post	10-31-06	0630	N/A	N/A	N/A	4.9K	346.10K	P	DG
Pre	10-31-06	0630	N/A	N/A	N/A	4.9K	346.10K	P	DG
Post	11-1-06	0600	N/A	N/A	N/A	4.1K	337.9K	P	DG
Pre	11-1-06	0600	N/A	N/A	N/A	4.1K	337.9K	P	DG
Post	11-2-06	0615	N/A	N/A	N/A	4.13K	345.87K	P	DG
Pre	11-2-06	0615	N/A	N/A	N/A	4.13K	345.87K	P	DG
Post	11-3-06	0615	N/A	N/A	N/A	3.78K	350.22K	P	DG
Pre	11-3-06	0615	N/A	N/A	N/A	3.78K	350.22K	P	DG
Post	11-6-06	0615	N/A	N/A	N/A	3.62K	347.38K	P	DG
Pre	11-6-06	0615	N/A	N/A	N/A	3.62K	347.38K	P	DG
Post	11-7-06	0630	N/A	N/A	N/A	3.81K	350.19K	P	DG

Reviewed By (print and sign)	Date
Clifford Stel	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: ~~9-1-06~~ 11-7-06 To: ~~11-15-06~~ 11-17-06	ESID Number:	Probe Serial Number:
ALAMEDA 06		003	0244

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	11-7-06	0530	N/A	N/A	N/A	3.81K	350.19K	P	DG
Post	11-8-06	0600	N/A	N/A	N/A	4.20K	350.8K	P	DG
Pre	11-8-06	0600	N/A	N/A	N/A	4.20K	350.8K	P	DG
Post	11-9-06	0550	N/A	N/A	N/A	4.54K	353.46K	P	DG
Pre	11-9-06	0550	N/A	N/A	N/A	4.54K	353.46K	P	DG
Post	11-10-06	0600	N/A	N/A	N/A	3.67K	343.33K	P	DG
Pre	11-10-06	0600	N/A	N/A	N/A	3.67K	343.33K	P	DG
Post	11-11-06	0700	N/A	N/A	N/A	3.80K	350.2K	P	DG
Pre	11-11-06	0700	N/A	N/A	N/A	3.80K	350.2K	P	DG
Post	11-12-06	0700	N/A	N/A	N/A	3.81K	350.19K	P	DG
Pre	11-12-06	0700	N/A	N/A	N/A	3.81K	350.19K	P	DG
Post	11-13-06	0600	N/A	N/A	N/A	3.89K	352.11K	P	DG
Pre	11-13-06	0600	N/A	N/A	N/A	3.89K	352.11K	P	DG
Post	11-14-06	0600	N/A	N/A	N/A	3.50K	350.5K	P	DG
Pre	11-14-06	0600	N/A	N/A	N/A	3.50K	350.5K	P	DG
Post	11-15-06	0615	N/A	N/A	N/A	3.95K	326.05K	P	DG
Pre	11-15-06	0615	N/A	N/A	N/A	3.95K	326.05K	P	DG
Post	11-16-06	0610	N/A	N/A	N/A	4.02K	344.98K	P	DG
Pre	11-16-06	0610	N/A	N/A	N/A	4.02K	344.98K	P	DG
Post	11-17-06	0605	N/A	N/A	N/A	3.41K	342.55K	P	DG
Pre	~~11-17-06~~	~~0605~~	~~N/A~~	~~N/A~~	~~N/A~~	~~DG~~	~~/NA~~		
Post									
Pre									
Post					A				
Pre				N					
Post									
Pre									
Post									

Reviewed By (print and sign)	Date
Clifford Stephens	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 9-11-06	ESID Number: 004

Instrument/Probe Information

Instrument Serial Number: 1135	Instrument Type: E600	Calibration Date: 8-24-06	Calibration Due Date: 8-24-07		
Probe Serial Number: 0241	Probe Type/Model: SPA-3	Calibration Date: 8-24-06	Calibration Due Date: 8-24-07	Alpha Eff: N/A	Beta/Gamma Eff: 16.9 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: Co-60	Source Activity: 947.4 nC	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 10:00	~~RCT Name~~/Signature: David Gray	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 4.90 K	Beta/Gamma Count Time (min): 10 SEC.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	374.1 K.
2	N/A	373.1 K.
3	N/A	372.1 K.
4	N/A	372.1 K.
5	N/A	374.1 K.
6	N/A	373.1 K.
7	N/A	374.1 K.
8	N/A	372.1 K.
9	N/A	374.1 K.
10	N/A	371.1 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
373 K	447.6 K	298.4 K

Reviewed By (print and sign)	Date
Clifford Stephen	12/11/04

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 9-11-06	ESID Number: 004	Probe Serial Number: 0241

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0705	N/A	N/A	N/A	5.89K	367.11K	P	DG
Post	9/7	0700	N/A	N/A	N/A	4.48K	385.52K	P	DG
Pre	9/7	0700	N/A	N/A	N/A	4.48K	385.52K	P	DG
Post	9/8	0700	N/A	N/A	N/A	4.24K	385.76K	P	DG
Pre	9/8	0700	N/A	N/A	N/A	4.24K	385.76K	P	DG
Post	9-11-06	0740	N/A	N/A	N/A	4.52K	379.48K	P	DG
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				
Pre			N/A	N/A	N/A				
Post			N/A	N/A	N/A				

Reviewed By (print and sign)	Date
Cl. Rod Stephen	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-27-06	ESID Number: 005

Instrument/Probe Information

Instrument Serial Number: 1141	Instrument Type: E600	Calibration Date: 8-23-06	Calibration Due Date: 8-23-07		
Probe Serial Number: 0238	Probe Type/Model: SPA-3	Calibration Date: 8-23-06	Calibration Due Date: 8-23-07	Alpha Eff: N/A	Beta/Gamma Eff: 13.6 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: Co 60	Source Activity: 947.4 uCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 1015	RCT Name/Signature: David Gray	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 4.95	Beta/Gamma Count Time (min): 10 SEC

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	307.05 K.
2	N/A	307.05 K.
3	N/A	308.05 K.
4	N/A	310.05 K.
5	N/A	309.05 K.
6	N/A	306.05 K.
7	N/A	311.05 K.
8	N/A	309.05 K.
9	N/A	312.05 K.
10	N/A	310.05 K.

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
308.95 K	370.74 K	247.16 K

Reviewed By (print and sign)	Date
Clifford Stephen	12/1/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-6-06	ESID Number: 005	Probe Serial Number: 0238

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	705	N/A	N/A	N/A	4.39K	307.61K	P	DG
Post	9/7	705	N/A	N/A	N/A	4.63K	313.37K	P	DG
Pre	9/7	705	N/A	N/A	N/A	4.63K	313.37K	P	DG
Post	9/8	0705	N/A	N/A	N/A	4.20K	313.80K	P	DG
Pre	9/8	0705	N/A	N/A	N/A	4.20K	313.80K	P	DG
Post	9-11-06	0740	N/A	N/A	N/A	4.89K	317.11K	P	DG
Pre	9-11-06	0740	N/A	N/A	N/A	4.89K	317.11K	P	DG
Post	9-12-06	0650	N/A	N/A	N/A	5.60K	315.40K	P	DG
Pre	9-12-06	0650	N/A	N/A	N/A	5.60K	315.40K	P	DG
Post	9-13-06	0710	N/A	N/A	N/A	3.85K	316.15K	P	DG
Pre	9-13-06	0710	N/A	N/A	N/A	3.85K	316.15K	P	DG
Post	9-14-06	0645	N/A	N/A	N/A	4.00K	327.00K	P	DG
Pre	9-14-06	0645	N/A	N/A	N/A	4.00K	327.00K	P	DG
Post	9-15-06	0700	N/A	N/A	N/A	4.39K	322.61K	P	DG
Pre	9-15-06	0700	N/A	N/A	N/A	4.39K	322.61K	P	DG
Post	9-18-06	0700	N/A	N/A	N/A	3.92K	322.08K	P	DG
Pre	9-~~18~~ 19-06	0700	N/A	N/A	N/A	4.09K	313.91K	P	DG
Post	9-20-06	0720	N/A	N/A	N/A	4.62K	309.38K	P	DG
Pre	9-28-06	0700	N/A	N/A	N/A	4.84K	314.16K	P	DG
Post	9-29-06	0700	N/A	N/A	N/A	4.14K	309.86K	P	DG
Pre	9-29-06	0700	N/A	N/A	N/A	4.14K	309.86K	P	DG
Post	10-2-06	0710	N/A	N/A	N/A	3.45K	314.55K	P	DG
Pre	10-2-06	0718	N/A	N/A	N/A	3.45K	314.55K	P	DG
Post	10-4-06	0900	N/A	N/A	N/A	5K	307K	P	DG
Pre	10-4-06	0900	N/A	N/A	N/A	5K	307K	P	DG
Post	10-5-06	0730	N/A	N/A	N/A	5.8K	311.20K	P	DG
Pre	10-5-06	0730	N/A	N/A	N/A	5.8K	311.20K	P	DG
Post	10-6-06	0715	N/A	N/A	N/A	5.36K	306.64K	P	DG

Reviewed By (print and sign)	Date
Mel Steph	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-6-06 To: 10-27-06	005	0238

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-6-06	0715	N/A	N/A	N/A	5.36K	306.64K	P	DG
Post	10-9-06	0715	N/A	N/A	N/A	5.46K	303.54	P	DG
Pre	10-9-06	0715	N/A	N/A	N/A	5.46K	303.54	P	DG
Post	10-10-06	0700	N/A	N/A	N/A	5.00K	315.00K	P	DG
Pre	10-10-06	0700	N/A	N/A	N/A	5.00K	315.00K	P	DG
Post	10-11-06	0700	N/A	N/A	N/A	4.69K	307.31K	P	DG
Pre	10-11-06	0700	N/A	N/A	N/A	4.69K	307.31K	P	DG
Post	10-12-06	0700	N/A	N/A	N/A	5.45K	312.55K	P	DG
Pre	10-12-06	0700	N/A	N/A	N/A	5.45K	312.55K	P	DG
Post	10-13-06	0700	N/A	N/A	N/A	6.15K	306.85K	P	DG
Pre	10-13-06	0700	N/A	N/A	N/A	6.15K	306.85K	P	DG
Post	10-16-06	0645	N/A	N/A	N/A	4.15K	301.85K	P	DG
Pre	10-16-06	0645	N/A	N/A	N/A	4.15K	301.85K	P	DG
Post	10-17-06	0645	N/A	N/A	N/A	4.38K	307.62K	P	DG
Pre	10-17-06	0645	N/A	N/A	N/A	4.38K	307.62K	P	DG
Post	10-18-06	0645	N/A	N/A	N/A	3.97K	311.03K	P	DG
Pre	10-23-06	1300	N/A	N/A	N/A	4.20K	310.58K	P	[illegible]
Post	10-24-06	0700	N/A	N/A	N/A	3.95K	304.05K	P	DG
Pre	10-24-06	0700	N/A	N/A	N/A	3.95K	304.05K	P	DG
Post	10-25-06	0700	N/A	N/A	N/A	4.15K	302.85K	P	DG
Pre	10-25-06	0700	N/A	N/A	N/A	4.15K	302.85K	P	DG
Post	10-26-06	0650	N/A	N/A	N/A	3.79K	307.21K	P	DG
Pre	10-26-06	0650	N/A	N/A	N/A	3.79K	307.21K	P	DG
Post	10-27-06	0650	N/A	N/A	N/A	4.24K	312.76K	P	DG

Reviewed By (print and sign)	Date
Clifford Stephen [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-27-06 To: 10-27-06	005	0238

Operational Checks

	Date	Time	Alpha Background (cpm)	Alpha Source Check (netcpm)	Alpha P/F*	Beta/Gamma Background (cpm)	Beta/Gamma Source Check (netcpm)	Beta/Gamma P/F*	RCT Initials
Pre	10-27-06	0650	N/A	N/A	N/A	4.24K	312.76K	P	DG
Post	10-27-06	0845	N/A	N/A	N/A	4.6K	293.4K	P	
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre				N	A				
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

Reviewed By (print and sign)	Date
Clifford Steh	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-17-06	ESID Number: 006

Instrument/Probe Information

Instrument Serial Number: 1156	Instrument Type: E600	Calibration Date: 8-23-06	Calibration Due Date: 8-23-07		
Probe Serial Number: 0237	Probe Type/Model: SPA-3	Calibration Date: 8-23-06	Calibration Due Date: 8-23-07	Alpha Eff: N/A	Beta/Gamma Eff: 13.6 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: Co-60	Source Activity: 947.4 nCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 1030	RGT Name/Signature: David Gray	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 4.92 K	Beta/Gamma Count Time (min): 10 SEC.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	307.08 K
2	N/A	304.08 K
3	N/A	304.08 K
4	N/A	306.08 K
5	N/A	304.08 K
6	N/A	305.08 K
7	N/A	303.08 K
8	N/A	304.08 K
9	N/A	305.08 K
10	N/A	304.08 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
304.67 K	365.60 K	243.73 K

Reviewed By (print and sign)	Date
Clifford Stephen	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-11-06	ESID Number: 006	Probe Serial Number: 0237

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0705	N/A	N/A	N/A	4.16K	304.84K	P	DG
Post	9/7	0705	N/A	N/A	N/A	4.63K	312.37K	P	DG
Pre	9/7	0705	N/A	N/A	N/A	4.63K	312.37K	P	DG
Post	9/8	0705	N/A	N/A	N/A	4.33K	315.67K	P	DG
Pre	9/8	0705	N/A	N/A	N/A	4.33K	315.67K	P	DG
Post	9-11-06	0740	N/A	N/A	N/A	4.65K	311.35K	P	DG
Pre	9-13-06	1300	N/A	N/A	N/A	4.85K	330.15K	P	DG
Post	9-14-06	0640	N/A	N/A	N/A	3.72K	321.28K	P	DG
Pre	9-14-06	0640	N/A	N/A	N/A	3.72K	321.28K	P	DG
Post	9-15-06	0700	N/A	N/A	N/A	4.32K	325.68K	P	DG
Pre	9-19-06	0745	N/A	N/A	N/A	4.16K	311.84K	P	[illegible]
Post	9-20-06	0725	N/A	N/A	N/A	4.47K	306.53K	P	DG.
Pre	9-26-06	0700	N/A	N/A	N/A	4.31K	302.69K	P	DG
Post	9-27-06	0700	N/A	N/A	N/A	3.86K	306.14K	P	DG
Pre	9-27-06	0700	N/A	N/A	N/A	3.86K	306.14K	P	DG
Post	9-28-06	0700	N/A	N/A	N/A	5.45K	309.55K	P	DG
Pre	9-28-06	0700	N/A	N/A	N/A	5.45K	309.55K	P	DG
Post	9-29-06	0700	N/A	N/A	N/A	4.06K	309.94K	P	DG
Pre	10-2-06	0900	N/A	N/A	N/A	4.36K	296.64K	P	[illegible]
Post	10-3-06	0710	N/A	N/A	N/A	4.88K	306.12K	P	DG
Pre	10-3-06	0710	N/A	N/A	N/A	4.88K	306.12K	P	DG
Post	10-4-06	0710	N/A	N/A	N/A	5.82K	294.18K	P	DG
Pre	10-5-06	0710	N/A	N/A	N/A	4.3K	301.7K	P	[illegible]
Post	10-6-06	0715	N/A	N/A	N/A	4.23K	312.77K	P	DG
Pre	10-9-06	0715	N/A	N/A	N/A	4.68K	305.32K	P	DG
Post	10-10-06	0705	N/A	N/A	N/A	5.66K	309.34K	P	DG
Pre	10-10-06	0705	N/A	N/A	N/A	5.66K	309.34K	P	DG
Post	10-11-06	0705	N/A	N/A	N/A	4.03K	310.97K	P	DG

Reviewed By (print and sign)	Date
Clifford Stephen [illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-11-06 To: 11-15-06	006	0237

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-11-06	0705	N/A	N/A	N/A	4.03K	310.97K	P	DG
Post	10-12-06	0700	N/A	N/A	N/A	4.20K	308.80 K	P	DG
Pre	10-18-06	0650	N/A	N/A	N/A	4.41K	310.59K	P	DG
Post	10-19-06	0615	N/A	N/A	N/A	4.35K	304.68K	P	DG
Pre	10-19-06	0615	N/A	N/A	N/A	4.35K	304.68K	P	DG
Post	10-20-06	0645	N/A	N/A	N/A	4.37K	299.63K	P	DG
Pre	10-20-06	0645	N/A	N/A	N/A	4.37K	299.36K	P	DG
Post	10-23-06	0645	N/A	N/A	N/A	5.00K	305.00K	P	DG
Pre	10-23-06	0645	N/A	N/A	N/A	5.00K	305.00K	P	DG
Post	10-24-06	0650	N/A	N/A	N/A	4.42K	301.58K	P	DG
Pre	10-25-06	0850	N/A	N/A	N/A	4.77K	306.23K	P	BD
Post	10-30-06	0630	N/A	N/A	N/A	4.50K	302.50K	P	DG
Pre	10-30-06	0630	N/A	N/A	N/A	4.50K	302.50K	P	DG
Post	10-31-06	0630	N/A	N/A	N/A	5.37K	302.63K	P	DG
Pre	10-31-06	0630	N/A	N/A	N/A	5.37K	302.63K	P	DG
Post	11-1-06	0600	N/A	N/A	N/A	5.27K	299.73K	P	DG
Pre	11-1-06	0600	N/A	N/A	N/A	5.27K	299.73K	P	DG
Post	11-2-06	0615	N/A	N/A	N/A	5.09K	295.91K	P	DG
Pre	11-2-06	0615	N/A	N/A	N/A	5.09K	295.91K	P	DG
Post	11-3-06	0605	N/A	N/A	N/A	5.62K	258K	P	DG
Pre	11-9-06	1000	N/A	N/A	N/A	4.88K	293.2K	P	BD
Post	11-9-06	1730	N/A	N/A	N/A	5.24K	296.76K	P	BD
Pre	11-14-06	0605	N/A	N/A	N/A	3.83K	295.17K	P	DG
Post	11-15-06	0615	N/A	N/A	N/A	4.21K	296.79K	P	DG

Reviewed By (print and sign)	Date
[illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
Alamoa 06	From: 11-15-06 To: 11-17-06	006	0237

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	11-15-06	0615	N/A	N/A	N/A	4.21K	296.79K	P	DG
Post	11-16-06	0615	N/A	N/A	N/A	3.48K	300.52K	P	DG
Pre	11-16-06	0615	N/A	N/A	N/A	3.48K	300.52K	P	DG
Post	11-17-06	0605	N/A	N/A	N/A	3.66K	280K	P	DG
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre				N	A				
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

Reviewed By (print and sign)	Date
CMH [illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-17-06	ESID Number: 006

Instrument/Probe Information

Instrument Serial Number: 1156	Instrument Type: E600	Calibration Date: 8-23-06	Calibration Due Date: 8-23-07		
Probe Serial Number: 0237	Probe Type/Model: SPA-3	Calibration Date: 8-23-06	Calibration Due Date: 8-23-07	Alpha Eff: N/A	Beta/Gamma Eff: 13.6 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: Co-60	Source Activity: 947.4 nCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 1030	RST Name/Signature: [signature]	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 4.92 K	Beta/Gamma Count Time (min): 10 SEC.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	307.08 K
2	N/A	304.08 K
3	N/A	304.08 K
4	N/A	306.08 K
5	N/A	304.08 K
6	N/A	305.08 K
7	N/A	303.08 K
8	N/A	304.08 K
9	N/A	305.08 K
10	N/A	304.08 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
304.67 K	365.60 K	243.73 K

Reviewed By (print and sign)	Date
Clifford Stephen [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-11-06	ESID Number: 006	Probe Serial Number: 0237

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0705	N/A	N/A	N/A	4.16K	304.84K	P	DG
Post	9/7	0705	N/A	N/A	N/A	4.63K	312.37K	P	DG
Pre	9/7	0705	N/A	N/A	N/A	4.63K	312.37K	P	DG
Post	9/8	0705	N/A	N/A	N/A	4.33K	315.67K	P	DG
Pre	9/8	0705	N/A	N/A	N/A	4.33K	315.67K	P	DG
Post	9-11-06	0740	N/A	N/A	N/A	4.65K	311.35K	P	DG
Pre	9-13-06	1300	N/A	N/A	N/A	4.85K	330.15K	P	DG
Post	9-14-06	0640	N/A	N/A	N/A	3.72K	321.28K	P	DG
Pre	9-14-06	0640	N/A	N/A	N/A	3.72K	321.28K	P	DG
Post	9-15-06	0700	N/A	N/A	N/A	4.32K	325.68K	P	DG
Pre	9-19-06	0745	N/A	N/A	N/A	4.16K	311.84K	P	[illegible]
Post	9-20-06	0725	N/A	N/A	N/A	4.47K	306.53K	P	DG.
Pre	9-26-06	0700	N/A	N/A	N/A	4.31K	300.69K	P	DG
Post	9-27-06	0700	N/A	N/A	N/A	3.86K	306.14K	P	DG
Pre	9-27-06	0700	N/A	N/A	N/A	3.86K	306.14K	P	DG
Post	9-28-06	0700	N/A	N/A	N/A	5.45K	309.55K	P	DG
Pre	9-28-06	0700	N/A	N/A	N/A	5.45K	309.55K	P	DG
Post	9-29-06	0700	N/A	N/A	N/A	4.06K	309.94K	P	DG
Pre	10-2-06	0900	N/A	N/A	N/A	4.36K	296.64K	P	[illegible]
Post	10-3-06	0710	N/A	N/A	N/A	4.88K	306.12K	P	DG
Pre	10-3-06	0710	N/A	N/A	N/A	4.88K	306.12K	P	DG
Post	10-4-06	0710	N/A	N/A	N/A	5.82K	294.18K	P	DG
Pre	10-5-06	0710	N/A	N/A	N/A	4.3K	301.7K	P	[illegible]
Post	10-6-06	0715	N/A	N/A	N/A	4.23K	312.77K	P	DG
Pre	10-9-06	0715	N/A	N/A	N/A	4.68K	305.32K	P	DG
Post	10-10-06	0705	N/A	N/A	N/A	5.66K	309.34K	P	DG
Pre	10-10-06	0705	N/A	N/A	N/A	5.66K	309.34K	P	DG
Post	10-11-06	0705	N/A	N/A	N/A	4.03K	310.97K	P	DG

Reviewed By (print and sign)	Date
Clifford Stephen [illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-11-06 To: 11-15-06	006	— 0237

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-11-06	0705	N/A	N/A	N/A	4.03K	310.97K	P	DG
Post	10-12-06	0700	N/A	N/A	N/A	4.20K	308.80K	P	DG
Pre	10-18-06	0650	N/A	N/A	N/A	4.41K	310.59K	P	DG
Post	10-19-06	0645	N/A	N/A	N/A	4.35K	304.68K	P	DG
Pre	10-19-06	0645	N/A	N/A	N/A	4.35K	304.68K	P	DG
Post	10-20-06	0645	N/A	N/A	N/A	4.37K	299.63K	P	DG
Pre	10-20-06	0645	N/A	N/A	N/A	4.37K	299.36K	P	DG
Post	10-23-06	0645	N/A	N/A	N/A	5.00K	305.00K	P	DG
Pre	10-23-06	0645	N/A	N/A	N/A	5.00K	305.00K	P	DG
Post	10-24-06	0650	N/A	N/A	N/A	4.42K	301.58K	P	DG
Pre	10-25-06	0850	N/A	N/A	N/A	4.77K	306.23K	P	BD
Post	10-30-06	0630	N/A	N/A	N/A	4.50K	302.50K	P	DG
Pre	10-30-06	0630	N/A	N/A	N/A	4.50K	302.50K	P	DG
Post	10-31-06	0630	N/A	N/A	N/A	5.37K	302.63K	P	DG
Pre	10-31-06	0630	N/A	N/A	N/A	5.37K	302.63K	P	DG
Post	11-1-06	0600	N/A	N/A	N/A	5.27K	299.73K	P	DG
Pre	11-1-06	0600	N/A	N/A	N/A	5.27K	299.73K	P	DG
Post	11-2-06	0615	N/A	N/A	N/A	5.09K	295.91K	P	DG
Pre	11-2-06	0615	N/A	N/A	N/A	5.09K	295.91K	P	DG
Post	11-3-06	0605	N/A	N/A	N/A	5.62K	258K	P	DG
Pre	11-9-06	1000	N/A	N/A	N/A	4.88K	295.2K	P	BD
Post	11-9-06	1730	N/A	N/A	N/A	5.24K	296.76K	P	BD
Pre	11-14-06	0605	N/A	N/A	N/A	3.83K	295.17K	P	DG
Post	11-15-06	0615	N/A	N/A	N/A	4.21K	296.79K	P	DG

Reviewed By (print and sign)	Date
[illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALMACOA 06	From: 11-15-06 To: 11-17-06	006	0237

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	11-15-06	0615	N/A	N/A	N/A	4.21K	296.79K	P	DG
Post	11-16-06	0615	N/A	N/A	N/A	3.48K	300.52K	P	DG
Pre	11-16-06	0615	N/A	N/A	N/A	3.48K	300.52K	P	DG
Post	11-17-06	0605	N/A	N/A	N/A	3.66K	280K	P	DG
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre				N	A				
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

Reviewed By (print and sign)	Date
[illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-30-06	ESID Number: 007

Instrument/Probe Information

Instrument Serial Number: 1239	Instrument Type: E600	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07		
Probe Serial Number: 0240	Probe Type/Model: SPA-3	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07	Alpha Eff: N/A	Beta/Gamma Eff: 12.8 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: Co-60	Source Activity: 947.4nCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 1040	~~RCT~~ Name/Signature: David Gerg	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 5.24 K	Beta/Gamma Count Time (min): 10 SEC.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	288.76 K
2	N/A	286.76 K
3	N/A	285.76 K
4	N/A	288.76 K
5	N/A	285.76 K
6	N/A	286.76 K
7	N/A	286.76 K
8	N/A	283.76 K
9	N/A	286.76 K
10	N/A	287.76 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
286.76 K	344.11 K	229.40 K

Reviewed By (print and sign)	Date
Clifford Stel	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-9-06	ESID Number: 007	Probe Serial Number: 0240

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0705	N/A	N/A	N/A	4.57K	288.43K	P	DG
Post	9/7	0705	N/A	N/A	N/A	4.36K	298.64K	P	DG
Pre	9/7	0705	N/A	N/A	N/A	4.36K	298.64K	P	DG
Post	9/8	0705	N/A	N/A	N/A	4.91K	296.09K	P	DG
Pre	9/8	0705	N/A	N/A	N/A	4.91K	296.09K	P	DG
Post	9-11-06	0745	N/A	N/A	N/A	4.67K	293.33K	P	DG
Pre	9-13-06	1300	N/A	N/A	N/A	4.96K	293.04K	P	DG
Post	9-14-06	0645	N/A	N/A	N/A	3.66K	312.34K	P	DG
Pre	9-14-06	0645	N/A	N/A	N/A	3.66K	312.34K	P	DG
Post	9-15-06	0700	N/A	N/A	N/A	4.20K	310.80K	P	DG
Pre	9-19-06	0700	N/A	N/A	N/A	4.12K	295.88K	P	DG
Post	9-20-06	0730	N/A	N/A	N/A	4.72K	292.28K	P	DG.
Pre	9-26-06	0700	N/A	N/A	N/A	5.75K	301.25K	P	DG
Post	9-28-06	0700	N/A	N/A	N/A	4.78K	300.22K	P	DG
Pre	9-28-06	0700	N/A	N/A	N/A	4.78K	300.22K	P	DG
Post	9-29-06	0705	N/A	N/A	N/A	3.80K	302.2K	P	DG
Pre	9-29-06	0705	N/A	N/A	N/A	3.80K	302.2K	P	DG
Post	10-2-06	0705	N/A	N/A	N/A	5.02K	307.98K	P	DG
Pre	10-2-06	0705	N/A	N/A	N/A	5.02K	307.98K	P	DG
Post	10-3-06	0705	N/A	N/A	N/A	3.66K	301.34K	P	DG
Pre	10-3-06	0705	N/A	N/A	N/A	3.66K	301.34K	P	DG
Post	10-4-06	0710	N/A	N/A	N/A	3.71K	309.29K	P	DG
Pre	10-4-06	0710	N/A	N/A	N/A	3.71K	309.29K	P	DG
Post	10-5-06	0715	N/A	N/A	N/A	4.11K	307.89K	P	DG
Pre	10-5-06	0715	N/A	N/A	N/A	4.11K	307.89K	P	DG
Post	10-6-06	0700	N/A	N/A	N/A	5.13K	305.87K	P	DG
Pre	10-6-06	0700	N/A	N/A	N/A	5.13K	305.87K	P	DG
Post	10-9-06	0700	N/A	N/A	N/A	4.18K	304.82K	P	DG

Reviewed By (print and sign)	Date
Clifford St	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-11-06 To: 10-30-06	007	— 0240

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-11-06	1315	N/A	N/A	N/A	4.84K	309.16K	P	DG
Post	10-12-06	0705	N/A	N/A	N/A	4.68K	290.32K	P	DG
Pre	10-12-06	0705	N/A	N/A	N/A	4.68K	290.32K	P	DG
Post	10-13-06	0705	N/A	N/A	N/A	5.89K	299.11K	P	DG
Pre	10-13-06	0705	N/A	N/A	N/A	5.89K	299.11K	P	DG
Post	10-16-06	0700	N/A	N/A	N/A	3.64K	306.36K	P	DG
Pre	10-16-06	0700	N/A	N/A	N/A	3.64K	306.36K	P	DG
Post	10-17-06	0700	N/A	N/A	N/A	4.38K	305.62K	P	DG
Pre	10-17-06	0700	N/A	N/A	N/A	4.38K	305.62K	P	DG
Post	10-18-06	0700	N/A	N/A	N/A	4.10K	305.9K	P	DG
Pre	10-18-06	0700	N/A	N/A	N/A	4.10K	305.9K	P	DG
Post	10-19-06	0700	N/A	N/A	N/A	3.57K	306.43K	P	DG
Pre	10-19-06	0700	N/A	N/A	N/A	3.57K	306.43K	P	DG
Post	10-20-06	0700	N/A	N/A	N/A	4.05K	299.95K	P	DG
Pre	10-20-06	0700	N/A	N/A	N/A	4.05K	299.95K	P	DG
Post	10-23-06	0700	N/A	N/A	N/A	4.00K	292.00K	P	DG
Pre	10-23-06	0700	N/A	N/A	N/A	4.00K	292.00K	P	DG
Post	10-24-06	0705	N/A	N/A	N/A	2.10K	300.90K	P	DG
Pre	10-24-06	0705	N/A	N/A	N/A	2.10K	300.90K	P	DG
Post	10-25-06	0705	N/A	N/A	N/A	3.92K	301.08K	P	DG
Pre	10-26-06	0800	N/A	N/A	N/A	4.66K	305.34K	P	DG
Post	10-27-06	0700	N/A	N/A	N/A	4.03K	299.97K	P	DG
Pre	10-27-06	0700	N/A	N/A	N/A	4.03K	299.97K	P	DG
Post	10-30-06	0630	N/A	N/A	N/A	4.02K	305.98K	P	DG

Reviewed By (print and sign)	Date
Clifton [illegible]	12/11/04

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-31-06	ESID Number: 008

Instrument/Probe Information

Instrument Serial Number: 1242	Instrument Type: E600	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07		
Probe Serial Number: 0224	Probe Type/Model: SPA-3	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07	Alpha Eff: N/A	Beta/Gamma Eff: 11.4 %

Alpha Source Information

Source Number: N/A	Source Isotope: N/A	Source Activity: N/A	Assay Date: N/A

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: CO60	Source Activity: 947.4 mCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 1050	RCT Name/Signature: David Gerg	
Alpha Background (CPM): N/A	Alpha Count Time (min.): N/A	Beta/Gamma Background: (CPM) 4,800	Beta/Gamma Count Time (min): 10 SEC.

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	N/A	257.2 K
2	N/A	258.2 K
3	N/A	259.2 K
4	N/A	257.2 K
5	N/A	258.2 K
6	N/A	258.2 K
7	N/A	256.2 K
8	N/A	256.2 K
9	N/A	258.2 K
10	N/A	255.2 K

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
257.4 K	308.88 K	205.92 K

Reviewed By (print and sign)	Date
Clifford Stephen	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-6-06	ESID Number: 008	Probe Serial Number: 0224

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9/6	0705	N/A	N/A	N/A	3.98K	259.02K	P	DG
Post	9/7	0705	N/A	N/A	N/A	3.98K	266.02K	P	DG
Pre	9/7	0705	N/A	N/A	N/A	3.98K	266.02K	P	DG
Post	9/8	0705	N/A	N/A	N/A	4.46K	267.54K	P	DG
Pre	9/8	0705	N/A	N/A	N/A	4.46K	267.54K	P	DG
Post	9-11-06	0746	N/A	N/A	N/A	4.16K	264.84K	P	DG
Pre	9-13-06	1300	N/A	N/A	N/A	5.06K	303.94K	P	DG
Post	9-14-06	0650	N/A	N/A	N/A	3.84K	271.16K	P	DG
Pre	9-14-06	0650	N/A	N/A	N/A	3.84K	271.16K	P	DG
Post	9-15-06	0700	N/A	N/A	N/A	4.22K	272.88K	P	DG
Pre	9-19-06	0755	N/A	N/A	N/A	3.9K	265.1K	P	BD
Post	9-20-06	0725	N/A	N/A	N/A	4.04K	274.96K	P	DG
Pre	9-22-06	0900	N/A	N/A	N/A	3.87K	264.13K	P	[illegible]
Post	9-25-06	0700	N/A	N/A	N/A	3.79K	269.21K	P	DG
Pre	9-25-06	0700	N/A	N/A	N/A	3.79K	269.21K	P	DG
Post	9-26-06	0645	N/A	N/A	N/A	4.31K	269.69K	P	DG
Pre	9-28-06	0645	N/A	N/A	N/A	4.11K	265.89K	P	DG
Post	9-29-06	0705	N/A	N/A	N/A	3.03K	268.97K	P	DG
Pre	9-29-06	0705	N/A	N/A	N/A	3.03K	268.97K	P	DG
Post	10-2-06	0705	N/A	N/A	N/A	4.62K	270.38K	P	DG
Pre	10-2-06	0705	N/A	N/A	N/A	4.62K	270.38K	P	DG
Post	10-3-06	0705	N/A	N/A	N/A	3.43K	260.57K	P	DG
Pre	10-3-06	0705	N/A	N/A	N/A	3.43K	260.57K	P	DG
Post	10-4-06	0710	N/A	N/A	N/A	3.51K	264.49K	P	DG
Pre	10-4-06	0710	N/A	N/A	N/A	3.51K	264.49K	P	DG
Post	10-5-06	0715	N/A	N/A	N/A	4.00K	275.00K	P	DG
Pre	10-5-06	0715	N/A	N/A	N/A	4.00K	275.00K	P	DG
Post	10-6-06	0705	N/A	N/A	N/A	4.71K	265.29K	P	DG

Reviewed By (print and sign)	Date
Clifford Steph [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-6-06 To: 10-27-06	008	0224

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-6-06	0705	N/A	N/A	N/A	4.71K	265.29K	P	DG
Post	10-9-06	0710	N/A	N/A	N/A	3.81K	269.19K	P	DG
Pre	10-11-06	0315	N/A	N/A	N/A	5.52K	270.48K	P	DG
Post	10-12-06	0705	N/A	N/A	N/A	4.09K	260.91K	P	DG
Pre	10-12-06	0705	N/A	N/A	N/A	4.09K	260.91K	P	DG
Post	10-13-06	0705	N/A	N/A	N/A	5.94K	270.06K	P	DG
Pre	10-13-06	0705	N/A	N/A	N/A	5.94K	270.06K	P	DG
Post	10-16-06	0700	N/A	N/A	N/A	3.35K	264.65K	P	DG
Pre	10-16-06	0700	N/A	N/A	N/A	3.35K	264.65K	P	DG
Post	10-17-06	0710	N/A	N/A	N/A	4.08K	271.92K	P	DG
Pre	10-17-06	0710	N/A	N/A	N/A	4.08K	271.92K	P	DG
Post	10-18-06	0705	N/A	N/A	N/A	3.60K	273.4K	P	DG
Pre	10-18-06	0705	N/A	N/A	N/A	3.60K	273.4K	P	DG
Post	10-19-06	0700	N/A	N/A	N/A	3.83K	270.17K	P	DG
Pre	10-19-06	0700	N/A	N/A	N/A	3.83K	270.17K	P	DG
Post	10-20-06	0700	N/A	N/A	N/A	3.91K	263.09K	P	DG
Pre	10-20-06	0700	N/A	N/A	N/A	3.91K	263.09K	P	DG
Post	10-23-06	0700	N/A	N/A	N/A	3.94K	267.06K	P	DG
Pre	10-23-06	0700	N/A	N/A	N/A	3.94K	267.06K	P	DG
Post	10-24-06	0705	N/A	N/A	N/A	3.45K	263.55K	P	DG
Pre	10-24-06	0705	N/A	N/A	N/A	3.45K	263.55K	P	DG
Post	10-25-06	0705	N/A	N/A	N/A	3.42K	269.58K	P	DG
Pre	10-26-06	0800	N/A	N/A	N/A	4.29K	272.71K	P	DG
Post	10-27-06	0705	N/A	N/A	N/A	3.96K	273.04K	P	DG

Reviewed By (print and sign)	Date
[signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Page 1 of 1

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-27-06 To: 10-31-06	008	0224

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (cpm)	Source Check (netcpm)	P/F*	RCT Initials
Pre	10-27-06	0705	N/A	N/A	N/A	3.96K	273.04K	P	DG
Post	10-31-06	0645	N/A	N/A	N/A	3.83K	263.17K	P	DG
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

N/A

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[signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-19-06	ESID Number: 011

Instrument/Probe Information

Instrument Serial Number: 1596	Instrument Type: E600	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07		
Probe Serial Number: 1614	Probe Type/Model: 380AB	Calibration Date: 8-21-06	Calibration Due Date: 8-21-07	Alpha Eff: 12%	Beta/Gamma Eff: ~~47%~~ 8D 24%

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
CS 12	TH 230	14K	

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
51592	CO-60	947.4 nCi	06-01-04

Instrument Response Check

Date:	Time:	~~RCT~~ Name/Signature:	
9-1-06	1300	[illegible]	
Alpha Background (CPM):	Alpha Count Time (min.):	Beta/Gamma Background: (CPM)	Beta/Gamma Count Time (min):
Ø	1 MIN	204	1 MIN

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	4810	21300
2	4780	21300
3	4840	20900
4	4830	21300
5	4820	20900
6	4830	21000
7	4820	20900
8	4860	20900
9	4650	21000
10	4710	21100

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
4732	5678.4	3785.6
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
~~4732~~ ~~12668.31~~ 21060	25272	16848

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Clifford Stephen [illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-19-06	ESID Number: 011	Probe Serial Number: 1614

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9-26-06	1305	0	4.66K	P	207	22493	P	[illegible]
Post	NOT	USED							
Pre	11-17-06	1100	0	4.85K	P	198	21702	P	[illegible]
Post	11-18-06	0700	~~+7~~ +10	5.03K	P	197.6	22102.4	P	[illegible]
Pre	11-18-06	0700	~~+7~~ +10	5.03K	P	197.6	22102.4	P	[illegible]
Post	11-19-06	0730	0	5.04K	P	199.9	21100.1	P	[illegible]
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre				N	A				
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

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Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-18-06	ESID Number: 012

Instrument/Probe Information

Instrument Serial Number: 1071	Instrument Type: E600	Calibration Date: 8-22-06	Calibration Due Date: 8-22-07		
Probe Serial Number: 1580	Probe Type/Model: 380AB	Calibration Date: 8-21-06	Calibration Due Date: 8-21-07	Alpha Eff: 11%	Beta/Gamma Eff: ~~47%~~ 23%

Alpha Source Information

Source Number: CS12	Source Isotope: TH 230	Source Activity: 14K	Assay Date:

Beta/Gamma Source Information

Source Number: 51592	Source Isotope: CO-60	Source Activity: 947.4 nCi	Assay Date: 06-01-04

Instrument Response Check

Date: 9-1-06	Time: 1500	RCT Name/Signature: [signature]	
Alpha Background (CPM): 0.352	Alpha Count Time (min.): 1 MIN	Beta/Gamma Background: (CPM) 124	Beta/Gamma Count Time (min): 1 MIN

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	4740	21000
2	4790	21100
3	4760	21200
4	4700	21100
5	4770	21100
6	4750	20900
7	4800	21100
8	4830	21000
9	4850	20900
10	4750	20800

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
4774	5728.8	3819.2
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
21020	25224	16816

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[signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-18-06	ESID Number: 012	Probe Serial Number: 1580

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9-26-06	1310	0	4.82K	P	148	20,952	P	[illegible]
Post	9-27-06	0900	0	4.81K	P	133	19,867	P	[illegible]
Pre	9-27-06	0900	0	4.81K	P	133	19,867	P	[illegible]
Post	9-28-06	0715	0.424	4.356K	P	152.8	18,087	P	DG
Pre	11-13-06	1230	0.327	5,009.67	P	139.8	19,160.2	P	[illegible]
Post	11-14-06	0630	0	4.29K	P	140	18,788	P	DG
Pre	11-14-06	0630	0	4.29K	P	140	18,788	P	DG
Post	11-16-06	0610	0.404	4.136K	P	123.8	17,022	P	DG
Pre	11-16-06	0610	0.404	4.136K	P	123.8	17,022	P	DG
Post	11-16-06	0600	0	4.95K	P	126.4	18,756	P	DG
Pre	11-16-06	0600	0	4.95K	P	126.4	18,756	P	DG
Post	11-17-06	0620	0	4.69K	P	132.0	19,578	P	DG
Pre	11-17-06	0620	0	4.69K	P	132.0	19,578	P	DG
Post	11-18-06	0700	0 ~~0.342~~	4.48K	P	136.8	20,695	P	DG
Pre	11-18-06	0700	0 ~~0.342~~	4.48K	P	136.8	20,695	P	DG
Post	11-18-06	1500	0	5K	P	128.4	19,045	P	[illegible]
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

2 min Counts

2 min Counts

N/A

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Clifford Smith [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:
Alameda 06	From: 9-1-06 To: 11-17-06	013

Instrument/Probe Information

Instrument Serial Number:	Instrument Type:	Calibration Date:	Calibration Due Date:		
95100184	RSS-112	3-23-06	3-23-07		
Probe Serial Number:	**Probe Type/Model:**	**Calibration Date:**	**Calibration Due Date:**	**Alpha Eff:**	**Beta/Gamma Eff:**
V-4055	RSS-112	3-22-06	3-22-07	N/A	N/A

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
N/A			

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
51723	Cs-137	9.587 µCi	6-1-04

Instrument Response Check

Date:	Time:	RCT Name/Signature:	
9-5-06	0900	Bob Dickenson / [signature]	
Alpha Background (CPM):	**Alpha Count Time (min.):**	**Beta/Gamma Background: ~~(CPM)~~**	**Beta/Gamma Count Time (min):**
N/A	N/A	6 µR/hr	10

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate ~~(NET CPM)~~ NET µR/hr
1	N/A	120.8
2		155.9
3		155.7
4		155.4
5		155.4
6		155.6
7		155.6
8		155.3
9		155.7
10		155.5

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A		
Mean Beta/Gamma Source Measurement (NET ~~CPM~~ µR/hr)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
152.1	182.5	121.7

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Clifford Steph [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-11-06	ESID Number: 013	Probe Serial Number: V-4055

Operational Checks

	Date	Time	Alpha Background (CPM)	Alpha Source Check (NET CPM)	Alpha P/F*	Beta/Gamma Background ~~(CPM)~~ µR/hr	Beta/Gamma Source Check ~~(NET CPM)~~ NET µR/hr	Beta/Gamma P/F*	RCT Initials
Pre	N/A							N/A	
Post						N/A	N/A		
Pre	9-6-06	0730				6.7	123.2	P	[illegible]
Post	9/7/06	0715				7.9	131.3	P	MW
Pre	9/7/06	0715				7.9	131.3	P	MW
Post	9/8/06	0645				7.4	156	P	DG
Pre	9/8/06	0645				7.4	156	P	DG
Post	9-11-06	0730				8.4	156.4	P	DG
Pre	9-22-06	10:15				7.9	139.5	P	DG
Post	9-25-06	0900				6.5	139.1	P	DG
Pre	~~9-25-06~~	~~0900~~ NA				N/A			
Post	N/A		N/A						
Pre	9-29-06	0945				7.8	140.4	P	MW
Post	10-2-06	0715				6.2	140.3	P	[illegible]
Pre	10-2-06	0715				6.2	140.3	P	[illegible]
Post	10-3-06	0715				6.2	143.4	P	DG
Pre	10-3-06	0715				6.2	143.4	P	DG
Post	10-4-06	0715				6.1	139.8	P	MW
Pre	10-4-06	0715				6.1	139.8	P	MW
Post	10-5-06	0715				6.8	139.4	P	DG
Pre	10-5-06	0715				6.8	139.4	P	DG
Post	10-6-06	0720				6.3	139.6	P	DG
Pre	10-6-06	0720				6.3	139.6	P	DG
Post	10-9-06	0713				7.4	158.9	P	MW
Pre	10-9-06	0713				7.4	158.9	P	MW
Post	10-10-06	0700				9.8	136.0	P	DG
Pre	10-10-06	0700				9.8	136.0	P	DG
Post	10-11-06	0715				6.3	130.1	P	DG

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Clifford Stephen [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-11-06 To: 11-7-06	013	-V-4055

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background uR/hr ~~(cpm)~~	Source Check uR/hr ~~(netcpm)~~	P/F*	RCT Initials
Pre	10-11-06	0715	N/A			6.3	130.1	P	DG
Post	10-12-06	0715				6.5	140.4	P	DG
Pre	10-12-06	0715				6.5	140.4	P	DG
Post	10-13-06	0715				6.5	139.8	P	DG
Pre	10-13-06	0715				6.5	139.8	P	DG
Post	10-16-06	0715				6.7	138.8	P	DG
Pre	10-16-06	0715				6.7	138.8	P	DG
Post	10-17-06	0715				6.7	138.5	P	DG
Pre	10-17-06	0715				6.7	138.5	P	DG
Post	10-18-06	0715				6.3	137.8	P	DG
Pre	10-25-06	1515				7.2	136.8	P	DG
Post	10-26-06	0700				6.5	140.4	P	DG
Pre	10-26-06	0700				6.5	140.4	P	DG
Post	10-31-06	0930				6.7	137.1	P	DG
Pre	10-31-06	0930				6.7	137.1	P	DG
Post	11-1-06	0620				7.3	138.9	P	MW
Pre	11-1-06	0620				7.3	138.9	P	MW
Post	11-2-06	0620				6.5	138.8	P	MW
Pre	11-2-06	0620				6.5	138.8	P	MW
Post	11-3-06	0620				6.1	138.4	P	MW
Pre	11-3-06	0620				6.1	138.4	P	MW
Post	11-6-06	0630				6.5	138.2	P	DG
Pre	11-6-06	0630				6.5	138.2	P	DG
Post	11-7-06	0530			N/A	7.2	136.8	P	DG

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Cliff Stal	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered ~~From: 9-1-06~~ 11-2-06 To: 11-17-06	ESID Number: 013	Probe Serial Number: -V 4055
1			

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	11-7-06	0530	N/A	N/A	N/A	6.2	136.8	P	DG
Post	11-8-06	0515	N/A	N/A	N/A	6.2	138.3	P	DG
Pre	11-8-06	0515	N/A	N/A	N/A	6.2	138.3	P	DG
Post	11-9-06	0600	N/A	N/A	N/A	6.2	139.4	P	DG
Pre	11-9-06	0600	N/A	N/A	N/A	6.2	139.4	P	DG
Post	11-10-06	0600	N/A	N/A	N/A	6.3	138.6	P	DG
Pre	11-10-06	0600	N/A	N/A	N/A	6.3	138.6	P	DG
Post	11-11-06	0700	N/A	N/A	N/A	6.3	139.3	P	DG
Pre	11-11-06	0700	N/A	N/A	N/A	6.3	139.3	P	DG
Post	11-12-06	0710	N/A	N/A	N/A	6.5	139.9	P	DG
Pre	11-12-06	0710	N/A	N/A	N/A	6.5	139.9	P	DG
Post	11-13-06	0600	N/A	N/A	N/A	6.4	139.7	P	DG
Pre	11-13-06	0600	N/A	N/A	N/A	6.4	139.7	P	DG
Post	11-14-06	0615	N/A	N/A	N/A	6.4	135.3	P	DG
Pre	11-14-06	0615	N/A	N/A	N/A	6.4	135.3	P	DG
Post	11-15-06	0630	N/A	N/A	N/A	6.2	138.7	P	DG
Pre	11-15-06	0630	N/A	N/A	N/A	6.2	138.7	P	DG
Post	11-16-06	0600	N/A	N/A	N/A	6.2	129.7	P	DG
Pre	11-16-06	0600	N/A	N/A	N/A	6.2	129.7	P	DG
Post	11-17-06	0615	N/A	N/A	N/A	6.1	138.7	P	DG
Pre	11-17-06	0615	N/A	N/A	N/A	6.1	138.7	P	DG
Post	11-17-06	1030	N/A	N/A	N/A	6.8	138.5	P	MW
Pre									
Post									
Pre									
Post									
Pre									
Post									

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[illegible]	12/1/06

Eberline Services
Environmental Survey Instrument Data Sheet

Page 1 of ___

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-17-06	ESID Number: 014

Instrument/Probe Information

Instrument Serial Number:	Instrument Type:	Calibration Date:	Calibration Due Date:		
K-211	RSS-112	2-15-06	2-15-07		
Probe Serial Number:	**Probe Type/Model:**	**Calibration Date:**	**Calibration Due Date:**	**Alpha Eff:**	**Beta/Gamma Eff:**
V-41023	RSS-112	2-15-06	2-15-07	N/A	N/A

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
N/A			

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
51723	Cs-137	9.587 mCi	6-1-04

Instrument Response Check

Date:	Time:	RCT Name/Signature:	
9-5-06	1100	Bob Dickenson / [signature]	
Alpha Background (CPM):	**Alpha Count Time (min.):**	**Beta/Gamma Background: ~~(CPM)~~ BD μR/hr**	**Beta/Gamma Count Time (min):**
N/A	N/A	6	10

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET ~~CPM~~ BD) μR/hr
1	N/A	114
2		147.8
3		148.1
4		147.8
5		147.7
6		147.7
7		147.6
8		147.5
9		147.1
10		147.7

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A		
Mean Beta/Gamma Source Measurement (NET ~~CPM~~ BD) μR/hr	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
144.3	173.16	115.44

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Clifford Stephan [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 10-11-06	ESID Number: 014	Probe Serial Number: V-4023

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background ~~(CPM)~~ μR/hr	Source Check ~~(NET CPM)~~ μR/hr	P/F*	RCT Initials
Pre	N/A	N/A						N/A	N/A
Post						N/A	N/A		
Pre	9-6-06	0700				6.1	117.3	P	BD
Post	9-7-06	0720				6.5	131.6	P	DG
Pre	9-7-06	0720				6.5	131.6	P	DG
Post	9/8/06	0700				5.8	131.1	P	DG
Pre	9/8/06	0700				5.8	131.9	P	DG
Post	9-11-06	0730				6.4	BATTERY	DEAD	DG
Pre	n/a	n/a							n/a
Post	9-11-06	1780				5.8	129.8	P	DG
Pre	9-22-06	1015	N	A		5.9	117.5	P	DG
Post	9-25-06	0900				6.1	117.0	P	DG
Pre	9-28-06	0945				5.9	131.7	P	MW
Post	10-2-06	0715				5.8	134.6	P	BD
Pre	10-2-06	0715				5.8	134.6	P	BD
Post	10-3-06	0725				5.7	132	P	DG
Pre	10-3-06	0725				5.7	132	P	DG
Post	10-4-06	0720				5.8	131.5	P	MW
Pre	10-4-06	0720				5.8	131.5	P	MW
Post	10-5-06	0715				5.4	121.1	P	DG
Pre	10-5-06	0715				5.4	121.1	P	DG
Post	10-6-06	0720				7.2	129.6	P	DG
Pre	10-6-06	0720				7.2	129.6	P	DG
Post	10-9-06	1230				6.5	122.8	P	MW
Pre	10-9-06	1300				6.5	122.8	P	MW
Post	10-10-06	0700				5.8	131.7	P	DG
Pre	10-10-06	0700				5.8	131.7	P	DG
Post	10-11-06	0715				5.8	127.8	P	DG

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Clifford Steyl	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-11-06 To: 11-8-06	0014	V-4023

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background (~~cpm~~)	Source Check (~~netcpm~~)	P/F*	RCT Initials
Pre	10-11-06	0715	N/A			5.8	127.8	P	DG
Post	10-12-06	0815				6.5	138.4	P	[illegible]
Pre	10-12-06	0815				6.5	138.4	P	[illegible]
Post	10-13-06	0715				6.7	130.2	P	DG
Pre	10-13-06	0715				6.7	130.2	P	DG
Post	10-16-06	0720				7.4	129.8	P	DG
Pre	10-16-06	0720				7.4	129.8	P	DG
Post	10-17-06	0715			6.1	~~6.1~~ 19.4	129.6	P	DG
Pre	10-25-06	~~0710~~ 1515			6.2	~~6.1~~ 08	128.3	P	DG
Post	10-26-06	0710				6.9	131.1	P	DG
Pre	10-26-06	0710				6.9	131.1	P	DG
Post	10-31-06	0900				6.2	131.0	P	DG
Pre	10-31-06	0900				6.2	131.0	P	DG
Post	11-1-06	0610				5.8	132.5	P	DG
Pre	11-1-06	0610				5.8	132.5	P	DG
Post	11-2-06	0620				6.0	131.7	P	DG
Pre	11-2-06	0620				6.0	131.7	P	DG
Post	11-3-06	0620				6.1	130.0	P	MW
Pre	11-3-06	0620				6.1	130.0	P	MW
Post	11-6-06	0620				5.7	133.3	P	DG
Pre	11-6-06	0620				5.7	133.3	P	DG
Post	11-7-06	0530				5.9	129.8	P	DG
Pre	11-7-06	0530				5.9	129.8	P	DG
Post	11-8-06	0515			N/A	5.7	128.9	P	DG

Reviewed By (print and sign)	Date
Clifford Stel [illegible]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Page 1 of 1

Project:	Dates Covered	ESID Number:	Probe Serial Number:
Hornecla 06	From: 11-8-06 To: 11-17-06	0014	-V-4023

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background μR/hr ~~(cpm)~~	Source Check NET μR/hr ~~(netcpm)~~	P/F*	RCT Initials
Pre	11-8-06	0515	N/A	N/A	N/A	5.7	138.9	P	DG
Post	11-9-06	0600	N/A	N/A	N/A	5.8	129.8	P	DG
Pre	11-9-06	0600	N/A	N/A	N/A	5.8	129.8	P	DG
Post	11-10-06	0600	N/A	N/A	N/A	5.8	128.8	P	DG
Pre	11-10-06	0600	N/A	N/A	N/A	5.8	128.8	P	DG
Post	11-11-06	0700	N/A	N/A	N/A	5.8	130.02	P	DG
Pre	11-11-06	0700	N/A	N/A	N/A	5.8	130.02	P	DG
Post	11-12-06	0710	N/A	N/A	N/A	5.7	129.8	P	DG
Pre	11-12-06	0710	N/A	N/A	N/A	5.7	129.8	P	DG
Post	11-13-06	0600	N/A	N/A	N/A	5.8	130.6	P	DG
Pre	11-13-06	0600	N/A	N/A	N/A	5.8	130.6	P	DG
Post	11-14-06	0630	N/A	N/A	N/A	6.0	120.3	P	DG
Pre	11-14-06	0630	N/A	N/A	N/A	6.0	120.3	P	DG
Post	11-15-06	0630	N/A	N/A	N/A	5.7	129.8	P	DG
Pre	11-15-06	0630	N/A	N/A	N/A	5.7	129.8	P	DG.
Post	11-16-06	0600	N/A	N/A	N/A	5.7	131.9	P	MW
Pre	11-16-06	0600	N/A	N/A	N/A	5.7	130.9	P	MW
Post	11-17-06	0615	N/A	N/A	N/A	5.5	122.1	P	DG
Pre	11-17-06	0615	N/A	N/A	N/A	5.5	122.1	P	DG
Post	11-17-06	1030	NA	NA	NA	6.6	130.2	P	MW
Pre									
Post									
Pre									
Post									

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Cliff Stephen	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-17-06	ESID Number: 015

Instrument/Probe Information

Instrument Serial Number:	Instrument Type:	Calibration Date:	Calibration Due Date:		
N/A					
Probe Serial Number:	**Probe Type/Model:**	**Calibration Date:**	**Calibration Due Date:**	**Alpha Eff:**	**Beta/Gamma Eff:**
0123	MICRO REM	2-21-06	2-21-07	N/A	N/A

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
N/A			

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
51723	Cs-137	9.587 uCi	6-1-04

Instrument Response Check

Date:	Time:	RCT Name/Signature:	
9-5-06	1230	Bob Dickenson / [signature]	
Alpha Background (CPM):	**Alpha Count Time (min.):**	**Beta/Gamma Background: ~~(CPM)~~ (BG) µR/hr**	**Beta/Gamma Count Time (min):**
N/A	N/A	5	N/A

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET ~~CPM~~ (BG) µR/hr
1	N/A	7,000
2		7,100
3		6,900
4		7,000
5		7,100
6		7,000
7		7,200
8		7,100
9		7,000
10		7,000

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A		
Mean Beta/Gamma Source Measurement (NET ~~CPM~~ (BG) µR/hr	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
7,040	8,448	5,632

Reviewed By (print and sign)	Date
Clifford Stephen [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-17-06	ESID Number: 015	Probe Serial Number: 0123

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background ~~(CPM)~~ μR/hr	Source Check ~~(NET CPM)~~ μR/hr	P/F*	RCT Initials
Pre	N/A								
Post						N/A	N/A	N/A	
Pre	9-6-06	0800				5	7000	P	
Post	9-7-06	0740				3.5	7896.5	P	DG
Pre	9-7-06	0740				3.5	7896.5	P	DG
Post	9-8-06	0730				5	6995	P	DG
Pre	9-8-06	0730				5	6995	P	DG
Post	9-11-06	0830				5	7995	P	DG
Pre	11-13-06	1300				5	6995	P	BD
Post	11-14-06	0605				5	7995	P	DG
Pre	11-14-06	0605				5	7995	P	DG
Post	11-15-06	0605	N	A		4	7996	P	DG
Pre	11-15-06	0605				4	7996	P	DG
Post	11-16-06	0600				5	7995	P	DG
Pre	11-16-06	0600				5	7995	P	DG
Post	11-17-06	0620				4	7996	P	DG
Pre									
Post									
Pre									
Post		A							
Pre									
Post								A	
Pre	N						N		
Post									
Pre									
Post									
Pre									
Post									

Reviewed By (print and sign)		Date
Clifford Stafh		12/4/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:
Alameda 06	From: 9-1-06 To: 11-19-06	016

Instrument/Probe Information

Instrument Serial Number:	Instrument Type:	Calibration Date:	Calibration Due Date:		
N/A					
Probe Serial Number:	**Probe Type/Model:**	**Calibration Date:**	**Calibration Due Date:**	**Alpha Eff:**	**Beta/Gamma Eff:**
604	Hand E Count	3-30-06	3-30-07	81.6%	49.9%

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
C5-12	Th-230	14K	

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
A2-575	Sr-90/Y-90	10nCi	10/01

Instrument Response Check

Date:	Time:	RCT Name/Signature:	
9-7-06	0900	Bob Dickenson / [signature]	
Alpha Background (CPM):	**Alpha Count Time (min.):**	**Beta/Gamma Background: (CPM)**	**Beta/Gamma Count Time (min):**
1	1	35	1

Count Number	Alpha Source Count Rate (NET CPM)	Beta/Gamma Sources Dose Rate (NET CPM)
1	12779.1	8621.2
2	12819.1	8857.1
3	13023.1	8880.2
4	12908.9	8734.3
5	12860.1	8931.6
6	12895.1	8903.2
7	12981.9	9041.1
8	12701.1	8750.1
9	12834.1	8923.2
10	13009.4	8825.1

Mean Alpha Source Measurement (NET CPM)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
12881.2	15457.4	10304.9
Mean Beta/Gamma Source Measurement (NET CPM)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
8846.7	10616	7077.4

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Clifford Stephen [signature]	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 9-1-06 To: 11-19-06	ESID Number: 016	Probe Serial Number: 604

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	9-26-06	1400	0	13043.9	P	33	8714.2	P	[illegible]
Post	9-27-06	0910	0.5	12831.5	P	37	8836	P	[illegible]
Pre	9-27-06	0910	0.5	12831.5	P	37	8836	P	[illegible]
Post	9-28-06	0735	0.4	12755.5	P	33	8852	P	[illegible]
Pre	11-13-06	1230	0.8	12403.6	P	35	8196.6	P	[illegible]
Post	NOT USED								
Pre	11-15-06	0615	0.8	12661.6	P	35	8636	P	[illegible]
Post	11-16-06	0635	1.6	12511.8	P	32	8443.8	P	[illegible]
Pre	11-17-06	0700	0.9	12118	P	34.2	8132.2	P	DG
Post	11-18-06	0700	0.9	11765.1	P	33.4	8032.7	P	DG
Pre	11-18-06	0700	0.9	11765.1	P	33.4	8032.7	P	DG
Post	11-19-06	0730	0.7	11827.7	P	27.8	7616.8	P	DG
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									

) min BKG
min Count

) min BKG
2 min Count

N/A

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Clifford Stel	12/11/06

α

MODEL NUMBER	HandE Count	INSTRUMENT SERIAL NUMBER	604	CALIBRATION DUE DATE	3-30-07

CHI – SQUARED

(Example)

	$X - X_b$ X_n	$\bar{X}_n - \bar{\ }$ =	$(X_n - \bar{\ })^2$
1	12978.1	80.815	6531.06
2	13055.1	157.815	24905.57
3	12913.1	15.815	250.11
4	12847.1	50.185	2518.53
5	12779.1	118.185	13967.69
6	12819.1	78.185	611289
7	13023.1	125.815	15829.41
8	12908.9	11.615	134.91
9	12860.1	37.185	1382.72
10	12895.1	2.185	4.77
11	12981.9	84.615	7159.7
12	12701.1	196.185	3848855
13	12834.1	63.185	3992.34
14	13009.4	112.115	12569.77
15	12930.1	32.815	1056.15
16	12970.1	72.815	5302.02
17	12918.1	20.815	433.26
18	12661.1	236.185	55783.35
19	13016.9	119.615	14307.75
20	12844.1	53.185	2828.64
SUM			

257945.7 213559.19

X_b = 0.8

$\Sigma(X_n - \bar{\ })^2$ = 213559.19

ΣX_n = 257945.7

$$\text{Chi-Squared} = \frac{\Sigma(X_n - \bar{\ })^2}{\Sigma X_n}$$

Chi-Squared = 0.8279

If Chi-Squared value is between 0.508 and 1.5072, then instrument is good.

If Chi-Squared value does not fall between 0.508 and 1.5072, repeat procedure.

X.....GROSS COUNTS

X_n.....GROSS COUNTS - BACKGROUND COUNTS

$\bar{\ }$.....AVERAGE OF 20 COUNTS

$(X_n - \bar{\ })$.....NET COUNT - AVERAGE

$(X_n - \bar{\ })^2$.....SQUARE OF THE ABOVE ANSWER

$\Sigma(X_n - \bar{\ })^2$.....SUM OF THE ABOVE SQUARES

ΣX_n.....SUM OF THE ORIGINAL COUNTS

B

MODEL NUMBER	Hand E Count	INSTRUMENT SERIAL NUMBER	604	CALIBRATION DUE DATE	3-30-07

CHI – SQUARED

(Example)

	$X - X_b$ X_n	$\bar{\ } = X_n - \bar{\ }$	$(X_n - \bar{\ })^2$
1	8855.1	17.2	295.8
2	8925.2	87.3	7621.3
3	8836.1	1.8	3.24
4	8824.3	13.6	184.9
5	8621.2	216.2	46959
6	8857.1	19.2	368.6
7	8880.2	42.3	1789.3
8	8734.3	103.6	10732.9
9	8931.6	93.7	8779.7
10	8903.2	65.3	4264.1
11	9041.1	203.2	41290.2
12	8750.1	87.8	7708.8
13	8923.2	85.3	7276.1
14	8825.1	12.8	163.8
15	8541.3	296.6	87971.6
16	8853.2	15.3	234.1
17	8700.1	137.8	18988.8
18	8868.1	30.2	912.04
19	8721.5	116.4	13548.9
20	8859.1	21.2	449.4
SUM			

176451.1 259542.58

X_b = 33

$\Sigma(X_n - \bar{\ })^2$ = 259542.58

ΣX_n = 176451.1

$$\text{Chi-Squared} = \frac{\Sigma(X_n - \bar{\ })^2}{\Sigma X_n}$$

Chi-Squared = 1.4709

If Chi-Squared value is between 0.508 and 1.5072, then instrument is good.

If Chi-Squared value does not fall between 0.508 and 1.5072, repeat procedure.

X.....GROSS COUNTS

X_n.....GROSS COUNTS - BACKGROUND COUNTS

$\bar{\ }$.....AVERAGE OF 20 COUNTS

$(X_n - \bar{\ })$.....NET COUNT - AVERAGE

$(X_n - \bar{\ })^2$.....SQUARE OF THE ABOVE ANSWER

$\Sigma(X_n - \bar{\ })^2$.....SUM OF THE ABOVE SQUARES

ΣX_n.....SUM OF THE ORIGINAL COUNTS

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:
ALAMEDA 06	From: 10-31-06 To: 11-1-06	17

Instrument/Probe Information

Instrument Serial Number:	Instrument Type:	Calibration Date:	Calibration Due Date	
L-223	RSS-112	3-28-06	3-28-07	

Probe Serial Number:	Probe Type/Model:	Calibration Date:	Calibration Due Date:	Alpha Eff:	Beta/Gamma Eff
L-2079	RSS-112	3-22-06	3-22-07	N/A	N/A

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
N/A	N/A	N/A	N/A

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity: A	Assay Date:
51723	Cs-137	9.587 uCi	6-1-04

Instrument Response Check

Date:	Time:	RCT Name/Signature:	
10-31-06	0900	David Gerg / David Gerg	
Alpha Background (cpm):	Alpha Count Time (min.): 1	Beta/Gamma Background: uR/hr	Beta/Gamma Count Time (min):
N/A	N/A	6.8	10

Count Number	Alpha Source Count Rate (cpm)	Beta Sources Count Rate (uR (NET)
1	N/A	149.1
2		149.1
3		149.1
4		148.7
5		148.8
6		148.8
7		148.4
8		146.7
9		146.6
10	N/A	DG ~~155.6~~ 146.8

Mean Alpha Source Net Measurement (cpm)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta Source Net Measurement (NET uR)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
148.21	177.85	118.57

Reviewed By (print and sign)	Date
Clifford Stek	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-31-06 To: 11-14-06	17	-2-2079

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background mR/hr ~~cpm~~	Source Check mR/hr (netcpm)	P/F*	RCT Initials
Pre	10-31-06	0900	N/A	N/A	N/A	6.8	146.8	P	DG
Post	11-1-06	0615				6.8	130.3	P	DG
Pre	11-1-06	0615				6.8	130.3	P	DG
Post	11-2-06	0620				7.2	148.9	P	DG
Pre	11-2-06	0620				7.2	148.9	P	DG
Post	11-3-06	0615				7.1	148.4	P	DG
Pre	11-3-06	0615				7.1	148.4	P	DG
Post	11-6-06	0630				6.7	149.4	P	MW
Pre	11-6-06	0630				6.7	149.4	P	MW
Post	11-7-06	0525				6.3	147.5	P	DG
Pre	11-7-06	0525				6.3	147.5	P	DG
Post	11-8-06	0515				6.5	144.9	P	DG
Pre	11-8-06	0515				6.5	144.9	P	DG
Post	11-9-06	0600				6.6	148.5	P	DG
Pre	11-9-06	0600				6.6	148.5	P	DG
Post	11-10-06	0630				6.6	147.3	P	DG
Pre	11-10-06	0630				6.6	147.3	P	DG
Post	11-11-06	0700				6.8	149	P	DG
Pre	11-11-06	0700				6.8	149	P	DG
Post	11-12-06	0710				6.4	149.6	P	DG
Pre	11-12-06	0710				6.4	149.6	P	DG
Post	11-13-06	0600				6.5	149.3	P	DG
Pre	11-13-06	0600				6.5	149.3	P	DG
Post	11-14-06	0630	N/A	N/A	N/A	6.6	132.2	P	DG

Reviewed By (print and sign)	Date
Clifford Stephen	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: ~~0-1-06~~ 11-14-06 To: 11-17-06	ESID Number: 17	Probe Serial Number: Z-2079
Alameda 06			

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	11-14-06	0630	N/A	N/A	N/A	6.6	132.2	P	DG
Post	11-15-06	0645				6.4	149.6	P	DG
Pre	11-15-06	0645				6.4	149.6	P	DG
Post	11-16-06	0600				6.5	150.1	P	DG
Pre	11-16-06	0600				6.5	150.1	P	DG
Post	11-17-06	0715				6.5	148.3	P	DG
Pre	11-17-06	0715				6.5	148.3	P	DG
Post	11-17-06	1030				7.7	148.1	P	MW
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post	N	A							
Pre								A	
Post							N		
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post			N/A	N/A	N/A				

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Clifton Sha	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:
ALAMEDA 06	From: 10-31-06 To: 11-17-06	18

Instrument/Probe Information

Instrument Serial Number:	Instrument Type:	Calibration Date:	Calibration Due Date		
K-200	RSS-112	3-28-06	328-07		
Probe Serial Number:	**Probe Type/Model:**	**Calibration Date:**	**Calibration Due Date:**	**Alpha Eff:**	**Beta/Gamma Eff:**
K6905	RSS-112	3-27-06	3-27-07	N/A	N/A

Alpha Source Information

Source Number:	Source Isotope:	Source Activity:	Assay Date:
N/A	N/A	N/A	N/A

Beta/Gamma Source Information

Source Number:	Source Isotope:	Source Activity: A	Assay Date:
51723	Cs-137	9.587 uCi	6-1-04

Instrument Response Check

Date:	Time:	RCT Name/Signature:	
10-31-06	10:00	David Gray / David Gray	
Alpha Background (cpm):	**Alpha Count Time (min.): 1**	**Beta/Gamma Background:**	**Beta/Gamma Count Time (min): 10**
N/A	N/A	~~N/A~~ 29. 7.6 uR	

Count Number	Alpha Source Count Rate (cpm)	Beta Sources Count Rate (~~uR~~ DET)
1	N/A	153.5
2		153.6
3		153.3
4		153.5
5		153.4
6		153.4
7		153.6
8		153.4
9		153.3
10	N/A	153.5

Mean Alpha Source Net Measurement (cpm)	Alpha Upper Bound (average + 20%)	Alpha Lower Bound (average - 20%)
N/A	N/A	N/A
Mean Beta Source Net Measurement (~~uR~~)	**Beta/Gamma Upper Bound (average + 20%)**	**Beta/Gamma Lower Bound (average - 20%)**
153.45	184.14	122.76

Reviewed By (print and sign)	Date
[illegible]	12/11/04

Eberline Services
Environmental Survey Instrument Data Sheet

Project:	Dates Covered	ESID Number:	Probe Serial Number:
ALAMEDA 06	From: 10-31-06 To: 11-14-06	18	K-6905

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (cpm)	Source Check (netcpm)	P/F*	Background ~~(cpm)~~ µR/hr 3D	Source Check (~~netcpm~~ µR/hr) 3D	P/F*	RCT Initials
Pre	10-31-06	1000	N/A	N/A	N/A	7.6 ~~K~~	153.3	P	DG
Post	11-1-06	0615				7.2 ~~K~~	155.3	P	DG
Pre	11-1-06	0615				7.2 ~~K~~	155.3	P	DG
Post	11-2-06	0616				~~7.2~~ 7.5 ~~K~~	153.4 ~~K~~	P	DG
Pre	11-2-06	0615				7.5 ~~K~~	153.4	P	DG
Post	11-3-06	0625				7.4	152.8	P	DG
Pre	11-3-06	0625				7.4	152.8	P	DG
Post	11-6-06	0630				7.2	133.4	P	DG
Pre	11-6-06	0630				7.2	133.4	P	DG
Post	11-7-06	0520				7.3	154.9	P	DG
Pre	11-7-06	0520				7.3	154.9	P	DG
Post	11-8-06	0515				7.0	150.9	P	DG
Pre	11-8-06	0515				7.0	150.9	P	DG
Post	11-9-06	0600				7.2	153.9	P	DG
Pre	11-9-06	0600				7.2	153.9	P	DG
Post	11-10-06	0610				7.1	152.4	P	MW
Pre	11-10-06	0610				7.1	152.4	P	MW
Post	11-11-06	0700				7.1	152.5	P	DG
Pre	11-11-06	0700				7.1	152.5	P	DG
Post	11-12-06	0710				5.6	156.3	P	DG
Pre	11-12-06	0710				5.6	156.3	P	DG
Post	11-13-06	0600				7.2	154.7	P	DG
Pre	11-13-06	0600				7.2	154.7	P	DG
Post	11-14-06	0630	N/A	N/A	N/A	7.1	146.9	P	DG

Reviewed By (print and sign)	Date
Clifford Steph	12/11/06

Eberline Services
Environmental Survey Instrument Data Sheet

Project: Alameda 06	Dates Covered From: 11-14-06 To: 11-17-06	ESID Number: 68	Probe Serial Number: K6905

Operational Checks

			Alpha			Beta/Gamma			
	Date	Time	Background (CPM)	Source Check (NET CPM)	P/F*	Background (CPM)	Source Check (NET CPM)	P/F*	RCT Initials
Pre	11-14-06	0630	N/A	N/A	N/A	7.1	146.9	P	DG
Post	11-15-06	0650				7.0	155.0	P	DG
Pre	11-15-06	0650				7.0	155.0	P	DG
Post	11-16-06	0600				6.8	141.8	P	DG
Pre	11-16-06	0600				6.8	141.8	P	DG
Post	11-17-06	0615				6.9	153.5	P	DG
Pre	11-17-06	0615				6.9	153.5	P	DG
Post	11-17-06	1030				7.7	153.5	P	MW
Pre	N/A	N/A							
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre							N/A		
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post									
Pre									
Post			N/A	N/A	N/A				

Reviewed By (print and sign)	Date
Clifford Stan	12/11/06

ATTACHMENT 1

QUALITY CONTROL DATA FORM

Detector Name Daffy Shield Pb

Source IDs: 51592

Peak 1 Energy Range (±1.0 keV): 1173.2	Peak 2 Energy Range (±1.0 keV): 1332.5
Net Area Range: N/A	Net Area Range: N/A
FWHM Range: 1.5 - 3	FWHM Range: 1.5 - 3

Ranges valid through: 12/01/06

Date	Filename	Centroid Energy (keV)	Net Area	FWHM	Acceptable? (Y/N)	Initials
11-04-06	110406 QC	1173.19	N/A	2.36	Y	BD
11-04-06	110406 QC	1332.76	N/A	2.41	Y	BD
11-11-06	111106 QC	1174.03	N/A	2.42	Y	BD
11-11-06	111106 QC	1333.44	N/A	2.57	Y	BD
11-12-06	111206 QC	1172.89	N/A	2.36	Y	BD
11-12-06	111206 QC	1332.40	N/A	2.26	Y	BD
11-13-06	111306 QC	1172.92	N/A	2.79	Y	BD
11-13-06	111306 QC	1332.41	N/A	2.58	Y	BD
11-14-06	111406 QC	1173.02	N/A	~~2~~ 3.0	Y	BD
11-14-06	111406 QC	1333.03	N/A	2.72	Y	BD
11-15-06	111506 QC	1172.75	N/A	3.0	Y	BD
11-15-06	111506 QC	1332.40	N/A	~~2~~ 2.65	Y	BD
11-16-06	111606 QC	1172.92	N/A	2.06	Y	BD
11-16-06	111606 QC	1332.49	N/A	2.08	Y	BD
11-17-06	111706 QC	1173.53	N/A	2.76	Y	BD
11-17-06	111706 QC	1333.14	N/A	2.85	Y	BD

FWHM Acceptance Criteria: 1.5 – 3.0

ATTACHMENT 1

QUALITY CONTROL DATA FORM

Detector Name Daffy Shield N/A

Source IDs: 51592

Peak 1 Energy Range (±1.0 keV): 1173.2	Peak 2 Energy Range (±1.0 keV): 1332.5
Net Area Range: N/A	Net Area Range: N/A
FWHM Range: 1.5 – 3	FWHM Range: 1.5 - 3

Ranges valid through: 12/01/06

Date	Filename	Centroid Energy (keV)	Net Area	FWHM	Acceptable? (Y/N)	Initials
11-18-06	111806 QC	1173.15	N/A	2.37	Y	BD
11-18-06	111806 QC	1332.53	N/A	2.04	Y	BD
			N/A			
			N/A			
			N/A			
			N/A			
			N/A			
			N/A		N/A	
	N/A		N/A			
			N/A		N/A	
			N/A			
			N/A			
			N/A			
			N/A			
			N/A			

FWHM Acceptance Criteria: 1.5 – 3.0

Attachment 2

HpGe Equipment Operating Form

Date	Action	Initials
11-04-06	Energy Cal'd. Adjusted fine gain to 0.6244 x4	BD
11-11-06	Energy Cal'd. Adjusted fine gain to 0.6268 x4.	BD
11-12-06	Energy Cal'd. Fine gain ok. Left @ 0.6268 x4	BD
11-13-06	Energy Cal'd. FINE GAIN OK. LEFT @ 0.6268 x4	BD
11-14-06	Energy Cal'd. Fine Gain ok. Left @ 0.6268 x4	BD
11-15-06	Energy Cal'd. Adjusted fine gain to 0.6267 x4	BD
11-16-06	Energy Cal'd. Fine gain ok. Left @ 0.6267.	BD
11-17-06	Energy Cal'd. Fine gain ok. Left @ 0.6267	BD
11-18-06	Energy Cal'd. Fine gain ok. Left @ 0.6267	BD
	A	
	N	

APPENDIX I

BACKGROUND REFERENCE AREA STATIC SURVEY DATA

I.1 NAI DETECTOR STATIC COUNT RATE

I.2 SCAN MEASUREMENTS (TOWED ARRAY)

I.3 PRESSURIZED ION CHAMBER MEASUREMENTS

I.4 MICROREM METER MEASUREMENTS

APPENDIX I – BACKGROUND REFERENCE AREA STATIC SURVEY DATA IS CONTAINED IN ELECTRONIC FORMAT ONLY

TO VIEW THE DATA, CONTACT:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

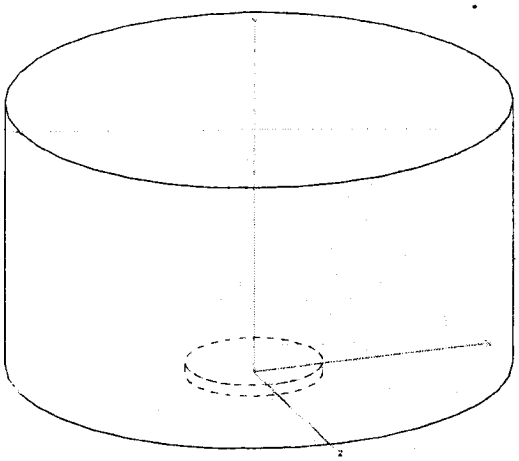
APPENDIX J

MICROSHIELD MODELING RESULTS

MicroShield v5.05 (5.05-00212)

Page : 1
DOS File: ANSRASO3.MS5
Run Date: April 2, 2007
Run Time: 11:47:22 AM
Duration: 00:00:21

Case Title: Alameda 3" Offset
Description: Detector Offset 0"-10"
Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions

Height	1.27 cm	0.5 in
Radius	7.62 cm	3.0 in

Dose Points

	X	Y	Z
# 1	25.4 cm	39.37 cm	0 cm
	10.0 in	1 ft 3.5 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	14.137 in³	Radium	5
Shield 1	12.0 in	Concrete	1.6
Air Gap		Air	0.00122
Immersion		Concrete	1.6

Source Input
Grouping Method : Linear Energy
Number of Groups : 25
Lower Energy Cutoff : 0.015
Photons < 0.015 : Excluded
Library : Grove

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Bi-210	6.3310e-004	2.3425e+007	2.7328e+000	1.0111e+005
Bi-214	2.9351e-006	1.0860e+005	1.2669e-002	4.6877e+002
Pb-210	6.3272e-004	2.3411e+007	2.7312e+000	1.0105e+005
Pb-214	2.9351e-006	1.0860e+005	1.2669e-002	4.6877e+002
Po-210	6.4401e-004	2.3828e+007	2.7799e+000	1.0286e+005
Po-214	2.9345e-006	1.0858e+005	1.2667e-002	4.6868e+002
Po-218	2.9357e-006	1.0862e+005	1.2672e-002	4.6887e+002
Ra-226	2.9357e-006	1.0862e+005	1.2672e-002	4.6887e+002
Rn-222	2.9357e-006	1.0862e+005	1.2672e-002	4.6887e+002

Buildup
The material reference is : Shield 1

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0474	9.745e+05	1.980e-12	1.168e-11	5.889e-15	3.474e-14

DOS File: ANSRASO3.MS5
Run Date: April 2, 2007
Run Time: 11:47:22 AM
Duration: 00:00:21

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.1862	3.563e+03	1.434e-06	5.167e-05	2.490e-09	8.972e-08
0.2798	3.054e+04	1.399e-04	3.915e-03	2.628e-07	7.355e-06
0.3527	4.126e+04	6.002e-04	1.310e-02	1.159e-06	2.529e-05
0.4644	1.951e+03	9.544e-05	1.486e-03	1.872e-07	2.914e-06
0.5579	6.860e+02	6.840e-05	8.481e-04	1.340e-07	1.661e-06
0.6112	5.196e+04	7.220e-03	8.011e-02	1.408e-05	1.562e-04
0.7646	8.107e+03	2.429e-03	2.069e-02	4.645e-06	3.955e-05
0.8156	2.407e+03	8.902e-04	7.041e-03	1.689e-06	1.336e-05
0.9363	4.015e+03	2.299e-03	1.558e-02	4.282e-06	2.903e-05
1.0605	6.548e+02	5.478e-04	3.248e-03	9.991e-07	5.925e-06
1.1298	2.238e+04	2.258e-02	1.254e-01	4.067e-05	2.258e-04
1.2359	6.953e+03	9.095e-03	4.615e-02	1.607e-05	8.152e-05
1.2827	1.739e+03	2.528e-03	1.237e-02	4.426e-06	2.166e-05
1.3908	9.516e+03	1.731e-02	7.850e-02	2.971e-05	1.347e-04
1.5173	3.247e+03	7.464e-03	3.132e-02	1.252e-05	5.254e-05
1.623	2.690e+03	7.372e-03	2.922e-02	1.214e-05	4.810e-05
1.7581	2.068e+04	6.944e-02	2.581e-01	1.117e-04	4.151e-04
1.846	2.690e+03	1.019e-02	3.647e-02	1.616e-05	5.781e-05
1.8833	4.394e+02	1.749e-03	6.162e-03	2.755e-06	9.708e-06
2.1186	1.275e+03	6.722e-03	2.172e-02	1.021e-05	3.298e-05
2.2042	5.412e+03	3.127e-02	9.825e-02	4.689e-05	1.473e-04
2.2934	3.536e+02	2.237e-03	6.839e-03	3.312e-06	1.012e-05
2.4479	1.693e+03	1.240e-02	3.627e-02	1.797e-05	5.256e-05
TOTALS:	1.199e+06	2.147e-01	9.328e-01	3.519e-04	1.571e-03

	Sensitivity	Variable	X Dose Point 1	(1 of 13)	(0 in)
0.0474	9.745e+05	8.879e-11	4.899e-10	2.641e-13	1.457e-12
0.1862	3.563e+03	7.190e-06	2.064e-04	1.249e-08	3.585e-07
0.2798	3.054e+04	5.930e-04	1.306e-02	1.114e-06	2.453e-05
0.3527	4.126e+04	2.293e-03	3.932e-02	4.426e-06	7.590e-05
0.4644	1.951e+03	3.229e-04	3.992e-03	6.332e-07	7.829e-06
0.5579	6.860e+02	2.150e-04	2.140e-03	4.211e-07	4.192e-06
0.6112	5.196e+04	2.193e-02	1.964e-01	4.275e-05	3.830e-04
0.7646	8.107e+03	6.816e-03	4.759e-02	1.303e-05	9.098e-05
0.8156	2.407e+03	2.444e-03	1.593e-02	4.639e-06	3.023e-05
0.9363	4.015e+03	6.038e-03	3.410e-02	1.125e-05	6.352e-05
1.0605	6.548e+02	1.385e-03	6.909e-03	2.527e-06	1.260e-05
1.1298	2.238e+04	5.605e-02	2.631e-01	1.010e-04	4.739e-04
1.2359	6.953e+03	2.201e-02	9.503e-02	3.887e-05	1.679e-04
1.2827	1.739e+03	6.054e-03	2.528e-02	1.060e-05	4.427e-05
1.3908	9.516e+03	4.056e-02	1.579e-01	6.962e-05	2.710e-04
1.5173	3.247e+03	1.711e-02	6.198e-02	2.869e-05	1.040e-04
1.623	2.690e+03	1.662e-02	5.715e-02	2.736e-05	9.407e-05
1.7581	2.068e+04	1.537e-01	4.982e-01	2.471e-04	8.012e-04
1.846	2.690e+03	2.231e-02	6.988e-02	3.536e-05	1.108e-04
1.8833	4.394e+02	3.810e-03	1.177e-02	6.002e-06	1.854e-05
2.1186	1.275e+03	1.429e-02	4.082e-02	2.169e-05	6.199e-05
2.2042	5.412e+03	6.593e-02	1.837e-01	9.885e-05	2.755e-04

DOS File: ANSRASO3.MS5
Run Date: April 2, 2007
Run Time: 11:47:22 AM
Duration: 00:00:21

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
2.2934	3.536e+02	4.681e-03	1.273e-02	6.928e-06	1.884e-05
2.4479	1.693e+03	2.562e-02	6.696e-02	3.712e-05	9.703e-05
TOTALS:	1.199e+06	4.907e-01	1.904e+00	8.100e-04	3.232e-03
	Sensitivity	Variable	X Dose Point 1	(2 of 13)	(1 in)
0.0474	9.745e+05	8.405e-11	4.650e-10	2.500e-13	1.383e-12
0.1862	3.563e+03	7.025e-06	2.022e-04	1.220e-08	3.511e-07
0.2798	3.054e+04	5.827e-04	1.289e-02	1.095e-06	2.421e-05
0.3527	4.126e+04	2.262e-03	3.896e-02	4.367e-06	7.521e-05
0.4644	1.951e+03	3.198e-04	3.968e-03	6.271e-07	7.782e-06
0.5579	6.860e+02	2.133e-04	2.130e-03	4.178e-07	4.173e-06
0.6112	5.196e+04	2.177e-02	1.957e-01	4.244e-05	3.815e-04
0.7646	8.107e+03	6.777e-03	4.745e-02	1.296e-05	9.072e-05
0.8156	2.407e+03	2.431e-03	1.589e-02	4.614e-06	3.016e-05
0.9363	4.015e+03	6.010e-03	3.403e-02	1.120e-05	6.339e-05
1.0605	6.548e+02	1.380e-03	6.898e-03	2.516e-06	1.258e-05
1.1298	2.238e+04	5.583e-02	2.627e-01	1.006e-04	4.732e-04
1.2359	6.953e+03	2.193e-02	9.492e-02	3.874e-05	1.677e-04
1.2827	1.739e+03	6.034e-03	2.525e-02	1.057e-05	4.422e-05
1.3908	9.516e+03	4.044e-02	1.578e-01	6.941e-05	2.708e-04
1.5173	3.247e+03	1.706e-02	6.195e-02	2.862e-05	1.039e-04
1.623	2.690e+03	1.658e-02	5.712e-02	2.729e-05	9.403e-05
.7581	2.068e+04	1.533e-01	4.980e-01	2.466e-04	8.010e-04
.846	2.690e+03	2.226e-02	6.986e-02	3.529e-05	1.107e-04
1.8833	4.394e+02	3.802e-03	1.177e-02	5.990e-06	1.854e-05
2.1186	1.275e+03	1.426e-02	4.082e-02	2.166e-05	6.199e-05
2.2042	5.412e+03	6.583e-02	1.837e-01	9.869e-05	2.755e-04
2.2934	3.536e+02	4.674e-03	1.273e-02	6.918e-06	1.884e-05
2.4479	1.693e+03	2.558e-02	6.697e-02	3.707e-05	9.705e-05
TOTALS:	1.199e+06	4.894e-01	1.902e+00	8.077e-04	3.227e-03
	Sensitivity	Variable	X Dose Point 1	(3 of 13)	(2 in)
0.0474	9.745e+05	7.474e-11	4.142e-10	2.223e-13	1.232e-12
0.1862	3.563e+03	6.655e-06	1.930e-04	1.156e-08	3.351e-07
0.2798	3.054e+04	5.553e-04	1.238e-02	1.043e-06	2.326e-05
0.3527	4.126e+04	2.164e-03	3.757e-02	4.176e-06	7.252e-05
0.4644	1.951e+03	3.071e-04	3.840e-03	6.022e-07	7.531e-06
0.5579	6.860e+02	2.053e-04	2.066e-03	4.021e-07	4.047e-06
0.6112	5.196e+04	2.098e-02	1.899e-01	4.090e-05	3.703e-04
0.7646	8.107e+03	6.547e-03	4.615e-02	1.252e-05	8.824e-05
0.8156	2.407e+03	2.351e-03	1.546e-02	4.461e-06	2.935e-05
0.9363	4.015e+03	5.819e-03	3.315e-02	1.084e-05	6.175e-05
1.0605	6.548e+02	1.337e-03	6.726e-03	2.439e-06	1.227e-05
1.1298	2.238e+04	5.416e-02	2.562e-01	9.756e-05	4.616e-04
1.2359	6.953e+03	2.129e-02	9.264e-02	3.761e-05	1.636e-04
1.2827	1.739e+03	5.860e-03	2.466e-02	1.026e-05	4.317e-05
1.3908	9.516e+03	3.930e-02	1.541e-01	6.745e-05	2.645e-04

DOS File: ANSRASO3.MS5
Run Date: April 2, 2007
Run Time: 11:47:22 AM
Duration: 00:00:21

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
1.5173	3.247e+03	1.659e-02	6.054e-02	2.783e-05	1.015e-04
1.623	2.690e+03	1.613e-02	5.585e-02	2.655e-05	9.193e-05
1.7581	2.068e+04	1.493e-01	4.871e-01	2.401e-04	7.834e-04
1.846	2.690e+03	2.168e-02	6.834e-02	3.437e-05	1.083e-04
1.8833	4.394e+02	3.704e-03	1.151e-02	5.835e-06	1.814e-05
2.1186	1.275e+03	1.390e-02	3.996e-02	2.111e-05	6.068e-05
2.2042	5.412e+03	6.418e-02	1.799e-01	9.623e-05	2.697e-04
2.2934	3.536e+02	4.558e-03	1.246e-02	6.747e-06	1.845e-05
2.4479	1.693e+03	2.496e-02	6.559e-02	3.617e-05	9.505e-05
TOTALS:	1.199e+06	4.759e-01	1.856e+00	7.852e-04	3.150e-03
	Sensitivity	Variable	X Dose Point 1	(4 of 13)	(3 in)
0.0474	9.745e+05	6.147e-11	3.417e-10	1.828e-13	1.017e-12
0.1862	3.563e+03	6.084e-06	1.787e-04	1.057e-08	3.103e-07
0.2798	3.054e+04	5.128e-04	1.159e-02	9.633e-07	2.177e-05
0.3527	4.126e+04	2.010e-03	3.537e-02	3.880e-06	6.828e-05
0.4644	1.951e+03	2.872e-04	3.638e-03	5.632e-07	7.135e-06
0.5579	6.860e+02	1.928e-04	1.964e-03	3.776e-07	3.847e-06
0.6112	5.196e+04	1.973e-02	1.808e-01	3.848e-05	3.525e-04
0.7646	8.107e+03	6.186e-03	4.409e-02	1.183e-05	8.429e-05
0.8156	2.407e+03	2.223e-03	1.478e-02	4.219e-06	2.805e-05
0.9363	4.015e+03	5.517e-03	3.175e-02	1.028e-05	5.914e-05
1.0605	6.548e+02	1.271e-03	6.451e-03	2.317e-06	1.177e-05
1.1298	2.238e+04	5.150e-02	2.459e-01	9.277e-05	4.430e-04
1.2359	6.953e+03	2.027e-02	8.901e-02	3.581e-05	1.572e-04
1.2827	1.739e+03	5.583e-03	2.370e-02	9.776e-06	4.150e-05
1.3908	9.516e+03	3.749e-02	1.482e-01	6.434e-05	2.544e-04
1.5173	3.247e+03	1.585e-02	5.829e-02	2.658e-05	9.776e-05
1.623	2.690e+03	1.542e-02	5.380e-02	2.538e-05	8.856e-05
1.7581	2.068e+04	1.428e-01	4.695e-01	2.297e-04	7.552e-04
1.846	2.690e+03	2.076e-02	6.591e-02	3.290e-05	1.045e-04
1.8833	4.394e+02	3.546e-03	1.111e-02	5.587e-06	1.750e-05
2.1186	1.275e+03	1.333e-02	3.857e-02	2.024e-05	5.858e-05
2.2042	5.412e+03	6.157e-02	1.737e-01	9.231e-05	2.604e-04
2.2934	3.536e+02	4.374e-03	1.204e-02	6.475e-06	1.782e-05
2.4479	1.693e+03	2.397e-02	6.338e-02	3.473e-05	9.185e-05
TOTALS:	1.199e+06	4.544e-01	1.784e+00	7.495e-04	3.025e-03
	Sensitivity	Variable	X Dose Point 1	(5 of 13)	(4 in)
0.0474	9.745e+05	4.676e-11	2.612e-10	1.391e-13	7.768e-13
0.1862	3.563e+03	5.378e-06	1.607e-04	9.339e-09	2.791e-07
0.2798	3.054e+04	4.598e-04	1.058e-02	8.638e-07	1.988e-05
0.3527	4.126e+04	1.817e-03	3.257e-02	3.507e-06	6.287e-05
0.4644	1.951e+03	2.620e-04	3.377e-03	5.137e-07	6.623e-06
0.5579	6.860e+02	1.768e-04	1.832e-03	3.463e-07	3.588e-06
0.6112	5.196e+04	1.814e-02	1.690e-01	3.538e-05	3.295e-04
0.7646	8.107e+03	5.720e-03	4.139e-02	1.094e-05	7.913e-05

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.8156	2.407e+03	2.059e-03	1.390e-02	3.908e-06	2.637e-05
0.9363	4.015e+03	5.127e-03	2.991e-02	9.550e-06	5.572e-05
1.0605	6.548e+02	1.184e-03	6.091e-03	2.159e-06	1.111e-05
1.1298	2.238e+04	4.805e-02	2.324e-01	8.656e-05	4.187e-04
1.2359	6.953e+03	1.895e-02	8.424e-02	3.348e-05	1.488e-04
1.2827	1.739e+03	5.223e-03	2.244e-02	9.146e-06	3.929e-05
1.3908	9.516e+03	3.513e-02	1.405e-01	6.029e-05	2.412e-04
1.5173	3.247e+03	1.487e-02	5.532e-02	2.494e-05	9.278e-05
1.623	2.690e+03	1.449e-02	5.110e-02	2.385e-05	8.412e-05
1.7581	2.068e+04	1.344e-01	4.464e-01	2.161e-04	7.180e-04
1.846	2.690e+03	1.955e-02	6.270e-02	3.098e-05	9.938e-05
1.8833	4.394e+02	3.341e-03	1.057e-02	5.263e-06	1.665e-05
2.1186	1.275e+03	1.258e-02	3.675e-02	1.910e-05	5.580e-05
2.2042	5.412e+03	5.814e-02	1.655e-01	8.717e-05	2.482e-04
2.2934	3.536e+02	4.133e-03	1.147e-02	6.117e-06	1.699e-05
2.4479	1.693e+03	2.267e-02	6.045e-02	3.285e-05	8.761e-05
TOTALS	1.199e+06	4.265e-01	1.689e+00	7.030e-04	2.863e-03
	Sensitivity	Variable	X Dose Point 1	(6 of 13)	(5 in)
0.0474	9.745e+05	3.294e-11	1.850e-10	9.798e-14	5.504e-13
0.1862	3.563e+03	4.620e-06	1.412e-04	8.024e-09	2.452e-07
0.2798	3.054e+04	4.012e-04	9.444e-03	7.537e-07	1.774e-05
.3527	4.126e+04	1.600e-03	2.934e-02	3.088e-06	5.664e-05
.4644	1.951e+03	2.332e-04	3.074e-03	4.574e-07	6.028e-06
0.5579	6.860e+02	1.585e-04	1.677e-03	3.104e-07	3.285e-06
0.6112	5.196e+04	1.632e-02	1.551e-01	3.181e-05	3.024e-04
0.7646	8.107e+03	5.182e-03	3.821e-02	9.907e-06	7.306e-05
0.8156	2.407e+03	1.869e-03	1.285e-02	3.547e-06	2.438e-05
0.9363	4.015e+03	4.673e-03	2.774e-02	8.704e-06	5.168e-05
1.0605	6.548e+02	1.083e-03	5.664e-03	1.975e-06	1.033e-05
1.1298	2.238e+04	4.403e-02	2.164e-01	7.931e-05	3.899e-04
1.2359	6.953e+03	1.741e-02	7.857e-02	3.075e-05	1.388e-04
1.2827	1.739e+03	4.801e-03	2.095e-02	8.408e-06	3.668e-05
1.3908	9.516e+03	3.236e-02	1.314e-01	5.553e-05	2.255e-04
1.5173	3.247e+03	1.373e-02	5.179e-02	2.302e-05	8.686e-05
1.623	2.690e+03	1.339e-02	4.789e-02	2.205e-05	7.884e-05
1.7581	2.068e+04	1.244e-01	4.189e-01	2.002e-04	6.737e-04
1.846	2.690e+03	1.812e-02	5.887e-02	2.872e-05	9.331e-05
1.8833	4.394e+02	3.098e-03	9.924e-03	4.881e-06	1.563e-05
2.1186	1.275e+03	1.169e-02	3.457e-02	1.776e-05	5.249e-05
2.2042	5.412e+03	5.408e-02	1.558e-01	8.109e-05	2.335e-04
2.2934	3.536e+02	3.848e-03	1.080e-02	5.695e-06	1.599e-05
2.4479	1.693e+03	2.113e-02	5.696e-02	3.062e-05	8.254e-05
TOTALS:	1.199e+06	3.937e-01	1.576e+00	6.486e-04	2.670e-03
	Sensitivity	Variable	X Dose Point 1	(7 of 13)	(6 in)
0.0474	9.745e+05	2.151e-11	1.217e-10	6.400e-14	3.621e-13

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.1862	3.563e+03	3.853e-06	1.207e-04	6.690e-09	2.097e-07
0.2798	3.054e+04	3.403e-04	8.233e-03	6.394e-07	1.547e-05
0.3527	4.126e+04	1.373e-03	2.589e-02	2.650e-06	4.997e-05
0.4644	1.951e+03	2.029e-04	2.745e-03	3.979e-07	5.384e-06
0.5579	6.860e+02	1.390e-04	1.509e-03	2.723e-07	2.955e-06
0.6112	5.196e+04	1.437e-02	1.400e-01	2.801e-05	2.729e-04
0.7646	8.107e+03	4.604e-03	3.473e-02	8.801e-06	6.640e-05
0.8156	2.407e+03	1.665e-03	1.170e-02	3.159e-06	2.220e-05
0.9363	4.015e+03	4.182e-03	2.536e-02	7.790e-06	4.723e-05
1.0605	6.548e+02	9.733e-04	5.193e-03	1.775e-06	9.471e-06
1.1298	2.238e+04	3.966e-02	1.987e-01	7.144e-05	3.580e-04
1.2359	6.953e+03	1.572e-02	7.230e-02	2.777e-05	1.277e-04
1.2827	1.739e+03	4.342e-03	1.929e-02	7.603e-06	3.378e-05
1.3908	9.516e+03	2.933e-02	1.212e-01	5.034e-05	2.080e-04
1.5173	3.247e+03	1.248e-02	4.787e-02	2.092e-05	8.028e-05
1.623	2.690e+03	1.220e-02	4.432e-02	2.008e-05	7.296e-05
1.7581	2.068e+04	1.136e-01	3.882e-01	1.826e-04	6.244e-04
1.846	2.690e+03	1.655e-02	5.461e-02	2.624e-05	8.655e-05
1.8833	4.394e+02	2.832e-03	9.209e-03	4.461e-06	1.451e-05
2.1186	1.275e+03	1.072e-02	3.213e-02	1.628e-05	4.879e-05
2.2042	5.412e+03	4.962e-02	1.449e-01	7.439e-05	2.172e-04
2.2934	3.536e+02	3.533e-03	1.005e-02	5.229e-06	1.488e-05
2.4479	1.693e+03	1.943e-02	5.305e-02	2.815e-05	7.688e-05
TOTALS:	1.199e+06	3.578e-01	1.451e+00	5.890e-04	2.456e-03

	Sensitivity	Variable	X Dose Point 1	(8 of 13)	(7 in)
0.0474	9.745e+05	1.307e-11	7.457e-11	3.887e-14	2.218e-13
0.1862	3.563e+03	3.121e-06	1.008e-04	5.419e-09	1.750e-07
0.2798	3.054e+04	2.818e-04	7.034e-03	5.294e-07	1.322e-05
0.3527	4.126e+04	1.152e-03	2.241e-02	2.224e-06	4.326e-05
0.4644	1.951e+03	1.729e-04	2.410e-03	3.391e-07	4.727e-06
0.5579	6.860e+02	1.196e-04	1.335e-03	2.342e-07	2.615e-06
0.6112	5.196e+04	1.241e-02	1.244e-01	2.420e-05	2.425e-04
0.7646	8.107e+03	4.018e-03	3.111e-02	7.681e-06	5.948e-05
0.8156	2.407e+03	1.457e-03	1.050e-02	2.765e-06	1.993e-05
0.9363	4.015e+03	3.681e-03	2.286e-02	6.857e-06	4.258e-05
1.0605	6.548e+02	8.609e-04	4.699e-03	1.570e-06	8.570e-06
1.1298	2.238e+04	3.516e-02	1.801e-01	6.334e-05	3.245e-04
1.2359	6.953e+03	1.399e-02	6.570e-02	2.471e-05	1.160e-04
1.2827	1.739e+03	3.868e-03	1.754e-02	6.773e-06	3.072e-05
1.3908	9.516e+03	2.620e-02	1.105e-01	4.498e-05	1.896e-04
1.5173	3.247e+03	1.118e-02	4.372e-02	1.875e-05	7.333e-05
1.623	2.690e+03	1.095e-02	4.055e-02	1.803e-05	6.675e-05
1.7581	2.068e+04	1.022e-01	3.558e-01	1.644e-04	5.722e-04
1.846	2.690e+03	1.492e-02	5.009e-02	2.365e-05	7.939e-05
1.8833	4.394e+02	2.554e-03	8.450e-03	4.024e-06	1.331e-05
2.1186	1.275e+03	9.699e-03	2.955e-02	1.473e-05	4.486e-05
2.2042	5.412e+03	4.494e-02	1.333e-01	6.738e-05	1.999e-04

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
2.2934	3.536e+02	3.203e-03	9.257e-03	4.742e-06	1.370e-05
2.4479	1.693e+03	1.764e-02	4.890e-02	2.557e-05	7.086e-05
TOTALS:	1.199e+06	3.207e-01	1.320e+00	5.275e-04	2.232e-03
	Sensitivity	Variable	X Dose Point 1	(9 of 13)	(8 in)
0.0474	9.745e+05	7.413e-12	4.272e-11	2.205e-14	1.271e-13
0.1862	3.563e+03	2.465e-06	8.230e-05	4.280e-09	1.429e-07
0.2798	3.054e+04	2.279e-04	5.891e-03	4.282e-07	1.107e-05
0.3527	4.126e+04	9.454e-04	1.905e-02	1.825e-06	3.677e-05
0.4644	1.951e+03	1.444e-04	2.082e-03	2.831e-07	4.082e-06
0.5579	6.860e+02	1.009e-04	1.164e-03	1.977e-07	2.279e-06
0.6112	5.196e+04	1.053e-02	1.088e-01	2.053e-05	2.122e-04
0.7646	8.107e+03	3.448e-03	2.748e-02	6.592e-06	5.255e-05
0.8156	2.407e+03	1.254e-03	9.301e-03	2.380e-06	1.765e-05
0.9363	4.015e+03	3.190e-03	2.035e-02	5.942e-06	3.790e-05
1.0605	6.548e+02	7.502e-04	4.200e-03	1.368e-06	7.660e-06
1.1298	2.238e+04	3.073e-02	1.613e-01	5.535e-05	2.906e-04
1.2359	6.953e+03	1.227e-02	5.900e-02	2.167e-05	1.042e-04
1.2827	1.739e+03	3.398e-03	1.577e-02	5.950e-06	2.762e-05
1.3908	9.516e+03	2.309e-02	9.954e-02	3.963e-05	1.709e-04
1.5173	3.247e+03	9.883e-03	3.950e-02	1.658e-05	6.625e-05
1.623	2.690e+03	9.705e-03	3.670e-02	1.598e-05	6.041e-05
.7581	2.068e+04	9.084e-02	3.226e-01	1.461e-04	5.188e-04
.846	2.690e+03	1.328e-02	4.547e-02	2.105e-05	7.207e-05
1.8833	4.394e+02	2.275e-03	7.674e-03	3.584e-06	1.209e-05
2.1186	1.275e+03	8.672e-03	2.690e-02	1.317e-05	4.084e-05
2.2042	5.412e+03	4.023e-02	1.215e-01	6.032e-05	1.821e-04
2.2934	3.536e+02	2.871e-03	8.440e-03	4.249e-06	1.249e-05
2.4479	1.693e+03	1.584e-02	4.464e-02	2.295e-05	6.468e-05
TOTALS:	1.199e+06	2.837e-01	1.187e+00	4.661e-04	2.005e-03
	Sensitivity	Variable	X Dose Point 1	(10 of 13)	(9 in)
0.0474	9.745e+05	3.946e-12	2.300e-11	1.174e-14	6.842e-14
0.1862	3.563e+03	1.900e-06	6.584e-05	3.300e-09	1.143e-07
0.2798	3.054e+04	1.803e-04	4.842e-03	3.388e-07	9.097e-06
0.3527	4.126e+04	7.602e-04	1.592e-02	1.467e-06	3.073e-05
0.4644	1.951e+03	1.183e-04	1.771e-03	2.321e-07	3.472e-06
0.5579	6.860e+02	8.373e-05	9.998e-04	1.640e-07	1.958e-06
0.6112	5.196e+04	8.784e-03	9.396e-02	1.713e-05	1.832e-04
0.7646	8.107e+03	2.914e-03	2.398e-02	5.571e-06	4.585e-05
0.8156	2.407e+03	1.064e-03	8.137e-03	2.019e-06	1.544e-05
0.9363	4.015e+03	2.725e-03	1.790e-02	5.076e-06	3.335e-05
1.0605	6.548e+02	6.449e-04	3.712e-03	1.176e-06	6.770e-06
1.1298	2.238e+04	2.650e-02	1.429e-01	4.773e-05	2.575e-04
1.2359	6.953e+03	1.062e-02	5.243e-02	1.877e-05	9.261e-05
1.2827	1.739e+03	2.947e-03	1.404e-02	5.161e-06	2.458e-05
1.3908	9.516e+03	2.010e-02	8.880e-02	3.450e-05	1.524e-04

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Run Time: 11:47:22 AM
Duration: 00:00:21

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
1.5173	3.247e+03	8.635e-03	3.533e-02	1.448e-05	5.926e-05
1.623	2.690e+03	8.503e-03	3.289e-02	1.400e-05	5.414e-05
1.7581	2.068e+04	7.982e-02	2.898e-01	1.284e-04	4.660e-04
1.846	2.690e+03	1.169e-02	4.089e-02	1.853e-05	6.482e-05
1.8833	4.394e+02	2.004e-03	6.905e-03	3.158e-06	1.088e-05
2.1186	1.275e+03	7.671e-03	2.427e-02	1.165e-05	3.685e-05
2.2042	5.412e+03	3.564e-02	1.097e-01	5.343e-05	1.644e-04
2.2934	3.536e+02	2.546e-03	7.627e-03	3.769e-06	1.129e-05
2.4479	1.693e+03	1.408e-02	4.039e-02	2.040e-05	5.853e-05
TOTALS:	1.199e+06	2.480e-01	1.057e+00	4.071e-04	1.783e-03
	Sensitivity	Variable	X Dose Point 1	(11 of 13)	(10 in)
0.0474	9.745e+05	1.980e-12	1.168e-11	5.889e-15	3.474e-14
0.1862	3.563e+03	1.434e-06	5.167e-05	2.490e-09	8.972e-08
0.2798	3.054e+04	1.399e-04	3.915e-03	2.628e-07	7.355e-06
0.3527	4.126e+04	6.002e-04	1.310e-02	1.159e-06	2.529e-05
0.4644	1.951e+03	9.544e-05	1.486e-03	1.872e-07	2.914e-06
0.5579	6.860e+02	6.840e-05	8.481e-04	1.340e-07	1.661e-06
0.6112	5.196e+04	7.220e-03	8.011e-02	1.408e-05	1.562e-04
0.7646	8.107e+03	2.429e-03	2.069e-02	4.645e-06	3.955e-05
0.8156	2.407e+03	8.902e-04	7.041e-03	1.689e-06	1.336e-05
0.9363	4.015e+03	2.299e-03	1.558e-02	4.282e-06	2.903e-05
1.0605	6.548e+02	5.478e-04	3.248e-03	9.991e-07	5.925e-06
1.1298	2.238e+04	2.258e-02	1.254e-01	4.067e-05	2.258e-04
1.2359	6.953e+03	9.095e-03	4.615e-02	1.607e-05	8.152e-05
1.2827	1.739e+03	2.528e-03	1.237e-02	4.426e-06	2.166e-05
1.3908	9.516e+03	1.731e-02	7.850e-02	2.971e-05	1.347e-04
1.5173	3.247e+03	7.464e-03	3.132e-02	1.252e-05	5.254e-05
1.623	2.690e+03	7.372e-03	2.922e-02	1.214e-05	4.810e-05
1.7581	2.068e+04	6.944e-02	2.581e-01	1.117e-04	4.151e-04
1.846	2.690e+03	1.019e-02	3.647e-02	1.616e-05	5.781e-05
1.8833	4.394e+02	1.749e-03	6.162e-03	2.755e-06	9.708e-06
2.1186	1.275e+03	6.722e-03	2.172e-02	1.021e-05	3.298e-05
2.2042	5.412e+03	3.127e-02	9.825e-02	4.689e-05	1.473e-04
2.2934	3.536e+02	2.237e-03	6.839e-03	3.312e-06	1.012e-05
2.4479	1.693e+03	1.240e-02	3.627e-02	1.797e-05	5.256e-05
TOTALS:	1.199e+06	2.147e-01	9.328e-01	3.519e-04	1.571e-03
	Sensitivity	Variable	X Dose Point 1	(12 of 13)	(11 in)
0.0474	9.745e+05	9.398e-13	5.617e-12	2.795e-15	1.671e-14
0.1862	3.563e+03	1.060e-06	3.984e-05	1.840e-09	6.918e-08
0.2798	3.054e+04	1.066e-04	3.117e-03	2.003e-07	5.855e-06
0.3527	4.126e+04	4.661e-04	1.063e-02	8.998e-07	2.052e-05
0.4644	1.951e+03	7.582e-05	1.231e-03	1.487e-07	2.414e-06
0.5579	6.860e+02	5.511e-05	7.109e-04	1.079e-07	1.392e-06
0.6112	5.196e+04	5.856e-03	6.752e-02	1.142e-05	1.317e-04
0.7646	8.107e+03	2.000e-03	1.766e-02	3.825e-06	3.376e-05

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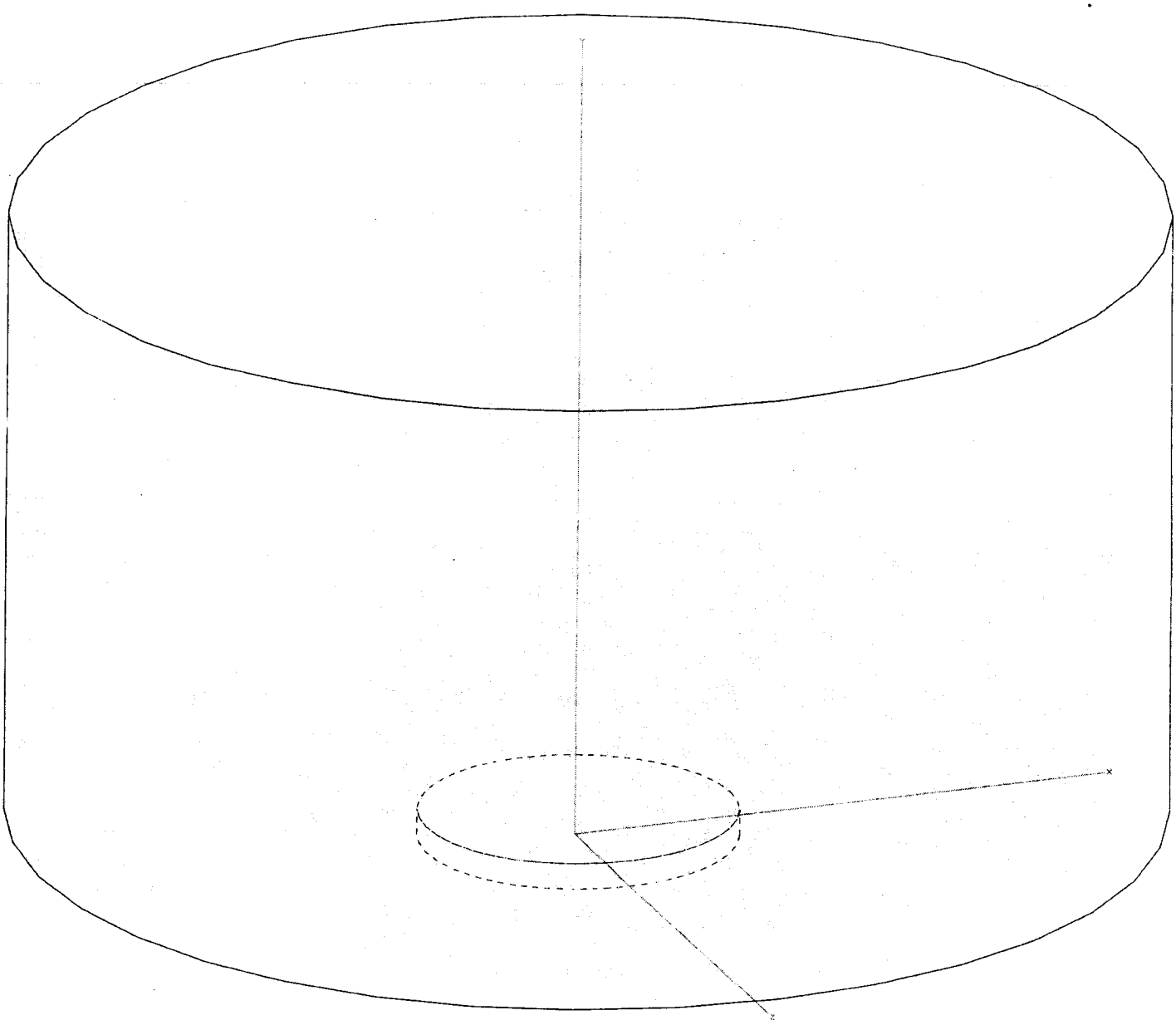
Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.8156	2.407e+03	7.361e-04	6.031e-03	1.397e-06	1.145e-05
0.9363	4.015e+03	1.917e-03	1.344e-02	3.571e-06	2.503e-05
1.0605	6.548e+02	4.602e-04	2.817e-03	8.394e-07	5.138e-06
1.1298	2.238e+04	1.904e-02	1.090e-01	3.429e-05	1.964e-04
1.2359	6.953e+03	7.707e-03	4.027e-02	1.361e-05	7.114e-05
1.2827	1.739e+03	2.146e-03	1.081e-02	3.758e-06	1.893e-05
1.3908	9.516e+03	1.476e-02	6.882e-02	2.533e-05	1.181e-04
1.5173	3.247e+03	6.392e-03	2.755e-02	1.072e-05	4.621e-05
1.623	2.690e+03	6.333e-03	2.576e-02	1.042e-05	4.241e-05
1.7581	2.068e+04	5.987e-02	2.281e-01	9.630e-05	3.669e-04
1.846	2.690e+03	8.807e-03	3.229e-02	1.396e-05	5.118e-05
1.8833	4.394e+02	1.512e-03	5.458e-03	2.382e-06	8.599e-06
2.1186	1.275e+03	5.841e-03	1.930e-02	8.870e-06	2.931e-05
2.2042	5.412e+03	2.722e-02	8.740e-02	4.081e-05	1.310e-04
2.2934	3.536e+02	1.950e-03	6.090e-03	2.887e-06	9.015e-06
2.4479	1.693e+03	1.083e-02	3.235e-02	1.570e-05	4.688e-05
TOTALS:	1.199e+06	1.841e-01	8.165e-01	3.014e-04	1.373e-03
	Sensitivity	Variable	X Dose Point 1	(13 of 13)	(12 in)
0.0474	9.745e+05	4.237e-13	2.568e-12	1.261e-15	7.638e-15
0.1862	3.563e+03	7.690e-07	3.022e-05	1.335e-09	5.248e-08
0.2798	3.054e+04	7.994e-05	2.447e-03	1.502e-07	4.598e-06
0.3527	4.126e+04	3.567e-04	8.517e-03	6.884e-07	1.644e-05
0.4644	1.951e+03	5.943e-05	1.008e-03	1.165e-07	1.978e-06
0.5579	6.860e+02	4.385e-05	5.897e-04	8.588e-08	1.155e-06
0.6112	5.196e+04	4.692e-03	5.634e-02	9.148e-06	1.098e-04
0.7646	8.107e+03	1.629e-03	1.494e-02	3.115e-06	2.856e-05
0.8156	2.407e+03	6.022e-04	5.120e-03	1.143e-06	9.715e-06
0.9363	4.015e+03	1.583e-03	1.149e-02	2.948e-06	2.140e-05
1.0605	6.548e+02	3.829e-04	2.423e-03	6.985e-07	4.419e-06
1.1298	2.238e+04	1.590e-02	9.404e-02	2.865e-05	1.694e-04
1.2359	6.953e+03	6.472e-03	3.488e-02	1.143e-05	6.161e-05
1.2827	1.739e+03	1.806e-03	9.379e-03	3.163e-06	1.642e-05
1.3908	9.516e+03	1.247e-02	5.990e-02	2.141e-05	1.028e-04
1.5173	3.247e+03	5.428e-03	2.406e-02	9.104e-06	4.036e-05
1.623	2.690e+03	5.397e-03	2.256e-02	8.883e-06	3.713e-05
1.7581	2.068e+04	5.122e-02	2.003e-01	8.238e-05	3.222e-04
1.846	2.690e+03	7.551e-03	2.840e-02	1.197e-05	4.501e-05
1.8833	4.394e+02	1.298e-03	4.804e-03	2.044e-06	7.568e-06
2.1186	1.275e+03	5.039e-03	1.705e-02	7.652e-06	2.589e-05
2.2042	5.412e+03	2.352e-02	7.728e-02	3.526e-05	1.159e-04
2.2934	3.536e+02	1.688e-03	5.390e-03	2.499e-06	7.979e-06
2.4479	1.693e+03	9.400e-03	2.868e-02	1.362e-05	4.156e-05
TOTALS:	1.199e+06	1.566e-01	7.096e-01	2.562e-04	1.192e-03



MicroShield v5.05 (5.05-00212)

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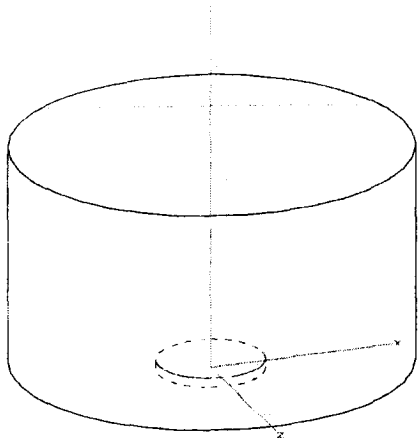
Case Title: Alameda 7.5" Offset
Description: Detector Offset 0"-10"
Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions

Height	1.27 cm	0.5 in
Radius	7.62 cm	3.0 in

Dose Points

	X	Y	Z
# 1	25.4 cm	50.8 cm	0 cm
	10.0 in	1 ft 8.0 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	231.667 cm³	Radium	5
Shield 1	30.48 cm	Concrete	1.6
Air Gap		Air	0.00122
Immersion		Concrete	1.6

Source Input
Grouping Method : Linear Energy
Number of Groups : 25
Lower Energy Cutoff : 0.015
Photons < 0.015 : Excluded
Library : Grove

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Bi-210	1.3578e-004	5.0239e+006	5.8610e-001	2.1686e+004
Bi-214	2.9351e-006	1.0860e+005	1.2670e-002	4.6878e+002
Pb-210	1.3570e-004	5.0209e+006	5.8576e-001	2.1673e+004
Pb-214	2.9351e-006	1.0860e+005	1.2670e-002	4.6878e+002
Po-210	1.3808e-004	5.1090e+006	5.9603e-001	2.2053e+004
Po-214	2.9345e-006	1.0858e+005	1.2667e-002	4.6868e+002
Po-218	2.9357e-006	1.0862e+005	1.2672e-002	4.6887e+002
Ra-226	2.9357e-006	1.0862e+005	1.2672e-002	4.6887e+002
Rn-222	2.9357e-006	1.0862e+005	1.2672e-002	4.6887e+002

Buildup
The material reference is : Shield 1

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0501	2.297e+05	1.152e-11	7.710e-11	3.058e-14	2.046e-13

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.1862	3.563e+03	1.571e-06	5.216e-05	2.728e-09	9.058e-08
0.2798	3.054e+04	1.445e-04	3.709e-03	2.715e-07	6.968e-06
0.3527	4.126e+04	5.974e-04	1.195e-02	1.153e-06	2.307e-05
0.4644	1.951e+03	9.087e-05	1.301e-03	1.782e-07	2.551e-06
0.5579	6.860e+02	6.337e-05	7.254e-04	1.241e-07	1.421e-06
0.6112	5.197e+04	6.604e-03	6.777e-02	1.288e-05	1.321e-04
0.7646	8.107e+03	2.157e-03	1.707e-02	4.123e-06	3.263e-05
0.8167	2.209e+03	7.224e-04	5.311e-03	1.371e-06	1.008e-05
0.9363	4.016e+03	1.990e-03	1.261e-02	3.708e-06	2.349e-05
1.0605	6.548e+02	4.675e-04	2.600e-03	8.527e-07	4.742e-06
1.1298	2.238e+04	1.913e-02	9.981e-02	3.446e-05	1.798e-04
1.2359	6.953e+03	7.632e-03	3.647e-02	1.348e-05	6.443e-05
1.2827	1.739e+03	2.113e-03	9.749e-03	3.700e-06	1.707e-05
1.3908	9.516e+03	1.435e-02	6.148e-02	2.462e-05	1.055e-04
1.5173	3.247e+03	6.135e-03	2.438e-02	1.029e-05	4.088e-05
1.623	2.690e+03	6.021e-03	2.263e-02	9.911e-06	3.726e-05
1.7581	2.068e+04	5.631e-02	1.989e-01	9.056e-05	3.198e-04
1.846	2.690e+03	8.230e-03	2.802e-02	1.304e-05	4.441e-05
1.8833	4.394e+02	1.409e-03	4.728e-03	2.220e-06	7.449e-06
2.1186	1.275e+03	5.367e-03	1.656e-02	8.149e-06	2.515e-05
2.2042	5.412e+03	2.489e-02	7.476e-02	3.732e-05	1.121e-04
2.2934	3.536e+02	1.775e-03	5.194e-03	2.628e-06	7.688e-06
2.4479	1.693e+03	9.791e-03	2.746e-02	1.419e-05	3.980e-05
TOTALS:	4.538e+05	1.760e-01	7.332e-01	2.892e-04	1.239e-03
	Sensitivity	Variable	X Dose Point 1	(1 of 13)	(0 cm)
0.0501	2.297e+05	1.130e-10	7.175e-10	2.999e-13	1.904e-12
0.1862	3.563e+03	4.409e-06	1.261e-04	7.656e-09	2.189e-07
0.2798	3.054e+04	3.638e-04	7.975e-03	6.835e-07	1.498e-05
0.3527	4.126e+04	1.405e-03	2.398e-02	2.712e-06	4.629e-05
0.4644	1.951e+03	1.975e-04	2.430e-03	3.873e-07	4.765e-06
0.5579	6.860e+02	1.313e-04	1.301e-03	2.572e-07	2.548e-06
0.6112	5.197e+04	1.338e-02	1.194e-01	2.609e-05	2.327e-04
0.7646	8.107e+03	4.153e-03	2.888e-02	7.940e-06	5.522e-05
0.8167	2.209e+03	1.372e-03	8.892e-03	2.603e-06	1.687e-05
0.9363	4.016e+03	3.675e-03	2.067e-02	6.846e-06	3.851e-05
1.0605	6.548e+02	8.424e-04	4.187e-03	1.536e-06	7.637e-06
1.1298	2.238e+04	3.407e-02	1.594e-01	6.137e-05	2.871e-04
1.2359	6.953e+03	1.337e-02	5.755e-02	2.362e-05	1.017e-04
1.2827	1.739e+03	3.678e-03	1.531e-02	6.440e-06	2.681e-05
1.3908	9.516e+03	2.463e-02	9.557e-02	4.227e-05	1.640e-04
1.5173	3.247e+03	1.038e-02	3.751e-02	1.742e-05	6.291e-05
1.623	2.690e+03	1.008e-02	3.458e-02	1.660e-05	5.692e-05
1.7581	2.068e+04	9.320e-02	3.013e-01	1.499e-04	4.846e-04
1.846	2.690e+03	1.353e-02	4.226e-02	2.144e-05	6.698e-05
1.8833	4.394e+02	2.310e-03	7.119e-03	3.640e-06	1.121e-05
2.1186	1.275e+03	8.659e-03	2.468e-02	1.315e-05	3.748e-05
2.2042	5.412e+03	3.995e-02	1.111e-01	5.990e-05	1.665e-04

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
2.2934	3.536e+02	2.836e-03	7.692e-03	4.198e-06	1.139e-05
2.4479	1.693e+03	1.552e-02	4.047e-02	2.249e-05	5.864e-05
TOTALS:	4.538e+05	2.978e-01	1.152e+00	4.915e-04	1.956e-03
	Sensitivity	Variable	X Dose Point 1	(2 of 13)	(2.54 cm)
0.0501	2.297e+05	1.096e-10	6.971e-10	2.909e-13	1.850e-12
0.1862	3.563e+03	4.338e-06	1.242e-04	7.534e-09	2.156e-07
0.2798	3.054e+04	3.590e-04	7.895e-03	6.744e-07	1.483e-05
0.3527	4.126e+04	1.391e-03	2.383e-02	2.685e-06	4.599e-05
0.4644	1.951e+03	1.962e-04	2.421e-03	3.848e-07	4.748e-06
0.5579	6.860e+02	1.307e-04	1.298e-03	2.559e-07	2.543e-06
0.6112	5.197e+04	1.333e-02	1.192e-01	2.598e-05	2.323e-04
0.7646	8.107e+03	4.141e-03	2.886e-02	7.918e-06	5.518e-05
0.8167	2.209e+03	1.368e-03	8.888e-03	2.596e-06	1.686e-05
0.9363	4.016e+03	3.668e-03	2.067e-02	6.833e-06	3.851e-05
1.0605	6.548e+02	8.412e-04	4.188e-03	1.534e-06	7.640e-06
1.1298	2.238e+04	3.403e-02	1.595e-01	6.130e-05	2.872e-04
1.2359	6.953e+03	1.336e-02	5.759e-02	2.360e-05	1.017e-04
1.2827	1.739e+03	3.675e-03	1.532e-02	6.435e-06	2.683e-05
1.3908	9.516e+03	2.462e-02	9.567e-02	4.225e-05	1.642e-04
1.5173	3.247e+03	1.038e-02	3.756e-02	1.741e-05	6.299e-05
1.623	2.690e+03	1.008e-02	3.462e-02	1.660e-05	5.699e-05
.7581	2.068e+04	9.320e-02	3.018e-01	1.499e-04	4.853e-04
.846	2.690e+03	1.353e-02	4.232e-02	2.145e-05	6.708e-05
1.8833	4.394e+02	2.311e-03	7.129e-03	3.640e-06	1.123e-05
2.1186	1.275e+03	8.662e-03	2.472e-02	1.315e-05	3.754e-05
2.2042	5.412e+03	3.997e-02	1.113e-01	5.993e-05	1.668e-04
2.2934	3.536e+02	2.837e-03	7.706e-03	4.200e-06	1.141e-05
2.4479	1.693e+03	1.553e-02	4.054e-02	2.250e-05	5.875e-05
TOTALS:	4.538e+05	2.976e-01	1.153e+00	4.912e-04	1.957e-03
	Sensitivity	Variable	X Dose Point 1	(3 of 13)	(5.08 cm)
0.0501	2.297e+05	1.021e-10	6.502e-10	2.709e-13	1.726e-12
0.1862	3.563e+03	4.195e-06	1.206e-04	7.284e-09	2.095e-07
0.2798	3.054e+04	3.484e-04	7.702e-03	6.545e-07	1.447e-05
0.3527	4.126e+04	1.353e-03	2.330e-02	2.612e-06	4.497e-05
0.4644	1.951e+03	1.913e-04	2.373e-03	3.752e-07	4.654e-06
0.5579	6.860e+02	1.276e-04	1.274e-03	2.500e-07	2.495e-06
0.6112	5.197e+04	1.302e-02	1.170e-01	2.539e-05	2.281e-04
0.7646	8.107e+03	4.054e-03	2.837e-02	7.751e-06	5.425e-05
0.8167	2.209e+03	1.340e-03	8.741e-03	2.543e-06	1.659e-05
0.9363	4.016e+03	3.596e-03	2.035e-02	6.698e-06	3.790e-05
1.0605	6.548e+02	8.252e-04	4.124e-03	1.505e-06	7.522e-06
1.1298	2.238e+04	3.340e-02	1.570e-01	6.016e-05	2.829e-04
1.2359	6.953e+03	1.312e-02	5.675e-02	2.317e-05	1.002e-04
1.2827	1.739e+03	3.609e-03	1.510e-02	6.320e-06	2.644e-05
1.3908	9.516e+03	2.419e-02	9.431e-02	4.151e-05	1.619e-04

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Run Time: 1:19:09 PM
Duration: 00:00:21

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
1.5173	3.247e+03	1.020e-02	3.703e-02	1.711e-05	6.211e-05
1.623	2.690e+03	9.915e-03	3.415e-02	1.632e-05	5.621e-05
1.7581	2.068e+04	9.168e-02	2.977e-01	1.475e-04	4.788e-04
1.846	2.690e+03	1.331e-02	4.176e-02	2.110e-05	6.619e-05
1.8833	4.394e+02	2.274e-03	7.034e-03	3.582e-06	1.108e-05
2.1186	1.275e+03	8.527e-03	2.440e-02	1.295e-05	3.705e-05
2.2042	5.412e+03	3.936e-02	1.098e-01	5.901e-05	1.647e-04
2.2934	3.536e+02	2.794e-03	7.607e-03	4.136e-06	1.126e-05
2.4479	1.693e+03	1.529e-02	4.003e-02	2.216e-05	5.800e-05
TOTALS:	4.538e+05	2.925e-01	1.136e+00	4.828e-04	1.928e-03
	Sensitivity	Variable	X Dose Point 1	(4 of 13)	(7.62 cm)
0.0501	2.297e+05	9.070e-11	5.792e-10	2.407e-13	1.537e-12
0.1862	3.563e+03	3.967e-06	1.150e-04	6.888e-09	1.997e-07
0.2798	3.054e+04	3.315e-04	7.392e-03	6.228e-07	1.389e-05
0.3527	4.126e+04	1.293e-03	2.244e-02	2.495e-06	4.332e-05
0.4644	1.951e+03	1.835e-04	2.295e-03	3.600e-07	4.501e-06
0.5579	6.860e+02	1.227e-04	1.235e-03	2.404e-07	2.419e-06
0.6112	5.197e+04	1.254e-02	1.135e-01	2.445e-05	2.213e-04
0.7646	8.107e+03	3.914e-03	2.759e-02	7.483e-06	5.274e-05
0.8167	2.209e+03	1.295e-03	8.503e-03	2.457e-06	1.613e-05
0.9363	4.016e+03	3.479e-03	1.981e-02	6.481e-06	3.691e-05
1.0605	6.548e+02	7.995e-04	4.020e-03	1.458e-06	7.332e-06
1.1298	2.238e+04	3.238e-02	1.531e-01	5.832e-05	2.759e-04
1.2359	6.953e+03	1.273e-02	5.537e-02	2.248e-05	9.780e-05
1.2827	1.739e+03	3.503e-03	1.473e-02	6.134e-06	2.580e-05
1.3908	9.516e+03	2.349e-02	9.208e-02	4.032e-05	1.580e-04
1.5173	3.247e+03	9.918e-03	3.618e-02	1.664e-05	6.068e-05
1.623	2.690e+03	9.642e-03	3.337e-02	1.587e-05	5.493e-05
1.7581	2.068e+04	8.922e-02	2.910e-01	1.435e-04	4.681e-04
1.846	2.690e+03	1.296e-02	4.084e-02	2.054e-05	6.473e-05
1.8833	4.394e+02	2.214e-03	6.880e-03	3.487e-06	1.084e-05
2.1186	1.275e+03	8.309e-03	2.388e-02	1.262e-05	3.626e-05
2.2042	5.412e+03	3.836e-02	1.075e-01	5.751e-05	1.611e-04
2.2934	3.536e+02	2.724e-03	7.446e-03	4.032e-06	1.102e-05
2.4479	1.693e+03	1.492e-02	3.919e-02	2.162e-05	5.679e-05
TOTALS:	4.538e+05	2.843e-01	1.109e+00	4.691e-04	1.881e-03
	Sensitivity	Variable	X Dose Point 1	(5 of 13)	(10.16 cm)
0.0501	2.297e+05	7.691e-11	4.930e-10	2.041e-13	1.308e-12
0.1862	3.563e+03	3.671e-06	1.077e-04	6.375e-09	1.869e-07
0.2798	3.054e+04	3.096e-04	6.986e-03	5.817e-07	1.313e-05
0.3527	4.126e+04	1.213e-03	2.132e-02	2.342e-06	4.116e-05
0.4644	1.951e+03	1.733e-04	2.192e-03	3.399e-07	4.298e-06
0.5579	6.860e+02	1.163e-04	1.183e-03	2.278e-07	2.317e-06
0.6112	5.197e+04	1.190e-02	1.089e-01	2.321e-05	2.122e-04
0.7646	8.107e+03	3.728e-03	2.653e-02	7.128e-06	5.072e-05

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.8167	2.209e+03	1.235e-03	8.183e-03	2.342e-06	1.553e-05
0.9363	4.016e+03	3.324e-03	1.910e-02	6.192e-06	3.557e-05
1.0605	6.548e+02	7.652e-04	3.879e-03	1.396e-06	7.076e-06
1.1298	2.238e+04	3.101e-02	1.479e-01	5.587e-05	2.664e-04
1.2359	6.953e+03	1.221e-02	5.351e-02	2.156e-05	9.452e-05
1.2827	1.739e+03	3.361e-03	1.425e-02	5.885e-06	2.495e-05
1.3908	9.516e+03	2.256e-02	8.909e-02	3.873e-05	1.529e-04
1.5173	3.247e+03	9.536e-03	3.503e-02	1.599e-05	5.875e-05
1.623	2.690e+03	9.278e-03	3.233e-02	1.527e-05	5.322e-05
1.7581	2.068e+04	8.591e-02	2.821e-01	1.382e-04	4.537e-04
1.846	2.690e+03	1.249e-02	3.960e-02	1.979e-05	6.276e-05
1.8833	4.394e+02	2.133e-03	6.672e-03	3.361e-06	1.051e-05
2.1186	1.275e+03	8.016e-03	2.317e-02	1.217e-05	3.519e-05
2.2042	5.412e+03	3.702e-02	1.043e-01	5.551e-05	1.564e-04
2.2934	3.536e+02	2.630e-03	7.229e-03	3.893e-06	1.070e-05
2.4479	1.693e+03	1.441e-02	3.806e-02	2.088e-05	5.516e-05
TOTALS:	4.538e+05	2.733e-01	1.072e+00	4.509e-04	1.817e-03
	Sensitivity	Variable	X Dose Point 1	(6 of 13)	(12.7 cm)
0.0501	2.297e+05	6.230e-11	4.012e-10	1.653e-13	1.065e-12
0.1862	3.563e+03	3.335e-06	9.924e-05	5.791e-09	1.723e-07
0.2798	3.054e+04	2.843e-04	6.510e-03	5.341e-07	1.223e-05
0.3527	4.126e+04	1.121e-03	1.999e-02	2.164e-06	3.858e-05
0.4644	1.951e+03	1.612e-04	2.067e-03	3.161e-07	4.054e-06
0.5579	6.860e+02	1.086e-04	1.120e-03	2.128e-07	2.193e-06
0.6112	5.197e+04	1.114e-02	1.032e-01	2.172e-05	2.013e-04
0.7646	8.107e+03	3.506e-03	2.525e-02	6.702e-06	4.827e-05
0.8167	2.209e+03	1.162e-03	7.795e-03	2.205e-06	1.479e-05
0.9363	4.016e+03	3.137e-03	1.822e-02	5.844e-06	3.395e-05
1.0605	6.548e+02	7.238e-04	3.708e-03	1.320e-06	6.764e-06
1.1298	2.238e+04	2.937e-02	1.415e-01	5.290e-05	2.548e-04
1.2359	6.953e+03	1.158e-02	5.125e-02	2.045e-05	9.052e-05
1.2827	1.739e+03	3.189e-03	1.365e-02	5.585e-06	2.390e-05
1.3908	9.516e+03	2.144e-02	8.544e-02	3.679e-05	1.466e-04
1.5173	3.247e+03	9.072e-03	3.362e-02	1.522e-05	5.639e-05
1.623	2.690e+03	8.835e-03	3.105e-02	1.454e-05	5.111e-05
1.7581	2.068e+04	8.190e-02	2.712e-01	1.317e-04	4.361e-04
1.846	2.690e+03	1.191e-02	3.808e-02	1.888e-05	6.035e-05
1.8833	4.394e+02	2.035e-03	6.417e-03	3.207e-06	1.011e-05
2.1186	1.275e+03	7.660e-03	2.231e-02	1.163e-05	3.387e-05
2.2042	5.412e+03	3.539e-02	1.005e-01	5.307e-05	1.506e-04
2.2934	3.536e+02	2.515e-03	6.964e-03	3.724e-06	1.031e-05
2.4479	1.693e+03	1.379e-02	3.668e-02	1.999e-05	5.316e-05
TOTALS:	4.538e+05	2.600e-01	1.027e+00	4.287e-04	1.740e-03
	Sensitivity	Variable	X Dose Point 1	(7 of 13)	(15.24 cm)
0.0501	2.297e+05	4.827e-11	3.126e-10	1.281e-13	8.296e-13

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.1862	3.563e+03	2.973e-06	8.998e-05	5.163e-09	1.562e-07
0.2798	3.054e+04	2.563e-04	5.972e-03	4.815e-07	1.122e-05
0.3527	4.126e+04	1.018e-03	1.847e-02	1.965e-06	3.566e-05
0.4644	1.951e+03	1.476e-04	1.926e-03	2.896e-07	3.777e-06
0.5579	6.860e+02	1.000e-04	1.048e-03	1.959e-07	2.052e-06
0.6112	5.197e+04	1.028e-02	9.680e-02	2.005e-05	1.887e-04
0.7646	8.107e+03	3.254e-03	2.378e-02	6.221e-06	4.546e-05
0.8167	2.209e+03	1.081e-03	7.350e-03	2.050e-06	1.395e-05
0.9363	4.016e+03	2.926e-03	1.723e-02	5.450e-06	3.209e-05
1.0605	6.548e+02	6.768e-04	3.512e-03	1.235e-06	6.405e-06
1.1298	2.238e+04	2.750e-02	1.341e-01	4.953e-05	2.416e-04
1.2359	6.953e+03	1.086e-02	4.864e-02	1.918e-05	8.592e-05
1.2827	1.739e+03	2.994e-03	1.296e-02	5.242e-06	2.270e-05
1.3908	9.516e+03	2.015e-02	8.123e-02	3.459e-05	1.394e-04
1.5173	3.247e+03	8.542e-03	3.200e-02	1.433e-05	5.368e-05
1.623	2.690e+03	8.329e-03	2.958e-02	1.371e-05	4.869e-05
1.7581	2.068e+04	7.732e-02	2.585e-01	1.244e-04	4.158e-04
1.846	2.690e+03	1.125e-02	3.632e-02	1.783e-05	5.757e-05
1.8833	4.394e+02	1.924e-03	6.122e-03	3.030e-06	9.645e-06
2.1186	1.275e+03	7.252e-03	2.131e-02	1.101e-05	3.236e-05
2.2042	5.412e+03	3.352e-02	9.600e-02	5.026e-05	1.439e-04
2.2934	3.536e+02	2.384e-03	6.656e-03	3.529e-06	9.853e-06
2.4479	1.693e+03	1.308e-02	3.508e-02	1.896e-05	5.084e-05
TOTALS:	4.538e+05	2.449e-01	9.747e-01	4.035e-04	1.652e-03

	Sensitivity	Variable	X Dose Point 1	(8 of 13)	(17.78 cm)
0.0501	2.297e+05	3.581e-11	2.335e-10	9.504e-14	6.197e-13
0.1862	3.563e+03	2.601e-06	8.024e-05	4.516e-09	1.393e-07
0.2798	3.054e+04	2.273e-04	5.406e-03	4.269e-07	1.016e-05
0.3527	4.126e+04	9.103e-04	1.687e-02	1.757e-06	3.256e-05
0.4644	1.951e+03	1.334e-04	1.774e-03	2.616e-07	3.480e-06
0.5579	6.860e+02	9.090e-05	9.704e-04	1.780e-07	1.901e-06
0.6112	5.197e+04	9.371e-03	8.985e-02	1.827e-05	1.752e-04
0.7646	8.107e+03	2.985e-03	2.218e-02	5.707e-06	4.241e-05
0.8167	2.209e+03	9.930e-04	6.867e-03	1.884e-06	1.303e-05
0.9363	4.016e+03	2.698e-03	1.613e-02	5.027e-06	3.006e-05
1.0605	6.548e+02	6.262e-04	3.297e-03	1.142e-06	6.014e-06
1.1298	2.238e+04	2.548e-02	1.260e-01	4.590e-05	2.271e-04
1.2359	6.953e+03	1.008e-02	4.579e-02	1.781e-05	8.088e-05
1.2827	1.739e+03	2.782e-03	1.221e-02	4.872e-06	2.138e-05
1.3908	9.516e+03	1.876e-02	7.661e-02	3.221e-05	1.315e-04
1.5173	3.247e+03	7.968e-03	3.022e-02	1.336e-05	5.069e-05
1.623	2.690e+03	7.779e-03	2.796e-02	1.281e-05	4.603e-05
1.7581	2.068e+04	7.232e-02	2.447e-01	1.163e-04	3.935e-04
1.846	2.690e+03	1.053e-02	3.439e-02	1.670e-05	5.451e-05
1.8833	4.394e+02	1.802e-03	5.798e-03	2.838e-06	9.135e-06
2.1186	1.275e+03	6.806e-03	2.021e-02	1.034e-05	3.068e-05
2.2042	5.412e+03	3.149e-02	9.107e-02	4.721e-05	1.366e-04

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
2.2934	3.536e+02	2.241e-03	6.318e-03	3.316e-06	9.352e-06
2.4479	1.693e+03	1.231e-02	3.332e-02	1.784e-05	4.828e-05
TOTALS:	4.538e+05	2.284e-01	9.180e-01	3.762e-04	1.554e-03
	Sensitivity	Variable	X Dose Point 1	(9 of 13)	(20.32 cm)
0.0501	2.297e+05	2.550e-11	1.675e-10	6.767e-14	4.446e-13
0.1862	3.563e+03	2.235e-06	7.050e-05	3.880e-09	1.224e-07
0.2798	3.054e+04	1.984e-04	4.829e-03	3.727e-07	9.073e-06
0.3527	4.126e+04	8.023e-04	1.521e-02	1.549e-06	2.937e-05
0.4644	1.951e+03	1.189e-04	1.617e-03	2.331e-07	3.170e-06
0.5579	6.860e+02	8.157e-05	8.893e-04	1.598e-07	1.742e-06
0.6112	5.197e+04	8.436e-03	8.256e-02	1.645e-05	1.610e-04
0.7646	8.107e+03	2.707e-03	2.050e-02	5.176e-06	3.920e-05
0.8167	2.209e+03	9.024e-04	6.357e-03	1.712e-06	1.206e-05
0.9363	4.016e+03	2.462e-03	1.498e-02	4.587e-06	2.791e-05
1.0605	6.548e+02	5.735e-04	3.070e-03	1.046e-06	5.599e-06
1.1298	2.238e+04	2.337e-02	1.175e-01	4.211e-05	2.117e-04
1.2359	6.953e+03	9.272e-03	4.276e-02	1.638e-05	7.553e-05
1.2827	1.739e+03	2.561e-03	1.141e-02	4.484e-06	1.998e-05
1.3908	9.516e+03	1.731e-02	7.170e-02	2.970e-05	1.231e-04
1.5173	3.247e+03	7.364e-03	2.833e-02	1.235e-05	4.751e-05
1.623	2.690e+03	7.201e-03	2.624e-02	1.185e-05	4.319e-05
1.7581	2.068e+04	6.707e-02	2.298e-01	1.079e-04	3.697e-04
.846	2.690e+03	9.779e-03	3.233e-02	1.550e-05	5.125e-05
1.8833	4.394e+02	1.673e-03	5.453e-03	2.636e-06	8.590e-06
2.1186	1.275e+03	6.335e-03	1.903e-02	9.620e-06	2.890e-05
2.2042	5.412e+03	2.933e-02	8.581e-02	4.398e-05	1.287e-04
2.2934	3.536e+02	2.089e-03	5.955e-03	3.092e-06	8.815e-06
2.4479	1.693e+03	1.149e-02	3.143e-02	1.665e-05	4.555e-05
TOTALS:	4.538e+05	2.111e-01	8.579e-01	3.475e-04	1.452e-03
	Sensitivity	Variable	X Dose Point 1	(10 of 13)	(22.86 cm)
0.0501	2.297e+05	1.746e-11	1.157e-10	4.634e-14	3.071e-13
0.1862	3.563e+03	1.889e-06	6.106e-05	3.280e-09	1.060e-07
0.2798	3.054e+04	1.706e-04	4.258e-03	3.204e-07	8.000e-06
0.3527	4.126e+04	6.970e-04	1.356e-02	1.345e-06	2.617e-05
0.4644	1.951e+03	1.046e-04	1.457e-03	2.051e-07	2.858e-06
0.5579	6.860e+02	7.230e-05	8.069e-04	1.416e-07	1.580e-06
0.6112	5.197e+04	7.504e-03	7.514e-02	1.463e-05	1.465e-04
0.7646	8.107e+03	2.428e-03	1.878e-02	4.643e-06	3.591e-05
0.8167	2.209e+03	8.114e-04	5.834e-03	1.539e-06	1.107e-05
0.9363	4.016e+03	2.224e-03	1.380e-02	4.143e-06	2.570e-05
1.0605	6.548e+02	5.201e-04	2.835e-03	9.486e-07	5.171e-06
1.1298	2.238e+04	2.124e-02	1.087e-01	3.826e-05	1.958e-04
1.2359	6.953e+03	8.448e-03	3.963e-02	1.492e-05	7.000e-05
1.2827	1.739e+03	2.336e-03	1.058e-02	4.090e-06	1.853e-05
1.3908	9.516e+03	1.582e-02	6.662e-02	2.716e-05	1.143e-04

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
1.5173	3.247e+03	6.748e-03	2.636e-02	1.132e-05	4.422e-05
1.623	2.690e+03	6.610e-03	2.445e-02	1.088e-05	4.024e-05
1.7581	2.068e+04	6.168e-02	2.145e-01	9.921e-05	3.449e-04
1.846	2.690e+03	9.004e-03	3.019e-02	1.427e-05	4.786e-05
1.8833	4.394e+02	1.541e-03	5.093e-03	2.428e-06	8.024e-06
2.1186	1.275e+03	5.852e-03	1.781e-02	8.886e-06	2.704e-05
2.2042	5.412e+03	2.711e-02	8.033e-02	4.065e-05	1.204e-04
2.2934	3.536e+02	1.932e-03	5.578e-03	2.860e-06	8.257e-06
2.4479	1.693e+03	1.064e-02	2.946e-02	1.542e-05	4.270e-05
TOTALS:	4.538e+05	1.935e-01	7.958e-01	3.183e-04	1.345e-03
	Sensitivity	Variable	X Dose Point 1	(11 of 13)	(25.4 cm)
0.0501	2.297e+05	1.152e-11	7.710e-11	3.058e-14	2.046e-13
0.1862	3.563e+03	1.571e-06	5.216e-05	2.728e-09	9.058e-08
0.2798	3.054e+04	1.445e-04	3.709e-03	2.715e-07	6.968e-06
0.3527	4.126e+04	5.974e-04	1.195e-02	1.153e-06	2.307e-05
0.4644	1.951e+03	9.087e-05	1.301e-03	1.782e-07	2.551e-06
0.5579	6.860e+02	6.337e-05	7.254e-04	1.241e-07	1.421e-06
0.6112	5.197e+04	6.604e-03	6.777e-02	1.288e-05	1.321e-04
0.7646	8.107e+03	2.157e-03	1.707e-02	4.123e-06	3.263e-05
0.8167	2.209e+03	7.224e-04	5.311e-03	1.371e-06	1.008e-05
0.9363	4.016e+03	1.990e-03	1.261e-02	3.708e-06	2.349e-05
1.0605	6.548e+02	4.675e-04	2.600e-03	8.527e-07	4.742e-06
1.1298	2.238e+04	1.913e-02	9.981e-02	3.446e-05	1.798e-04
1.2359	6.953e+03	7.632e-03	3.647e-02	1.348e-05	6.443e-05
1.2827	1.739e+03	2.113e-03	9.749e-03	3.700e-06	1.707e-05
1.3908	9.516e+03	1.435e-02	6.148e-02	2.462e-05	1.055e-04
1.5173	3.247e+03	6.135e-03	2.438e-02	1.029e-05	4.088e-05
1.623	2.690e+03	6.021e-03	2.263e-02	9.911e-06	3.726e-05
1.7581	2.068e+04	5.631e-02	1.989e-01	9.056e-05	3.198e-04
1.846	2.690e+03	8.230e-03	2.802e-02	1.304e-05	4.441e-05
1.8833	4.394e+02	1.409e-03	4.728e-03	2.220e-06	7.449e-06
2.1186	1.275e+03	5.367e-03	1.656e-02	8.149e-06	2.515e-05
2.2042	5.412e+03	2.489e-02	7.476e-02	3.732e-05	1.121e-04
2.2934	3.536e+02	1.775e-03	5.194e-03	2.628e-06	7.688e-06
2.4479	1.693e+03	9.791e-03	2.746e-02	1.419e-05	3.980e-05
TOTALS:	4.538e+05	1.760e-01	7.332e-01	2.892e-04	1.239e-03
	Sensitivity	Variable	X Dose Point 1	(12 of 13)	(27.94 cm)
0.0501	2.297e+05	7.346e-12	4.965e-11	1.950e-14	1.318e-13
0.1862	3.563e+03	1.287e-06	4.399e-05	2.235e-09	7.638e-08
0.2798	3.054e+04	1.208e-04	3.195e-03	2.270e-07	6.002e-06
0.3527	4.126e+04	5.058e-04	1.043e-02	9.764e-07	2.012e-05
0.4644	1.951e+03	7.811e-05	1.150e-03	1.532e-07	2.256e-06
0.5579	6.860e+02	5.498e-05	6.465e-04	1.077e-07	1.266e-06
0.6112	5.197e+04	5.754e-03	6.063e-02	1.122e-05	1.182e-04
0.7646	8.107e+03	1.898e-03	1.539e-02	3.628e-06	2.943e-05

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Run Time: 1:19:09 PM
Duration: 00:00:21

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.8167	2.209e+03	6.374e-04	4.800e-03	1.209e-06	9.108e-06
0.9363	4.016e+03	1.766e-03	1.144e-02	3.290e-06	2.132e-05
1.0605	6.548e+02	4.167e-04	2.368e-03	7.601e-07	4.318e-06
1.1298	2.238e+04	1.710e-02	9.106e-02	3.080e-05	1.640e-04
1.2359	6.953e+03	6.842e-03	3.335e-02	1.208e-05	5.891e-05
1.2827	1.739e+03	1.897e-03	8.923e-03	3.321e-06	1.562e-05
1.3908	9.516e+03	1.291e-02	5.638e-02	2.216e-05	9.677e-05
1.5173	3.247e+03	5.537e-03	2.240e-02	9.287e-06	3.757e-05
1.623	2.690e+03	5.445e-03	2.083e-02	8.963e-06	3.429e-05
1.7581	2.068e+04	5.104e-02	1.833e-01	8.210e-05	2.949e-04
1.846	2.690e+03	7.471e-03	2.586e-02	1.184e-05	4.098e-05
1.8833	4.394e+02	1.280e-03	4.365e-03	2.017e-06	6.877e-06
2.1186	1.275e+03	4.890e-03	1.532e-02	7.425e-06	2.326e-05
2.2042	5.412e+03	2.270e-02	6.920e-02	3.403e-05	1.038e-04
2.2934	3.536e+02	1.621e-03	4.811e-03	2.399e-06	7.121e-06
2.4479	1.693e+03	8.953e-03	2.546e-02	1.297e-05	3.689e-05
TOTALS:	4.538e+05	1.589e-01	6.714e-01	2.610e-04	1.133e-03

	Sensitivity	Variable	X Dose Point 1	(13 of 13)	(30.48 cm)
0.0501	2.297e+05	4.531e-12	3.096e-11	1.203e-14	8.216e-14
0.1862	3.563e+03	1.040e-06	3.665e-05	1.807e-09	6.364e-08
0.2798	3.054e+04	9.976e-05	2.723e-03	1.874e-07	5.116e-06
0.3527	4.126e+04	4.234e-04	9.009e-03	8.173e-07	1.739e-05
0.4644	1.951e+03	6.644e-05	1.009e-03	1.303e-07	1.978e-06
0.5579	6.860e+02	4.723e-05	5.716e-04	9.251e-08	1.120e-06
0.6112	5.197e+04	4.966e-03	5.381e-02	9.682e-06	1.049e-04
0.7646	8.107e+03	1.656e-03	1.378e-02	3.165e-06	2.635e-05
0.8167	2.209e+03	5.577e-04	4.308e-03	1.058e-06	8.174e-06
0.9363	4.016e+03	1.554e-03	1.032e-02	2.895e-06	1.922e-05
1.0605	6.548e+02	3.687e-04	2.143e-03	6.725e-07	3.908e-06
1.1298	2.238e+04	1.516e-02	8.256e-02	2.731e-05	1.487e-04
1.2359	6.953e+03	6.089e-03	3.032e-02	1.076e-05	5.355e-05
1.2827	1.739e+03	1.690e-03	8.119e-03	2.960e-06	1.422e-05
1.3908	9.516e+03	1.154e-02	5.141e-02	1.981e-05	8.824e-05
1.5173	3.247e+03	4.964e-03	2.047e-02	8.326e-06	3.434e-05
1.623	2.690e+03	4.893e-03	1.907e-02	8.054e-06	3.139e-05
1.7581	2.068e+04	4.598e-02	1.681e-01	7.395e-05	2.704e-04
1.846	2.690e+03	6.740e-03	2.373e-02	1.068e-05	3.762e-05
1.8833	4.394e+02	1.156e-03	4.008e-03	1.821e-06	6.315e-06
2.1186	1.275e+03	4.429e-03	1.410e-02	6.725e-06	2.141e-05
2.2042	5.412e+03	2.058e-02	6.373e-02	3.086e-05	9.556e-05
2.2934	3.536e+02	1.471e-03	4.433e-03	2.178e-06	6.563e-06
2.4479	1.693e+03	8.139e-03	2.349e-02	1.180e-05	3.404e-05
TOTALS:	4.538e+05	1.426e-01	6.113e-01	2.339e-04	1.031e-03

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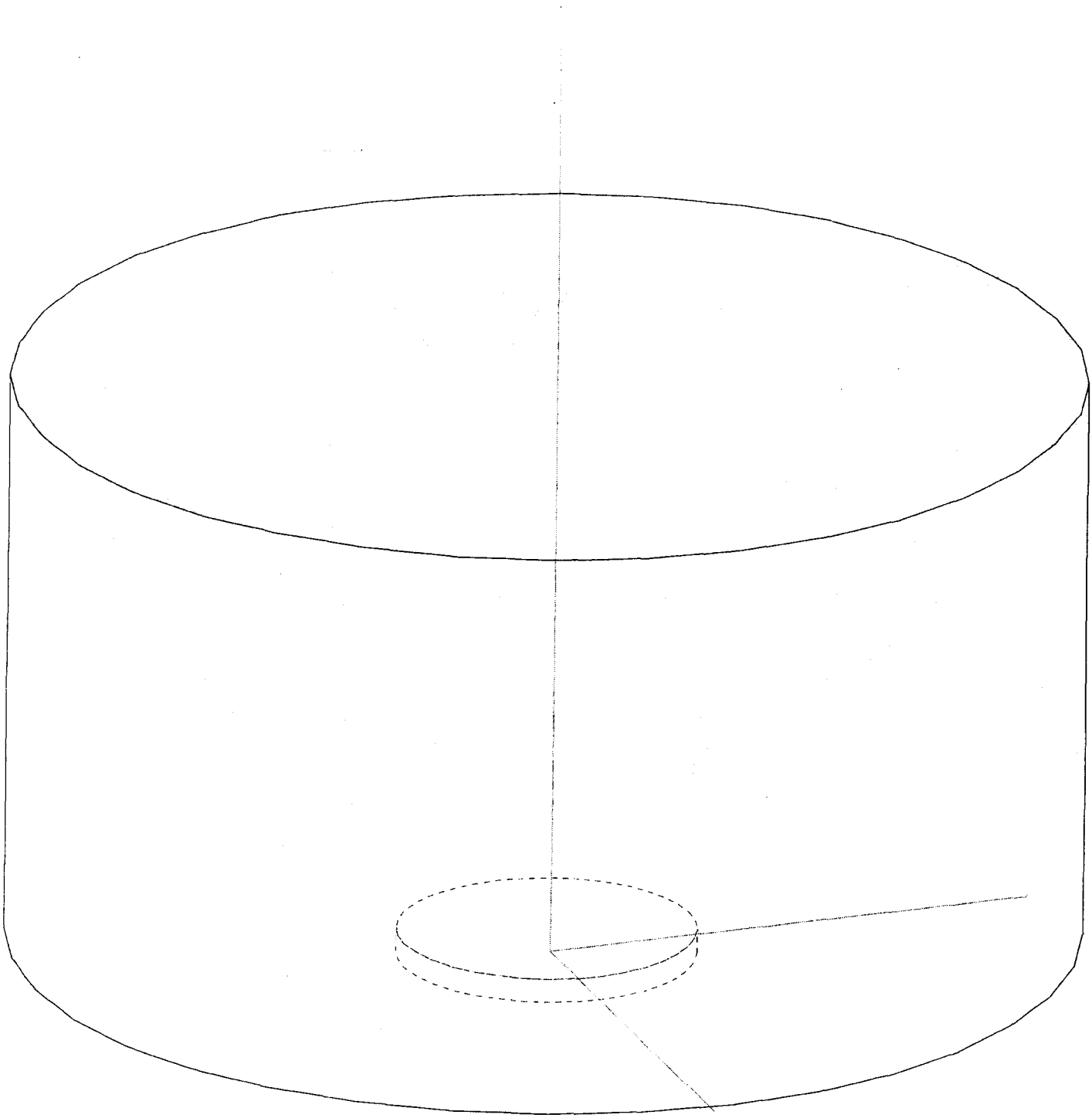


APPENDIX K

SURVEY AREA LARADS DATA

Legend

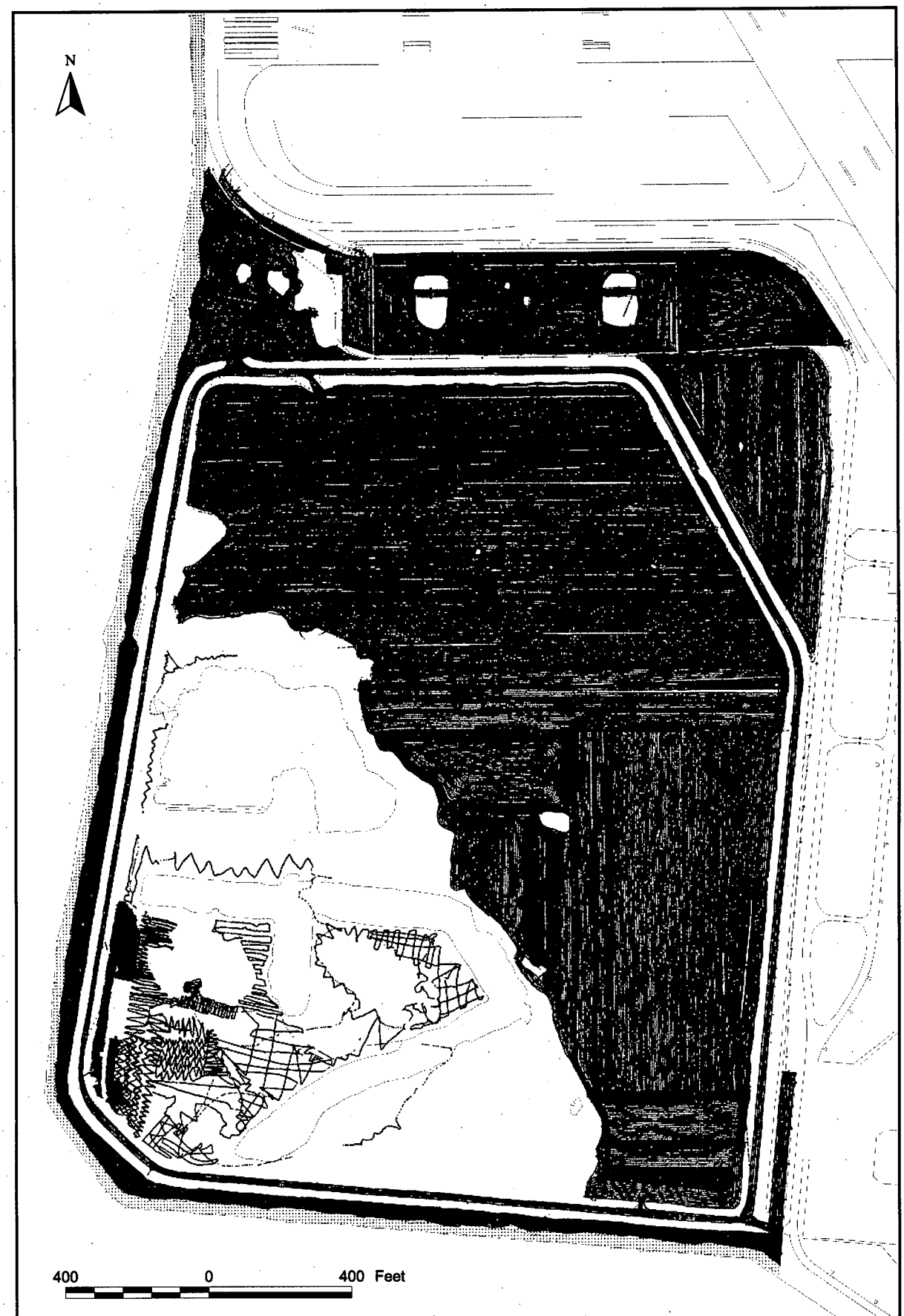
NET COUNTS PER MINUTE (NCPM)

- 4k - 10k
- 10k - 15k
- 15k - 20k
- 20k - 25k
- 25k - 30k
- 30k - 35k
- 35k - 40k
- 40k - 45k
- 45k - 50k
- > 50k

Elevated Gamma Locations
Scan & Static Points
IR2 & Rad Shack
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File : S2_HIT

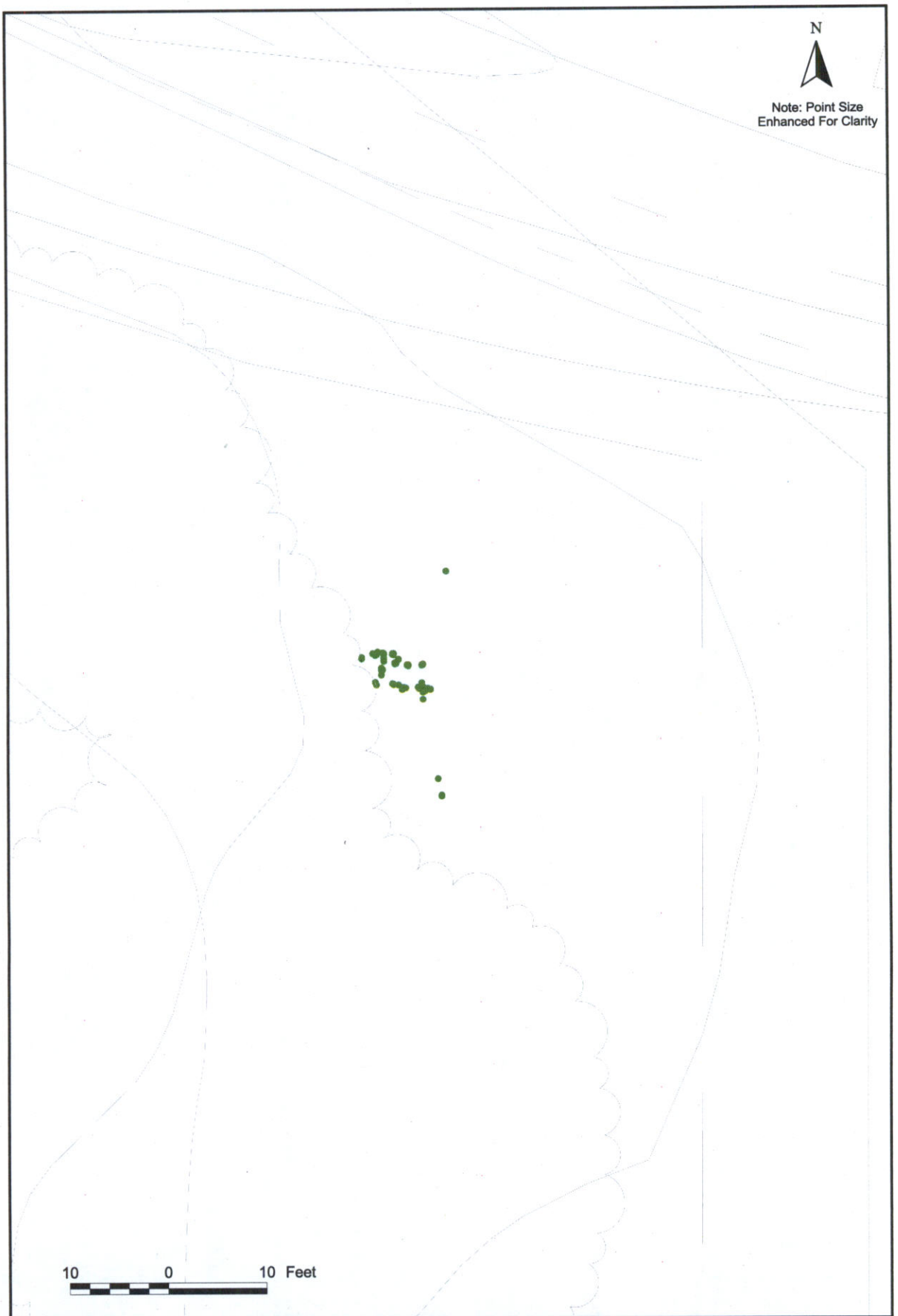


Overall Coverage (2004 & 2006)

Scan & Static Point Coverage
IR2 & Rad Shack
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File : S2_OA



Legend

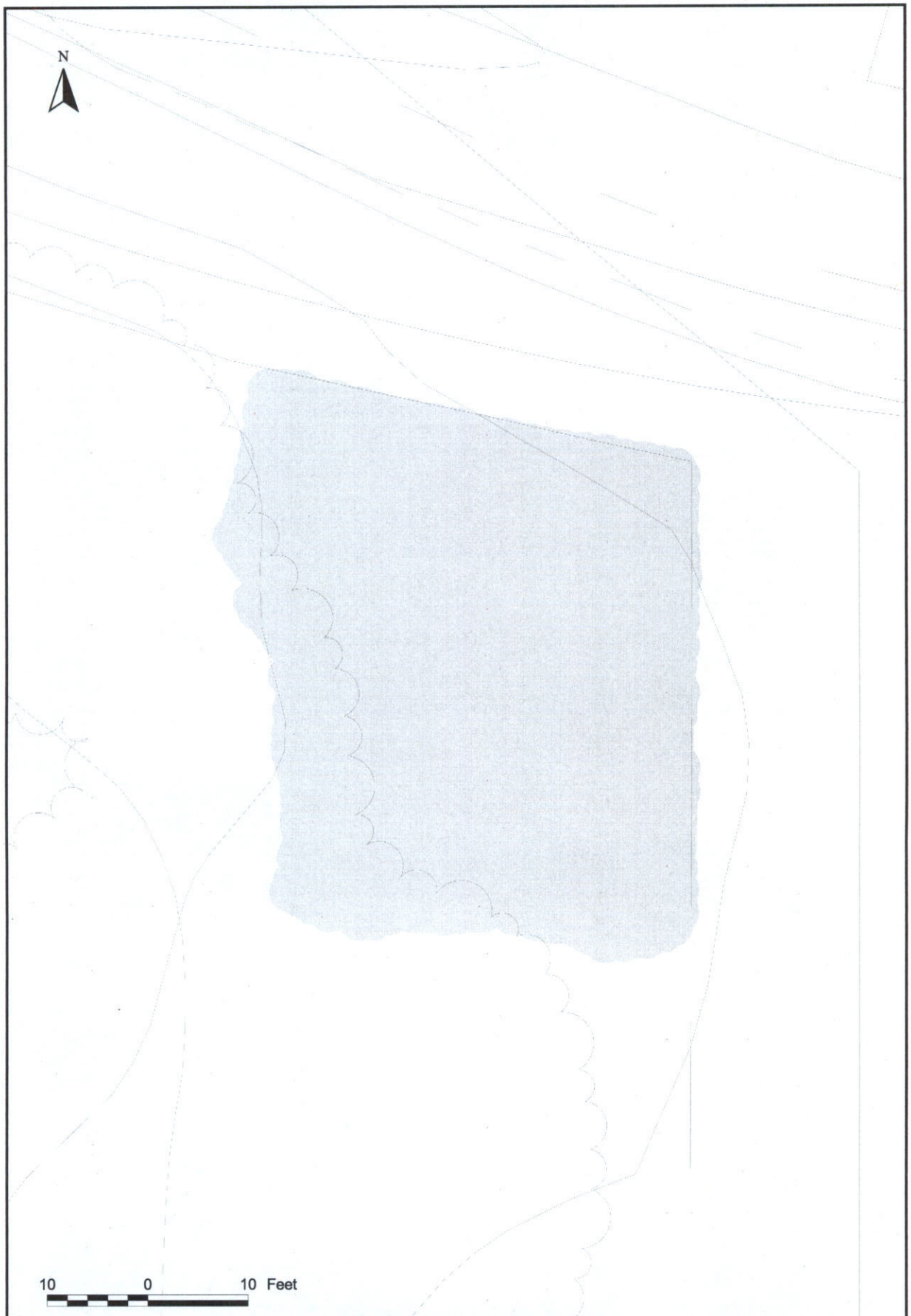
NET COUNTS PER MINUTE (NCPM)

- 4k - 10k
- 10k - 15k
- 15k - 20k
- 20k - 25k
- 25k - 30k
- 30k - 35k
- 35k - 40k
- 40k - 45k
- 45k - 50k
- > 50k

Elevated Gamma Scan Locations
>4,000 net cpm
IR2 "Rad Shack" Location
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File : RS_EL



Overall Coverage

Alameda Naval Air Station
IR2 "Rad Shack" Location
LARADS Radiological Survey
Gamma Track Map

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File : RS_OA

N

No Results
>4,000 net cpm

400 0 400 Feet

Legend

NET COUNTS PER MINUTE (NCPM)

- 4k - 10k
- 10k - 15k
- 15k - 20k
- 20k - 25k
- 25k - 30k
- 30k - 35k
- 35k - 40k
- 40k - 45k
- 45k - 50k
- > 50k

Elevated Gamma Scan Locations
>4,000 net cpm
2006 "Gap" Scan - IR2 Location
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File : IR2_EL

Overall Coverage	**2006 "Gap" Scan IR1 Location Alameda Naval Air Station**	EBERLINE SERVICES *Survey Map Prepared By Dillon & Dickenson* *PDF File : IR1_OA*

Legend

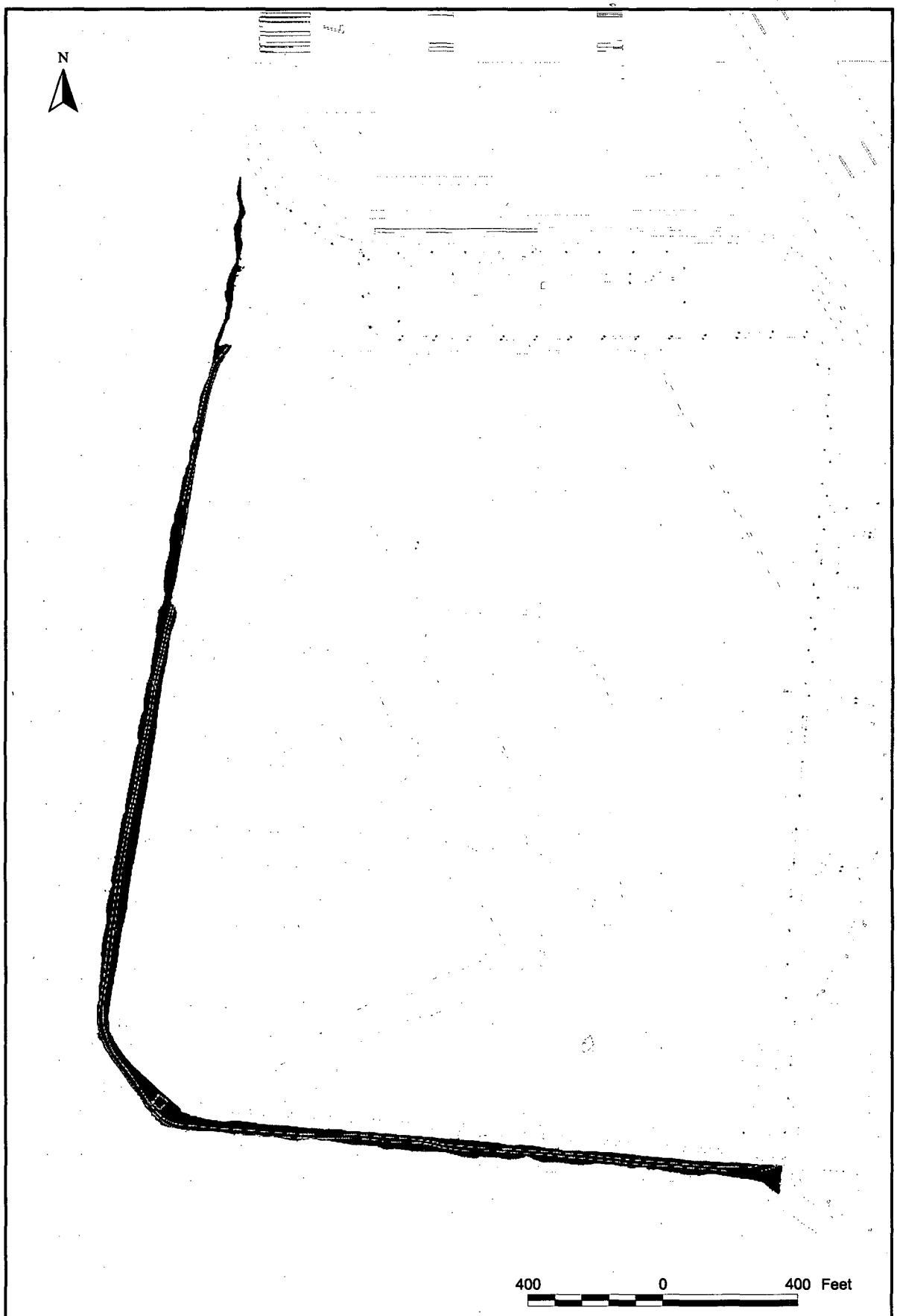
NET COUNTS PER MINUTE (NCPM)

- 4k - 10k
- 10k - 15k
- 15k - 20k
- 20k - 25k
- 25k - 30k
- 30k - 35k
- 35k - 40k
- 40k - 45k
- 45k - 50k
- > 50k

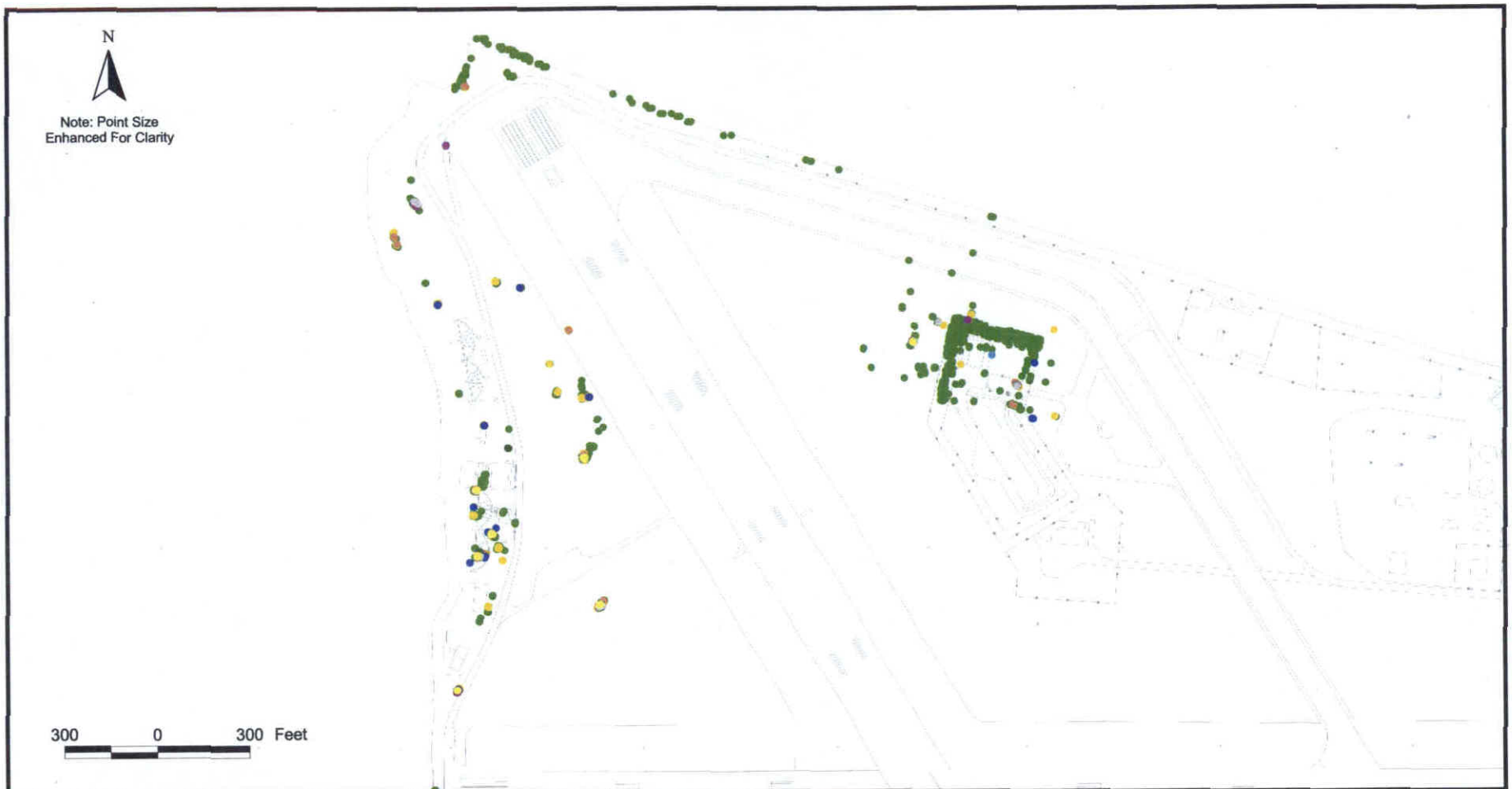
Elevated Gamma Scan Locations
>4,000 net cpm
2006 "Gap" Scan - IR1 Location
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File : IR1_EL



Overall Coverage	**2006 "Gap" Scan IR2 Location Alameda Naval Air Station**	EBERLINE SERVICES *Survey Map Prepared By Dillon & Dickenson* *PDF File : IR2_OA*



Legend

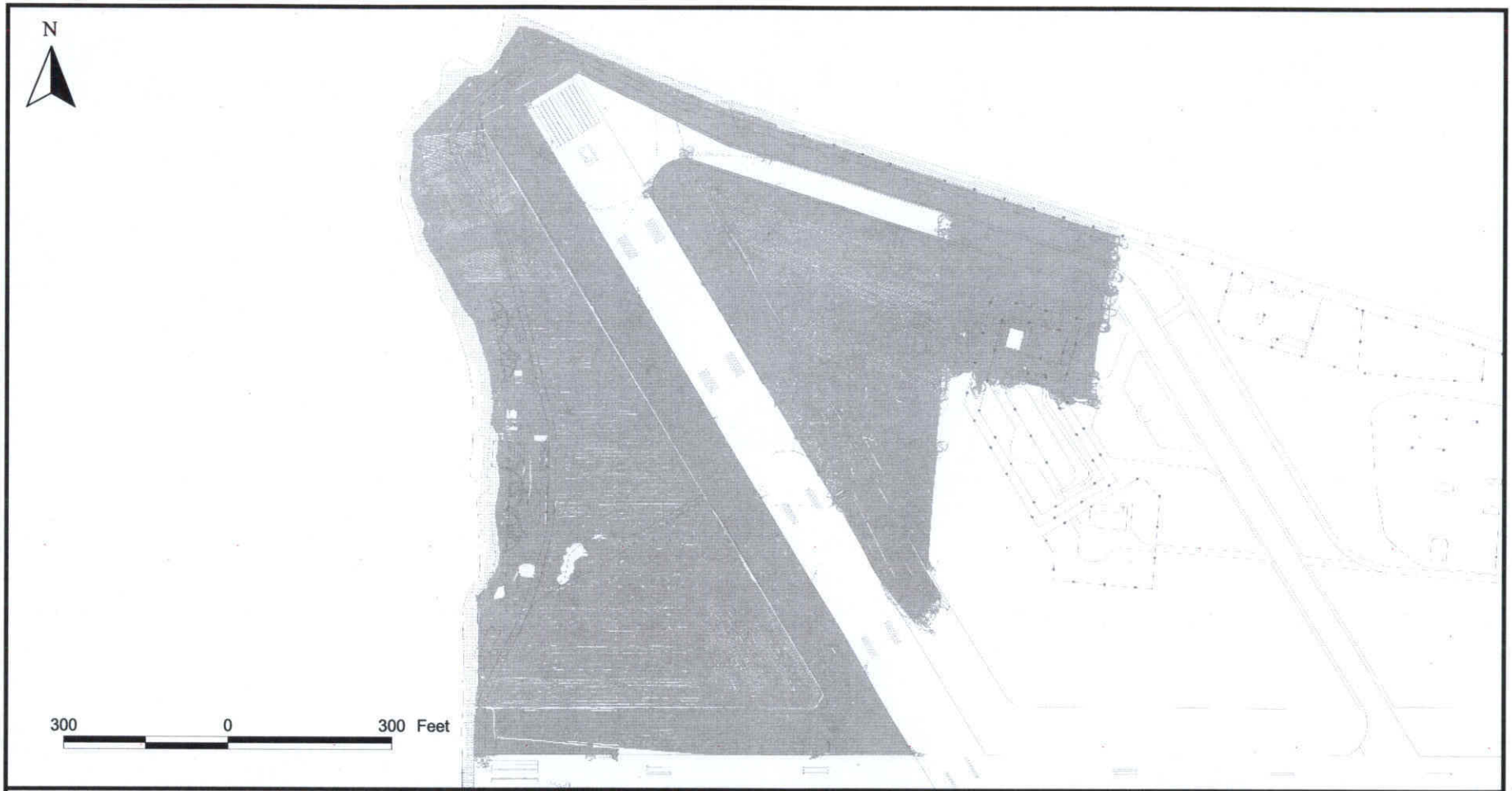
NET COUNTS PER MINUTE (NCPM)

- 4k - 10k
- 10k - 15k
- 15k - 20k
- 20k - 25k
- 25k - 30k
- 30k - 35k
- 35k - 40k
- 40k - 45k
- 45k - 50k
- > 50k

Elevated Gamma Locations
Scan and Static Points
IR1 & IR32
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File S1_HIT



Overall Coverage (2004 & 2006)

Scan & Static Point Coverage
IR1 & IR32
Alameda Naval Air Station

EBERLINE SERVICES

Survey Map Prepared By Dillon & Dickenson
PDF File S1_OA

APPENDIX L

SURVEY AREA STATIC SURVEY DATA

APPENDIX L – SURVEY AREA STATIC SURVEY DATA IS CONTAINED IN ELECTRONIC FORMAT ONLY

TO VIEW THE DATA, CONTACT:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

APPENDIX M

UNCONDITIONAL RELEASE DATA SHEETS

ATTACHMENT 3 – SURVEY LOG

Survey Number Project	#	Year	Date	Survey Description	Surveyor (Init.)
A	001	06	9-27-06	Equiptment/Tools Release	BD
A	002	06	11-17-06	Pine Equiptment Release	BD
A	003	06	11-17-06	Richmond Equipment Release	BD
A	004	06	11-18-06	TRUCKS/Equipment Release	BD
A	005	06	11-18-06	TetraTech Equipment Release	BD
A	006	06	11-18-06	Eberlin Equipment Release	BD
A	007	06	11-18-06	Soil Sample External Survey	BD

Reviewed/Approved By: _____ RSO/RTM 12/4/06 Date

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-001-06	Date: 9-27-06

Description of equipment or materials: Equiptment / Tools Release

UR Mower S/N 891212, UR Mower S/N 730961
UR Weed Wacker S/N 879904, UR Weed Walker S/N 560352
UR Chainsaw S/N 844181
Double Jack, Pick, Post Pounder, Face shield, Flagger sign
Hammer

SURVEY EQUIPMENT:

Model No:	S/N:	Background:	Eff:	Cal Due Date:
HandECount	604	α .5 cpm / β 37 cpm	α 81.6 / β 49.9	3-30-07
Model No:	S/N:	Background:	Eff:	Cal Due Date:
E600 / 380	1071 / 1580	α 0cpm / β 133 cpm	α 22 / β 46	8-21-07
Model No:	S/N:	Background:	Eff:	Cal Due Date:
N/A				

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 βγ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm βγ Fixed
< 100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: Bob Dickenson / [signature]	Date/Time: 9-27-06 1400

Disposition of equipment or materials:
Returned to vendor

Reviewed By: [signature]	Date: 9/27/06

COPY

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 9-27-06	TIME: 1400	INSTRUMENTATION USED					
SURVEY NUMBER: A-001-06		Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm²)	Background ~~dpm~~ CPM/100cm²
LOCATION: Alameda Point		HandECount	604	3-30-07	α / β 21.6 / 49.9	α / β 16 / 136	α / β 0.5 / 37
SURVEYOR: B. Dickenson		E600/380	1071/1580	8-21-07	α / β 22 / 46	α / β 27 / 289	α / β 0 / 133
REVIEWED BY:		N/A					
RSO/RTM:		N/A					

Isotopes of Concern: Ba 226

Description or drawing: Equipment / Tools Release

(1)-(6) united Rentals Mower S/N 891212
(7)-(12) United Rentals Mower S/N 730961
(13)-(14) united Rentals chainsaw S/N 844181
(15)-(16) united Rentals weed wacker S/N 879904
(17)-(18) united Rentals weed wacker S/N 560352
(19) Double Jack
(20) Pick
(21) Post Pounder
(22) Face shield
(23) Flagger Sign
(24) Hammer

Static & smear results/locations shown on attachment 2
No Contamination levels found above limits of Appendix D-6 Table 4-1.
Items released to vendor.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.
(#) ....denotes swipe location or fixed α/β readings.
#.....denotes G/A radiation readings.
#/#...denotes contact / 1 meter radiation readings.
*.....denotes highest radiation reading on contact.
Δ.....denotes static location.

Copy

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-001-06

SURVEYOR: Bob Dickenson LOCATION: Alameda Point

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	0	-9	7.4	-24	Tire
2				36	17	0	-8	Tire
3				36	-173	4.9	-24	Blade
4				0	-43	4.9	-24	Deck
5				18	70	-2.5	-56	Deck
6				36	-96	2.5	24	Motor
7				55	104	9.8	-16	Tire
8				0	217	2.5	-64	Tire
9				0	-139	2.5	24	Blade
10				36	-261	7.4	-88	Deck
11				55	339	0	-40	Deck
12				55	173	-2.5	-16	Motor
13				18	-17	2.5	-56	Blade
14				36	165	2.5	0	Motor
15				0	235	0	-56	Blade
16				0	87	0	-40	Motor
17				0	70	0	-24	Blade
18				36	-70	-2.5	-72	Motor
19				73	-165	0	-8	Head
20				0	-43	2.5	-64	Head
21				18	78	0	-72	Handle
22				18	147	2.5	16	Shield
23				18	-96	2.5	64	Sign
24				55	452	0	-40	Head
25 N/A								

Reviewer	Date/Time:	PHP	Date/Time:
		[illegible]	9/27/06

COPY

Cliff Stephan/ESQ/CSQ
09/27/2006 09:57 AM

To Jennifer Dessort/ESQ/CSQ@CSQ, mwendling@eberlineservices.com
cc Abram Eloskof/RMPM/CSQ@CSQ
bcc
Subject Mower/Weed Whacker Release Surveys

Jennifer

I agree that it enough to say that internal surfaces for these types of equipment are not suspect for contamination due to the type of functions they performed (veg clearance). They were not were not used for invasive activities, and they are not externally contaminated. Therefore it is unrealistic to think they could potentially be internally contaminated.

Clifford J. Stephan II, CHP
Tetra Tech EC, Inc.
Tel 509.371.0140
Fax 509.372.5801

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ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-002-06	Date: 11/17/06

Description of equipment or materials: Pine equipment. PDR-1000 & Dry Cal

SURVEY EQUIPMENT:

Model No: HandECount	S/N: 604	Background: A.9/B34.2	Eff: A.816/B.499	Cal Due Date: 3-30-07
Model No: 380AB	S/N: 1614	Background: A0/B198	Eff: A.12/B.24	Cal Due Date: 8-21-07
Model No: E600	S/N: 1596	Background: N/A	Eff: N/A	Cal Due Date: 8-22-07

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 $\beta\gamma$ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm $\beta\gamma$ Fixed
<100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: B. DICKENSON	Date/Time: 11-17-06

Disposition of equipment or materials: RETURNED TO VENDOR

Reviewed By:	Date: 12-11-06

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 11-17-06 TIME: 1700	INSTRUMENTATION USED					
SURVEY NUMBER: A-002-06	Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm²)	Background (dpm/100cm²)
LOCATION: Alameda Point	HandECount	604	3-30-07	A 81.6 B 49.9	A 19 B 131	A 0.9 B 34.2
SURVEYOR: B. Dickenson	380AB	1614	8-21-07	A 24 B 48	A 25 B 370	A 0 B 198
REVIEWED BY:	E600	1596	8-22-07	N/A	N/A	N/A
RSO/RTM:	N/A	N/A	N/A	N/A	N/A	N/A

Isotopes of Concern: Ra226

Description or drawing: Pine Equipment release

Static & smear results/locations shown on attachment 2.

No contamination levels found above limits of appendix D-6 Table 4-1.

Items released to vendor.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.

(#)....denotes swipe location or fixed α/β readings.

#.....denotes G/A radiation readings.

#/#...denotes contact / 1 meter radiation readings.

*.....denotes highest radiation reading on contact.

Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-002-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	7.35	-675	1.85	9	PDR FRONT
2	N/A	N/A	N/A	8	-608	2.46	81	PDR BACK
3	N/A	N/A	N/A	0	-783	0.62	61	PDR ZERO BAG
4	N/A	N/A	N/A	0	-658	0.62	65	PDR ZERO PUMP
5	N/A	N/A	N/A	0	-625	1.23	70	PDR BAG
6	N/A	N/A	N/A	0	-683	1.23	57	DRY CAL FRONT
7	N/A	N/A	N/A	6	-541	1.85	68	DRY CAL BACK
8	N/A	N/A	N/A	0	-666	0.62	70	DRY CAL BAG
9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Reviewer [illegible] | Date: 12/11/00

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-003-06	Date: 11/17/06

Description of equipment or materials: Equipment going to Richmond. 2 PICs & HPGe system.

SURVEY EQUIPMENT:

Model No: HandECount	S/N: 604	Background: A.9/B34.2	Eff: A.816/B.499	Cal Due Date: 3-30-07
Model No: 380AB	S/N: 1614	Background: A0/B198	Eff: A.12/B.24	Cal Due Date: 8-21-07
Model No: E600	S/N: 1596	Background: N/A	Eff: N/A	Cal Due Date: 8-22-07

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 $\beta\gamma$ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm $\beta\gamma$ Fixed
<100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: B. DICKENSON	Date/Time: 11-17-06

Disposition of equipment or materials: RETURNED TO VENDOR

Reviewed By:	Date: 12/1/06

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 11-17-06 TIME: 1700	INSTRUMENTATION USED					
SURVEY NUMBER: A-003-06	Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm²)	Background (dpm/100cm²)
LOCATION: Alameda Point	HandECount	604	3-30-07	A 81.6 B 49.9	A 19 B 131	A 0.9 B 34.2
SURVEYOR: B. Dickenson	380AB	1614	8-21-07	A 24 B 48	A 25 B 370	A 0 B 198
REVIEWED BY:	E600	1596	8-22-07	N/A	N/A	N/A
RSO/RTM:	N/A	N/A	N/A	N/A	N/A	N/A

Isotopes of Concern: Ra226

Description or drawing: Richmond Equipment release

Static & smear results/locations shown on attachment 2.

No contamination levels found above limits of appendix D-6 Table 4-1.

Items released to vendor.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.

(#)....denotes swipe location or fixed α/β readings.

#.....denotes G/A radiation readings.

#/#...denotes contact / 1 meter radiation readings.

*.....denotes highest radiation reading on contact.

Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-003-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	57	-590	2.46	65	PIC L-223 LID
2	N/A	N/A	N/A	16	-40	0.62	75	PIC L-223 DISLAY
3	N/A	N/A	N/A	49	-104	1.23	56	PIC L-223 BOTTOM
4	N/A	N/A	N/A	32	-237	1.85	65	PIC L-2079 SIDE
5	N/A	N/A	N/A	33	-70	1.23	71	PIC L-2079 BOTTOM
6	N/A	N/A	N/A	24	108	1.85	69	TRIPOD FEET
7	N/A	N/A	N/A	31	-409	0	63	TRIPOD SIDES
8	N/A	N/A	N/A	24	25	1.85	61	PIC K-200 LID
9	N/A	N/A	N/A	24	-112	1.23	68	PIC K-200 DISPLAY
10	N/A	N/A	N/A	33	-154	2.46	61	PIC K-200 BOTTOM
11	N/A	N/A	N/A	50	-201	0.62	57	PIC K-6905 BOTTOM
12	N/A	N/A	N/A	58	-164	2.46	77	PIC K-6905 SIDE
13	N/A	N/A	N/A	8	-604	1.23	69	TRIPOD FEET
14	N/A	N/A	N/A	49	-136	1.23	66	TRIPOD SIDES
15	N/A	N/A	N/A	16	-262	0	60	STUEY
16	N/A	N/A	N/A	17	-281	1.23	66	DWER
17	N/A	N/A	N/A	67	-19	2.46	64	DWER
18	N/A	N/A	N/A	16	-386	2.46	64	DIGI DART
19	N/A	N/A	N/A	24	-77	1.85	63	DIM
20	N/A	N/A	N/A	24	25	2.46	68	CABLE
21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Reviewer [illegible] | Date: 12/11/06

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-004-06	Date: 11/18/06

Description of equipment or materials: Trucks/Equipment

SURVEY EQUIPMENT:

Model No: HandECount	S/N: 604	Background: A.9/B33	Eff: A.816/B.499	Cal Due Date: 3-30-07
Model No: 380AB	S/N: 1614	Background: A0/B197	Eff: A.12/B.24	Cal Due Date: 8-21-07
Model No: E600	S/N: 1596	Background: N/A	Eff: N/A	Cal Due Date: 8-22-07

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 $\beta\gamma$ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm $\beta\gamma$ Fixed
<100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: B. DICKENSON	Date/Time: 11-18-06

Disposition of equipment or materials: RETURNED TO VENDOR

Reviewed By:	Date: 12/11/06

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 11-18-06 TIME: 1700	INSTRUMENTATION USED					
SURVEY NUMBER: A-004-06	Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm^2)	Background (dpm/100cm^2)
LOCATION: Alameda Point	HandECount	604	3-30-07	A 81.6 B 49.9	A 19 B 130	A 0.9 B 33
SURVEYOR: B. Dickenson	380AB	1614	8-21-07	A 24 B 48	A 50 B 795	A 0 B 197
REVIEWED BY:	E600	1596	8-22-07	N/A	N/A	N/A
RSO/RTM:	N/A	N/A	N/A	N/A	N/A	N/A

Isotopes of Concern: Ra226

Description or drawing: Trucks/Equipment release

Static & smear results/locations shown on attachment 2.

No contamination levels found above limits of appendix D-6 Table 4-1.

Items released to vendor.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.

(#)....denotes swipe location or fixed α/β readings.

#.....denotes G/A radiation readings.

#/#...denotes contact / 1 meter radiation readings.

*.....denotes highest radiation reading on contact.

Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-004-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	17	-432	1.23	33	(7H66303)TAILGATE
2	N/A	N/A	N/A	33	-538	0.62	21	BED
3	N/A	N/A	N/A	67	-426	2.46	76	BED
4	N/A	N/A	N/A	50	-645	0.62	25	BED
5	N/A	N/A	N/A	57	102	1.23	37	BED
6	N/A	N/A	N/A	67	-356	1.23	17	TIRE
7	N/A	N/A	N/A	-83	-487	0	97	TIRE
8	N/A	N/A	N/A	17	-245	0.62	41	TIRE
9	N/A	N/A	N/A	33	-398	0.62	24	TIRE
10	N/A	N/A	N/A	18	-390	1.23	25	DOOR
11	N/A	N/A	N/A	33	-358	0.62	108	DOOR
12	N/A	N/A	N/A	0	-485	0.62	0	FLOORBOARD
13	N/A	N/A	N/A	8	-269	1.23	83	DASHBOARD
14	N/A	N/A	N/A	33	20	1.85	100	FLOORBOARD
15	N/A	N/A	N/A	-8.35	-478	0.62	21	DASHBOARD
16	N/A	N/A	N/A	16.7	-327	0.62	12	(7D46231)TAILGATE
17	N/A	N/A	N/A	0	-125	0	50	BED
18	N/A	N/A	N/A	41	-422	1.23	42	BED
19	N/A	N/A	N/A	-8	-634	1.23	25	BED
20	N/A	N/A	N/A	33	-34	1.23	75	BED
21	N/A	N/A	N/A	41	-420	1.85	15	TIRE
22	N/A	N/A	N/A	67	-580	1.23	58	TIRE
23	N/A	N/A	N/A	42	130	0.62	17	TIRE
24	N/A	N/A	N/A	33	-502	0.62	97	TIRE
25	N/A	N/A	N/A	0	-302	1.23	42	DOOR

Reviewer [illegible] | Date : 12/11/04

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-004-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
26	N/A	N/A	N/A	30	-326	1.23	50	FLOOR
27	N/A	N/A	N/A	33	-457	1.23	23	FLOORBOARD
28	N/A	N/A	N/A	3	-205	0.62	58	DASHBOARD
29	N/A	N/A	N/A	5	80	1.23	12	FLOORBOARD
30	N/A	N/A	N/A	33	-430	0.62	33	DASHBOARD
31	N/A	N/A	N/A	8	-563	1.23	21	(7K16956)TAILGATE
32	N/A	N/A	N/A	33	-420	1.23	67	BED
33	N/A	N/A	N/A	43	-438	1.85	59	BED
34	N/A	N/A	N/A	-8	-624	0.62	50	BED
35	N/A	N/A	N/A	8	-205	1.85	17	BED
36	N/A	N/A	N/A	43	-304	0	12	TIRE
37	N/A	N/A	N/A	33	-238	1.23	25	TIRE
38	N/A	N/A	N/A	10	51	0	69	TIRE
39	N/A	N/A	N/A	41	-308	0.62	28	TIRE
40	N/A	N/A	N/A	33	-468	0.62	58	DOOR
41	N/A	N/A	N/A	58	-240	0.62	21	DOOR
42	N/A	N/A	N/A	25	-521	1.23	15	FLOORBOARD
43	N/A	N/A	N/A	-15	-486	0	10	DASHBOARD
44	N/A	N/A	N/A	42	-301	1.23	25	FLOORBOARD
45	N/A	N/A	N/A	-7	-325	0	80	DASHBOARD
46	N/A	N/A	N/A	58	80	0	77	MANLIFT TIRE
47	N/A	N/A	N/A	50	-429	1.23	76	MANLIFT TIRE
48	N/A	N/A	N/A	52	-478	1.85	54	MANLIFT TIRE
49	N/A	N/A	N/A	50	-623	1.23	77	MANLIFT TIRE
50	N/A	N/A	N/A	22	-589	0	66	BASKET FLOOR

Reviewer [illegible] | Date: 12/11/00

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-004-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
51	N/A	N/A	N/A	3	-236	0.62	17	MANLIFT CONTROLS
52	N/A	N/A	N/A	43	-435	1.23	25	GEN TRAILER
53	N/A	N/A	N/A	5	-321	1.23	12	GENERATOR
54	N/A	N/A	N/A	5	-632	1.85	69	GENERATOR
55	N/A	N/A	N/A	33	-234	0	54	GENERATOR
56	N/A	N/A	N/A	8	-634	0	18	GEN TIRE
57	N/A	N/A	N/A	33	-125	1.23	25	(7K16990)TAILGATE
58	N/A	N/A	N/A	43	-456	0.62	67	TAILGATE
59	N/A	N/A	N/A	-8	104	0	59	BED
60	N/A	N/A	N/A	8	-254	2.46	50	BED
61	N/A	N/A	N/A	43	-342	0	17	BED
62	N/A	N/A	N/A	33	-468	0	15	BED
63	N/A	N/A	N/A	10	-623	0	125	TIRE
64	N/A	N/A	N/A	41	-154	0.62	69	TIRE
65	N/A	N/A	N/A	33	-23	1.23	42	TIRE
66	N/A	N/A	N/A	10	-265	1.85	38	TIRE
67	N/A	N/A	N/A	41	26	1.85	67	DOOR
68	N/A	N/A	N/A	33	-345	0	59	FLOORBOARD
69	N/A	N/A	N/A	5	-623	0.62	50	DASH
70	N/A	N/A	N/A	41	-430	2.46	17	FLOORBOARD
71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
73	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
74	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Reviewer [illegible] | Date: 12/11/06

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-005-06	Date: 11/18/06

Description of equipment or materials: Tetra Tech Equipment

SURVEY EQUIPMENT:

Model No: HandECount	S/N: 604	Background: A.9/B33	Eff: A.816/B.499	Cal Due Date: 3-30-07
Model No: 380AB	S/N: 1614	Background: A0/B197	Eff: A.12/B.24	Cal Due Date: 8-21-07
Model No: E600	S/N: 1596	Background: N/A	Eff: N/A	Cal Due Date: 8-22-07

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 $\beta\gamma$ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm $\beta\gamma$ Fixed
<100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: B. DICKENSON	Date/Time: 11-18-06

Disposition of equipment or materials: RETURNED TO VENDOR

Reviewed By:	Date: 12/11/06

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 11-18-06 TIME: 1700	INSTRUMENTATION USED					
SURVEY NUMBER: A-005-06	Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm²)	Background (dpm/100cm²)
LOCATION: Alameda Point	HandECount	604	3-30-07	A 81.6 B 49.9	A 19 B 130	A 0.9 B 33
SURVEYOR: B. Dickenson	380AB	1614	8-21-07	A 24 B 48	A 50 B 795	A 0 B 197
REVIEWED BY:	E600	1596	8-22-07	N/A	N/A	N/A
RSO/RTM:	N/A	N/A	N/A	N/A	N/A	N/A

Isotopes of Concern: Ra226

Description or drawing: Tetra Tech Equipment Release

Static & smear results/locations shown on attachment 2.

No contamination levels found above limits of appendix D-6 Table 4-1.

Items released to vendor.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.

(#)....denotes swipe location or fixed α/β readings.

#.....denotes G/A radiation readings.

#/#...denotes contact / 1 meter radiation readings.

*.....denotes highest radiation reading on contact.

Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-005-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	0	-558	0	23	Jack Hammer Blade
2	N/A	N/A	N/A	0	-524	0	46	Jack Hammer Blade
3	N/A	N/A	N/A	22	-526	1.23	48	Jack Hammer Blade
4	N/A	N/A	N/A	24	-333	0	12	Sample Auger
5	N/A	N/A	N/A	0	-524	2.46	29	Sample Auger
6	N/A	N/A	N/A	15	-391	0.62	4	Sample Auger
7	N/A	N/A	N/A	5	-533	1.85	18	Sample Auger
8	N/A	N/A	N/A	22	-532	0.62	26	Barrel
9	N/A	N/A	N/A	7	-538	1.85	88	Barrel
10	N/A	N/A	N/A	22	-608	0.62	25	Bucket
11	N/A	N/A	N/A	24	-516	1.85	76	Bucket
12	N/A	N/A	N/A	7	-517	1.23	95	Desk
13	N/A	N/A	N/A	7	-517	1.23	5	Desk
14	N/A	N/A	N/A	0	-508	1.85	-4	Desk
15	N/A	N/A	N/A	14	-574	1.23	26	Desk
16	N/A	N/A	N/A	22	-599	0.62	37	Desk
17	N/A	N/A	N/A	0	-663	1.23	46	Chair
18	N/A	N/A	N/A	22	-583	0.62	84	Chair
19	N/A	N/A	N/A	22	-649	0	56	Chair
20	N/A	N/A	N/A	6	-708	1.23	22	Chair
21	N/A	N/A	N/A	0	-599	0.62	19	Chair
22	N/A	N/A	N/A	0	-854	0	44	Chair
23	N/A	N/A	N/A	7	-616	0	72	Office Floor
24	N/A	N/A	N/A	0	-466	1.85	26	Office Floor
25	N/A	N/A	N/A	0	-608	2.46	23	Office Floor

Reviewer [illegible] | Date: 12/11/06

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-005-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (μR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
26	N/A	N/A	N/A	6	-616	1.23	50	Office Floor
27	N/A	N/A	N/A	6	-491	0.62	22	Office Floor
28	N/A	N/A	N/A	0	-583	1.23	25	Office Floor
29	N/A	N/A	N/A	65	-658	0	108	Copier
30	N/A	N/A	N/A	47	-599	0	4	Microwave
31	N/A	N/A	N/A	38	-558	0	26	Water Cooler
32	N/A	N/A	N/A	81	-413	1.85	38	File Cabinet
33	N/A	N/A	N/A	23	-433	1.23	75	File Cabinet
34	N/A	N/A	N/A	6	-591	1.85	12	Conex Floor
35	N/A	N/A	N/A	15	-466	0	24	Conex Floor
36	N/A	N/A	N/A	23	-624	1.85	21	Conex Floor
37	N/A	N/A	N/A	0	-649	2.46	95	Conex Floor
38	N/A	N/A	N/A	0	-633	0	37	Conex Floor
39	N/A	N/A	N/A	0	-524	1.23	42	Conex Floor
40	N/A	N/A	N/A	32	-483	1.85	114	Conex Floor
41	N/A	N/A	N/A	7	-424	0	102	Conex Floor
42	N/A	N/A	N/A	15	-663	0.62	53	Coffee Pot
43	N/A	N/A	N/A	7	-474	0.62	82	Table
44	N/A	N/A	N/A	16	-549	0.62	17	Table
45	N/A	N/A	N/A	7	-583	1.23	18	Shelves
46	N/A	N/A	N/A	17	-608	0	111	Shelves
47	N/A	N/A	N/A	0	-691	1.85	22	Shelves
48	N/A	N/A	N/A	22	-624	1.23	64	Bucket
49	N/A	N/A	N/A	23	-741	2.46	58	Door Handle
50	N/A	N/A	N/A	0	-694	1.85	82	Door Handle

Reviewer [illegible] | Date: 12/11/00

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-006-06	Date: 11-18-06

Description of equipment or materials: Eberline equipment release.

SURVEY EQUIPMENT:

Model No: HandECount	S/N: 604	Background: A.9/B33	Eff: A.816/B.499	Cal Due Date: 3-30-07
Model No: 380AB	S/N: 1614	Background: A0/B197	Eff: A.12/B.24	Cal Due Date: 8-21-07
Model No: E600	S/N: 1596	Background: N/A	Eff: N/A	Cal Due Date: 8-22-07

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 $\beta\gamma$ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm $\beta\gamma$ Fixed
<100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: B. Dickenson	Date/Time: 11-18-06

Disposition of equipment or materials: Returned to vendor.

Reviewed By:	Date: 12/11/06

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 11-18-06 TIME: 1700	INSTRUMENTATION USED					
SURVEY NUMBER: A-006-06	**Model Inst/Det.**	**Serial Number**	**Calibration Due Date**	**% Efficiency**	**MDC/MDA (dpm/100cm²)**	**Background (dpm/100cm²)**
LOCATION: Alameda Point	HandECount	604	3-30-07	A 81.6 B 49.9	A 19 B 130	A 0.9 B 33
SURVEYOR: B. Dickenson	380AB	1614	8-21-07	A 24 B 48	A 50 B 795	A 0 B 197
REVIEWED BY:	E600	1596	8-22-07	N/A	N/A	N/A
RSO/RTM:	N/A	N/A	N/A	N/A	N/A	N/A

Isotopes of Concern: Ra226

Description or drawing: Eberline Equipment Release

Static & smear results/locations shown on attachment 2.

No contamination levels found above limits of appendix D-6 Table 4-1.

Items released to vendor.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.

(#)....denotes swipe location or fixed α/β readings.

#.....denotes G/A radiation readings.

#/#...denotes contact / 1 meter radiation readings.

*.....denotes highest radiation reading on contact.

Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-006-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	0	-513	0	64	GUN
2	N/A	N/A	N/A	0	-483	0	58	GUN CASE
3	N/A	N/A	N/A	52	-558	1.23	73	GUN
4	N/A	N/A	N/A	15	-449	1.23	21	GUN CASE
5	N/A	N/A	N/A	22	-408	1.23	38	GUN
6	N/A	N/A	N/A	7	-533	0.62	14	GUN CASE
7	N/A	N/A	N/A	0	-624	1.23	27	TRAILER BED
8	N/A	N/A	N/A	48	-441	2.46	31	TRAILER TIRES
9	N/A	N/A	N/A	24	-458	0	26	GAS CANS
10	N/A	N/A	N/A	38	-608	1.23	2	PAINT TRAILER
11	N/A	N/A	N/A	23	-564	0.62	94	ATV TIRES
12	N/A	N/A	N/A	7	-675	1.85	34	ATV TIRES
13	N/A	N/A	N/A	4	-432	0	46	ATV SEAT
14	N/A	N/A	N/A	17	-453	0.62	62	ATV FOOT REST
15	N/A	N/A	N/A	35	-642	1.85	67	ATV FOOT REST
16	N/A	N/A	N/A	12	-350	1.23	53	SILVER BOX
17	N/A	N/A	N/A	24	-457	0	15	SILVER BOX
18	N/A	N/A	N/A	46	-425	1.85	96	SILVER BOX
19	N/A	N/A	N/A	38	-645	0	52	SILVER BOX
20	N/A	N/A	N/A	62	50	0	50	SILVER BOX
21	N/A	N/A	N/A	16	-354	0	59	PACK FRAME
22	N/A	N/A	N/A	27	-436	1.23	22	FREEWAVES
23	N/A	N/A	N/A	17	-635	2.46	4	FREEWAVES
24	N/A	N/A	N/A	0	-349	1.23	8	FREEWAVES
25	N/A	N/A	N/A	5	-468	0	29	FREEWAVES

Reviewer: CMJ Sh

Date: 12/11/04

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-006-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
26	N/A	N/A	N/A	32	-654	1.23	-452	FREEWAVES
27	N/A	N/A	N/A	17	-495	1.23	-356	FREEWAVES
28	N/A	N/A	N/A	5	-265	1.85	-452	FREEWAVES
29	N/A	N/A	N/A	5	-647	1.23	108	FREEWAVES
30	N/A	N/A	N/A	0	-231	0	-400	MICROVISION
31	N/A	N/A	N/A	32	10	0	-530	MICROVISION
32	N/A	N/A	N/A	8	-426	.62	-423	COMP. BOX
33	N/A	N/A	N/A	12	-124	1.23	-325	COMP. BOX
34	N/A	N/A	N/A	0	-352	0.62	20	COMP. BOX
35	N/A	N/A	N/A	0	108	2.46	-686	POD
34	N/A	N/A	N/A	0	-56	1.23	-572	CANES
37	N/A	N/A	N/A	26	-521	1.23	-437	TRIPOD BOX
38	N/A	N/A	N/A	22	-413	0	-264	TRIPOD BOX
39	N/A	N/A	N/A	29	-215	0	-286	BACK PACK
40	N/A	N/A	N/A	0	-632	0	-465	PRISM POLE
41	N/A	N/A	N/A	12	-641	0.62	-156	PRISM POLE
42	N/A	N/A	N/A	0	-554	1.85	-342	PRISM POLE
43	N/A	N/A	N/A	0	22	1.23	-453	TRIPOD
44	N/A	N/A	N/A	34	-312	0	-652	TRIPOD
45	N/A	N/A	N/A	15	-46	0	68	TRIPOD
46	N/A	N/A	N/A	5	-543	0.62	-508	TRIMBLE
47	N/A	N/A	N/A	17	-264	0.62	-436	TRIMBLE
48	N/A	N/A	N/A	23	-41	0.62	-490	TRIMBLE
49	N/A	N/A	N/A	41	-658	0	-675	SKIL SAW
50	N/A	N/A	N/A	5	-568	1.85	-129	SKIL SAW

Reviewer: [illegible]

Date: 12/11/06

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-006-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
51	N/A	N/A	N/A	6	-521	1.23	124	BATT CHARGER
52	N/A	N/A	N/A	23	-412	1.23	26	BATT CHARGER
53	N/A	N/A	N/A	23	24	0.62	12	BATT CHARGER
54	N/A	N/A	N/A	5	-45	1.85	14	BATT CHARGER
55	N/A	N/A	N/A	0	-12	1.85	101	BATT CHARGER
56	N/A	N/A	N/A	0	-623	1.85	5	BATT CHARGER
57	N/A	N/A	N/A	15	-487	0.62	62	BATTERY
58	N/A	N/A	N/A	7	-265	0	33	BATTERY
59	N/A	N/A	N/A	17	-354	0	54	BATTERY
60	N/A	N/A	N/A	17	-46	2.46	84	BATTERY
61	N/A	N/A	N/A	6	-392	1.23	136	BATTERY
62	N/A	N/A	N/A	23	-265	1.23	45	BATTERY
63	N/A	N/A	N/A	15	34	0	8	BATTERY
64	N/A	N/A	N/A	17	-625	0	62	BATTERY
65	N/A	N/A	N/A	0	-412	0	41	BATTERY
66	N/A	N/A	N/A	6	-218	0.62	25	E600
67	N/A	N/A	N/A	38	-335	1.85	71	E600
68	N/A	N/A	N/A	0	-448	0	32	E600
69	N/A	N/A	N/A	0	-222	1.23	43	E600
70	N/A	N/A	N/A	0	-48	1.23	42	E600
71	N/A	N/A	N/A	65	-523	0.62	95	DWER
72	N/A	N/A	N/A	17	-415	0	23	DWER
73	N/A	N/A	N/A	5	-232	0	16	PROBE
74	N/A	N/A	N/A	6	-165	2.46	55	DWER
75	N/A	N/A	N/A	34	24	2.46	28	LAPTOP

Reviewer: CM Sh

Date: 12/11/06

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-006-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
76	N/A	N/A	N/A	24	-462	1.23	88	DIGI DART
77	N/A	N/A	N/A	0	-358	1.85	62	DIM
78	N/A	N/A	N/A	15	-447	0	58	CART
79	N/A	N/A	N/A	6	-52	0.62	69	CART WHEELS
80	N/A	N/A	N/A	0	-623	1.23	23	SHIELD
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Reviewer [illegible] | Date: 12/11/06

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #: A-007-06	Date: 11-18-06

Description of equipment or materials: SOIL SAMPLE EXTERNAL SURVEY.

SURVEY EQUIPMENT:

Model No: HandECount	S/N: 604	Background: A.9/B33	Eff: A.816/B.499	Cal Due Date: 3-30-07
Model No:	S/N:	Background:	Eff:	Cal Due Date:
Model No:	S/N:	Background:	Eff:	Cal Due Date:

CONTAMINATION LEVELS:

< 200	dpm/100 cm^2 $\beta\gamma$ Removable
< 20	dpm/100 cm^2 α Removable
< 1000	dpm/100 cm $\beta\gamma$ Fixed
<100	dpm/100 cm^2 α Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Regulatory Guide 1.86.

Radiological Control Technician: B. Dickenson	Date/Time: 11-18-06

Disposition of equipment or materials: Shipped to lab

Reviewed By:	Date: 12/4/06

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: 11-18-06 TIME: 1700	INSTRUMENTATION USED					
SURVEY NUMBER: A-007-06	Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm^2)	Background (dpm/100cm^2)
LOCATION: Alameda Point	HandECount	604	3-30-07	A 81.6 B 49.9	A 19 B 130	A 0.9 B 33
SURVEYOR: B. Dickenson	N/A	N/A	N/A	N/A	N/A	N/A
REVIEWED BY:	N/A	N/A	N/A	N/A	N/A	N/A
RSO/RTM:	N/A	N/A	N/A	N/A	N/A	N/A

Isotopes of Concern: Ra226

Description or drawing: Soil Sample External Survey.

Smear results/locations shown on attachment 2.

No contamination levels found on outside of containers above limits of appendix D-6 Table 4-1.

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☒

All radiation readings in μr/hr unless otherwise noted.

(#)....denotes swipe location or fixed α/β readings.

#.....denotes G/A radiation readings.

/ #...denotes contact / 1 meter radiation readings.

*.....denotes highest radiation reading on contact.

Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: A-007-06

SURVEYOR: B. DICKENSON | LOCATION: ALAMEDA POINT

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	N/A	N/A	N/A	N/A	N/A	1.23	34	Sample 1
2	N/A	N/A	N/A	N/A	N/A	0	88	Sample 2
3	N/A	N/A	N/A	N/A	N/A	1.23	23	Sample 3
4	N/A	N/A	N/A	N/A	N/A	0	43	Sample 4
5	N/A	N/A	N/A	N/A	N/A	0.62	12	Sample 5
6	N/A	N/A	N/A	N/A	N/A	1.85	95	Sample 6
7	N/A	N/A	N/A	N/A	N/A	1.85	33	Sample 7
8	N/A	N/A	N/A	N/A	N/A	2.46	108	Sample 8
9	N/A	N/A	N/A	N/A	N/A	1.23	26	Sample 9
10	N/A	N/A	N/A	N/A	N/A	0.62	32	Sample 10
11	N/A	N/A	N/A	N/A	N/A	0.62	60	Sample 11
12	N/A	N/A	N/A	N/A	N/A	1.23	110	Sample 12
13	N/A	N/A	N/A	N/A	N/A	1.85	14	Sample 13
14	N/A	N/A	N/A	N/A	N/A	1.85	22	Sample 14
15	N/A	N/A	N/A	N/A	N/A	1.85	64	Sample 15
16	N/A	N/A	N/A	N/A	N/A	0.62	59	Sample 16
17	N/A	N/A	N/A	N/A	N/A	1.23	48	Sample 17
18	N/A	N/A	N/A	N/A	N/A	1.23	118	Sample 18
19	N/A	N/A	N/A	N/A	N/A	0.62	28	Sample 19
20	N/A	N/A	N/A	N/A	N/A	2.46	92	Sample 20
21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Reviewer: CM Sh

Date: 12/11/06

APPENDIX N

WASTE MANIFESTS

Will be included in Final Radiological Characterization Survey Report