

**COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY
(CLEAN II)**

**Northern and Central California, Nevada, and Utah
Contract No. N62474-94-D-7609
Contract Task Order No. 0147**

Prepared For

**DEPARTMENT OF THE NAVY
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**ALAMEDA POINT
ALAMEDA, CALIFORNIA
FINAL REMOVAL SITE EVALUATION
FOR REMOVAL ACTION AT IR SITES 1, 2, 5, AND 10**

May 1998

Prepared By

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1.0 PURPOSE

Tetra Tech EM Inc. (TtEMI), formerly known as PRC Environmental Management, Inc. (PRC), received contract task order (CTO) 0147, dated March 6, 1997, from the Department of the Navy, Naval Facilities Engineering Command, Engineering Field Activity West (EFA WEST), under Comprehensive Long-Term Environmental Action Navy contract number N62474-94-D-7609 (CLEAN II), on March 11, 1997. Under the scope of work for this CTO, TtEMI prepared removal action documents to support a removal action at Alameda Point, formerly known as the Naval Air Station (NAS) Alameda, Alameda, California.

This removal site evaluation documents, for the Alameda Point administrative record, the Navy's decision to consider undertaking a removal action for radioactive contamination of pipes, sediment, and buildings at Installation Restoration (IR) Program Sites 1, 2, 5, and 10, at Alameda Point (Figure 1). Past disposal practices included disposal of low-level radioluminescent materials at these sites. The purpose of the removal site evaluation is to summarize site conditions and background, in order to determine if the proposed action is warranted, and how quickly it should be implemented. The Navy has the authority to undertake Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions, including removal actions, under 42 U. S. Code (USC) § 9604, 10 USC § 2705, and federal Executive Order 12580. Further, this removal action is consistent, to the maximum extent possible, with Chapter 6.8 of the California Health and Safety Code.

Radioactivity has been detected above background levels at IR Sites 1, 2, 5, and 10 at Alameda Point. The proposed action will remove near-surface radium-226 sources from IR Site 1 and Site 2 landfills, and will remove radium-226 contamination from equipment, building surfaces, pipes, sewers, manholes, and sediments associated with IR Sites 5 and 10 (Buildings 5 and 400, respectively). The proposed action will substantially eliminate the identified pathways of exposure to radioactive contamination for workers and visitors to the Alameda Point site.

2.0 BACKGROUND

Alameda Point lies at the geographic center of San Francisco Bay, occupying the western third of Alameda Island (Figure 1). The Navy acquired the site in 1936 from the City of Alameda, and the

station was commissioned in 1940. Alameda Point occupies 2,842 acres, of which, 1,734 acres is land, and 1,108 acres consists of water and an airspace easement. Most of the land at Alameda Point was created by filling existing tidelands, marshlands, and sloughs. Alameda Point was closed in April, 1997 under the Base Realignment and Closure (BRAC) program.

The Navy began its investigation of Alameda Point under the Naval Assessment and Control of Installation Pollutants (NACIP) program in 1982. The investigation began with an initial assessment survey (IAS), which identified 12 potentially contaminated sites at Alameda Point, including the present Installation Restoration (IR) Sites 1 and 2 landfills. In 1988, the State of California issued a remedial action order (RAO) requiring a remedial investigation (RI) at Alameda Point. The RAO sites included the IR Sites 1 and 2 landfills and Building 5 (IR Site 5). The Navy began remedial investigation and feasibility study (RI/FS) investigations at Alameda Point in 1988. At that time, the Navy designated 23 IR program sites, including the three sites addressed in the RAO, Building 400 (IR Site 10), and 19 additional sites.

The use of radioactive materials at Alameda Point began in the 1940s in Building 5 (IR Site 5), where radioluminescent aircraft instrument dials were refurbished with radium-226. Building 5's radium operations ended in the late 1950s to early 1960s (exact date unknown). Similar radiological refurbishing operations were conducted in Building 400 (IR Site 10) from the 1950s up to the closing of the base. After 1979, all radiological operations in Building 400 were conducted in a controlled booth and carefully monitored. Low-level radioactive waste from the radium dial operations reportedly was disposed of at both the IR Sites 1 and 2 landfills.

3.0 SITE DESCRIPTIONS

To characterize radiological contamination at Alameda Point, a series of radiological surveys were conducted. Radioactive contamination was detected in piping, equipment, and building surfaces of both Buildings 5 and 400, as well as drain lines, storm sewers, manholes, and entrained sediments associated with those buildings (Figure 2). Radioactive anomalies (areas with elevated radioactivity of unknown origin) were detected in the IR Sites 1 and 2 landfills (Figure 1), and radium-226 sources were recovered from both sites. Based on the results of the radiological surveys, it was recommended that further investigations and removal actions be considered for the IR Site 1 landfill, IR Site 2 landfill, IR Site 5

(Building 5), IR Site10 (Building 400), and storm sewer line F and related manholes (associated with Buildings 5 and 400). Brief descriptions of these sites and their associated radiological issues follow.

IR Site 1 landfill consists of a former landfill in the northeastern corner of Alameda Point (Figure 1). Jogging trails and runways cross the approximately 22-acre site. The landfill reportedly received all wastes generated at Alameda Point from 1943 to 1956, including low-level radioactive material. During previous radiological surveys of the IR Site 1 landfill, several near-surface radium-226 sources were located and removed, while other survey anomalies were identified, some in proximity to jogging trails. Approximately 50 percent of the site has been surveyed for radiation sources. Until base closure, access to the IR Site 1 landfill was not controlled, however, the Navy has since fenced off areas with radioactive anomalies in proximity to jogging trails, and currently, access to the entire area has been restricted to Navy caretaker personnel and authorized restoration contractors.

IR Site 2 landfill consists of a former landfill at the southeastern corner of Alameda Point (Figure 1). A radioactive waste storage building was located at the northwestern corner of the approximately 65-acre site, which is crossed by jogging trails. The building was dismantled in 1995. The landfill reportedly received wastes from Alameda Point, including low-level radioactive material, from 1956 to 1978. During radiological surveys of the IR Site 2 landfill, one radium-226 source was detected and removed. Several near-surface radium-226 sources were also identified and removed from the former radioactive waste storage building location. A radiation survey of the entire IR Site 2 landfill area has not been completed. Previously, access to the IR Site 2 landfill was partially controlled by topographic barriers, such as bushes, mounds, ponds, and wetlands. Currently, access to the entire area has been restricted to Navy caretaker personnel and authorized restoration contractors.

IR Site 5 consists of Building 5, which was an aircraft rework facility (Figures 1 and 2). Radioluminescent paints containing radium-226 have been stored, used, or disposed of in Building 5. Radiological surveys revealed one area of radioactive contamination within Room 227C in Building 5. In addition, the surveys detected radioactive contamination of drain lines in Building 5 that feeds storm sewer line F. The contaminated drain lines include both exposed and subsurface sections. The building is presently locked, and access is controlled by the Navy.

IR Site 10 consists of Building 400, which was a missile rework facility (Figures 1 and 2).

Radioluminescent paint was stored, used, or disposed of in Building 400. The radiation surveys detected radioactive contamination of the surfaces of four rooms (Rooms 203, 204, 210, and 213). The building is presently locked, and access is controlled by the Navy.

Storm sewer line F and related manholes include portions of the sewer system leading from IR Site 5 (Building 5) and IR Site 10 (Building 400) to an outfall at the seaplane lagoon (Figure 2). Portions of these sewer lines are contaminated with radioactive material. Some manhole catch basins along storm sewer line F also exhibit radioactive contamination. Access to storm sewer line F is through the associated manholes. Access to storm sewer line F manholes is not controlled, however, the Navy has marked the covers of radioactively contaminated manholes with radiation warning signs.

4.0 STATEMENT OF THE PROBLEM

The results of recent radiation surveys conducted at IR Sites 1, 2, 5, and 10 at Alameda Point has led the Navy to conclude that the facility poses a potential threat of radiation exposure from drain line sediments and landfill soils, and several other areas of suspected radioactive contamination, principally from radium-226. The U. S. Environmental Protection Agency (EPA) classifies all radioactive materials, including radium, as carcinogens. There is no clear evidence that long-term exposure to radium at levels that are normally present in the environment (that is, background levels) is likely to result in harmful health effects; however, exposure to elevated levels of radium (above background levels) over long periods of time may result in harmful effects. As a result, being near radium at elevated levels may result in harmful human health effects over time. There is uncertainty as to the amount and extent of radium exposure that increase the chances of developing harmful health effects; nevertheless, the greater the total amount of exposure to radium (including both the level of radioactivity and the exposure duration), the greater the chances of developing harmful health effects.

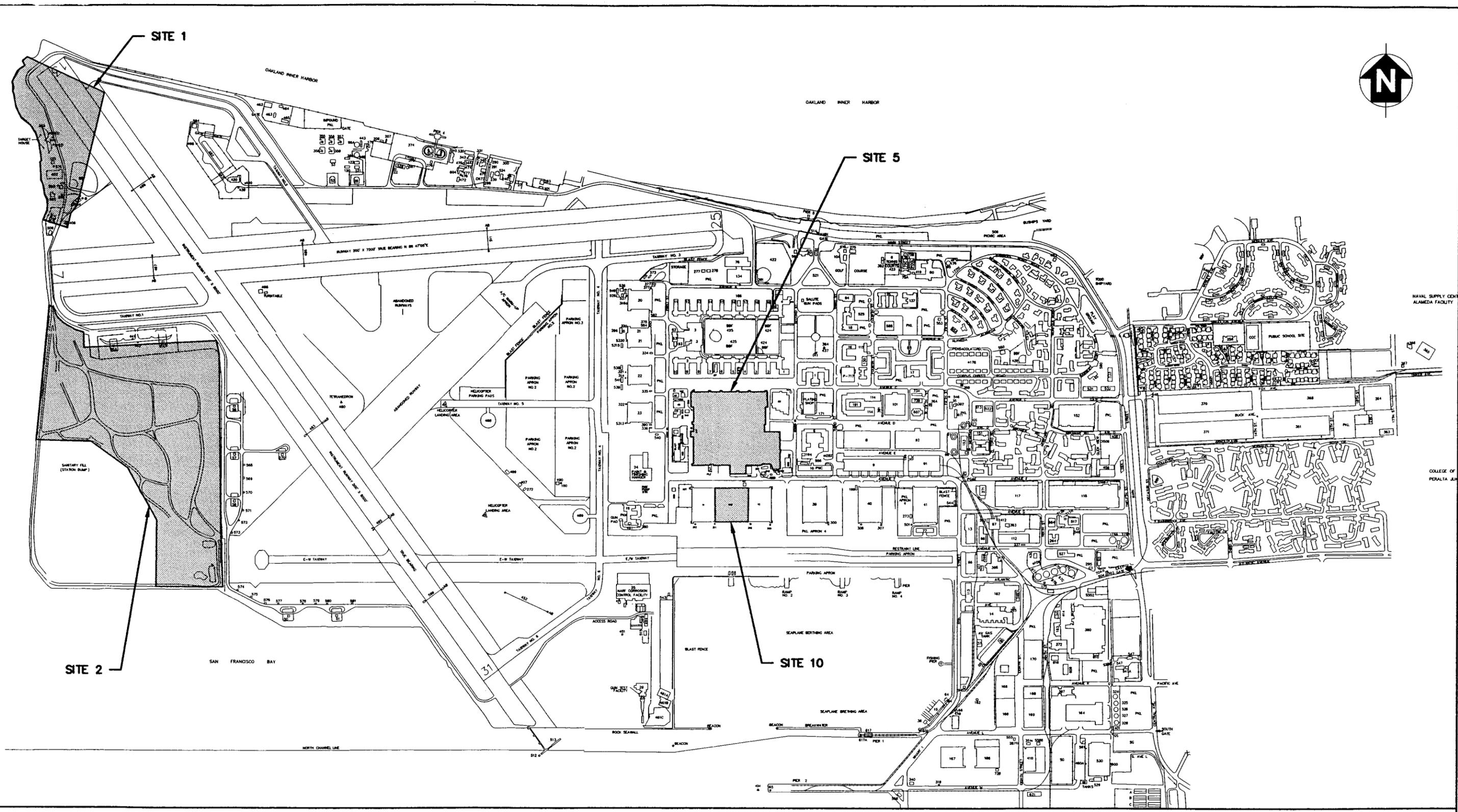
Radioactive contamination at IR Sites 1, 2, 5, and 10 at Alameda Point has resulted in surface radioactivity at levels above background in some areas of the subject sites. As explained above, prolonged exposure to radioactivity above background levels may result in harmful health effects. As a result, the major problem associated with radioactivity at IR Sites 1, 2, 5, and 10 at Alameda Point is the actual or potential exposure by nearby human populations, animals, or the food chain to radium-226

contamination. The proposed removal action will remove sources of radium-226 contamination from the upper soil layer of the IR Sites 1 and 2 landfills, and will remove radium-226 contamination from building surfaces, pipes, sewers, manholes, and sediments associated with IR Sites 5 and 10 (Buildings 5 and 400), to accepted limits. This will substantially eliminate exposure to radium-226 and confirm that any remaining contamination is at acceptable concentrations to limit actual or potential health threats from exposure.

5. RECOMMENDATION

Data from radiation surveys indicate that IR Sites 1, 2, 5, and 10 have been impacted with radiological materials (radium-226) from Navy activities at these sites. Conditions at the sites may pose a potential exposure to ionizing radiation from radium-226. A detailed risk analysis has not been performed for these sites at the present time. However, according to CERCLA methodology for determining the appropriateness of a removal action (40 CFR §300.415[b][2]), the threat of actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chains may apply to IR Sites 1, 2, 5, and 10. Some conditions at these sites may constitute releases while others are contained within buildings at this time and do not constitute releases to the environment.

Preliminary information indicates that radiation from IR Sites 1, 2, 5, and 10 has not endangered occupants or visitors and does not present a clear endangerment threat to the human population at this time. However, if the proposed removal action is not taken, potential exposure of human populations and the environment to ionizing radiation from radium-226 will continue. Implementing the proposed removal action will reduce present and future levels of potential radiation exposure to levels substantially below any threat to human health for the long term, and meet protectiveness criteria defined by the US EPA for radioactive materials. The Navy has proposed media specific remediation goals for IR Sites 1,2,5 and 10, which meet the EPA protectiveness criteria for radioactive materials, and in addition, which would allow IR sites 5 and 10 to be used without property, access or deed restrictions, based on consideration of residual radioactive materials. It is recommended that the Navy implement the proposed removal action as soon as possible, in order to meet EPA protectiveness criteria, insure long term human health, and allow IR Site 5 and 10 reuse without property, access, or deed restrictions.

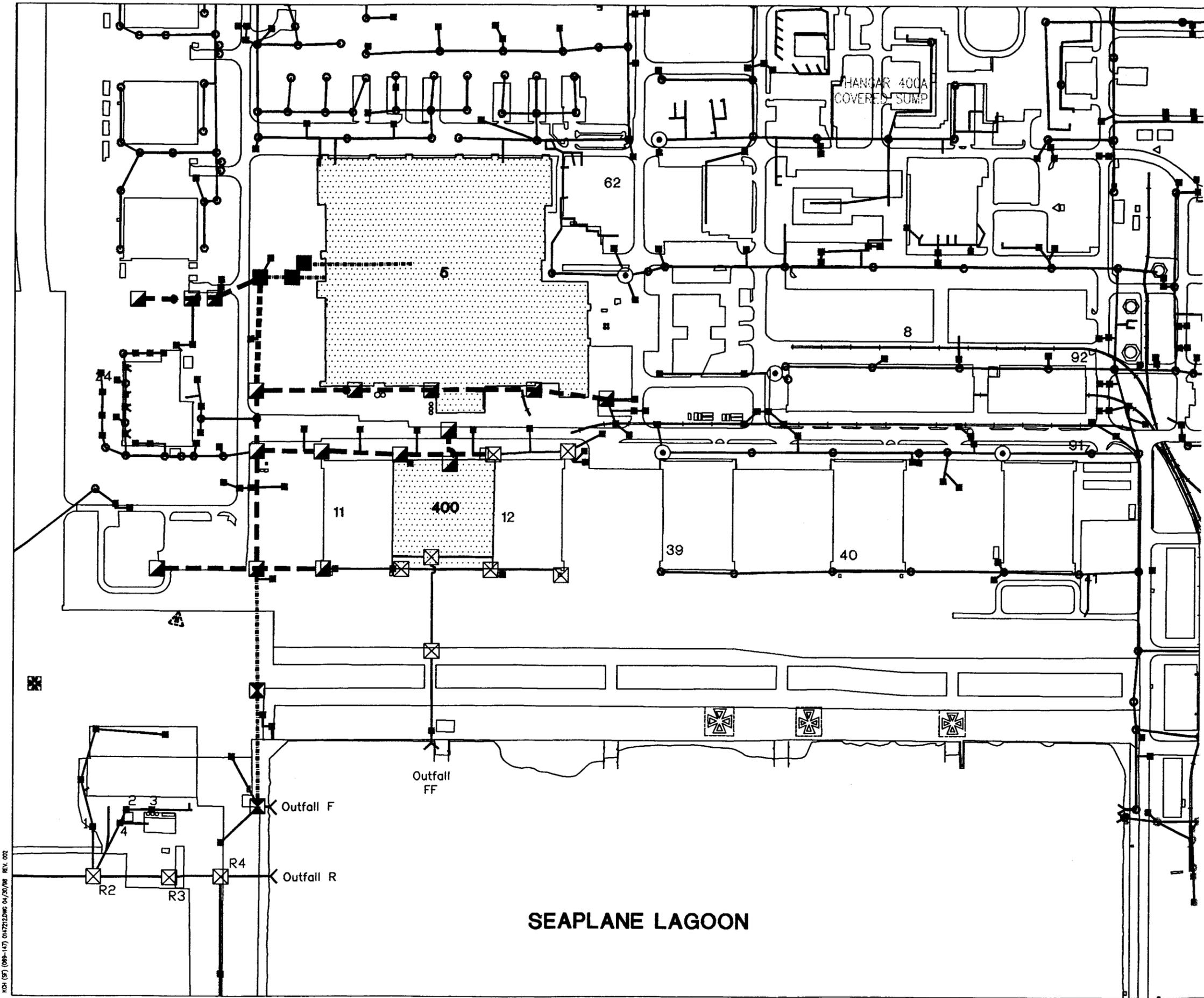


KCH (SF) (069-147) NAS/SIZE.DWG 03/03/98 - PLOT 1:1 - REV.001

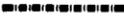
SOURCE: "RADIATION SURVEY REPORT, NAVAL AIR STATION, ALAMEDA, CALIFORNIA", PRE-DRAFT FEBRUARY 1997



NAS ALAMEDA, CALIFORNIA	
Figure 1 LOCATION OF SITES 1, 2, 5 AND 10	
	Tetrtech EM, Inc.

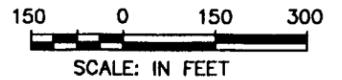


LEGEND

- 
 MANHOLE/CATCH BASIN LOCATION
 MAXIMUM ACTIVITY DETECTED
 $> 10^8$ pCi Ra-226
- 
 SEWER SYSTEM LINE
 MAXIMUM ACTIVITY DETECTED
 $> 10^8$ pCi Ra-226
- 
 MANHOLE/CATCH BASIN LOCATION
 MAXIMUM ACTIVITY DETECTED
 $> 10^6$ pCi Ra-226 $< 10^8$ pCi Ra-226
- 
 SEWER SYSTEM LINE
 MAXIMUM ACTIVITY DETECTED
 $> 10^6$ pCi Ra-226 $< 10^8$ pCi Ra-226
- 
 MANHOLE/CATCH BASIN LOCATION
 MAXIMUM ACTIVITY DETECTED
 $> 10^4$ pCi Ra-226 $< 10^6$ pCi Ra-226
- 
 SEWER SYSTEM LINE
 MAXIMUM ACTIVITY DETECTED
 $> 10^4$ pCi Ra-226 $< 10^6$ pCi Ra-226
- 
 NO APPRECIABLE DIFFERENCE
 FROM BACKGROUND ($< 10^4$ pCi Ra-226)
- 
 BACKGROUND MANHOLE
- 
 SEWER SYSTEM
 MANHOLE LOCATION
- 
 SEWER SYSTEM CATCH
 BASIN LOCATION
- 
 SEWER SYSTEM LINE

SOURCES: "RADIATION SURVEY REPORT, NAVAL AIR STATION, ALAMEDA, CALIFORNIA", PRE-DRAFT FEBRUARY 1997.

"ALAMEDA NAVAL AIR STATION, RADIOLOGICAL CHARACTERIZATION SURVEY OF STORM DRAINS," FINAL REPORT FOR COMMENT.



KCH (SF) (08-147) 04/21/2006 04/20/98 REV. 02

SEAPLANE LAGOON

NAS ALAMEDA, CALIFORNIA	
Figure 2 SITES 5 & 10 - BUILDINGS 5 & 400 EXTERIOR STORM DRAIN LINES & SEWERS	
	Tetrattech EM, Inc.