CLEAN
Central Zone

Contract No. N62474-88-D-5086

Contract Task Order No. 0139

Navy Engineer-in-Charge: Lisa Grippo
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JMM Project Manager: William Mabey

NAVAL AVIATION DEPOT
NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

FUEL SPILL INVESTIGATION REPORT
FINAL

CTO 139

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March 30, 1992

PRC ENVIRONMENTAL MANAGEMENT INC. MEMORANDUM

SACRAMENTO OFFICE

Date : November 11, 1992

To : Gary Munekawa - WESTDIV, 1811GM

From : Duane C. Balch

Subject : Notes on DTSC Meeting of November 4, 1992, at NAS Alameda and at the DTSC - Berkeley Office

NAS Alameda, IMF Site

At approximately 1100 hours, November 4, 1992, personnel from NAS Alameda, WESTDIV, DTSC, PRC and J.M. Montgomery meet at the IMF site at NAS Alameda to observe IT Corporation personnel (at the direction of NAS Alameda personnel) bail and sample free product from IMF site monitoring well MW-IMF-01. A 1¼-inch diameter, three-foot long teflon bailer was used to extract two bailer volumes worth of hydrocarbon free product from MW-IMF-01. Samples were collected for analysis of hydrocarbon type (chromatographic "fingerprinting"). The bailer contained only free product and water was not observed in this well. Nearby monitoring well MW-IMF-02 was also sampled and was found to contain water, however, no free-product or hydrocarbon odors were observed in MW-IMF-02. The two wells are approximately 20 feet apart and roughly cross-gradient to each other. Water samples from MW-IMF-02 were to be analyzed for pH and lead.

Field discussions indicated that IT personnel would attempt to bail MW-IMF-01 dry, then return two days later to observe fluid levels and bail free-product (and water if present) again until the well was dry. Chemical analyses are expected to be available by November 13, 1992, according to NAS Alameda personnel.

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At DTSC - Berkeley

At 1330 hours, November 4, 1992, the personnel listed below met at the DTSC office in Berkeley to discuss possible removal activities for a past JP-5 fuel release to the storm drain and industrial sewer systems at the east side of Building 397 (due northwest of the IMF site).

Name	Company	Telephone
Virginia Lasky	DTSC	510-540-3817
Tom Lanphar	DTSC	510-540-3809
Chein Kao	DTSC	510-540-3822
Janette Baxter	RWQCB	510-286-1287
Gary Munekawa	US Navy-WESTDIV	415-244-2524
George Kikugawa	US Navy-WESTDIV	415-244-2559
Ken Callegari	US Navy-WESTDIV	415-244-2569
Michael Petouhoff	NAS Alameda	510-263-3726
Randy Cate	NAS Alameda	510-263-3716
Paul Pentony	NADEP	510-263-6294
Bill Fetherston	NADEP	510-263-6292
Roger Caswell	NADEP	510-263-6241
Duane Balch	PRC-EMI	916-852-8300
Kenneth Leung	JM Montgomery	510-975-3460

Ken Callegari called the meeting to order to discuss a proposed schedule of work related to addressing DTSC concerns for initiating a removal action and cleanup of a release of JP-5 fuel to the storm drain/industrial waste sewer system at Building 397. Following standard contractual procedures for generating a scope of work, awarding a contract to investigate the lateral extent of the JP-5 in soils and ground water at Building 397, writing a report, recommending appropriate follow-on work and initiating an EE/CA to identify the best cleanup approach, would take until the end of 1993 to early 1994 to complete.

DTSC and RWQCB personnel suggested that an interim removal action should be implemented as soon as possible, and that waiting until the end of 1993 would not be acceptable. It was explained that investigation and cleanup of the JP-5 release at Building 397 was being addressed by NADEP, and that their area of concern overlapped the old oil refinery site (Site 13 of the RI/FS study) being addressed by WESTDIV. NADEP expressed concern on defining the limits of the required removal action of JP-5 impacted soils if they were also overlying hydrocarbon contamination associated with the old oil refinery.

The possibility of developing some field-screening criteria for removal of the worst of the JP-5 in the soils around the storm drain/sewer system was discussed, and Jan Baxter-RWQCB

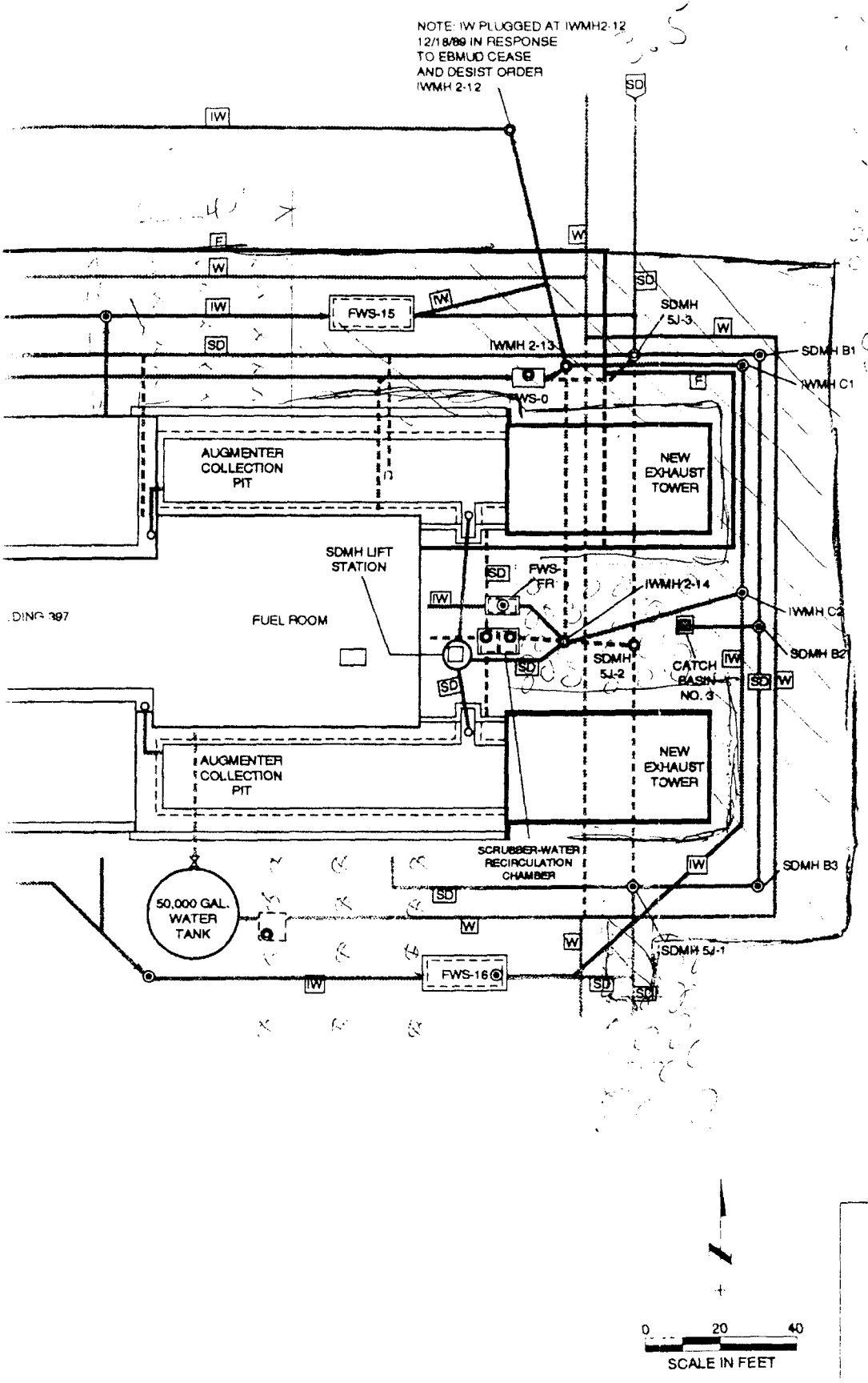
suggested the possibility of using aminoassay techniques for JP-5. It was then discussed that unless JP-5 could be clearly differentiated from old crude oils from the refinery site, it might not be possible to distinguish the difference between the limits of the JP-5 impact to soils where it has commingled with crude oil (and its waste products) from the old oil refinery site. Thus, using pre-determined cleanup level defined in parts per million hydrocarbons would not help define the limits of the JP-5 impact to soils by which NADEP could gauge the limits of their cleanup effort.

It was suggested that after DTSC and RWQCB review of the Final Fuel Spill Investigation Report generated concerning the JP-5 release, a meeting be held to discuss defining the most likely area impacted around the storm drain/sewer system. Copies of this report were distributed to Jan Baxter-RWQCB and to Virginia Lasky-DTSC. PRC suggested establishing an arbitrarily fixed distance (for example, 25 feet), centered on the storm drain/sewer system along the east side of Building 397 where JP-5 free product had been extracted in October 1991. This would allow NADEP to address the probable "worst" part of JP-5 impacted soils, while preventing NADEP from unnecessarily excavating soils impacted by crude oil hydrocarbons from the old oil refinery.

It was generally agreed by DTSC that such an approach would address their immediate concerns for a removal action, while the remaining JP-5 impact (if any) beyond the storm drain/sewer system would be addressed as part of the additional site work planned in 1993 for the old oil refinery site under the ongoing RI/FS study by WESTDIV. Lt. Mike Petouhoff indicated that NAS Alameda would check into other contracting options to assist in implementing the JP-5 removal action with NADEP. A tentative follow-up meeting date with the DTSC was scheduled for November 13, 1992 at 0930 hours.

A brief discussion of the bailing activity at the IMF site that morning was held, and it was reiterated that the Navy was currently in the process of negotiating the EE/CA activity for the IMF site soils (lead and low pH problems). DTSC and RWQCB personnel asked if Navy would continue to pump or extract free product from MW-IMF-01. WESTDIV and NAS Alameda personnel indicated that a course of action would be discussed at the next meeting with the DTSC following the results of the bail-down currently being performed at MW-IMF-01 by IT personnel.

As a separate issue, Chein Kao-DTSC announced that Tom Lanphar would be phasing in as the new project manager for NAS Alameda, replacing Virginia Lasky.



NAVAL AIR STATION
ALAMEDA, CALIFORNIA
UTILITY AND DRAINAGE PLAN

FIGURE 1

NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

FUEL SPILL INVESTIGATION REPORT

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APPENDICES

SECTION 1.0

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), received Contract Task Order (CTO) No. 139 from the Department of the Navy, Naval Facilities Engineering Command, Western Division (WESTDIV), to perform a fuel spill investigation at Building 397 at the Naval Air Station (NAS) Alameda, California. As PRC's Comprehensive Long-Term Environmental Action Navy (CLEAN) contract team member, James M. Montgomery, Consulting Engineers, Inc. (JMM), performed a records review, interviews, and a field investigation related to CTO 139. All activities were performed in accordance with the work plan and health and safety plan prepared by JMM and PRC (JMM, 1991, a, b, c).

NAS Alameda is located at the west end of Alameda Island, in San Francisco and Alameda Counties, California. Alameda Island lies along the eastern side of San Francisco Bay and adjacent to the city of Oakland. The air station occupies 2,634 acres and is approximately 2 miles long and 1 mile wide. Most of the eastern portion of the air station is developed with offices and industrial facilities; runways and support facilities occupy the western portion of the station. Building 397 is located in the eastern portion of the station, and it houses two jet engine test cells (JETC), JETC-15 and JETC-16, which are operated by the Naval Aviation Depot (NADEP).

Following a period of heavy rains during February of 1991, several storm drain manholes near Building 397 at NAS Alameda overflowed, with the resulting ponded water showing a layer of hydrocarbon product. These manholes are part of the storm drain and industrial waste sewer systems that serve Building 397.

NADEP's subsequent investigation to determine the cause and extent of the release found that a drain valve on the jet fuel supply line in Building 397's fuel room had been left open during start-up and operational testing of a new automatic data acquisition system (ADAS) for JETC-15. NADEP initially estimated that up to 17,000 gallons of JP-5 jet fuel had been potentially released. NADEP reasoned that the jet fuel had flowed from the drain valve to the fuel/water separator outside the fuel room and then moved through the industrial waste sewer to the storm drain. NADEP further reasoned that the storm drain had subsequently filled with rainwater and the jet fuel and water mixture had overflowed from the manholes.

The complexity of evaluating possible releases from the fuel/water separator and associated piping systems and the potential need for clean-up efforts prompted NADEP to request assistance from WESTDIV and ultimately led WESTDIV to issue CTO 139 under the CLEAN contract. This report presents the findings of the Fuel Spill Investigation conducted under this CTO.

The scope of work for CTO 139 was to determine the cause(s) of the JP-5 release, to identify other potential sources of contamination, if any, and to recommend remedial alternatives. The specific tasks associated with CTO 139 are as follows:

- Investigate the Cause for the Release of JP-5
- Identify Other Potential Sources of Contamination
- Evaluate Condition and Configuration of Piping
- Evaluate the Contribution from Installation Restoration Site 13
- Recommend Remedial Alternatives
- Collect and Characterize Hydrocarbon Samples
- Observe Product Recovery in a Storm Drain Manhole After Removal of Standing Product

This report is organized as follows: Section 2 (Background) describes the fuel/water separator, industrial waste sewer, and storm drain systems around Building 397, various observations of Navy personnel and known events that potentially relate to the jet fuel release incident, and a material balance approach for evaluating how jet fuel could have moved through this utility system. Section 3 discusses information from previous investigations at NAS Alameda as it may be related to events at Building 397. Section 4, Field Activities-Manhole Inspections, presents the results of field investigations of the presence of fuel in the utility system, and Section 5 summarizes the results of the PRC team's investigation and potential remediation alternatives. Section 6 presents conclusions and recommendations for possible future investigations around Building 397.

SECTION 2.0

2.0 BACKGROUND

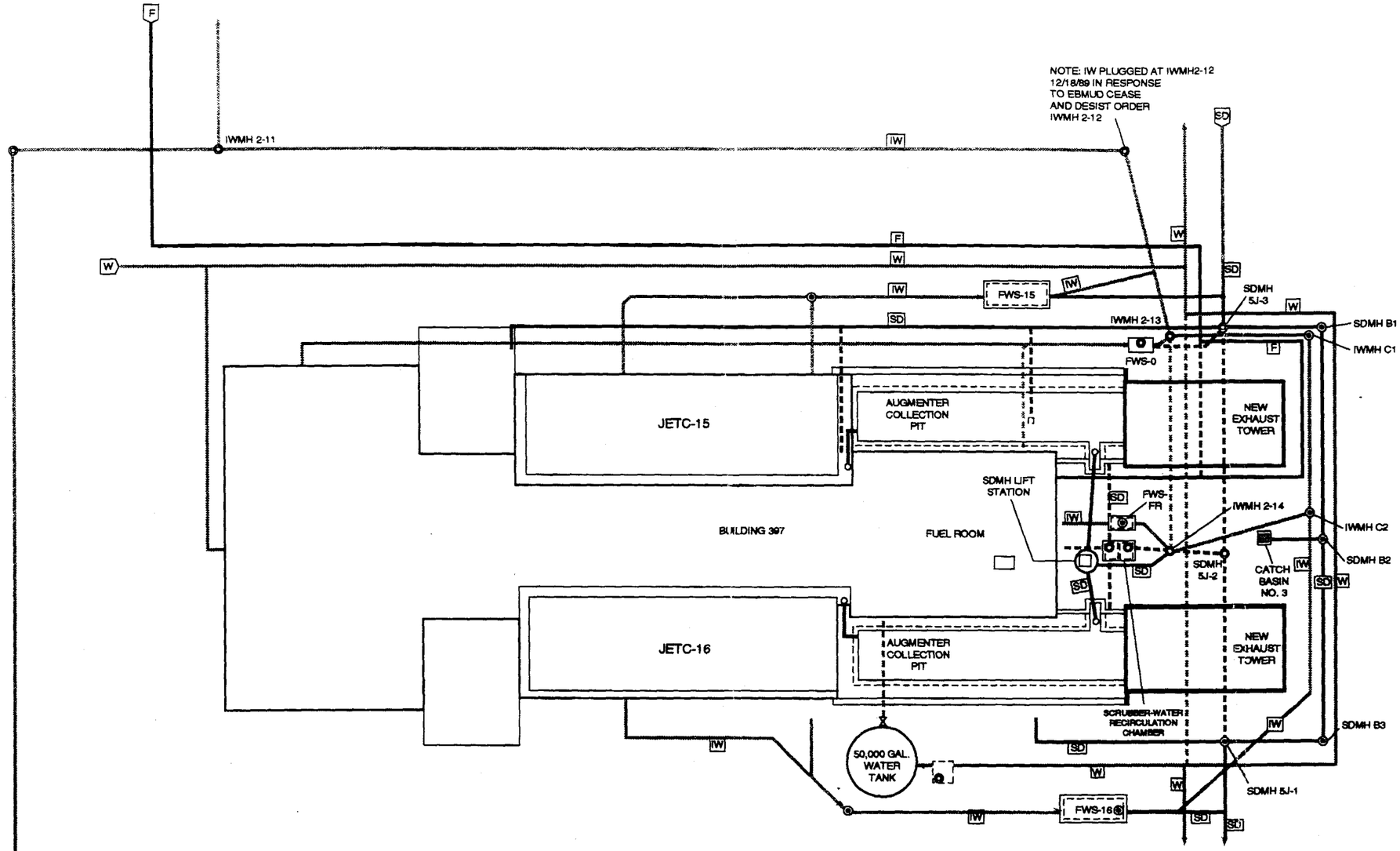
This section summarizes the site's recent history as it relates to the fuel spill investigation. Included in this section are a description of the piping system that existed at the time of the jet fuel release, reasons for the plugging of the industrial waste sewer system, a sequence of observations and events related to the jet fuel release, other observations potentially related to presence of hydrocarbons, and finally a material balance to evaluate jet fuel movement in the piping system (Note: This report will henceforth refer to the jet fuel losses from the drain valve as a "jet fuel release" and not a spill or a leak).

2.1 PIPING SYSTEM AFTER JET ENGINE TEST CELL MODIFICATIONS

This section provides a description of modifications to the JETCs at Building 397 under Military Construction Project (MCON) P-752, which resulted in the rerouting of lines that served Building 397. Design engineering for modifications to the JETCs at Building 397 was provided by the firm of Daniel, Mann, Johnson, and Mendenhall (DMJ&M), with the Utility and Drainage Plan detailed in Naval Facility (NAVFAC) Drawing 6141941. From this drawing, a simplified utility and drainage plan (Figure 1) has been prepared, which is useful for understanding the observations and information discussed in this report.

The construction work consisted primarily of incorporating exhaust handling facilities into the two JETCs, addition of several in-ground fuel/water separators, and modifications for abandonment of an existing in-ground scrubber water recirculation chamber (Figure 1). Exhaust facilities included augmenters with underlying concrete collection pits, and new exhaust towers. The augmenters are insulated tunnels that reduce noise from the JETCs, acting in much the same way as an automobile muffler. The new exhaust towers are located at the ends of the augmenters.

Construction of the augmenter tunnels and new exhaust towers, which extend eastward from the two JETCs, necessitated that the industrial waste sewer, storm drain, jet fuel (JP-5) supply line, and water mains be rerouted around the new exhaust towers. Significant modifications to existing manholes and the construction of several new manholes along new sections of the industrial waste sewer and storm drain were required. Figure 1 illustrates these modifications. As a result of MCON P-752 modifications, those sections of the industrial waste sewers, storm drain, the jet fuel supply line, and water mains that ran beneath the new exhaust towers were abandoned. Abandonment measures, as described on DMJ&M detail drawings (NAVFAC Drawing Nos. 6141943 and 6141945), called for plugging or bricking up pipe openings at connecting manholes.



LEGEND

FSW	FUEL WATER SEPARATOR
IW	INDUSTRIAL WASTE
SD	STORM DRAIN
MH	MANHOLE
F	FUEL
W	WATER
JETC	JET ENGINE TEST CELL

SOLID LINES INDICATE EXISTING SYSTEMS
DASHED LINES INDICATE REPORTEDLY ABANDONED SYSTEMS

N

0 20 40
SCALE IN FEET

A-2

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
UTILITY AND DRAINAGE PLAN

FIGURE 1

Maximum footing thicknesses for the new exhaust towers called out in DMJ&M's Concrete Walls and Foundation Details (NAVFAC Drawing No. 6141968) are 3 feet with a 3-inch concrete base and nominal 2-feet of crushed rock beneath. These specifications would result in a total foundation thickness of 5 feet 3 inches. For construction at this depth, removal of abandoned sections of jet fuel supply line and water mains would have been necessary, though it is possible that affected sections of industrial waste sewers and storm drain would have been abandoned in place. Definitive information regarding their abandonment is not available.

2.2 THE PLUGGING OF THE INDUSTRIAL WASTE SEWER

In the spring of 1989 the East Bay Municipal Utilities District (EBMUD) began to monitor the industrial waste discharges at all JETC fuel/water separators. Sampling of discharges indicated sporadic excursions from National Pollutant Discharge Elimination System (NPDES) limits for total toxic organics.

On December 18, 1989, EBMUD ordered Buildings 14, 372, and 397 at NAS Alameda to cease and desist discharging from their JETC fuel/water separators any wastewaters containing chemicals in excess of NPDES limits. In response to this order, NADEP had the industrial waste sewer from Building 397 plugged at the industrial waste manhole No. 2-12 (IWMH 2-12). This action could have resulted in any liquids in the sewer, including jet fuel, being trapped and potentially backing up in the industrial waste sewer line.

2.3 EVENTS RELATED TO THE JET FUEL RELEASE INVESTIGATION

On February 28, 1991, following continual heavy rains, the storm drain overflowed from storm drain manhole No. 5J-3 (SDMH 5J-3) onto Avenue K northeast of Building 397 (Figure 1). The resulting pool was covered with a layer of free hydrocarbon product and reportedly covered an area of 600 to 1,000 square feet. The NAS Fire Department was called for assistance (see Fire Department Run reports #315 and #322 in Appendix A) and began opening manhole covers in an attempt to determine the source(s) and extent of the discharge. Twelve (12) manholes uncovered near Building 397 were found to contain floating free product hydrocarbon. Other manholes within a block of SDMH 5J-3 and building 397 were also examined, but no evidence of hydrocarbon product in these manholes was found. The fire department run reports state that the hydrocarbon products were determined to be JP-5 jet fuel, but no information to document this finding was available to the PRC team during this investigation.

On March 1, 1991, an ensuing investigation by NADEP discovered that a small drain valve on the fuel supply line in the fuel room was open. Attached to the open drain valve was a flexible hose, which ran

into the floor drain leading to fuel/water separator FR (FWS-FR). The flexible hose had apparently prevented notice of the jet fuel flow from the open valve into the floor drain.

Subsequently, the flow rate at typical operating conditions from the hose attached to the drain valve was measured empirically by NADEP to establish a basis for estimating the volume of jet fuel discharged. The flow rate measured was 1.2 gallons per minute. NADEP initially assumed that the valve had been open since January 21, 1991, when acceptance tests for the newly installed computerized automatic data acquisition system (ADAS) at JETC-15 were performed. NADEP later received information indicating that the first J-52 jet engine test after ADAS installation had been conducted on JETC-15 on February 22, 1991. This information suggested to NADEP that the JP-5 supply line may not have been under pressure until the February 22 date. With a March 1 date for the time the fuel line was shut off, the calculated amount of fuel released would have been 3,500 gallons or 17,000 gallons depending on whether the fuel line had been pressurized on February 22 or January 21, respectively (these calculations are discussed more fully in Section 5.0).

Following the discovery of the open drain valve, the Public Works Center (PWC) was authorized to block discharge outlets from the fuel/water separators at Building 397. Between March 2 and March 10, 1991 discharge outlets from FWS-15, FWS-16, FWS-FR, FWS-O, and the SDMH Lift Station were permanently plugged, and the SDMH Lift Station disconnected (see Figure 1).

An additional observation of hydrocarbons in subsurface soils is also potentially related to the fuel release discussed above. On March 9, 1991, while excavating around a fuel/water separator on the northeast side of Building 397, PWC encountered free product, which the fire department described as JP-5, infiltrating the excavation (see Fire Department Run Report #370 in Appendix A). Conversations with the NAS Fire Department and PWC personnel indicate that the excavation may have reached ground water and that approximately 50 gallons of hydrocarbon were pumped from the excavation. The origin of the hydrocarbon is unknown, but it is possible that this product could have leaked from breaches in the industrial waste sewer or storm drain line at junctures with the fuel/water separator. Other potential sources of the hydrocarbon are discussed in subsequent sections.

2.4 OTHER OBSERVATIONS POTENTIALLY RELATED TO PRESENCE OF HYDROCARBONS AT BUILDING 397

Several other incidents were noted during the PRC team's investigation that are potentially relevant to understanding the presence of hydrocarbons in the subsurface soils at Building 397. These incidents have

to do with other appearances of free product, presumed to be JP-5, and a "minor" jet fuel leak that was detected in the buried JP-5 supply line between Buildings 397 and 372.

Incident No. 1: An earthquake of magnitude 7.1 occurred in the Bay Area on October 17, 1989, with damage occurring to the San Francisco-Oakland Bay Bridge and an overpass approximately 3 miles north of NAS Alameda. As discussed in Section 3.2, extensive damage to the storm drain in an area south of Building 397 has been reported by excavation crews and the storm drain is now believed by the Navy to be blocked. Several NAS Alameda personnel have attributed this damage to the earthquake. These personnel have speculated that additional damage to other underground piping and/or structures may have occurred and that breaches in the industrial waste sewer and storm drain may now exist as a result of earthquake damage. Although new information collected during the current investigation can be interpreted as indicating these breaches do exist (see Section 4.0), no quantitative information is available on the locations or sizes of such breaks in the industrial waste sewer or storm drain.

Incident No. 2: The second incident potentially relates to the period during which the fuel supply line to Building 397 was pressurized. Review of fire department run reports reveals that on February 4, 1991, the NAS Fire Department responded to a call reporting product emanating from two manholes on the northeastern corner of Building 397 (see Appendix A). The Fire Department found approximately 300 gallons of JP-5 mixed with other materials. One interpretation of this observation would suggest that JP-5 had already been released to the industrial waste sewer and/or storm drain before February 22, the date jet engine tests reportedly resumed in JETC-15. Information available is insufficient to determine whether the source of the hydrocarbon was from the open drain valve, as discussed in section 2.4, or from another origin.

Incident No. 3: During the PRC team's investigation, NADEP personnel reported the appearance of free hydrocarbon product in the JETC-15 augmenter pit, and such a slick was noted by PRC team personnel during one site visit. Upon inspection, it did not appear that the fluid had come from area runoff drains, which appeared dry and filled with debris (sticks and dirt). The slick was a dark brown material and appeared to have infiltrated through the concrete walls at the southwest end of the pit. No tests to verify the integrity of the augmenter pits are known to have been conducted. In another observation by NADEP, floating "black oil", which did not appear to be similar to the floating product believed to be JP-5 found in other manholes, has been observed in SDMH 5J-1 southeast of JETC-16. This "black oil", if not JP-5, could suggest another source of contamination in the vicinity.

Incident No. 4: From the outset of JMM's investigation, NADEP and WESTDIV indicated a possible leak in the jet fuel supply line was suspected as being an additional contributing factor to the

presence of jet fuel in subsurface soils. Thus, following the overflow of SDMH 5J-3, NADEP had requested that the NAS Fuel Department conduct an unscheduled pressure test on the fuel supply line leading from Building 372 to Building 397 to determine its integrity. This test was performed on March 13, 1991. The test's duration was abbreviated when the line held pressure and was concluded to be sound.

In June 1991, a scheduled pressure test was performed on the fuel line as part of a preventative maintenance program. During this test, according to the NAS Fuel Department, the line lost approximately 15 pounds per square inch (psi) of pressure form an initial 100 psi in about 20 minutes, and this response was repeated upon repressurization. The NAS Fuel Department considers such a loss in pressure to constitute a "minor" leak. It should be noted that the fuel supply line normally operates at a pressure of 50 to 60 psi. Nonetheless, this pressure test result indicates that some jet fuel may have leaked from the jet fuel supply line sometime between March and June. The fuel line leak is known to be between Building 372 and Building 397, but the exact location of the leak along the approximately 1,000 feet of supply line is not known. If the pressure test of March 13, 1991 is correct, then none of the observations discussed in section 2.3 are related to the fuel line leak that has now been detected. However, this fuel line leak may be a source of jet fuel in soils that will potentially extend the efforts required for any remediation of jet fuel now present in the site soils and ground water.

2.5 MATERIAL BALANCE FOR EVALUATING FUEL MOVEMENT IN PIPING SYSTEM

As is seen from the above information obtained from interviews and records reviews, there is an incomplete understanding of the amount of fuel released form the open drain valve, the integrity of the industrial sewer and storm drain systems, and other sources of jet fuel or other hydrocarbons that are present in subsurface soils and piping systems in the area of Building 397. As another approach for understanding the potential extent of jet fuel movement in subsurface piping systems, a material balance is useful for evaluating the capacities and jet fuel movement in these systems.

The material balance approach presented below assumes that the jet fuel release from the open drain valve is the only source of hydrocarbon in the area of Building 397. Reference to Figure 1, is helpful throughout the following discussion. First, it is known that the open drain valve discharged JP-5 to FWS-FR. The capacity of FWS-FR is 500 gallons. Given a release of a minimum of 3,500 gallons of JP-5, 3,000 gallons would have spilled over into the industrial waste sewer system. The calculated capacity of the industrial waste sewer pipelines and manholes from FWS-FR down to IWMH 2-12, is 2,000 gallons; this calculation assumes that liquid in this system would back up to, but not enter, FWS-16, FWS-15, FWS-O, or the SDMH Lift Station. Assuming the industrial waste sewer was empty prior to the jet fuel release, 1,000 gallons of JP-5 could then have backed up into these other fuel/water separators.

The SDMH Lift Station receives influent from the two augmenter collection pits and is actuated by a level switch in the pumpwell. In the event of heavy rains, as occurred in late February 1991, the two augmenter pits would begin to collect stormwater runoff thereby actuating the SDMH Lift Station. As is shown on Figure 1, the SDMH Lift Station would then pump into IWMH 2-14 and the industrial waste sewer system. However, after being plugged at IWMH 2-12 in response to the EBMUD order, the industrial waste sewer around Building 397 became a confined system. If at least 3,000 gallons of JP-5 had already been released into the industrial waste sewer and other fuel/water separators, this stormwater runoff being pumped into the industrial sewer would force what JP-5 remained in the industrial waste sewer into the fuel/water separators.

The aggregate capacity of FWS-15, FWS-16, and FWS-O is approximately 9,350 gallons. Assuming the fuel/water separators were empty before the fuel release occurred, only 8,350 gallons of stormwater would have had to be pumped into the industrial waste sewer before the fuel/water separators spilled over through their emergency overflows into the storm drain. Both augmenter pits filled 6 inches deep would account for this volume of water.

The above analysis assumed an initial release of 3,500 gallons of jet fuel. However, a 17,000 gallon JP-5 release would have introduced 5,150 gallons of JP-5 into the storm drain before the SDMH Lift Station even actuated. No information was obtained in this investigation that would allow any reliable estimates of the amount of jet fuel recovered from the manholes, and which could be used to estimate the minimum amount of fuel released.

SECTION 3.0

3.0 CONTRIBUTIONS FROM OTHER POTENTIAL SOURCES

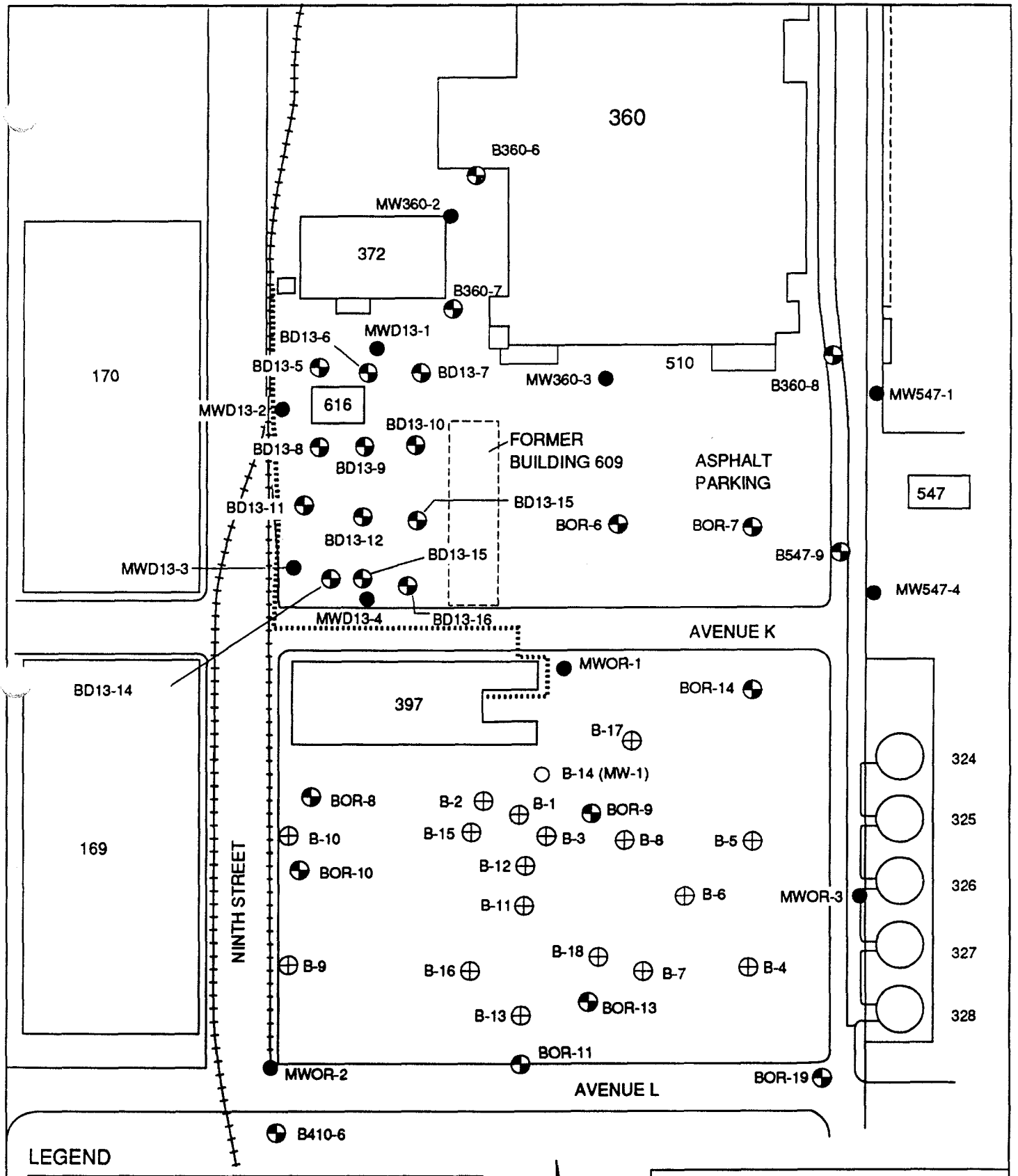
A review of base operations shows two sites adjacent to Building 397 that have been previously investigated for the presence of chemicals in soil and ground water. The following sections discuss these sites as they may be potential sources of hydrocarbons at Building 397. These sites are referred to as Yard D-13 (IR Site No. 19) and Installation Restoration Site No. 13. Locations of borings and monitoring wells installed during previous investigations by Canonie Environmental (Canonie) and Harding Lawson Associates (HLA) are shown on Figure 2. Both sites are now the subject of Remedial Investigation activities.

3.1 YARD D-13 (IR Site No. 19)

Yard D-13 is located directly north of Building 397 and directly south of Building 372. This yard is fenced on all sides with Building 616 located in its northwest corner as shown on Figure 2. The yard is a storage area for drummed hazardous wastes generated on the base and has been recently resurfaced. The prior pavement surface was reported to be broken in places allowing the possible migration of any spilled chemicals to the soil (Canonie, 1990).

Canonie (1990) found total petroleum hydrocarbons (TPH) at elevated concentrations in both shallow soils (less than 3 feet) and in deeper soils (greater than 3 feet) at Yard D-13. No information on the reference standards (such as JP-5, diesel, gasoline) used for the TPH measurements is available in Canonie reports, so the type of the hydrocarbon is not known. However, levels of toluene in soils were generally on the order of 10-50 μg/kg, and analyses did not show significant amounts of other monocyclic aromatic hydrocarbons in soil samples. Areas of elevated TPH concentrations in shallow soils were localized on the southern edge of the yard (3070 milligrams per kilogram [mg/kg] from BD13-16, and 14,500 mg/kg from BD13-15), and just south of Building 616 roughly in the center of the site (2280 mg/kg from BD13-8, and 5310 mg/kg from BD13-9). Areas of elevated concentrations in deeper soils are more evenly distributed throughout the site with the highest concentration at this depth horizon occurring just west of Building 616 (12,800 mg/kg in soils from MWD13-2). A high TPH concentration was also found in deeper soils on the western edge of Yard D-13 (1570 mg/kg from BD13-11).

Ground water beneath Yard D-13 was relatively free of TPH and oil and grease (O&G) (Canonie 1990), a condition not unusual for lighter-than-water, water-insoluble hydrocarbon phases in which soluble monocyclic hydrocarbons are not present. It should be noted that 5 of the 6 sampling points having the highest TPH concentrations in soil are near the jet fuel supply line path (Figure 2). Such an occurrence may indicate past jet fuel supply line leaks possibly complicated by preferential flow along jet fuel line backfill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MW360-2
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B360-7
MWD13-1
BD13-6
BD13-5
BD13-7
MW360-3
510
B360-8
MW547-1
170
MWD13-2
616
BD13-10
FORMER
BUILDING 609
ASPHALT
PARKING
547
BD13-8
BD13-9
BD13-11
BD13-15
BD13-12
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AVENUE K
MWOR-1
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BOR-14
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327
328
BOR-8
B-2
B-1
BOR-9
169
B-10
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B-8
B-5
NINTH STREET
BOR-10
B-12
B-6
MWOR-3
B-11
B-18
B-9
B-16
B-7
B-4
B-13
BOR-13
BOR-11
MWOR-2
BOR-19
AVENUE L
B410-6
LEGEND
CANONIE BORING
HLA BORING
CANONIE MONITORING WELL
HLA MONITORING WELL
JET FUEL SUPPLY LINE
N
0 50 100
SCALE IN FEET
A-2
NAVAL AIR STATION
ALAMEDA, CALIFORNIA
PREVIOUS INVESTIGATION,
BORING AND
MONITORING WELL LOCATIONS
FIGURE 2

materials. However, these leaks would likely have occurred in the past as evidenced by the absence of the more volatile, soluble constituents from soil and water samples.

3.2 INSTALLATION RESTORATION SITE NO. 13

IR site no. 13 was formerly the Pacific Coast Oil Refinery which operated from 1879 to 1903. During the refinery's operation, asphaltic residues and other refinery wastes were reportedly disposed at the site. Several instances of excavations and drilling operations on site have encountered a material that has been described as "black oil," and this material may be due to former refinery operation. IR Site No. 13 itself covers a large area, with the northern edge of the site located at the south side of Building 372 (Canonie, 1990).

In September 1989, petroleum hydrocarbons were detected in several locations during construction activities for an Aircraft Intermediate Maintenance Department (AIMD) facility on part of IR Site No. 13 adjacent to Building 397. In particular, green-stained soils were encountered by crews excavating around a storm drain at the AIMD construction site south of Building 397. These soils were later found to be contaminated with petroleum hydrocarbons. During the PRC team investigation several Navy personnel stated that the storm drain was damaged and was backfilled without repair. This part of the storm drain is believed to be the downstream leg of the storm drain serving Building 397; if so, these activities may be responsible for the apparent blockage of the Building 397 storm drain.

Harding Lawson Associates (HLA) was contracted to perform a limited investigation at the AIMD site to determine the extent of petroleum hydrocarbons found in soils (1989). HLA advanced a total of 18 soil borings, developing one into a ground water monitoring well. HLA concentrated its sampling grid within the planned AIMD building location and just southeast of Building 397, as shown on Figure 2. Characterizations of the hydrocarbons were made on the basis of the boiling point range of a characteristic carbon chain-length range of specific hydrocarbon mixtures (jet fuel, gasoline, diesel). However, chromatographic fingerprints of hydrocarbon samples did not match the laboratory standard fingerprints of gasoline, jet fuel, or diesel. Therefore, the identification of hydrocarbons present at the site as being jet fuel, gasoline, or other hydrocarbons cannot be regarded as definitive. Also, a black "tar-like" material was encountered in adjacent borings, B-7 and B-18, in the southeastern quadrant of the sampling grid. Petroleum hydrocarbons were fairly evenly distributed with the highest levels of TPH occurring in the southeastern and northwestern (that is, near the southeastern corner of Building 397) quadrants of HLA's sampling grid. HLA also reported the presence of the hydrocarbons benzene, ethyl benzene, xylene, naphthalene, and methylnaphthalene in Monitoring Well MW-1 located to the south of Building 397.

TPH concentrations found by Canonie (1990) at IR Site No. 13 are significantly lower than those found by Canonie at Yard D-13, and again the reference standards for the TPH measurements are unknown. Canonie's sampling was more wide spread than HLA's, with the sampling grid probing areas northeast, east, and southwest of Building 397. The highest TPH concentration was found southeast of Building 397 in deeper soils (4360 mg/kg from BOR-9) as shown in Figure 2. No hydrocarbons were detected in any of the monitoring wells installed by Canonie.

In conclusion, the information available for Yard-D13 and IR Site No. 13 are inconclusive as to whether hydrocarbons present at these sites are similar to the jet fuel found in the area of Building 397. However, given that refinery operations at IR Site No. 13 ceased before jet aircraft were available and given the age of hydrocarbons that would have been disposed from the refinery, it is unlikely that this site is now a source of jet fuel to the area of Building 397.

SECTION 4.0

4.0 FIELD ACTIVITIES - MANHOLE INSPECTIONS

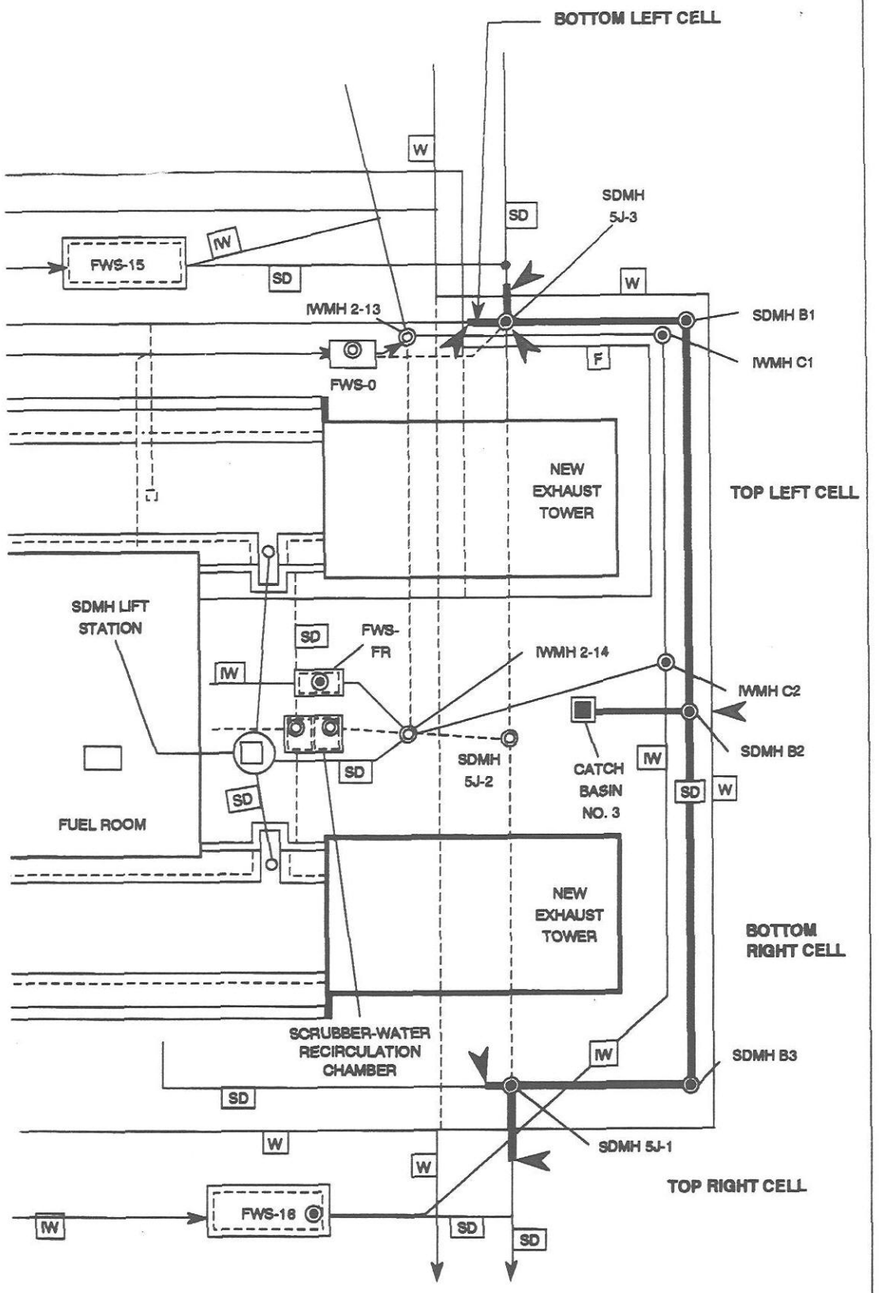
Following the above review of site records and reports and interviews with NADEP, Fuel Department, PWC, and fire department personnel, the PRC team conducted a limited field investigation. Access to manholes along the storm drain and industrial waste sewer near Building 397 was restricted by the presence of large volumes of fluid in these systems; the presence of substantial amounts of sediment in these systems is also likely. Due to the restricted access to manholes and piping systems, attempts were canceled to conduct a video examination of industrial waste sewer and storm drain interiors using remote television equipment, as originally proposed in the investigation work plan. Instead, manholes were visually inspected from ground surface and probed with a metal rod to evaluate any manhole offsets or other features below the fluid surface.

4.1 INITIAL MANHOLE INSPECTIONS

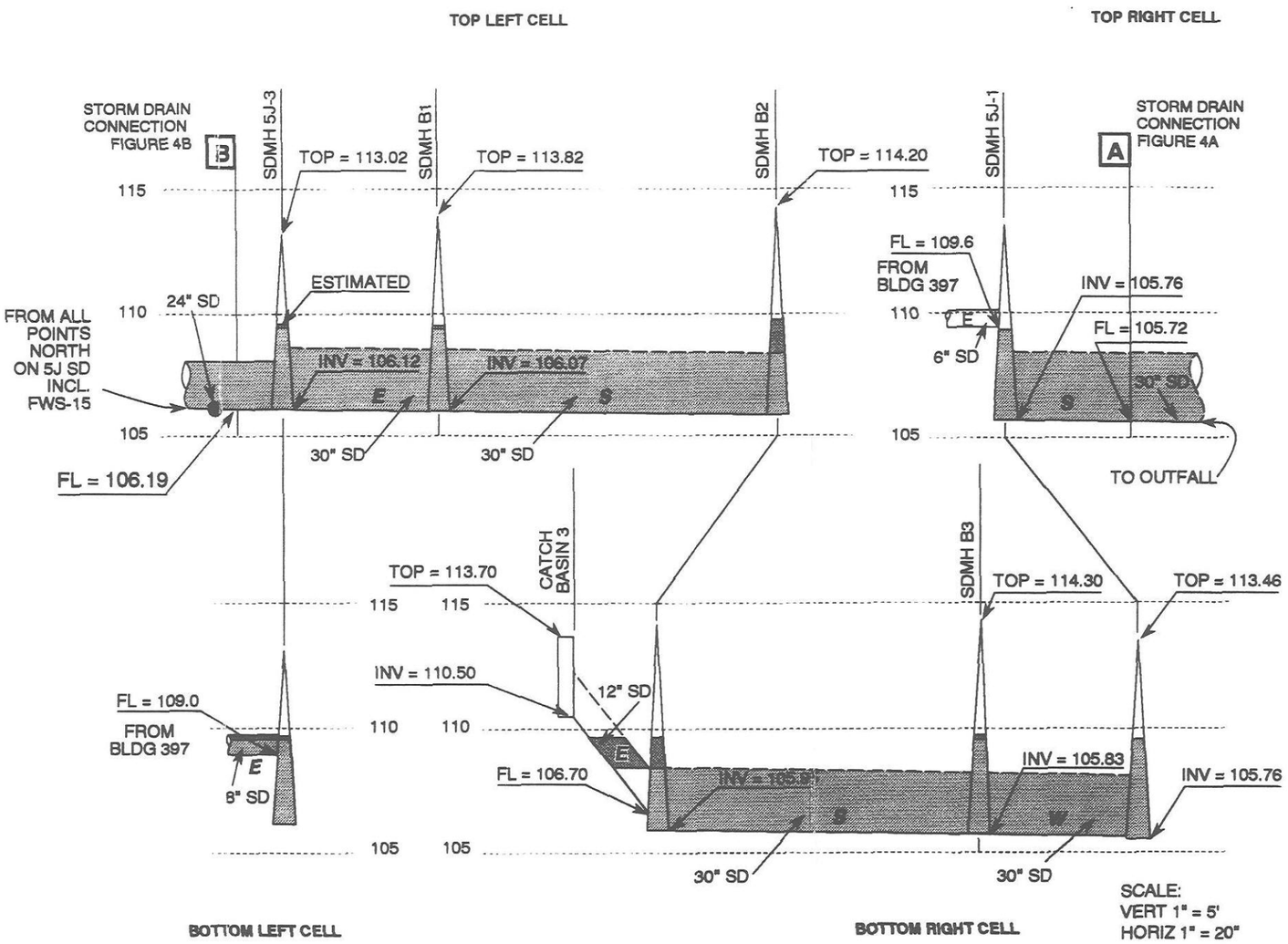
Initial manhole inspections were conducted on August 15, 1991. Figures 3 and 4 show a series of profile drawings depicting expanded cross-sectional views of the storm drain and industrial waste sewer systems including manholes and fuel/water separators; construction details in the figures are taken from NAVFAC drawings. Measured water levels and thicknesses of floating product layers are shown in these figures and in Table 1. The depth below ground surface (bgs) to the top of the product layer and depth BGS to the water/product interface were measured from the tops of manholes with a dual-phase interface indicator. Manhole interiors were probed with a long metal rod to detect where pipeline connections were and if they were plugged. Table 1 summarizes the results of this inspection.

The measured levels shown in Figures 3 and 4 indicate that fluids in the industrial waste sewer and storm drain have assumed a common equilibrium level. The figures indicate that this equilibrium fluid level occurs at a reference level just above 109.5 feet (reference levelps of manholes with a dual-phase interface indicator. Manhole interiors were probed with a long metal rod to detect where pipeline connections were and if they were plugged. Table 1 summarizes the results of this inspection.

The measured levels shown in Figures 3 and 4 indicate that fluids in the industrial waste sewer and storm drain have assumed a common equilibrium level. The figures indicate that this equilibrium fluid level occurs at a reference level just above 109.5 feet (reference levels are feet above mean sea level plus 100 feet). This common equilibrium may be an indication that fluid levels in the industrial waste sewer and storm drain are being influenced by the water table since measured levels are below the level at which the industrial waste sewer and storm drain become interconnected through the fuel/water separators. Of particular interest is SDMH B2, which was observed to contain a product layer over 14 inches thick.



INDICATES CELL TERMINOUS ON PROFILE



LEGEND

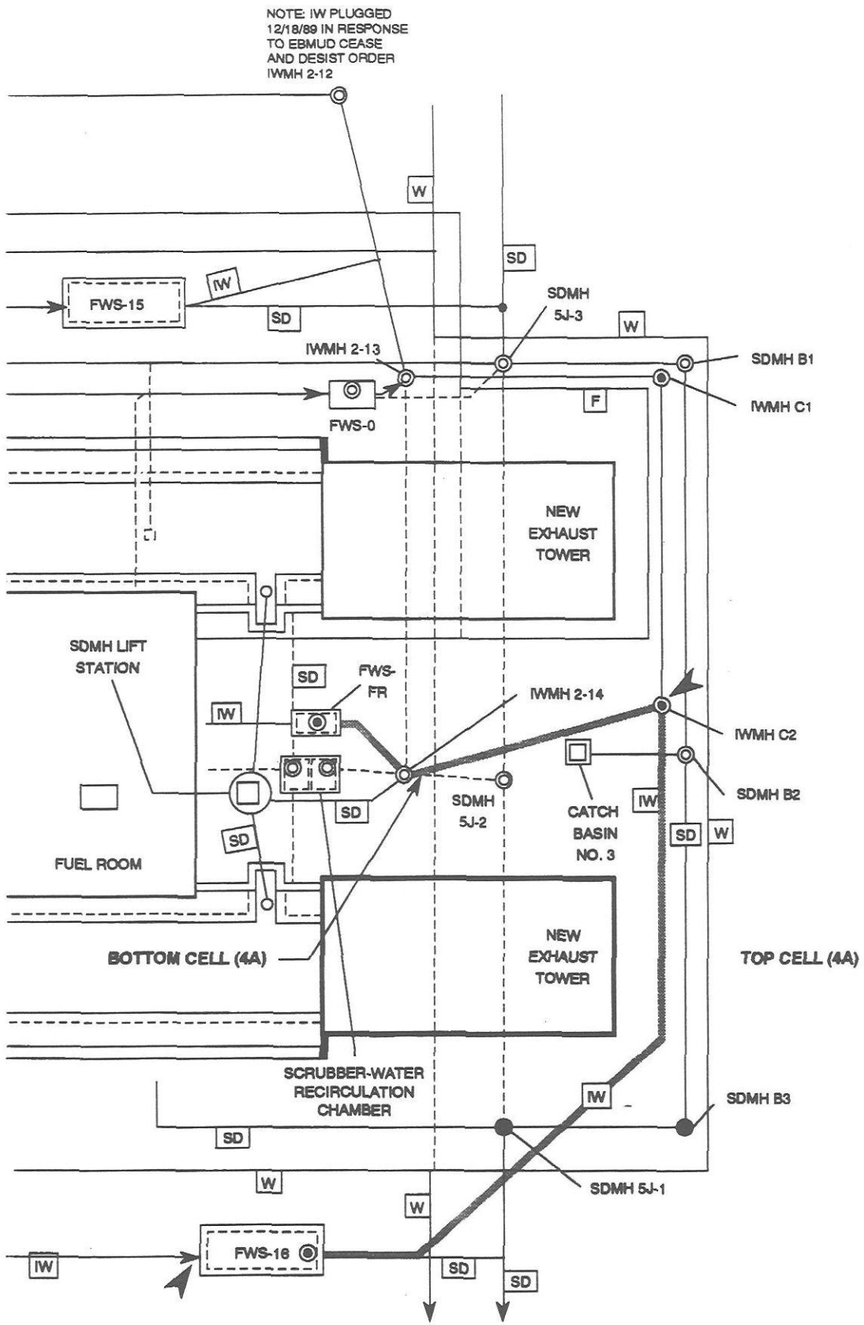
HYDROCARBON PHASE
WATER PHASE

FL	FLOW LINE
INV	INVERT
SD	STORM DRAIN
E, S, W	DIRECTION

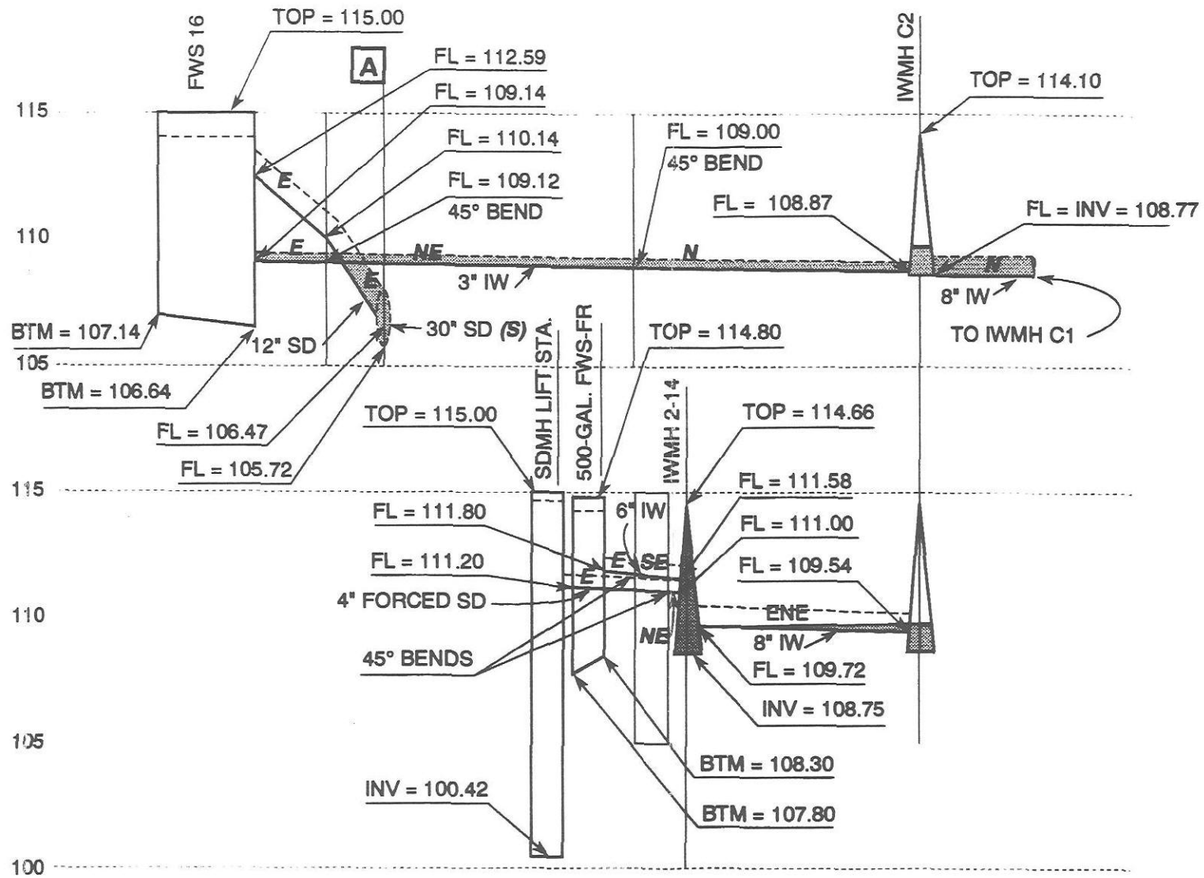
A-2

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
STORM DRAIN PROFILE
AS INSPECTED 8/15/91

FIGURE 3



INDICATES CELL TERMINOUS ON PROFILE



SCALE:
VERT 1" = 5'
HORIZ 1" = 20"

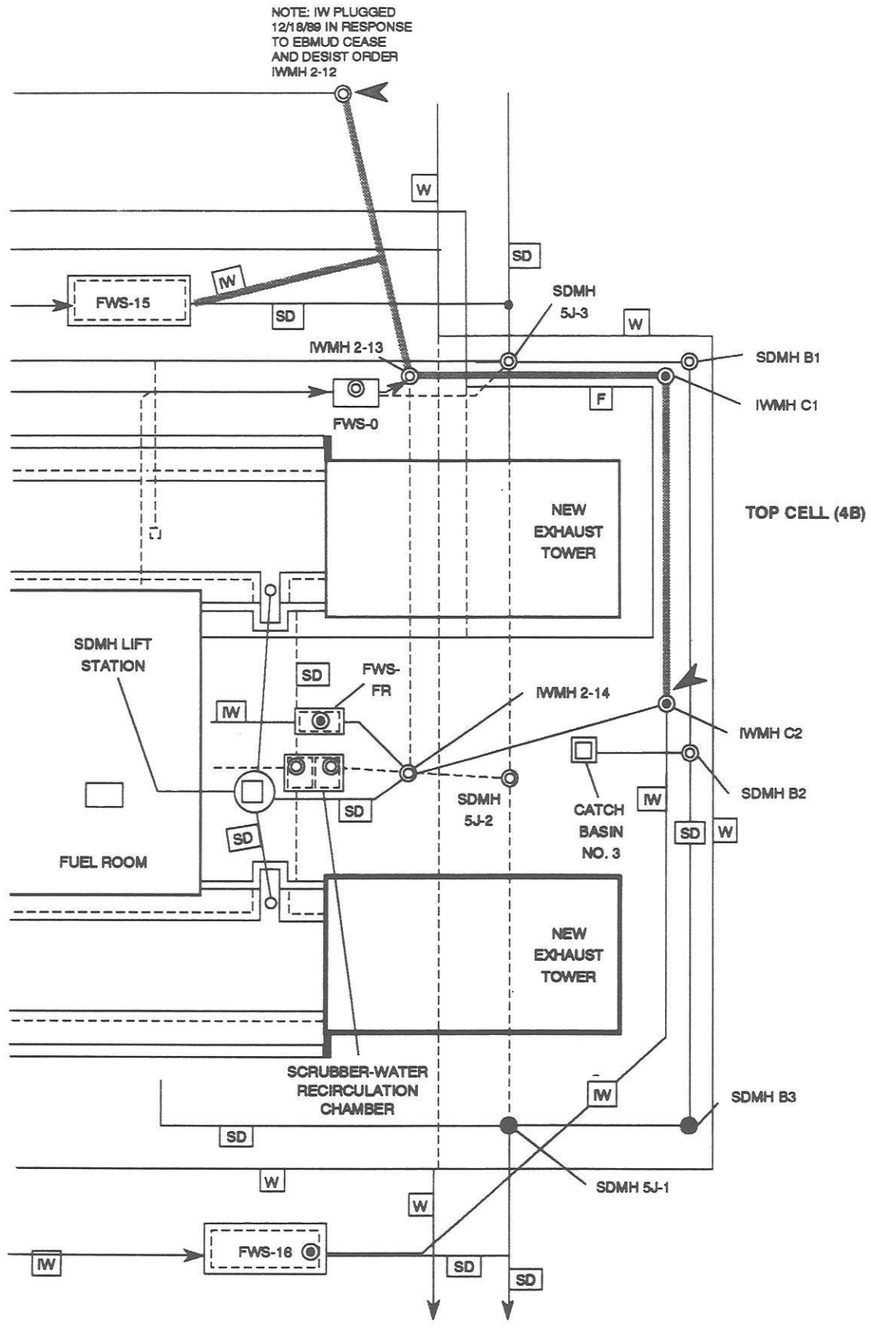
LEGEND

HYDROCARBON PHASE
WATER PHASE

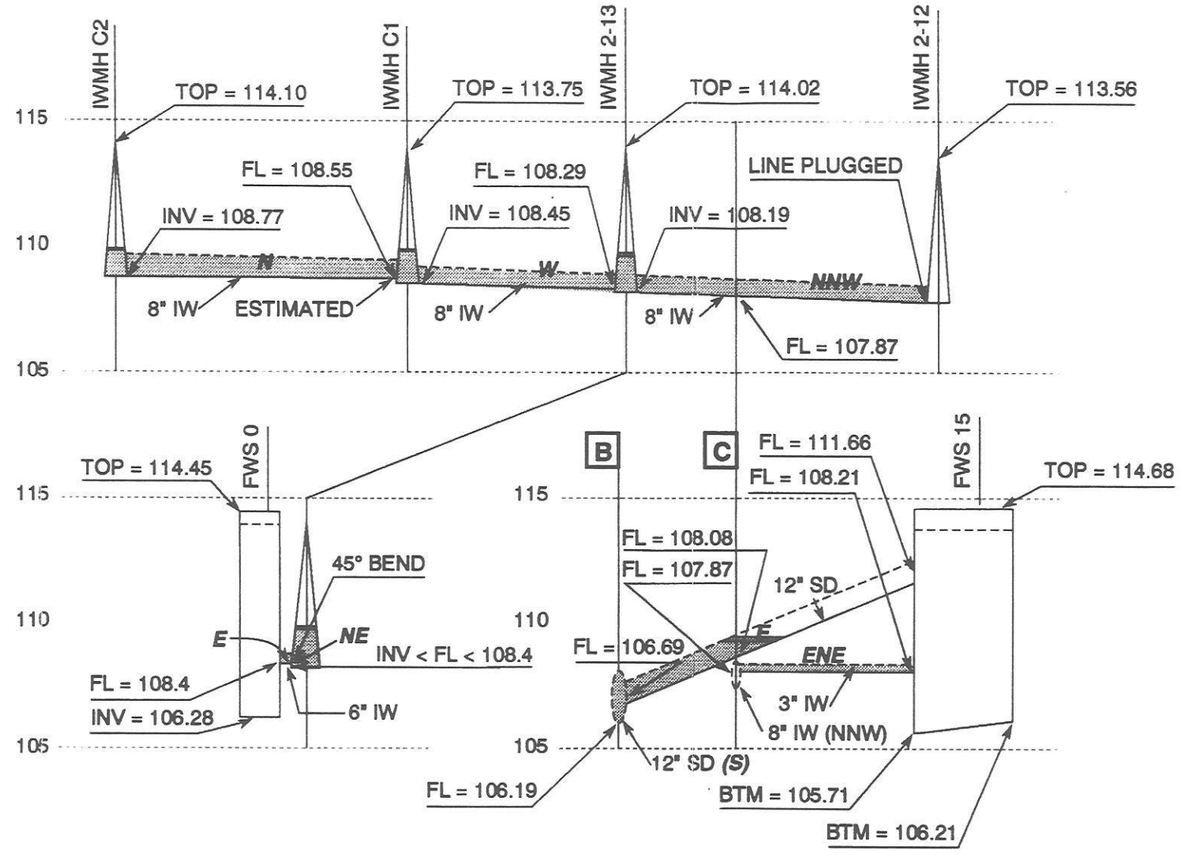
FL	FLOW LINE
INV	INVERT
SD	STORM DRAIN
E, S, W	DIRECTION

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
INDUSTRIAL WASTE SEWER PROFILE
AS INSPECTED 8/15/91

FIGURE 4A



INDICATES CELL TERMINOUS ON PROFILE



SCALE:
VERT 1" = 5'
HORIZ 1" = 20"

LEGEND

HYDROCARBON PHASE
WATER PHASE

FL	FLOW LINE
INV	INVERT
SD	STORM DRAIN
E, S	DIRECTION

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
INDUSTRIAL WASTE SEWER PROFILE
AS INSPECTED 8/15/91

FIGURE 4B

TABLE 1

SUMMARY OF INITIAL MANHOLE INSPECTION

BUILDING 397
NAVAL AIR STATION, ALAMEDA
AUGUST 15, 1991

Location	Depth to Product (ft, BGS)	Depth to Water (ft, BGS)	Comments
SDMH B1	4.40	4.45	Honey-colored product
SDMH B2	4.60	5.79	Top ring of manhole offset 6 inches E, 3 inches N
IWMH C2	4.38	4.45	Irregular concrete above pipe openings
SDMH 5J-2	4.54	4.74	Top ring of manhole offset 4 inches E
SDMH B3	4.89	4.91	
SDMH 5J-1		4.02	Product sheen, negligible layer thickness
IWMH 2-13	4.35	4.40	

Because the product layers were above the pipeline connections in manholes, and apparently confined to the manholes, the anomolously thick product layer in a single manhole was thought by the PRC team to indicate a source near that manhole or downstream.

4.2 ADDITIONAL MANHOLE INSPECTIONS

To verify whether a source of hydrocarbon product existed near SDMH B2, additional manhole inspections were conducted on October 24 and 25, 1991.

4.2.1 Fluid Measurements

In the first part of the additional inspections, product and water levels were measured in SDMH B2 and surrounding manholes, and product samples were collected for hydrocarbon characterization. After collecting samples and measuring product and water levels, approximately 6 1/2 inches of free product was pumped out of SDMH B2 followed by periodic observation of fluid recovery in this manhole and any response on surrounding manholes. The water level in the nearest monitoring well, HLA's B-14 (MW-1) located to the southeast of JETC-16 (Figure 2), was also measured to determine possible influence from the water table. The results of the additional manhole inspection, periodic observations, and the follow-up inspection are summarized in Table 2. Comparison of fluid levels in the storm drain manholes with levels previously measured (Table 1) indicate the water level was approximately one-half foot lower during the October inspection. On October 24, 1991, when the additional manhole inspection occurred, the industrial waste sewer was found to be dry (free of fluids).

As shown in Figure 5, the equilibrium fluid levels measured in storm drain manholes during the October inspection had retreated to a reference level below 109 feet. This equilibrium level is over 7 inches below that measured in August and corresponds to a level near the invert levels of the industrial waste sewer (Figure 6). This strongly suggests that the integrity of the industrial waste sewer and storm drain are breached allowing the water table level to exercise influence upon their equilibrium fluid levels. It is also reasonable to expect some tidal influence on the water table in this area of NAS Alameda, causing significant variations of its level on a daily basis. Given the porous nature of the sandy soils in the area of Building 397, significant responses in water table level to rainfall events also would be reasonable and these water level variations could be manifest through breaches in the sewer and drain lines.

4.2.2 Hydrocarbon Characterization

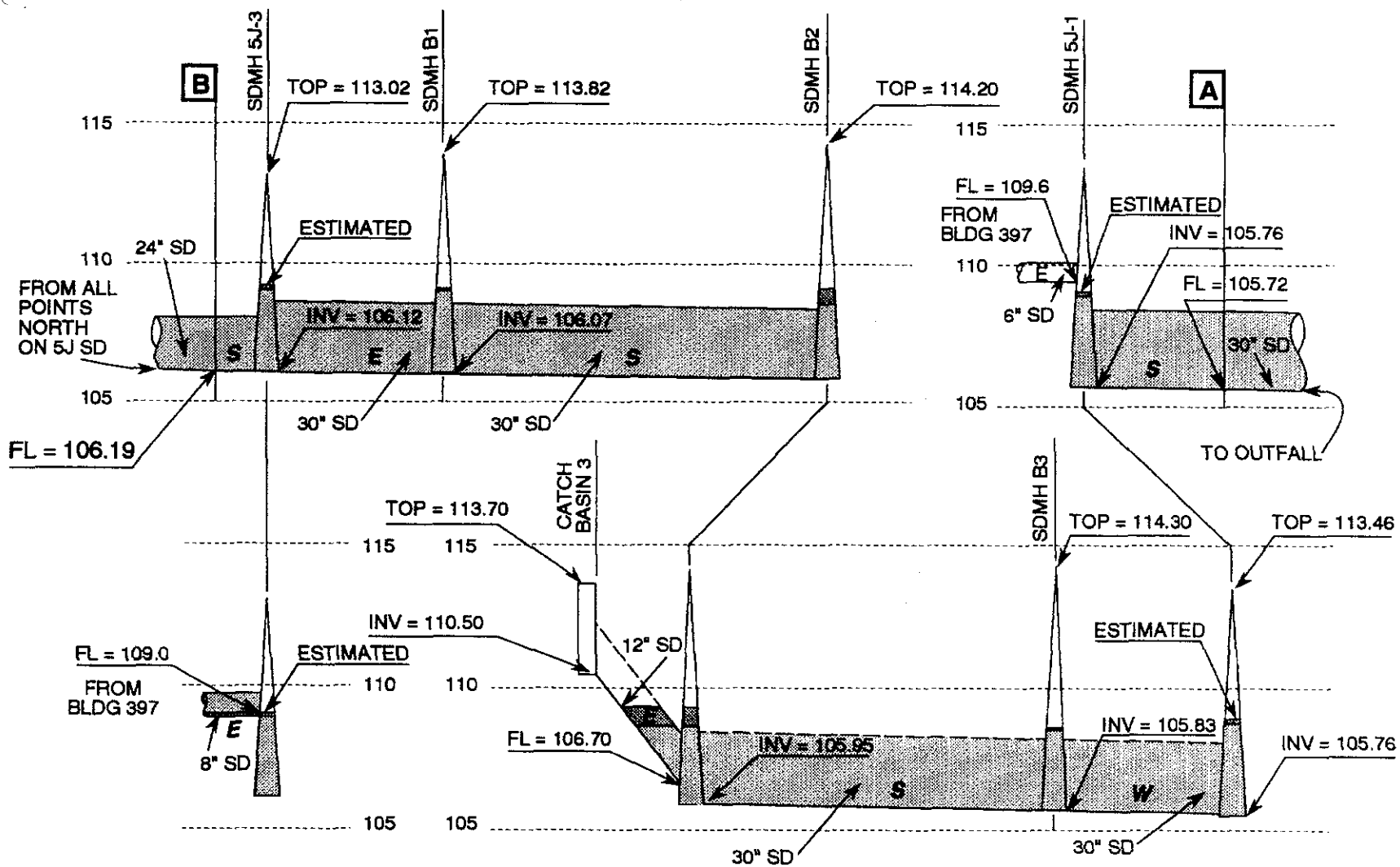
On October 24, 1991, product samples were collected from SDMH B2, SDMH B3, and SDMH 5J-2. A second sample was collected on October 25, 1991 from SDMH B2. A sample of JP-5 from the NAS, Alameda Fuel Department was also collected as a reference standard. These samples were analyzed for (1) constituent characterization as carbon number for fuel hydrocarbon content: total petroleum hydrocarbons (TPH) as JP-5, performed with a capillary gas chromatograph (GC) in series with a flame

TABLE 2

SUMMARY OF ADDITIONAL MANHOLE INSPECTIONS

BUILDING 397
NAVAL AIR STATION, ALAMEDA
OCTOBER 24 AND 25, 1991

Location	Date	Time	Depth to Product (ft, BGS)	Depth to Water (ft, BGS)	Comments
SDMH B1	10/24/91	1:30	4.89	4.91	
		13:01	5.07	5.09	
		14:31	4.98	5.01	
	10/25/91	13:25	4.85	4.88	
SDMH B2	10/24/91	11:20	5.18	5.71	Sample collected/ Free product removed
		12:42	5.47	5.51	
		12:49	5.46	5.52	
		12:53	5.44	5.51	
		13:12	5.40	5.46	
		13:20	5.39	5.45	
		14:25	5.33	5.41	
	10/25/91	13:07	5.22	5.28	Sample collected
SDMH 5J-2	10/24/91	11:59	5.34	5.43	Sample collected
		12:57	5.23	5.39	
		13:08	5.22	5.40	
		14:28	5.23	5.40	
	10/25/91	13:17	5.22	5.41	
SDMH B3	10/24/91	11:40	5.32	5.34	Sample collected
		13:05	5.49	5.51	
		14:32	5.42	5.44	
	10/25/91	13:15	5.31	5.33	
HLA MW-1	10/24/91	11:45		5.60	Oily residue/product sheen



LEGEND

HYDROCARBON PHASE
WATER PHASE

FL	FLOW LINE
INV	INVERT
SD	STORM DRAIN
E, S, W	DIRECTION

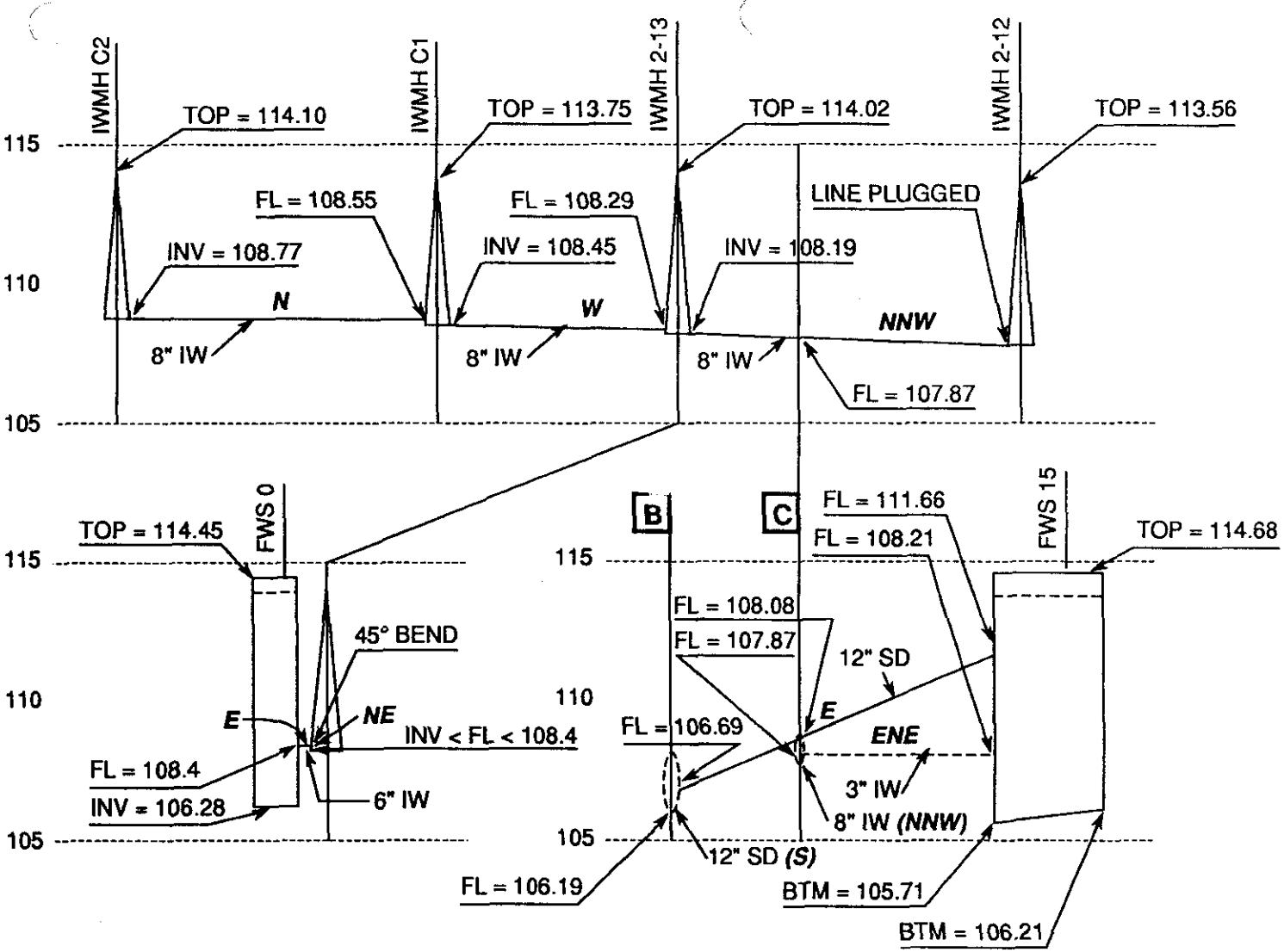
SCALE:
VERT 1" = 5'
HORIZ 1" = 20"

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
STORM DRAIN PROFILE
AS INSPECTED 10/24/91

FIGURE 5

SEE FIGURE 3 FOR PLAN VIEW OF STORM DRAIN SEGMENT IN THIS FIGURE

A-2



SCALE:
VERT 1" = 5'
HORIZ 1" = 20"

LEGEND

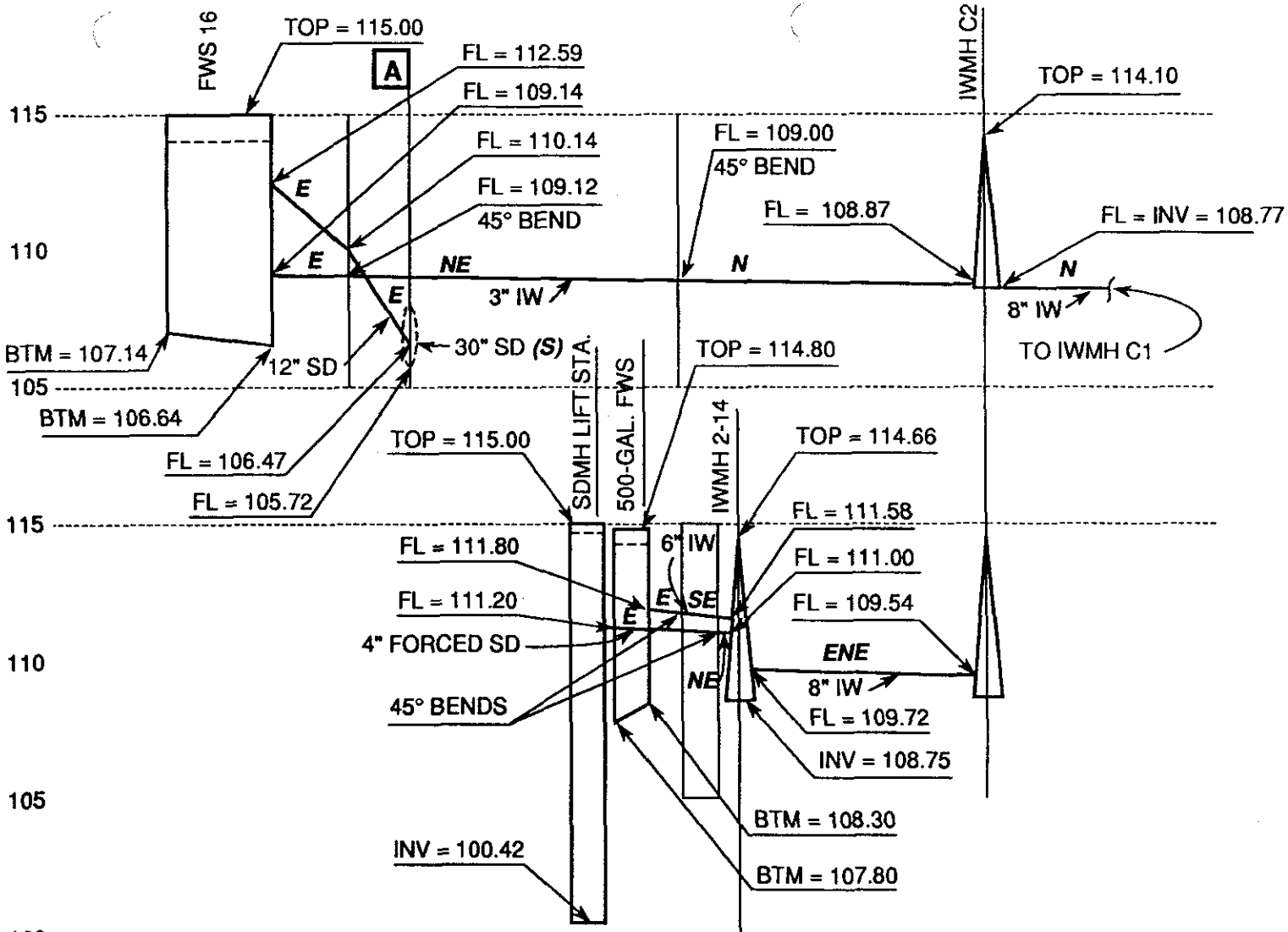
HYDROCARBON PHASE
WATER PHASE

FL	FLOW LINE
INV	INVERT
SD	STORM DRAIN
E, S, W	DIRECTION

SEE FIGURE 4A FOR PLAN VIEW OF INDUSTRIAL SEWER SEGMENTS IN FIGURES 6A AND 6B

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
INDUSTRIAL WASTE SEWER PROFILE
AS INSPECTED 10/24/91

FIGURE 6A



LEGEND

HYDROCARBON PHASE
WATER PHASE

FL	FLOW LINE
INV	INVERT
SD	STORM DRAIN
E, S, W	DIRECTION

SCALE:
VERT 1" = 5'
HORIZ 1" = 20"

A-2

NAVAL AIR STATION
ALAMEDA, CALIFORNIA
INDUSTRIAL WASTE SEWER PROFILE
AS INSPECTED 10/24/91

FIGURE 6B

ionization detector (FID); and (2) aromatic hydrocarbon characterization: benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene, and methylnaphthalenes, performed with a GC in series with a photoionization detector (PID). Analytical results are summarized in Table 3, and laboratory analytical reports and chromatograms appear in Appendix B. The characterization for TPH detected hydrocarbons in the carbon number envelope from C_5 to C_{25}. Analysis of the JP-5 standard found hydrocarbons from C_5 to C_{18} but predominating in the C_{12} to C_{14} range.

The chromatograms, which appear in Appendix B, serve as "fingerprints" for identifying the hydrocarbon of interest. In the opinion of the PRC team, and that of the laboratory performing the analyses, the hydrocarbon is from a very recent release of JP-5. There is no evidence of other hydrocarbons being present in these samples. This conclusion is based on several criteria for evaluating the weathering of hydrocarbon mixtures:

1. The tallest spikes in the gc traces match extremely well, and these spikes are for the straight chain alkane constituents of the hydrocarbon mixture. Weathering of hydrocarbon mixtures typically shows the most significant loss of these straight chain constituents that are the most subject to biotransformation.

2. Weathered hydrocarbons typically show an increased envelope underneath the chromatogram's major peaks when compared to the chromatogram of fresh hydrocarbon because of the formation of transformation products that have slightly different properties which contribute new peaks to the GC trace. Examination of the chromatogram shows that there is little difference between the JP-5 reference material and the hydrocarbon samples from the manhole.

Aromatic hydrocarbons found in the petroleum product are more soluble than other jet fuel constituents, and this preferential solubility results in the variation in BTEX concentrations of sampled product shown in Table 3 (that is, lower and variable concentrations of BTEX indicate higher degrees of dissolution into the water phase). A simple calculation shows the solubility argument is plausible and reasonable. Using the example of naphthalene (with a solubility of 31 mg/L in water), the calculation is as follows: the JP-5 reference sample has a measured naphthalene content of 0.824%, whereas the arithmetic average of the samples collect

TABLE 3

SUMMARY OF ANALYTICAL RESULTS
BUILDING 397
NAVAL AIR STATION, ALAMEDA

Analyte	% Analyte at Sample Location				
	JP-5 Standard (10/24/91)	SDMH B2 (10/24/91)	SDMH 5J-2 (10/24/91)	SDMH B3 (10/24/91)	SDMH B2 (10/25/91)
TPH and JP-5	100	104	89.4	78.9	84.9
Benzene	0.031	<0.005	<0.005	<0.005	<0.005
Toluene	0.104	0.016	<0.005	<0.005	<0.005
Ethylbenzene	0.064	0.022	<0.005	<0.005	0.017
meta- and para-Xylene	0.254	0.106	0.040	<0.005	0.082
ortho-Xylene	0.119	0.058	0.029	<0.005	0.047
Naphthalene	0.824	0.644	0.542	0.303	0.531
Methylnaphthalenes	2.49	1.50	1.86	1.66	1.26

SECTION 5.0

5.0 SUMMARY OF INVESTIGATION RESULTS

This investigation found that the hydrocarbon present in the storm drain is JP-5 jet fuel. This presence of jet fuel, the apparent absence of other hydrocarbons in the samples, and evaluation of site plans and other Navy records all indicate that the fuel release from the fuel room at Building 397 is likely the major source of the hydrocarbons observed when the storm drain manholes overflowed on February 28, 1991. Some of this jet fuel may have entered soils from suspected breaches in the industrial waste sewer line, storm drain or fuel/water separators associated with Building 397. Jet fuel from a supply line leak may have subsequently contributed to the amount of hydrocarbon present in subsurface soils, but neither the amount of JP-5 lost nor the location of the leak is known. The following sections provide a more detailed summary of investigation findings as they relate to the amount of jet fuel released; environments containing jet fuel; possible scenarios to explain jet fuel presence in industrial waste sewer, storm drain, and soils; and finally potential remedial action alternatives at site.

5.1 AMOUNT OF JET FUEL RELEASED

The rate of release and the duration of jet fuel release are the determining factors for estimating the amount of jet fuel released. The rate of release has been determined empirically by NADEP by measuring the volume which flowed from the hose attached to the valve over a fixed time interval with the drain valve fully open and the fuel supply line operating at normal operating pressure. The flow rate thus measured was 1.2 gallons/minute. The duration of release is determined by how long the fuel supply line was under pressure with the drain valve open. The JETCs at Building 397 are normally operated 8 hours per day, and 5 days per week. It is known that acceptance tests commenced on JETC-15 on January 21, 1991, and that the drain valve was discovered open on March 1, 1991. Assuming the release occurred through March 1, the time interval here is 30 working days or 240 hours. At 1.2 gallons per minute the calculated total volume released is 17,280 gallons (rounded to 17,000 gallons for this report). NADEP later received information, in the form of a handwritten note from a JETC calibration employee, stating that the first J-52 jet engine test run on JETC-15 (after the ADAS was installed) occurred on February 22, 1991. The time interval from this date through March 1 is 6 days. The calculated total volume released over this time interval is 3,456 gallons (rounded to 3,500 gallons for this report).

It should be considered that the note from the JETC calibration employee lists the date that the first J-52 jet engine was tested on JETC-15 after the ADAS was installed. This does not necessarily indicate that the fuel supply line was not under pressure for acceptance tests conducted before that date. As discussed in section 2.5, NAS Fire Department Run Report No. 188 documents a fire department response to a JP-5

"spill" found in two manholes near Building 397 on February 4, 1991. Given these facts, the estimate of larger than 3,500 gallons total product volume released is possible and reasonable.

Pressure tests performed on the fuel supply line between Building 372 and Building 397 indicate with reasonable confidence that the line was sound when tested in March, 1991. However, when the line was tested again in June, 1991, a "minor" leak was found. Inasmuch as the leak is considered minor and flow through the fuel supply line was stopped a short time after the leak was detected, it is unlikely that the fuel line significantly contributed to the appearances of free product in the industrial waste sewer and storm drain systems.

5.2 ENVIRONMENTS CONTAINING JET FUEL

Based on the findings of this investigation, subsurface soils are expected to contain an unknown amount of jet fuel that may be present as free product and possibly held as residual saturation in soil. It is expected that a minimal amount of jet fuel should now be present in the industrial waste sewer lines and storm drain because of the Navy's recovery activities, but the infiltration of jet fuel into these systems from soils may be a source of jet fuel now being encountered in the storm drain. There is circumstantial evidence based on the PRC team's inspections of manholes and interpretation of water level data to suspect that the integrities of the industrial waste sewer and storm drain have been breached. Additionally, after heavy rains and after the open drain valve had been discovered, an excavation by a PWC crew encountered free product, presumably on ground water entering the excavation. The existence of free product on the ground water, along with breaches in the industrial waste sewer and storm drain, is the simplest and possibly the most plausible explanation of the repeated appearances of free product even after several reported recovery actions.

5.3 POSSIBLE SCENARIOS

There are three potential sources of hydrocarbon contamination near Building 397. As has been discussed above, the open drain valve is a known source of jet fuel to the fuel/water separators, industrial waste sewer line, and likely to the storm drain; breaches in the industrial waste sewer or storm drain may have resulted in jet fuel entering subsurface soils, and a fluctuating water table would likely disperse the hydrocarbon in the vertical soil column around any breach. However, the amount of jet fuel released through the piping system is unknown. A second source of jet fuel to the subsurface is the fuel supply line leak, and the location of the leak and the amount of jet fuel that may have leaked cannot be estimated at this time. Lastly, Yard D-13 and IR Site No. 13 have been suggested as being possible sources of hydrocarbons

at Building 397, but there is no information that these sites are sources of the jet fuel found in the area of Building 397.

Data collected during this investigation indicates that subsurface soils have likely been impacted by the release of jet fuel into the industrial and storm drain systems. Thus it is important to develop some concept of how these hydrocarbons may have moved through the piping system and into soils at the site. This concept will allow a focused future investigation and eventual evaluation of remediation alternatives for the site. Following are four scenarios providing plausible explanations for the events leading to this future investigation. Scenario A is the simplest and most basic scenario that assumes industrial waste sewer and storm drain lines are intact. Scenario B and Scenario C are variations of Scenario A differing only in that they include breaches in the piping system that result in jet fuel entering soil. Scenario D includes the possibility that other sources of jet fuel may be contributing to hydrocarbons in subsurface soils. It is also possible that a combination of these scenarios could have caused the appearance of jet fuel observed in manholes and soil.

Scenario A

In this scenario, the industrial waste sewer, storm drain, and fuel/water separators (Figure 1) are assumed to be intact and have not been breached. Only a blockage in the storm drain downstream from Building 397 is assumed. This blockage is assumed to be south of SDMH 5J-1, about halfway across the proposed AIMD site in a southward direction (see discussion in Sections 2.4 and 3.2). Following is the chain of events defining this scenario:

(A1) The drain valve on the fuel supply line in the Building 397 fuel room is left open. The fuel supply line is pressurized allowing JP-5 to flow through a rubber hose attached to the drain valve. The rubber hose leads to a floor drain thus obscuring any notice of the release.

(A2) JP-5 released to the floor drain fills FWS-FR past its 500 gallon capacity. JP-5 begins to spill over into the industrial waste sewer to IWMH 2-14. From IWMH 2-14, JP-5 flows to IWMH C2 downstream through IWMH C1, IWMH 2-13 to the plug at IWMH 2-12. The industrial waste sewer system surcharges, backing up into FWS-15 first, FWS-O next, then FWS-16.

(A3) These three fuel/water separators fill until FWS-15 begins to spill over into the storm drain via its emergency overflow. If it is assumed that the industrial waste sewer, storm drain, and all fuel/water separators were empty when this scenario began, then the storm drain possesses sufficient volumetric capacity to contain even the higher estimate (17,000 gallons) of the release.

(A4) Heavy rainfall inundates the Bay Area causing a large influx of stormwater runoff into the storm drain, and the two augmenter collection pits at Building 397. Concurrently with the

influx of stormwater to the storm drain, the SDMH Lift Station actuates in response to a rising level in the two augmenter pits, pumping stormwater into the industrial waste sewer, which is already filled to capacity with jet fuel.

(A5) The stormwater being pumped into the industrial waste sewer immediately begins to displace the lighter JP-5 into the rapidly filling storm drain. As the equilibrium level begins to rise, JP-5, almost certainly having been completely flushed from the industrial waste sewer and fuel/water separators (except what is trapped above pipeline connections in IWMHs) into the storm drain, appears at the surface of IWMHs and SDMHs eventually pooling above the top of the lowest lying manhole, SDMH 5J-3.

This scenario predicts the overflow of SDMH 5J-3. However, both the industrial waste sewer and storm drain were pumped out by PWC in March 1991, and the jet fuel should have been removed from the system. It should be recognized that some residual liquid, probably containing JP-5, may have remained in downstream sections of the storm drain. As the storm drain refilled after additional rains, the remaining JP-5 would begin to be brought up. This scenario would not easily explain the several observations of jet fuel found in subsurface soils.

Scenario B

This scenario is similar to Scenario A but adds the assumption that the integrity of the storm drain has been breached. This assumption is reasonable because storm drains are not generally designed to provide a high level of containment, but simply to act as conduits to transport runoff. Additionally, probing of the manholes during the PRC team investigation did find some indication of offsets that suggest damage to storm drain segments. All of the Scenario A development is retained for this scenario. However, during step A5 of Scenario A, JP-5 also exfiltrates the storm drain to surrounding subsurface soils. Water table levels have been measured, and indeed were measured in HLA's MW-1 (see Table 2), at levels above storm drain pipeline levels. A pathway to ground water is thereby established. JP-5 on ground water would also be able to infiltrate into the storm drain as the water table retreats below the tops of storm drain pipelines.

The existence of flow through breaches in the storm drain would explain the continual recharging of fluids into the storm drain even without a contributory rainfall event. If the water table should advance to levels submerging storm drain pipelines and above the levels of fuel/water separator emergency overflow outlets to the storm drain, it is possible that the potentiometric head of the water table could create a driving force for backflow from the storm drain into fuel/water separators. JP-5 being brought into fuel/water separators in this manner could spill over into the industrial waste sewer if the level in the fuel/water separator was at or near its industrial waste sewer overflow. Hydrocarbon movement could continue under this potentiometric driving force bringing up JP-5 as layers on standing water in manholes. Since the advance and retreat of the water table occurs slowly, and since the potentiometric driving force would most

likely be attenuated by the storm drain, ample time would be allowed for JP-5 to surface and be observed in manholes.

Scenario C

Breaches to the integrity of the industrial waste sewer would create a pathway for the transport of JP-5 between the industrial waste sewer and ground water and would probably accelerate the phenomena alluded to in Scenario B. It is also possible for rainwater to recharge the ground water with the jet fuel moving upward with the water table.

Scenario D

This scenario includes the possibility that sources other than the fuel release from the open drain valve may be contributing to hydrocarbons being present in subsurface soils. The reported leak in the fuel supply line is one particular source that may have resulted in additional jet fuel being introduced into area soils after the fuel release, and this fuel leak may be contributing to the jet fuel observed during the PRC team's recent investigation. There is no information to quantitatively assess the amount of jet fuel in soil from this source, or the location of the leak, as it may be related to conditions at Building 397.

SECTION 6.0

SECTION 6.0
POTENTIAL REMEDIATION AND ALTERNATIVES

FINAL FUEL SPILL INVESTIGATION REPORT

THE ABOVE IDENTIFIED SECTION
IS NOT AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY NAVFAC SOUTHWEST TO LOCATE THIS SECTION. THIS PAGE HAS BEEN INSERTED AS A PLACEHOLDER AND WILL BE REPLACED SHOULD THE MISSING ITEM BE LOCATED.

QUESTIONS MAY BE DIRECTED TO:

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

TELEPHONE: (619) 532-3676

SECTION 7.0

7.0 CONCLUSIONS AND RECOMMENDATIONS

The above discussion shows that additional investigation of site conditions is needed before remediation alternatives can be evaluated and selected. In particular, the vertical and lateral extent of jet fuel in soils must be determined to evaluate whether a combination of alternatives (such as free-product recovery and sparging) are necessary to achieve cleanup goals for soil or groundwater. These investigations should address data needs that would serve to verify or refute the scenarios discussed in section 5.2, and which would then provide an understanding of site conditions and the applicability of remedial alternatives.

In planning future investigations, the purpose and goals of field investigations must be clear. Such investigations could be focused on remediation, and may not be able to identify specific sources and associated amounts of jet fuel if the points of release to soil are closely related. For example, the storm drain and industrial waste sewer system may be breached in a location where the leak in the fuel supply line also has occurred, and differentiation of these sources of recent jet fuel releases to soil may be difficult, if not impossible.

Given the recent nature of the fuel release and the fuel supply line leak, interim remedial measures may be effective for mitigating any hazards that may exist due to free product in soils, as has been the concern during excavations at the site when the Fire Department has been called. The following investigative elements are suggested for evaluating the lateral and vertical extent of jet fuel present in soils and the presence of free product in soils. The resulting information could be used to evaluate such interim measures such as free-product in soils. The resulting information could be used to evaluate such interim measures such as free-product recovery and/or soil vapor extraction. The information would also be important for planning additional investigations focused on final remedial actions such as sparging or bioremediation.

Soil Gas Investigation: A soil gas investigation should be conducted along the jet fuel supply line, the storm drain, the industrial waste sewer line, and around the fuel/water separators. The soil gas survey should extend out from these potential sources to define the lateral extent of jet fuel in the subsurface soils. The investigation should focus on the presence of jet fuel (JP-5) constituents in soil, with some general analyses for hydrocarbons (aviation gas and diesel) to identify other hydrocarbons that also may be present. The results of this soil gas investigation would be a lateral profile for jet fuel in soil.

Focused Soil Boring Program: Using the results of the soil gas investigation, soil borings should be advanced at locations where the soil gas profiles indicate the highest concentrations of jet fuel exist. The

soil borings should be continuously sampled through the unsaturated and into the saturated zone until the depth of jet fuel in soil is determined. Selected soil samples should be analyzed for total JP-5 and for aromatic constituents. If floating free product is found in any boring, other borings should be advanced in a radial array from the initial boring to define the extent of the hydrocarbon on the water table. Grab ground water samples should also be collected and analyzed for JP-5 and aromatic constituents. At least one additional monitoring well should be installed closer to Building 397 so as to establish the local groundwater gradient in the area and any fluctuation in groundwater level due to tidal influences; existing monitoring wells MW-1 (B-4, HLA) and MWOR-1 (Canonie) would be the other wells used in this determination.

The above activities would then be useful in subsequent site investigations. Additionally, examination of the storm drain and industrial waste sewer lines also should be conducted if these systems are to be used in the future. This examination could be conducted using video methods if, liquids are removed from the storm drains and industrial sewers.

SECTION 8.0

8.0 REFERENCES

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Harding Lawson Associates, 1989. Soil and ground-water Investigation, Intermediate Maintenance Facility, Project P-207, Alameda Naval Air Station, Alameda, California. December 6, 1989

JMM, 1991a. Fuel Spill Investigation Work Plan, Naval Aviation Depot, Naval Air Station, Alameda, Alameda, California. Contract Task Order 0139, NAVY CLEAN Contract No. N62474-88-D-5086. April 30, 1991

JMM, 1991b. RI/FS Phases 2B and 3, IMF Site EE/CA, Health and Safety Plan, Final, Alameda Naval Air Station, Alameda, California. Contract Task Order 0121 and 0137, NAVY CLEAN Contract No. N262474-88-D-5086. May 1991.

JMM, 1991c. Amendment to Health and Safety Plan, Final, Previously Submitted for Contract Task Orders 0121 and 0137; Confined Space Entry. Contract Task Order 0139, NAVY CLEAN Contract No. N62474-88-D-5086. July 25, 1991.

VAVFAC Drawings, 1981. Naval Facilities Engineering Command drawings for Military Construction Project P-752. Drawing Nos. 6141941, 6141943, 6141945, 6141968. Prepared by Daniel, Mann, Johnson, and Mendenhall.

APPENDIX A

NAVAL AIR STATION, ALAMEDA
FIRE DEPARTMENT RUN REPORTS

DEPARTMENT OF THE NAVY
NAVAL AIR STATION
ALAMEDA, CALIFORNIA 94501 - 5000

IN REPLY REFER TO:
5090
Ser 114/879
August 15, 1991

Western Division
Naval Facilities Engineering Command
P. O. Box 727
San Bruno, CA 94066-0727
Attn: Code 1822LG

Dear Sir:

This responds to your Freedom of Information Act request of 13 August 1991 in which you seek Naval Air Station, Alameda Fire Station Run Reports #188, #315, #322, and #370.

Enclosed are copies of the requested documents. The fees associated with the processing of your request have been waived.

Sincerely,

R. A. PORZEINSKI
LT, JAGC, USNR
Staff Judge Advocate

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 11

To Duane Balch	From LISA Grippo
Co. PRC	Co. WestDiv
Dept.	Phone # 415-244-2510
Fax # 916-852-0307	Fax #

08/19/91 15:46

FIRE DEPARTMENT RUN REPORT

REPORT NUMBER: 130 | DATE: 8/14/91

HOW CALL WAS MADE: FIRE PHONE - 33333	CALLER: SECURITY DISPATCHER - X33766	TIME OF CALL: 2022
DISTANCE FROM STATION NO. 1: 1/2 MILE	STATION NO. 2	RESPONSE SECURED: 2439

APPARATUS RESPONDING	SIGNAL 99	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1	2216	2439	2445
ENGINE NO. 2			
ENGINE NO. 3	2216	2233	2235.
ENGINE NO. 4			
LADDER TRUCK			
HAZMAT VEHICLE			
CRASH FIRE RESCUE P - 17			
CRASH FIRE RESCUE P - 17			
CRASH FIRE RESCUE P - 19			
FIRE CHIEF			
ASS'T. CHIEF	2024	2405	2409
BATT. CHIEF			
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: Bldg #372 Btwn 8th & 9th St.

PURPOSE OF CALL: Fuel Spill.

AMOUNT OF HOSE LAID: 5" 3" 1 3/4" BOOSTER

AMOUNT AND TYPE OF EXTINGUISHING AGENT USED

WATER THROW FROM: ____ HYDRANT ____ DRAFT ____ BOOSTER TANK

WAS WATER SUPPLY ADEQUATE

DESCRIBE ANY UNSATISFACTORY CONDITIONS OF EQUIPMENT INCLUDE LOST OR DAMAGED EQUIPMENT)

REMARKS: Upon arrival the Fire Dept found about a 300 gallon fuel spill mixed with other materials. The spill was coming from underground thru two man-hole covers. The building supervisor was called, sump truck was called, (Edward Flowers). The fuel truck driver dumped the fuel in Area 37, Tank 112. Fire Dept personnel used absorbent pads and absorbent rolls to contain and clean up the spill. Fire Dept secured from the scene. drw and L.B.

.396 General Foreman: John Furino CDO: Nakacawa GCD: Sr. Chief Mann

MARVER DID NOT SIGN BY

ALARM ROOM OPERATOR: Arnold Kay

DUTY CHIEF

FIRE CHIEF

NASALAMEDA 11220/1 (REV.10-88)

P.6

AUG 19 '91 04:30PM FRC EMI - SACRAMENTO

HAZARDOUS MATERIAL REPORT

REPORT NUMBER: 188

DATE: 2-4-91

RESPONSE TEAM LEADER: Chief Ramsing

LOCATION: ☐ INSIDE ☒ OUTSIDE

TIME OF ARRIVAL: 2026

BUILDING: # 397

AREA: East and North side of bldg.

ACTIVITY RESPONSIBLE FOR INCIDENT: NADEP Bldg# 360 General Foreman: John Furino

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: Fuel Aviation and other materials

IDENTIFICATION NUMBER: 1863 & 1993

CLASSIFICATION: Flammable/Combustible liquids Materials

HAZARDS: May be poisonous if or absorbed through skin.
Vapors may cause dizziness or suffer- ocation
Contact may irritate or burn skin and eyes.

CHARACTERISTICS: Maybe ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.

AMOUNT: 300 to 400 GALLONS POUNDS

REACTS WITH: Heat, sparks and flames

METHOD OF CONTAINMENT

Absorbed pad and absorbed rolls
Fuel suction truck was used in containment.

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Absorbed pad and absorbed rolls
Fuel suction truck was used in containment.

TIME AREA SECURED: 2439

TIME PERSONNEL RELEASED: 2449

INITIAL RESPONSE TEAM	Chief-2 Engine-3-1
SUPPORT PERSONNEL	6
FIRE SUPERVISOR	0
INSPECTION TEAM	3
TOTAL MAN-HOURS	52 HR.

ESTIMATED COST OF CONTAINMENT MATERIAL

Absorbed pads 1 EA. 39.99 used 4 bale
Absorbed rolls unknown
Fuel suction truck unknown

NAVSTA ALAMEDA 11320/77 (8-86)

FIRE DEPARTMENT RUN REPORT

REPORT NUMBER: 315	DATE: 28 Feb '91		
HOW CALL WAS MADE: Via 34300	CALLER: Security	TIME OF CALL: 0956	
DISTANCE FROM STATION NO. 1: 1 mile	STATION NO. 2: 1 1/4 miles	RESPONSE SECURED: 1014	

APPARATUS RESPONDING	SIGNAL 80	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1	0100	1014	1021
ENGINE NO. 2			
ENGINE NO. 3			
ENGINE NO. 4			
LADDER TRUCK			
HAZMAT VEHICLE	0137	0308	0316
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
FIRE CHIEF	0216	0648	0651
ASS'T. CHIEF	0110	0648	0651
BATT. CHIEF	0137	0308	0316
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: 9 [illegible] of Ave 'K'

PURPOSE OF CALL: Fuel Spill

AMOUNT OF HOSE LAID: 5" 2" 1-3/4" BOOSTER

AMOUNT AND TYPE OF EXTINGUISHING AGENT USED:

WATER TAKEN FROM: ___ HYDRANT ___ DRAFT ___ BOOSTER TANK

WAS WATER SUPPLY ADEQUATE?

DESCRIBE ANY UNSATISFACTORY OPERATIONS OF EQUIPMENT (INCLUDE LOST OR DAMAGED EQUIPMENT)

REMARKS

Engine 1 responded to a fuel spill at building 397. Upon arrival and after surveying the scene Cheif 2 was called to the scene. The spill was approx. 50 gal. of JP 5. Engine 1 personnal started to open manhole covers and storm drains around building 397 to see where the fuel had come from and to see where it had spread. Out of the 12 covers that had been opened all of them were full of fuel.

Haz Mat and Chief 3 were called to the scene. Chief 3 had brought fuel booms. The booms were put around the spill to contain it just incase it started to rain again. A crew was

MASTER RUN SET BY:

ALARM ROOM OPERATOR: [signature] / [signature]

DUTY CHIEF: [signature]

FIRE CHIEF: [signature]

NAVALANCEA 11320/1 (REV.10-65)

sent out to check the manhole coves and storm drains in a block around the spill. No fuel was found in any of the drains.

Chief 1 as well as NAS CDO and NADAP CDO were called to the scene. (NOTE: It took 1¼ hours for the NADAP CDO to arrive.) After not being able to find a de-fuel truck or a suction truck to clean up the spill. It was decided upon to call G.S.X.

After the NADAP CDO arrived we gained access to building 397. We did not find any fuel spill in the building. It was at this time that I found out that NADAP security officer Donald Nesbit had reported a small of fuel, at this building, to NADAP security dispatch at 1941 that day. It did not get reported to the Fire Department. The person that reported it to the Fire Department was Base Police Officer McDowell at 0100.

A GSX supervisor arrived at about 0630. A GSX clean up crew arrived at 0754 to clean up around the spill area. When the Fire Department secured at 1014 the spill still had not been cleaned up.

JVD

HAZARDOUS MATERIAL REPORT

REPORT NUMBER: 315

DATE: 28 Feb 91

RESPONSE TEAM LEADER: Asst. Cheif Wyman

LOCATION: ☐ INSIDE ☒ OUTSIDE

TIME OF ARRIVAL: 0056

BUILDING: 397

AREA: North of the building

ACTIVITY RESPONSIBLE FOR INCIDENT: NADAP

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: JP 5

IDENTIFICATION NUMBER: UN 1863

CLASSIFICATION: Combustible Liquid

HAZARDS:

May Cause skin irritation.
May be harmfull if inhaled.
Contains petroleum distillates.
Moderately combustible.

CHARACTERISTICS:

Will release flammable vapors which if exposed to an ignition source can burn.
Can ignite under normal flash point temp. if mists or sprays come in contact with ignition source.

AMOUNT: Approx. 50 GALLONS POUNDS

REACTS WITH: Heat or flame

METHOD OF CONTAINMENT

Dri-it
Absorbent pads or booms

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Absorbent booms around the spill area.

TIME AREA SECURED: 0100

TIME PERSONNEL RELEASED: 1014

INITIAL RESPONSE TEAM	4
SUPPORT PERSONNEL	3
FIRE SUPPRESSION	4
INSPECTION TEAM	1
TOTAL MAN HOURS	49

ESTIMATED COST OF CONTAINMENT MATERIAL

Absorbent booms 6 packs @ 40.00 per pack

NAVALAMEDA 11320/77 (5-80)

FIRE DEPARTMENT RUN REPORT

REPORT NUMBER	322
DATE	1 MARCH 91
HOW CALL WAS MADE	Via Business Line
CALLER	Officer Nesbitt NADEP
TIME OF CALL	Ø345
DISTANCE FROM STATION NO. 1	1 mile
STATION NO. 2	
RESPONSE SECURED	Ø414

APPARATUS RESPONDING	SIGNAL 20	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1			
ENGINE NO. 2			
ENGINE NO. 3	Ø351	Ø414	Ø420
ENGINE NO. 4			
LADDER TRUCK			
HAZMAT VEHICLE			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
FIRE CHIEF			
ASS'T. CHIEF	Ø351	Ø414	Ø418
BATT. CHIEF			
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: BLDG 397

PURPOSE OF CALL: Fuel Spill

AMOUNT OF HOSE LAID: 2" 2" 1-3/4" BOOSTER

AMOUNT AND TYPE OF EXTINGUISHING AGENT USED:

WATER TAKEN FROM: ____ HYDRANT ____ DRAFT ____ BOOSTER TANK

WAS WATER SUPPLY ADEQUATE:

DESCRIBE ANY UNSATISFACTORY OPERATIONS OF EQUIPMENT (INCLUDE LOST OR DAMAGED EQUIPMENT):

REMARKS:

Engine#3 responded to Bldg.#397 for a reported fuel spill. The responsible party for this spill was NADAP. They were unable to get a contractor last night for clean-up operations. NADAP security were on scene, the spill was contained with absorbent booms. Engine#3 then secured without incident.

TCT

MASTER RUN SET BY:

ALARM ROOM OPERATOR: Demetrius Martinez Reese

DUTY CHIEF: [signature]

FIRE CHIEF: [signature]

NASALAMEDA 11320/1 (REV.10-86)

HAZARDOUS MATERIAL REPORT

REPORT NUMBER: 322

DATE: 1 Mar 91

RESPONSE TEAM LEADER: Battalion Chief Wyler

LOCATION: ☐ INSIDE ☒ OUTSIDE

TIME OF ARRIVAL:

BUILDING: 397

AREA: North of the building

ACTIVITY RESPONSIBLE FOR INCIDENT: NADAP

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: JP 5

IDENTIFICATION NUMBER: UN 1863

CLASSIFICATION: Combustible Liquid

HAZARDS:

May Cause skin irritation.
May be harmfull if inhaled.
Contains petroleum distillates.
Moderately combustible.

CHARACTERISTICS:

Will release flammable vapors which if exposed to an ignition source can burn.
Can ignite under normal flash point temp.. if mists or sprays come in contact with ignition source.

AMOUNT: Approx. 5. GALLONS POUNDS

REACTS WITH: Heat or flame

METHOD OF CONTAINMENT

Dri-it
Absorbent pads or booms

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Absorbent booms around the spill area.

TIME AREA SECURED: 0414 hrs.

TIME PERSONNEL RELEASED: 0414 hrs.

INITIAL RESPONSE TEAM	4
SUPPORT PERSONNEL	3
FIRE SUPPRESSION	4
INSPECTION TEAM	1
TOTAL MAN HOURS	2 hrs 15 mins

ESTIMATED BODY OF CONTAINMENT MATERIAL: N/A

FIRE DEPARTMENT RUN REPORT

HOW CALL WAS MADE: ViA 1028 Line	CALLER: SGT. JOHNSON NAVSEC.	REPORT NUMBER: 370	DATE: 3-9-91
DISTANCE FROM STATION NO. 1: 1 mi.	STATION NO. 2	RESPONSE SECURED	TIME OF CALL: 0957

APPARATUS RESPONDING	SIGNAL 58	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1			
ENGINE NO. 2			
ENGINE NO. 3	0959	1300	1304
ENGINE NO. 4			
LADDER TRUCK			
HAZMAT VEHICLE			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
FIRE CHIEF			
ASS'T. CHIEF			
BATT. CHIEF			
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: Bldg. 397

PURPOSE OF CALL: Fuel Leak, Spill

AMOUNT OF HOSE LAID: 5" 3" 1-3/4" BOOSTER	AMOUNT AND TYPE OF EXTINGUISHING AGENT USED
WATER TAKEN FROM: ___ HYDRANT ___ DRAFT ___ BOOSTER TANK	WAS WATER SUPPLY ADEQUATE

DESCRIBE ANY UNSATISFACTORY OPERATIONS OF EQUIPMENT (INCLUDE LOST OR DAMAGED EQUIPMENT)

REMARKS: Upon arrival we made contact with Bill Murray (96431 X7692). Who advised me that fuel was leaking from and unknown source in a pit on the northeast corner of building 397. I advised Mr. Murray that any fuel to building 397 need to be secured. Base Security was on the scene and provided traffic control until release, (Patrolman McDowell #232) Chiefs' Wyman&Perry arrived on the scene to investigate the situation. When they secured command was turned over to Captain Paul.Mr. Vigil of PWC (ph# 785-2728) who was Supervising the operation, he;took a sample of the fuel and sent it to the base Laboratory to be analyzed. Engins #3 hook-up a supply line on the Northeast corner and pulled the 300 foot cross bed and provided Fire Protection until secured. (OVER)

MASTER ARM SET BY	ALARM ROOM OPERATOR: F/E [signature]
DUTY CHIEF: [signature]	FIRE CHIEF: [signature]

NASALAMEDA (11320/1 (REV. ...)

The fuel was determined to be JP-5. The fuel line to the area was secured. Mr. Vigil PWC and Mr. Masaru Iwamoto Industrial Engineer for 397 determine that any major repairs would have to be completed when the proper personnel could be brought in. A loader was used to push dirt into the pit. The loader was driven by Don Pasquini code 732 PWC ph# 302-5893. We secured without without further incident.

Other support personnel
Mike Cruz NADEP 73410 Hazardous Waste (removed the fuel from the pit)
J. Tomeo NAS CDO
Lt. Don Griffin NADEP CDO
Chief Williams CDO
Luther McCoy 96430 Branch Head building #360

JP

REPORT NUMBER 370

HAZARDOUS MATERIAL REPORT

DATE 3/11/91

RESPONSE TEAM LEADER: Assistant Chief Wyman

LOCATION: NAS Alameda ☐ INSIDE ☒ OUTSIDE

TIME OF ARRIVAL: 0959 | BUILDING: 307 | AREA: Northeast corner

ACTIVITY RESPONSIBLE FOR INCIDENT: NADEP

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: Military Aviation Tubine Fuel JP-5

IDENTIFICATION NUMBER: UN 1863

CLASSIFICATION: Petroleum Hydrocarbons

HAZARDS: May be poisonous if inhaled or absorbed through skin

CHARACTERISTICS: Flammable/Combustible

AMOUNT: 50 GALLONS | POUNDS

REACTS WITH: Heat, Spark, Flame

METHOD OF CONTAINMENT

Dirt was used to cover up pit

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Dirt, Heavy equipment dirt loader

TIME AREA SECURED: 1304 | TIME PERSONNEL RELEASED: 1304

INITIAL RESPONSE TEAM	0
SUPPORT PERSONNEL	10
FIRE SUPPRESSION	4
INSPECTION TEAM	0
TOTAL MAN HOURS	42

ESTIMATED COST OF CONTAINMENT MATERIAL

NAVALAMEDA 11320/77 (8-88)

APPENDIX B

LABORATORY ANALYSIS REPORTS OF HYDROCARBON ANALYSES

K PRIME, INC.

CONSULTING ANALYTICAL CHEMISTS

4197 Lakeside Dr., Suite 170
Richmond, CA 94806
(510) 222-4815
Fax: 222-4817

TRANSMITTAL

DATE: 10/31/91

TO: Mr. Joel Lodics
JM Montgomery Consulting Engineers
365 Lennon Lane
Walnut Creek, CA 94598

FAX: 975-3412

Acct#: 100-9133
Your Project: 2738.0323

FROM: Richard A. Kagel, Ph.D. jd for RAK
Laboratory Director

SUBJECT: YOUR PROJECT 2738.0323 LABORATORY RESULTS

Enclosed please find K Prime's laboratory reports for the following samples tested 10/29/91 in our laboratory. Please call me if you have any questions or need further information.

SAMPLE ID	SAMPLE TYPE	DATE	KPI LAB #
SDMH B-2(1)	HYDROCARBON	10/24/91	1471
SDMH 5-J2	HYDROCARBON	10/24/91	1472
SDMH B-3	HYDROCARBON	10/24/91	1473
JP5 NAS ALA	HYDROCARBON	10/24/91	1474
SDMH B-2(2)	HYDROCARBON	10/25/91	1476

Thank you for this opportunity to be of service.

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH B-2(1)
LAB ID: 1471

METHOD: GC/FID BOILING RANGE CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 12:05
DATE ANALYZED: 10/29/91

FUEL HYDROCARBON CONTENT	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
TOTAL PETROLEUM HYDROCARBON (AS JP5)	%	1.0	104

COMPOUND NAME	UNITS	REPORTING LIMIT	GROUP CONC	N-ALKANE CONC
C-5 RANGE (TOTAL)	%	0.010	ND	
- N-PENTANE	%	0.010		ND
C-6 RANGE (TOTAL)	%	0.010	ND	
- N-HEXANE	%	0.010		ND
C-7 RANGE (TOTAL)	%	0.010	0.115	
- N-HEPTANE	%	0.010		0.020
C-8 RANGE (TOTAL)	%	0.010	0.653	
- N-OCTANE	%	0.010		0.115
C-9 RANGE (TOTAL)	%	0.010	2.02	
- N-NONANE	%	0.010		0.280
C-10 RANGE (TOTAL)	%	0.010	6.00	
- N-DECANE	%	0.010		0.941
C-11 RANGE (TOTAL)	%	0.010	18.7	
- N-UNDECANE	%	0.010		3.40
C-12 RANGE (TOTAL)	%	0.010	22.4	
- N-DODECANE	%	0.010		4.10
C-13 RANGE (TOTAL)	%	0.010	20.2	
- N-TRIDECANE	%	0.010		3.43
C-14 RANGE (TOTAL)	%	0.010	16.8	
- N-TETRADECANE	%	0.010		3.08
C-15 RANGE (TOTAL)	%	0.010	6.31	
- N-PENTADECANE	%	0.010		1.33
C-16 RANGE (TOTAL)	%	0.010	0.438	
- N-HEXADECANE	%	0.010		0.116
C-17 RANGE (TOTAL)	%	0.010	0.023	
- N-HEPTADECANE	%	0.010		0.027
C-18 RANGE (TOTAL)	%	0.010	ND	
- N-OCTADECANE	%	0.010		ND
C-19 RANGE (TOTAL)	%	0.010	ND	
- N-NONADECANE	%	0.010		ND
C-20 RANGE (TOTAL)	%	0.015	ND	
- N-EICOSANE	%	0.015		ND
C-21 RANGE (TOTAL)	%	0.015	ND	
- N-HENICOSANE	%	0.015		ND
C-22 RANGE (TOTAL)	%	0.015	ND	
- N-DOCOSANE	%	0.015		ND
C-23 RANGE (TOTAL)	%	0.015	ND	
- N-TRICOSANE	%	0.015		ND
C-24 RANGE (TOTAL)	%	0.015	ND	
- N-TETRACOSANE	%	0.015		ND
C-25 RANGE (TOTAL)	%	0.015	ND	
- N-PENTACOSANE	%	0.015		ND

NOTES:
ND - NOT DETECTED AT STATED DETECTION LIMIT

SAMPLE DISCUSSION

The fuel hydrocarbon "fingerprint" (components present and relative concentrations of those components) is consistent with the fingerprint obtained on the JP5 reference sample (JP5 NAS ALA).

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Hazel
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH B-2(1)
LAB NO: 1471

METHOD: GC/PID AROMATIC HYDROCARBON CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 12:05
DATE ANALYZED: 10/29/91

COMPOUND NAME	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
BENZENE	%	0.005	ND
TOLUENE	%	0.005	0.016
ETHYLBENZENE	%	0.005	0.022
M-&P-XYLENE	%	0.005	0.106
O-XYLENE	%	0.005	0.058
NAPHTHALENE	%	0.005	0.644
METHYLNAPHTHALENES	%	0.005	1.50

NOTES:
ND - NOT DETECTED AT STATED REPORTING LIMIT
NA - NOT ANALYZED

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Lloyd
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH 5-J2
LAB ID: 1472

METHOD: GC/FID BOILING RANGE CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 12:12
DATE ANALYZED: 10/29/91

FUEL HYDROCARBON CONTENT	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
TOTAL PETROLEUM HYDROCARBON (AS JP5)	%	1.0	89.4

COMPOUND NAME	UNITS	REPORTING LIMIT	GROUP CONC	N-ALKANE CONC
C-5 RANGE (TOTAL)	%	0.010	ND	
- N-PENTANE	%	0.010		ND
C-6 RANGE (TOTAL)	%	0.010	ND	
- N-HEXANE	%	0.010		ND
C-7 RANGE (TOTAL)	%	0.010	ND	
- N-HEPTANE	%	0.010		ND
C-8 RANGE (TOTAL)	%	0.010	0.169	
- N-OCTANE	%	0.010		0.031
C-9 RANGE (TOTAL)	%	0.010	1.15	
- N-NONANE	%	0.010		0.176
C-10 RANGE (TOTAL)	%	0.010	4.63	
- N-DECANE	%	0.010		0.782
C-11 RANGE (TOTAL)	%	0.010	16.1	
- N-UNDECANE	%	0.010		3.05
C-12 RANGE (TOTAL)	%	0.010	19.6	
- N-DODECANE	%	0.010		3.72
C-13 RANGE (TOTAL)	%	0.010	17.6	
- N-TRIDECANE	%	0.010		3.09
C-14 RANGE (TOTAL)	%	0.010	15.3	
- N-TETRADECANE	%	0.010		2.74
C-15 RANGE (TOTAL)	%	0.010	5.68	
- N-PENTADECANE	%	0.010		0.922
C-16 RANGE (TOTAL)	%	0.010	0.330	
- N-HEXADECANE	%	0.010		0.080
C-17 RANGE (TOTAL)	%	0.010	0.015	
- N-HEPTADECANE	%	0.010		0.018
C-18 RANGE (TOTAL)	%	0.010	ND	
- N-OCTADECANE	%	0.010		ND
C-19 RANGE (TOTAL)	%	0.010	ND	
- N-NONADECANE	%	0.010		ND
C-20 RANGE (TOTAL)	%	0.015	ND	
- N-EICOSANE	%	0.015		ND
C-21 RANGE (TOTAL)	%	0.015	ND	
- N-HENICOSANE	%	0.015		ND
C-22 RANGE (TOTAL)	%	0.015	ND	
- N-DOCOSANE	%	0.015		ND
C-23 RANGE (TOTAL)	%	0.015	ND	
- N-TRICOSANE	%	0.015		ND
C-24 RANGE (TOTAL)	%	0.015	ND	
- N-TETRACOSANE	%	0.015		ND
C-25 RANGE (TOTAL)	%	0.015	ND	
- N-PENTACOSANE	%	0.015		ND

NOTES:
ND - NOT DETECTED AT STATED DETECTION LIMIT

SAMPLE DISCUSSION

The fuel hydrocarbon "fingerprint" (components present and relative concentrations of those components) is consistent with the fingerprint obtained on the JP5 reference sample (JP5 NAS ALA).

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Kaye
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH 5-J2
LAB NO: 1472

METHOD: GC/PID AROMATIC HYDROCARBON CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 12:12
DATE ANALYZED: 10/29/91

COMPOUND NAME	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
BENZENE	%	0.005	ND
TOLUENE	%	0.005	ND
ETHYLBENZENE	%	0.005	ND
M-&P-XYLENE	%	0.005	0.040
O-XYLENE	%	0.005	0.029
NAPHTHALENE	%	0.005	0.542
METHYLNAPHTHALENES	%	0.005	1.86

NOTES:
ND - NOT DETECTED AT STATED REPORTING LIMIT
NA - NOT ANALYZED

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Kayl
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH B-3
LAB ID: 1473

METHOD: GC/FID BOILING RANGE CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 12:20
DATE ANALYZED: 10/29/91

FUEL HYDROCARBON CONTENT	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
TOTAL PETROLEUM HYDROCARBON (AS JP5)	%	1.0	78.9

COMPOUND NAME	UNITS	REPORTING LIMIT	GROUP CONC	N-ALKANE CONC
C-5 RANGE (TOTAL)	%	0.010	ND	
- N-PENTANE	%	0.010		ND
C-6 RANGE (TOTAL)	%	0.010	ND	
- N-HEXANE	%	0.010		ND
C-7 RANGE (TOTAL)	%	0.010	ND	
- N-HEPTANE	%	0.010		ND
C-8 RANGE (TOTAL)	%	0.010	0.055	
- N-OCTANE	%	0.010		ND
C-9 RANGE (TOTAL)	%	0.010	0.375	
- N-NONANE	%	0.010		0.056
C-10 RANGE (TOTAL)	%	0.010	2.09	
- N-DECANE	%	0.010		0.347
C-11 RANGE (TOTAL)	%	0.010	11.3	
- N-UNDECANE	%	0.010		2.10
C-12 RANGE (TOTAL)	%	0.010	18.1	
- N-DODECANE	%	0.010		3.39
C-13 RANGE (TOTAL)	%	0.010	18.2	
- N-TRIDECANE	%	0.010		3.22
C-14 RANGE (TOTAL)	%	0.010	15.7	
- N-TETRADECANE	%	0.010		2.86
C-15 RANGE (TOTAL)	%	0.010	6.10	
- N-PENTADECANE	%	0.010		1.24
C-16 RANGE (TOTAL)	%	0.010	0.623	
- N-HEXADECANE	%	0.010		0.129
C-17 RANGE (TOTAL)	%	0.010	ND	
- N-HEPTADECANE	%	0.010		ND
C-18 RANGE (TOTAL)	%	0.010	ND	
- N-OCTADECANE	%	0.010		ND
C-19 RANGE (TOTAL)	%	0.010	ND	
- N-NONADECANE	%	0.010		ND
C-20 RANGE (TOTAL)	%	0.015	ND	
- N-EICOSANE	%	0.015		ND
C-21 RANGE (TOTAL)	%	0.015	ND	
- N-HENICOSANE	%	0.015		ND
C-22 RANGE (TOTAL)	%	0.015	ND	
- N-DOCOSANE	%	0.015		ND
C-23 RANGE (TOTAL)	%	0.015	ND	
- N-TRICOSANE	%	0.015		ND
C-24 RANGE (TOTAL)	%	0.015	ND	
- N-TETRACOSANE	%	0.015		ND
C-25 RANGE (TOTAL)	%	0.015	ND	
- N-PENTACOSANE	%	0.015		ND

NOTES:
ND - NOT DETECTED AT STATED DETECTION LIMIT

SAMPLE DISCUSSION

The fuel hydrocarbon "fingerprint" (components present and relative concentrations of those components) is consistent with the fingerprint obtained on the JP5 reference sample (JP5 NAS ALA). The lower carbon number range (C5-C11) pattern is attenuated in this sample likely due to large amounts of water in the sample container.

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: George W. Hayes
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH B-3
LAB NO: 1473

METHOD: GC/PID AROMATIC HYDROCARBON CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 12:20
DATE ANALYZED: 10/29/91

COMPOUND NAME	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
BENZENE	%	0.005	ND
TOLUENE	%	0.005	ND
ETHYLBENZENE	%	0.005	ND
M-&P-XYLENE	%	0.005	ND
O-XYLENE	%	0.005	ND
NAPHTHALENE	%	0.005	0.306
METHYLNAPHTHALENES	%	0.005	1.66

NOTES:
ND - NOT DETECTED AT STATED REPORTING LIMIT
NA - NOT ANALYZED

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Hagel
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: JP5 NAS ALA
LAB ID: 1474

METHOD: GC/FID BOILING RANGE CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 13:40
DATE ANALYZED: 10/29/91

FUEL HYDROCARBON CONTENT	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
TOTAL PETROLEUM HYDROCARBON (AS JP5)	%	1.0	100

COMPOUND NAME	UNITS	REPORTING LIMIT	GROUP CONC	N-ALKANE CONC
C-5 RANGE (TOTAL)	%	0.010	0.085	
- N-PENTANE	%	0.010		0.039
C-6 RANGE (TOTAL)	%	0.010	0.270	
- N-HEXANE	%	0.010		0.117
C-7 RANGE (TOTAL)	%	0.010	1.02	
- N-HEPTANE	%	0.010		0.176
C-8 RANGE (TOTAL)	%	0.010	1.80	
- N-OCTANE	%	0.010		0.335
C-9 RANGE (TOTAL)	%	0.010	3.56	
- N-NONANE	%	0.010		0.497
C-10 RANGE (TOTAL)	%	0.010	8.30	
- N-DECANE	%	0.010		1.30
C-11 RANGE (TOTAL)	%	0.010	12.8	
- N-UNDECANE	%	0.010		3.81
C-12 RANGE (TOTAL)	%	0.010	26.8	
- N-DODECANE	%	0.010		4.69
C-13 RANGE (TOTAL)	%	0.010	25.1	
- N-TRIDECANE	%	0.010		3.88
C-14 RANGE (TOTAL)	%	0.010	20.4	
- N-TETRADECANE	%	0.010		4.27
C-15 RANGE (TOTAL)	%	0.010	7.92	
- N-PENTADECANE	%	0.010		1.17
C-16 RANGE (TOTAL)	%	0.010	0.765	
- N-HEXADECANE	%	0.010		0.145
C-17 RANGE (TOTAL)	%	0.010	0.030	
- N-HEPTADECANE	%	0.010		0.030
C-18 RANGE (TOTAL)	%	0.010	0.019	
- N-OCTADECANE	%	0.010		0.019
C-19 RANGE (TOTAL)	%	0.010	ND	
- N-NONADECANE	%	0.010		ND
C-20 RANGE (TOTAL)	%	0.015	ND	
- N-EICOSANE	%	0.015		ND
C-21 RANGE (TOTAL)	%	0.015	ND	
- N-HENICOSANE	%	0.015		ND
C-22 RANGE (TOTAL)	%	0.015	ND	
- N-DOCOSANE	%	0.015		ND
C-23 RANGE (TOTAL)	%	0.015	ND	
- N-TRICOSANE	%	0.015		ND
C-24 RANGE (TOTAL)	%	0.015	ND	
- N-TETRACOSANE	%	0.015		ND
C-25 RANGE (TOTAL)	%	0.015	ND	
- N-PENTACOSANE	%	0.015		ND

NOTES:
ND - NOT DETECTED AT STATED DETECTION LIMIT

SAMPLE DISCUSSION

JP5 reference sample

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Kagel
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: JP5 NAS ALA
LAB NO: 1474

METHOD: GC/PID AROMATIC HYDROCARBON CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/24/91
TIME SAMPLED: 13:40
DATE ANALYZED: 10/29/91

COMPOUND NAME	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
BENZENE	%	0.005	0.031
TOLUENE	%	0.005	0.104
ETHYLBENZENE	%	0.005	0.064
M-&P-XYLENE	%	0.005	0.254
O-XYLENE	%	0.005	0.119
NAPHTHALENE	%	0.005	0.824
METHYLNAPHTHALENES	%	0.005	2.49

NOTES:
ND - NOT DETECTED AT STATED REPORTING LIMIT
NA - NOT ANALYZED

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Kaye
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH B-2(2)
LAB ID: 1476

METHOD: GC/FID BOILING RANGE CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/25/91
TIME SAMPLED: 13:20
DATE ANALYZED: 10/29/91

FUEL HYDROCARBON CONTENT	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
TOTAL PETROLEUM HYDROCARBON (AS JP5)	%	1.0	84.9

COMPOUND NAME	UNITS	REPORTING LIMIT	GROUP CONC	N-ALKANE CONC
C-5 RANGE (TOTAL)	%	0.010	ND	
- N-PENTANE	%	0.010		ND
C-6 RANGE (TOTAL)	%	0.010	ND	
- N-HEXANE	%	0.010		ND
C-7 RANGE (TOTAL)	%	0.010	0.069	
- N-HEPTANE	%	0.010		0.017
C-8 RANGE (TOTAL)	%	0.010	0.406	
- N-OCTANE	%	0.010		0.074
C-9 RANGE (TOTAL)	%	0.010	1.48	
- N-NONANE	%	0.010		0.218
C-10 RANGE (TOTAL)	%	0.010	4.80	
- N-DECANE	%	0.010		0.775
C-11 RANGE (TOTAL)	%	0.010	15.5	
- N-UNDECANE	%	0.010		2.85
C-12 RANGE (TOTAL)	%	0.010	18.5	
- N-DODECANE	%	0.010		3.43
C-13 RANGE (TOTAL)	%	0.010	16.6	
- N-TRIDECANE	%	0.010		2.85
C-14 RANGE (TOTAL)	%	0.010	13.4	
- N-TETRADECANE	%	0.010		2.52
C-15 RANGE (TOTAL)	%	0.010	5.33	
- N-PENTADECANE	%	0.010		1.08
C-16 RANGE (TOTAL)	%	0.010	0.312	
- N-HEXADECANE	%	0.010		0.079
C-17 RANGE (TOTAL)	%	0.010	0.017	
- N-HEPTADECANE	%	0.010		0.017
C-18 RANGE (TOTAL)	%	0.010	ND	
- N-OCTADECANE	%	0.010		ND
C-19 RANGE (TOTAL)	%	0.010	ND	
- N-NONADECANE	%	0.010		ND
C-20 RANGE (TOTAL)	%	0.015	ND	
- N-EICOSANE	%	0.015		ND
C-21 RANGE (TOTAL)	%	0.015	ND	
- N-HENICOSANE	%	0.015		ND
C-22 RANGE (TOTAL)	%	0.015	ND	
- N-DOCOSANE	%	0.015		ND
C-23 RANGE (TOTAL)	%	0.015	ND	
- N-TRICOSANE	%	0.015		ND
C-24 RANGE (TOTAL)	%	0.015	ND	
- N-TETRACOSANE	%	0.015		ND
C-25 RANGE (TOTAL)	%	0.015	ND	
- N-PENTACOSANE	%	0.015		ND

NOTES:
ND - NOT DETECTED AT STATED DETECTION LIMIT

SAMPLE DISCUSSION

The fuel hydrocarbon "fingerprint" (components present and relative concentrations of those components) is consistent with the fingerprint obtained on the JP5 reference sample (JP5 NAS ALA).

PREPARED BY: K. Denney
DATE: 10-31-91

APPROVED BY: Gary W. Hoyt
DATE: 10-31-91

K PRIME, INC.
LABORATORY REPORT

SAMPLE ID: SDMH B-2(2)
LAB NO: 1476

METHOD: GC/PID AROMATIC HYDROCARBON CHARACTERIZATION
PROJECT: 9133-100

SAMPLE TYPE: HYDROCARBON
DATE SAMPLED: 10/25/91
TIME SAMPLED: 13:20
DATE ANALYZED: 10/29/91

COMPOUND NAME	UNITS	REPORTING LIMIT	SAMPLE CONCENTRATION
BENZENE	%	0.005	ND
TOLUENE	%	0.005	ND
ETHYLBENZENE	%	0.005	0.017
M-&P-XYLENE	%	0.005	0.082
O-XYLENE	%	0.005	0.047
NAPHTHALENE	%	0.005	0.531
METHYLNAPHTHALENES	%	0.005	1.26

NOTES:
ND - NOT DETECTED AT STATED REPORTING LIMIT
NA - NOT ANALYZED

PREPARED BY: J. Denney
DATE: 10-31-91

APPROVED BY: Tony W. Hoyt
DATE: 10-31-91

KPI ME, INC.

CHAIN OF CUSTODY RECORD

CONSULTING ANALYTICAL CHEMISTS 4197 Lakeside Drive, Suite 170, Richmond, CA 94806 · FAX: (415) 222/4817 PHONE: (415) 222-4815

Client/Project ID	Address/Phone	KPI Project No.
James M. Montgomery Consulting Engineers	365 Lennon Ln, Walnut Creek, CA 94598	
Project Location	**Client Project No.**	
Alameda Bldg 397,	2758.0323, CTO 139	
Contact	**Sampler (Signature)**	
Joel Ladics	Scott Weber	

Sample Identification No.	Date	Time	Lab Sample No.	Type of Sample	No. of Containers	Hydrocarbon Characterization	ANALYSES	Expected Turnaround Time	Remarks
SDMH B-2(1)	10/24/91	12:05	1471	Product	1	X		5 Day	
SDMH 5-J2	"	12:12	1472	"	"	X		"	
SDMH B-3	"	12:20	1473	"	"	X		"	
JPS NAS ALA	"	13:40	1474	"	"	X		"	
Trip Blank		—	1475	H_2O	2	X		"	
SDMH B-2(2)	10/25/91	13:20	1476	Product	1	X		"	

Relinquished by: (Signature) Scott Weber	Date 10/25/91	Time 14:07	Received by: (Signature) Gary W. Lloyd	Date 10/28/91	Time 14:07
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

Disposal Method	White Copy : Accompanies Samples
Disposed by: (Signature) Date Time	Yellow Copy : Sampler

K PRIME, INC.

CONSULTING ANALYTICAL CHEMISTS

4197 Lakeside Dr., Suite 170
Richmond, CA 94806
Telephone: (510) 222-4815
Fax: (510) 222-4817

TRANSMITTAL

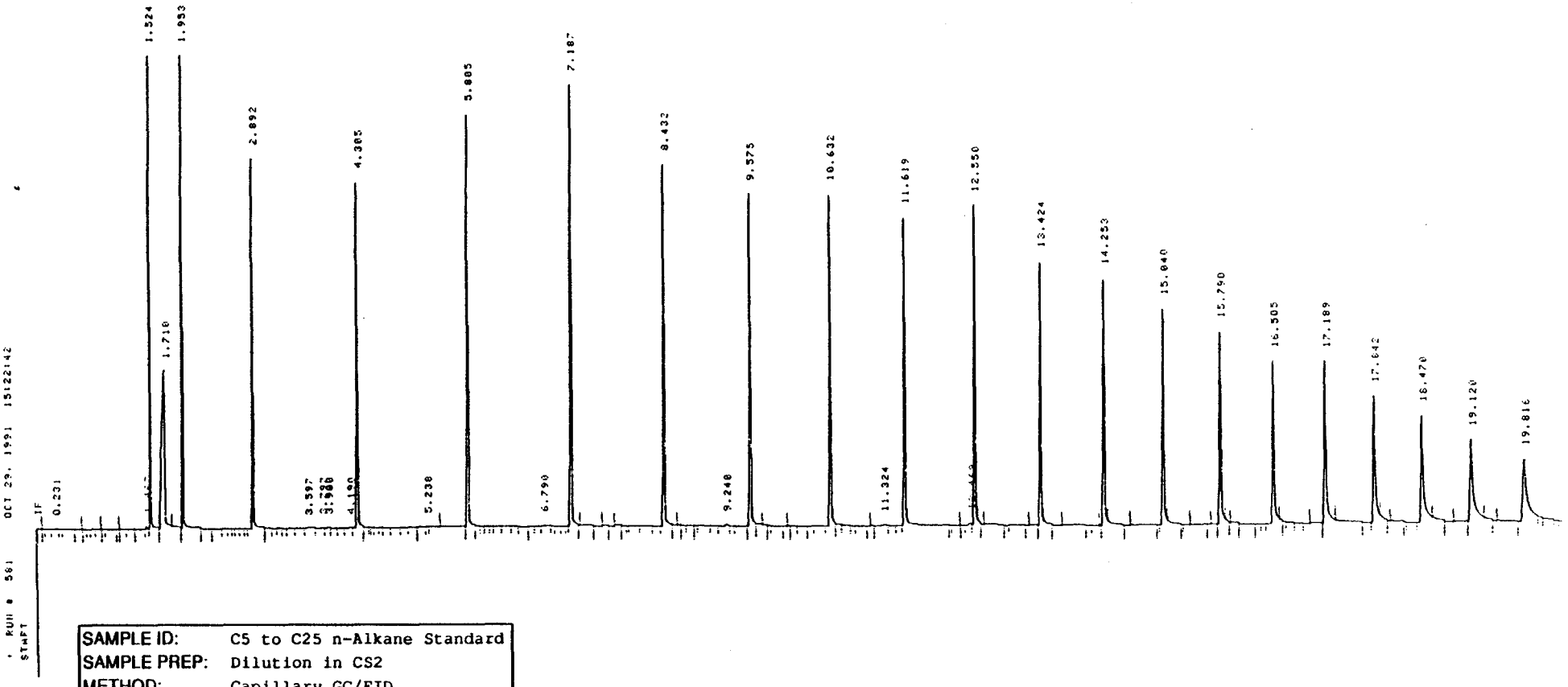
DATE: 11/01/91

TO: Mr. Joel Lodics
JM Montgomery Consulting Engineers
365 Lennon Lane
Walnut Creek, CA 94598

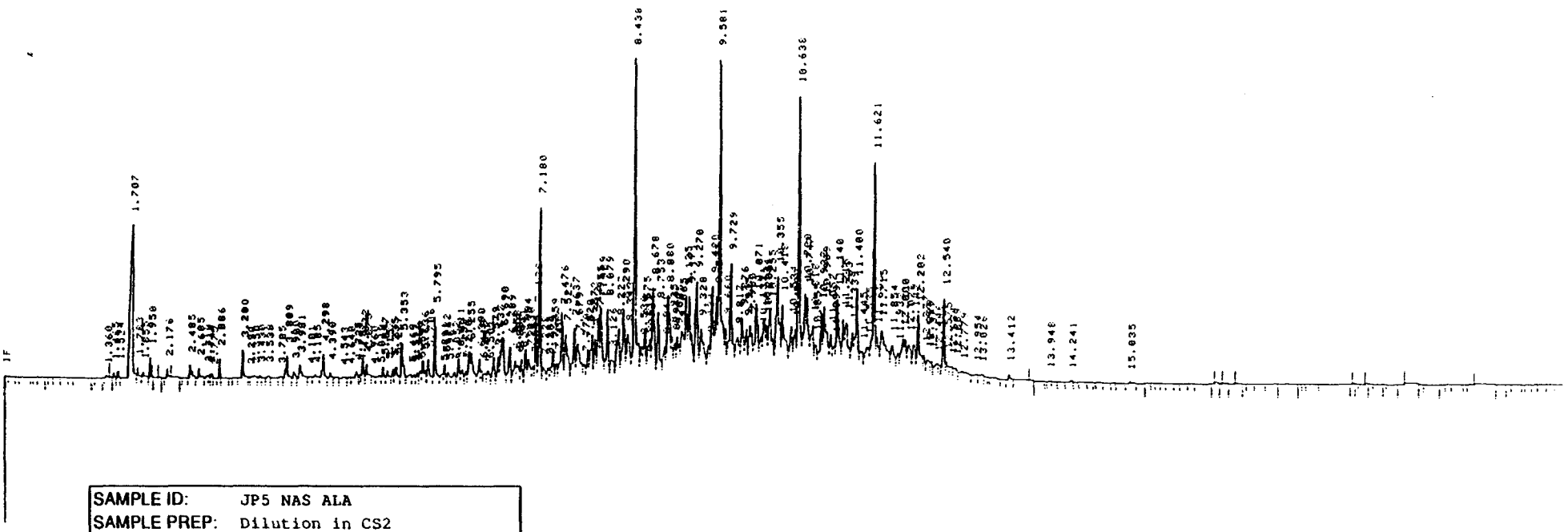
FROM: Gary W. Kagel GWK 11/1/91

Please find the attached chromatograms per our telephone discussion yesterday evening. I have also included a chromatogram of an n-alkane standard containing all the n-alkanes from pentane to pentacosane.

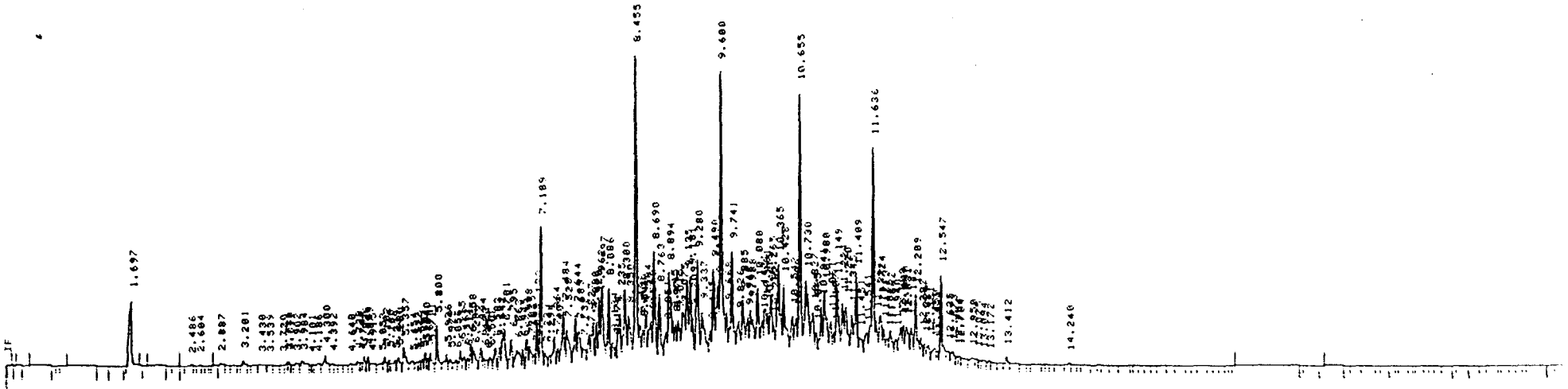
If you have any questions or need further information, please call me at (415) 222-4815.



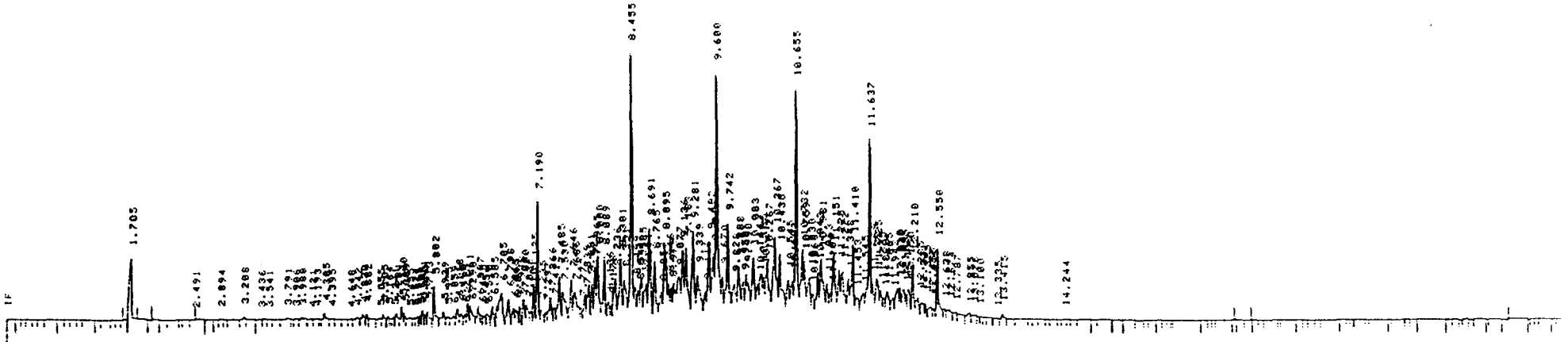
SAMPLE ID:	C5 to C25 n-Alkane Standard
SAMPLE PREP:	Dilution in CS2
METHOD:	Capillary GC/FID
NOTES:	Solvent peak at 1.7 min



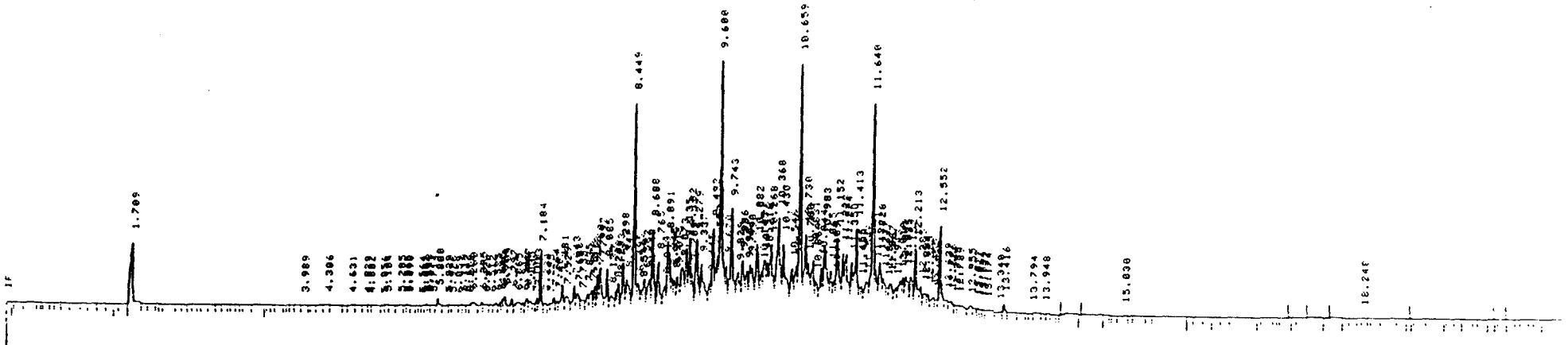
SAMPLE ID:	JP5 NAS ALA
SAMPLE PREP:	Dilution in CS2
METHOD:	Capillary GC/FID
NOTES:	Solvent peak at 1.7 min



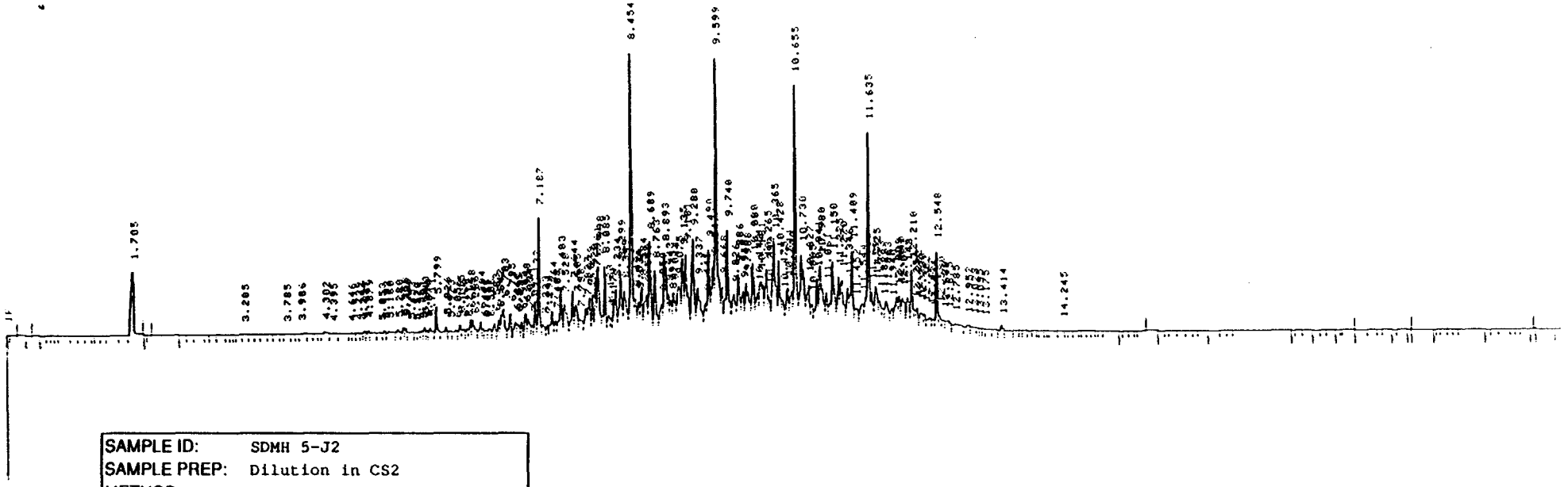
SAMPLE ID:	SDMH B-2(1)
SAMPLE PREP:	Dilution in CS2
METHOD:	Capillary GC/FID
NOTES:	Solvent peak at 1.7 min



SAMPLE ID:	SDMH B-2(2)
SAMPLE PREP:	Dilution in CS2
METHOD:	Capillary GC/FID
NOTES:	Solvent peak at 1.7 min



SAMPLE ID:	SDMH B-3
SAMPLE PREP:	Dilution in CS2
METHOD:	Capillary GC/FID
NOTES:	Solvent peak at 1.7 min



SAMPLE ID:	SDMH 5-J2
SAMPLE PREP:	Dilution in CS2
METHOD:	Capillary GC/FID
NOTES:	Solvent peak at 1.7 min

FIRE DEPARTMENT RUN REPORT

HOW CALL WAS MADE: Via 34300	CALLER: Security	REPORT NUMBER: 315	DATE: 28 Feb '91
			TIME OF CALL: 0056
DISTANCE FROM STATION NO. 1: 1 mile	STATION NO. 2: 1 1/4 miles	RESPONSE SECURED: 1014	

APPARATUS RESPONDING	SIGNAL 90	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1	0100	1014	1021
ENGINE NO. 2			
ENGINE NO. 3			
ENGINE NO. 4			
LADDER TRUCK			
HAZ MAT VEHICLE	0137	0308	0316
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
FIRE CHIEF	0216	0648	0651
ASS'T. CHIEF	0110	0648	0651
BATT. CHIEF	0137	0308	0316
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: 9th St. + Ave "K"

PURPOSE OF CALL: Fuel Spill

AMOUNT OF HOSE LAID: 2" 2" 1-3/4" BOOSTER

AMOUNT AND TYPE OF EXTINGUISHING AGENT USED:

WATER TAKEN FROM: ____ HYDRANT ____ DRAFT ____ BOOSTER TANK

WAS WATER SUPPLY ADEQUATE:

DESCRIBE ANY UNSATISFACTORY OPERATIONS OF EQUIPMENT (INCLUDE LOST OR DAMAGED EQUIPMENT)

REMARKS

Engine 1 responded to a fuel spill at building 397. Upon arrival and after surveying the scene Cheif 2 was called to the scene. The spill was approx. 50 gal. of JP 5. Engine 1 personnel started to open manhole covers and storm drains around building 397 to see where the fuel had come from and to see where it had spread. Out of the 12 covers that had been opened all of them were full of fuel.

Haz Mat and Chief 3 were called to the scene. Chief 3 had brought fuel booms. The booms were put around the spill to contain it just incase it started to rain again. A crew was

MASTER BOX RESET BY	ALARM ROOM OPERATOR: [signatures]
DUTY CHIEF: [signature]	FIRE CHIEF: [signature]

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sent out to check the manhole coves and storm drains in a block around the spill. No fuel was found in any of the drains.

Chief 1 as well as NAS CDO and NADAP CDO were called to the scene. (NOTE: It took 1½ hours for the NADAP CDO to arrive.) After not being able to find a de-fuel truck or a suction truck to clean up the spill. It was decided upon to call G.S.X.

After the NADAP CDO arrived we gained access to building 397. We did not find any fuel spill in the building. It was at this time that I found out that NADAP security officer Donald Nasbit had reported a small of fuel, at this building, to NADAP security dispatch at 1941 that day. It did not get reported to the Fire Department. The person that reported it to the Fire Department was Base Police Officer McDowell at 0100.

A GSX supervisor arrived at about 0630. A GSX clean up crew arrived at 0754 to clean up around the spill area. When the Fire Department secured at 1014 the spill still had not been cleaned up.

JVD

HAZARDOUS MATERIAL REPORT

REPORT NUMBER: 315
DATE: 28 Feb 91

RESPONSE TEAM LEADER: Asst. Cheif Wyman
LOCATION: ☐ INSIDE ☒ OUTSIDE
TIME OF ARRIVAL: 0056
BUILDING: 397
AREA: North of the building
ACTIVITY RESPONSIBLE FOR INCIDENT: NADAP

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: JP 5
IDENTIFICATION NUMBER: UN 1863
CLASSIFICATION: Combustible Liquid

HAZARDS:
May Cause skin irritation.
May be harmfull if inhaled.
Contains petroleum distillates.
Moderately combustible.

CHARACTERISTICS:
Will release flammable vapors which if exposed to an ignition source can burn.
Can ignite under normal flash point temp. if mists or sprays come in contact with ignition source.

AMOUNT: 50 Approx. GALLONS ____ POUNDS
REACTS WITH: Heat or flame

METHOD OF CONTAINMENT

Drix-it
Absorbent pads or booms

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Absorbent booms around the spill area.

TIME AREA SECURED: 0100
TIME PERSONNEL RELEASED: 1014

INITIAL RESPONSE TEAM	4
SUPPORT PERSONNEL	3
FIRE SUPERVISOR	4
INSPECTION TEAM	1
TOTAL MAN HOURS	49

ESTIMATED COST OF CONTAINMENT MATERIAL

Absorbent booms 6 packs @ 40.00 per pack

FIRE DEPARTMENT RUN REPORT

DISPATCH NUMBER: 3922 | DATE: 1 MARCH 91

HOW CALL WAS MADE: Via Business Line | CALLER: Officer Nesbitt NADEP | TIME OF CALL: 0345

DISTANCE FROM STATION NO. 1: 1 Mile | STATION NO. 2: | RESPONSE GRANTED: 0414

APPARATUS RESPONDING	SIGNAL 20	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1			
ENGINE NO. 2			
ENGINE NO. 3	0351	0414	0420
ENGINE NO. 4			
LADDER TRUCK			
HAZMAT VEHICLE			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
FIRE CHIEF			
ASS'T. CHIEF	0351	0414	0418
BATT. CHIEF			
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: BLDG 397

PURPOSE OF CALL: Fuel Spill

AMOUNT OF HOSE LAID: 2½" 2" 1-3/4" BOOSTER

AMOUNT AND TYPE OF EXTINGUISHING AGENT USED:

WATER TAKEN FROM: ____ HYDRANT ____ DRAFT ____ BOOSTER TANK

WAS WATER SUPPLY ADEQUATE:

DESCRIBE ANY UNSATISFACTORY OPERATIONS OF EQUIPMENT (INCLUDE LOST OR DAMAGED EQUIPMENT):

REMARKS:

Engine#3 responded to Bldg.#397 for a reported fuel spill. The responsible party for this spill was NADAP. They were unable to get a contractor last night for clean-up operations. NADAP security were on scene, the spill was contained with absorbent booms. Engine#3 then secured without incident.

TCT

REPORT SENT OUT BY: C. L. [illegible]

DUTY CHIEF:

ALARM ROOM OPERATOR: Demetrius Martinez Reese

FIRE INSPECTOR:

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HAZARDOUS MATERIAL REPORT

REPORT NUMBER: 322

DATE: 1 Mar 91

RESPONSE TEAM LEADER: Section Chief Wyler

LOCATION: ☐ INSIDE ☒ OUTSIDE

TIME OF ARRIVAL:

BUILDING: 397

AREA: North of the building

ACTIVITY RESPONSIBLE FOR INCIDENT: NADAP

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: JP 5

IDENTIFICATION NUMBER: UN 1863

CLASSIFICATION: Combustible Liquid

HAZARDS:

May Cause skin irritation.
May be harmfull if inhaled.
Contains petroleum distillates.
Moderately combustible.

CHARACTERISTICS:

Will release flammable vapors which if exposed to an ignition source can burn.
Can ignite under normal flash point temp.. if mists or sprays come in contact with ignition source.

AMOUNT: Approx. 5. GALLONS POUNDS

REACTS WITH: Heat or flame

METHOD OF CONTAINMENT

Drie-it
Absorbant pads or booms

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Absorbant booms around the spill area.

TIME AREA SECURED: 0414 hrs.

TIME PERSONNEL RELEASED: 0414 hrs.

INITIAL RESPONSE TEAM	4
SUPPORT PERSONNEL	3
FIRE SUPPRESSION	4
INSPECTION TEAM	1
TOTAL MAN HOURS	2 hrs 15 mins

ESTIMATED COST OF CONTAINMENT MATERIAL: N/A

FIRE DEPARTMENT RUN REPORT

ACCOUNT NUMBER: 220 DATE: 3-991

HOW CALL WAS MADE: VIA 1022 Line CALLER: SGT. JOHNSON NAVAL SEC. TIME OF CALL: 0957

DISTANCE FROM STATION NO. 1: 1 Mi. STATION NO. 2: RESPONSE RECEIVED:

APPARATUS RESPONDING	SIGNAL 99	TIME SECURED	RETURNED TO QUARTERS
ENGINE NO. 1			
ENGINE NO. 2			
ENGINE NO. 3	0959	1300	1304
ENGINE NO. 4			
LADDER TRUCK			
HAZMAT VEHICLE			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
CRASH FIRE RESCUE P-17			
FIRE CHIEF			
ASS'T. CHIEF			
BATT. CHIEF			
TRAINING CHIEF			
FIRE PREVENTION			

LOCATION OF CALL: Bldg 397

PURPOSE OF CALL: Fuel Leak, Spill

AMOUNT OF HOSE LAID: 5" 2" 1-3/4" BOOSTER

AMOUNT AND TYPE OF EXTINGUISHING AGENT USED:

WATER TAKEN FROM: ____ HYDRANT ____ DRAFT ____ BOOSTER TANK

WAS WATER SUPPLY ADEQUATE:

DESCRIBE ANY UNSATISFACTORY OPERATIONS OF EQUIPMENT INCLUDE BODY OR DAMAGED EQUIPMENT:

REMARKS: Upon arrival we made contact with Bill Murray (96431 X/692). Who advised me that fuel was leaking from and unknown source in a pit on the northeast corner of building 397. I advised Mr. Murray that any fuel to building 397 need to be secured. Base Security was on the scene and provided traffic control until release, (Patrolman McDowall #232) Chiefs' Wyman&Perry arrived on the scene to investigate the situation. When they secured command was turned over to Captain Paul Mr. Vigil of FWC (ph# 785-2728) who was Supervising the operation, he took a sample of the fuel and sent it to the base Laboratory to be analyzed. Engine #3 hook-up a supply line on the Northeast corner and pulled the 300 foot cross bed and provided Fire Protection until secured. (OVER)

MASTER AM CAT BY: ALARM ROOM OPERATOR: FF Chris Tull

DUTY CHIEF: FIRE/RESCUE:

NAVALANCOA (11330/1 (REV/10-80)

The fuel was determined to be JP-5. The Fuel line to the area was secured. Mr. Vigil PWC and Mr. Masaru Iwamoto Industrial Engineer for 397 determine that any major repairs would have to be completed when the proper personnel could be brought in. A loader was used to push dirt into the pit. The Loader was driven by Don Pasquini code 732 PWC ph# 302-5893. We secured without without further incident.

Other support personnel
Mike Cruz NADEP 73410 Hazardous Waste (removed the fuel from the pit)
J. Tomeo NAS CDO
Lt. Don Griffin NADEP CDO
Chief Williams OOD
Luther McCoy 96430 Branch Head building #360

JP

HAZARDOUS MATERIAL REPORT

SEQUENCE NUMBER: 370

DATE: 3/11/91

RESPONSE TEAM LEADER: Assistant Chief Wyman

LOCATION: NAS Alameda ☐ INSIDE ☒ OUTSIDE

TIME OF ARRIVAL: 0959

BUILDING: 307

AREA: Northeast corner

ACTIVITY RESPONSIBLE FOR INCIDENT: NADEP

TYPE OF INCIDENT

☒ LIQUID ☐ SOLID ☐ POWDER ☐ TANK ☐ BARREL ☐ CRATE

SPECIFIC NAME OF MATERIAL: Military Aviation Tubine Fuel JP-5

IDENTIFICATION NUMBER: UN 1863

CLASSIFICATION: Petroleum Hydrocarbons

HAZARDS: May be poisonous if inhaled or absorbed through skin

CHARACTERISTICS: Flammable/Combustible

AMOUNT: 50 GALLONS POUNDS

REACTS WITH: Heat, Spark, Flame

METHOD OF CONTAINMENT

Dirt was used to cover up pit

MATERIAL USED FOR CONTAINMENT OF INCIDENT

Dirt, Heavy equipment dirt loader

TIME AREA SECURED: 1304

TIME PERSONNEL RELEASED: 1304

INITIAL RESPONSE TEAM	0
SUPPORT PERSONNEL	10
FIRE SUPPRESSION	4
INVESTIGATION TEAM	0
TOTAL MAN HOURS	42

ESTIMATED COST OF CONTAINMENT MATERIAL

NASALAMEDA 11320/77 (8-80)