DCN: TZ4-R09052-RN-M19910

RECEIVED
ADEQ
MAY 13 1994
Hazardous
Waste
Permits

RCRA FACILITY ASSESSMENT REPORT
FOR
UNIVERSAL PROPULSION COMPANY, INC.
PHOENIX, ARIZONA

EPA I.D. NO.: AZD980814479

DECEMBER 1993

PREPARED FOR:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 HAWTHORNE STREET
SAN FRANCISCO, CALIFORNIA 94105

PREPARED BY:

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
TECHNOLOGY SERVICES COMPANY
20 CALIFORNIA STREET, SUITE 400
SAN FRANCISCO, CALIFORNIA 94111

EPA CONTRACT NO. 68-W9-0008
EPA WORK ASSIGNMENT NO. R09052
SAIC/TSC PROJECT NO. 06-0794-03-4421

TABLE OF CONTENTS

Section			Page
1.0	INTRODUCTION		1-1
	1.1	Purpose and Scope of the RCRA Facility Assessment (RFA) Program	1-1
	1.2	Report Contents	1-2
2.0	FACILITY DESCRIPTION		2-1
	2.1	Facility Operations	2-1
	2.2	Waste Generation	2-2
3.0	REGULATORY HISTORY		3-1
4.0	WASTE MANAGEMENT		4-1
5.0	ENVIRONMENTAL SETTING		5-1
	5.1	Physiography	5-1
	5.2	Geology and Hydrogeology	5-1
	5.3	Soil	5-5
	5.4	Surface Hydrology	5-6
	5.5	Surrounding Land Use	5-7
	5.6	Climate/Meteorology/Air Quality	5-8
	5.7	Flora/Fauna	5-9
6.0	SOLID WASTE MANAGEMENT UNITS AND RELEASE INFORMATION		6-1
	6.1	SWMU No. 1: Open Burn/Open Detonation Unit (OBOD)	6-2
	6.2	SWMU No. 2: Sand and Plastic Media Blasting Areas and Waste Accumulation Point	6-11
	6.3	SWMU No. 3: Sandblast Waste in Dry Wash (Remediated and Closed)	6-14
	6.4	SWMU No. 4: Paint Booths and Satellite Accumulation Points	6-17
	6.5	SWMU No. 5: Assembly Area Solvent Shed - Building B-5	6-19
	6.6	SWMU Nos. 6, 7 and 8: Propellant Plant Satellite Accumulation Points, for Propellant Plant 1 Liner Building (Building C-2), Propellant Plant 3 Storage (Building F-8), and Propellant Plant 2 Assembly (Building F-1)	6-24
	6.7	SWMU No. 9: Propellant Plant 1 Solvent Shed	6-26
	6.8	SWMU No. 10: Propellant Water Bore Residual Tanks	6-28
	6.9	SWMU No. 11: Former Propellent Water Bore Residual Pit(s)	6-33
	6.10	SWMU No. 12: Ignitable and Reactive Waste Magazines	6-37
	6.11	SWMU No. 13: Former Earth Covered Ignitable and Reactive Waste Magazines	6-40
	6.12	SWMU No. 14: Waste Propellant Thermal Treatment Unit (TTU)	6-43
	6.13	SWMU No. 15: Spent X-ray Fixer and Ion Exchange Drum Accumulation Area	6-47
	6.14	SWMU No. 16: Lab Pack Accumulation Points	6-49
	6.15	SWMU No. 17: QC Laboratory Wash Water Holding Tank	6-52

TABLE OF CONTENTS

Section			Page
6.16	SWMU No. 18:	Wash-Down Water Accumulation Drum at Mix/Cast #2 Building	6-54
6.17	SWMU No. 19:	Septic Tank that Formerly Received Film Processing Waste Water	6-56
6.19	SWMU No. 20:	Septic Tank (Leach Field) that Formerly Received Building C-11 Laboratory Wastewater	6-58
6.19	SWMU No. 21:	C Area Solid Propellant Manufacturing Tank	6-60
6.20	SWMU No. 22	High Level X-ray Building (B-9) Wastewater Discharge to Wash	6-62
7.0	AREAS OF CONCERN		7-1
8.0	MIGRATION PATHWAYS AND HUMAN AND ENVIRONMENTAL RECEPTORS		8-1
8.1	General Human and Environmental Receptors		8-2
8.2	Soil Migration Pathways and Receptors		8-3
8.4	Groundwater Migration Pathways and Receptors		8-5
8.5	Air Migration Exposure Pathways and Receptors		8-5
REFERENCES			R-1

APPENDIX A - FIGURES

APPENDIX B - PHOTOGRAPHS

1.0 INTRODUCTION

This RCRA Facility Assessment for the Universal Propulsion Company, Inc. (UPCO) facility located in Phoenix, Arizona (EPA ID No. AZD980814479) was prepared by Science Applications International Corporation/Technology Services Company (SAIC/TSC), for the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W9-0008, Work Assignment No. R09052. This RFA has been completed in accordance with the Work Plan for Work Assignment No. R09052 and EPA's RCRA Facility Assessment (RFA) Guidance (EPA/530-86-053).

1.1 Purpose and Scope of the RCRA Facility Assessment (RFA) Program

The purpose of this RFA is to identify solid waste management units (SWMUs) and other areas of concern (AOCs) and to evaluate their past and present potential for release of hazardous wastes or constituents to all environmental media and to determine likely pathways and human and environmental receptors. New authority was provided to EPA by the RCRA Hazardous and Solid Waste Amendments (HSWA) in 1984 to require corrective action for all releases that threaten human health or the environment. This RFA is based upon the PR report, which was prepared from a review of facility files including permit applications, inspection reports, site investigation and closure reports and discussions with regulatory agency and facility staff and on the visual site inspection (VSI) performed on September 23, 1993 by SAIC/TSC representing the U.S. EPA.

SWMUs are defined as any discernible waste management unit at a RCRA facility from which hazardous wastes or constituents might migrate, irrespective of whether the unit was intended for the management of solid and/or hazardous waste. SWMUs include those units defined as "regulated units" under RCRA, as well as other units which EPA has generally exempted from standards applicable to hazardous waste management units, such as recycling units and wastewater treatment units, and areas contaminated by "routine, systematic, and deliberate discharges" from process areas. For the purpose of this assessment, AOCs are defined as: 1) hazardous material product storage units or areas; 2) one time hazardous material product spill events; and 3) hazardous material units or areas

where waste management may have occurred and where the potential for release may have existed, but where insufficient evidence was found during the PR file review to verify the existence of a definable SWMU.

1.2 Report Contents

The results of a detailed file review and evaluation of the history, processes, and waste management practices employed at UPCO, and the results of the VSI are summarized in this report. Sources of information include files from EPA Region IX, the Arizona Department of Environmental Quality (ADEQ) and the UPCO facility and personal interviews with these parties as well as other involved regulatory agencies, i.e., the Maricopa County Department of Health Services (Bureau of Air Pollution Control), the Arizona Department of Water Resources, and the Arizona State Lands Department.

Section 2.0 of this report provides a description of the site location, operations and processes, and waste generation. Section 3.0 presents a regulatory history of the facility and discussion of facility mitigation activities, if any (i.e., previous and current investigations of facility contamination). Section 4.0 describes the facilities waste management practices. Section 5.0 presents an overview of the environmental setting of the facility. Section 6.0 describes the potential SWMUs identified during the course of this preliminary assessment, and Section 7.0 discusses potential AOCs. Section 8.0, discusses potential or documented contamination migration pathways, and any potential or documented human and environmental receptors. A list of references used to prepare this RFA report is provided in Section 9.0. Figures and tables are included in this report as Appendix A. Photographs from the VSI are included in this RFA report as Appendix B.

2.0 FACILITY DESCRIPTION

The Universal Propulsion Company, Inc. facility (hereinafter referred to as UPCO) consists of approximately 112,000 square feet in 40+ buildings on a one-half mile square (160 acre) site. This parcel, leased from the State of Arizona, is located about 25 miles north of central Phoenix on the north side of Happy Valley Road between Central Avenue and Seventh Street. The street address of the facility is:

Universal Propulsion Company, Inc.
25401 North Central Avenue
Phoenix, Arizona 85027-9801

The site, with the exception of the Administration and Operations Buildings at the southwest corner, is enclosed by a perimeter fence. Within that perimeter enclosure, the manufacturing functional areas are also individually fenced and locked. A facility diagram which shows the general location of facility operations is presented in Figure 1.

2.1 Facility Operations

The UPCO facility is an aerospace company that designs, develops and manufactures military aircraft ejection seats and related components for emergency escape and survival, including the required propellants. Facility operations began in 1972; under a lease agreement with the State Land Department. UPCO was acquired by Talley Industries in 1978 (5). Rocket propulsion cartridges for ejection seats are manufactured by lining the casing with a fuel solution, then pouring propellent into the casing and curing the material. A relatively high proportion of the personnel are scientists and engineers that support the research and development phase of the activities.

UPCO's principal customers are the U.S. Department of Defense (DoD) agencies, Army, Navy, and Air Force, and the National Aeronautics and Space Administration (NASA). As a qualified government supplier, UPCO's facilities and any additions thereto must be inspected and approved by DoD safety and security specialists. The Defense Investigative Service (DIS) and the Federal Bureau of Alcohol,

Tobacco and Firearms (BATF) also inspect and approve specific security measures. (1.B-2)

2.2 Waste Generation

The manufacture of propellant motors and explosive devices for aircraft ejection seats and escape systems results in the generation of waste explosive and propellant materials defined as hazardous by the EPA and ADEQ. These wastes, (the primary ones managed) are considered hazardous due to their characteristic of reactivity (D003). Also as part of the process, excess oxidizers become a portion of the waste. These oxidizers exhibit the characteristic of ignitability (D001). Explosives, propellants and waste oxidizers burn rapidly when ignited, even in the absence of atmospheric oxygen. Because of this "flash burn" characteristic and the high temperature at which the propellants burn (as high as 6,800° F), the propellant wastes and oxidizers in large quantities cannot be safely burned in conventional controlled-air or reduced pressure incineration systems. (3.B-2)

UPCO generates a waste resulting from evaporation of an oxidizer-contaminated water discharge from a water boring operation. After discussions with ADEQ in 1991, the waste compliance unit agreed to designate the sludge waste after evaporation as meeting the EPA definition of listed waste K044. A decision has yet to be made regarding if this waste when mixed with water constitutes a hazardous waste (22).

UPCO also uses small quantities of solvents (F001, F002, F003, and F005) used in manufacturing and in cleaning operations and are considered hazardous wastes when removed from service.

Other hazardous wastes managed by UPCO include the following (1.B-4,5):

a. Burn pad residue and ash created by the open burning of propellants, oxidizers and explosive devices on the burn pad. This waste has been determined to meet EPA toxic characteristics D006 and D008 due to lead

compounds in some propellants burned and cadmium being removed from metal parts when burned.

b. Waste paint stripping media generated during refurbishment processes that require stripping external paints from cadmium-plated metal parts. This waste has been determined to meet EPA toxic characteristics D006 and D007 due to chromates in the paint and cadmium removed from metal surfaces.

c. Waste dry paint filters generated from UPCO's two paint booths. The EPA toxic characteristic of D007 is produced by the chromate primers used to prime products in these booths.

d. Spent x-ray fixer generated by the x-ray film developing process. This has been determined to meet the EPA toxic characteristic of D011 due to silver content in the fixer bath.

e. X-ray wash system ion exchange drums when they are removed from the x-ray waste water treatment system. These drums have been determined to meet the EPA toxic characteristic of D011 for silver. The drums exchange iron for silver metal ions during system operation. The silver is captured and remains in the drum, which is sent offsite for precious metal recovery.

f. Lab pack wastes which are a combination of many small quantities of waste materials from research and development and quality control laboratories, off-specification materials, surplus items from inventory stores and residue tanks, adhesives, and resins from assembly areas.

Waste generation estimates presented in the October 30, 1992 EPA Compliance Evaluation Inspection, for these other wastes disposed of offsite are (4.5):

flammable	1 drum every 90 days
solvents	2 drums every 90 days, maximum, primarily TCA
dry paint filters	6 30-gallon drums per year
plastic media	varies by contract; last year 0-4 30-gallon drums per month

3.0 REGULATORY HISTORY

UPCO first submitted a Part A Permit Application as a treatment, storage disposal facility on March 15, 1983. As a RCRA Interim Status facility, UPCO submitted its Part B Permit Application (Part B) on November 8, 1988, and a revised Part B on November 8, 1991. On May 20, 1992, UPCO submitted a revised Part A permit application (Part A) adding a thermal treatment unit (see SWMU No. 14) in addition to the existing burn pad (see SWMU No. 1). A revised Part B was submitted on May 14, 1993, as a specified condition of operating the thermal treatment unit. ADEQ has been the lead agency for the site.

There has been a history of UPCO and ADEQ having differences of opinion regarding the issue of whether UPCO qualifies for the exemptions for small quantity generators as defined by A.A.C. R9-8-1861.A (40 CFR 261.5), i.e., generating less than 1,000 kilograms per month of hazardous waste. Prior to November 19, 1980, and through the present, UPCO has disposed of waste propellants by open burning. This activity (in concert with the amounts of waste generated - over 1,000 kilograms per month) subjected UPCO to the interim status standards. UPCO was instructed to submit Part A of the hazardous waste facility permit application by the Arizona Department of Health Services (ADHS) on December 9, 1981. After much review and discussion regarding UPCO's claim to be a small quantity generator, ADHS reviewed UPCO's December 24, 1981, arguments, and again on April 19, 1982, required UPCO to submit Part A. Claiming it to be a "protective filing," UPCO filed it's Part A on March 15, 1983. ADEQ did not consider the Part A to be a "protective filing" in that the they considered the application to be required. (2.1)

On June 11, 1984, ADHS notified UPCO in the form of a letter of violations found during a March 19, 1984, inspection. This letter also informed UPCO of the potential for their withdrawing the Part A and becoming eligible for the small quantity generator exemptions. For UPCO, the procedure for accomplishing this change of status involved meeting the small quantity generator requirements, including obtaining the municipal/industrial solid waste management permit/license/registration from ADHS for the waste propellant open burning.

This letter also stated that UPCO must request this change of status in writing, must submit information regarding the burn process, the burn "unit," the wastes to be burned, operating records, etc. ADHS would then review the submittal and, if acceptable, approve the proposed waste management activities. ADHS stated that such an approval would be the basis for withdrawing the Part A and reverting (the status of the facility) to small quantity generator status. (2.1)

On July 13, 1984, UPCO requested approval to operate under the small quantity generator exemption. This request contained process information, including evidence that the burn area did not meet the set backs specified in R9-8-1865.A (265.382). Approval to conduct the open burning under R9-8-1861.A (261.5(g)(3)(iv)) was not granted. On December 10, 1984, UPCO was cited for violations of the financial requirements. A meeting was held on December 19, 1984. UPCO responded to the financial violations with a letter dated January 4, 1985. In this letter, UPCO claimed small quantity generator status, even though the required state approval (originally described in ADHS' June 11, 1984, violation letter) had not been granted. While maintaining its small quantity generator claim, UPCO nevertheless agreed to pursue the state approval for small quantity generator status in order to be relieved of the interim status financial requirements. (2.1,2)

The required State approval was made with stipulations for the management of municipal/industrial waste on March 6, 1985. On March 25, 1985, UPCO agreed to the stipulations. On April 11, 1985, UPCO requested to withdraw its Part A and continue operations under the small quantity generator exemptions. That same calendar month, April of 1985, UPCO accumulated more than 1,000 kg of hazardous waste as evidenced by UPCO generator manifests dated April 2, 1985, and April 25, 1985. On September 4, 1985, ADHS conducted a hazardous waste facility inspection. This inspection showed that UPCO exceeded the allowable accumulation of hazardous wastes for small quantity generators due to the wastes documented on the April 1985 manifests and for burn residues or slag. Due to this over-accumulation ADEQ declined to grant generator status via a letter dated September 23, 1985. In a September 30, 1985, letter, UPCO disputes ADHS' over-accumulation ruling. However, according to ADEQ, this letter did not address the April 1985

manifests or the undrummed burn residue/slag remaining on the ground after a burn. (2.2)

ADHS' position regarding UPCO's failure to qualify for small quantity generator status is reiterated in a January 23, 1986, violation letter based on the September 4, 1985, inspection. On February 6, 1986, a meeting was held. At this meeting, UPCO agreed to remove all burn residue/slag from the burn site, to test the soil of the burn site for contamination and to comply with UPCO's solid waste burn permit and the small quantity generator generation and accumulation limits. On June 20, 1986, UPCO, presented documentation that UPCO had fulfilled the February 6, 1986, agreements. ADHS performed a confirmatory inspection on August 27, 1986. This inspection again revealed accumulation in excess of the small quantity generator limits. In addition, it was discovered that UPCO also disposed of solvent waste by open burning, a violation of its state burn permit. (2.2)

On February 23, 1987, ADHS performed another hazardous waste inspection. ADHS again found hazardous waste accumulation in excess of the small quantity generator limits. In addition, soil contamination due to EPA toxic lead levels was found near the burn pad. (2.2)

In summary, UPCO has never qualified for small quantity generator status. As stated above, on June 11, 1984, UPCO was notified of the potential for it to meet the small quantity generator exemption. This June 11, 1984, notification clearly outlined the information requirements and hazardous waste accumulation limits that UPCO would have to meet. This notification also clearly stated that ADHS approval was necessary to withdraw Part A and change to small quantity generator status. According to the documents reviewed, this approval was never granted. Therefore, UPCO has always been, [and is currently], under interim status and subject to all applicable RCRA regulatory and permitting requirements. (2.2)

According to Kathelene Carson, Environmental Engineering Specialist for ADEQ's Hazardous Waste Remedial Unit, the most recent revised Part B Permit Application dated May 12, 1993 is currently under Agency review. She stated that perhaps the

two major issues to be resolved as part of the review/approval process are; the issue of whether the Open Burn/Open Detonation (OBOD) Unit is located the required distance from Happy Valley Road and; the ongoing issue of whether the facility's propellant bore-out waste is a hazardous waste when in the tanks and submerged in water and will be required to be treated as such. According to Ms. Carson, ADEQ is currently in the process of attempting to resolve these issues. She stated that the timetable for permit approval will likely be during 1994. (22)

The ADEQ Office of Air Quality is the responsible agency for permitting of the OBOD Unit and the Thermal Treatment Unit. UPCO operates it's OBOD Unit under Open Burn Permit No. 930155. On July 15, 1992, the facility received an Installation Permit (No. 78004) from the ADEQ Office of Air Quality to first test and, if proven successful, operate in the interim the Thermal Treatment Unit. An application for a Permit to Operate the Thermal Treatment Unit has been submitted and is currently under Agency review. According to John Buchard, Permits Engineer for the ADEQ Office of Air Quality, the Operating Permit is currently public noticed, and depending on the public response and whether hearings are held, could be approved within 6 months. (27)

According to the October 1992 CEI (4) UPCO has filed an aquifer protection form to receive an Aquifer Protection Permit with the ADEQ for discharge to the septic system. However, in a telephone conversion between SAIC/TSC and Al Roesler, Mining Aquifer Protection Permit Engineer for ADEQ's Office of Water Quality, no record of the application or pending permit was found on the computer database. (28) Based on information gained during the VSI, it is believed the facility is in the process of Aquifer Protection Permit application. Groundwater monitoring downgradient of the septic systems will likely be required.

UPCO has given notice of intent to EPA to comply with recent stormwater permit stipulations. This permit will include provisions for the OBOD and the TTU.

4.0 WASTE MANAGEMENT

Reactive and ignitable waste generated by manufacturing operations is accumulated in small quantities at or near the points of generation in the facility. This waste is routinely taken to a specially-constructed pad open burn/open detonation (OBOD) area (SWMU No. 1) at the UPCO facility and open-burned to eliminate the reactive and ignitable characteristic of the wastes. This means of treatment generally considered an effective and safe method for managing such wastes in large or bulk quantity and it avoids the necessity of transporting these hazardous materials over public roads to off-site treatment or disposal facilities. (3.B-2)

Recently, UPCO has installed, tested and is now using a thermal treatment unit (TTU) to treat selected types of propellant wastes (SWMU No. 14). This unit was specially designed to capture air emissions asociated with UPCOs thermal treatment activities. The TTU is not an incinerator (as defined by RCRA) but is a unique, self-sustaining thermal treatment method which also reduces or eliminates visible and other emissions. This unit is capable of treating solid propellant (D003), excess oxidizers (D001) if mixed with propellant, and wastewater bore sludge (K044). Due to the high temperatures created by propellants when burned, the quantity in the burn chamber is severely limited. By design (and verified by test) a limit of two pounds of waste enters the unit at one time. Therefore, the unit is not currently able to handle all types of UPCO's reactive and ignitable wastes. (1.B-3) The facility currently utilizes both open burning and the TTU to dispose of it's reactive and ignitible wastes.

UPCO treats the following wastes in the thermal treatment unit: normal density II propellant, medium density propellant, K044 waste (sludge from water bore evaporation), excess oxidizers (except those containing lead), and minimum smoke propellant. These were successfully burned on March 30, 1993, during the required state verification testing under the ADEQ, Office of Air Quality, Installation Permit. UPCO, having satisfactorily demonstrated that these materials can be safely treated in this unit, is currently operating this unit pending approval of it's Operating Permit from ADEQ Office of Air Quality.

Due to the physical nature of the material, UPCO will be unable to treat the following in the thermal treatment unit: waste high-explosives; scrapped explosive leaded devices such as cartridges, primers, initiators, delay devices, etc.; waste solid propellant rocket motors; other scrapped products (hardware containing explosives/propellants); and waste explosive-contaminated plastic bags, liners, cleanup materials, etc. These are treated at the OBOD unit. In addition, UPCO does not intend to treat propellants and oxidizers containing lead compounds in the thermal treatment unit unless proper notifications are made to ADEQ including revised permits applications. (1.B-3,4)

The thermal treatment unit meets the definition for thermal treatment; as mentioned, it does not meet the definition of a hazardous waste incinerator as contained in 40 CFR 260.10. (1.B-4) It is subject to the RCRA Subpart X. Miscellaneous Units standards as is the current burn pad.

Because of its oxidizer content, waste from the water boring operation is treated at either the burn pad (OBOD) or the thermal treatment unit (TTU). (1.B-4) Detailed descriptions of the OBOD Unit and TTU are found in SWMU Section 6.

The solvents wastes (F001, F002, F003 and F005) from manufacturing and cleaning operations are placed in appropriately labeled 55-gallon drums and are removed by contractors for off-site recycling, treatment and/or disposal. (1.B-4)

Currently other hazardous wastes generated (burn pad residue and ash, paint stripping media, paint filters, spent x-ray fixer, x-ray wash, and lab packs) are containerized (the facility uses 30-gallon drums for solid wastes and 55-gallon drums for liquid) and accumulated for less than 90 days and transported off-site for disposal. UPCO uses two companies for transport and disposal of these wastes: Romic Chemical and Chemical Disposal (4.5).

Since 1988, dry paint filters (from paint booths) have been shipped off-site to Rollins in Texas for incineration. As verified during the VSI, prior to 1988, the paint filters were burned at the OB/OD area. (5)

Prior to 1987, paint stripping was accomplished by sandblasting painted metal parts. Zinc chromate and/or cadmium contaminated sandblast grit was deposited at the OB/OD area and used as a soft box for burning activities. Since 1987, only unpainted fiberglass parts have been sandblasted to prepare the surfaces for coating. This sandblast grit is still deposited at the OB/OD are for soft box use. Currently, and since 1987, zinc chromate- and cadmium-containing paint is stripped from parts using a plastic bead media for blasting. When spent, the plastic head media is containerized and shipped off-site for disposal. (5)

In the past, solvents such as methylene chloride and 1,1,1-trichloroethane (1,1,1-TCA) were used in quantity for general parts cleaning in the propellant plant and one assembly plant. Currently methylene chloride is used to prime the propellant tubes prior to injecting propellant into the tubes. 1,1,1,-TCA is used to clean protective oil from metal parts prior to assembly. (5)

Untreated laboratory waste water (sink) from the quality control lab has historically been discharged through pipes to a leachfield. The pipe to the leachfield has been cut and capped, and currently the waste water is piped to a 400-gallon plastic holding tank. When the tank is full, the waste water is added to the fiberglass evaporation tanks at the water boring area. (5)

Unprocessed X-ray processing waste water were historically discharged to a septic tank/leachfield and a dry wash. These disposal methods no longer occur. Hazardous components of X-ray processing waste is now collected and shipped off-site for silver recovery and disposal.

5.0 ENVIRONMENTAL SETTING

5.1 Physiography

The UPCO facility is located within Deer Valley, a northwest-trending alluvial valley within the Basin and Range Physiographic Province. The climate in Deer Valley is generally arid, having an average annual precipitation of approximately seven inches. (1.I-19)

5.2 Geology and Hydrogeology

The primary geologic features in the vicinity of the facility are the southern Union Hills which are characterized by 800 feet of vertical relief, and the northeastern margin of the Deer Valley Basin. The southern Union Hills are composed of granitic rock that solidified from its magma source between 1,750 and 1,650 million years ago, and Proterozoic volcanic rocks that were both formed and metamorphosed over 570 million years ago (See Figure 2). The rocks within the Union Hills were elevated to their present position during the periods of intense faulting which were responsible for formation of the Basin and Range Physiographic Province during the Miocene and Pliocene epochs (Dickinson, 1989). (1.I-19)

The Deer Valley Basin originated during the same periods of geologic faulting that created the Union Hills. The floor of the Basin is probably composed of rock types similar to those present in the adjacent Union Hills, with the possible addition of some more recent volcanic rocks and a red sedimentary unit. The rocks which comprise the floor of the Basin contain little water and are relatively unimportant hydrologically (Laney and Hahn, 1986). The Basin contains accumulations of sediments that are over 2,000 feet thick near the Basin axis and thin toward its margins (See Figure 3). Those basin-fill sediments have been subdivided by other researchers into the Lower, Middle, and Upper Units that can be recognized across much of northern Maricopa County. Generally, the Lower Unit consists of well cemented stream and lake bed sediments that were deposited more than 8 million years ago. The Middle Unit contains abundant lake deposits that

are moderately well-cemented and were laid down between 8 and 3.3 million years ago. The Upper Unit consists of relatively coarse-grained stream deposits that are poorly consolidated and are less than 3.3 million years old (Brown and Pool, 1989). (1.I-19,20)

Proterozoic volcanic rocks are exposed in the western most portion of the UPCO facility. In the eastern half of the facility, where both of UPCO's water wells are located (See Figure 3) basin-fill deposits crop out at the surface; the depth to bedrock is unknown. The driller's log submitted for the actively used water well at the facility (i.e., Arizona Department of Water Resources [ADWR] Operations well registration number 55-500290) showed that gravel, clay and breccia were present to a depth of at least 500 feet. The log submitted for UPCO's inoperative well (ADWR Operations well registration number 55-602630) showed "bedrock" from surficial levels to a depth of at least 315 feet below ground surface, with interlayers of gravel, clay, and sandstone occurring at depths of about 60 and 230 feet from the surface. Although this may indicate the presence of a bedrock high beneath the inoperative well, the closely-spaced sedimentary interlayers are somewhat anomalous, and it is possible that bedrock materials identified at the site may have originated from clasts within basin-fill sediments. None of the drillers' logs from wells in the immediate vicinity of the UPCO facility provide information on the position of the Lower, Middle, and Upper Units described above. However, Brown and Pool (1989) reported the presence of those units in two wells located approximately 2 to 3 miles southwest of the facility (See Figure 3). At those well sites, the top of the Middle Unit was penetrated at an elevation of about 1,350 feet above mean sea level (MSL), and the top of the Lower Unit was penetrated at about 1,250 feet above MSL (Brown and Poole, 1989). (1.I-20,21)

The subsurface hydrogeology at the facility has been interpreted on the basis of local borehole data and analysis of regional studies. A regional water level map (Figure 4) produced by Reeter and Remick (1986) includes the area of the UPCO facility. Although the water level surface in the immediate vicinity of the facility has not been contoured by Reeter and Remick (1986), it may be extrapolated from contoured data several miles to the south. As shown on the

regional water table map provided in Figure 4, the water-level surface near the facility slopes southwestward at about 70 feet per mile toward the central axis of the Deer Valley Basin. Reeter and Remick's report (1986) of the water level surface is supported by four water-level measurements that were collected by the Basic Data Division of ADWR from wells near the facility during November 1991 (Figure 5). These roughly contemporaneous measurements are particularly useful because they provide a reasonable interpretation of static conditions of the water-level surface. The southwestward water level gradient (about 150 to 350 feet per mile) indicated by these data suggests that groundwater below the facility was flowing to the southwest, away from the Union Hills, at the time the measurements were made. Furthermore, assuming that the middle and lower units occur beneath the facility at about the same altitude (about 260 to 280 feet below ground surface [bgs]) as in wells located two to three miles to the southwest, most of the groundwater beneath the site occurs within these units. (1.I-23)

Additional data on water levels measured in wells located within one mile of the facility were collected from the well registry maintained by the Operations Division of ADWR and can be found in Appendix I-8 of the 1993 Part B Permit Application (1). Well yields within the one square mile section (Sec. 5, T4N, R3E) in which the facility is located are reported in the ADWR Operations Division well registry to range from 6 to 100 gallons per minute. The reported well yield for the active well within the facility boundaries is 15 gallons per minute. (1.I-23)

The groundwater flow rate beneath the UPCO facility is difficult to determine, because the depth of bedrock and the corresponding thickness of overlying basin-fill sediments is not known. For example, if depth of bedrock is shallow beneath the facility, as suggested by borehole data, groundwater could move rapidly downgradient in some areas. In other areas, groundwater flow may be impeded by topographic anomalies in the bedrock surface. However, a groundwater flow rate may be estimated for areas of the facility underlain by substantial thicknesses of basin-fill sediments. (1.I-24)

As discussed previously, most of the groundwater beneath the facility is probably contained within the Lower and Middle Units. Although no test data are available from geologic units in the immediate vicinity of the facility, hydraulic conductivity values reported by Brown and Pool (1989) for those units range from 3 to 25 feet per day, and 4 to 60 feet per day for the Lower and Middle Units, respectively. Because the facility is located near a mountainous basin margin, local occurrences of basin-fill sediments likely contain abundant sand and gravel, and the associated hydraulic conductivity values are probably near the higher ends of the ranges reported by Brown and Pool (1989). Assuming maximum hydraulic conductivities of 25 feet per day and 60 feet per day for the Lower and Middle Units, respectively, and a maximum hydraulic gradient of 350 feet per mile (as discussed above), groundwater beneath the facility may flow at velocities up to about 1.7 feet per day through the Lower Unit and 4 feet per day through the Middle Unit. It should be noted that these estimates are Darcy velocity values which assume that the groundwater flows at a vertically constant speed through each unit; the actual velocity profile may vary significantly depending on vertical variations in lithology, cementation, fracturing, and other factors. It is not possible using available data to accurately determine a Darcy velocity for localities where groundwater percolates through fractured bedrock, because associated hydraulic conductivity values vary widely depending upon numerous properties including rock type, weathering, and the three-dimensional geometry of fracture sets.

Although values for precipitation and evapotranspiration can be approximated for the UPCO facility, a net recharge rate cannot be accurately determined due to a lack of quantitative information on stormwater runoff. According to the Hydrology Division of the Arizona Department of Water Resources, the estimated mountain-front recharge rate along the McDowell Mountains is 1,000 acre-feet per year. However, because the area contributing this recharge is not accurately known, no value for recharge rate per unit area has been determined that would allow calculation of the recharge rate specific to the UPCO facility. (1.I-25)

Water quality analyses from wells located within four miles of the facility were reported in regional studies by Brown and Pool (1989) and Reeter and Remick

(1986). At those well sites, total dissolved solid concentrations (219 to 312 milligrams per liter [mg/L]) and nitrate levels (0.1 mg/L) were low, and fluoride concentrations (0.8 to 1.0 mg/L) were moderate relative to the maximum contaminant levels (MCLs) established by the EPA for public drinking water supplies. Additionally, carbonate plus bicarbonate were the dominant anions present in samples from those well sites, while cations were present in nearly equal concentrations. The quality of water from the active well at the UPCO facility has also been assessed. Five inorganic chemical analyses and one volatile organic chemical analysis have been performed on samples collected from UPCO's active well since 1981. None of the analyses indicated contaminant concentrations in excess of the MCLs established by EPA. (1.I-26)

5.3 Soil

Information regarding the soil profile at the UPCO facility was provided by Foree & Vann, Inc., a Phoenix-based geotechnical firm, based on its soil and foundation investigation conducted for UPCO. Foree & Vann reported that the soil profile is 5.5 to 6.5 feet thick and consists of three sub-units. According to Foree & Vann (1988), the lowermost sub-unit consists of 3 to 3.5 feet of fanglomerate; the middle sub-unit consists of 1.5 to 2 feet of clayey, silty sand with cliche; and the upper sub-unit consists of 0.5 to 1.5 feet of clayey sand. (1.I-21)

Construction Inspection & Testing Company (CIT) performed an independent soil investigation at the facility during 1985. CIT (1985) described a soil profile similar to that identified by Foree and Vann, except that greater percentages of surficial gravel were encountered in CIT's boreholes. In a regional soil survey prepared by the U.S. Department of Agriculture Soil Conservation Service (1985), the soils in the area of the UPCO facility were described as being Gachado - Rock outcrop - Quilotosa type, consisting of strongly sloping to steep, very gravelly, loamy soils and rock outcrop (See Figure 6).

5.4 Surface Hydrology

Important elements of the surface hydrology in the vicinity of the facility include stream patterns, flood-plain boundaries, the Central Arizona Project canal, and the nearby Cave Creek Dam. Drainages (i.e., ephemeral) that traverse the UPCO facility have been mapped in detail (See Figure 7) and are described in the master site drainage study provided in Appendix B-4 of the 1993 Part B Permit Application. (1) The facility drains rapidly, via the washes, during storm events. All runoff eventually travels to the Cave Creek Wash, to the New River drainage to the Agua Fria and Salt Rivers. There are no standing waters, surface water bodies or wetlands at the UPCO facility.

The Cave Creek Dam is located on the eastern side of Union Hills, about one mile east of the UPCO facility. During periods of heavy stormwater runoff, surface water impounded behind the dam may cover an area in excess of one square mile. According to the Part B Permit Application, a spokesman for the U.S. Army Corps of Engineers (ACE) stated that under no circumstances would stormwater from the dam site be diverted toward the UPCO facility through the Union Hills. Instead, excess water during periods of heavy stormwater runoff would be conveyed through spillways located at the western end of the dam and then returned to Cave Creek. (1.I-22)

The UPCO facility is located in an arid, desert setting which is characterized by ephemeral streams (i.e., normally dry washes) traversing the 160 acre site from north-northeast to south-southwest. (See Figure 7) The area is subjected to very little precipitation and has high evaporation rates, especially in spring, summer, and fall seasons. Storms, when they do occur, are usually intense but of short duration. Historical data indicates the maximum 24-hour precipitation event for Phoenix, Arizona, was 3.07 inches in August 1943. The annual precipitation for Phoenix, Arizona, is approximately 7 inches. (1.I-26,30)

The UPCO facility is not located within the 100 year floodplain as shown in the Federal Emergency Management Agency (FEMA) Flood Insurance Program (FIA) Flood

Insurance Rate map. This map is provided in Appendix B-4 of the Part B Permit Application. (1)

5.5 Surrounding Land Use

Although the UPCO facility is in the Phoenix metropolitan area, the area surrounding UPCO is best characterized as rural rather than urban. The population in the nearby area is concentrated in a 0.5 square mile tract directly north of the UPCO facility. The population density in the tract is approximately 125 people per square mile, while the population density in all other areas adjoining the facility is less than 5 people per square mile. The principal reason for low population density on nearby land that it is owned by various governmental entities, such as U.S. Bureau of Land Management, State of Arizona, and Maricopa County, and no homebuilding or other development has occurred. This large amount of relatively vacant land provides an excellent buffer zone around UPCO's site. Some development has occurred beyond the public lands. Phoenix-Deer Valley Airport is located approximately two miles south-southwest of UPCO. A landfill and gravel pit are located approximately 0.6 mile to the east-southeast. Central Arizona Water Conservation District offices and maintenance facility is located approximately 0.8 mile to the south. Interstate 17 is located about three miles to the west, and the Central Arizona Project Canal lies approximately 0.25 mile to the west and south of UPCO.

Negotiations are underway to lease additional land undeveloped from the State of Arizona to use as a buffer zone between facility (the Burn Pad and TTU) and the adjacent private lands. UPCO expects to lease 80 acres of adjacent land that is currently not zoned for industrial use. According to Steven Hildreth of the Arizona State Lands Commission, the land could not be used for expansion or development. He stated that leasing the land to UPCO would be beneficial to both parties in that by being fenced in and under the stewardship of UPCO the open, illegal dumping that is presently occurring on these vacant, desert scrub lands would be discouraged. Jim Cross, also of the Arizona State Lands Commission, is aware of the status of the lease review and approval. He was not contacted by SAIC/TSC but can be contacted at (602) 542-2655.

5.6 Climate/Meteorology/Air Quality

The UPCO manufacturing facility is situated in an area of low-elevation hills known as the Union Hills. Elevation of peaks in this range are as high as 2,383 feet above mean sea level and approximately 800 feet above the average surface elevation of the UPCO facility. Because the Union Hills occupy a small area, their presence exerts only a minimal effect on general atmospheric inversions in the vicinity of UPCO. However, the UPCO facility may be affected by inversions in the metropolitan Phoenix air shed. Stable atmospheric conditions which cause thermal inversions are most likely to occur during winter months. (1.I-37)

The average mean temperature for Phoenix is 72.6°F, the average daily high is 85.6°F., and the average daily low temperature is 59.3°F. Historical data indicates the maximum 24-hour precipitation event for Phoenix, Arizona, was 3.07 inches in August 1943. The annual precipitation for Phoenix, Arizona is approximately 7 inches. Relative humidity is normally very low in Phoenix's desert environment. (1.I-37) In essence, the area is subject to very little precipitation and has high evaporation rates, especially in spring, summer, and fall seasons. Storms, when they do occur, are usually intense but of short duration.

The wind rose presented in Figure 8 demonstrates that the predominant wind direction in the Phoenix area is east-west. During the morning hours the wind normally comes from the east; it changes to the west in the afternoon. (1.I-38)

UPCO's manufacturing facility is situated at the northern extent of the Phoenix metropolitan area where air monitoring data are relatively limited. The nearest sampling station operated by the Maricopa County Department of Air Pollution Control (MCDAPC) is located at the Central Arizona Water Conservation District (CAWCD) site approximately 0.8 mile south of UPCO's facility. This air monitoring station measures only ozone. The one-hour ambient air quality standard of 0.12 parts per million for ozone was exceeded two times at the station during 1991. No exceedances were reported during 1992. Because of past violations of air quality standards at the CAWCD monitoring site and other

monitoring stations, the Phoenix area has been classified by EPA as a non-attainment area for ozone, carbon monoxide, and particulate. Currently, no monitoring is being conducted for toxic air pollutants by MCDAPC. (1.I-38) According to Dick Hamilton, Compliance Engineer for the ADEQ Office of Air Quality, he believes some ambient air monitoring occurs in the regional vicinity of the facility. (30) However, he was not able to supply details regarding such activities.

There is limited industrial activity in the area of Phoenix in which the UPCO facility is located. Except for a rock crushing plant approximately two miles south of UPCO, no other significant industrial pollutant sources exist within five miles of the UPCO facility. Because of the lack of industrial activity in the area, significant levels of background pollutants would not be expected to be present at the UPCO facility. (1.I-39)

5.7 Flora/Fauna

UPCO is located in an arid desert with little to no precipitation and no surface waters. These conditions are conducive to few animal and vegetation populations. The area is characterized by occasional transient stray domestic cats or dogs (less than two per year). Many times these are the result of desert releases of unwanted pets by owners. When such animals are found, UPCO employees contact animal control agencies and have them removed. An occasional transient coyote or javelina have been seen near the facility usually in early spring or fall. They rarely are inhabitants of the area. Small reptiles such as rattlesnakes and Gila monsters are known to frequent the facility in early spring or fall. These animals tend to traverse large surface areas in search of food. (1.I-49) Avian species also migrate through the area. Nancy Olsen, Project Evaluations Specialist for the Habitat Branch of the Arizona Game and Fish Department, was contacted by SAIC/TSC regarding sensitive habitats and endangered species that may be in the area of the facility. She agreed with the above evaluation, and added that although it is not prime habitat, the site and surrounding area is a potential Desert Tortoise (a federally endangered species) habitat. She also stated that the Chuckwalla, a Category II federally endangered species may also traverse the area. (31)

No farms exist nearby where cattle, sheep, horses, etc. graze and crops are grown.

6.0 SOLID WASTE MANAGEMENT UNITS AND RELEASE INFORMATION

Section 6.0 addresses Solid Waste Management Units (SWMUs) identified at the Universal Propulsion Company. These SWMUs were identified based on file reviews and regulatory agency and facility personnel interviews. For each SWMU, information is provided on unit characteristics, wastes managed, release controls, history of releases, and release potential. Table 6-1 lists these SWMUs. Figure 9 shows the current location of many of these units.

Table 6-1
SOLID WASTE MANAGEMENT UNITS
AT UNIVERSAL PROPULSION COMPANY

Unit No.	Name
1	Open Burn/Open Detonation (OBOD) Unit
2	Sandblasting Area and Waste Accumulation Point
3	Sandblast Waste in Dry Wash (Remediated & Closed)
4	Paint Shop Satellite Accumulation Points
5	Assembly Area Solvent Shed
6	Liner Building Satellite Waste Accumulation Point
7	Propellant Plant 3 Satellite Accumulation Point
8	Propellant Plant 2 Satellite Accumulation Point
9	Propellant Plant 1 Solvent Shed
10	Propellant Water Bore Residual Tanks
11	Former Propellant Water Bore Residual Pit(s)
12	Ignitable and Reactive Waste Magazines
13	Former Earth Covered Ignitable and Reactive Waste Magazines
14	Thermal Treatment Unit (TTU)
15	Spent X-ray Fixer and Ion Exchange Drum Accumulation Point
16	Lab Pack Accumulation Points
17	QC Laboratory Waste Water Holding Tank
18	Wash Down Accumulation Drum at Mix/Cast #2 Building
19	Septic Tank that Formerly Received Film Processing Waste Water
20	Septic Tank (Leachfield) that Formerly Received Building C-11 Laboratory Wastewater
21	C Area Solid Propellant Manufacturing Tank
22	High Level X-ray Pyramid Building Wastewater Discharge to Wash

6.1 SWMU No. 1: Open Burn/Open Detonation Unit (OBOD)

Unit Description

The OBOD unit is located near the south central UPCO property boundary. This area is a remote portion of the facility property. A fence prevents access to the UPCO property from offsite locations. The OBOD unit measures 75 feet long by 25 feet wide in the actual burn area and 95 feet long by 45 feet wide in overall dimension. The OBOD unit consists of concrete with No. 4 steel rebar on 12 inch centers over soil covered with sand. Pad depth is 10 inches, and it contains 6 inches of sand. The unit is surrounded by an outer concrete apron that is sloped 1/4 inch per foot toward the pad. A portable catchment fence is located on the outer apron and adjacent to the pad to help contain burn materials in the burn area (see Figure 10). Dimensions and configuration of the pad allow for excess area to accommodate the possibility of waste movement during treatment. (1.D-3) Photo Nos. 1,2, and 3 show this unit. Note the cement cylinders used to conduct burns in.

Only open burning of wastes occur at this unit. Wastes are not detonated. All of the wastes burned at the OBOD unit (as well as at the Thermal Treatment Unit - SWMU No. 14) are generated at the facility; no offsite wastes are accepted for treatment at the facility. Explosive wastes are burned in the center of the burn pad on top of the sand. An open-burn event lasts approximately 10 to 15 seconds for 250 to 300 pounds of waste. Smoke from the burn may not disperse for a few minutes after the burn. The residue is removed from the burn pad 24 hours after the burn. The 1993 air permit allows the facility to burn 1000 pounds in a week with maximum burns of 300 pounds; typically, it performs two burns per week each about 250 pounds. In the past, the facility has conducted single burns of 500 pounds. (4.8) According to UPCO staff this no longer occurs.

The residue from the burn pad is swept into 30-gallon drums and transported on-site to a temporary storage area at the Hazardous Waste Bunker Accumulation Area (Ignitable and Reactive Waste Magazine, SWMU No. 12). Once a year analysis of the burn pad residue is conducted. It is analyzed for TCLP metals; results have indicated that the residue is high in lead and has some chromium, cadmium, and barium. (4.9)

All of the burn pad residue is treated as hazardous waste, even though some burns may be nonhazardous. Hazardous waste residue would come from items such as lead azide or lead nitrate, used as an oxidizer, which may leave behind lead-contaminated residue. The residue from the burn pad may contain remnants of fiberglass, metals, burned plastic bags that contained the waste, and sand. (4.9)

As previously discussed, negotiations are underway to lease additional land to use as a buffer zone around the burn area. The facility expects to lease 80 acres of adjacent land.

Prior to the construction of the burn unit described above (in 1989) burns were conducted in what is thought to have been the same location at a unit consisting of a 100-foot by 20-foot bare soil area. The burning area is described as being "located in a field that has apparently been bulldozed/scraped to .. level with some slope to the south/east towards a desert wash and culvert under Happy Valley Road." (3) A Generator Inspection Report dated September 4, 1985, stated that the process "entails placing propellent in a long narrow strip and igniting one end with a match. The propellent is encased in fiberglass reinforced plastic tubes and may include small pieces of metal hardware and powders. The tubes are approximately 2 to 3 inches in diameter and have been cut into approximately 1 foot lengths." The report stated that burns have taken place at this location since 1980. (6)

At the time of the 1985 inspection the following was observed:

- The burn area contained a thin layer (1 to several inches) of discolored soil mixed with small metal parts and indistinguishable lumps. The burn residue was not ash-like but clings more tightly to soil and was referred to as slag." (6)

- A full 55-gallon open-topped drum was observed adjacent to the Burn Area which contained "slag." (6)

- Burned debris was observed along the east side of the burn area field on the west flank of the desert wash extending up to 200 feet south of the Burn Area, towards the culvert under Happy Valley Road. No debris was observed in the culvert or on the other side of Happy Valley Road where the desert wash continues. (3)

- Analysis indicates slag contains EP toxic levels of barium and lead. Soil samples were reported taken to determine the depth of contamination. It was reported to be on the order of inches. (3)

The file review indicated that sampling and analysis of the soils underlying the burn residue area did not exhibit any hazardous characteristics on the basis of the soil analysis (EP toxicity for barium and lead) performed (10). The 1984 EPA CEI (18) shows two burn areas located on-site. One of these was this Former Burn Pad (see AOC No. 2).

The September 9, 1986, Hazardous Waste Inspection Report by ADHS (7) first reported the current unit (prior to the apron being constructed) as "a new burning pad on top of a portion of the old burn area." The "new" unit was described as a concrete pad (very recently constructed) that is 25 feet by 75 feet, 5 inches thick with 6-inch high curbs around the sides. The concrete slab was reported to have No. 4 rebar in both directions on 12-inch centers. The interior of the pad was reportedly filled with 6 inches of screened sand. It is unknown if the practice of using the sand from the sandblasting unit to fill this unit was done at this time. (5) This description is consistent with the design details found in the 1988 and

1993 Part B Permit Applications and confirmed during the VSI. Modifications to the burn pad as detailed in the 1988 Part B Permit Application (23), i.e., the portable catchment fence and the concrete outer apron described above were added by 1988.

Apparently, according to W. Hallas, Director of Facilities and Safety for UPCO, the area was thoroughly cleaned prior to construction. This was confirmed during the VSI. Apparently, in late 1988 or January, 1989 five roll-off bins of contaminated soils were excavated and removed from the burn pad and surrounding apron area prior to construction of the new unit.

According to Mr. Hallas, only lead-containing propellant waste will be burned on the new pad. No air monitoring is conducted other that visual for this unit. No violations of the air permit have been reported. One nearby neighbor has repeatedly complained about the smoke, which on occasion has wafted into the nearby residential area. The facility distributes a newsletter informing it's neighbors of operation and permitting issues. All burns (since 1991) are now video taped.

Date of Start-up

Burns were conducted at this facility on bare soil from 1980 to the time of the construction of the burn pad in 1986 (6,9). UPCO has made additions to the OBOD Unit since construction of the unit. These included removing soils under and surrounding the 25- by 75-foot concrete pad and providing an apron 10 feet wide completely around the burn area, and adding debris fencing. Clean closure and a complete remediation of this apron area was completed in 1989, and final notifications were made to the ADEQ Waste Compliance Unit. (24,25)

Prior to 1980 the propellent was produced and loaded in Riverside and only assembled at the Phoenix facility.

Date of Closure

The OBOD unit is currently operational. The area under and surrounding the current Burn Pad was remediated and closed in 1989.

Wastes Managed

The OBOD unit treats waste propellant, scrap off-specification explosive devices and oxidizer generated during manufacturing operations. UPCO produces solid propellant (class "B" explosive) filled with granular oxidizers, as well as various small initiator, cartridge, delay and gas generation devices containing small amounts of explosive materials. (1.K-3)

The wastes managed include dry waste propellant, waste liner and binder materials, small explosive devices, tubes containing propellant, dry water bore sludge, and waste oxidizers. The waste oxidizers typically used are ammonium perchlorate, potassium perchlorate, or lead nitrate. Ammonium nitrate is also used but in comparatively smaller quantities. The small devices may contain small quantities of barium chromate mixtures or boron potassium nitrate. (1.K-3)

Release Controls

The unit consists of a 4 to 6 inch deep sand layer over a cement base with 6 inch berms. The unit is surrounded by a concrete apron sloped towards the unit to protect the immediately surrounding soils. The apron has a plastic liner beneath. Cement burn cylinders are used and the pad also has a metal fence to catch debris that gets ejected during a burn. This design should effectively control release to soil and groundwater. According to the Part B Application the unit is designed to prevent stormwater run-on, runoff and flooding. This was confirmed during the VSI. Also according to the Part B Application, OBOD operations are not conducted on days when precipitation or winds in excess of 10 mph are

present. By restricting operations to dry and calm days, UPCO prevents releases to soil that otherwise might be caused by run-on, runoff and wind dispersal during staging and treatment operations. Weather and winds are closely monitored before burning, and reportedly a weighted impermeable cover is kept on the unit's surface in between burns preventing winds and precipitation from mobilizing metals remaining on the sand surface. During the VSI, no cover was observed. Releases to air are fully permitted.

Also as stated in the Part B Permit Application, after cooling, burn residues on the pad and outer apron and any contaminated soils are promptly removed from the unit. Some residual lead remains on the unit's sand surface (as well as possibly very small quantities of barium and chromium). These contaminants are reportedly kept on the unit's surface by means of a weighted impermeable cover. The cover is reportedly placed over the unit as soon as practicable after treatment is complete (always on the same day as treatment occurs) and is only removed temporarily to allow collection of treatment residues. At all other times the cover is supposed to remain over the unit, effectively preventing precipitation from mobilizing residual metals, however, as stated above, this cover was not observed during the VSI. The cover also prevents wind dispersal of particulates from the unit. (3.D-3)

Burns were conducted on bare soil prior to the construction of the new pad. It is unknown what release controls, if any, were in place.

History of Releases

Sampling prior to construction of the present unit indicated the upper inches of soil (slag) at the former burn site contained metals (lead, barium). Contamination had not penetrated the underlying soils according to a waste investigation conducted in June of 1986. Samples were collected from 0 to 3 inches and from 6 to 9 inches below the surface. Environmental contamination was documented by analysis of a soil sample

taken north of the burn pad during the ADEQ inspection conducted in February 1987. This indicated release from the burn pad to surrounding soils. On September 27, 1988, the Earth Technology Corporation obtained 24 soil samples from around the burn pad plus one control sample. Six soil samples had lead concentrations above EPA's maximum concentration. UPCO excavated eight to ten inches of soil in the subject locations to ensure that the areas around the sample locations were clean before the cement apron was poured. (12) Confirmation sampling was conducted (13). This area has been clean closed with the approval of ADEQ (25).

The 18-inch catchment fence coupled with sloped outer apron (10 feet wide with a 1/4 inch per foot slope toward the burn area) surrounding the pad effectively stops all such stray propellants from leaving the confines of the OBOD unit. As stipulated in the Part B Application, during post-OBOD cleanup, the soils surrounding the outer apron are also thoroughly inspected and all such residues and contaminated soils are removed and managed as hazardous wastes. (3.D-3)

UPCO's facility is located in a rural, largely uninhabited area. There are a few residences approximately 1/2 mile north and northwest of the OBOD unit. Apparently, since OBOD operations are conducted when the wind direction is from the southwest or south-southwest, the OBOD plume travels at an angle away from the residences and towards uninhabited land (3.D-4). According to the February 8, 1991, CEI, "According to Mr. Miller (of UPCO), a balloon is also sent up prior to a burn to check for wind direction. The wind must be blowing to the northeast before a burn can be commenced. However, sometimes the winds are swirling such that smoke has occasionally drifted over a residential area to the northwest. Mr. Miller indicated that some complaints from these residents have occurred. (13) This was confirmed during the VSI. It is believed that these complaints have been regarding smoke nuisance and that health problems have not been reported.

Release Potential

Soil:

In the past, releases occurred to soils at the Burn Unit and to surrounding soils. These contaminated soils have been remediated by excavation and removal (see above discussion).

During OBOD activities, small portions of propellant motors occasionally stray from the burn pad surface due to the propulsive force generated during treatment.

During February and March 1993, UPCO conducted an initial soil sampling program in the vicinity of the OBOD to evaluate possible accumulation of metals (primarily lead) in site soils as a result of open burning operations. A total of seven soil samples from five locations in the vicinity, and downwind, were taken. Based on the initial soil sampling and analysis conducted at the site, treatment of waste propellants, small explosive devices and oxidizers at the OBOD since 1983 does not appear to have increased the concentrations of metals in site soils to levels exceeding Arizona HBGls. (1.I-16) Therefore, the potential for release to soils from the OBOD operations appears to be low.

Groundwater:

Depth to groundwater in the area is 260 to 280 feet. Soil characterization conducted at the site has not shown contamination levels at depth. Based on these facts coupled with the release controls in place (see above discussion), the potential for release of contaminants from the unit to groundwater is considered negligible.

Surface Water:

The facility is located in an arid area with no perennial surface water features. However, according to UPCO staff, runoff is capable of running fast and deep in the adjacent ephemeral stream channel that runs to Cave Creek Wash and then to a canal via a siphon overspill. The unit is designed to prevent stormwater runoff and flooding. Contaminated surface soils have been excavated and removed. Based on these facts coupled with the release controls in place, the potential for release of contaminants from the unit to surface water is considered low.

Documented soil contamination existed at the site. The potential for past release of contaminants to washes and ephemeral streams is medium.

Air:

There is no physical system of air emission control on the OBOD. By design, it is intended to allow smoke from the treatment of propellants and oxidizers to mix with the ambient air in the rising plume. Also, the rapid nature of large quantity burns prohibits such systems. (1.E-13) Treatment of the reactive wastes by OBOD releases certain "conventional" air contaminants, metal oxide particulates, and innocuous combustion products. The released materials are primarily water, carbon dioxide, and nitrogen oxides. Lead present in the wastes (as well as any very small quantities of barium or chromium that may occasionally be present) are oxidized and released as an aerosol. These releases are regulated by Arizona under the standards of its State Implementation Plan and are fully permitted. (1.D-4)

The amount of toxic emissions released by OBOD activities has been modeled by the ADEQ Office of Air Quality using the TRPUF model. This modeling indicated that a burn of 300 pounds would not violate any Arizona air guidelines or standards. Health risk assessments and further air modeling using the INPUF model were performed by Basin and Range Hydrologists, a

consultant to UPCO. (1.E-13) The conclusions reached by this study is that exposure to any of the 12 chemical compounds evaluated is not expected to cause an increased health hazard risk, with one possible exception. Exposure to lead compounds in any concentration may pose an increased health risk. However, ambient air concentrations at the receptors are below the accepted National Ambient Air Quality Standard for lead compounds. Therefore, while lead compounds are of concern, the concentrations predicted in the air are below current air standards. (1.I-47)

No air monitoring (except for visual) is currently being conducted for this unit. Attempts by the facility to monitor the air during burns with Draeger tubes have been unsuccesful (VSI). No violations of the facility's air permit have occurred.

Release potential from the OBOD Unit to air is high. However, this is a permitted release.

6.2 SWMU No. 2: Sand and Plastic Media Blasting Areas and Waste Accumulation Point

Unit Description

Building D-4 contains a paint stripping cabinet which is used to remove old paint and primer from metal rocket motor tubes and other associated hardware items. (Photo No. 4) This is part of a refurbishment process to allow reuse and relife of hardware items. The paint is removed using a plastic bead media. The residue collected from the cabinet (Photo No. 5) is a dry solid powder which is placed in sealed 30-gallon metal drums accumulated on a concrete pad south of the building. (See Photo No. 6). This is an unbermed open air pad. The drums are on pallets and are picked up from this area for shipment offsite. (1.K-4)

A sandblasting unit is also located in Building D-4, (directly across from the plastic bead blasting unit) and the solid waste from sanding operations is collected in 30-gallon metal or polyethylene drums (1.K-4). This unit is currently used to "rough up" fiberglass parts so propellent will adhere to tubes (5). Photo Nos. 7 and 8 show the sandblasting unit and the sandblast unit collection system.

The February 8, 1991, ADEQ CEI report (13) described sandblast activities being carried out on bare soil. Sandblast residue was also noted on the soil. In UPCO's response to the 1991 inspection dated March 13, 1991, UPCO states that "sand" from the supply chamber visible on the ground does not indicate it is a hazardous waste; in fact, laboratory testing has verified the "sand" media used in the facility is "clean" and suitable for landfill disposal. This waste has been determined by UPCO not to exhibit the EPA characteristic of toxicity, as evidenced by laboratory analysis submitted with the 1993 Part B Permit Application (1.Appendix K-4)

The sand blast media has in the past and is currently used as a cover for the Burn Pit (1.K-4).

Date of Start-up

Steve Miller of UPCO stated that these stripping operations began operating in 1984 or early 1985 (5), and that the bead blasting activities were initiated in 1987 for stripping parts coated with metals-containing paints.

Date of Closure

Both sandblasting and bead blasting are activities currently in operation.

Wastes Managed

The plastic waste paint stripping media is accumulated and shipped to an authorized hazardous waste disposal facility. This waste exhibits the EPA characteristic of toxicity for cadmium and chromium. The solid waste sand from sandblasting is reported to be non-hazardous and is placed on the OBOD Burn Pad to provide the sand base for burning operations.

Release Controls

Both blasting activities are located in a three-sided building, on a cement floor and are conducted inside contained units. The spent plastic media is stored in 30-gallon drums on a unbermed, open air cement pad.

History of Releases

No history of release of cadmium containing plastic media was documented. Release of sandblast grit was documented to soil; however, this is not thought to be a hazardous waste. The history of sandblasting prior to the use of plastic media is unknown. The sandblasting of painted parts likely occurred in the past. The March 17, 1989 CEI cited the facility for not having secure lids on sandblast waste (14).

Release Potential

Soil:

No evidence of release of plastic media to soil was discovered during the PR document search or the VSI. Release of sandblast sand was reported in the past but the facility produced analytical evidence that it was non-hazardous. The potential for release of hazardous spent plastic media to soil from the blasting operations area is low due to the containment features of the unit. Although the pad used for the accumulation of hazardous plastic media waste is not bermed, due to the nature of the

materials (dry, relatively non-mobile), and the current practice of keeping the containers covered, the potential for spills to the soil of any significance is low.

Groundwater:

The potential for release to groundwater from this unit is negligible (see above discussion under Soil).

Surface Water:

The potential for release to surface water from this unit is negligible.

Air:

The potential for release to air from the blasting area appears to be low due to the containment features in place. The County regulates these units and both are permitted. The potential for release to air from the drum accumulation area is low.

6.3 SWMU No. 3: Sandblast Waste in Dry Wash (Remediated and Closed)

Unit Description

A portion of a wash located immediately to the west of the sandblasting unit and adjacent to the service road leading toward the unit contained an unknown quantity of sandblasting waste material. The sand was evident on both banks of the wash. Photo No. 9 shows this wash and the former area of soil contamination. The waste was apparently mistakenly disposed of at this location on only one occasion. (1.K-5) At the time of the disposal (1986), the facility sandblast operations generated (possibly contaminated) sand from stripping parts painted with metal-containing paints. (5)

This material was sampled in 1988 and EP Toxicity test showed the soil was hazardous due to cadmium. According to UPCO staff, the contaminated soil was excavated (6 cubic yards were removed - all white sand was removed until it could no longer be detected visually.

Date of Start-up

Sandblasting waste was disposed of at this location on one occasion during 1986. (1.K-5)

Date of Closure

Between December 1988 and February 1989, this site was remediated by removing all sand in the wash and soil surrounding the sand. Approximately 6 cubic yards of waste materials were then containerized and shipped to an offsite authorized hazardous waste landfill. Sampling of the area was reported in the Part B to be completed, the results showing a clean closure was accomplished (although the report presenting the analysis was not found during the PR or by the facility during the VSI and thus not reviewed for this report). This site has been considered closed by UPCO since 1989. It was remediated simultaneously with the burn pad and water bore-out area. The additional data previously reported to ADEQ is provided in Appendix K-2 of the Part B Permit Application. (1.K-2)

Wastes Managed

The wash contained waste sandblasting material. Exact constituents were determined to exceed regulatory levels in 40 CFR 261.24 for cadmium. The waste also contained metal fragments and fiberglass/epoxy fragments in addition to the sand. (1.K-5) The origin of the materials was the sand blast unit.

Release Controls

None historically. Wastes and surrounding soil excavated so release controls are no longer applicable.

History of Releases

Sandblast wastes were disposed in a wash on at least one occasion in 1986.

Release Potential

Soil:

A documented release to soil occurred on at least one occasion. The contaminated waste sand and surrounding soil were excavated and removed and clean closed to the satisfaction of the regulatory agencies.

Groundwater:

Due to the depth to groundwater (260 to 280 feet), the relative immobility of the contaminants found in the waste (metals such as cadmium), and the arid climate of the area the potential for migration of contaminants from the surface to the groundwater is negligible. Soil sampling showed that contaminants had not migrated downward.

Surface Water:

Since the wastes were deposited in a dry wash the potential for past release offsite via surface water runoff was high. The one-time nature of the disposal, the climate and the volumes of waste involved indicate any releases that may have occurred were likely not significant. No current release potential exists because the sand and surrounding soil have been removed.

Air:

Historic potential for release of wind blown particulates to air was high. No current potential exists.

6.4 SWMU No. 4: Paint Booths and Satellite Accumulation Points

Unit Description

Two paint booths exist at the facility. They are both enclosed in large paint rooms (large assembly areas with paint booths located at the east ends of both buildings. Both units are permitted by the County for release to air. A small container (approximately 1 gallon) is placed inside each paint shop (Buildings B-3 and B-11) for the purpose of accumulating waste paint and waste thinners. The waste accumulated in these containers is daily transferred into the flammable material drum inside the assembly area solvent shed accumulation area (SWMU No. 5). (1.K-6) No evidence of sloppy paint handling was evident during the VSI. No photos were taken of these units during the VSI.

Date of Start-up

1976 and 1989, respectively (1.K-6).

Date of Closure

Currently in operation.

Wastes Managed

Paint wastes and paint residues mixed with thinning solvents are placed in the containers located inside the paint shop buildings (1.K-6). These wastes result from the use of lacquer, MEK, acetone and isopropyl alcohol. Used paint filters are also accumulated for offsite disposal. These

filters may have been burned at the OB unit in the past prior to today's practice of manifesting offsite.

Release Controls

The painting areas are located inside and are both permitted for air release by the County.

History of Releases

Potential for release if low.

Release Potential

Soil:

Due to containment inside of building and low waste volumes involved, the potential for release is low.

Groundwater:

The potential for release to groundwater from these areas is negligible.

Surface Water:

The potential for release to surface water is low.

Air:

Release potential to air is likely low due to the small volumes involved and because the units are located in buildings. Both paint booth units are permitted.

6.5 SWMU No. 5: Assembly Area Solvent Shed - Building B-5

Unit Description

This unit consists of two (less than 90 days) waste storage components located at Building B-5. An outside open area contains sealed hazardous waste drums on pallets along the south exterior wall of the solvent shed (See Photo No. 10). These drums contain residue removed from the burn pad. Secondary containment (i.e., a four-inch deep sealed concrete containment) is provided for the outside storage area. The drums are stored on raised metal pallets inside the concrete-bermed pad. The entire concrete pad also has an underlying polyethylene plastic liner. (1.K-7)

Inside the building, dry paint filters are collected in 30-gallon drums and waste solvents and oils in 55-gallon drums. The building is roofed and walled on two sides. All drums rest in secondary containment basins made of polyethylene (spill catchment containers). (1.K-7, 4.10) See Photo No. 11.

It was verified during the VSI that two hazardous waste accumulation areas exist at this facility. The building is 30 feet by 40 feet and was built in 1975; the area may have been modified to cover the "porch" area, where materials are stored. Burn pad residue is stored outside on secondary containment. The inside unit has historically stored product solvents, hazardous wastes and product paints. One 55-gallon drum of waste oil and other materials were in storage at this unit during the VSI.

Located inside one of the rooms in the building were an old unused degreaser unit (See Photo No. 12) and a (reportedly) unused sandblasting unit (See Photo No. 13). Although UPCO personnel stated that the sandblasting unit is not used, it appeared to have recently been used (i.e., grit was evident on the floor).

Prior to 1988, paints storage and a parts washer were located in an open porch area. This is the same degreaser unit shown in Photo No. 12. Also, a former drum storage area that apparently stored paint wastes on bare soil was located outside on the north side of the building. Photo Nos. 11, 14 and 15 show this former drum storage area. The soil and wooden foundation of the shed were stained.

Another waste storage area where drums of solvent have historically been stored on pallets was located outside along the east side of this building. This area is shown in Photo No. 16. According to UPCO, a spill occurred at this outside storage area (wastes stored on pallets). According to UPCO, this soil was sampled and proved to be non-hazardous. No analytical data was available for review for this report. However, this soil was reportedly scooped up and burned at the OBOD unit. According to UPCO, as a result of this spill, waste management practices at this building changed and waste storage was moved inside the building in 1988. The outside unit was added in 1992.

The file review during the PR, documented the following, "it is reported that drums of hazardous waste were stored on pallets on bare ground (15)." It appears from a March 1984 inspection report that open drums of solvents (disposal by solar evaporation) and possibly other wastes were stored outside on an unbermed cement pad and bare soil (33); according to UPCO personnel, although open drums of solvents were discovered onsite during the 1984 inspection, UPCO did not have a policy of evaporation. It was determined during the VSI that these references refer to the former outside storage unit that was located on the east side of Building B-2 discussed above.

Date of Start-up

The solvent shed (and inside hazardous waste accumulation area) was constructed in 1975. Facility representatives did not know when drums were stored in the two former outside drum storage areas; the inspection

reports would indicate it to be at least as early as 1984. The outside storage unit was constructed in 1992.

It is not known when the practice of storing drums (some were open for evaporation) outside on the unbermed pad and bare soil began, but it was reported in 1984 (15, 33).

Date of Closure

The interior storage/accumulation areas are currently in operation. Storage on the areas outside of the building may have ceased by approximately 1988.

Wastes Managed

Drums containing liquid and solid waste are managed here. Waste dry-paint filters, waste flammables, solvents, and lab-pack materials are accumulated and stored for less than 90 days inside the building. Burn residues from the OBOD are contained outside the shed in sealed 30-gallon drums. The burn residues may contain lead compounds. (1.K-7) MEK and TCA may have been the solvents stored at the outside area in the 1980s (15).

Release Controls

Secondary containment (i.e., a four-inch deep sealed concrete containment) is provided for the outside storage area. The entire concrete pad also has an underlying polyethylene plastic liner.

The building is roofed and walled on two sides. All drums rest in secondary containment basins made of polyethylene.

Drums of burn pad residue and other wastes including solvents and paints have been stored on pallets and on bare soil and unbermed cement.

The March 19, 1984 hazardous waste inspection conducted by EPA (16) found solvents in 55-gallon drums being disposed by what appeared to be solar evaporation. The drums were sitting on bare soil or a cement pad, but the pad was not bermed to contain spills.

History of Releases

The facility has been cited on at least two occasions (June 11, 1984 Notice of Violation for March 19, 1984 CEI Report, and in a February 2, 1987 CEI [17]) for having open drums. Documented evidence of a potential release was found in the March 17, 1989 CEI (15) follow up document entitled Comments and Probable Violations (14). In what is described in the photo log as "north of Photo 3" (Photo 3 was of a drum stored on the east side of B-5), drums of unknown waste were discovered sitting on wooden pallets with both the pallets and the bare soil stained. The March 17, 1989 ADEQ CEI (15) report stated that on the east side of Building B-5 a wooden pallet existed that was stained from a spill. The report stated "No waste analysis had been performed on the spill area according to Mr. Steve Miller." It is believed this soil was excavated and disposed offsite.

Past releases to air occurred from the open drums of solvents may have occurred in March 1984 as documented in the EPA inspection report (16). During the VSI, staining was noted on the soil adjacent to the north and east sides of this building.

Release Potential

Soil:

A documented release to soil of an unknown hazardous waste was reported in the March 17, 1989, CEI report (15). The area of the spill (the drum storage area on the east side of the building) was apparently cleaned up and it is not known if verification sampling was conducted. It was

reported and verified during the VSI that drums were stored on bare soil in areas located on the north and east sides of the building (see Photo Nos. 11, 14, and 15). Visual evidence of release to soil was noted during the VSI. The current potential for release to soil is low based on the design of the accumulation areas.

Groundwater:

The potential for release to groundwater from this facility is thought to be minimal due primarily to the depth to groundwater.

Surface Water:

Based on observations during the VSI, the unit is not located near any dry washes. The potential for release to surface of documented past soil contamination (as well as observed current stained soil) via storm runoff is low. Currently, secondary containment is used, and current potential for release to surface water is minimal.

Air:

Drums of solvents and burn area debris have historically been stored open resulting in likely past release to air of solvents. The potential for release to air of contaminants under current conditions is thought to be low.

6.6 SWMU Nos. 6, 7 and 8: Propellant Plant Satellite Accumulation Points, for Propellant Plant 1 Liner Building (Building C-2), Propellant Plant 3 Storage (Building F-8), and Propellant Plant 2 Assembly (Building F-1)

Unit Description

A single 55-gallon drum is placed in each of these buildings on a pallet to accumulate contaminated solvents generated during cleaning. Each drum is placed in a secondary containment basin made of polyethylene. Each drum is maintained in an area under a roof to prevent stormwater contamination. (1.K-8) Historic waste management practices and design features are unknown. Photo No. 17 shows the satellite accumulation point for the Propellant Plant Liner Building (SWMU No. 6). This containment is typical of all three units. Located directly outside the door of Plant No. 2 is the hand washing area showing staining. Photo No. 19 shows the satellite accumulation area for Propellant Plant 3 (SWMU No. 7). No Photo was taken of SWMU No. 8 since no accumulation was observed in the area identified by UPCO as SWMU No. 8.

Dates of Start-up

Liner Building - 1981, Propellant Plant 3 - 1988, Propellant Plant 2 - 1987 (1.K-8).

Dates of Closure

All three plants and satellite accumulation areas are currently in operation.

Wastes Managed

All three areas manage contaminated solvents which are generated primarily from metal parts cleaning and washing of tooling. Chlorinated solvents are used in Buildings F-1 and F-2. The spent solvent from Buildings F-1 and F-8 contains small amounts of oxidizers. The waste containing oxidizers does not exhibit the characteristic of reactivity as defined in 261.23. Chlorinated solvent wastes are listed in 261.31 as hazardous wastes from non-specific sources.

Release Controls

Each drum is placed in a secondary containment basin made of polyethylene and in an area under a roof to prevent stormwater contamination. Past containment features and other waste management practices are unknown.

History of Releases

No evidence of release of wastes from these three satellite accumulation areas was discovered in the file review or during the VSI.

Release Potential

Soil:

Release potential to soil is low due to the wastes being stored in secondary spill catchment containers and inside buildings. Past release potential is unknown.

Groundwater:

There does not appear to be any potential for release to groundwater from these units.

Surface Water:

There does not appear to be any potential for release to surface water from there units. However, past potential is unknown. Photo No. 20 shows the surface drainage wash located directly east of Plant No. 2 (Building F-2). The building on the extreme right is building F-2.

Air:

There appears to be minimal potential for release to air of volatile organics from these areas due to the fact they are stored in closed containers and the minor amounts being managed. One drum was stored open at the time of the VSI (see Photo No. 21 - this is the same drum which can be seen located in the back right hand corner of the building in Photo No. 19). According to UPCO, this drum contained R-45 product.

6.7 SWMU No. 9: Propellant Plant 1 Solvent Shed

Unit Description

This hazardous waste accumulation area (less than 90 days) is located outside along the south wall of the propellant plant solvent shed, C-12, a materials storage facility (see Photo No. 22a). This grated bermed area would be used for solid-phase propellant waste. Drums of waste solvents generated by parts cleaning are brought from accumulation points around UPCO and placed in a new accumulation area at this building that was constructed in 1989 (photo No. 22). A roof covers the concrete pad used for solvent waste accumulation. Prior to 1989, drums were historically stored on metal pallets and sealed. (1.K-9) Currently, poly-secondary containment drums are used.

Date of Start-up

1985 (1.K-9).

Date of Closure

Currently in operation.

Wastes Managed

Materials stored at this location include methylene chloride and 1,1,1-trichloroethane (1,1,1-TCA) solvents, and cleaning solvents contaminated with small amounts of oxidizer. These are from the three different propellant plant satellite accumulation points (SWMU Nos. 6, 7 and 8).

Release Controls

A secondary containment made of concrete is provided for this outside area. The containment is approximately six inches deep and consists of sealed concrete with a polyethylene liner under all concrete. No roof is provided, since the drums are placed here only while awaiting immediate transportation. Drums are stored on metal pallets and are sealed.

History of Releases

No evidence of documented releases from this unit was found during the file review.

Release Potential

Soil:

Potential for release to soil is low due to the secondary containment features for this unit. Past release potential is unknown.

Groundwater:

Potential for release to groundwater is minimal.

Surface Water:

Potential for release to surface water is minimal.

Air:

If containers are stored in a secured manner, the potential for release to air is low.

6.8 SWMU No. 10: Propellant Water Bore Residual Tanks

Unit Description

The water bore operations area is located east of the sandblast building (D-4). The water bore system consists of the operator station, a vertically mounted water boring wand, a fiberglass open tank with cloth filters to remove larger propellant materials, a pipe manifold to deliver the aqueous discharge to the water bore residual containers, and the container. These residual containers are five, 12-foot diameter, 3.5 foot high, open-top fiberglass tanks used for drying aqueous wastes generated by the propellant removal operations. These containers are positioned on sand. The containers are lined with a removable, sheet of polyethylene. Photo Nos. 23, 24, and 25 show these containers. An aerator was installed on one of the tanks to try to increase the evaporation rate (20). Heaters have also been added to two of the tanks to help evaporate the liquid. (4.7)

Propellant machining involves the boring of a solid propellant motor with a high pressure stream of water (10,000 psi) to remove propellants from cylindrical tubes so that the tubes can be reused. Typically, the tubes are 2 feet long and 3 to 5 inches in diameter. The resultant solution (water mixed with propellent) is drained from the water bore to the fiberglass tanks to evaporate free moisture. Residuals are left in the tank until they are sufficiently dry and can be treated at the OBOD Unit

or thermal treatment unit. This propellant residual can be seen in the storage tank in Photo No. 22. In 1988, these tanks replaced the 4 Former Propellent Water Bore Residual Pits (SWMU No. 11) which served the same purpose and was located in the same area.

In UPCO's opinion, the presence of water within the waste stream renders the material non-reactive and, thus non-hazardous. Upon evaporation of the water, the dry material becomes reactive (and therefore hazardous waste). The polyethylene liner and dried waste propellant are then removed from the tanks and transferred to the OBOD unit or thermal treatment unit for treatment. As is evident in Photo No. 23, this dried material is stored in open tanks, and the potential for dispersal via wind appears to exist.

There has been continuing discussion between the regulators and UPCO as to whether the water/propellent solution is a hazardous waste and as such should require regulated tank systems. After the October 30, 1991 inspection, ADEQ and UPCO discussed whether the facility's propellant bore-out activities manage a hazardous waste. It is UPCO's opinion that scrap propellant is not a hazardous waste when in water but becomes hazardous when it is dry enough to be placed on the burn pad. However, ADEQ's opinion has in the past been that reactive waste stored in a surface impoundment and covered by water is a hazardous waste. As stated in a letter from ADEQ to UPCO, dated August 17, 1987, in which ADEQ states in response to UPCO's contention that "the water propellant waste is not a hazardous waste because it does not exhibit a hazardous waste characteristic" that "the water propellant waste is a hazardous waste that is simply managed in accordance with CFR §265.229/265.17 requirements to protect it from conditions where ignition may occur" (20).

In a recent conversation between SAIC/TSC and Kathlene Carson of the ADEQ Hazardous Waste Permit Unit, Ms. Carson indicated that this issue still has not been resolved and that ADEQ is in the process of making a decision as an important aspect of its Part B Permit Application review (21).

On January 9, 1991, a joint CEI was conducted at the facility by EPA and ADEQ (12). EPA issued a memorandum to ADEQ dated March 26, 1991, (22) and ADEQ issued "Instructions to Responsible Parties" to UPCO dated February 8, 1991 (attached to the CEI) (12) in which one of the violations cited was that the propellant which is bored out of casings with water is a reactive hazardous waste when in the dry state, and that this reactive hazardous waste is being stored in tanks that do not meet the requirements of a regulated tank system (40 CFR 265 subpart J).

Photo No. 26 shows the slope and surface water drainage immediately upgradient from the tanks. To the left and just off the photo is the bore-out process area.

Date of Start-up

The current propellant water bore residual tanks began operation in 1989 and are presently being operated. UPCO installed two closed-circulation water heater systems (one each in Tanks 4 and 5) in 1991 and 1992 to increase evaporation rates of the discharge water. Two additional 6-foot fiberglass evaporation tanks have been placed in the water bore-out area (see Photo No. 27, AOC No. 7). These are used to evaporate non-hazardous waste waters generated from onsite industrial areas, (according to the 1993 Part B Permit and verified by UPCO personnel). They make use of the return water in the closed water system to aid in evaporation. (1.K-10)

Date of Closure

Currently in operation.

Wastes Managed

The water bore-out units contain wastewater discharge generated during propellant water bore operations. Ammonium perchlorate and potassium

perchlorate oxidizers along with fine particles of waste propellant constitute the waste material. (1.K-10)

The ADEQ Waste Compliance Unit has determined the dry sludge to meet the EPA listed waste, K044, description. UPCO contends that because the aqueous portions in the tanks do not meet the EPA characteristics of ignitability or reactivity it is not hazardous. ADEQ is in the process of making a determination on this issue.

Release Controls

Each fiberglass tank is lined with polyethylene (UPCO considers the fiberglass tank as "technically" secondary containment). UPCO has also provided what they consider to be tertiary containment by use of a polyethylene liner which underlays the 6 inch sand layer beneath the tanks. The area is bermed on all sides with earth about 2 feet high on three sides of the 100-foot by 18-foot site and a 4-foot concrete block wall on the other. A freeboard of 6 to 8 inches is maintained to prevent an estimated maximum 24-hour storm (Phoenix official maximum is 3.07 inches in August 1943) from overflowing any tank." (1.K-10) The October 1992 CEI report states on the other hand, that "although the tanks do not appear to be contained, they are on a concrete pad. A black polyethylene liner was placed underneath the concrete pad." It was determined during the VSI that the tanks are underlain with plastic but no concrete was observed.

History of Releases

No incidence of release of liquid from the tanks was found during the file review or VSI.

Release Potential

Soil:

The tanks are underlain with concrete, which in turn is underlain with polyethylene plastic. The potential for release of the solutions being evaporated in the tanks to soil is therefore low.

Groundwater:

Due to containment beneath the tanks and berms, and the depth to groundwater, there is little potential for release to groundwater from the tanks.

Surface Water:

The tanks are located next to an unlined wash (dry creek bed) which flows during heavy rains offsite (4.7). The freeboard adhered to (3.5 inches or the capacity for a 24-hour storm) and the (described) secondary and tertiary containment and the earthen berms in place around the tanks, reduce the potential for release of liquids (non-hazardous) to surface waters, however, based on observation during the VSI the berm height may not be adequate. The streams in the area only flow during precipitation events.

Air:

No hazardous volatile chemical wastes are emitted from the open tanks. While the sludge is in a dry state, there is a potential for air-borne release of the powdery residue into the air and the surrounding ground (4.7). This potential for release to air was evident during the VSI due to dry powdery solids being stored in uncovered, open tanks.

6.9 SWMU No. 11: Former Propellent Water Bore Residual Pit(s)

Unit Description

Before 1988, the propellant wastes were treated in two in-ground, lined pits or surface impoundments. According to the Generator Inspection conducted by ADHS (now ADEQ) on September 4, 1985 (6), "two small surface impoundments were excavated into the side of a desert wash. The largest is about 40 feet by 25 feet and 3 feet deep. A water bore (cutting machine) apparatus cuts tubes of propellent into small pieces for disposal/burning. These pieces and waste cutting water drain into the two impoundments. Impoundment A is used for ammonium perchlorate- and potassium perchlorate-based propellants. Impoundment B is used for lead nitrate-based propellants. Impoundment A contained about 24 to 50 pounds of wet cuttings (red-colored) and no obvious liquids. Impoundment B contained a small amount (several hundred gallons) of water. Impoundment B was also about 3 feet deep. Both impoundments are loosely lined with thin black plastic (garbage bag quality)... the impoundments when full take one to two or more months to evaporate and can leave as much as 500 pounds of dried propellent waste in each; the dried waste is then burned in place... the oldest pit has been in existence two years; the newest pit (B) is recent and was constructed to isolate the lead-bearing waste because lead is the primary pollutant of concern; and to date three "burns" have taken place." At the time of the inspection a 55-gallon drum 1/4 to 1/3 full of burn residue was located adjacent to the impoundment area. The water bore residual pit was removed from service in 1988 and was replaced with the current fiberglass tanks in 1989.

This description was for the most part verified during the VSI. According to UPCO personnel, these former pits were located in the exact same area as the current tank units (SWMU No. 10) are now located. They were in essence, one pond with a common berm to separate the lead-containing wastes from the non-lead containing wastes. Apparently, water eventually overflowed between the two resulting in both ponds holding lead-containing

wastes. The wastes were brought to the pits from the water bore-out area via 4-inch fiberglass pipe suspended above ground. The pits were lined with 10 mil plastic. A tear in the plastic was reported during an inspection, but was, according to UPCO located up on the berm. Berms were constructed around the pits from the soil excavated from the pits.

According to UPCO, the wastes and plastic were burned in place. After the burns, another layer of plastic was laid down over the burn residue and ponding activity once again took place.

It was determined during the VSI that a wash is located approximately 10 feet to the north (see Photo No. 25). The soil berm between the present tanks (and what was possibly the same berm that separated the former units from the wash) was low and the potential for release to the wash from the former ponds was very likely during precipitation events.

Date of Start-up

The Propellant Water Bore Residual Pit (Pit A) began operation in 1983. Pit B was constructed in 1985. (1.K-11)

Date of Closure

The Propellant Water Bore Residual Pits ceased operation in 1988, prior to replacement by the currently used Propellant Water Bore Residual Tanks (SWMU No. 10). UPCO considered the closure of the water bore residual pit to be a clean closure. This former unit was remediated simultaneously with the burn pad (SWMU No. 1) and sandblast waste in the dry wash (SWMU No. 3). Documentation supporting this closure is provided in Appendix K-2 of the 1993 Part B Permit Application. According to Earth Technology's summary of the investigation at the water bore facility (11) soil sampling was conducted at the water bore facility within the surface impound area in accordance with UPCO's sampling program outlined in a letter dated September 15, 1988 to Dr. Bodo Diehn of ADEQ. Based on EP Toxicity

laboratory results, remediation of the surface impoundment area was performed. Remediation consisted of excavation of the surface impoundment area soils to a depth of 8 to 12 inches. Upon excavation, the analytical results of confirmation samples still showed lead concentrations which exceeded 5.0 ppm. Consequently, further excavation was conducted, to a depth of 8 to 24 inches and confirmatory soil samples were again collected. Analytical results of these samples showed lead concentrations below the EPA MCL for lead. A letter from ADEQ to UPCO dated March 15, 1989 (24) stated that the "bore pit area and the burn pad area..... have been adequately remediated. The Compliance Unit has contacted the Permits Unit and in accordance with their instructions hereby approves UPCO's proposed construction activities in the burn pad and bore pit areas." (25) The construction referred to is assumed to be the current storage tanks (SWMU No. 10).

Wastes Managed

The units contained the same wastes generated by water bore activities that are managed currently in the residual storage tanks (SWMU No. 10). Ammonium perchlorate and potassium perchlorate oxidizers along with fine particles of waste propellant constitute the waste material. (1.K-10) A portion of these wastes contained lead and other metals.

UPCO contends that the aqueous portions in the surface impoundment did not meet the EPA characteristics of ignitability or reactivity and therefore were not hazardous. ADEQ is in the process of making a determination on this issue. The pits also have held dried propellant waste (after liquid-evaporation), and possibly burn residue.

Release Controls

The "(garbage bag quality)" plastic liner (6) is the only noted release control employed at the pits. According to UPCO personnel, soil berms were also in place surrounding the ponds.

History of Releases

Releases to soil occurred during the life of these units. Excavation of contaminated soils (primarily lead) was conducted (See above discussion).

The August 27, 1986 CEI identified a discharge coming from the high pressure water bore that entered a small dry wash. This discharge apparently consisted of water contaminated with dry phenolic resins and carbon fibers. (8) According to UPCO, this release was due to a hand-held nozzle found draining to the ground. The discharge was a fibrite liquid containing 0 to 5 percent phenol. This liquid could not be drained to tanks that held ammonium perchlorate wastewater, so was released to ground. Analysis of soils apparently found traces of phenol. These analytical results were not made available for review. According to UPCO, no remediation was conducted. This release was in the same area as the water bore-out process area. This waste stream is now evaporated in tanks (AOC 8).

Release Potential

Soil:

Contaminated soils in the former surface impoundments (pits) have been remediated. According to the report on this activity the remediation criteria for clean-up level used EPA's MCLs. These levels are appropriate for levels in groundwater and are much more stringent than clean-up levels for soils. No further potential for release from the pit(s) to soils exists.

Groundwater:

Soils at the pit(s) were excavated to a depth of 24 inches in some areas and confirmation sampling showed no further downward migration of contamination. Since depth of groundwater in area is 260 to 280 feet and

since EPA's MCLs for groundwater were used as clean-up goals for the soil, no potential for groundwater contamination exists.

Surface Water:

The VSI confirmed that the former pits were in close proximity to a wash. The berm between the unit area and the wash was noticeably low during the VSI. Since past design is not known, it is thought that the potential for past release of pond liquids and surface soil contaminants to surface waters during precipitation events was likely to have existed. No current potential for release to surface waters from the former pit(s) exists.

Air:

Past potential for pond solids and contaminated soils to have been released to air via wind may have existed in the past. No current potential for release to air exists.

6.10 SWMU No. 12: Ignitable and Reactive Waste Magazines

Unit Description

The ignitable and reactive waste magazines (E-1C and D) are metal, wood lined, storage units. These units are located in the southwest corner of the facilities' E-1 explosive storage magazine area. (These units can be seen in the background of Photo No. 15). Waste oxidizers are placed in one unit, and waste propellant scrap in the other. Each compartment has a metal door and is secured by a security lock/hasp combination. According to the 1993 Part B Permit Application, strict inventory control ensures that all materials are properly stored. (1.K-12)

It was determined during the VSI that these units were portable waste magazines moved to the UPCO facility in 1990 from a Los Angeles facility

purchased by the company. The former units (see SWMU No. 13) were removed at this time and the new units placed in the same general area.

According to the October 1992 CEI (4) a metal transportainer is used for accumulation of waste propellant and explosive material, which is temporarily stored until there is sufficient quantity of a particular type to conduct an open burn. The report states that of the four transportainers, only one is used for accumulation of hazardous wastes (as opposed to the two described above). At the time of the CEI, explosive wastes were stored in plastic bags or in drums without lids. Lids are not used because of the explosive hazard associated with the wastes and because the wastes must continue to dry so that they can be burned (excess moisture inhibits burning). (4) The VSI found these same waste handling methods in place. However, two of the units (the two most easterly) were used for the storage of hazardous wastes instead of only the one described in the CEI.

Explosive wastes are transported onsite by three pick-up trucks. These trucks are designated as explosives trucks; the trucks are not used for any other purpose and do not leave the site except to refill their gas tanks. Outside the explosives transportainer there is asphalt paving but no other secondary containment. (4)

Date of Start-up

In 1990, the above-ground units replaced the earth-covered magazines (SWMU No. 13).

Date of Closure

These units are currently in operation.

Wastes Managed

Waste propellants, off-specification explosive devices and oxidizers from production processes are stored for less than 90 days in these magazines prior to onsite treatment in the OBOD or TTU.

Release Controls

The wastes are contained inside the enclosed units. Each compartment has a metal door and is secured by a security lock/hasp combination. These units were inspected during the VSI and the welds were all in tact and everything was completely contained. According to UPCO, strict inventory control ensures that all materials are properly stored. Outside the hazardous waste storage transportainer(s) there is asphalt paving but no other secondary containment. (4)

History of Releases

No evidence of release from these units was found during the file review or VSI.

Release Potential

Soil:

The potential for release to soil is low.

Groundwater:

No potential for release from this unit(s) to groundwater exists.

Surface Water:

No potential for release from this unit(s) to surface water appears to exist.

Air:

The potential for release to air from this unit is low.

6.11 SWMU No. 13: Former Earth Covered Ignitable and Reactive Waste Magazines

Unit Description

Prior to being stored in the above-ground units presently in service (SWMU No. 12), scrap propellants were stored (for less than 90 days) in earth-covered magazines. UPCO stated during the VSI that these were three groups of overseas shipment containers with earth coverings. No photos were taken of these former unit locations. The September 4, 1985 Generator Inspection Report (6) described these units as "containers built into dirt covered berms as appropriate for explosives storage. There are two magazines that contain hazardous wastes - one for propellent and one for oxidizer (propellent oxidizer plus polybutadiene fuel); oxidizer; lead nitrate; ammonium or potassium perchlorate. A number of other magazines along the same road store other explosive items; approximately 15 in total. "The inspector looked in about 11 of these and found no hazardous wastes stored other than below:

- Propellent magazine held, according to its inventory list, 259 pounds of hazardous waste.

- Oxidizer magazine held, according to its inventory list, 199 pounds of hazardous waste."

Photos from the March 19, 1984 EPA hazardous waste inspection showed units to be sitting on bare soil. (16)

Date of Start-up

1972 (1.K-12).

Date of Closure

1990 (1.K-12) These units were removed (final destination unknown) upon placement of the new magazines described under SWMU No. 12.

Wastes Managed

Waste propellants, off-specification explosive devices, and oxidizers from production processes were stored for less than 90 days in these magazines prior to onsite treatment in the OBOD or TTU. (1.K-12)

Release Controls

Wastes were stored inside enclosed bunkers. The bunkers were located on bare soil.

History of Releases

No evidence of release from this SWMU was found during the file review or VSI. UPCO stated during the VSI that no remediation was required upon removal of these units.

Release Potential

Soil:

No evidence of release from these units was found during the file review. Although the units were placed on bare soil no remediation was required upon removal according to UPCO.

Groundwater:

No potential for release from this unit(s) to groundwater exists.

Surface Water:

Past potential for release to surface water was low since the wastes were not of a liquid nature, stored inside, and not near surface water bodies. Also, due to their explosive/ignitible nature these wastes were likely carefully managed.

Air:

Past potential for release is unknown and could possibly have occurred during handling. However, as stated above, due to their explosive/ignitible nature the wastes were likely carefully handled. Potential for release to air is low.

6.12 SWMU No. 14: Waste Propellant Thermal Treatment Unit (TTU)

Unit Description

The waste propellant TTU furnishes a series of processes designed to allow burning of waste propellants and oxidizers while reducing most particulate emissions. Figures 11 and 12 present drawings of the system. In this design, a conveyor feeds small quantities of the scrap into a combustion chamber which has an igniter to light the first bag of waste propellant. An associated emissions processing system includes a horizontal, three-foot diameter metal chamber (Zone 4). Emissions from the burning propellant cool as they are drawn through the system and are filtered through the bag house polyester cloth bags. Residue collected on the dry filter media is dislodged with a shaker and is collected in 55-gallon drums beneath the bag house. The drums are accumulated for subsequent offsite disposal. The UPCO operating procedure is at Appendix D-5 of the Part B Permit Application. The general dimensions of the TTU are 100 feet by 18 feet. The stack is approximately 38 feet above the ground level of the bag house. Concrete sidewalks are provided beneath the conveyor and between the operator station and TTU magazine (D-7). Secondary concrete containments are placed under the bag house hopper and Zones 1, 2, and 3. Warning signals, lights, and instrumentation are provided for safety of operations. (1.K13) Photo No. 28 shows an overview of the TTU looking southeast. On the left in this photo is the operator's safety barrier. Photo Nos. 29 and 30 show closer views of the TTU from the same direction. Looking south, (Photo No. 30) shows the TTU (to the left) and the TTU work area located on the right of the photo. Photo No. 31 shows the feed end of the fire box located at the north end of the TTU and Photo No. 32 shows a close-up of this portion of the unit. Photo No. 33 is another close-up of the feed-end of the fire box with the conveyor belt shown in the upper right hand side of the photo. Note discoloring in these photos. Finally, Photo Nos. 34 and 35 show the bottom of the bag house and the drum (and its concrete containment) used for collection of TTU residue. It was suggested during the VSI that with the present design, the potential for

release of particulates (ash) to air and surrounding soils exists. A funnel or other device to be placed from the bottom of the baghouse to the drum was recommended to alleviated this potential problem.

Treatment of various wastes in the TTU is accomplished with very few restrictions. UPCO has imposed weather restrictions in that the unit will not be operated in heavy precipitation, in lightning, or in periods of strong winds (gusts exceeding ten mph). The feed rate established for the installation testing phase (as stipulated in the Installation Permit) is 90 pounds per hour. This allows HCl emissions to remain below air quality maximum concentrations for one hour, 24-hour and annual periods. The 90 pound per hour feed rate was determined from computer modeling by ADEQ of UPCO's projected maximum emission. (1.D-8)

Propellant and oxidizer waste is prepared at the TTU magazine work area. Carts are used to transport the plastic containers holding the 2 pound bags of waste to the operator station. According to the 1993 Part B Permit Application the operator station has all controls necessary to enable safe operation from behind the safety barrier. (1.D-8) This was verified during the VSI.

Residues are removed from the bags in the bag house by the use of a mechanical shaker system. The residue is collected in steel drums and is shipped to an approved offsite solid waste disposal facility if found to be non-hazardous wastes, or to an authorized hazardous waste facility if determined to be hazardous waste. According to the 1993 Part B Permit Application, UPCO had not been able to collect a representative sample of this residue for analysis due to the very low amounts of residue generated during UPCO's testing period. UPCO will sample the residue per the waste analysis plan presented in Section C of the 1993 Part B Permit Application. This issue was discussed during the VSI and it was determined that ash residue has not yet been characterized. The facility has accumulated only 1/3 to 1/2 of a drum of residue since operations have

began. Preliminary screening has found Cd, Cr, and Zinc, but a TCLP has not been done for this material.

Date of Start-up

1992 - This includes equipment verification testing in 1992 and final testing in March 1993. The TTU is currently operating under a ADEQ Installation Permit until the ADEQ Air Operating Permit is obtained. This Permit is still out for public comment.

Date of Closure

Currently in operation.

Wastes Managed

55-gallon and 30-gallon drums and wooden boxes are used to contain scrap propellant and waste oxidizers during transport by pick-up truck from the ignitable and reactive waste magazines to the TTU magazine (Building D-7). These wastes have the EPA characteristics of ignitability and reactivity and may also be an EPA listed waste, K044. The wastes are prepared in two-pound scrap-increments and placed into polyethylene bags. The bags are then taken to the TTU operator station and are treated in the unit.

An ash residue is produced and initial screening has shown it to contain metals. A TCLP to determine if this material is a hazardous waste will be conducted as soon as a representative sample can be collected. Only 1/3 to 1/2 of a 30 gallon drum had been collected at the time of the VSI.

Release Controls

Emissions from the burning propellant cool as they are drawn through the system and are filtered through the bag house polyester cloth bags.

Residue collected on the dry filter media is dislodged with a shaker and is collected in 55-gallon drums beneath the bag house.

A concrete secondary containment is under all horizontal sections (Zones 1, 2, and 3) and under the bag house hopper spout.

History of Releases

No evidence of release has been documented during the short time the unit has been in operation.

Release Potential

Soil:

The TTU does not, by design, release quantities of solid residues which would concentrate and migrate to soils or groundwaters. The only emissions are from the stack. These are gaseous vapor products which are combined with the ambient air. (1.I-33) The VSI found one area of potential release not considered in this description (found in the Part B Application) and that is the part of the unit were the ash residue drops from the bag house to the 30 gallon container placed below it (see Photo No. 34). Although the collection container is contained by a concrete, bermed pad, winds have the potential of dispersing ash residue to surrounding soils. It has not as yet been determined if this ash residue is a hazardous waste. Except for this potential release, the potential for release to soil from this unit appears to be low.

Groundwater:

No potential for release to groundwater exists from this unit.

Surface Water:

No potential for release to surface water exists from this unit.

Air:

The appearance of the plume discharged from the TTU could be described as barely visible. The primary factor causing the low opacity is the lack of particulate emissions. Emissions from the TTU pass through a bag house that removes greater that 90 percent (calculated from stack test conducted March 30, 1993, at 98.6 percent) of the particulates from the gas stream. (1.I-44) Modeling results indicate emissions (lead in particular) will be below current air standards. (1.I-47) The potential for release to air of ash from the bag house during disposal to the container (as discussed above) exists, although this release would be minor.

6.13 SWMU No. 15: Spent X-ray Fixer and Ion Exchange Drum Accumulation Area

Unit Description

UPCO operates an ion exchange wastewater treatment system to treat effluent streams from two x-ray film processors located in the assembly building, B-1 (see Photo No. 36). This is a 12-inch deep containment 12 feet wide by 20 feet long. A roof is provided over the entire wash water treatment system. This treatment/collection system is shown in Photo No. 36. The wash water is processed through a series of ion exchange tanks where the silver ion is exchanged for iron from packed iron wool in 30-gallon sealed drums, prior to discharge of the effluent to the septic system. The drums are removed when ion exchange becomes inefficient. (1.K-14, 4.13)

In September 1991, the septic system was redesigned to add only the effluent treatment for wastewater from film processing described above. The photoprocessing wastes used to go untreated to the septic system (See

SWMU No. 19 discussion). Photo No. 37 shows the location of this septic system (note the access hole in shadow). In 1992, the waste went offsite to the Merry X-Ray Corporation in Phoenix for recovery. (4.13,14)

The empty barrels of fixer solution are stored outside against the building on cement and bare soil. The x-ray fixer overflow is separately collected in polyethylene 55-gallon drums as part of the system. When the drum is full, it is removed from the system and retained in the concrete containment area of the system (see Photo No. 36).

Date of Start-up

1991.

Date of Closure

Currently in operation.

Wastes Managed

The spent x-ray fixer (x-ray fixer overflow), through analysis, is known to have a contamination level of silver above the EPA characteristic of toxicity. Drums of this waste are sealed and shipped to an authorized hazardous waste recycling facility where the silver is removed by precious metal recovery and the fixer reclaimed for reuse. The ion exchange drums, through process knowledge, contain silver above the EPA characteristic of toxicity. These are plugged, sealed, and shipped for precious metal recovery to an authorized hazardous waste recycling facility. (1.K-14)

Release Controls

The concrete containment area of the system is 12-inch deep by 12 feet wide by 20 feet long. (1.K-14)

History of Releases

No evidence of releases from this unit were documented in the files reviewed. However, according to UPCO, wastewater was historically released to the septic system or septic tank untreated.

Release Potential

Soil:

Potential for release to soil is low due to the containment features in-place. Historic potential for release was high based on discharge of untreated wastewater to the septic system.

Groundwater:

No potential for release to groundwater exists from the current unit. Due to depth to groundwater (>200 ft), historic potential for release is also low.

Surface Water:

No potential for release to surface water exists.

Air:

Drums are stored closed. Potential for release to air is low.

6.14 SWMU No. 16: Lab Pack Accumulation Points

Unit Description

Waste laboratory chemicals are produced by the Quality Control (QC) laboratories located in Buildings C-2 and C-11 in the Propellant Plant 1

area. The majority of the waste liquids are separated into compatible chemical containers (sealed five-gallon plastic containers). Solids and some additional liquids in small quantities remain in their original containers. According to the Part B Permit Application, the five-gallon containers are accumulated in the laboratory building, C-11. The other waste chemicals are accumulated in an approved 110-gallon flammable chemical container outside Building C-11 (near C-12) (SWMU No. 19). According to UPCO personnel, these procedures have changed but this modification has not yet been incorporated into the Part B Permit Application. All wastes are now accumulated in 5-gallon containers and stored in a locked cabinet located outside (C-11).

The October 1992 CEI shows 5-gallon containers being stored in a metal flammable closet outside the laboratory (C-11). (4.13) This cabinet was observed during the VSI; it was locked, measured approximately 4 feet high by 2 feet by 2 feet, and was located on a concrete pad.

Date of Start-up

1988. (1.K-15)

Date of Closure

Currently in operation.

Wastes Managed

Laboratory wastes vary depending on chemicals in use in each laboratory. UPCO maintains, in the Safety Department and at Propellant Plant 1, a complete file of Material Safety Data Sheets on chemicals used in the laboratories. These are used to determine hazardous chemicals requiring disposal as hazardous wastes versus those which can be disposed of as non-hazardous solid waste. Lab pack shipments are made approximately every

four months. An approved hazardous waste contractor packs, transports and disposes of these wastes. (1.K-15)

Release Controls

Chemical wastes are stored in containers in a locked shed, then are labpacked and stored in the contained accumulation area (SWMU No. 8).

History of Releases

No evidence of past releases was found during the file review.

Release Potential

Soil:

The potential for release to soil is low.

Groundwater:

No potential for release to groundwater exists.

Surface Water:

No potential for release to surface water exists.

Air:

No potential for release air exists.

6.15 SWMU No. 17: QC Laboratory Wash Water Holding Tank

Unit Description

A 300-gallon polyethylene holding tank is used to collect rinse water from the QC laboratory (Building C-11). The three sinks in this building (trailer) discharge into a sump. The discharge is then pumped into the holding tank. The tank is placed in a concrete secondary containment which is approximately six inches in depth. Photo No. 38 shows this unit. This system was designed and installed after discussions with the ADEQ Office of Water Quality, Permits Unit. (1.K-16)

According to the October 1992 CEI (4), UPCO operated a series of septic leach fields at the site (see Photo No. 39). Previously, the facility discharged its laboratory wastes to the leach field via a laboratory sink from Building C-11 (See SWMU No. 20). ADEQ directed this practice to stop and now UPCO is using the 300-gallon plastic tank (Photo No. 38) to contain the laboratory waste. Laboratory system plumbing had not been completed at the time of the CEI. The facility representative claimed that there was no other discharge to the septic leach field system except for domestic-type sewage. (4)

The piping had been cut and capped by August 1993 (5).

Date of Start-up

1992.

Date of Closure

Currently in operation.

Wastes Managed

The sinks in the laboratory trailer discharge up to five gallons of wash water into the 300-gallon tank daily. UPCO evaluates the waste for hazardous waste properties prior to disposal. The non-hazardous waste water is taken to the non-hazardous industrial discharge evaporation tanks at the water bore facility (SWMU No. 10) for evaporation and disposal. During the first year of operation, the tank was emptied only twice. (1.K-16)

Release Controls

The tank is located in a concrete secondary containment which is approximately six inches in depth. When this tank reaches near capacity, discharge is prevented through valves in the piping.

History of Releases

No evidence of release from the current unit was found during the file review or VSI.

Release Potential

Soil:

Potential for release to soil is minimal from this current unit.

Groundwater:

No potential for release to groundwater from this current unit exists.

Surface Water:

Potential for release to surface water from this unit is negligible.

Air:

Release potential to air from this unit is low.

6.16 SWMU No. 18: Wash-Down Water Accumulation Drum at Mix/Cast #2 Building

Unit Description

A 55-gallon polyethylene drum is provided in a concrete sump well at the mix/cast #2 building, C-15, to retain wash-down or mop water which is drained from the building. Because of the possibility of oxidizer contamination in the cleanup water, it is not discharged to the environment. The floor drains from three buildings are piped to the polyethylene drum. When the drum is full, it is lifted out or pumped to another drum for disposal. (1.K-17) The contents may be transferred to one of the evaporation tanks at the water bore area (SWMU No. 10) (5). No photo was taken of this SWMU. The building could not be accessed for inspection since it was after hours and the building was locked.

Date of Start-up

UPCO completed construction of the building in April 1993. Operations which produce this waste began on May 3, 1993. (1.K-17)

Date of Closure

Currently in operation.

Wastes Managed

The wash-down waste contains dirt, water and at times a small amount of oxidizer. Through knowledge of the process, UPCO has determined that when the waste contains oxidizer it would meet the EPA definition of a listed waste, K044, wastewater treatment sludges from the manufacturing and

processing of explosives, 261.32. This waste will be transported to the water bore residual tanks for evaporation and eventual treatment at the OBOD or TTU.

Release Controls

The 55-gallon drum sits in a concrete well is approximately 6 feet deep with a metal lid on top. The concrete is 4 inches thick on all sides and on the bottom. A polyethylene liner underlies all concrete.

History of Releases

No evidence of past release from this unit was found in the file review.

Release Potential

Soil:

The potential for release to soil is minimal.

Groundwater:

No potential for release to groundwater from this unit exits.

Surface Water:

No potential for release to surface water from this unit exists.

Air:

Potential for release to air from this unit is low.

6.17 SWMU No. 19: Septic Tank that Formerly Received Film Processing Waste Water

Unit Description

According to the March 11, 1989, CEI, eight septic tanks exist on the site that receive domestic waste. One also accepts X-ray film processing wastewater which is treated with an on-line silver exchange processor and then discharged to a leach field. This leach field area is shown in Photo No. 37. From approximately 1981 through 1986, untreated x-ray wastewater was discharged to the domestic sewer that serves the whole facility's waste water disposal. In 1986, domestic disposal lines for this building were removed and a septic tank was installed. At that time UPCO began discharging both domestic wastewater and x-ray wastewater (after silver exchange) into that tank for this building only.

According to UPCO personnel, in September 1991, the septic system was redesigned so that treated photoprocessing wastewater after silver exchange was collected for offsite disposal and only the non-hazardous effluent from this process is now discharged to the septic tank.

The October 1992 CEI (4) states that UPCO filed an aquifer protection form with ADEQ for discharge of hazardous industrial wastes to the septic system. According to UPCO, the discharges in question are 1) the untreated photoprocessing waste discharge, and 2) the laboratory sink waste discharge (see SWMU No. 20). The CEI stated that as part of the aquifer protection plan, the facility will install a single monitoring well at approximately 210 feet below ground.

Al Roesler of ADEQ was contacted regarding this issue and he was not aware of UPCO applying for an Aquifer Protection Permit and could not locate the facility on the Agency's database. (28)

Based on discussions with UPCO personnel during the VSI, ADEQ want a groundwater well installed at the Northwest corner of the site.UPCO would

like to use an old existing well as a monitoring well, but ADEQ does not agree. UPCO states that a well in the northwest corner would be too close to residential septic tanks and might get some contamination from those systems.

Date of Start-up

It is believed untreated wastes were discharged to this system from 1986 to 1991.

Date of Closure

1991, when the "Spent X-ray Fixer and Ion Exchange Drum Accumulation Point" (SWMU No. 15) came on-line.

Wastes Managed

The characteristics of the waste water prior to silver recovery treatment is unknown. This would have been the past waste stream disposed to the septic tank/leach field.

Release Controls

None. The discharge was directly to the subsurface soil via septic tank.

History of Releases

Wastewater released on a continual basis for an unspecified period of time, possibly beginning in 1986 and likely ending in 1991.

Release Potential

Soil:

Release potential to soil is high, depending on the characteristics of the wastewater.

Groundwater:

Release potential to groundwater is moderate, based on the depth to groundwater.

Surface Water:

Release potential to surface water is low due to distance to surface conveyance.

Air:

Release potential to air is minimal.

6.19 SWMU No. 20: Septic Tank (Leach Field) that Formerly Received Building C-11 Laboratory Wastewater

Unit Description

According to the October 1992 CEI (14), a series of septic leach fields operate at the site. Previously, the Laboratory discharged its wastes to a leach field via a sink from Building C-11. Photo No. 39 shows the location of this septic system, located to the west adjacent to the laboratory building C-11. ADEQ directed this practice to stop and now UPCO is using a 300-gallon plastic tank to contain the laboratory waste. This system was in place in October 1992 but the plumbing had not yet been completed. As of August 1993, the pipe had been cut and capped (5).

Date of Start-up

Installed between 1980 and 1982.

Date of Closure

The leach field has not been closed but was capped in 1992/1993 when the new system had been constructed.

Wastes Managed

The same or similar characteristics as the wastes now being discharged to the QC Laboratory Wastewater Holding Tank (SWMU No. 17) which are unknown.

Release Controls

None. The discharge was directly to the subsurface soil.

History of Releases

Wastewater released on a continual basis for an unspecified period of time, likely ending in 1992 or early 1993.

Release Potential

Soil:

Release potential to soil is high, depending on the characteristics of the wastewater.

Groundwater:

Release to groundwater is moderate, depending on the characteristics of the wastewater and the duration of disposal to the leach field.

Surface Water:

Release potential to surface water is low.

Air:

Release potential to air is minimal.

6.19 SWMU No. 21: C Area Solid Propellant Manufacturing Tank

Unit Description

The March 17, 1989, Hazardous Waste Inspection Report (15) reported a heavy white precipitate on the ground under and around a tank that was located along the outside of the north wall of a building in the C Area Solid Propellent Manufacturing area. This tank was reported to be part of a particulate collection system associated with the propellent manufacturing process inside the building. This material was reported to be waste ammonium perchlorate (NH_4ClO_4). The discharge was occurring from a faulty valve on the collection system. This discharge was of special concern to the inspectors because according to MSDS, NH_4ClO_4 in its originally produced dry state is listed as a Class "B" explosive. The report stated that "when dried of it's water of crystallization it becomes a Class "A" explosive." (15)

It was stated by UPCO personnel that a polyethylene tank approximately 2 feet by 2 feet of groundup oxidizer ammonium perchlorate leaked from the bottom of the drum via a valve, onto a cement slab and adjacent soil. Upon discovery of the spill in 1989, the tank was removed and the operation was moved inside and replaced with a container with a cloth bag. The concrete was mopped. Tank and soil were removed to the burnpad. The former location of this unit is shown in Photo Nos. 40 and 41. Note the deep chemical etching in the concrete.

Date of Start-up

The tank was installed in 1988. The spill was noticed in March 1989.

Date of Closure

This tank was removed in 1989 and the stained soil excavated and burned at the burn pad.

Wastes Managed

Waste ammonium perchlorate (NH_4ClO_4).

Release Controls

The tank was placed on concrete. However, it discharged from the concrete directly to soil.

History of Releases

The release was noticed during the inspection March 1989. It is not known if this was a one-time release or if it occurred previous to or again after the inspection.

Release Potential

Soil:

Release to soil is documented.

Groundwater:

Release potential to groundwater is likely low.

Surface Water:

Release potential to surface water is low.

Air:

Release potential to air is likely minimal.

6.20 SWMU No. 22 High Level X-ray Building (B-9) Wastewater Discharge to Wash

Unit Description

The September 9, 1986 ADEQ CEI identified a wastewater discharge to a dry wash that came from the x-ray film developing unit.

It was discovered during the VSI that film processing wastewater was discharged to a wash for 5 years. Photo No. 42 shows this wash. UPCO reportedly stopped this discharge after EPA ordered them to stop. Soil sampling is apparently being required. The status of this sampling is unknown. The current waste management and disposal practices for the X-ray High Level Building are unknown.

7.0 AREAS OF CONCERN

Five new AOCs were identified during the VSI (AOC Nos. 4-8). AOC No. 2 in the PR report, Burn Area, was eliminated from further consideration because it could not be located during the VSI, and UPCO personnel had no knowledge of it. Subsequently AOC Nos. 3 and 4 from the PR report are now AOC Nos. 2 and 3.

Table 7-1
AREAS OF CONCERN
AT UNIVERSAL PROPULSION COMPANY

Unit No.	Name
1	Leach Fields
2	F-5/F-9 Satellite Accumulation Area
3	Steam Plant Boiler Blow-down Water Accumulation Point
4	Pumps at Building F-2
5	Boneyard Northeast of Building B-9
6	Area West of Building B-4
7	Wastewater Evaporation Tanks
8	Hand wash Area at Plant 2

1. Leach Fields - A series (possible eight) of leach fields exists at the facility. These are reportedly used for domestic wastes but may have been used for industrial wastes. (4.12) The locations and uses of 2 of these leach fields was discovered during file review and the VSI.

2. F-5/F-7 Satellite Accumulation Area - One drum of waste methylene chloride and aluminum powder was located outside of the building not within the direct control of the process operator. This satellite accumulation was held in a fiberglass secondary containment bin. This drum was found to have standing liquid on the drum top which resulted from the bung plug not being securely fastened. (16) This AOC was not located during the VSI.

3. Steam Plant Boiler Blow-Down Water Accumulation Point - UPCO operates a steam boiler near propellant plant 2 in Building F-7. This boiler must undergo a blow-down at least once a week during operation. A certified blow-down tank is installed outside the building on a concrete pad. This tank must be drained after the blow-down as part of its function. The

water from the blow-down is drained into a 30-gallon polyethylene drum (1).

From process knowledge this wastewater does not meet or exceed hazardous waste characteristics. The water is internally circulated in the steam system and does not come into contact with any materials outside of the boiler or piping. Because the water comes from an industrial process, it cannot be discharged to the ground or septic system without an aquifer protection permit. UPCO manages this waste by evaporating the water in the non-hazardous evaporation tanks near the water bore (1).

UPCO has operated the blow-down accumulation system since October 1992. Management of blow-down prior to 1992 is unknown.

4. Pumps at southwest side of Building F-02 (Photo Nos 43 and 44) showed evidence of leakage onto pad and soil. No further information was found on this unit.

5. A large boneyard northeast of Building B-09 (Photo Nos. 45, 49, and 47) showed various debris, including tank and drums. Due to time and safety constraints in this area, no further information was discovered on this AOC at the time of the VSI.

6. Area West of Building B-04 (Photo Nos. 48 and 49).

7. Wastewater Evaporation Tanks Adjacent to Water Bore-Out Tanks (Photo No. 26). Two 6-foot fiberglass evaporation tanks are located in the water bore-out area (see Photo No. 27, AOC No. 8). These are used to evaporate non-hazardous wastewaters including Steam Plant Boiler Blow Down water (AOC No. 3) and laboratory sink water (SWMU No. 17) generated from onsite industrial areas, (according to the 1993 Part B Permit and verified by UPCO personnel). They make use of the return water in the closed water system to aid in evaporation. (1.K-10)

8. Hand Wash Area at Plant 2.

8.0 MIGRATION PATHWAYS AND HUMAN AND ENVIRONMENTAL RECEPTORS

The purpose of this section is to discuss the potential for human and environmental receptors to be exposed to contaminants via media-specific migration pathways. Information presented will help determine the potential for releases from specific SWMUs and AOCs that may threaten human health or the environment and enable the U.S. EPA and ADEQ to set priorities for further corrective action.

This section first presents a summary of media and releases of concern as well as information on human and environmental receptors for the site. Migration pathways for soil, surface water, groundwater, and air are then discussed in subsections mentioning specific receptors that may be exposed.

The media for potential human and environmental receptor exposure to hazardous wastes for the SWMUs identified is primarily air. Open Burn/Open Detonation (OBOD) unit operations as well as the potential for release of particulate waste from the open water bore-out tanks, the TTU unit and the OBOD burn pad are the primary potential sources. At this stage of analysis, soil, surface water and groundwater seem to be less of a concern.

Several SWMUs have been documented and/or visual evidence of releases or have a potential for release to soil that could be significant. Areas of potentially significant documented or potential soil contamination (that have not already been remediated) include: OBOD former drum storage area outside the Assembly Area Solvent Shed (SWMU No. 5); the wash near the Former Propellant Water Bore Residual Pits (SWMU No. 11); the Septic Tank/Leachfield that Formerly Received Laboratory Wastewater (SWMU No. 20); the Septic Tank/Leachfield that Formerly Received Film Processing Waste (SWMU No. 19); and the wash that received film processing wastewater from the High Level X-ray Building (SWMU No. 22).

Potential for release to groundwater from the majority of facility SWMUs does not appear to be of great concern due to the depth to groundwater (greater that 200 feet) the arid climate of the region and the nature and volumes of wastes

managed. However, the potential for release to groundwater cannot be ruled out, particularly in regards to SWMUs that combine water and wastes. Therefore, SWMUs having what appears to be the greatest potential for migration from soils to groundwater are the septic tank/leachfield units (SWMU Nos. 20 and 21) and the wash that received wastewater from the X-ray building (SWMU No. 22).

A number of SWMUs had a past potential for release to surface water (washes) during heavy rains. The most significant of these appears to be the OBOD unit (SWMU No. 1), the Former Water Bore Residual Pits (SWMU No. 11) and the High Level X-ray Building discharge (SWMU No. 22). No significant current potential appears to exist.

Potential releases to air are likely occurring from: the OBOD burn activities and soil particulates from the burn pad (SWMU No. 1), the TTU (wind blown ash) (SWMU No. 14), and particulate waste from the open water bore-out tanks (SWMU No. 10). Health risk assessments and air modeling have been conducted regarding UPCO's thermal treatment activities and the conclusions (based on modeling) are that at the permitted burn levels (300 pounds per burn), the only compound that might cause an increased health hazard risk would be lead. Although these lead compounds are of concern, "the concentrations predicted in the air are below current air standards". (1.I-47) Ambient air concentrations at the receptors were below the accepted National Ambient Air Quality Standard for lead compounds (1.I-47). The significance of the potential particulate releases are unknown, but likely minor.

8.1 General Human and Environmental Receptors

UPCO is located in a rural, largely uninhabited area. Houses in the vicinity of the plant are located in two, one-half square mile areas that border the north side and northwest corner of the UPCO facility. These residences are located about 1/2 mile from the OBOD unit. Population density in the housing tract areas is approximately 125 people per square mile, while the population density in all other areas adjoining the facility is less that 5 people per square mile. Within

a ten mile radius of the UPCO facility, there are no farming enterprises raising plant crops known to be for human consumption.

Humans (non-employees) and large animals are prevented from entering the facility during non-working hours by a fence. The fence encompasses both UPCO treatment units. It is 6 feet high and has a three strand barb-wire top. Razor or concertina wire is placed in all washes to prevent entry. (1:I-55) A public road (Happy Valley Road) runs adjacent to the facility to the south.

There is a potential for exposure to hazardous wastes by workers during operations, and waste handling/disposal activities. Safety procedures and personal safety gear are apparently utilized to avoid such exposure.

As stated in Section 5.7, small reptiles such as rattlesnakes and Gila monsters are known to frequent the facility in early spring and fall. Also, although it is not prime habitat, the site and surrounding area is a potential Desert Tortoise (a federally endangered species) habitat. The Chuckwalla, a Category II federally endangered species may also traverse the area.

8.2 Soil Migration Pathways and Receptors

This subsection addresses the potential for receptors to be exposed by contaminants via direct contact with soil. Soil or subsurface soil contamination may also be an intermediate to other media, such as to groundwater via leaching or air via volatilization or wind erosion. As stated above, several SWMUs have had documented or visual evidence of release and others have a high potential for release to soil.

8.2.1 Human Receptors

Human receptors may be exposed to site contaminants in soil through dermal contact or inhalation and ingestion of wind blown particles. Exposure to contaminated soils onsite by humans other than protected onsite workers

(particularly children) is unlikely since the facility is fenced off and access is controlled.

8.2.2 Environmental Receptors

Environmental receptors that may be exposed to soil contamination include burrowing insects and animals directly in contact with the soil and animals feeding off the ground, such as birds. Animal exposure can be through ingestion, dermal contact and inhalation. The areas of possible concern may be the washes where contaminants may still be entrained in the sediments and their potential effect on reptiles and other burrowing animals. It is unlikely animals would be exposed to soils near the Assembly Area Solvent Shed (SWMU No. 5) and the OBOD unit burn pad.

8.3 Surface Water Migration Pathways and Receptors

There are no standing waters, surface water bodies or wetlands at the UPCO facility. The facility drains rapidly, via the washes, during storm events. These storm waters are not directly captured in the Phoenix area for any drinking water system. All run-off eventually travels in the Cave Creek Wash to the New River drainage to the Agua Fria and Salt Rivers. (1:I-55) Since the runoff waters are not used for municipal drinking water, and not considered major recreation (body contact) resources, surface water is not considered to be a significant potential exposure pathway for humans.

As stated above several SWMUs may have contributed hazardous contaminants to surface waters in the past. The current potential for major release is low due to containment and runoff/runon control practices in-place at the facility.

8.3.1 Human Receptors

The potential for human exposure to contaminants via surface water is not considered significant.

8.3.2 Environmental Receptors

Any of numerous species living and foraging in the washes and creeks could potentially be affected by releases to surface water during storm events. However, potential impacts are minimal in that the UPCO facility and surrounding land is populated with few animal and vegetation populations and the potential for significant release of contaminants from the UPCO facility to surface water is minimal.

8.4 Groundwater Migration Pathways and Receptors

A few SWMUs have documented or suspected releases to soil that could possibly result in impacts to groundwater via leaching of contaminants from the soil. This potential will require further investigation. An onsite supply well exists and the state is in the process of requiring at least one or two groundwater monitoring wells be installed at the site, downgradient of the hazardous waste leach fields and process areas.

8.4.1 Human Receptors

The potential for groundwater contamination is considered to be low. However, if contamination exists and depending on its duration a drinking water aquifer may be affected.

8.4.2 Environmental Receptors

Environmental receptors would not have access to groundwater resources thus making exposure impossible.

8.5 Air Migration Exposure Pathways and Receptors

The migration pathway for air is primarily downwind from a contaminant source. The most probable route of exposure to humans relevant to the UPCO facility is through inhalation of contaminants carried downwind at the thermal treatment

units. Other routes of exposure may be from particulates settling on the ground. Dermal contact from soil or dust, ingestion from soil and ingestion of foods containing bioaccumulated contaminants are potential pathways.

Emissions from the burning of waste materials are considered to be the most significant means of exposure at the UPCO facility (1:I-54). Air modeling and/or health risk assessments have been conducted by both the State and the facility and results are presented in the Part B Permit Application. Basically, risks to neighboring offsite residents from airborne lead compounds released during the open burns do exist. However, at permitted burn levels, the health risks are within the acceptable range. Other potential air contaminants are windblown particulates from the burn pad, the water bore containers and the TTU bag house when emptying ash. These, however, are likely minor when compared to the burn emissions.

8.5.1 Human Receptors

One of the most important operating conditions described in the Part B Permit Application is to burn waste materials only when the wind is blowing away from sensitive receptors and heavily populated areas. There are no hospitals in the downwind direction within the 43-mile radius, and the nearest school is near the town of Cave Creek, approximately 10 miles away. Modeling results indicate that concentrations of combustion products approach zero approximately 5 to 6 miles downwind. Therefore, the number of individuals who could be exposed in the downwind direction is estimated to be less than 100 offsite and less than 20 onsite employees or contractors. (1.I-47) While lead compounds are of concern, the concentrations predicted in the air are below current air standards and guidelines (1.I-47)

Soil sampling and analysis was conducted downwind of the thermal treatment units and levels of lead and other metals in surface soils were found to be below current soil standards and guidelines. (1.I-47) Based on this study, exposure to lead and other metal-laden particulates that may have settled on the ground downwind of the facility is considered insignificant.

8.5.2 Environmental Receptors

The potential for emissions from the UPCO treatment units to damage domestic animals, wildlife, crops, vegetation, and physical structures does not appear to be significant. One reason is that the location of UPCO in an arid desert with little to no precipitation and no surface waters leads to few animal and vegetation populations which could be in a receptor group. (1.I-48) The other is that the health risk screening assessment discussed in Section I-3f of the Part B Permit Application, indicates that the emissions are below concentrations that would adversely affect human health. Likewise, it is not expected that domestic animals, wildlife, crops and vegetation would be impacted, because emissions are below current air standards. (1.I-48)

REFERENCES

1. RCRA Part B Permit Application for Universal Propulsion Company, Inc., May 12, 1993, Phoenix, Arizona Facility.

2. Inter-Office Memorandum from Cherry Moyer to Dr. Bodo Diehn regarding UPCO's response to the June 26, 1987 letter.

3. RCRA Part B Permit Application for Universal Propulsion Company, Inc., Phoenix, Arizona Facility, November 8, 1988.

4. RCRA Compliance Evaluation Inspection Report, at Universal Propulsion, Phoenix, Arizona October 30, 1992 SAIC/TSC for EPA.

5. Personal communications between Sue Corbaley SAIC/TSC and Steve Miller of UPCO on August 4, 1993.

6. Generator Inspection Report, Arizona Department of Health Services, September 4, 1985.

7. Hazardous Waste Inspection Report, Arizona Department of Health Services, September 9, 1986.

8. Hazardous Waste Inspection Report, Arizona Department of Health Services, August 27, 1986.

9. Waste Investigation Report, Western Technologies Inc., June 10, 1986.

10. Report from Western Technologies, Inc., regarding soil sampling for the Burn Ground Area, February 1, 1988.

11. Report from Earth Technologies, Inc., regarding soil sampling, for the Burn Ground Area, December 16, 1988.

12. Hazardous Waste Inspection Report, Arizona Department of Environmental Quality, February 8, 1991.

13. Response from UPCO to ADEQ regarding the February 1991 Inspection, March 13, 1991.

14. Hazardous Waste Inspection, Comments and Probable Violations, Arizona Department of Environmental Quality, March 17, 1989.

15. Hazardous Waste Inspection Report, Arizona Department of Environmental Quality, March 17, 1989.

16. Notice of Violation for Compliance Evaluation Inspection of March 19, 1984, Arizona Department of Health Services, June 11, 1984.

17. Hazardous Waste Inspection Report for February 23, 1987 inspection, Arizona Department of Environmental Quality.

18. Notice dated May 18, 1984 to the Arizona Department of Health Services regarding a Hazardous Waste Inspection conducted by EPA on March 19, 1984.

19. Hazardous Waste Inspection Report, Arizona Department of Environmental Quality, February 8, 1991.

20. Letter dated August 17, 1987 from the Arizona Department of Environmental Quality to UPCO in response to UPCO's letter of June 1986.

21. Telephone Communication between Buck Toler of SAIC/TSC and Katherine Carson, Environmental Engineering specialist, Hazardous Waste Permit Unit, Arizona Department of Environmental Quality, September 9, 1993.

22. Memorandum from EPA to ADEQ dated March 26, 1991 regarding RCRA CEI of January 9, 1991.

23. Response to ADEQ's comments dated January 5, 1989, to UPCO, January 20, 1989.

24. Letter from Arizona Department of Environmental Quality to UPCO regarding remediation of the burn pad and bore pit area, March 15, 1989.

25. Telephone communication between Buck Toler of SAIC/TSC and Al Roester, Mining Aquifer Protection Permit Engineer, Office of Water Quality, Arizona Department of Environmental Quality, September 9, 1993.

26. Policy and Procedures for Hazardous Waste Management for UPCO, Revised September 1989.

27. Telephone Communication between Buck Toler SAIC/TSC and John Buchard, Permits Engineer for ADEQ Office of Air Quality, September 9, 1993.

28. Telephone Communication between Buck Toler SAIC/TSC and Al Roesler, Mining Aquifer Protection Permit Engineer, ADEQ Office of Environmental Quality, September 10, 1993.

29. Telephone Communication between Buck Toler SAIC/TSC and Steven Hildreth of the Arizona State Lands Department.

30. Telephone Communication between Buck Toler SAIC/TSC and Dick Hamilton, Compliance Engineer, ADEQ Office of Air Quality, September 9, 1993.

31. Telephone Communication between Buck Toler SAIC/TSC and Nancy Olsen, Project Evaluation Specialist, Arizona Game and Fish Department, September 9, 1993.

APPENDIX A

FIGURES

FIGURE No. 1.

Facility Map

UNIVERSAL PROPULSION COMPANY, INC.
Talley INDUSTRIES
BLACK CANYON STAGE I, BOX 1140 . PHOENIX, ARIZONA 85027

NUMBER	DESCRIPTION
A1	ADMINISTRATION.
A2	OPERATIONS BLDG. #1
A3	OPERATIONS BLDG. #2
B1	MK-16 ASSEMBLY BLDG.
B2	PROPELLANT MACHINE SHOP.
B3	PAINT & PACKOUT.
B4	WEIGH & PRESS BLDG.
B5	SOLVENT STORAGE SHED.
B6	LOAD BLDG. #1.
B7	OFM STORAGE SHED.
B8	CKU-5 ASSEMBLY BLDG.
B9	X-RAY BLDG.
B10	MAINT.,MODEL SHOP, CAD/PAD SHIPPING.
B11	PAINT BLDG.
B12	LOAD BLDG #2.
B13	VEHICLE STORAGE SHED.
B14	MOS TRAILER.
B15	INSPECTION, STORES & ASSEMBLY.
B16	STORAGE SHED.
B17	NORTH STORAGE BLDG.
B18	SAFE & ARM ASSEMBLY.
B19	E.E.D.
B20	PROCESS OVENS.
B21	BOX STORAGE.
C1	CHEMICAL STORAGE BLDG.
C2	LINER/O.C./WEIGHOUT BLDG.
C3	MIX/CAST CONTROL BUNKER.
C4	MIX/CAST BLDG.
C5	PROPELLANT CURE OVENS.
C6	TOOL-PULL BLDG.
C7	OXIDIZER STORES.
C8	OFFICE TRAILER.
C9	LUNCH TRAILER.
C10	PROPELLANT R & D COMPLEX.
C11	Q.A. TRAILER.
C12	SERVICE MAG.
C13	R & D STORAGE MAG.
C14	R & D PROCESSING BLDG.
D1	TEST BLDG.
D2	TEST SHOP & STORES BLDG.
D3	LARGE MOTOR TEST CELL.
D4	SANDBLAST & WATER-BORE BLDG.
D5	STATIC TEST CELL-EARTH COVER.
D6	THERMAL TREATMENT UNIT.
D7	MAGAZINE.
E1	CLASS 1.3 STORAGE MAG.
E2	CLASS 1.1 STORAGE MAG.
E3	CLASS 1.3 STORAGE MAG.
E4	CLASS 1.1 STORAGE MAG.
F1	WEIGHOUT/ASSY/CONTROL BLDG.
F2	MIX BLDG.
F3	CAST BLDG.
F4	CURE OVEN.
F5	EXTRUDE BLDG.
F6	EXTRUDE CONTROL BLDG.

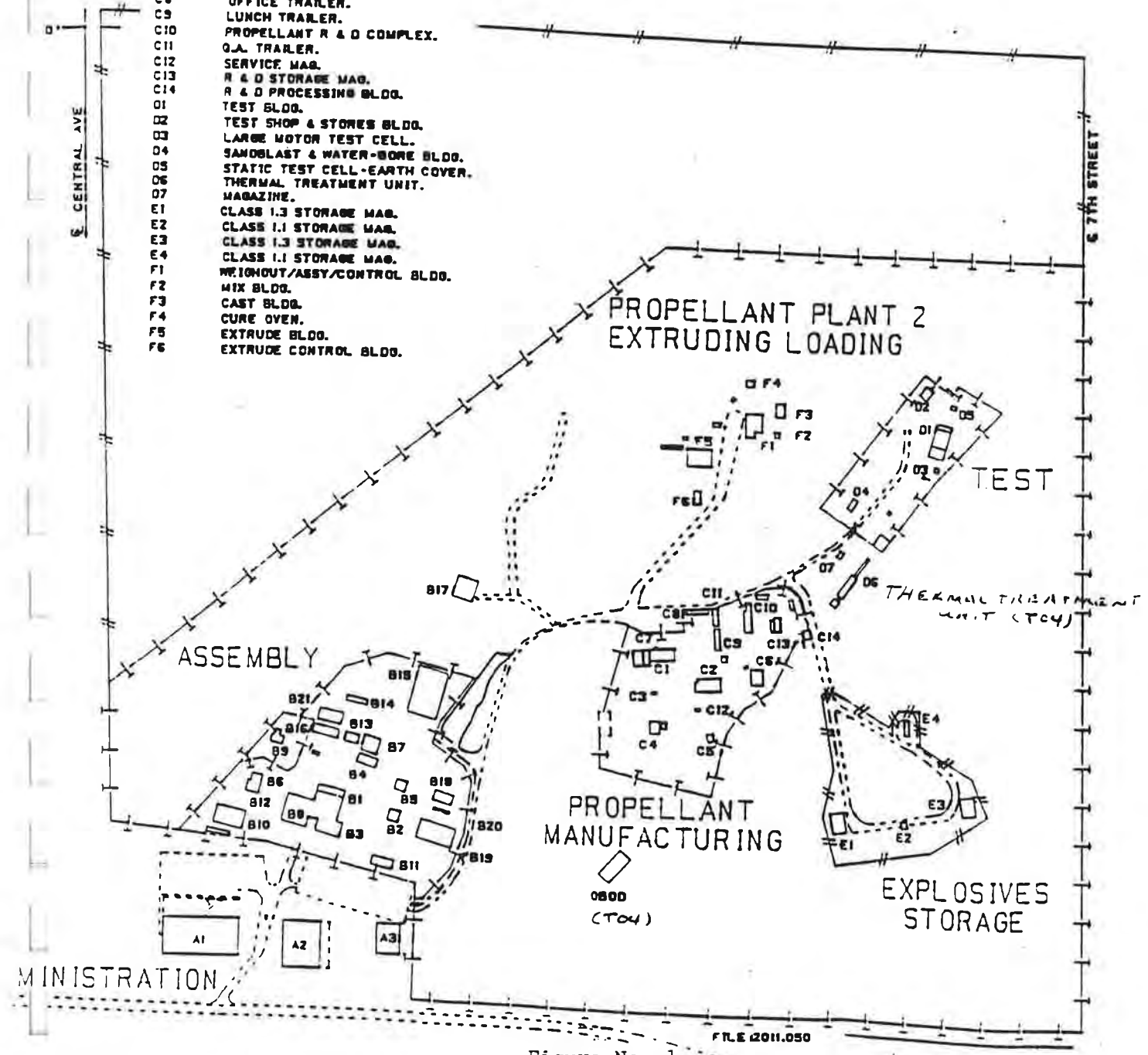
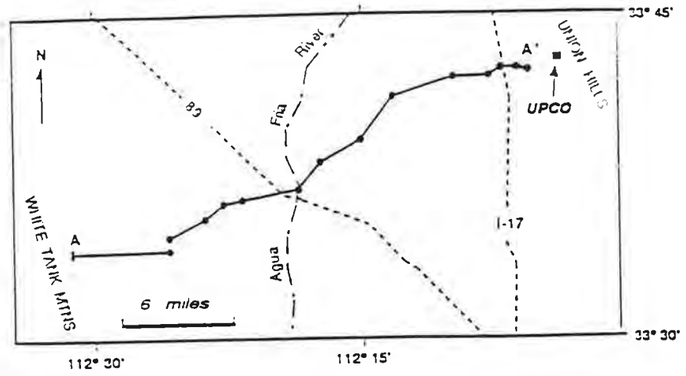


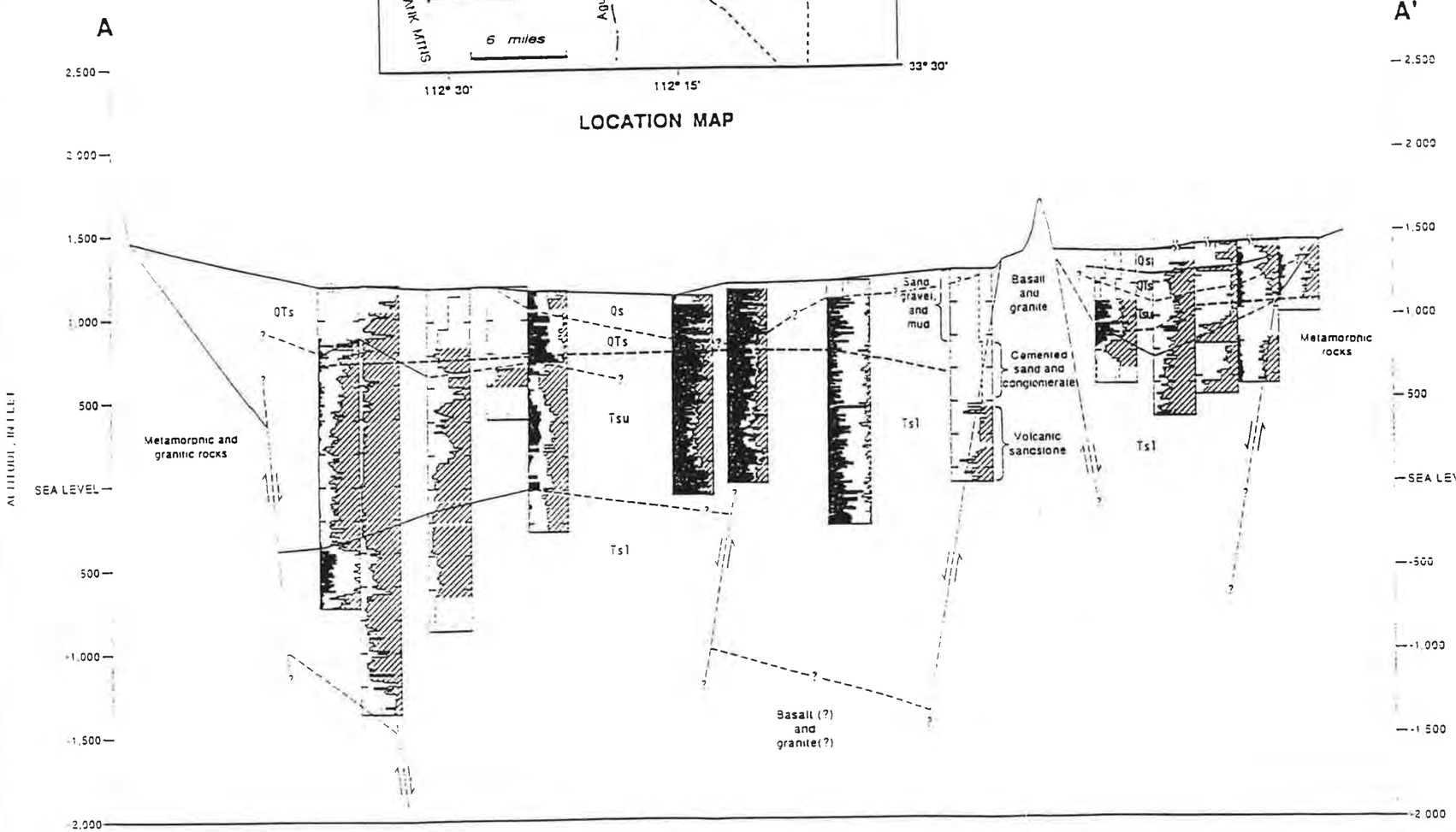
Figure No. 1

FIGURE No. 2.

Geologic Map



LOCATION MAP



Source: Modified after Brown and Pool, 1989.

EXPLANATION

- Qs Upper Unit
- QTs Middle Unit
- Tsu Lower Unit, upper part
- Tsl Lower Unit, lower part

——— ?— — GEOLOGIC CONTACT—Dashed where approximately located; queried where uncertain

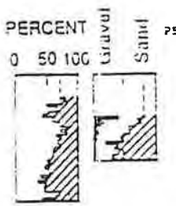
——— ?— — FAULT—Dashed where approximately located; queried where uncertain. Arrows show relative movement

——— Indicates where horizontal spacing is increased to show data more clearly

(B-2-2)10ccc WELL AND LOCATION—See figure 4 for well-numbering system in Arizona

– – – – – – APPROXIMATE WATER LEVEL, NOVEMBER 1984 TO JANUARY 1985

PERCENT SAND AND GRAVEL—(>0.062 millimeter in diameter) average for 10-foot or 20-foot section of unit. Graph on left shows percent sand and gravel undifferentiated (>0.062 millimeter in diameter); graph on right shows percent sand (0.062 to 2.0 millimeters in diameter) and percent gravel (>2.0 millimeters in diameter). Dashed where estimated from drillers' logs or lithologic logs



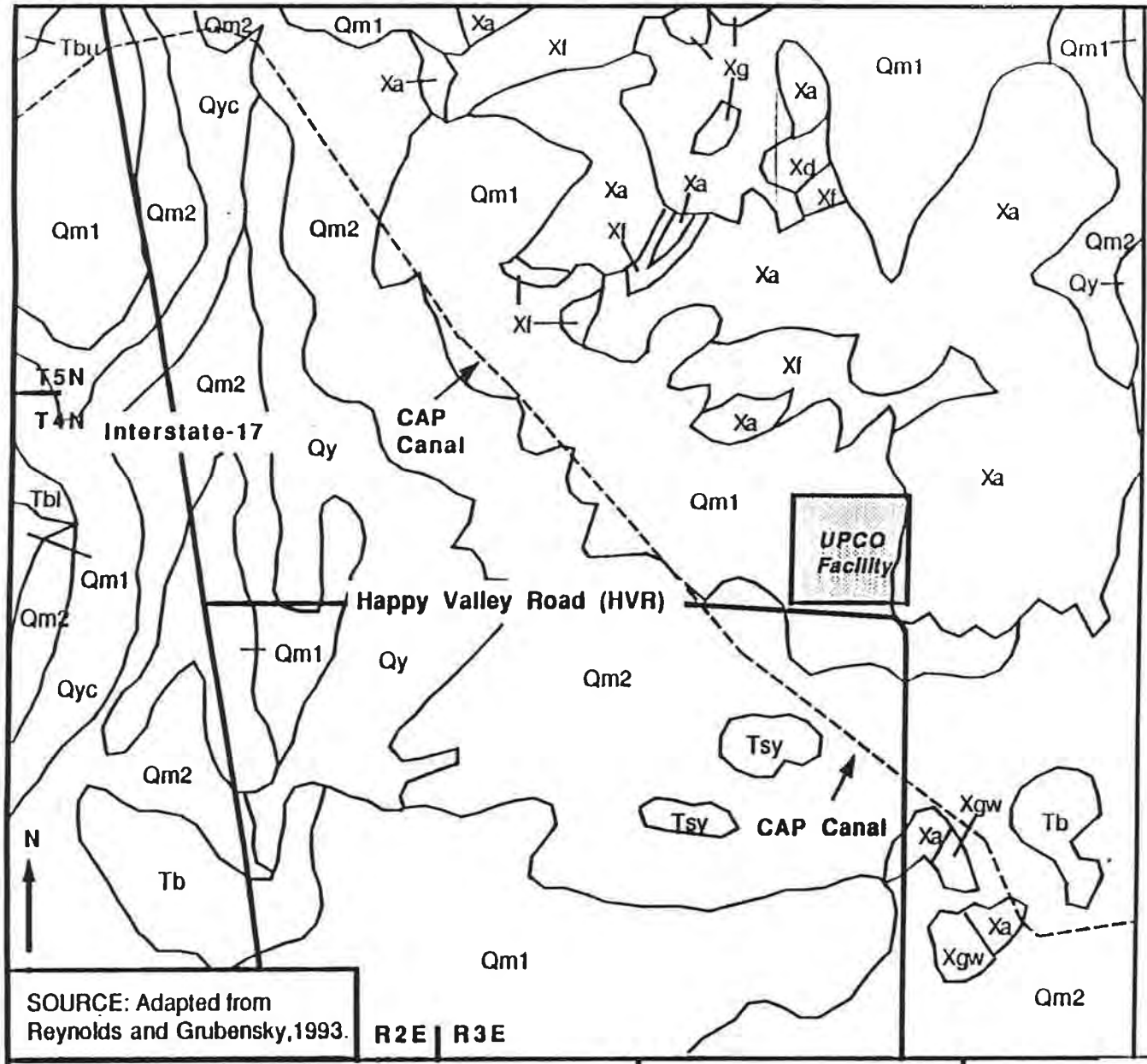
0 5 3 MILES
0 5 10 KILOMETERS

NATIONAL GEODETIC VERTICAL DATUM OF 1929
VERTICAL SCALE GREATLY EXAGGERATED

UNIVERSAL PROPULSION COMPANY, INC. RCRA PART B PERMIT APPLICATION	Figure No. 2	GEOLOGIC SECTION A-A' MARICOPA COUNTY, ARIZONA	REVISION 2 MAY 1993	APPENDIX I - 4

FIGURE No. 3.

Figure 2 Geologic Section A-A'
Maricopa County, Arizona



SOURCE: Adapted from Reynolds and Grubensky,1993.

EXPLANATION:

Qyc	Alluvium in channels (Holocene to late Pleistocene)
Qy	Alluvium in valleys and piedmonts (Holocene to late Pleistocene)
Qm2	Alluvial sedimentary rocks (late Pleistocene)
Qm1	Alluvial sedimentary rocks (middle Pleistocene)
Tbu	Basaltic rocks (late Miocene)
Tb	Basaltic rocks (late to middle Miocene)
Tsy	Sedimentary rocks (Tertiary)
Xg	Granitic rocks (Early Proterozoic)
Xgw	Graywacke sedimentary rocks (Early Proterozoic)
Xa	Andesitic volcanic rocks (Early Proterozoic)
Xd	Dacitic volcanic flow (Early Proterozoic)
Xf	Felsic intrusive rocks (Early Proterozoic)
T4N R3E	Location descriptions indicating identity of Townships (T) and Ranges (R)

0 1/2 1

APPROXIMATE SCALE IN MILES

UNIVERSAL PROPULSION COMPANY, INC.
RCRA PART B PERMIT APPLICATION

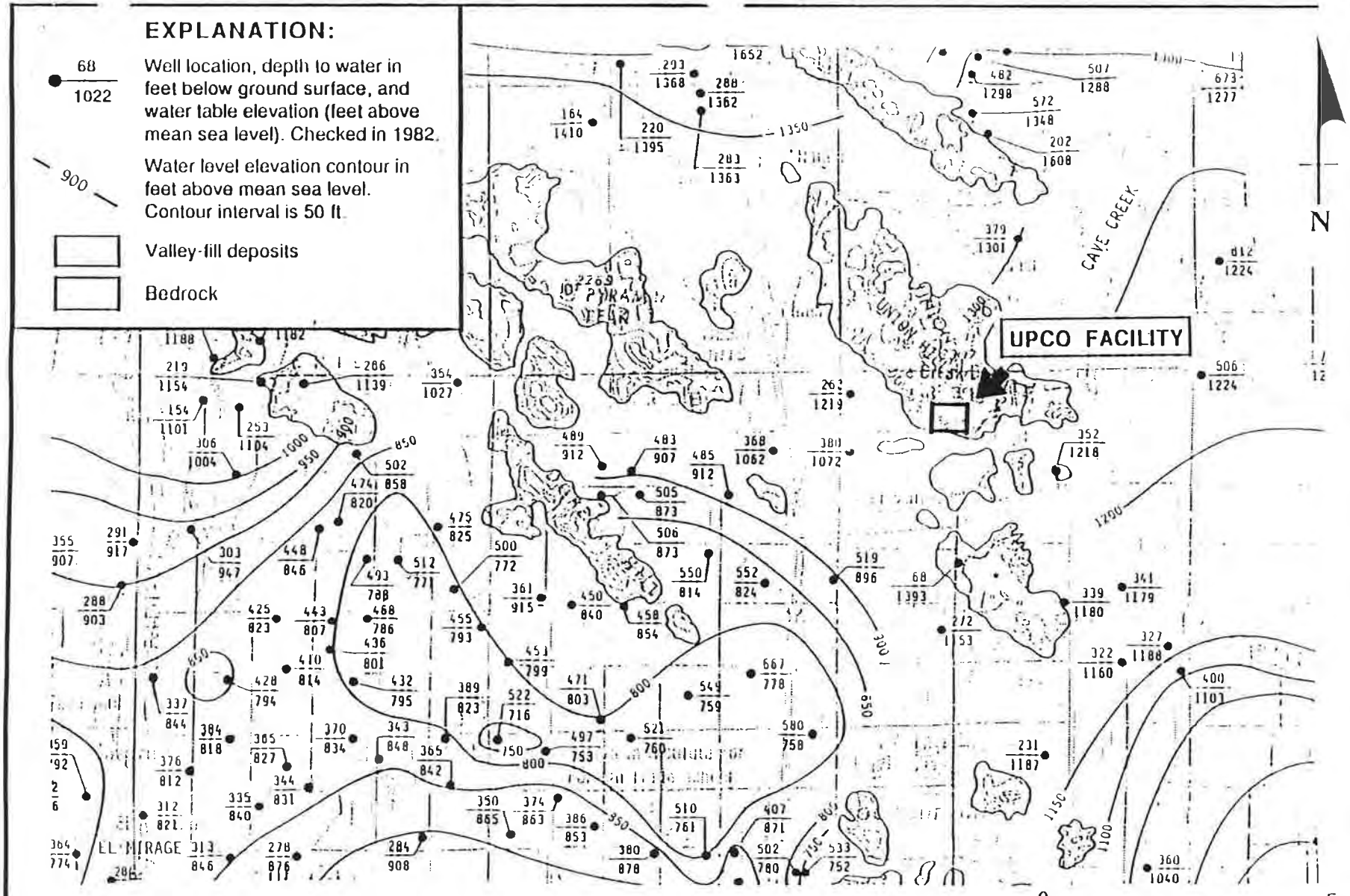
REVISION 2
MAY 1993

Figure No. 3
GEOLOGIC MAP

APPENDIX
I - 3

FIGURE No. 4.

Regional Water Level Contour
Maricopa and Pinal Counties, Arizona



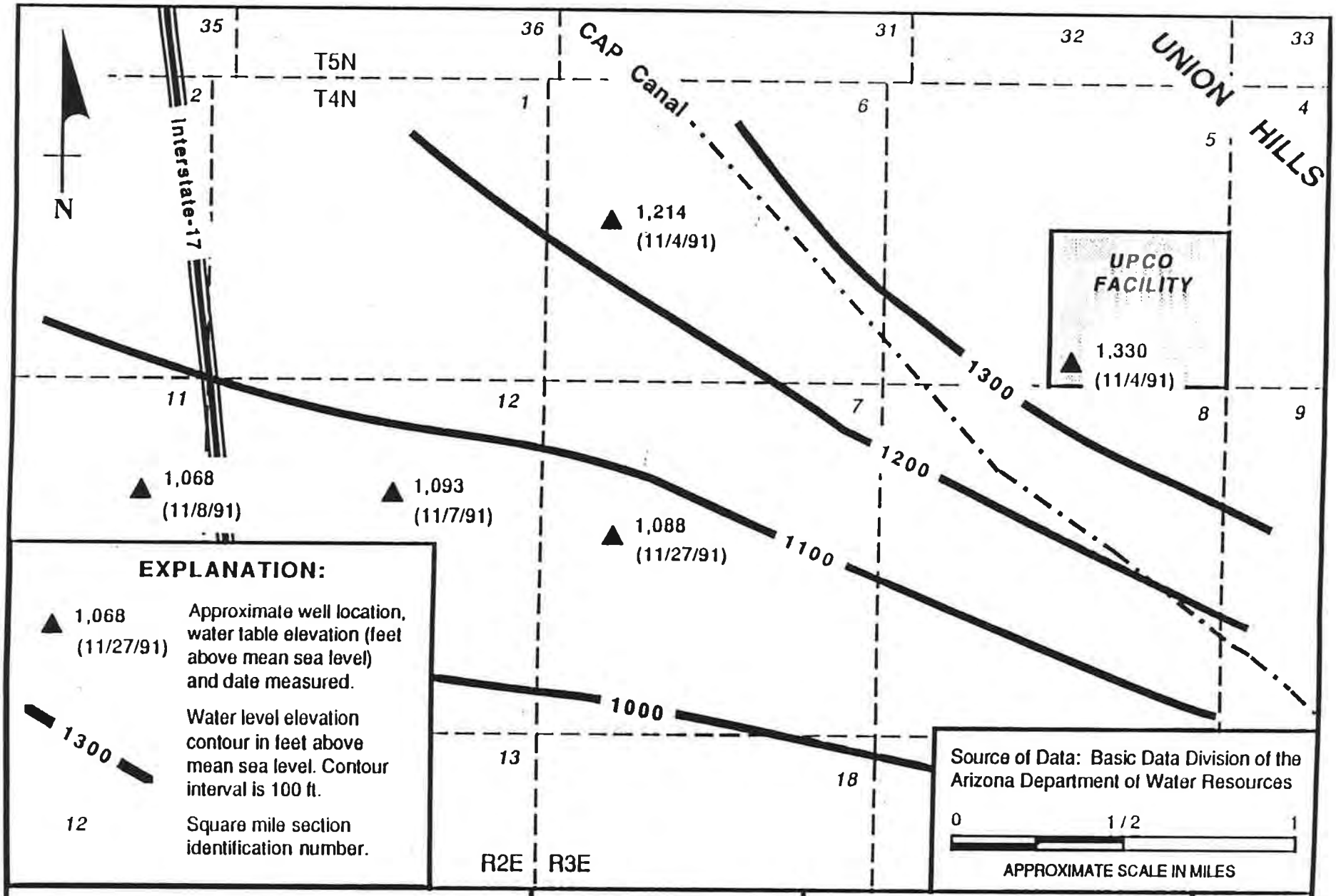
Source: Modified after Reeter and Remick, 1986.

Base from U S. Geological Survey, Phoenix, Arizona, 1954, revised 1969, 1:250,000.

UNIVERSAL PROPULSION COMPANY, INC. RCRA PART B PERMIT APPLICATION	Figure No. 4 REVISION 2 MAY 1993	REGIONAL WATER LEVEL CONTOUR MAP MARICOPA AND PINAL COUNTIES, ARIZONA	APPENDIX I - 6

FIGURE No. 5.

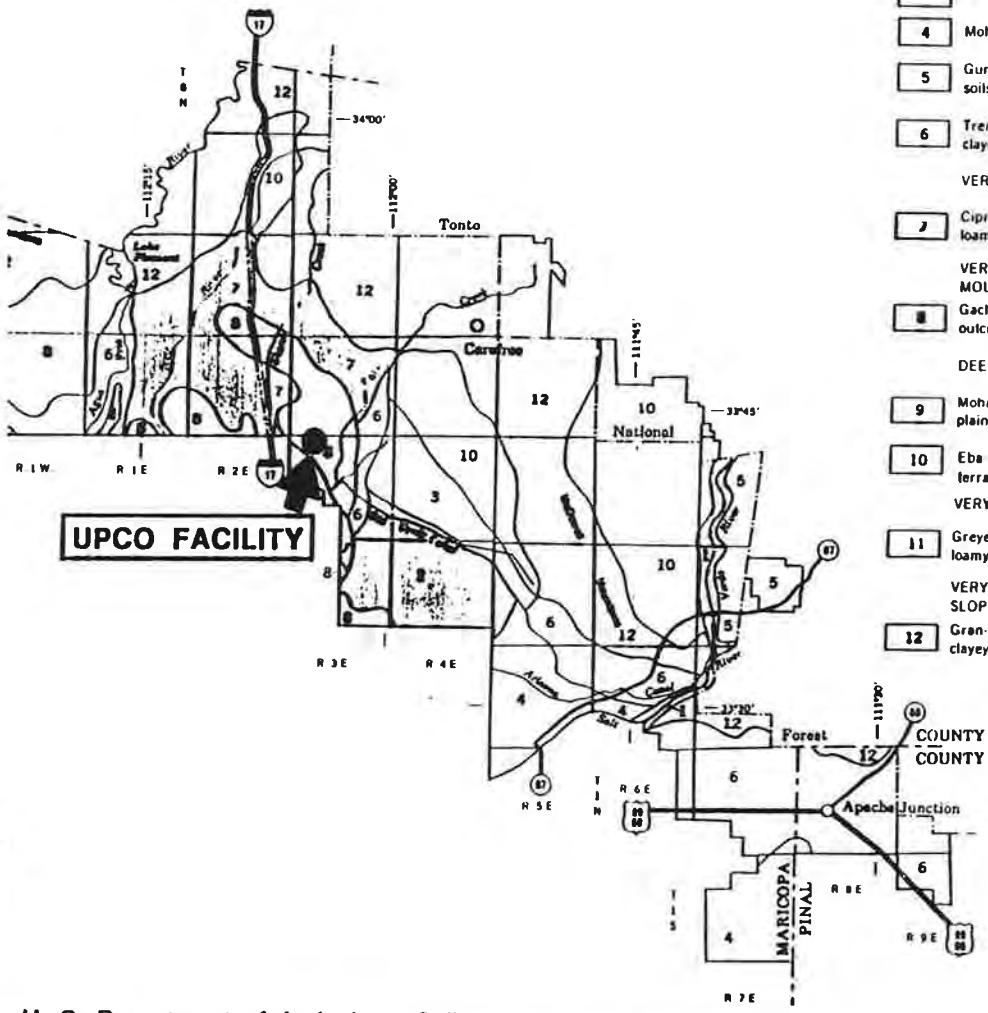
Local Water Level Contour Map
near UPCO's facility



UNIVERSAL PROPULSION COMPANY, INC. RCRA PART B PERMIT APPLICATION	Figure No. 5 REVISION 2 MAY 1993	LOCAL WATER LEVEL CONTOUR MAP NEAR UPCO's FACILITY	APPENDIX I - 7

FIGURE No. 6.

General Soil Map Aquila - Carefree Area
Maricopa and Pinal Counties, Arizona



LEGEND

DEEP, VERY WARM SOILS, ON FLOOD PLAINS AND ALLUVIAL FANS

1 Carrizo: Nearly level and gently sloping, occasionally flooded, very gravelly, sandy soils; on flood plains

2 Gilman: Nearly level, rarely flooded, loamy soils; on flood plains and alluvial fans

DEEP, VERY WARM SOILS, ON FAN TERRACES

3 Momoli Carrizo Denure: Nearly level, nongravelly to very gravelly, loamy and sandy soils, on fan terraces

4 Mohall Contine: Nearly level and gently sloping, loamy and clayey soils; on fan terraces

5 Gunsight Rillito Chuckawalla: Dominantly gently sloping to moderately steep, gravelly and very gravelly, loamy soils; on fan terraces

6 Tremant Ebon-Pinamt: Dominantly gently sloping to moderately steep, gravelly and very gravelly, loamy and clayey soils; on fan terraces

VERY SHALLOW, SHALLOW, AND DEEP, VERY WARM SOILS, ON FAN TERRACES

7 Cipriano-Suncity Carefree: Nearly level and gently sloping, cobbly and nongravelly to very gravelly, clayey and loamy soils, on fan terraces

VERY SHALLOW AND SHALLOW, VERY WARM SOILS, AND ROCK OUTCROP, ON HILL SLOPES AND MOUNTAIN SLOPES

8 Gachado-Rock outcrop-Quifotosa: Dominantly strongly sloping to steep, very gravelly, loamy soils, and Rock outcrop; on hill slopes and mountain slopes

DEEP, WARM SOILS; ON FAN TERRACES AND FLOOD PLAINS

9 Mohave Continental Guest: Nearly level and gently sloping, clayey and loamy soils, on fan terraces and flood plains

10 Eba-Pinaleno: Dominantly gently sloping to moderately steep, very gravelly, clayey and loamy soils; on fan terraces

VERY SHALLOW, SHALLOW, AND DEEP, WARM SOILS; ON FAN TERRACES

11 Greyeagle-Continental Nickel: Dominantly gently sloping to moderately steep, nongravelly and very gravelly, loamy and clayey soils; on fan terraces

VERY SHALLOW AND SHALLOW, WARM SOILS, AND ROCK OUTCROP, ON HILL SLOPES AND MOUNTAIN SLOPES

12 Gran-Rock outcrop-Lehmans: Dominantly moderately steep and steep, nongravelly and very gravelly, loamy and clayey soils, and Rock outcrop; on hill slopes and mountain slopes

Source: U. S. Department of Agriculture Soil Conservation Service, 1985

0 4 8

APPROXIMATE SCALE IN MILES

UNIVERSAL PROPULSION COMPANY, INC. RCRA PART B PERMIT APPLICATION	REVISION 2 Figure No. 6 MAY 1993	GENERAL SOIL MAP AGUILA-CAREFREE AREA MARICOPA AND PINAL COUNTIES, ARIZONA	APPENDIX I - 5

FIGURE No. 7.

Master Drainage Plan

TABLE OF FINISH FLOOR/WASH FLOW/100 YR WS EL

BLDG. NO.	FINISH FLOOR EL	ADJACENT WASH	WASH SECTION	100 YR. FLOW	DEPTH (FT)	EST. 100 YR WS EL	ACTUAL WS EL
(1)	93	A	A-A	148	1.5	88	87.5
		B	A-A	107	0.7	88.5	88.2
(2)	90	B	B-B	107	0.7	86	85.7
		C	A-A	118	0.8	80	79.8
(3)	77	C	B-B	118	0.7	70	69.7
(4)	66*	A	B-B	210	1.2	61	61.2
		D	A-A	185	1.2		
		E	A-A	373	1.7		
		X	X-X	783	2.75		

*PAD EL

THE 100 YR WS EL IN ALL WASHES IS LESS THAN 2' DEEP EXCEPT WASH "x" ABOUT 150' NORTH OF HAPPY VALLEY ROAD (DEPTH = 2.75'). THE 100 YR WS EL TOP WIDTH OF WASH FLOWS ARE SHOWN ON THE MAP BY DASH LINES TO DELINEATE THE 100 YEAR FLOOD LIMITS. THE DASH LINES ARE DRAWN AT THE 2' CONTOUR LINES ON BOTH SIDES OF THE WASH BOTTOM CONTOUR LINES, IE. WASH BOTTOM CONTOUR IS 80; DASH LINE ON TOP OF 82 CONTOUR LINE ON BOTH SIDES. DASH LINE FLOOD LIMIT ALONG WASH "x" IS DRAWN ON TOP OF 3' CONTOUR LINES BOTH SIDES OF WASH BOTTOM CONTOUR. THE 100 YR WS EL AT ANY LOCATION IN ANY WASH CAN BE CALCULATED BY READING THE WASH BOTTOM CONTOUR AND ADDING THE WASH FLOW DEPTH SHOWN IN THE TABLE ABOVE.

Figure No. 7 Available in Part B Application

0 100' 200' 400'

AMWEST
engineering company incorporated
1710 east indian school road suite 100
phoenix, arizona 85016
phone (602) 264-1427 (602) 230-7221 fax

UNIVERSAL PROPULSION

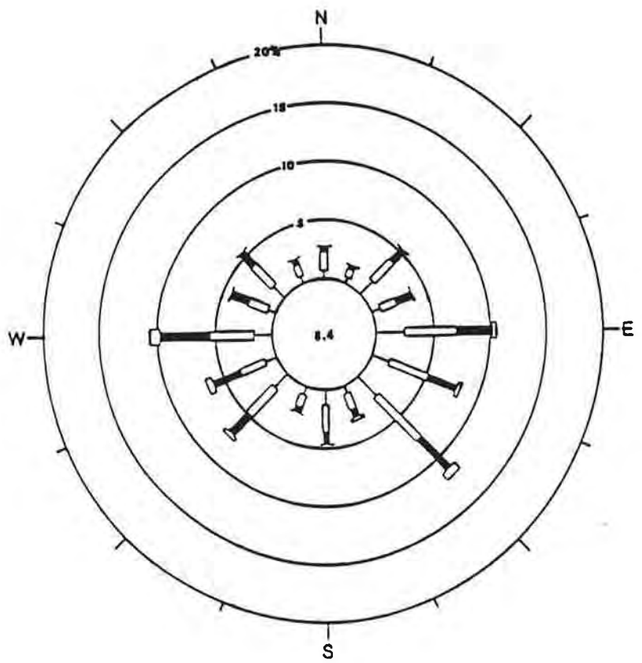
MASTER DRAINAGE PLAN

JOB NO.	SCALE	DATE	SHEET
92.032	1"=200'	Sept. '92	1 of 1

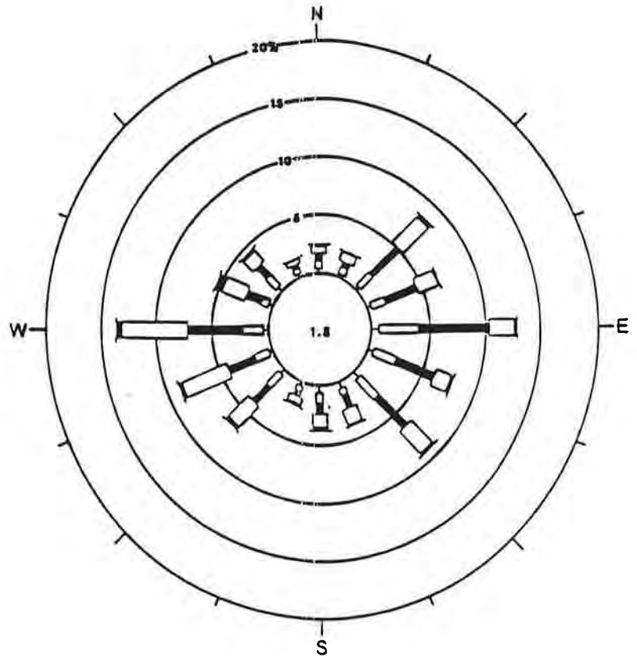
FIGURE No. 8.

Annual Wind Rose for Phoenix

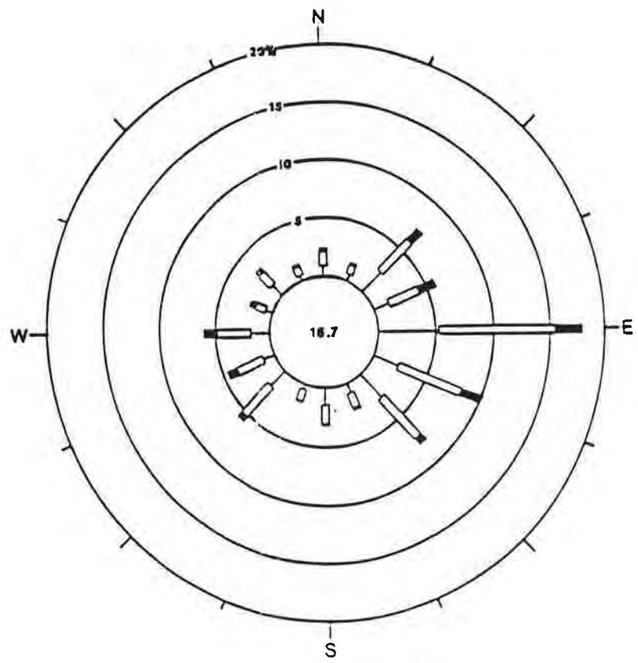
Annual Wind Roses for Phoenix



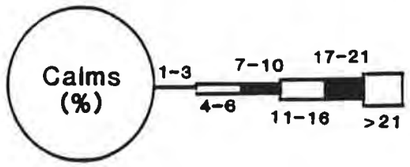
UNSTABLE CONDITIONS



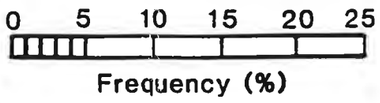
NEUTRAL CONDITIONS



STABLE CONDITIONS



Wind Speed Class (Knots)



	Universal Propulsion Co.
Rev:	Figure No. 8 ANNUAL WIND ROSE FOR PHOENIX (1955–64)

FIGURE No. 9.

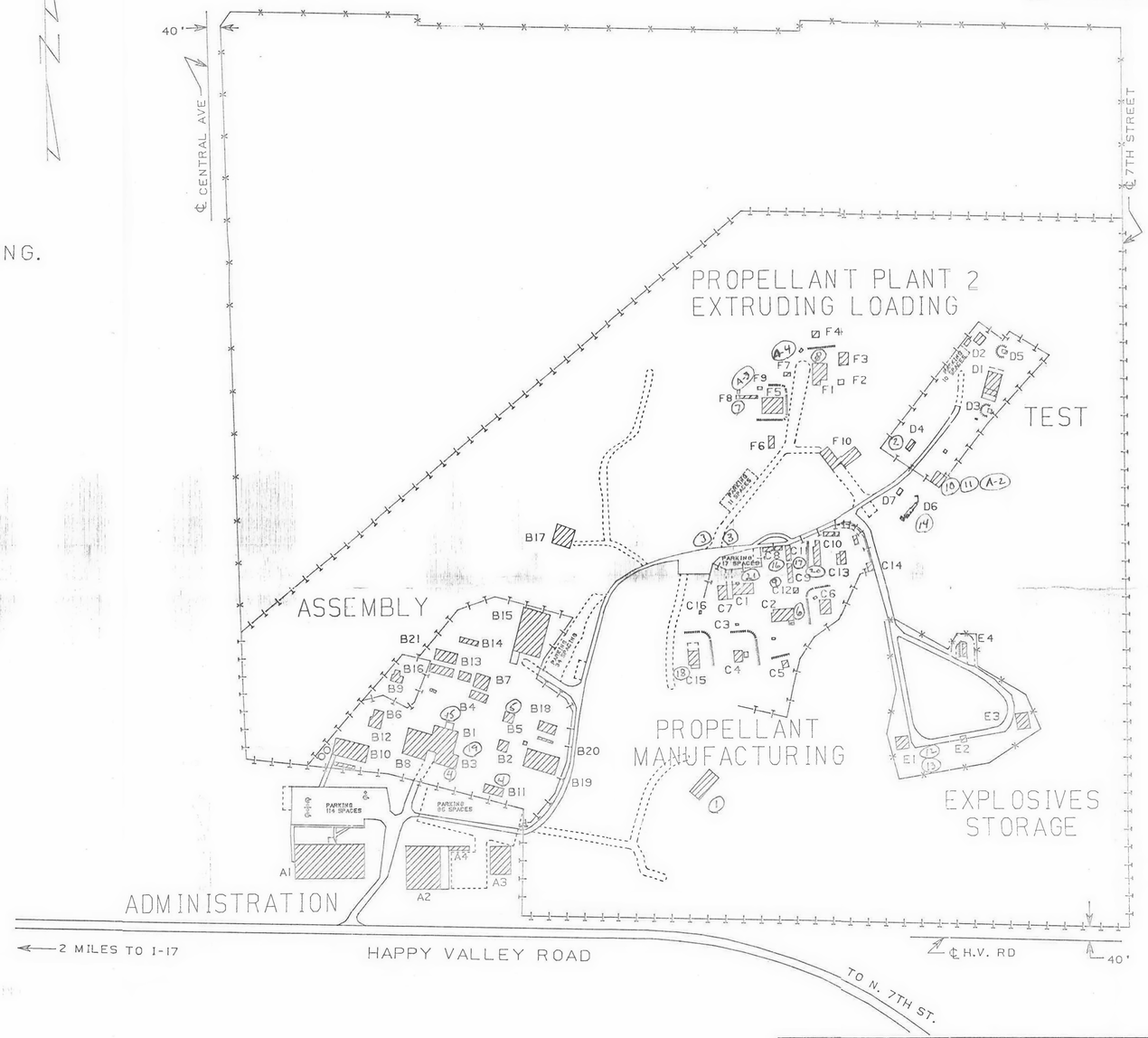
Solid Waste Management Units and Areas of Concern

DO NOT SCALE PRINT

REVISION				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	ADDED: THERMAL TREATMENT UNIT BOX STORAGE R & D PROCESSING	7-22-91	
	B	UPDATED TO CURRENT BLDG CONFIG	10-24-91	
	C	UPDATED TO CURRENT BLDG CONFIG	04-10-92	
	D	UPDATED TO CURRENT BLDG CONFIG	03-1-93	

LEGEND:

NUMBER	DESCRIPTION
A1	ADMINISTRATION.
A2	OPERATIONS BLDG. #1
A3	OPERATIONS BLDG. #2
A4	OFFICE TRAILER
B1	MK-16 ASSEMBLY BLDG.
B2	PROPELLANT MACHINE SHOP.
B3	PAINT & PACKOUT.
B4	WEIGH & PRESS BLDG.
B5	SOLVENT STORAGE SHED..
B6	LOAD BLDG. #1.
B7	GFM STORAGE SHED.
B8	CKU-5 ASSEMBLY BLDG.
B9	X-RAY BLDG.
B10	MAINT.,MODEL SHOP, CAD/PAD SHIPPING.
B11	PAINT BLDG.
B12	LOAD BLDG #2'.
B13	VEHICLE STORAGE SHED.
B14	MOS TRAILER..
B15	INSPECTION, STORES & ASSEMBLY.
B16	STORAGE SHED.
B17	NORTH STORAGE BLDG.
B18	SAFE & ARM ASSEMBLY.
B19	E.E.D.
B20	PROCESS OVENS.
B21	BOX STORAGE.
C1	CHEMICAL STORAGE BLDG.
C2	LINER/Q.C./WEIGHOUT BLDG.
C3	MIX/CAST #1 CONTROL BUNKER.
C4	MIX/CAST #1 BLDG.
C5	PROPELLANT CURE OVENS.
C6	TOOL-PULL BLDG.
C7	OXIDIZER STORES.
C8	OFFICE TRAILER.
C9	LUNCH TRAILER.
C10	PROPELLANT R & D COMPLEX.
C11	Q.A. TRAILER.
C12	SOLVENT SHED.
C13	R & D STORAGE MAG.
C14	R & D PROCESSING BLDG.
C15	MIX/CAST #2 BLDG.
C16	MIX/CAST #2 CONTROL BLDG.
D1	TEST BLDG.
D2	TEST SHOP & STORES BLDG.
D3	LARGE MOTOR TEST CELL.
D4	SANDBLAST & WATER-BORE BLDG.
D5	STATIC TEST CELL-EARTH COVER.
D6	THERMAL TREATMENT UNIT.
D7	MAGAZINE.
E1	CLASS 1.3 STORAGE MAG.
E2	CLASS 1.1 STORAGE MAG.
E3	CLASS 1.3 STORAGE MAG.
E4	CLASS 1.1 STORAGE MAG.
F1	WEIGHOUT/ASSY/CONTROL BLDG.
F2	MIX BLDG.
F3	CAST BLDG.
F4	CURE OVEN.
F5	EXTRUDE BLDG.
F6	EXTRUDE CONTROL BLDG.
F7	UTILITY SHED & STEAM BOILER
F8	EXTRUDE STORAGE BLDG.
F9	UTILITY SHED.
F10	SMOKEY DEVIL ASSEMBLY BLDG.



INFORMATION ONLY

SEP 22 1993

LEGEND

- BARB WIRE FENCE
- CHANE LINK FENCE
- EARTH BARICADES
- P, VED AREA
- GRAVEL AREA

QTY REQD	CAGE NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL AND SIZE	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

CLASSIFICATION OF CHARACTERISTICS
(+DENOTES 100% INSPECTION) (WR-43A)
CRITICAL (C) ____
MAJOR (M) ____
MINOR ALL OTHER CHARACTERISTICS

DASH NO.	NEXT QTY REQ'D	FINAL	NEXT ASSEMBLY APPLICATION	USED ON

CONTRACT NO.

SECURITY CLASSIFICATION

APPROVALS	NAME	DATE
DRAWN BY	C.MCFARLAND	7-19-91
CHECK BY		
STRESS		
RMS		
MFG		
PA		
PROJ ENG		
CHIEF ENG		
DIR ENG		
V.P. ENG		
Safety	S. Miller	3-1-93

2011-050-D

UPCO UNIVERSAL PROPULSION COMPANY, INC. Talley INDUSTRIES
BLACK CANYON STAGE I, BOX 1140 . PHOENIX, ARIZONA 85027-9801

TITLE

UPCO FACILITY

DWG SIZE	CAGE NO.	DRAWING NO.	REV
D	51998	2011-050	D

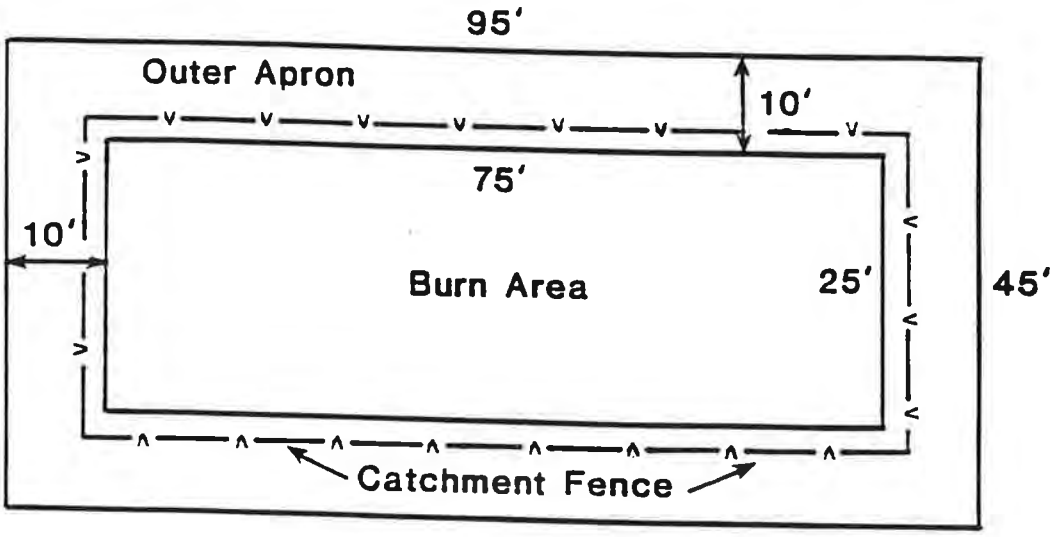
SCALE 1"=203' | WEIGHT | SHEET 1 OF 1

2011-050
D

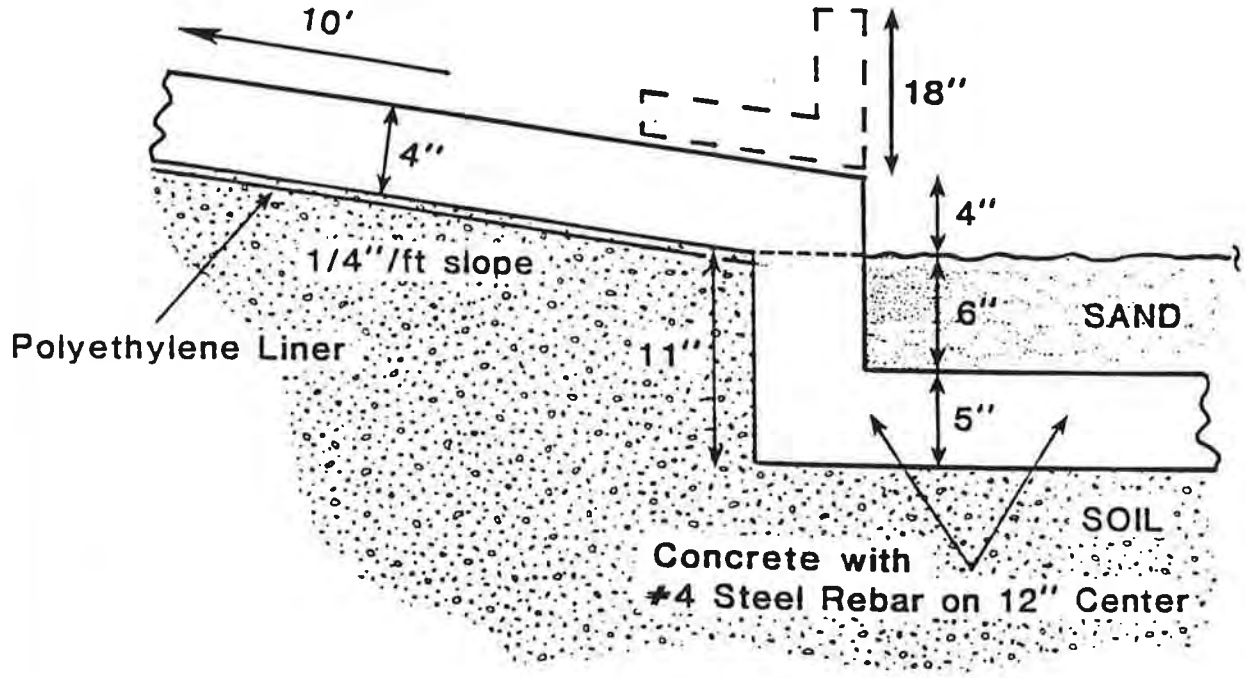
FIGURE No. 10.

OBOD Unit Design Features

TOP VIEW



Portable Catchment Fence



Explanation:

——— Polyethyene Liner

——v—— Portable Catchment Fence

Figure No. 10	Universal Propulsion Co.
Rev: 0	OBOD UNIT DESIGN FEATURES

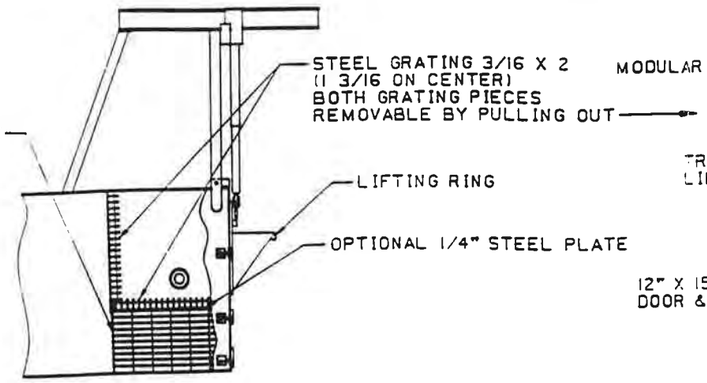
FIGURE No. 11.

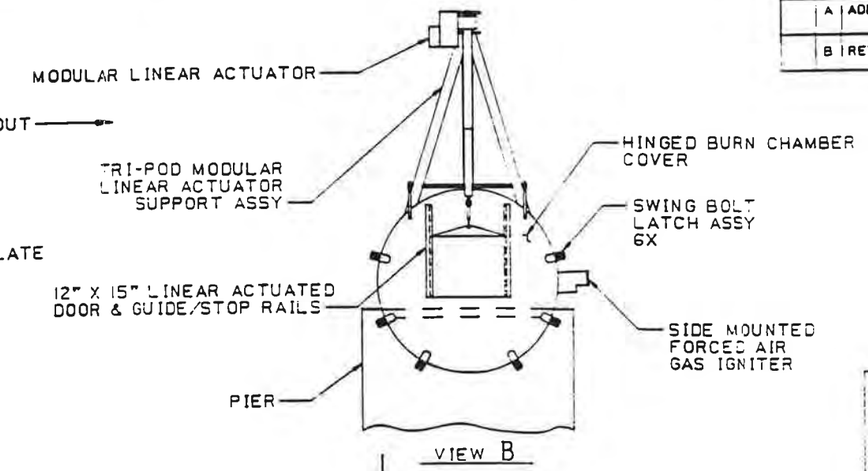
Thermal Treatment Unit Design Features

DO NOT SCALE PRINT

UNIVERSAL PROPULSION COMPANY, INC.
PROPRIETARY DATA:
THE INFORMATION CONTAINED ON THIS DOCUMENT IS PROPRIETARY TO UNIVERSAL PROPULSION COMPANY, INC. AND IS BEING PROVIDED FOR REFERENCE PURPOSES ONLY USE OF THESE DATA FOR THE MANUFACTURE, SALE, OR DISCLOSURE TO OTHERS IS NOT AUTHORIZED AND ARE NOT TO BE COPIED OR REPRODUCED WITHOUT EXPRESS WRITTEN PERMISSION OF UNIVERSAL PROPULSION COMPANY, INC. AND ARE TO BE RETURNED UPON DEMAND.

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE / APPROVED
	A	ADDED ZONE I.D.S	12-10-91 / C.F.M.
	B	REVISED AS REQ'D	9-22-92 / DN

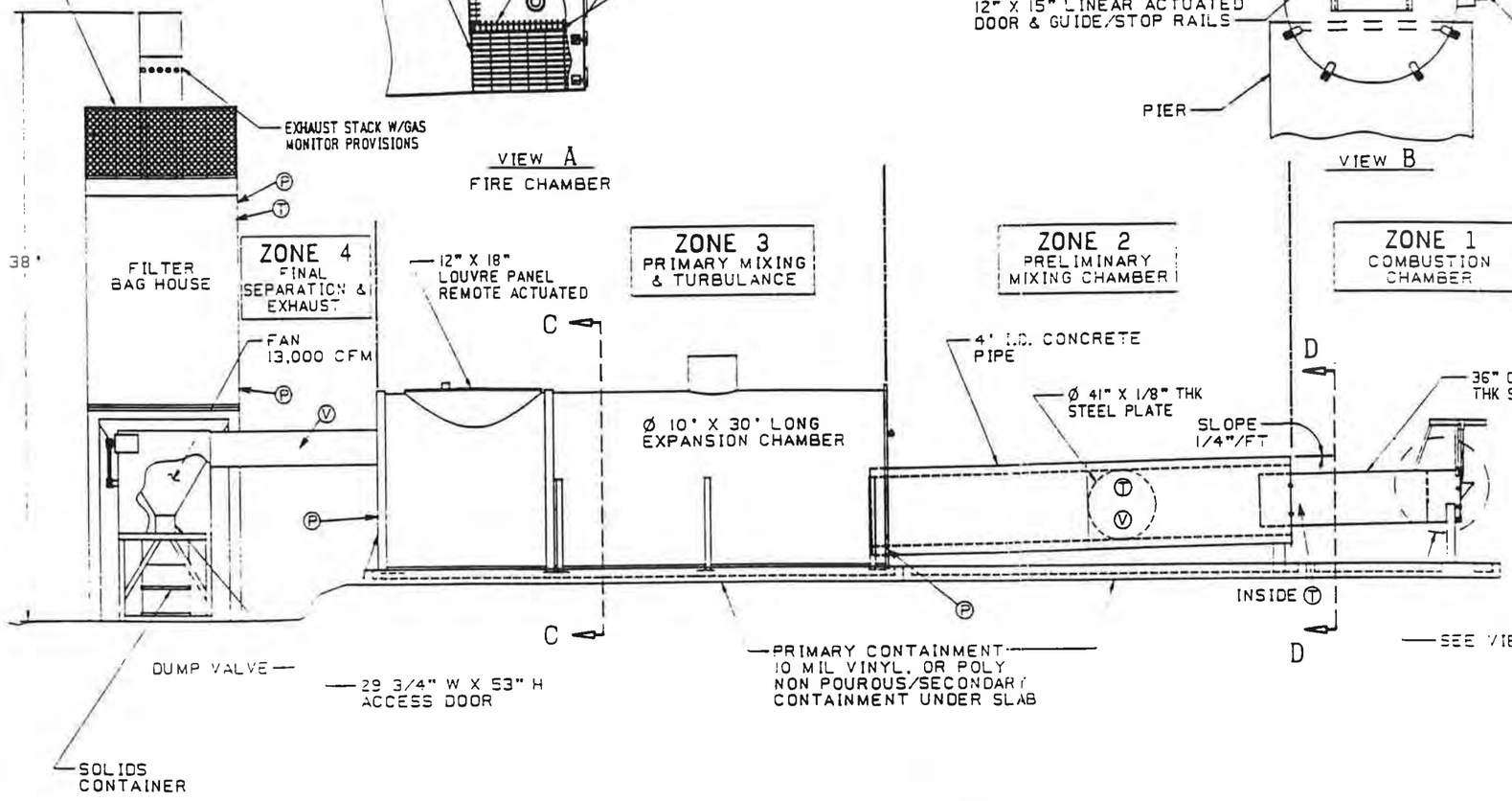


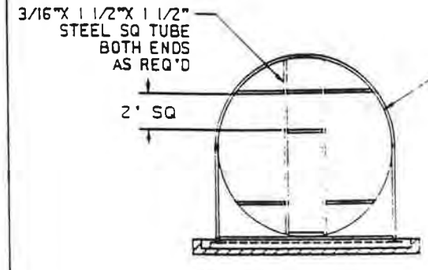


VIEW A
FIRE CHAMBER

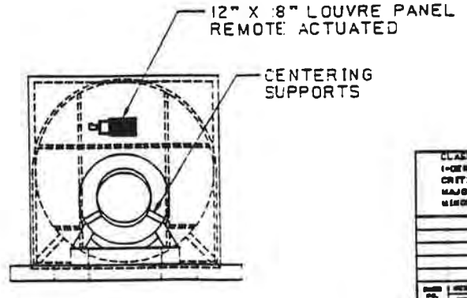
VIEW B

SENSOR LEGEND
- Ⓟ PRESSURE MONITOR
- Ⓣ TEMPERATURE MONITOR
- Ⓥ VELOCITY MONITOR





SECTION C-C



SECTION D-D

QTY REQD	CAGE NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL AND SIZE	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

CLASSIFICATION OF CHARACTERISTICS
CRITICAL
MAJOR
MINOR ALL OTHER CHARACTERISTICS

APPROVALS	NAME	DATE
DRAWN BY	IC.MCFARLAND	11-13-91
CHECK BY		
STRESS		
R&S		
MFG		
PA		
PROJ ENG		
CHIEF ENG		
QM ENG		
V.P. ENG		
V.P.		

Figure No. 11

UNIVERSAL PROPULSION COMPANY, INC.
UPCO
MAGNETROL

TITLE
THERMAL TREATMENT UNIT

DWG SIZE	CAGE NO.	DRAWING NO.	REV
D	51998	X2011-054	B

SCALE 1/4" | WEIGHT | SHEET

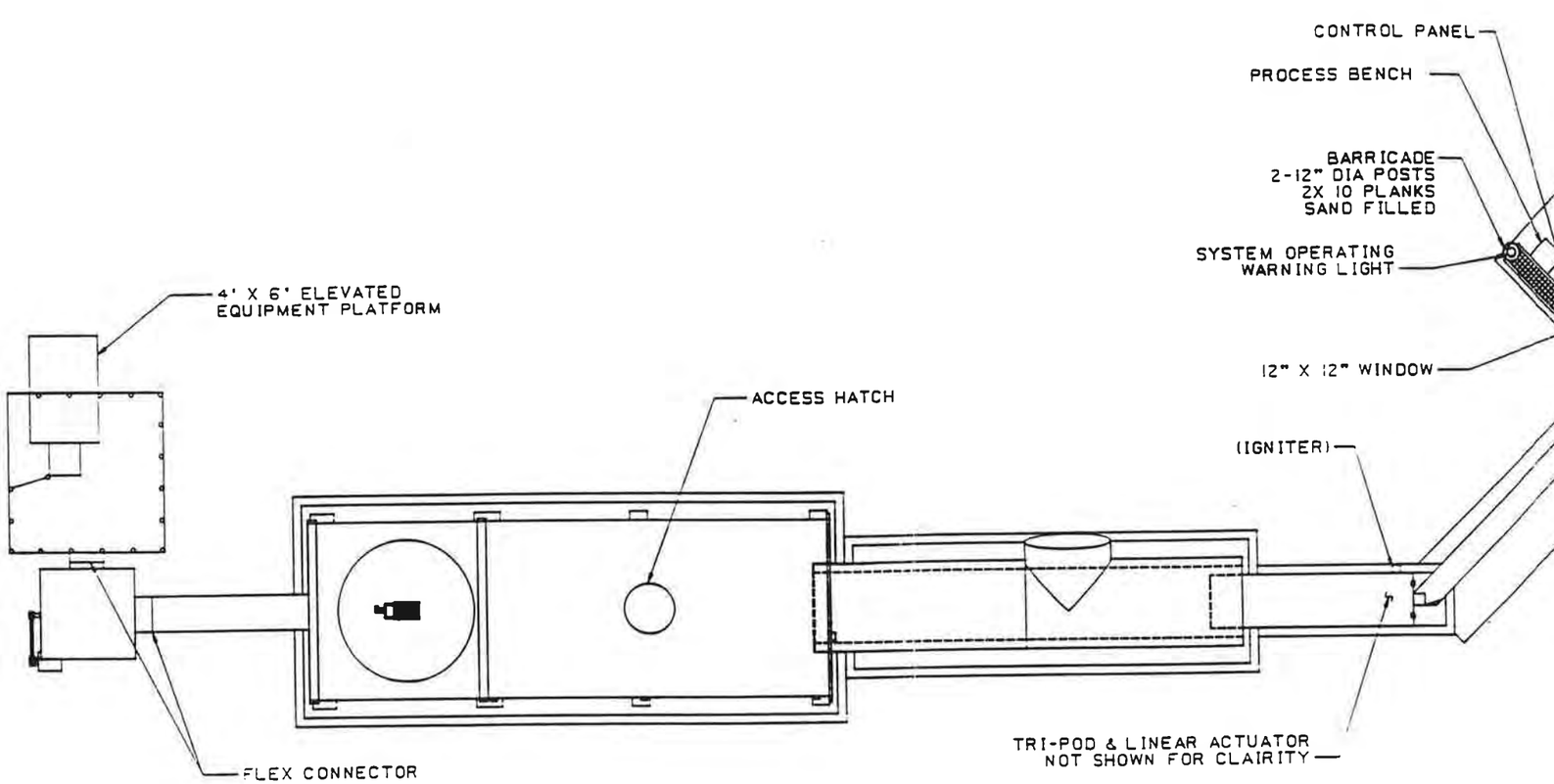
B X2011-054

FIGURE No. 12.

Thermal Treatment Unit Design Features

DO NOT SCALE PRINT

ZONE	LTR	REVISION DESCRIPTION	DATE	APPROVED
	B	REVISED AS REQ'D	9-22-92	JCH



CONTROL PANEL CONTAINS:

1. LOCK-OUT/TAG-OUT LOCK
2. CONVEYOR POWER/SPEED CONTROL SWITCH
3. LINEAR ACTUATED DOOR POWER SWITCH
4. FAN POWER SWITCH
5. PROPANE IGNITER SWITCH
6. BUTTON (10 SECONDS ON)
7. LOUVRE CONTROL SWITCH X2
8. EMERGENCY KILL SWITCH
9. SYSTEM MONITOR GAUGES

B X2011-054

Figure No. 12

DRAWN BY:	SIZE	CAGE NO.	DRAWING NO.	REV
C.MCFARLAND	D	51998	X2011-054	B
DATE: 10-25-91				
2011.054X	SCALE 1/4"=1'		SHEET 2	

APPENDIX B

PHOTOGRAPH LOG

PHOTOGRAPH LOG

Photo No. 1 SWMU No. 1: Open Burn (OB) unit looking to the northeast

Photo No. 2 SWMU No. 1: OB unit looking to the north

Photo No. 3 SWMU No. 1: Graded area to the southeast of OB pad used for runoff control. Photo taken standing on the OB pad.

Photo No. 4 SWMU No. 2: Plastic media blasting unit.

Photo No. 5 SWMU No. 2: Dust collection tower associated with plastic bead media.

Photo No. 6 SWMU No. 2 Area: Product storage shed south of SWMU 2; small drum on left contains spent plastic media.

Photo No. 7 SWMU No. 2: Sandblast unit.

Photo No. 8 SWMU No. 2: Sandblast dust collection system.

Photo No. 9 SWMU No. 3: Intermittent stream bed (arroyo) NW of Building C-7, approximate location where 5 drums of sand blast waste were dumped.

Photo No. 10 SWMU No. 5: Building B-5, south side, view of current HW accumulation area.

Photo No. 11 SWMU No. 5: Building B-5 north side of building. Note drum of waste oil inside and staining along soil.

Photo No. 12 SWMU No. 5: Old unused degreasing unit.

Photo No. 13 SWMU No. 5: Old sand-blast unit that reportedly was no longer used. Sand residue in unit and on concrete floor of metal shed may indicate that it had been used recently.

Photo No. 14 SWMU No. 5 Area: North side of Building B-5. This soil area was a former paint storage area. Note staining of soil and wood shed foundation at base of building.

Photo No. 15 SWMU No. 5 Area: Close-up of stained soil from Photo No. 14. Note the staining below the crumpled shed siding.

Photo No. 16 SWMU No. 5 Area: Building B-5, Southeast side, location of former HW (solvent) storage. Note the discoloration of wood base.

Photo No. 17 SWMU No. 8: Plant No. 2, Building F-2, hazardous waste accumulation area and part-washing area. Drum (containing TCA) in secondary containment is used as a dip-tank to clean parts.

Photo No. 18 Plant No. 2, Building No. F-2, hand-wash area on east side of building. Note soap dispenser and white soap stain. (see discussion of AOC #8)

Photo No. 19 SWMU No. 7: Accumulation area for Plant No. 3. Gray drum contains waste from propellant run the previous day. Note there is no berming. The shed opens on the north to protect it from the majority of rain storms.

Photo No. 20 SWMU No. 8: Overview of surface flow, east of Plant No. 2, Building F-2. Building on right of photo is F-2.

Photo No. 41 Close-up of SWMU No. 21; note etching.

Photo No. 42 SWMU No. 22: Surface drainage on south of high-level x-ray building, B-9, where x-ray waste water from that building was drained from approximately 1980 to December 1986.

Photo No. 43 AOC #4: Southwest side of F-2; note stains on concrete and soil from leaks at pumps.

Photo No. 44 AOC #4: Southwest side of F-2; note stains on concrete and soil from leaks at pumps.

Photo No. 45 AOC #5: Bone yard northeast of Building B-9 is in the foreground. The x-ray building is the pyramid shaped building.

Photo No. 46 AOC #5: Bone yard with a variety of scrap useable materials.

Photo No. 47 AOC #5: Bone yard looking west toward B-9, High Level X-Ray Building.

Photo No. 48 AOC #6: Heavy staining on slab and soil outside Building B-4, possibly coming from former press room (Load room). Shed on slab is new. A larger generator used to be here.

Photo No. 49 AOC #7: West of B-4, close-up of staining described in Photo No. 48.

Photo No. 1 SWMU No. 1: Open Burn (OB) unit looking to the northeast

Photo No. 2 SWMU No. 1: OB unit looking to the north

Photo No. 3 SWMU No. 1: Graded area to the southeast of OB pad used for runoff control. Photo taken standing on the OB pad.

Photo No. 4 SWMU No. 2: Plastic media blasting unit.

Photo No. 5 SWMU No. 2: Dust collection tower associated with plastic bead media.

Photo No. 6 SWMU No. 2 Area: Product storage shed south of SWMU 2; small drum on left contains spent plastic media.

Photo No. 7 SWMU No. 2: Sandblast unit.

Photo No. 8 SWMU No. 2: Sandblast dust collection system.

Photo No. 9 SWMU No. 3: Intermittent stream bed (arroyo) NW of Building C-7, approximate location where 5 drums of sand blast waste were dumped.

Photo No. 10 SWMU No. 5: Building B-5, south side, view of current HW accumulation area.

Photo No. 11 SWMU No. 5: Building B-5 north side of building. Note drum of waste oil inside and staining along soil.

Photo No. 12 SWMU No. 5: Old unused degreasing unit.

Photo No. 13 SWMU No. 5: Old sand-blast unit that reportedly was no longer used. Sand residue in unit and on concrete floor of metal shed may indicate that it had been used recently.

Photo No. 14 SWMU No. 5 Area: North side of Building B-5. This soil area was a former paint storage area. Note staining of soil and wood shed foundation at base of building.

Photo No. 15 SWMU No. 5 Area: Close-up of stained soil from Photo No. 14. Note the staining below the crumpled shed siding.

Photo No. 16 SWMU No. 5 Area: Building B-5, Southeast side, location of former HW (solvent) storage. Note the discoloration of wood base.

Photo No. 17 SWMU No. 8: Plant No. 2, Building F-2, hazardous waste accumulation area and part-washing area. Drum (containing TCA) in secondary containment is used as a dip-tank to clean parts.

Photo No. 18 Plant No. 2, Building No. F-2, hand-wash area on east side of building. Note soap dispenser and white soap stain. (see discussion of AOC #8)

Photo No. 19 SWMU No. 7: Accumulation area for Plant No. 3. Gray drum contains waste from propellant run the previous day. Note there is no berming. The shed opens on the north to protect it from the majority of rain storms.

Photo No. 20 SWMU No. 8: Overview of surface flow, east of Plant No. 2, Building F-2. Building on right of photo is F-2.

Photo No. 21 SWMU No. 7: Plant No. 3, Building No. F-8. Drum without label in accumulation. This was said to be R-45 product.

Photo No. 22 SWMU No. 9: At Building C-12, HW storage showing new concrete and roof.

Photo No. 22a SWMU No. 9: Concrete-bermed storage area at Building C-12, containing only empty drums during the VSI.

Photo No. 23 SWMU No. 10: Inside view of 3rd tank from north end containing residue from the Talley Defense Systems one-time contracted blow-out job.

Photo No. 24 SWMU Nos. 10 and 11: Looking SE at last tank and stream channel just to the left and beyond.

Photo No. 25 SWMU Nos. 10 and 11: Five bore-out tanks looking to the south. This is also the location of Former pit (from end of 2nd tank to the last tank). Note the wash at the left edge of photo and its proximity to where the former pit was located.

Photo No. 26 SWMU Nos. 10 and 11: Same area as Photo No. 24, looking approximately north. Note surface run-off erosion. Blow-out operation pad is to left of photo.

Photo No. 27 SWMU Nos. 10 and 11: "Non-hazardous waste water evaporation tanks" adjacent to water bore-out tanks. (see AOC #7)

Photo No. 28 SWMU No. 14: TTU looking east, an overview of TTU unit on left is operator's shed.

Photo No. 29 SWMU No. 14: TTU view of conveyor belt feed system and firebox.

Photo No. 30 SWMU No. 14: TTU Work Area storage shed.

Photo No. 31 SWMU No. 14: TTU north end (feed end) of fire box

Photo No. 32 SWMU No. 14: Close-up of base of feed end of fire box. Note staining.

Photo No. 33 SWMU NO. 14: Close-up of conveyor and feed-end of fire box. Note staining.

Photo No. 34 SWMU No. 14:
Drum for collection
of TTU residue,
looking to the east.

Photo No. 35 SWMU No. 14: Drummed residue in containment. Note staining.

Photo No. 36 SWMU No. 15: X-ray wastewater silver recovery by iron replacement method, on north side of B-01.

Photo No. 37 SWMU No. 19: Location of septic tank. Note round concrete plug. Leachfield is located beyond sidewalk. Photo is towards southeast from B-1.

Photo No. 38 SWMU Nos. 17 and 20. East side C-11 view of tank and old leach field connection on side of white bucket.

Photo No. 39 SWMU Nos. 17 and 20. Looking east from Lab C-11. Leachfield is still located in dirt between sidewalk in foreground and bush and hill.

Photo No. 40 Former location of SWMU No. 21. Note pipe in top of wall and new concrete apron. Note etching on old concrete pad.

Photo No. 41 Close-up of SWMU No. 21; note etching.

Photo No. 42 SWMU No. 22: Surface drainage on south of high-level x-ray building, B-9, where x-ray waste water from that building was drained from approximately 1980 to December 1986.

Photo No. 43 AOC #4: Southwest side of F-2; note stains on concrete and soil from leaks at pumps.

Photo No. 44 AOC #4: Southwest side of F-2; note stains on concrete and soil from leaks at pumps.

Photo No. 45 AOC #5: Bone yard northeast of Building B-9 is in the foreground. The x-ray building is the pyramid shaped building.

Photo No. 46 AOC #5: Bone yard with a variety of scrap useable materials.

Photo No. 47 AOC #5: Bone yard looking west toward B-9, High Level X-Ray Building.

Photo No. 48 AOC #6: Heavy staining on slab and soil outside Building B-4, possibly coming from former press room (Load room). Shed on slab is new. A larger generator used to be here.

Photo No. 49 AOC #6: West of B-4, close-up of staining described in Photo No. 48.