RCRA Part B Post-Closure Permit Application for Former Surface Impoundments 0250, 0635, and 0706

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EPA I.D. No. CAD00170235

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Acronyms

AA/AS	Associate of Arts/Associate of Science
Application	RCRA Part B Post-Closure Permit Application
ATF	Bureau of Alcohol, Tobacco, and Firearms
BAAQMD	Bay Area Air Quality Management District
BA/BS	Bachelor of Arts/Bachelor of Science
B&C	Brown & Caldwell
Cal/EPA	California Environmental Protection Agency
CAM 17 Metals	Metals identified in Title 22, Sect. 66261.24(a)(2)(A)
CCR	California Code of Regulations
CESW	Conditionally Exempt Specified Wastestream
cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
COPC	Chemical of Potential Concern
CSD	Chemical Systems Division, former name of United Technologies Corporation, Pratt & Whitney Rocketdyne, San Jose
DCA	Dichloroethane
DCE	Dichloroethene
DHS	Department of Health Services
DOD	Department of Defense
DOT	Department of Transportation
DTSC	California Department of Toxic Substances Control
EMPP	Environmental Monitoring Program Plan
EPA	Environmental Protection Agency
ERT	Emergency Response Task Force
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GAC	Granular Activated Carbon
gpd/ft	gallons per day per foot

GTS	Groundwater Treatment System
HazMat	Hazardous Materials
HBSL	Health Based Screening Levels
HMTA	Hazardous Materials Transportation Act
ICF	ICF Technology Incorporated
IT	IT Corporation
MCL	Maximum Contaminant Level
µg/kg	Micrograms per kilogram
mg/kg	Milligrams per kilogram
mph	Miles per Hour
MSDS	Material Safety Data Sheets
MSL	Mean Sea Level
NAICS	North American Industry Classification System
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
OBF	Open Burn Facility
Order	San Francisco Bay California Regional Water Quality Control Board Order No. R2-2004-0032, Revision to Final Site Cleanup Requirements, adopted May 19, 2004
PBAN	Polybutadiene Acrylic Acid Acrylonitrile
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
POC	Point of Compliance
PRG	Preliminary Remediation Goals
PWR	United Technologies Corporation, Pratt & Whitney Rocketdyne, San Jose
RACER	Remedial Actions Cost Engineering Requirements
RAP	Remedial Action Plan
RAT	Research and Advanced Technology
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SCBA	Self-Contained Breathing Apparatus

SCR	Site Cleanup Requirements
SVE	Soil Vapor Extraction
SVOCs	Semivolatile Organic Compounds
SWMU	Solid Waste Management Units
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TSDF	Treatment Storage or Disposal Facility
UBC	Uniform Building Codes
USEPA	United States Environmental Protection Agency
USV	Upper Shingle Valley
UTC	United Technologies Corporation, Pratt & Whitney Rocketdyne, San Jose (formerly known as CSD and Pratt & Whitney Space Propulsion)
VOCs	Volatile Organic Compounds
WDR	Waste Discharge Requirement

1. Introduction

Historically, United Technologies Corporation, Pratt & Whitney Rocketdyne, San Jose (PWR) developed, manufactured, and tested solid rocket motors for a variety of space exploration and defense purposes. The major portion of the manufacturing process was the mixing, casting, and curing of solid rocket motor propellants. Hazardous wastes were generated primarily from three activities at the site: manufacturing operations, research and development, and site remediation.

This Resource Conservation and Recovery Act (RCRA) Part B Post-Closure Permit Application (Application) addresses post-closure for former Surface Impoundments 0250, 0635, and 0706. Former Surface Impoundment 0250 was used for the storage of liquid wastes resulting from metal finishing. Former Surface Impoundment 0635 was used for the storage of liquid wastes resulting from polymer production. Former Surface Impoundment 0706 was used for the storage of liquid wastes resulting from container washing.

Former Surface Impoundments 0250, 0635, and 0706 were closed under the *Closure and Post-Closure Plans for Stations 0250, 0635 and 0706, Revision 3* (United Technologies Corporation [UTC], 1991). The plans were approved in the letter, *Approval of Closure and Post-Closure Plans for Stations 0250, 0635 and 0706 (Revision 3)* (Regional Water Quality Control Board [RWQCB], 1991). Closure was certified by an independent professional engineer in the report, *Closure Certification Report for Stations 0250, 0635 and 0706 Impoundments* (ICF Technology Incorporated [ICF], 1991).

This permit application is to place former Surface Impoundments 0250, 0635, and 0706 into post-closure.

1.1 Former Surface Impoundment 0250

Former Surface Impoundment 0250 was a 110,540-gallon impoundment used to hold metal finishing process wastewater (rinse tank liquids and floor washwater) from the metal finishing shop at Station 0250 in Shingle Valley. The unit was located in Administrative and Inert Area. Construction of former Surface Impoundment 0250 was completed in approximately 1968. The impoundment

wastewater contained sodium hydroxide, phosphoric acid, chromate solution, potassium dichromate, sulfuric acid, and nitric acid. Ferrous sulfate and lime were also added to the impoundment. Volatile organic compounds (VOCs) were not part of the Station 0250 wastestream going to the Station 0250 former Surface Impoundment, and were not added to the impoundment during treatment. In the April 6, 1990 letter, the Department of Toxic Substances Control (DTSC) acknowledged that solvents were not stored or treated at the Station 0250 former Surface Impoundment and agreed that the Station 0321 drum storage area was a potential source of VOCs found in groundwater in the area.

Metal finishing operations were discontinued in 1983. Removal of the impoundment liquid, sludge, and concrete was completed in 1985. The impoundment area was backfilled with clean fill and covered with asphalt in February 1986. The facility was certified closed on October 31, 1991. It is currently used as part of the street and for parking.

1.2 Former Surface Impoundment 0635

Former Surface Impoundment 0635 was constructed in 1972 adjacent to the former polymer manufacturing plant at Station 0635 in Mixer Valley. The polymer, polybutadiene acrylic acid acrylonitrile (PBAN), was used as a binding agent in propellants. Station 0635 plant operations ceased in 1983. When the plant was operating, the 174,000-gallon impoundment received wastewater bearing sodium chloride, acrylic acid, acrylonitrile, chlorinated solvents, and polymer emulsions. The former surface impoundment was approximately 60 feet by 100 feet and 5 feet deep. It was of earthen berm construction with a Hypalon liner. The pond liner was replaced by a second Hypalon liner installed in 1981. The pH of the wastewater was normally in the range of 1 to 4. The pond was emptied in June 1983 and prepared for closure in October 1985. Removal of the impoundment liquid, polymer residues, Hypalon liners, top 1 foot soil layer, and drainage structure was completed in 1986. The closed impoundment was capped with an asphaltic cap in 1991. The impoundment was backfilled and capped in March 1988. The facility was certified closed on October 31, 1991.

1.3 Former Surface Impoundment 0706

Former Surface Impoundment 0706 was a 42,964-gallon impoundment consisting of four concrete cells constructed in 1965. The two cells nearest Oxidizer Road were designated for washwater of empty hoppers that contained residual powdered ammonium perchlorate. The other two cells were used for the storage and evaporation of waste solvents and paint sludge.

The solvents and ammonium perchlorate washwater were temporarily stored in the impoundment. Use of former Surface Impoundment 0706 was discontinued in late 1985. Removal of the concrete cells was completed in 1991. During removal of the impoundment, soil was also removed around the four cells to facilitate demolition. The area of the former impoundment was capped with a concrete cap on September 25, 1991. The facility was certified closed on October 31, 1991.

1.4 Current RCRA Facilities

PWR has three active permitted Part B facilities: Storage Facility (2233), Hydrolysis Treatment Facility (0503), and Storage Magazine (0312). The numbers in parentheses identify the PWR station numbers. The Storage Facility (2233) and the Storage Magazine (0312) are permitted to store hazardous waste for periods exceeding 90 days. The Hydrolysis Treatment Facility (0503) treated hazardous wastes. The Open Burning Facility (OBF [0891]) is an interim status unit that was used to treat waste propellants and explosives by open burning. A short description of these facilities follows.

The Storage Facility (2233) consists of an 80-foot by 100-foot reinforced concrete slab covered by a prefabricated steel weather cover (Butler Building). Self-contained storage sheds are also used for storage of smaller individual quantities of hazardous waste and are located adjacent to Storage Facility (2233). The Storage Facility (2233) only received wastes generated onsite from manufacturing operations, research and development, testing activities, and site remediation. The majority of wastes were generated during rocket propellant and propulsion systems production. Wastes were also generated during routine cleaning and maintenance, as well as from surplus and off-specification materials that could not be used. Site remediation wastes are generated from various cleanup projects and may include contaminated soils and purge waters. Demolition wastes and carbon/resin from the water treatment plants are also currently stored at this facility.

The Storage Magazine (0312) is a precast concrete in-ground magazine. The magazine consisted of three separate, detached rooms (each measures about 13 feet wide, 24 feet long, and 9 feet high). An earthen mound covers all three rooms. The Storage Magazine was built to meet the Department of Defense (DOD) and the Bureau of Alcohol, Tobacco, and Firearms (ATF) requirements. The Storage Magazine was installed and constructed in 1984 and was used for less than 90-day storage of ignitable and reactive (explosive) wastes. The Storage Magazine (0312) was added to the RCRA permit because PWR planned to utilize it for storage of ignitable and reactive wastes for a period greater than 90 days.

The Hydrolysis Treatment Facility (0503) was constructed in 1997 and began operation in September 1997 for the purpose of treating excess propellant and propellant-related wastes. The hydrolysis of the propellant active ingredients into less reactive materials had been demonstrated to be a safe and reliable alternative to open burning of the wastes. The effluent from the process can be processed by conventional permitted wastewater treatment facilities. The key components of the Hydrolysis Treatment Facility (0503) included a reaction tumbler, caustic storage tank, digester tank, and brine holding tank. The Hydrolysis Treatment Facility (0503) is expected to be closed in 2006.

The OBF (0891) was closed under the *Open Burning Facility Closure/Post-Closure Plan* (ICF, 1998). Closure, except for filing of the deed restriction, was certified by an independent professional engineer in the report, *Open Burning Facility Closure Certification Report* (IT Corporation [IT], 2000). The deed restriction was filed in 2002 (Appendix A).

The onsite production of solid propellant was discontinued in August 2003 at the San Jose site. All other onsite manufacturing operations ended in December 2004. Currently, the main activities are decommissioning of the facilities and remediation of the soil and groundwater. As the PWR staff is downsized, hazardous waste operations may be subcontracted.

This document contains examples of and/or refers to many forms, work instructions, and procedures that apply to each of the three RCRA facilities. Minor modifications to these forms, work instructions, and procedures will be made without notification to the agencies. If major modifications or revisions are made, the agencies will be notified in a timely manner.

2. Facility Identification

2.1 Facility

2.1.1 Facility Name

The facility name is United Technologies Corporation, Pratt & Whitney Rocketdyne, San Jose (PWR). The U.S. Environmental Protection Agency (USEPA) I.D. Number is CAD001705235. The facility lies with the jurisdiction of the California Environmental Protection Agency (Cal/EPA)/DTSC, Region 2.

2.1.2 Facility Description

The PWR site encompasses 5,113 acres in the Santa Clara County foothills and is approximately 14 miles southeast of downtown San Jose. Figure 2-1 shows the general location of the PWR site. Figure 2-2 shows a detailed topographic map of former Surface Impoundment 0250. Figure 2-3 shows a detailed topographic map of former Surface Impoundments 0635 and 0706. The PWR site is not located on tribal land.

PWR developed, manufactured, and tested solid rocket motors at the San Jose site for a variety of space exploration and defense purposes. A major part of the manufacturing process was the mixing, casting, and curing of solid rocket motor propellants.

Hazardous waste was generated primarily from three activities at the San Jose site: manufacturing operations, research and development, and site remediation. The majority of hazardous wastes generated at the facility result from the full-scale production of rocket propellants and rocket propulsion systems. Wastes were also generated by cleaning and maintenance operations throughout the production process. In addition, some surplus and out-of-specification materials that cannot be used may be classified as wastes.

Wastes were also generated from research, development, and testing facilities. Research and development were conducted on a smaller scale and generate relatively small quantities of hazardous

waste. Site remediation activities also result in waste generation and include wastes from soil sampling, well development, soil excavation, and groundwater collection and treatment.

Former Surface Impoundment 0250: Former Surface Impoundment 0250 was a bowl-shaped, lined structure approximately 65 feet in diameter at the top of the rim and constructed of reinforced concrete. It was 6 feet in depth with a 50-foot-diameter flat base. The sloped sidewalls averaged 6 inches in concrete thickness.

In October 1985, the reinforced concrete portions of the impoundment were removed. In December 1985, the excavation was backfilled with general fill to a minimum of 90% compaction specification. In 1986, the impoundment area was paved with an asphaltic concrete cover. The existing cover extends several feet beyond the removed impoundment. The surface is sloped to facilitate stormwater runoff and has storm drains nearby.

Investigations have shown that soils underlying the closed Station 0250 former Surface Impoundment were impacted with up to 9.9 milligrams per kilogram (mg/kg) of total VOCs. VOCs were not part of the metal finishing process and were not managed in former Surface Impoundment 0250. It is believed that the presence of VOCs is due to a separate source. Sources of VOCs in soils have been identified at several areas near the closed former Surface Impoundment 0250, including Stations 0030, 0210, and 0211. These areas and the soils underlying the closed Station 0250 former Surface Impoundment were not contaminated by the Station 0250 former Surface Impoundment RCRA activities.

Remediation of the soils at the closed Station 0250 former Surface Impoundment using soil vapor extraction (SVE) under RWQCB oversight was initiated on August 3, 1992. In June 1992, thirteen SVE vents were installed in and around the location of former Surface Impoundment 0250 to remediate vadose zone soils contaminated with VOCs. A belowgrade manifold and condensate drain were installed. A mobile SVE unit with carbon adsorption tanks is connected to the SVE manifold to treat soil vapor. Soil concentrations of VOCs are below the corresponding increased cancer risk of 10-6 or a hazard quotient of 1.0 for residential exposure. Because the SVE unit has achieved its objective, it will be discontinued. The Supplemental Final Remedial Action Plan (RAP) will be used to

document the elevation and recommendation to discontinue use of the SVE system at former Surface Impoundment 0250.

SVE has also been initiated at Stations 0030, 0210, and 0211 under RWQCB oversight. Operational procedures for the SVE system are included in Appendix B. The soil remediation for soils at the closed Station 0250 former Surface Impoundment is reported under Station 0321 in *Soil Remediation Status Report for 1992* (ICF, 1993) and *Soil Remediation Status Report for 1993* (ICF, 1994).

Former Surface Impoundment 0635: Former Surface Impoundment 0635 was constructed with bottom dimensions of 40 by 83 feet, a depth of 5 feet, and side slopes of 2:1 horizontal to vertical. A longitudinal trench was excavated through the middle of the pond. The trench measured 1 foot in width with a minimum depth of 1 foot at the west end (using the plant's north direction) of the pond, sloping from west to east at a gradient of ¼-inch per foot.

A 6-inch-diameter perforated corrugated metal pipe was placed in the bottom of the trench and surrounded with pea gravel. The trench was backfilled to subgrade with a coarse filter. The resulting drainage structure was extended laterally through the east end of the pond approximately 30 feet, terminating in a 6-inch diameter vertical riser pipe (or standpipe). The riser pipe acted as a wet well and projected approximately 3 feet above ground surface. The construction design included an earth berm and Hypalon liner. A second liner was installed in 1981 after a fire damaged the first liner.

On December 1985, the Hypalon liners and approximately 140 cubic yards of soil were removed. A cover was installed that included a moisture barrier layer placed on top of the impoundment floor. The moisture barrier layer was constructed of a 24-inch thick layer of compacted clay. A 45-mil synthetic impermeable membrane was placed over the moisture barrier layer and anchored along its perimeter. The next layer was a drainage layer placed above the synthetic membrane constructed with a 12-inch thick sand layer. The drainage layer was overlain by a geotextile filter fabric, followed by a 24-inch minimum thickness layer of native soil. The original cap was completed in March 1988.

To keep burrowing ground squirrels out of the original cap, a final cap was installed over the original cap in 1991. A four-foot deep concrete cutoff wall was installed around the perimeter of the original

cap with a wall thickness of four to eight inches. The original cap was covered with six inches of compacted Class 2 bedrock under four inches of asphaltic concrete. The cap surface was sloped with a minimum of two percent from the centerline of the cap to the north and south to facilitate storm water runoff. The final cap was completed in September 1991.

In October 1985, soil samples were collected from four borings at former Surface Impoundment 0635, generally at depths of 2, 5, 10, 15, and 20 feet below the surface. In October 1986, additional soil samples were collected from four borings at the Station 0635 former Surface Impoundment, generally at depths of 2 and 5 feet below the surface. The work is described in *Closure and Post-Closure Plans – Stations 0250, 0635, and 0706* (Brown & Caldwell [B&C], 1991).

Only low levels of VOCs were detected in the soil beneath former Surface Impoundment 0635. The maximum soil concentrations are shown in Table 2-1. The maximum soil concentrations are below the 1999 residential Environmental Protection Agency (EPA) Region IV Preliminary Remediation Goals (PRGs) (EPA, 1999) as shown in Table 2-1. The soil levels are also below the RWQCB soil cleanup goals of 1 mg/kg of total class A, B1, and B2 VOCs and 5 mg/kg of total class C and D VOCs that were determined to be protective of groundwater (*Order No. 94-064, Final Site Cleanup Requirements for United Technologies Corporation, Chemical Systems Division – Coyote Center, Operable Unit 1* (RWQCB, 1994).

TABLE 2-1
MAXIMUM SOIL VOC CONTAMINATION AT
STATION 0635 SURFACE IMPOUNDMENT

VOC	Soil Concentration, mg/kg	PRG, mg/kg
Acetone	0.089	1,600
Benzene	0.021	0.67
1,1-Dichloroethene	0.007	0.054
trans-1,2-Dichloroethene	0.050	63
2-Hexanone	0.61	Not listed
Methylene Chloride	0.061	8.9

VOC	Soil Concentration, mg/kg	PRG, mg/kg
Toluene	0.041	520
1,1,1-Trichloroethane	0.019	770
Trichloroethene	0.058	2.8
Vinyl Acetate	0.17	430

Soil concentrations come from Table 3-15 (B&C, 1991). PRGs are residential goals (EPA, 1999).

When the former surface impoundment closure was undergoing public comment in 1990, the soil source for the VOC contamination at the Station 0635 former Surface Impoundment was not known. In the April 6, 1990 letter, DTSC stated that (1) data indicated the contamination in the Station 0635 former Surface Impoundment soil was due to groundwater movement and not from the soil or discharges from former Surface Impoundment 0635 and (2) chemicals unique to Station 0635 former Surface Impoundment have not been detected in downgradient groundwater. Since that time, investigations have shown that Station 0635 soils, upgradient of the closed Station 0635 former Surface Impoundment, were impacted with up to 1,200 mg/kg of total VOCs. VOC groundwater concentrations in upgradient well 20D-01 are much higher than the downgradient monitoring wells 20C-13, 20C-14, and 20C-16 (see Table 2-2). Therefore, there is very strong evidence that the VOCs in the closed 0635 former Surface Impoundment groundwater are not a result of a release from the former surface impoundment.

TABLE 2-2
GROUNDWATER VOC CONCENTRATIONS AT
STATION 0635 SURFACE IMPOUNDMENT
OCTOBER 14, 1999

VOC	20D-01	20C-13	20C-14	20C-16
1,1-Dichloroethane	<10	<5	<25	11
1,1-Dichloroethene	78.1	25.7	58.2	190
cis-1,2-Dichloroethene	330	150	380	110
1,1,1-Trichloroethane	160	24.6	<25	52.7
Trichloroethene	970	200	380	350
Vinyl Chloride	<10	<5	88.1	8

Note: Units are μg/L. The data shown above are from Appendix B (CSD, 2000).

There is no soil contamination above residential PRG levels, soil levels are protective of groundwater, and the groundwater contamination at the closed Station 0635 former Surface Impoundment was the result of other Chemical Systems Division (CSD) activities. Therefore, there is no need for post-closure of the former surface impoundment. In addition, there is no need to maintain the cap.

Remediation of the Station 0635 soils using SVE under RWQCB oversight was initiated on February 3, 1993. The soil remediation is reported in *Soil Remediation Status Report for 1992* (ICF, 1993) and *Soil Remediation Status Report for 1993* (ICF, 1994).

Former Surface Impoundment 0706: Former Surface Impoundment 0706 was 61 feet 4 inches long, 22 feet wide, and 4 feet 6 inches deep and was divided into four cells. It was constructed of steel-reinforced concrete with rubber water stops at construction joints. Joint filler was used at the slab edge to seal the joints. The impoundment walls were 8 inches thick and the floor slab ranged from 8 to 14 inches thick.

In 1991, the transite pipe from Station 0501 to the impoundment and the concrete impoundment were removed. During removal of the impoundment, soil was also removed around the four cells to facilitate demolition. The excavation was backfilled and compacted to 90 percent compaction. The backfill was covered with six inches of compacted Class 2 rock under four inches of concrete. The area of the former impoundment was capped with a concrete cap on September 25, 1991. An asphalt apron was constructed around the four sides of the concrete cap to prevent rodents from digging holes under the cap as well as to facilitate storm water runoff. The asphalt apron extends at least three feet on all sides. The final cap was completed in October 1991.

After the concrete impoundment was removed, soil samples were collected from 30 borings at the Station 0706 former Surface Impoundment between depths of 6 to 24 inches below the excavation floor to sample the unsaturated subsoils for VOCs in August and September 1991. Three soil samples were collected from the excavated soil that had surrounded the cells. Twelve soil samples that were collected from depths of 6 to 12 inches below the excavation floor were also analyzed for perchlorate.

The work is described in *Closure Certification Report for Stations 0250, 0635, and 0706 Impoundments* (ICF, 1991a).

Only low levels of VOCs and perchlorate were detected. The maximum soil concentrations are shown in Table 2-3. The maximum soil concentrations are below residential EPA Region IV PRGs (EPA, 1999) as shown in Table 2-3. The soil levels are also below the RWQCB soil cleanup goals 1 mg/kg of for total class A, B1, and B2 VOCs and 5 mg/kg for total class C and D VOCs that were determined to be protective of groundwater (*Order No. 94-064, Final Site Cleanup Requirements for United Technologies Corporation, Chemical Systems Division – Coyote Center, Operable Unit 1* (RWQCB, 1994).

TABLE 2-3
MAXIMUM SOIL VOC AND PERCHLORATE CONTAMINATION AT STATION 0706 SURFACE IMPOUNDMENT

Compound	Soil Concentration, mg/kg	PRG, mg/kg
Acetone	0.043	1,600
Carbon Tetrachloride	0.004	0.24
1,2-Dichlorobenzene	0.003	370
1,1-Dichloroethane	0.004	590
cis-1,2-Dichloroethene	0.061	43
Ethyl ester acetic acid*	0.008	Not Listed
2-Ethyl-1-hexanol*	0.05	Not Listed
Methylene Chloride	0.006	8.9
Perchlorate	0.70	39
Tetrachloroethene (PCE)	0.009	5.7
1,1,1-Trichloroethane (TCA)	0.006	770
Trichloroethene (TCE)	0.22	2.8

Note: Data are from Attachments R through T (ICF, 1991a). PRGs are residential goals (EPA, 1999).
*Tentatively identified compound (best computer fit).

In the April 6, 1990 letter, DTSC stated that the pattern of VOC distribution in downgradient groundwater is not consistent with chemical migration from the 0706 former Surface Impoundment. Soil sources of VOCs have been identified upgradient of the closed 0706 former Surface Impoundment along Oxidizer Road, and at Stations 0531, 0535, 0635, and 0630, upgradient of the closed 0706

former Surface Impoundment along Mixer Road. Perchlorate soil sources have been identified at Stations 0501 and 0521, upgradient of the 0706 former Surface Impoundment.

The 0706 former Surface Impoundment has been removed, there is no remaining soil contamination above residential PRG levels, soil levels are protective of groundwater, upgradient groundwater shows higher concentrations of unit-specific contaminants than downgradient groundwater, and groundwater is being monitored and cleaned up under RWQCB oversight. Therefore, there is no need for post-closure of the former surface impoundment. In addition, there is no need to maintain the cap.

2.1.3 Mailing Address

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2.1.4 Location

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Pratt & Whitney Rocketdyne
600 Metcalf Road
San Jose, CA 95138-9601

2.1.5 Telephone Number

Mr. Don Bilder: (561) 769-3904

2.1.6 NAICS Codes

The primary North American Industry Classification System (NAICS) code was 336415 and described the operations at PWR, which was designated as Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing. The secondary NAICS code was 336419, Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing.

2.2 Owner/Operator Information

2.2.1 Facility Owner

United Technologies Corporation
United Technologies Building
Hartford, Connecticut 06101

2.2.2 Facility Operator

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2.3 Contact Person

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2.4 Plan Preparation

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600 Metcalf Road
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2.5 DTSC Instructions Used to Prepare Plan

This permit application has been prepared by following the *Instructions for Preparing a Post-Closure Permit Application* (DTSC, January 2002). A completed copy of the permit completeness checklist is provided in Appendix C.

2.6 Environmental, Health and Safety Policy

Appendix D contains UTC's Environmental, Health and Safety policy. UTC is committed to safety, pollution prevention, and protection of the environment.

2.7 Operation Plan Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____ _____

Name Date

Title

3. Facility and Surroundings

This section provides physical characteristics of the PWR facility. Descriptions of the site location and layout, land characteristics, and land use and zoning are included with narrative descriptions of traffic patterns, security, and access control.

3.1 Maps

PWR physical characteristics are shown in several maps. Map contents are outlined below.

Figure 3-1 Site Specific Topographic Map
- Property boundary
- Drainage basin boundary
- Water wells
- Closed Surface Impoundments 0250, 0635 and 0706
- Former Open Burning Facility (0891)
- Storage Facility (2233)
- Storage Magazine (0312)
- Hydrolysis Treatment Facility (0503)

Figure 3-2 Flood, Land Use, and Zoning Map
- Area of 100-year floodplain
- Zoning classifications

Figure 3-3 Utilities Map
- Power lines
- Gas lines

Figure 3-4 Access Control Map
- Security fencing
- Security gates
- Guard houses

Figure 3-5 Hazardous and Energetic Waste Traffic Patterns
Waste routes and signs

Physical characteristics of former Surface Impoundments 0250, 0635, and 0706 are shown in the aforementioned figures.

Figure 2-2 Detailed Topographic Map of Surface Impoundment 0250
Surface water flow
Surface waters
Legal boundaries of Surface Impoundment 0250
Roads and buildings
2,000-foot perimeter boundary

Figure 2-3 Detailed Topographic Map of Surface Impoundments 0635 and 0706
Surface water flow
Surface waters
Legal boundaries of Surface Impoundments 0635 and 0706
Roads and buildings
2,000-foot perimeter boundary

Figure 3-6 Groundwater Monitoring Map of Surface Impoundment 0250
Groundwater extraction wells
Groundwater monitoring wells
Point of compliance wells

Figure 3-7 Groundwater Monitoring Map of Surface Impoundments 0635 and 0706
Groundwater extraction wells
Groundwater monitoring wells
Point of compliance wells

3.2 Site Location

The PWR facility is located in Township 8 South, Ranges 2 and 3 East, of the Mt. Diablo Base and Meridian, and at North Latitude 37^{o} 13' and West Longitude 121^{o} 41'. The terrain at the PWR facility is moderate to steeply sloping with elevations ranging from about 680 feet to over 1400 feet above mean sea level (MSL) along the ridges in the western portion of the site. The site topography is dominated by rounded, prominent hills and ridges with moderately steep hillsides having gradients up to 2.5 to 1, horizontal to vertical.

Former Surface Impoundment 0250 was located near Shingle Valley Road in Upper Shingle Valley. Former Surface Impoundment 0635 was located on Mixer Road in Mixer Valley. Former Surface Impoundment 0706 was located on Oxidizer Road in Mixer Valley.

3.3 Land Characteristics

Winds at the PWR facility blow predominantly from the north and west with occasional gusts to the southeast and northwest. Wind speeds range from 15-20 miles per hour (mph) from the north and west, and 6-8 mph from the southeast and northwest. An annual wind rose summary is shown below:

TABLE 3-1

ANNUAL WIND ROSE

Wind Speed	Percent of Time							
(mph)	N	NE	E	SE	S	SW	W	NW
1 – 4	12	3	3	4	4	3	3	8
5 – 7	15	4	4	7	7	4	6	9
8 – 11	18	—	5	10	7	—	12	11
12 – 14	21	—	—	11	8	—	18	12
15 – 17	—	—	—	—	—	—	19	—
18 – 21	—	—	—	—	—	—	—	—

Most surface water drainage located onsite is tributary to Anderson Reservoir. Anderson Reservoir drains to Coyote Creek, which flows to San Francisco Bay. The regional drainage patterns and onsite drainage basin delineations can be seen on the topographic map (Figure 3-1). The major ridges and streams of the PWR area parallel the northwest-southeast geologic trend, and the drainage patterns are

typically elongated along the northwest-southeast direction. Streamflow in the region is highly seasonal, with 90 percent of the annual runoff occurring from November to April.

As shown in Figure 3-1, four creeks flow through the PWR site: Shingle Creek, Mixer Creek, San Felipe Creek, and Las Animas Creek. Shingle Creek flows southeast through Shingle Valley and into Las Animas Creek just beyond the southeastern property boundary. Mixer Creek flows along the northern edge or center of the lower Mixer Valley floor and into Las Animas Creek about 3,000 feet upstream from where Shingle Creek joins Las Animas Creek. San Felipe Creek flows through the eastern section of the Panhandle portion of the PWR site and empties into Las Animas Creek about 500 feet downgradient of the confluence of Mixer and Las Animas Creeks. Las Animas Creek flows southeast through the eastern portion of the PWR site and eventually empties into Anderson Reservoir approximately 2,700 feet southwest of the confluence of Shingle and Las Animas Creeks. Anderson Reservoir is a municipal and domestic water supply source for Santa Clara County. Additional direct and indirect uses of the reservoir include recreational activities, groundwater recharge, wildlife habitat and a fish spawning area.

At the former Surface Impoundment 0250, surface runoff north and east of the impoundment area flows down a drainage ditch to the east that empties into Shingle Creek. Stormwater that falls on the capped impoundment area flows south-southeast across asphalt to storm drains that also empty to Shingle Creek.

At the former Surface Impoundment 0635, surface runoff flows east to Mixer Creek. At the former Surface Impoundment 0706, surface runoff flows east to Oxidizer drainage and then to Mixer Creek.

3.4 Land Use and Zoning

The land use surrounding the PWR facility is shown in Figure 3-2. Land to the northeast and southeast of the site is ranchland. Development in the ranchlands is severely restricted by Santa Clara County. To the northwest is a Regional Park and open public land. Directly to the west of PWR are additional Regional Park land and undeveloped hillsides.

Zoning for the PWR facility and contiguous areas is shown in Figure 3-2. A 3,100-acre use permit, granted November 18, 1959, and amended on December 4, 1963, allows the establishment and maintenance of the PWR plant site. The 2,000-acre hillside tract of PWR has a similar use permit which was granted December 18, 1963.

Figure 3-2 also shows that the majority of land surrounding PWR has been zoned for agricultural use. This zoning requires that the parcels be a minimum of 20 acres. Exceptions to agricultural use are the Motorcycle Park and public lands to the northwest of PWR. The land surrounding the former Surface Impoundments 0250, 0635 and 0706 is zoned for agricultural use.

3.5 Facility Utilities

Figure 3-3 shows a utility map, which identifies gas, electric and water utilities with respect to the site location. The former Surface Impoundments 0250, 0635 and 0706 do not have water, gas, or sewer lines. There is a potable water line outlet near former Surface Impoundment 0250.

Electrical power is supplied to the groundwater extraction wells and the SVE power hook-ups near former Surface Impoundments 0250, 0635 and 0706. Figure 3-6 shows the groundwater monitoring and extraction wells near the former Surface Impoundment 0250 and the point of compliance wells. Figure 3-7 shows the groundwater monitoring and extraction wells near the former Surface Impoundments 0635 and 0706, and the point of compliance wells.

3.6 Traffic Conditions

The most prevalent traffic pattern for the PWR facility occurs during morning and evening commutes. The incoming commute traffic pattern occurs at about 7:30 a.m. and the outgoing traffic occurs at about 4:00 p.m. About 50 employee vehicles and approximately 100 contractor vehicles access the facility on a daily basis. Employees and contractors enter and exit from the gate on Metcalf Road. In addition, about 5 delivery vehicles access PWR daily. Delivery vehicles typically range from vans to large semi-trailer trucks. Most deliveries occur during normal working hours. Generally, most deliveries are made using the entrance on Las Animas Road. Hazardous waste shipments to offsite

disposal facilities are made using this gate, which is in close proximity to the Storage Facility (2233). Consequently, disposal facility vendor trucks use access site internal roadways for movement of hazardous wastes. Less than 50 company vehicles are present onsite. Employee traffic within the facility is not restricted, except in the OBF and the Research and Advanced Technology (RAT) areas. Figure 3-5 illustrates the general movement of hazardous and energetic wastes on the PWR facility.

There are approximately 12 miles of roadway on the PWR facility. All access roads to the facility and onsite roads are asphalt. Figure 3-4 provides the locations of access control points for the PWR facility. Most roads are constructed of 3-inch blacktop on top of an 8-inch base rock. The roads are capable of bearing loads of up to 5,000 pounds per wheel. Therefore, the facility roads can bear the weight of trucks, trailers, and tractors typically used for hazardous waste transport.

Speed limits within the facility are enforced. The limits are 25 miles per hour within the propellant processing areas and 15 miles per hour in the inert work areas. All visitors to the facility must read and understand vehicle safety information presented to them upon issuance of their badge. Detailed internal safety regulations for the operation of company vehicles have been prepared and implemented to ensure safe and responsible operation of vehicles onsite.

The roads to the former Surface Impoundments 0250, 0635, and 0706 are asphalt. Public access to the former Surface Impoundments 0250, 0635, and 0706 is controlled by guard posts at the front and back gates. There is fencing around the three former surface impoundments.

3.7 Legal Description of Facility

Figure 3-1 shows the legal boundaries of the PWR facility. The Assessor Parcel Numbers for the PWR facility are shown below:

627-11-009	627-13-002	627-14-011	729-54-003
627-11-013	627-13-003	729-53-001	729-54-004
627-11-014	627-13-004	729-53-002	
627-11-015	627-13-005	729-53-003	

627-12-016 627-13-006 729-53-004
627-13-001 627-13-007 729-54-002

Former Surface Impoundment 0250 is located between Point Number 76 located at 269058.196N, 1654769.475E and Point Number 79 located at 269074.161N, 1654627.555E (see Figure 3-8).

Former Surface Impoundment 0635 is a rectangle. The east corner is located 97.68 feet and 11°17’53” northwest of the Bench Mark (Point Number 74) located at 267606.15N, 1659075.21E. The south corner is located 61.57 feet and 51°39’54” southwest of the east corner. The west corner is located 101.09 feet and 51°03’46” northwest of the south corner. The north corner is located 60.31 feet and 38°20’45” northeast of the west corner (Figure 3-9).

Former Surface Impoundment 0706 and the surrounding asphalt apron are defined by five corners. The south corner of the asphalt is located 159.71 feet and 76°40’20” northwest of the Bench Mark (Point Number 75) located at 267150.53N, 1660047.94E. The west corner of the asphalt is located 77.78 feet and 53°13’56” northwest of the south corner. The north corner of the asphalt is located 35.00 feet and 36°12’32” northeast of the west corner. The first east corner of the asphalt is located 73.19 feet and 37°35’39” southeast of the north corner. The second east corner of the asphalt is located 7.41 feet and 87°10’13” southeast of the first east corner (Figure 3-10).

4. Geology and Hydrogeology

4.1 Geology

Former Surface Impoundments 0250, 0635, and 0706 are located in the southwest section of the Diablo Range, a component of the Coast Range geomorphic province. The Diablo Range consists of a central core of the Jurassic-Cretaceous Franciscan Complex flanked by Cretaceous and Tertiary Formations along the western edge.

Most of the major faults, fold axes, valleys and ridges in the site vicinity exhibit the region's northwest structural trend, as defined by the San Andreas fault system. Compressional forces associated with the surrounding tectonic activity are responsible for the localized folding that is characteristic of the area.

The major ridges and streams at the PWR site parallel the regional northwest-southeast geologic trend. Stream valleys, especially along Las Animas Creek, are filled with unconsolidated recent alluvium. These deposits generally consist of interfingering, subhorizontal beds of poorly sorted silt, clay, sand, and sandy gravel. Subsurface investigations in Mixer Valley, near Stations 0635 and 0706, identified alluvium up to 30 feet in thickness. In Shingle Valley, near Station 0250, the maximum alluvial thickness was found to be 46 feet.

The subsurface materials in the Shingle Valley area are dominated, both in the valleys and the hills, by a thick sequence of moderately folded and faulted sediments known as the Santa Clara Formation. The Santa Clara Formation is Plio-Pleistocene in age, about 1,800 feet thick, consisting of semiconsolidated, interbedded clays, silts, sands and gravels. Distinction between the Santa Clara formation and the overlying alluvium may sometimes be accomplished by noting the difference in consolidation between the two formations. The Santa Clara Formation usually has a greater degree of consolidation. The Santa Clara Formation is typically a poor water-bearing material relative to overlying deposits. According to Dibblee (1973), the Santa Clara Formation dips to the northeast at 35 to 55 degrees on both sides of Shingle Valley.

The most significant water-bearing material at the site is the Quaternary alluvium, which overlies and is derived from the Santa Clara Formation. The alluvium consists of unconsolidated stream-deposited sediments occupying the relatively flat valley floors in and around the creeks and intermittent streams. These comprise the most permeable, shallowest and topographically lowest geologic unit. The alluvial deposits in Shingle Valley have a predominantly silty-clay matrix with occasional discontinuous sand and gravel lenses ranging from several inches to several feet thick. The configuration and permeability of individual lenses and layers in the alluvium cannot be precisely determined due to its widely varying composition. The alluvium ranges in thickness from less than 1 foot to about 50 feet. Groundwater in the alluvium is unconfined.

4.1.1 Station 0250 Geology

Geologic mapping by Dibblee (1973) indicates former Surface Impoundment 0250 was located very close to the contact between the alluvium and the Santa Clara Formation. Field reconnaissance indicated the vicinity of the pond is underlain by gravelly and sandy clays of the Santa Clara Formation. Outcrops on Metcalf Road about 400 feet northeast of the pond show the Santa Clara formation striking northwest and dipping 35 degrees to the northeast. Observation of a nearby cut slope indicates individual semiconsolidated clay layers in the Santa Clara are less than one to several feet thick and are virtually unfractured.

The boring logs from the drilling programs conducted in 1985 demonstrate that the area in the vicinity of the impoundment rests on a relatively intact mudstone bedrock material at a depth of 10 feet below the present surface grade. Above this relatively hard bedrock is a layer of apparently native alluvial conglomerate material. This alluvial material is a mixture of silty clay with coarse sands. The surface of this layer approximates the original grade elevations determined from construction drawings and also roughly corresponds with observed blow count, color, and gravel demarcations from drilling logs.

4.1.2 Station 0635 Geology

According to Dibblee (1973), the Station 0635 vicinity is underlain by alluvium. Subsurface investigation indicated the alluvium in this area varies in thickness from approximately 10 to 30 feet.

The alluvium consists of subhorizontal, 1 to 5-foot thick layers and lenses of silty, sandy, and gravelly clay intercalated with occasional 1 to 3-inch thick gravel lenses. The alluvium is underlain by the Santa Clara Formation, which consists of sandy and gravelly clay layers and lenses, which are generally 2 to 6 feet thick. The bedding attitude of the Santa Clara Formation beneath Station 0635 is unknown, but may strike northwest and dip 35 to 55 degrees northeast similar to the hills to the southwest. The clay layers in the alluvium and Santa Clara Formation are unfractured and unconsolidated to semiconsolidated.

The subsurface materials encountered in the vicinity of Station 0635 are generally similar to those in the vicinity of Station 0706, approximately 1,200 feet to the east. Two geologic units were identified. Quaternary age alluvium underlies the upper 20 to 30 feet of the Station 0635 area. The alluvium is underlain by more consolidated deposits of the Plio-Pleistocene Santa Clara Formation to the maximum depths of the soil borings made in the 0635 area (approximately 40 feet).

The alluvial deposits consist of medium stiff to hard, silty, sandy, and gravelly clays. The upper 4 to 9 feet of the alluvium consists of medium stiff to hard, damp to moist, silty to gravelly clays. Beneath these upper clays are stiff to hard, silty, sandy to gravelly clays. The lower clays, from 9 to 30 feet, are intercalated with 2-to 3 inch-thick lenses of more permeable sandy clay and clayey gravel. As is characteristic of alluvial deposits, individual layers are laterally discontinuous, and often cannot be correlated between boreholes.

The alluvial deposits are underlain by fluvial (river deposited) sediments of the Santa Clara Formation. The Santa Clara Formation in the vicinity of Station 0635 consists of hard, sandy to gravelly clays with occasional 2 to 3-inch lenses of more permeable clayey and sandy gravel. The Santa Clara Formation was encountered at depths ranging from approximately 21 to 30 feet in the Station 0635 area, but may be as shallow as 10 feet at wells 20D-01 and 20D-01A.

4.1.3 Station 0706 Geology

Geologic mapping by Dibblee (1973) indicates Station 0706 is underlain by alluvium. Subsurface investigation indicates Station 0706 is underlain by fill varying in thickness from a few inches to as

much as 4 feet. The fill is variable and consists of gravel, sand, sandy clay, and gravelly clay. The fill is underlain by 10 to 30 feet of alluvium consisting of subhorizontal 1 to 4-foot thick lenses and layers of silty, sandy and gravelly clay with 1 to 4-inch thick sand and gravel lenses. The Santa Clara Formation underlies the alluvium and consists of 2- to 6-foot thick layers of sandy and gravelly clay. The attitude of bedding in the Santa Clara Formation has not been observed in the vicinity of Station 0706. The clay layers in the alluvium are unconsolidated to semiconsolidated and unfractured.

Three soil types are mapped in the small valleys where Mixer Road and Oxidizer Road are located. In the upper Mixer Valley the soil is a Zamora clay loam. The Zamora series have moderately fine textured subsoils and are underlain by alluvium of mixed origin. In the upper Oxidizer Valley Road the soil is classified as a Pleasanton gravelly loam. Like the soils along the Las Animas and Shingle Creek beds, it was formed on gravelly alluvium. The soil type at Station 0706 is the Cropley Clay. The Cropley series soils are described as fine textured soils underlain by mixed alluvium.

Local soil sampling efforts indicate the surficial top soil layer is 1 to 3 feet deep and consists of dark brown, medium stiff, silty to sandy clay. The top soil is underlain by alluvium, generally stiff to very stiff, silty, sandy and gravelly clays. The clays are intercalated with lenses of more permeable sandy clay, gravelly clayey sand, and clayey gravelly sand. As is characteristic of such alluvial deposits, the clay and sand layers are laterally discontinuous, and oftentimes layers cannot be correlated between boreholes.

4.2 Seismic Conditions

The PWR facility is located in Uniform Building Codes (UBC) designated seismic Zone 4. This is a seismically active region, near or traversed by the Calaveras Fault, Silver Creek Fault, Metcalf Fault, and smaller Animas and Quimby faults. Therefore, ground shaking is to be expected in the event of seismic activity on one of the major faults.

The Alquist-Priolo Special Studies Zonation Map (Appendix E) shows the trace of potentially active faults as they occur on the ground surface within the PWR facility. These faults are considered to have

been active during Holocene (recent) time and to have a relatively high potential for surface rupture. The faults are bounded by straight-line segments that define the special studies zone segments.

The map may not show all faults that have the potential for rupture, either within the special studies zone or outside their boundaries. The identification and location of these faults are based on best available data.

4.2.1 Mixer Valley Seismic Study

A comprehensive geologic analysis of the effects of seismic activity on waste facilities at the PWR facility is presented in Appendix F, *Fault Hazard Investigation of the Storage Facility (2233) and Hydrolysis Treatment Facility (0503).* The fault hazard investigation was conducted at the Storage Facility (2233) and the Hydrolysis Treatment Facility (0503) at the request of the Department of Toxic Substances Control. The investigation found no evidence of active or potentially active faults, splays, or any other lineations within more than 200 feet of either of the facility structures. Results of the seismic refraction investigation at both stations indicated no evidence of subsurface conditions that can be attributed to faulting or fracturing.

Former Surface Impoundment 0706 is across the street from the Hydrolysis Treatment Facility (0503). On the basis of all the data, the potential for faulting at former Surface Impoundment 0706 is extremely low. Former Surface Impoundment 0635 is located approximately 900 feet upvalley from former Surface Impoundment 0635 and would also be expected to have a low potential for faulting (although a specific fault hazard investigation was not conducted).

Former Surface Impoundment 0250 is located approximately 7,500 feet from an active fault (Holocene displacement). The closest fault to former Surface Impoundment 0250 is the Animas fault (approximately 900 feet to the north); however, this fault has not had evidence of Holocene displacement.

4.3 Hydrology

4.3.1 Former Surface Impoundment 0250 Hydrology

The characteristics of the alluvium and the Santa Clara Formation at former Surface Impoundment 0250 are similar to those exhibited by the alluvial deposits and Santa Clara Formation throughout the major portion of Shingle Valley (Section 4.1). The alluvium has a wide range of permeabilities, varying both horizontally and vertically. This wide range is reflected in field hydraulic test results, which indicate a range of moderate to moderately high transmissivities, ranging from 110 to 17,000 gallons per day per foot (gpd/ft). On the other hand, the Santa Clara Formation has a low to very low permeability. Core samples of the Santa Clara Formation were dense, poorly sorted, and semiconsolidated, with little observable porosity. Groundwater migrating in the Santa Clara Formation would flow at a velocity several orders of magnitude lower than groundwater in the alluvium.

The uppermost aquifer is the alluvium. In general, alluvial groundwater flow in Shingle Valley is toward the southeast in the same general direction as Shingle Creek flow. Locally, alluvial groundwater flow is significantly influenced by extraction wells. Groundwater flow in the alluvium near Impoundment 0250 is toward extraction well 18P-01E and south to southeast. Groundwater hydrochemistry maps are included in Appendix D of the *2004 Environmental Monitoring Program Plan* (UTC, 2003) found in Appendix G of this report.

4.3.2 Former Surface Impoundment 0635 Hydrology

The groundwater gradients as determined by Weiss (1982) indicate that subsurface flows in the Mixer Creek watershed travel from tributary valleys to the main valley and down to its southeastern outlet. Gradients are steepest under hillslopes, more gentle in tributary valleys, and gentlest in the main valleys. The alluvium, which is the most permeable material at the site, is distributed along the valley floors and thus serves as the major pathway for groundwater flow. Flow in the underlying Santa Clara Formation is far more restricted than flow through the alluvium due to its much lower permeability. The direction of flow in the Santa Clara Formation is probably similar to, but more limited than, that of the shallower alluvial flow.

Subsurface conditions encountered during the installation of wells in the Station 0635 area are quite similar to those at Station 0706. Quaternary Alluvium consisting of a heterogeneous combination of discontinuous gravelly to sandy clay layers and lenses in a matrix of silty clay is about 10 to 30 feet thick in the Station 0635 vicinity. It is a low permeability unit, with more permeable lenses of sandy clay gravel up to several inches thick in the lower 9 to 30 feet of the unit. The Santa Clara Formation underlies the alluvium. Lithologically, it is quite similar to the overlying alluvium, except it is harder and generally much less permeable. The contact between the two units appears to be a partial groundwater barrier.

The uppermost aquifer is the alluvium. In general, alluvial groundwater flow in Mixer Valley is toward the southeast in the same general direction as Mixer Creek flow. Locally, alluvial groundwater flow near Impoundment 0635 is significantly influenced by extraction wells 20D-08E and 20C-27. Groundwater hydrochemistry maps are included in Appendix D of the *2004 Environmental Monitoring Program Plan* (UTC, 2003) found in Appendix G of this report.

4.3.3 Former Surface Impoundment 0706 Hydrology

Former Surface Impoundment 0706 overlies semiconsolidated and unconsolidated sedimentary materials which have been classified as "water-bearing" based on their ability to transmit and store water. Localized areas of low permeability rock may cause some confinement or perched groundwater, but, generally, the groundwater is classified as unconfined.

The extent and geometry of the groundwater body, where former Surface Impoundment 0706 is located, is defined by hydraulic boundaries and low permeability boundaries. The low permeability boundaries occur along the margins of both the Santa Clara Formation and the recent alluvium, where they are in contact with other rocks. These boundaries are created either by unconformities between lithologies or by faults. The hydraulic boundaries occur where the hydraulic gradient does not permit flow across a drainage divide.

Both the Santa Clara Formation and the recent alluvium are heterogeneous, with lenses of clay, sand, gravel, and mixtures of grain sizes occurring throughout. The discontinuous character of the lenses and

the gradual change in grain sizes within layers creates a complex variation in hydraulic conductivity. The top of the saturated zone is indicated by water levels in wells that tap the recent alluvium. The water levels are generally within 15 feet of the surface, but vary seasonally and from year to year. The base of the groundwater body is the contact with underlying rocks.

The uppermost aquifer is the alluvium. In general, alluvial groundwater flow in Mixer Valley is toward the southeast in the same general direction as Mixer Creek flow. Locally, alluvial groundwater flow near Impoundment 0706 is toward extraction well 20C-25 and south. Groundwater hydrochemistry maps are included in Appendix D of the *2004 Environmental Monitoring Program Plan* (UTC, 2003) found in Appendix G of this report.

5. Relationship of Facility to the 100-Year Floodplain

Figure 5-1 presents the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the PWR area. This map shows that former Surface Impoundments 0250, 0635, and 0706 are outside the 100-year flood boundary.

6. Characteristics of Hazardous Wastes Handled at Former Surface Impoundments 0250, 0635, and 0706

This section discusses the characteristics of hazardous waste handled at former Surface Impoundments 0250, 0635, and 0706.

A corrective action program is currently underway in Shingle and Mixer Valleys to remediate soil and groundwater impacts under oversight by RWQCB. VOC-impacted soils in the soils that lie underneath former Surface Impoundment 0250 are being treated with SVE. VOC-impacted groundwater in the area of former Surface Impoundment 0250 is being extracted and treated at Groundwater Treatment System (GTS) 2405 in Shingle Valley. VOCs and 1,4-dioxane are removed using advanced oxidation techniques (HiPox) and aqueous-phase carbon. Perchlorate is removed with ion exchange resin.

VOC-impacted groundwater in the area of former Surface Impoundments 0635 and 0706 are being extracted and treated at GTS 2404 in Mixer Valley. VOCs and 1,4-dioxane are removed using advanced oxidation techniques (HiPox) and aqueous-phase carbon. Perchlorate is removed with ion exchange resin.

6.1 Former Surface Impoundment 0250

6.1.1 Hazardous Wastes Placed in Former Surface Impoundment 0250

Former Surface Impoundment 0250 received wastewater containing metals, acids and bases from Station 0250 loading operations. The metal treatment process at Station 0250 started in 1968. Aluminum pieces were dipped into acidic and caustic solutions before being dipped into water to rinse the chemicals from the aluminum pieces. The rinse water and floor washwater (containing some of the acidic and caustic chemicals) were pumped to former Surface Impoundment 0250.

Sodium hydroxide, phosphoric acid, chromate solution, potassium dichromate, sulfuric acid and nitric acid were present in the impoundment wastewater. Ferrous sulfate was added to reduce hexavalent

chromium to trivalent chromium. Lime was added to precipitate the trivalent chromium to chromic hydroxide. Organic chemicals were not discharged to the impoundment wastewater.

Former Surface Impoundment 0250 received approximately 71,000 gallons per year. The capacity of the impoundment was 110,540 gallons.

All of the wastes sent to former Surface Impoundment 0250 have been removed.

6.1.2 Former Surface Impoundment 0250 Soil

Former Surface Impoundment 0250 vadose zone soils are being treated for VOCs using SVE under RWQCB oversight. However, the soil concentrations detected in the top 10 feet are below the health based screening levels corresponding to 10-6 residential increased cancer risk as shown in Table 6-1, except for TCE.

TABLE 6-1
SURFACE IMPOUNDEMNT 0250 SOIL MAXIMUM CONTAMINANT CONCENTRATIONS, SOIL CONCENTRATIONS CORRESPONDING TO 10^{-6} RESIDENTIAL RISK LEVELS OR A HAZARD QUOTIENT OF 1, AND PROPOSED CLEANUP LEVELS

Contaminant	Group[1]	Maximum Soil Concentration[2]	10-6 Risk to Residents[3]	Proposed Cleanup Levels
		Concentration, mg/kg		
Chloroform	B2	0.22	*	None
Methylene chloride	B2	4.0	*	None
Tetrachloroethene (PCE)	B2	0.17	*	None
Trichloroethene (TCE)	B2	4.4	3	None
Acetone	D	0.032	*	None
1,1-Dichloroethane	D	0.093	*	None
cis-1,2-Dichloroethene	D	0.053	*	None
Toluene	D	1.1	*	None
Xylenes	D	0.11	*	None
Chromium	-	70	*	None
Copper	D	35	*	None
Lead	B2	16	*	None
Nickel	-	120	*	None
Vanadium	-	36	*	None
Zinc	D	58	*	None

[1]Weight of Evidence, USEPA's guidelines (USEPA, 1997) for carcinogen risk characterization:
Group A - Human carcinogen

Group B - Probable human carcinogen
Group C - Possible human carcinogen
Group D - Not classified as to human carcinogenicity
[2]Maximum soil concentration in top 10 feet of Surface Impoundment 0250. The VOC values are historical values; current soil levels are likely to be lower due to SVE remedial efforts.
[3]Increased cancer risk for residential exposure; does not include groundwater ingestion pathway.
[4]Chemical not regulated as a carcinogen by the State of California. Soil level is equivalent to a hazard quotient of 1.0 for residential exposure; does not include groundwater ingestion pathway.
*Maximum soil concentration is below the risk assessment health-based screening level, not a chemical of potential concern.

The health based screening levels (HBSL) corresponding to 1 x 10^{-6} excess cancer risk for TCE is 3 mg/kg. The maximum soil concentration of TCE at former Surface Impoundment 0250 was 4.4 mg/kg. Only 1 out of 18 soil results was above the TCE HBSL. The average TCE concentration in soil samples collected from former Surface Impoundment 0250 was 0.78 mg/kg. In addition, SVE has been performed on the former Surface Impoundment 0250 soils since the samples were collected.

Due to (1) the low frequency of soil samples above the TCE HBSL, (2) the average soil concentration before SVE was initiated being below the TCE HBSL, and (3) the removal of TCE and other VOCs during SVE, the residential risk from soil at former Surface Impoundment 0250 is considered to be below a level corresponding to 1 x 10^{-6} excess cancer risk.

6.1.3 Survey Plat of Former Surface Impoundment 0250

A survey plat of former Surface Impoundment 0250 was prepared and certified by a professional land surveyor (Figure 3-8). A ¾-inch iron pipe with tag LS 3242 was set in a monument and surveyed to be a local benchmark.

6.2 Former Surface Impoundment 0635

6.2.1 Hazardous Wastes Placed in Former Surface Impoundment 0635

Station 0635 was a chemical process plant that manufactured a polymer product and an explosive material, trichlorotrinitrobenzene. Former Surface Impoundment 0635 served as an evaporation pond for process waste water and plant runoff. Acrylic acid, acrylonitrile, butadiene, cetyldimethylbenzyl ammonium chloride, dodecanethiol, azo-bis-iso-butyronitrile, hydroquinone, sodium chloride and sodium bisulfite were used in the production of polymer.

Aniline, ethanol and chlorine gas were used to produce trichloroaniline. Trichloroaniline, toluene and sodium sulfite were used to produce trichlorobenzene. Trichlorobenzene, sulfuric acid and nitric acid were used to produce trichlorotrinitrobenzene. Dimethyl sulfoxide, trichloroethene (TCE) and 1,1,1-TCA were used as solvents.

Former Surface Impoundment 0635 received approximately 170,000 gallons per year. The capacity of the impoundment was 174,000 gallons. A 2-foot freeboard was normally maintained so that the maximum inventory in the impoundment was normally 92,000 gallons.

All of the wastes sent to former Surface Impoundment 0635 have been removed.

6.2.2 Former Surface Impoundment 0635 Soil

There are no soils at the former Surface Impoundment 0635 with constituents of potential concern (COPC) concentrations above the levels corresponding to 10^{-6} residential increased cancer risk.

6.2.3 Survey Plat of Former Surface Impoundment 0635

A survey plat of former Surface Impoundment 0635 was prepared and certified by a professional land surveyor in November 1991 (Figure 3-9). A 1.5-inch aluminum cap stamped “Cross Land Surveying RLS 3242” was set in a monument and surveyed to be a local benchmark.

6.3 Former Surface Impoundment 0706

6.3.1 Hazardous Wastes Placed in Former Surface Impoundment 0706

Former Surface Impoundment 0706 consisted of four in-ground cells. Two cells held ammonium perchlorate wastewater. The other two cells were used for storage and evaporation of waste solvents, such as TCE and 1,1,1-TCA, and paint sludges.

Former Surface Impoundment 0706 received approximately 4,800 gallons per year. The capacity of the impoundment was 42,964 gallons.

The wastes were pumped out and properly disposed of.

6.3.2 Former Surface Impoundment 0706 Soil

There are no soils at the former Surface Impoundment 0706 with COPC concentrations above the levels corresponding to 10^{-6} residential increased cancer risk.

6.3.3 Survey Plat of Former Surface Impoundment 0706

A survey plat of former Surface Impoundment 0706 was prepared and certified by a professional land surveyor in November 1991 (Figure 3-10). A 1-inch iron pipe with tag "LS 3242" was set in a monument and surveyed to be a local benchmark.

6.4 Post-Closure Performance Standards

Former Surface Impoundments 0250, 0635, and 0706 were closed in a manner that minimizes any potential threat to human health or the environment. Therefore, there is no need for further maintenance or inspections because post-closure care requirements are met in the following way:

- Wastes, waste residues, contaminated containment system components, and contaminated subsurface soil have been removed;
- Free liquids have been removed; and
- Covers are in place to minimize the migration of rainfall through the closed impoundments (although concentrations in soils remaining beneath the former surface impoundments are below applicable criteria).

6.4.1 Deed Notices and Restrictions

On December 24, 1991, a *Property Owner's Post-Closure Notification Regarding Former Hazardous Waste Management on Owner's Property* was recorded in Santa Clara County (Appendix A). The deed

notice described the operations and the wastes managed at former Surface Impoundments 0250, 0635, and 0706.

The deed restriction prohibits the use of contaminated groundwater at PWR, including former Surface Impoundments 0250, 0635, and 0706, for human consumption, recreational uses or agriculture unless permitted by RWQCB. This restriction minimizes or eliminates potential exposure to impacted groundwater via use or ingestion of groundwater from the area.

6.5 Potential for Public Exposure to Releases

The maximum soil concentrations of COPCs at former Surface Impoundments 0250, 0635, and 0706 are considered to be below levels corresponding to 1×10^{-6} excess cancer risks or hazard quotients of 1.0. In addition, the presence of asphalt covers over clean fill at all three former surface impoundments eliminates the opportunity and likelihood of exposure to soil.

Groundwater beneath closed former Surface Impoundments 0635 and 0706 does not appear to be contaminated as a result of a release of hazardous constituents from either of these units. Groundwater beneath closed former Surface Impoundment 0250 appears to have constituents in downgradient groundwater higher than in upgradient groundwater. However, a site-wide groundwater collection and treatment system is in place for the facility (see Section 7.1), which effectively mitigates the potential for migration and exposure to COPCs.

7. Major Waste Management Devices

This section discusses the major waste management devices at former Surface Impoundments 0250, 0635 and 0706.

7.1 Groundwater Monitoring Wells and Remediation Systems

The groundwater monitoring of the three closed former surface impoundments was evaluated and recommendations to upgrade the groundwater monitoring were made in a report to RWQCB, *Evaluation of Wells Monitoring Former Surface Impoundment at Stations 0250, 0635, and 0706 – Phases I and II* (ICF, 1991b). The upgrades were performed.

Table 7-1 shows the wells that are currently used for monitoring of the closed impoundments under RWQCB oversight. The monitoring wells are sampled and analyzed for VOCs using EPA Method 8260 twice each year.

TABLE 7-1
GROUNDWATER MONITORING AND EXTRACTION WELLS
FOR THE CLOSED SURFACE IMPOUNDMENTS

Well	0250	0635	0706
Upgradient Monitoring Well	18P-17	20D-01	20C-34
Downgradient Monitoring Well	18P-01R	20C-13	20C-06
Downgradient Monitoring Well	18P-02	20C-14	20C-26
Downgradient Monitoring Well	18P-03R	20C-16	20C-35
Extraction Well	18P-01E	20D-08	20C-25

Under RWQCB oversight, CSD monitors (1) source area groundwater to ensure migration of groundwater with higher concentrations is minimized, (2) plume boundaries to ensure plume migration is controlled, and (3) the effectiveness of remedial measures in reducing contaminant concentrations in groundwater, both at the leading edge of the plumes and in areas with higher groundwater concentrations.

Former Surface Impoundments 0250, 0635, and 0706 lie within plumes commingled with multiple sources. Groundwater extraction and monitoring wells have already been installed for former Surface Impoundments 0250, 0635, and 0706.

Immediately downgradient of former Surface Impoundment 0250 is extraction well 18P-01E. Further downgradient is extraction well 18P-08E. These and other extraction wells in the area are routed to GTS 2405, where the water is treated with advanced oxidation techniques (HiPox), aqueous-phase carbon, and ion exchange resin to remove VOCs, perchlorate and 1,4-dioxane prior to introduction to PWR's treated groundwater reuse system. A number of monitoring wells have been installed near former Surface Impoundment 0250 including upgradient well 18P-17 and downgradient wells 18P-01R, 18P-02 and 18P-03R.

Immediately upgradient of former Surface Impoundment 0635 is extraction well 20D-08. Downgradient is extraction well 20C-27. These and other extraction wells in the area are routed to GTS 2404, where the water is treated with advanced oxidation techniques (Hipox), aqueous-phase carbon, and ion exchange resin to remove VOCs and perchlorate prior to introduction to PWR's treated groundwater reuse system. A number of monitoring wells have been installed near former Surface Impoundment 0635 including downgradient wells 20C-13, 20C-14 and 20C-16.

Downgradient of former Surface Impoundment 0706 is extraction well 20C-25. Further downgradient is extraction well 20F-11. These and other extraction wells in the area are routed to GTS 2404. A number of monitoring wells have been installed near former Surface Impoundment 0706 including upgradient well 20C-34 and downgradient wells 20C-26 and 20C-35.

The Shingle Valley and Mixer Valley, groundwater extraction and monitoring systems are capable of controlling and detecting VOC plume migration at all leading edges.

7.2 Seepage of Groundwater to Creeks

Groundwater contaminated with COPCs has the potential to seep to drainages and creeks. However, groundwater from the former Surface Impoundment 0250 area is removed by extraction wells 18P-

01E, 18P-08E, 19C-12E and the 2401 groundwater interception trench between former Surface Impoundment 0250 and Shingle Creek. These extraction wells remove contaminated groundwater and reduce groundwater seepage to Shingle Creek.

Groundwater from the former Surface Impoundment 0635 area is removed by extraction wells 20D-08 and 20C-27. Groundwater from the former Surface Impoundment 0706 area is removed by extraction wells 20C-25 and 20F-11. These extraction wells and others in Mixer Valley remove contaminated groundwater and lower the water table, thereby reducing groundwater seepage to Mixer Creek.

8. Facility Equipment

8.1 Safety and Emergency Equipment

8.1.1 General

A listing of equipment and materials generally available to departments normally involved in chemical safety and emergency response activities is contained in the *Integrated Incident Response and Contingency Plan* (Appendix H).

A Hazardous Materials Response Trailer is maintained at the site. The trailer is available for both onsite and offsite emergency response operations. Protective clothing including suits, gloves, boots, spill equipment, self-contained breathing apparatus (SCBA), and other items are typical examples of emergency response equipment maintained in the trailer. A complete listing of equipment found in the response trailer is included in the *Integrated Incident Response and Contingency Plan* (Appendix H).

Material Safety Data Sheets (MSDSs) for chemicals used onsite are maintained on file in the UTC EH&S Department. Both hard copy and files on electronic media are available.

The *Health and Safety Plan for United Technologies Corporation Pratt & Whitney Rocketdyne, San Jose Waste Operations* is included as Appendix I.

8.1.2 Emergency and Personal Protective Equipment

The emergency equipment and personal protective equipment available to personnel who enter or work at former Surface Impoundment 0250 are stored at the Storage Facility (2233) and presented in Table 8-1. Safety equipment is stored within the Storage Facility (2233) and Station 0024.

Former Surface Impoundments 0635 and 0706 are capped, not used for any activities and present no appreciable risk to workers. The only protective equipment required at these areas are safety shoes and safety glasses.

8.2 Security

8.2.1 General

An eight-foot chain link fence topped by three-strand barbed wire encloses the entire PWR facility, with the exception of the western portion. The western boundary is two miles from public access and is protected by four-strand barbed wire cattle fencing. The perimeter fencing is conspicuously posted with signs prohibiting trespass. The fence is provided with gates at strategic locations to allow emergency vehicle access. These gates may be kept locked depending on their use and are monitored for signs of tampering should they be normally locked. Figure 3-4 shows the locations of fencing and gates.

TABLE 8-1
EMERGENCY AND PERSONAL PROTECTIVE EQUIPMENT
AVAILABLE AT THE STORAGE FACILITY (2233) FOR USE AT
SURFACE IMPOUNDMENT 0250

Personal Protective Equipment
Tyvek, acid resistant, and Saranex suits
Respirators (full and half face) with assorted cartridges
Dust masks
Safety glasses
Goggles and shields
Gloves: latex, neoprene, nitrile, and polyvinyl acetate
Emergency Equipment
Fire extinguishers: carbon dioxide and metal-X
Safety shower and eye wash (2)
Telephone (2)
Acid and base neutralizer absorbent
Absorbent cloth and clay
“Plug and Dike”
Drain plug rug, spill dike
Drum invertro and drum grabber
Shovels and brooms
Salvage drums and containment tanks
Drum pump, dolly and wrench
Fork lift and pallet jack
Containment tank (55-gallon)
Secondarily contained, portable storage units

Employees will also wear fire retardant overalls and lab coats, leather gloves, and steel toe boots, as appropriate.

Security is controlled by trained staff in the Security Control Room located adjacent to the facility's main entrance (see Figure 3-4). This room serves as a 24-hour emergency and security communication center. Telephone and radio communications are controlled from this room. Fire, smoke, personnel assistance, and leak detection alarms are monitored from the Control Room. There is also a closed circuit television monitor at the Control Room that is connected to surveillance cameras throughout the facility. The Security Control Room also monitors access to all gates.

Security lighting is provided around the perimeter of buildings and along roadways. Uniformed security officers in radio-dispatched vehicles make continuous rounds of the facility during non-work hours. These officers are trained and equipped to respond to physical security emergencies.

There are no direct public access roads to former Surface Impoundments 0250, 0635, and 0706. All visitors in personal vehicles are processed through the main gate at the Security Control Room located on Metcalf Road. Badges are required for all persons entering the facility. All visitors, including contractors and non-employee visitors, are required to register at the security office and are provided with distinctive identification badges. Badges must be worn at all times while onsite. Any person not properly badged will be denied entry. All employees are further required to have employee decals on their vehicles.

Warning signs are located at intervals along the facility's perimeter fence. These signs are 12" x 18", and are worded as follows:

TRESPASSING OR LOITERING FORBIDDEN BY LAW

(SECTION 533 CPC)

UNITED TECHNOLOGIES CHEMICAL SYSTEMS DIVISION

The wording on the perimeter fence signs may be updated in the future to reflect the current name of the facility.

8.2.2 RCRA Facility Security

Former Surface Impoundments 0250, 0635, and 0706 are posted with signs that read, "Notice: Closed hazardous waste impoundment, excavation or pavement breaking prohibited without authorization from Manager Health and Safety Engineering." Former Surface Impoundment 0250 is marked with striped broad yellow lines. Former Surface Impoundments 0635 and 0706 are marked with a broad yellow line around each perimeter.

All facility personnel handling wastes are provided with appropriate protective clothing and equipment. Section 8.2.1 and the *Integrated Incident Response Plan and Contingency Plan* (Appendix H) provide detailed descriptions of personal protective and emergency response equipment.

8.3 Water Systems

8.3.1 Water Supply

Drinking water for the PWR facility is supplied from source wells located onsite. Two wells are located one half mile north of South Coyote on the east side of Highway 101. The remaining onsite well is located in the western end of the PWR facility (Figure 3-1). Water from each location is pumped to a treatment plant before introduction into the site distribution system. The water distribution system includes storage capacity for over 485,000 gallons. Backflow devices are provided to protect domestic water supplies onsite, but are not related to hazardous waste activities at former Surface Impoundments 0250, 0635, and 0706.

9. Operational Procedures

9.1 General Operating Procedure

Former Surface Impoundments 0250, 0635, and 0706 have been closed to prevent releases and to protect human health and the environment.

9.2 Provisions To Limit Access By Unauthorized Personnel To Post-Closure Area

The entire PWR facility is enclosed by a fence that prohibits public access to the property. The perimeter fencing is conspicuously posted with 12-inch by 18-inch warning signs prohibiting trespass. The signs are located at regular intervals along the perimeter fence and are worded as follows: "TRESPASSING OR LOITERING FORBIDDEN BY LAW (SECTION 533 C.P.C.) UNITED TECHNOLOGIES CHEMICAL SYSTEMS DIVISION." The wording on the perimeter fence signs may be updated in the future to reflect the current name of the facility.

Gates in the fence are located at strategic locations to allow emergency vehicle access. There are no public access roads to former Surface Impoundments 0250, 0635, and 0706.

Security is controlled by trained staff in the Security Control Room located adjacent to the facility main entrance. This room serves as a 24-hour emergency and security communication center. There is a closed circuit television monitor at the Control Room that is connected to surveillance cameras in certain areas of the facility. The Security Control Room also monitors access to all gates. A Security Shift Lieutenant is stationed 24 hours per day, seven days per week, at the main entry. Most deliveries are processed through the back gate, located on Las Animas Road. There is one guard station on Las Animas Road that is staffed during business hours when the gate is unlocked.

Standard procedures for site security, including site access control, have always been enforced at the PWR site. Site access control includes the use of identification badges and site passes to provide positive identification of personnel, and authorize personnel entry into areas requiring access control. Visitor control has a badge system in place to ensure that all visitors and non-employees are properly controlled while on the company premises. During non-business hours, employees and visitors are

required to document a site visit at the main Security headquarters upon entering and exiting the site. Visitor/contractor access requires a PWR employee to submit an advanced memorandum approved by a responsible supervisor to the Security Department listing the visiting individuals, the purpose of the visit, and the date, time and locations to be accessed.

9.3 Groundwater Monitoring Program

A RWQCB groundwater remediation and monitoring program is currently in place for former Surface Impoundments 0250, 0635, and 0706. In accordance with RCRA Appendix IX (RCRA Appendix IX, Title 22, Section 66264.801), Appendix IX sampling is performed annually for the monitoring wells associated with the former surface impoundments as shown in Table 9-1. Former Surface Impoundment 0250 lies within the Shingle Valley VOC plume. Former Surface Impoundments 0635 and 0706 lie within the Mixer Valley VOC plume. The three sections below present notable data from RCRA wells specific to the former Surface Impoundments 0250, 0635, and 0706.

TABLE 9-1

APPENDIX IX WELLS SAMPLED IN 2004 AND 2005

RCRA Unit	Well near RCRA Unit	Mid-Distance Well	Far-Distance Well
SI 0250	18P-01R	18P-02	AI-06
SI 0635	20C-14	20C-13	20C-17
SI 0706	20C-35	20C-25	20G-15

RCRA Appendix IX groundwater monitoring includes analysis for VOCs, semi-volatile organic compounds (SVOCs), perchlorate, organochlorine and organophosphate pesticides, 17 California Assessment Manual (CAM) metals, polychlorinated biphenyls (PCBs), sulfide, chlorinated herbicides, dioxins and furans, and cyanides. To evaluate regulatory exceedences, data are compared to the groundwater cleanup standards prescribed in the San Francisco Bay California Regional Water Quality Control Board Order No. R2-2004-0032, Revision to Final Site Cleanup Requirements, adopted May 19, 2004 (Order) or the California Department of Health Services (DHS) Maximum Contaminant Levels (MCL).

9.3.1 Former Surface Impoundment 0250

The designated monitoring wells for the former impoundment are 18P-01R, 18P-02, and AI-06; all three were sampled for Appendix IX parameters in 2005. Concentrations of analytes detected in 2005 were similar to data from 2004. Individual analytes that exceeded the cleanup levels in the Order or MCLs were 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), carbon tetrachloride, TCE, PCE, and perchlorate. The analytical results for 2004 and 2005 are shown in Table 9-2.

TABLE 9-2

SELECTED RESULTS IN WELLS AT THE FORMER SURFACE IMPOUNDMENT 0250

	Cleanup Standard (µg/L)*	18P-01R (µg/L)		18P-02 (µg/L)		AI-06 (µg/L)	
Analyte		**2004**	**2005**	**2004**	**2005**	**2004**	**2005**
1,1,1-TCA	200	40.7	15.7	8.2	8.9	74.8	79.4
1,1-DCA	5	23.1	13.3	64	65.4	18.8	18.6
1,1-DCE	6	217	64.2	330	247	47.8	41.6
1,4-Dioxane	3	<130	<130	68	<130	<130	<130
Carbon Tetrachloride	0.5	<1	<1	5.7	4.6	<1	<1
Chloroform	100	1.2	<1	10	10.3	<1	<1
TCE	5	191	149	110	107	38.1	40.1
PCE	5	<1	<1	20	27.2	<1	<1
Perchlorate	6	11.8	19.2	12.1	14.9	<3	<3
Cyanide	150	65	23	12	13	<10	<10

Notes:

< - below reporting limit
ug/L - micrograms per liter
1,1,1-TCA - 1,1,1-Trichloroethane
1,1-DCA - 1,1-Dichloroethane
1,1-DCE - 1,1-Dichloroethene
TCE - Trichloroethene
* Cleanup Standards are per the Order or based on the California MCL (if not listed in the Order)

9.3.2 Former Surface Impoundment 0635

The designated monitoring wells for the former impoundment are 20C-13, 20C-14, and 20C-17; all three were sampled for Appendix IX parameters in 2005. Concentrations of analytes detected in 2005 were similar to those results from 2004, except for a decrease of perchlorate in monitoring well 20C-17 from 1,230 µg/L (2004) to 643 µg/L (2005). Individual analytes that exceeded the cleanup levels in

the Order or MCLs were 1,1-DCA, 1,1-DCE, TCE, perchlorate, and vinyl chloride. The analytical results for 2004 and 2005 are shown in Table 9-3.

TABLE 9-3

SELECTED RESULTS IN WELLS AT THE FORMER SURFACE IMPOUNDMENT 0635

	Cleanup Standard (µg/L)*	20C-13 (µg/L)		20C-14 (µg/L)		20C-17 (µg/L)	
Analyte		**2004**	**2005**	**2004**	**2005**	**2004**	**2005**
1,1,1-TCA	200	5	4.5	7.7	8.7	19.5	15.2
1,1-DCA	5	9.3	3.8	4.9	3.8	4.6	3.5
1,1-DCE	6	33.4	19.5	9.8	6.7	40.3	27.7
1,4-Dioxane	3	<250	<130	<130	<130	<250	<250
trans-1,2-DCE	10	3.1	1.9	2.3	3.6	<2	<2
Barium	2000	<200	530	<200	486	<200	591
beta-BHC	NE	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
gamma-BHC (Lindane)	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perchlorate	6	216	80.4	7.8	15.6	1,230	553
TCE	5	204	155	194	192	300	288
Vinyl Chloride	0.5	12.9	6.3	2.8	1.7	<2	<2

Notes:

< - below reporting limit
µg/L - micrograms per liter
NA - Not Analyzed
NE - Not Established
1,1,1-TCA - 1,1,1-Trichloroethane
1,1-DCA - 1,1-Dichloroethane
1,1-DCE - 1,1-Dichloroethene
trans-1,2-DCE - trans 1,2-Dichloroethene
TCE - Trichloroethene
* Cleanup Standards are per the Order or based on the California MCL (if not listed in the Order)

9.3.3 Former Surface Impoundment 0706

The designated monitoring wells for the former impoundment are 20C-25, 20C-35, and 20G-15; all three were successfully sampled for Appendix IX parameters in 2005. Concentrations of analytes detected in 2005 were similar to those results from 2004. Individual analytes that exceeded the cleanup levels in the Order or MCLs were 1,1-DCA, 1,1-DCE, TCE, and perchlorate. The analytical results for 2004 and 2005 are shown in Table 9-4.

TABLE 9-4

SELECTED RESULTS IN WELLS AT THE FORMER SURFACE IMPOUNDMENT 0706

	Cleanup Standard (µg/L)*	20C-25 (µg/L)		20C-35 (µg/L)		20G-15 (µg/L)	
Analyte		**2004**	**2005**	**2004**	**2005**	**2004**	**2005**
1,1,1-TCA	200	35.6	24.5	33.3	33.7	28.4	17.4
1,1-DCA	5	24.2	18.3	20.2	18.7	12.7	9.2
1,1-DCE	6	47.3	25.3	30.8	32.1	42.0	19.8
1,4-Dioxane	3	630	<250	<630 R	<630	<130 R	<130
trans-1,2-DCE	10	<5	<2	<5	<5	<1	<1
Barium	2000	<200	634	<200	589	<200	<200
beta-BHC	NE	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
gamma-BHC (Lindane)	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perchlorate	6	3050	5920	1080	1330	3610	4690
TCE	5	566	384	562	534	83.1	68.2
Vinyl Chloride	0.5	<5	<2	<5	<5	<1	<1

Notes:
< - below reporting limit
µg/L - micrograms per liter
1,1,1-TCA - 1,1,1-Trichloroethane
1,1-DCA - 1,1-Dichloroethane
1,1-DCE - 1,1-Dichloroethene
TCE - Trichloroethene
R – Results rejected due to laboratory QC problem
* Cleanup Standards are per the Order or based on the California MCL (if not listed in the Order)

Groundwater monitoring results from June and July 2005 for former Surface Impoundments 0250, 0636 and 0706 are contained in Appendix J. Groundwater elevations from December 2004 through October 2005 are shown in Appendix K.

Former Surface Impoundment 0250 RCRA Monitoring: Previous groundwater sampling showed the presence of VOCs, perchlorate, and cyanide in former Surface Impoundment 0250 groundwater. Therefore, the proposed RCRA monitoring for former Surface Impoundment 0250 includes VOCs, perchlorate, and total cyanides. Former Surface Impoundment 0250 was used to hold metal finishing wastewater. Therefore, the proposed monitoring will also include the 17 CAM metals. Because metals and cyanides have not been detected in groundwater above MCLs, sampling for these parameters will only be performed annually.

Former Surface Impoundment 0635 RCRA Monitoring: Previous groundwater sampling showed the presence of VOCs and perchlorate in former Surface Impoundment 0635 groundwater. A pesticide, beta-BHC, was found at a maximum of 0.74 µg/L. Although beta-BHC was not part of the Station 0635 waste stream and may be an artifact (the concentration is too low to confirm using Method 8270), the level is above the California action level of 0.025 µg/L. Therefore, the proposed monitoring for former Surface Impoundment 0635 includes VOCs, perchlorate, and organochlorine pesticides. Due to the recent detection of beta-BHC, pesticides will be monitored annually.

Former Surface Impoundment 0706 RCRA Monitoring: Previous groundwater sampling showed the presence of VOCs and perchlorate in former Surface Impoundment 0706 groundwater. Historically, former Surface Impoundment 0706 was used to hold organic solvents and perchlorate aqueous solutions. Therefore, the proposed RCRA monitoring for former Surface Impoundment 0706 includes VOCs and perchlorate.

The sampling and analysis program proposed for the RCRA post-closure monitoring of former Surface Impoundments 0250, 0635, and 0706 is summarized in Table 9-5. Monitoring will comply with the requirements of 22 CCR 66264.90. Point of Compliance (POC) wells for former Surface Impoundments 0250, 0635, and 0706 were selected from existing downgradient wells and are also shown in Table 9-4.

A statistical analysis of upgradient versus downgradient concentrations of COPCs managed in each closed former surface impoundment will be performed. If the analysis demonstrates that downgradient concentrations are lower than or statistically equivalent to upgradient concentrations, that is evidence that the former surface impoundments are not contributing to groundwater impacts, and a permit modification will be submitted to request that groundwater monitoring be discontinued.

Figures 3-6 through 3-7 show the location of the groundwater monitoring wells for former Surface Impoundments 0250, 0635, and 0706. Monitoring well construction information is contained in Appendix A of the *2004 Environmental Monitoring Program Plan,* which is presented in Appendix G of this document. Monitoring well boring logs are presented in Appendix L.

TABLE 9-5

RCRA POST-CLOSURE GROUNDWATER MONITORING PLAN

RCRA Unit	RCRA Well ID	COPC	Frequency	Method
0250	18P-01R*	Perchlorate	6 MO	314.0
	18P-01R*	17 CAM Metals	A	6010
	18P-01R*	VOCs	6 MO	8260
	18P-01R*	Total Cyanides	A	9010
	18P-02	Perchlorate	6 MO	314.0
	18P-02	17 CAM Metals	A	6010
	18P-02	VOCs	6 MO	8260
	18P-02	Total Cyanides	A	9010
	AI-06	Perchlorate	6 MO	314.0
	AI-06	17 CAM Metals	A	6010
	AI-06	VOCs	6 MO	8260
	AI-06	Total Cyanides	A	9010
0635	20C-13	Perchlorate	6 MO	314.0
	20C-13	OC Pesticides	A	8081A
	20C-13	VOCs	6 MO	8260
	20C-14*	Perchlorate	6 MO	314.0
	20C-14*	OC Pesticides	A	8081A
	20C-14*	VOCs	6 MO	8260
	20C-17	Perchlorate	6 MO	314.0
	20C-17	OC Pesticides	A	8081A
	20C-17	VOCs	6 MO	8260
0706	20C-25	Perchlorate	6 MO	314.0
	20C-25	VOCs	6 MO	8260
	20C-35*	Perchlorate	6 MO	314.0
	20C-35*	VOCs	6 MO	8260
	20G-15	Perchlorate	6 MO	314.0
	20G-15	VOCs	6 MO	8260

*Point of Compliance (POC) well
OC: Organochlorine
6 MO: Monitoring parameters sampled every 6 months
A: Sampled once each year

PWR's groundwater monitoring plan is submitted annually to RWQCB for review and approval. The latest version of the groundwater monitoring plan will be in effect upon RWQCB approval and implemented under RWQCB oversight. The groundwater monitoring plan for former Surface Impoundments 0250, 0635, and 0706 will include, at a minimum, those analyses and frequency of analyses for those wells listed in Table 9-5.

An annual environmental monitoring program plan (EMPP) is prepared and includes the sampling collection procedures, preservation, analytical method, chain-of-custody procedures, and sampling frequency. Wells are purged prior to sampling using a submersible pump or a bailer and groundwater

indicator parameters measured. Groundwater is sampled, preserved as appropriate, and forwarded to a certified laboratory for analysis.

The annual Environmental Monitoring Report includes the procedures for determining the groundwater flow rates. Groundwater elevations are measured in all wells during a relatively short time frame so that groundwater elevations represent a given set of data that is comparable across the site. The data are used to produce groundwater potential maps that indicate the direction of groundwater flow.

Well sampling results are used to generate concentration trend graphs that are based on a linear regression. Trend lines with a positive slope are considered increasing, while a negative slope is considered a decreasing trend.

Figures 9-1 and 9-2 show the extent of VOCs and perchlorate at former Surface Impoundment 0250. Alluvial groundwater flow at former Surface Impoundment 0250 is south-southeast. Figures 9-3 and 9-4 show the extent of VOCs and perchlorate at former Surface Impoundments 0635 and 0706. Alluvial groundwater flow at former Surface Impoundment 0635 is southeast. Alluvial groundwater flow at former Surface Impoundment 0706 is south.

The Shingle Valley and Mixer Valley groundwater extraction systems are capable of containing the VOC plumes. The groundwater flow rates for former Surface Impoundments 0250, 0635, and 0706 were calculated in the *Fourth Quarter and Annual 2002 Environmental Monitoring Report* (UTC, 2003) and found to be 10.41, 0.93 and 1.22 feet per day, respectively.

9.4 Surface-Water Monitoring Program

An extensive surface water monitoring program is conducted at PWR and included in the annual EMPPs. Creek monitoring stations are shown in Figure 1-1 in Appendix G.

9.5 Planned Maintenance Activities

Some soils under former Surface Impoundment 0250 have COPC concentrations above RWQCB cleanup levels for protection to groundwater, but the soils under all three former Surface Impoundments 0250, 0635, and 0706 do not have COPC levels at or above 1×10^{-6} increased residential excess cancer risk. In addition, all three former impoundments are capped to eliminate exposure and infiltration. Although the former surface impoundment caps do not therefore need to be maintained, routine maintenance will be performed as needed to keep the areas and equipment in good repair.

9.6 Inspection Schedules and Procedures

9.6.1 Inspection Schedule and Procedures

The caps of former Surface Impoundments 0250, 0635, and 0706 will not be inspected because (1) there are no tanks or containers of hazardous waste that could fail, (2) the hazardous chemicals have been removed from beneath the closed former surface impoundments, eliminating the need to mitigate infiltration of surface water, (3) soils and hazardous wastes have been removed and replaced with clean fill, eliminating the potential for contact or exposure, and (4) settling of the cover will not affect closure performance.

The facility will inspect monitoring wells and the general physical location of each area. Examples of inspection checklists are included in Appendix M.

10. Personnel Training

10.1 General Training Requirements

Facility personnel who typically receive hazardous waste training include personnel directly involved in hazardous waste management activities and those employees who, in the course of their work, must know how to perform their jobs in compliance with state and federal hazardous waste regulations.

Hazardous waste management personnel are those employees who are routinely involved in the transport, packaging, treatment, or shipping of hazardous wastes. Also included in this category are employees who coordinate responses to hazardous waste emergencies, employees who have overall hazardous waste program responsibilities, and supervisors who direct the efforts of employees engaged in these activities.

Employees involved in processes which generate hazardous waste, or who may need to be aware of emergency response procedures, receive training to ensure compliance with applicable state and federal regulations. Typically, supervisors make determinations on which employees should attend training within a given department or station location based on the following guidelines:

- Employees involved in processes that generate hazardous waste.
- Employees who respond to emergencies involving hazardous waste by notifying others and evacuating as necessary.

UTC has a comprehensive chemical safety training program that is intended to inform employees of the safe handling, storage, and use of hazardous materials. Included in this program are new employee orientation, hazard communication, chemical safety, and other mandatory courses for employees working with hazardous materials.

Training instructors for employees involved in facility operations that require knowledge of safe hazardous material and waste handling practices are required to complete appropriate training and

education. Instructors are members of the Environmental Engineering Department or such training may be given by qualified vendors or consultants who specialize in hazardous waste training programs.

10.2 RCRA/OSHA Facility Specific Training Requirements

All employees who routinely handle, package, store, treat, or transport hazardous wastes are trained to recognize and avoid potential safety, health, and environmental hazards associated with their jobs. During training, emphasis is placed on the need to perform waste management activities in a safe and environmentally responsible manner.

Retraining is provided, as required, based on changes in procedures, materials, or processes. Written operating procedures are made available, where applicable, such as requirements for protective clothing, daily equipment inspection, and shutdown procedures for both normal and emergency situations.

Additional introductory and continuing training given to RCRA facility personnel will include but not be limited to the following topics:

- Waste sampling procedures;
- Forklift, truck and material handling, as appropriate;
- Respiratory safety training;
- Personal protective equipment;
- Work instructions;
- Contingency plan implementation;
- Hazard communication; and
- Medical surveillance.

10.2.1 Job Duties

In general, personnel directly involved in remediating contaminated soil and groundwater fall under two job classifications. These job classifications, and the duties associated with them, can change

depending on organizational and operational changes. The following is a listing of the current positions, job duties and requirements of each:

Person	Skills	Experience	Education	Updates	Regulatory Reference
Manager	RCRA hazardous waste management knowledge. Effectively manage and supervise employees.	6 – 10 years	Bachelor of Arts/Bachelor of Science (BA/BS) or equivalent with demonstrated knowledge	Annual review of initial training or recertification or required skills	22 California Code of Regulations (CCR) 66262.34(i)(4) 66264.16 & 66265.16
Technician	Employees able to perform operations and handle wastes.	3 – 5 years	Associate of Arts/Associate of Science (AA/AS) or equivalent with demonstrated knowledge	Annual refresher and certification	22CCR 66262.34(i)(4) 66264.16 & 66265.16

Manager

The Manager oversees and coordinates all remedial processes and activities of technicians involved in remediating contaminated soil and groundwater. He supervises the daily work of technicians. The principal responsibilities of the Manager, or his designee, may include, but are not limited to, the following:

- Instructs, assigns, checks, and reviews work of technicians and the staff;

- Ensures site-wide compliance with procedures and the most current regulations pertaining to hazardous waste facilities and remedial actions;

- Oversees maintenance of required documentation associated with hazardous waste operations including but not limited to: inspection reports and environmental monitoring reports;

- Oversees the maintenance of established procedures as they affect assigned functional responsibilities and develops, recommends or initiates new or revised procedures and practices, materials or equipment contributing to improved efficiency and economy;

- Reviews housekeeping practices at the facility; and

- Is responsible for complying fully with all safety and environmental requirements.

Technician

The Technicians at the RCRA facilities are responsible for performing operations related to the handling and disposal of hazardous wastes. Duties shall include but are not limited to the following:

- Performs remedial actions as required per operating procedures;
- Performs all required inspections and maintains appropriate records;
- Maintains appropriate inventories of supplies to sustain remedial actions;
- Uses and maintains necessary equipment associated with the remedial actions;
- Maintains safety and environmental compliance, cleanliness;
- Assists in field coordination in the absence of the Manager; and
- Performs other duties as required by the Manager.

10.2.2 Introductory Training

New employees are given both classroom and on-the-job training. On-the-job training is conducted under close supervision of an experienced operator. Typically, a "buddy" system is used for initial on-the-job training. Introductory training consists of but is not limited to:

- Safety and health orientation;
- Right-To-Know (Hazard Communication);
- Hazardous waste operations;

10.2.3 Continuing Training

On-going education and training is a continual process at UTC. Continuing training focuses primarily on classroom and refresher courses in various subjects related to hazardous waste management. Typically, RCRA Treatment Storage or Disposal Facility (TSDF) facility personnel complete a 24-hour course in hazardous waste operations and emergency response. An 8-hour refresher class is required on an annual basis after satisfactorily completing the initial course. All courses are taught by qualified instructors trained in hazardous waste management procedures. Typical refresher or annual courses include but are not limited to the following:

Person	Includes	Training Subjects	Training Criteria	Updates	Regulatory Reference
Cal/EPA – RCRA Hazardous Waste Management					
Large quantity generator or TSDF personnel	Anyone who could cause non-compliance at the facility	Duties which ensure the facility's compliance with EPA rules	Established by the generator in a written training plan	Annual review of initial training	22CCR 66262.34(i)(4) 66264.16 & 66265.16
Department of Transportation (DOT) – Hazardous Materials Transportation Act (HMTA) – Hazardous Materials Transportation					
Hazardous Materials (Hazmat) employees	Employees who directly affect transportation safety	Compliance with DOT rules and safety	Determined, tested and certified by the employer	Repeated at least every three years; train in rule changes as they occur.	172.700, 173.1(b)
Cal/OSHA – HAZWOPER – Certain Hazardous Waste Options					
TSDF site employee	Employees exposed to health hazards or hazardous substances at TSDF sites	To enable employees to perform their assigned duties in a safe and healthful manner	Specified as minimum time (e.g., 24 hours for general site employees)	8 hours annual refresher	5192(p)(7)
Emergency responder	Employees who respond to emergencies other than regulated above	Understand hazards, recognize emergencies, response actions, etc.	Both content and minimum time specified	Annual refresher	8CCR 5192(q)(4)-(8)

10.2.4 Implementation

Each employee is required to attend Safety orientation and Right-to-Know training, soon after hire or transfer into the department if not already completed. Training of employees is designed and tracked by the employees' supervisor. Core training classes such as Powered Industrial Trucks or Respirator Training are completed as soon as is practical. Employees must attend Powered Industrial Trucks training before operating any forklifts. Other training classes are taken at the employee's earliest opportunity.

New employees are typically assigned to work with at least one experienced employee. This on-the-job training may last up to thirty days, depending on the specific job assignment or on the employee's abilities. Training requirements are reviewed for all employees in the department on an annual basis. For new employees or newly assigned employees, requirements are reviewed after 30 days.

10.3 Emergency Response Team

10.3.1 General

The Emergency Response Team (ERT) is an in-house staff of professional firefighters assigned to respond to site fires, hazardous materials releases, and medical emergencies. In this capacity, all ERT personnel receive extensive training to provide the necessary response action for each of the emergency situations noted.

The ERT personnel are trained in the operation of various types of fire equipment, fire prevention, and fire fighting including specialized training in hazardous materials response. In addition, emergency medical training is provided to all members of the department.

There was a significant potential for a hazardous material incident onsite. Consequently, the ERT has conducted regular training of its members to prepare for this possibility. ERT department personnel on

shift have been designated hazardous material responders and are provided special and on-going training.

Training for Emergency Response personnel is provided by instructors certified by the State Fire Marshal's office or by the Industrial Emergency Council and includes the following:

Person	Includes	Training Subjects	Training Criteria	Updates	Regulatory Reference
Cal/OSHA – HAZWOPER – Certain Hazardous Waste Operations					
Emergency responder	Employees who respond to emergencies	Understand hazards, recognize emergencies, response actions, etc.	Both content and minimum time specified	Annual refresher	8CCR 5192(q)(4)-(8)

10.3.2 Job Duties

Typical ERT job titles and responsibilities are described below. These job titles and responsibilities can change depending on organizational and operational changes.

Fire Chief

- Policy development
- Supervision of ERT personnel. Assigns, instructs, and checks subordinate firefighters, and test their knowledge of assigned duties, rules, regulations, and instructions given them verbally or through bulletin board notices.
- Equipment recommendations
- Budget management

- Long range planning

- Inspections: periodic inspections of all areas

- Emergency operations (fire, hazardous material, and medical) - take command at emergency scenes, order resources, assign tactical assignments at scene

- Liaison - government, insurance, fire departments

- Safety - Maintaining a safe working environment for all personnel, proper lifting techniques, perform continual analysis of firefighter PPE's for compliance to National Fire Protection Association (NFPA) Standards.

- Administration of a comprehensive fire prevention program - evaluating target hazards on site, pre-planning for emergency responses to areas, develop training scenarios to test firefighters response and mitigation tactics.

- Monitoring personnel license, state certifications, medical examiner certifications, practice good defensive driving techniques, periodic review of driving record from Department of Motor Vehicles for compliance with California Highway Patrol requirements.

- Responsible for full compliance of the UTC Policy Statement on Business Ethics and Conduct in Contracting with the United States Government and the UTC Code of Ethics including ensuring that subordinate staff are aware of the UTC Policy Statement and their individual responsibility and accountability for their own actions in complying with the Policy Statement. Complies with all safety and environmental rules and regulations.

Lieutenants

- Hazard notice follow-up;
- Employee education and training programs;
- Inspections of site, buildings and fire protection equipment;
- Assurance of proper training of ERT members;
- Supervision of respective shifts;
- Training of shift personnel;
- Response to fire, medical and hazardous materials emergencies;
- Inspections;
- Training;
- Special standbys;
- Sprinkler and alarm tests;
- Various fire protection duties; and
- Additional duties as assigned, vehicle accident reports, animal control and disposal.

Firefighters:

- Response to fire, medical and hazardous materials emergencies, documentation of patient contact reports, giving patient report to paramedics along with documentation during patient transition;

- Inspections;

- Training;

- Special standbys;

- Sprinkler and alarm tests;

- Various fire protection duties;

- Fire equipment maintenance;

- Hazardous reduction of weeds, brush, assisting California Conservation Crews with disposal of vegetation;

- Assisting security force with daily vehicle inspections of personnel entering/exiting the site;

- Maintaining current certifications, State License, Drivers License, Ambulance Drivers License, medical examiners certification, hazmat recertifications; and
- Maintaining patient care within the company dispensary for personnel requiring medical attention.

10.3.3 Emergency Response Personnel Training

Training for emergency response personnel varies depending on the job title and responsibilities of the employee. Training programs are certified by outside agencies or individuals such as the Industrial Emergency Council and the State Fire Marshal. The frequency of training updates also varies with the employee's position, as follows:

Person	Includes	Training Subjects	Training Criteria	Updates	Regulatory Reference
Cal/OSHA – HAZWOPER – Certain Hazardous Waste Operations					
Emergency responder	Employees who respond to emergencies	Understand hazards, recognize emergencies, response actions, etc.	Both content and minimum time specified	Annual refresher	8CCR 5192(q)(4)-(8)

10.3.4 Implementation

Currently, the Fire Chief is a PWR employee. The rest of the ERT is contracted. The ERT members come onsite already trained and certified. There are also several members of Security that worked in

the former UTC Fire Department, are already trained, and may provide support. The Security supervisor reviews the ERT to ensure that the training is current.

10.4 Security

Security personnel for the PWR facility are provided with a hazard awareness training course. Course content includes information related to fire awareness and prevention, emergency incident command procedures, and hazardous materials response. Employees are also provided with information on the waste handling operations at the RCRA facilities as well as at the various generation sites located throughout the site.

10.5 Training Records

Training records for each PWR employee are maintained by the employee's supervisor. Attendance sheets from onsite classes are maintained on file. Attendance and completion records for Hazardous Material Operations training and Hazardous Material First Responder training are maintained until facility closure. For current employees, records are kept until facility closure. Records for former employees are kept for at least three years after employee resignation.

11. Contingency Plan and Emergency Procedures

Appendix H contains the *Integrated Incident Response and Contingency Plan* for the PWR facility. This plan was developed to outline the emergency incident responses and management procedures in place at the facility should an emergency occur. Mutual aid agreements have been established with local emergency response entities in the event an incident develops beyond PWR's capabilities. The plan includes: spill and fire prevention control measures for all hazardous waste management units, general preparedness and prevention procedures, emergency coordinator and incident command information, and the procedures for the documentation and notification of releases to appropriate agencies. The *Integrated Incident Response and Contingency Plan* will be amended as necessary whenever any changes occur to the facility (operational or physical); the plan fails in an emergency; the hazardous waste facility permit is revised; information in the plan changes (equipment and/or list of emergency coordinators); or there are changes in applicable regulations.

12. Environmental Permits

Copies of facility permits contained in this section represent permit status at the time of preparation of this document. Since all permits are subject to revision, modification, expiration and renewal, no effort will be made to continually update the status of each individual permit contained herein on an ongoing basis. Rather, permit status will be updated during revisions to this Part B permit application, or as required by regulatory agencies. All current facility permits in effect are available for review or examination at any time.

12.1 Conditional Land Use Permits

The facility has two Land Use Permits from the County of Santa Clara Planning Commission. The County of Santa Clara issued the first Use Permit for the PWR site on November 18, 1959, and subsequently amended it on December 4, 1963. The second Use Permit was issued on December 18, 1963. Copies of the Land Use Permits are included in Appendix N.

12.2 BAAQMD Permits to Operate

The Bay Area Air Quality Management District (BAAQMD) Authority to Construct for the trailer-mounted SVE unit was received on June 11, 1992. The Permit to Operate was modified on March 21, 2003 so that the two 127-cubic feet per minute (cfm) regenerative blowers (S-509 and S-510) could be operated separately on different trailers (two different SVE well fields could be remediated at the same time). The Permit to Operate and the monitoring conditions are included in Appendix O.

On November 5, 1997, PWR received a permit to operate the Hydrolysis Treatment Facility (0503) from the BAAQMD. The permit contains the conditions and emission factor calculations for the unit. Copies of the Permits to Operate are included in Appendix O.

12.3 Water Discharge Permits

Wastewater discharges at PWR, including those to the waters of the state, are regulated under Order No. 95-190 Waste Discharge Requirements (WDRs) adopted on September 14, 1995 by the RWQCB. A copy of the WDR is included in Appendix P. In addition, PWR has also been issued Site Cleanup Requirements (SCR) for treated groundwater (SCR Order No. R2-2004-0032 in Appendix O). PWR also complies with Storm Water National Pollutant Discharge Elimination System (NPDES) General Permit Number CAS000001.

12.4 Hazardous Waste Permits

The PWR facility has a RCRA permit for the Storage Facility (2233), the Storage Magazine (0312) and the Hydrolysis Treatment Facility (0503). All other hazardous waste facilities currently operate under interim status. The DTSC issued the Interim Status Document on April 6, 1981. The DTSC issued a Hazardous Waste Facility Permit for hazardous waste storage effective September 26, 1983. A copy of the current permit for the Storage Facility (2233), the Storage Magazine (0312) and the Hydrolysis Treatment Facility (0503) with an effective modification date of November 26, 2003 and an expiration date of June 20, 2007, is provided in Appendix R.

In 1993, PWR applied for and received approval to operate two hazardous waste treatment units: the drum crusher at the Storage Facility (2233) and the Silver Recovery Unit at Station 1319S. These units were operated as conditionally exempt units under DTSC's Permit-By-Rule tiered permitting program. A copy of the DTSC approval letter for these units is presented at the end of Appendix R.

On September 8, 1999, PWR filed a Notification of "Silver-Only" Hazardous Waste Treatment Form with DTSC and Santa Clara County Health Department/Hazardous Materials Compliance Division that covered the Conditionally Exempt Specified Wastestream (CESW) silver treatment process. SB 2111, which became effective January 1, 1999 deregulated silver. PWR has stopped using the Silver Recovery Unit at Station 1319S and intends to close the unit in 2006.

In October 1983, DTSC issued an operating permit for three former surface impoundments at Station 0250, 0635, and 0750. Former surface impoundment operations have since concluded, and in October 1991, the impoundments were certified as closed in accordance with the approved closure plan for RCRA units. On February 28, 1992, RWQCB approved the closure of these units. A copy of the RWQCB letter is presented at the end of Appendix R.

13. Records and Reports

13.1 General

The following records and reports (forms) are maintained by PWR for the operation of site hazardous waste facilities and are available for inspection by authorized regulatory agency personnel, upon request:

- Post-Closure Part B Permit Application;
- Twice Yearly Facility Inspection Reports; and
- Quarterly and Annual Environmental Groundwater Monitoring Reports.

The Environmental Department has the responsibility for coordinating and maintaining all facility hazardous waste operational records and reports involving regulatory agencies, including USEPA, DTSC, and RWQCB.

Groundwater monitoring results are reported to RWQCB and copied to DTSC. The groundwater monitoring reports will be prepared under the direction of and certified by a geologist or civil engineer registered in California. The annual groundwater monitoring report will be submitted to DTSC by March 1st of each year.

14. Post-Closure Costs

14.1 Post-Closure Cost Estimate

The post-closure activities that were considered for the post-closure cost estimate include permit fees, environmental monitoring, operations and maintenance, and general maintenance. The post-closure cost estimate was updated from the estimate provided in the closure/post-closure plan to meet the current sampling program. The cost estimate includes the quality control costs for field blanks and duplicate samples. Infrastructure maintenance costs such as roads and fencing repair and replacement are included. It was calculated based on third-party costs and is related to the three post-closure units only.

Post-closure costs are estimated to be $1,174,396 for closed former Surface Impoundment 0250; $1,158,336 for closed former Surface Impoundment 0635; and $1,447,719 for closed former Surface Impoundment 0706. The post-closure cost estimates are summarized in Tables 14-1 through 14-3.

TABLE 14-1

STATION 0250

30-YEAR RCRA POST-CLOSURE CARE COST ESTIMATES

PRATT & WHITYNEY ROCKETDYNE, INC.

PREPARED JANUARY 2006

Item	Cost
Permit Fees: Include RCRA medium facility fees for 30 years.	$52,438
Environmental Monitoring Program: Includes monitoring of 3 wells, 2 events per year for perchlorate and VOCs; annual for Appendix IX and cyanide.	$364,502
Cap Maintenance: Cap repairs of asphalt and striping occur every 3 years.	$35,020
Signs and Drainage: Sign replacement, drainage repairs, and mowing occur every 10 years.	$8,510
Road Maintenance: Road repairs (~2000 linear feet) occur every 10 years and include significant roadbase replacement and culvert repair and replacement.	$100,821
Site Security/Fencing Repairs: Site security and fencing occurs every 10 years and assumes repairs to fencing.	$3,000
OMM: Includes operation of and repairs to the SVE system and groundwater extraction and treatment systems.	$543,000
Post-Closure Inspection and Reporting: Includes semiannual inspections and reports for 30 years	$24,000
Site Closeout: Includes well destruction, GTS demolition, and site closeout documentation	$62,105
Net Present Value, Markup, and Contingency: Net present value includes a net discount of 1.6%. Markup values are the net present value of 7% of noncapital costs. Contingency values are 15% of the costs, excluding costs incurred in 2005.	$(18,999)
Totals:	**$1,174,396**

Notes:

1. Values are shown in 2005 dollars.
2. Costs shown are a summary of output from Remedial Actions Cost Engineering Requirements (RACER) software.
3. BBL prepared these estimates using current and generally accepted engineering cost estimation methods. These estimates are based on assumptions concerning future events, and actual costs may be affected by known and unknown risks, including, but not limited to changes in general economic and business conditions, site conditions, which were unknown to BBL at the time the estimates were prepared, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates, and such variations may be material. We are not licensed as accountants or securities attorneys, and therefore make no representations that these cost estimates form an appropriate basis for complying with financial reporting requirements for such costs.

TABLE 14-2

STATION 0635

30-YEAR RCRA POST-CLOSURE CARE COST ESTIMATES

PRATT & WHITNEY ROCKETDYNE, INC.

PREPARED JANUARY 2006

Item	Costs
Permit Fees: Includes RCRA medium facility fees for 30 years.	$52,438
Environmental Monitoring Program: Includes monitoring of 3 wells, 2 events per year for perchlorate and VOCs; annual for Appendix IX and pesticides.	$365,518
Cap Maintenance: Repairs of asphalt and striping occur every 3 years..	$53,830
Signs and Drainage: Sign replacement, drainage repairs, and mowing occur every 10 years.	$8,510
Road Maintenance: Road repairs (~2000 linear feet) occur every 10 years and include significant roadbase replacement and culvert repair and replacement.	$67,869
Site Security: Site security and fencing occurs every 10 years and assumes repairs to fencing.	$3,000
OMM: Includes operation of and repairs to the SVE system and groundwater extraction and treatment systems.	$543,000
Post-Closure Inspection and Reporting: Includes semiannual inspections and reports for 30 years	$24,000
Site Closeout: Includes well destruction, GTS demolition, and site closeout documentation	$62,105
Net Present Value, Markup, and Contingency: Net present value includes a net discount of 1.6%. Markup values are the net present value of 7% of noncapital costs. Contingency values are 15% of the costs, excluding costs incurred in 2005.	$(21,903)
Totals:	**$1,158,366**

Notes:

1. Values are shown in 2005 dollars.
2. Costs shown are a summary of output from Remedial Actions Cost Engineering Requirements (RACER) software.
3. BBL prepared these estimates using current and generally accepted engineering cost estimation methods. These estimates are based on assumptions concerning future events, and actual costs may be affected by known and unknown risks, including, but not limited to changes in general economic and business conditions, site conditions, which were unknown to BBL at the time the estimates were prepared, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates, and such variations may be material. We are not licensed as accountants or securities attorneys, and therefore make no representations that these cost estimates form an appropriate basis for complying with financial reporting requirements for such costs.

TABLE 14-3

STATION 0706

30-YEAR RCRA POST-CLOSURE CARE COST ESTIMATES

PRATT & WHITNEY ROCKETDYNE, INC.

PREPARED JANUARY 2006

Item	Costs
Permit Fees: Includes RCRA medium facility fees for 30 years.	$52,438
Environmental Monitoring Program: Includes monitoring of 3 wells, 2 events per year for perchlorate and VOCs; annual for Appendix IX and pesticides.	$333,275
Cap Maintenance: Repairs of asphalt and striping occur every 3 years..	$20,870
Signs and Drainage: Sign replacement, drainage repairs, and mowing occur every 10 years.	$8,510
Road Maintenance: Road repairs (~7600 linear feet) occur every 10 years and include significant roadbase replacement and culvert repair and replacement.	$366,171
Site Security: Site security and fencing occurs every 10 years and assumes repairs to fencing.	$3,000
OMM: Includes operation of and repairs to the SVE system and groundwater extraction and treatment systems.	$543,000
Post-Closure Inspection and Reporting: Includes semiannual inspections and reports for 30 years	$24,000
Site Closeout: Includes well destruction, GTS demolition, and site closeout documentation	$62,105
Net Present Value, Markup, and Contingency: Net present value includes a net discount of 1.6%. Markup values are the net present value of 7% of noncapital costs. Contingency values are 15% of the costs, excluding costs incurred in 2005.	$34,351
Totals:	**$1,447,719**

Notes:

1. Values are shown in 2005 dollars.
2. Costs shown are a summary of output from Remedial Actions Cost Engineering Requirements (RACER) software.
3. BBL prepared these estimates using current and generally accepted engineering cost estimation methods. These estimates are based on assumptions concerning future events, and actual costs may be affected by known and unknown risks, including, but not limited to changes in general economic and business conditions, site conditions, which were unknown to BBL at the time the estimates were prepared, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates, and such variations may be material. We are not licensed as accountants or securities attorneys, and therefore make no representations that these cost estimates form an appropriate basis for complying with financial reporting requirements for such costs.

15. Financial Responsibility

15.1 Financial Assurance of Post-Closure Costs and Liability Coverage

In compliance with financial requirements specified in 40 Code of Federal Regulations (CFR) Sections 264.143, 264.145, and 264.147 and equivalent state requirements, the following financial assurance documentation is contained in Appendix S:

- A January 1, 2006, transmittal from United Technologies Corporation to DTSC, submitting the most recent assurance documentation

- A copy of the United Technologies Corporation 2005 Annual Report

United Technologies Corporation submits an annual Financial Assurance Statement to DTSC. This document provides evidence of financial responsibility for post-closure costs and liability coverage. The next annual submittal will update the documentation with the most recent information; for example, the current post-closure cost estimates.

16. Corrective Action Program

Based on the type of closure that was performed (removal of soils with concentrations above applicable criteria) and the body of evidence indicating hazardous constituents do not appear to have been released to groundwater from closed former Surface Impoundments 0635 and 0706, corrective action for the closed former surface impoundments is not required. However, PWR is actively implementing a site-wide program to address past releases of hazardous constituents from the vicinity of former Surface Impoundment 0250 and Solid Waste Management Units (SWMUs) at the facility. This program is being carried out under the supervision of RWQCB. Details are presented in Section 7 of this application. Appendix Q contains the following agency clean-up orders that provide a description of PWR's remedial program:

RWQCB SCR Order No. R2-2004-0032: This Site Cleanup Requirements Order, adopted by the RWQCB on May 19, 2004, presents a discussion of site investigation history, site geology, and site hydrogeology. The Order presents regulatory requirements, cleanup standards, and constituents of concern. Attached to the Order is a specified groundwater and surface water self-monitoring program that PWR is required to follow for the purposes of supplying data to guide the continued implementation of the remediation program.

USEPA Consent Agreement and Final Order, US EPA Docket No. 09-89-0018: This order, signed February 22, 1991 requires that PWR define the magnitude and extent of contamination within and beyond the facility boundary. This characterization is to be done by performing a RCRA facility investigation and subsequent corrective measures study. The scope of the order includes characterization of:

- Geology and hydrogeology;
- Existence, nature and extent of groundwater contamination;
- Existence, nature and extent of surface water contamination;
- Existence, nature and extent of soil contamination;
- Pathways of contamination;
- Sources of contamination;

- Actual and potential receptors; and
- Development of remedial alternatives.

In addition, PWR has an EMPP, which describes the monitoring procedures at PWR to detect hazardous constituents. The groundwater monitoring procedures in the EMPP are in conformance with the RCRA and DTSC groundwater monitoring requirements.

16.1 Groundwater Corrective Action Plan

A remedial system has been installed for VOC and perchlorate-contaminated groundwater originating in Upper Shingle Valley (USV) under RWQCB oversight. The USV remedial system consists of extractions wells (including an extraction well immediately downgradient of former Surface Impoundment 0250) and monitoring wells. The contaminated groundwater is pumped through a double-contained pipe to GTS 2405 located in Shingle Valley for treatment. At GTS 2405, the extracted water is pumped through an advanced oxidation process (HiPox), aqueous phase granular activated carbon (GAC) units, and ion exchange resin to remove VOCs, 1,4-dioxane and perchlorate. The treated groundwater is sent to Pond 2140 or Pond 2130 for temporary storage before re-use (onsite irrigation for the front lawn, at the Station 1971 Irrigation Area in the Process Development Complex, or at the Station 2420 Recreation Area in Mixer Valley).

A remedial system has been installed for VOC and perchlorate-contaminated groundwater originating in Mixer Valley under RWQCB oversight. The Mixer Valley remedial system consists of extraction wells and monitoring wells. The contaminated groundwater is pumped through a double-contained pipe to GTS 2404 located in Mixer Valley for treatment.

At GTS 2404, the extracted water is pumped through an advanced oxidation process (HiPox), aqueous phase GAC units, and ion exchange resin to remove VOCs, perchlorate, and 1,4-dioxane. The treated groundwater is sent to Pond 2130 for temporary storage before re-use (irrigation at the Station 2420 Recreation Area in Mixer Valley).

The report, *Five-Year Status Report and Remediation Effectiveness Evaluation for Operable Unit 1 (Task 21 SCR Order 94-064)* (IT, 1999), evaluated the effectiveness of the groundwater extraction system for Shingle and Mixer Valleys and found that the groundwater remediation systems provide active remediation of VOC-impacted groundwater while protecting public health and the environment. PWR will evaluate the effectiveness of hydraulic containment and cleanup of perchlorate under SCR R2-2004-0032.

Additional groundwater monitoring wells: Currently, no additional monitoring wells are considered to be needed for groundwater monitoring related to former Surface Impoundments 0250, 0635, and 0706.

17. Amendment of Post-Closure Permit Application

This Post-Closure Permit Application is an update to the Post-Closure Plans for former Surface Impoundments 0250, 0635, and 0706. The Post-Closure Application will be amended and submitted to DTSC when events occur during the active life of the facility that affect the Post-Closure Permit Application and as specified in 22 CCR 66270.42.

It is anticipated that an amendment to the post-closure permit will be submitted to demonstrate that the closed former surface impoundments 0635 and 0706 have been clean closed and should therefore no longer be included in the post-closure permit. A demonstration that groundwater beneath closed former Surface Impoundment 0250 meets applicable criteria based on three years of monitoring data may also be submitted to petition for cessation of ongoing unit-specific groundwater monitoring.

PWR is responsible for maintaining and amending the Post-Closure Permit Application.

17.1 Renewal of Post-Closure Permit

DTSC issues a post-closure permit for a fixed term, not to exceed 10 years. Before the post-closure permit expires, PWR will apply to renew the post-closure permit.

18. References

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ICF. 1991b. *Evaluation of Wells Monitoring Former Surface Impoundment at Stations 0250, 0635, and 0706 – Phases I and II.*

ICF. 1993. *Soil Remediation Status Report for 1992.*

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