# Appendix D. Site Facilities and Waste Management Facilities

## D-1. Area I

*North American Kindelberger Atwood Laboratories (NAKA) and Thermal Treatment Facility (TTF)*

The Area I TTF is on the south site of the SSFL site; NAKA is less than a mile away. NAKA was used for research on solid rocket propellant and gun propellant (Rockwell Int., 1992). About 1 to 30 pounds of explosive wastes, including pyrotechnics and solid propellants, were generated at NAKA and Happy Valley per week. Waste generated at NAKA included HMX, RDX, nitrocellulose, nitroglycerin, and ammonium perchlorate. This waste, approximately 30 pounds of waste per month, was sent to the Area I TTF from 1958 to as late as 1992 (24.72 pounds of NAKA propellants, 1.92 pounds of triethylaluminum-triethylborane, (Rockwell International, 1992a). From 1982 to 1990, the TTF handled 1.28 pounds of gas cylinders). Other wastes sent to Area I TTF were "strong oxidizers" and hypergolic propellants—i.e., chlorine pentafluoride, tetrafluorohydrazine, and "limited quantities" of solvents and kerosene (Rockwell International, 1992a). Surface water from the Area I TTF can run off into the Perimeter Pond, which is part of SSFL's reclaimed water system. During normal operation and rainfall events, the Perimeter Pond overflows into NPDES Outfalls 001 and 002 to the south of the facility; these release the water into Bell Canyon Creek (Rockwell International, 1992a).

*Laser Engineering Test Facility (LETF) and Engineering Chemistry Labs (ECL)*

The LETF in Area I and the ECL pond in Area III were reported to be the only surface impoundments that stored and treated hazardous wastes on a routine basis for Areas I, II, or III (Hargis and Associates, 1985). The LETF pond held corrosive liquids, such as sodium hydroxide and sodium fluoride, before their removal to a Class I disposal facility.

*Rocket Engine Testing Sites*

Eight major rocket engine test facilities began operation in the late 1950s and early 1960s: the Bowl, the Canyon, and the Advanced Propulsion Test Facility (APTF), located in Happy Valley in Area I, and Alfa, Bravo, Coca, Delta, and the Systems Test Laboratory (STL) in Area II (Techlaw, 1990). These areas were in operation simultaneously in the late 1950s and early 1960s. The Bowl, Canyon, and Delta test areas were phased out of operation in the late 1960s and 1970s. The Coca test area was shut down in May 1988.

Engine testing at these areas primarily used petroleum-based compounds as the "fuel" and liquid oxygen as the "oxidizer." Solvents—primarily trichloroethene (TCE)—were used to clean engine components. The primary propellants used at SSFL were (a) hydrazine-based fuels (including hydrazine, monomethyl hydrazine, and unsymmetrical dimethyl hydrazine) and nitrogen tetroxide (oxidizer), (b) kerosene-based fuels (RP-1 and JP-4) and liquid oxygen (oxidizer), and (c) liquid hydrogen fuel and liquid oxygen (oxidizer). At present, hydrazine- and kerosene-based fuels are being used at SSFL (CH2M Hill, 1993; Rocketdyne, 1999b). Oxidizers

are reactive and have very short half-lives in air or soil. Therefore, they are expected to disappear rapidly from soil and sediment following an accidental spill or release.

## D-2. Area II

*Alpha, Bravo, Coca, Delta, and Systems Test Laboratory (STL) Engine Test Areas*

The Alfa and Bravo test areas are currently the only rocket engine test areas in operation. The Alpha-Bravo pond traps and retains raw fuel, lubricant oil, and other hydrocarbons from the test firings and/or spills in the Alpha-Bravo test area (DHS, 1999). STL is a NASA-associated test stand and laboratory.

## D-3. Area III

*Engineering Chemistry Laboratory (ECL)*

The ECL pond received a wide variety of wastes. Records show that these wastes included sodium hydroxide, methylene chloride, dimethyl sulfoxide, and sodium azide. This pond was excavated in 1984 and the excavated materials were transported to an offsite Class I disposal facility (Hargis and Associates, 1985).

## D-4. Area IV

*Hazardous Waste Management Facility (HWMF)*

The HWMF included two buildings in Area IV: T133 and T029, both owned by DOE. T133 operated as a sodium treatment facility from 1978 to 1987, and was used to react Na and Na / K to form NaOH and KOH; it is no longer active. Building T029 operated as a storage facility for containerized alkali metal waste; it too was used beginning in 1978 and is no longer active. Wastes generated at T029 (Building 29) were PCBs, mercury, and contaminated soil from underground storage tank removals (DHS, 1988a). Metal boxes and drums containing waste were stored on pallets along Building 29's perimeter (DHS, 1999). The building did not have enough impervious paved areas and diking to properly contain wastes in the event of drum leakage (Ecology and Environment, 1989). Mercury and PCBs were detected in the soil under the building (DHS, 1988a). At this time, Building 29 was storing PCB-containing transformers that had been undergoing phase-out.

*Energy Technology Engineering Center (ETEC)*

The current primary purpose of operations at ETEC is the environmental restoration of SSFL areas and facilities that have been impacted by DOE operations. A longer-term objective is to provide turn the DOE facilities into a commercially available test facility.

*Systems for Nuclear Auxiliary Power (SNAP), Building T059*

Building T059 (Building 59) is a former reactor test facility; decontamination and decommissioning of the building involved removal of activated steel and concrete, which may have generated radioactive effluents. Only filtered atmospheric effluents were reported to be released from the building to uncontrolled areas during operations. Activation products consist of iron-55, europium-152, and cobalt-60, as well as minimal amounts of tritium (DOE, 1989). Groundwater and sand beneath Building 59 was found to be contaminated with radioactive Cobalt-60. Building 59 formerly housed the SNAP prototype reactor. A program of controlled groundwater pumping has lowered the groundwater level beneath the building to depress the water level, preventing the migration of contaminated water from the building. Monitoring around the area is insufficient to determine if this program has been successful (DOE, 1989). Drums of reactive metal were also stored at the site for treatment at the Sodium Burn Facility or for removal. These drums contained sodium, potassium, sodium-potassium, zirconium hydride, and lithium.

*Hot Lab*

Operations at Building T020 (the Hot Lab) that may have generated radioactive effluents in the past consisted of hot cell examination and decladding of irridated nuclear fuels, as well as examination of reactor components. T020 was shut down in 1988. While it was active, the following radionuclides were handled in unencapsulated form there: uranium and plutonium (constituents of the various fuel materials), cesium-137 and strontium-90 as mixed fission products, and cobalt-60. The Nuclear Regulatory Committee license for the Hot Lab was terminated on September 27, 1996 and the facility was transferred to DOE for decontamination and decommissioning.

*Sodium Reactor Experiment Complex (SRE)*

The SRE was a graphite-moderated, liquid-sodium-cooled 20-megawatt nuclear reactor. In the summer of 1959, a coolant channel became clogged, which resulted in localized melting of 30 percent of the fuel elements. Some fuel elements dislodged and fell to the bottom of the primary sodium containment vessel, and the reactor was shut down. Most of the radioactive fission products were trapped in the sodium coolant or attached to metal components.

*Former Sodium Disposal Facility (SDF; Building T886) and Associated Disposal Ponds*

The SDF was a waste disposal facility. It is located on the western boundary of Area IV. The "Old Sodium Burn Pit," as it was otherwise known, was the site of regular combustion of hazardous wastes. Studies there were carried out between 1962 and the 1970s in support of DOE and predecessor agencies. No records were kept about the types and amounts of materials discharged here but CERCLA-mandated DOE investigations found enough contamination at the site to indicate that the quantity was significant (Rockwell International, 1987). Soils in the SDF impoundment were slightly radiologically contaminated (ETEC, 1987). Cesium-137 was the primary gamma-emitting constituent; some metal components containing enriched uranium were

also detected. EPA detected radioactive contamination in the soil here during inspections on July 12 and 13, 1989. According to the information reviewed, chemicals from the SDF migrated to offsite areas. An area of approximately 50,000 square feet was found to be contaminated with VOCs, metals, oil and grease, PCBs, polychlorinated terphenyls (PCTs), terphenyls, and biphenyls. Asbestos was found in a runoff sample taken behind the SDF (Ecology and Environment, 1989). In addition, radioactive cesium-137 was found in soil samples in this area (Rockwell International, 1987).

The SDF was located near unlined earth-bermed impoundments, the Upper, Lower, and Western Ponds. These ponds were used for the disposal of materials from reactor heat transfer experiments. There are three surface water bodies within 1 mile of the Lower Pond: R2A, R2B, and Silvernale. The Lower Pond drainage system drains to the north toward Simi Valley, whereas R2A, R2B, and Silvernale flow toward the San Fernando Valley through Bell Creek (DHS, 1989a). There are no natural springs within 1 mile of the SDF, but there are several artesian wells flowing at land surface about 2,000 feet north. During periods of rainfall, surface water from the SDF flows mainly north via two channels that ultimately discharge at NPDES-permitted outfalls at the northwest property boundary. In 1995, contractors for SSFL collected soil and sediment samples along these surface drainages. Sampling data indicate that PCBs, TCDD, asbestos, and mercury had migrated in these drainages from the SDF to offsite areas. Maximum concentrations were found in offsite samples collected a short distance downstream of the upper and lower ponds; concentrations decreased with increasing distance from the ponds. Approximately 12,000 cubic yards of soil have been removed from this area to an offsite landfill. In the lower pond, all soils have been removed down to bedrock (ITC, 1999).

*Radioactive Materials Disposal Facility (RMDF)*

The handling of radioactive wastes, including treatment and storage, took place at the RMDF in Area IV. Operations at the RMDF's Buildings T021 and T022 that may have generated radioactive effluents consisted of processing, packaging, and temporary storage of liquid and dry radioactive waste material for disposal. Waste treatment consisted of the solidification and evaporation of radioactive wastes. These wastes were then placed in 55-gallon drums for shipment to an offsite radioactive waste disposal facility. Contamination from nuclear fuel and decontamination operations contained uranium and plutonium plus cesium-137 and strontium-90 as mixed fission products, and cobalt-60 and europium-152 activation products.

In the 1970s, there was an accidental spill of radioactive-contaminated water from a tank in the RMDF. While investigating the results of this spill, radiation was found beneath the RMDF leachfield. It is believed that in the early 1960s, water containing strontium-90 and yttrium-90 was accidentally released to the sanitary sewer leachfield for the RMDF. After this contamination was found, the soil in the area was excavated and the joints and fractures in the Chatsworth Formation were sealed with asphalt. Given that about 15 years elapsed between the accidental spill and its discovery, migration of the associated contaminant to the aquifer below this area may have been likely. This potential release has not been fully investigated (DOE, 1989). Radionuclides have washed down from the RMDF at SSFL onto what was part of the Brandeis-Bardin property, located north of Area IV (McLaren/Hart, 1993, 1995). This area was purchased by Rocketdyne and is now part of the SSFL buffer zone. Strontium-90 and tritium were detected at concentrations slightly above background levels there.

*Old Conservation Yard*

Eighty-nine drums containing such materials as oils, alcohols, sodium and sodium reaction products, grease, phosphoric acid, and asbestos were removed in the early 1980s from an unregulated temporary drum storage area referred to as "the Old Landfill" (or "Old Conservation Yard") in Area IV (Rockwell International, 1987. This site borders SSFL's undeveloped northern border area (the former Brandeis-Bardin Institute). Hydrocarbon and cesium contamination was detected in the soils at the Old Conservation Yard (Ecology and Environment, 1989). Aerial photographs show that hundreds of drums were stored there in the 1960s and 1970s with no containment structures.

## D-6. NPDES Outfalls

Discharges from SSFL waste systems have been regularly monitored through the National Pollutant Discharge Elimination System (NPDES) outfalls at seven locations, five in Meier Canyon (NPDES 003–007, in the northwestern portion of the site) and two in Bell Canyon (NPDES 001 and 002, in the southwest). Another, in Woolsey Canyon, was monitored only once due to infrequent surface water flow and the lack of source areas. NPDES outfalls 001 (Perimeter Pond) and 002 (R2A) are located near the undeveloped area south of SSFL and upstream (north) of the residential area of Bell Canyon (and Bell Creek). These two onsite drainage channels join to form the headwaters of Bell Creek in the southern buffer zone of SSFL. According to Rocketdyne (1999a):

> *Approximately 90% of the surface water flows from SSFL into Bell Creek through the Bell Canyon residential community located directly south of SSFL property. The remaining surface flow from SSFL (10%) discharges via drainage channels flowing in a northerly direction from Area IV to Meier and Runckle Canyon in Simi Valley.*

Rain flow also emanates from Happy Valley, where propellant and munitions testing were conducted. The water falls down through Woolsey Canyon into Chatsworth and from Dayton Canyon into West Hills, but little testing has been done in these areas.

## D-7. De Soto Site

The De Soto site is offsite of SSFL. Operations that could have generated radioactive effluents there consisted of research studies in applied physics and physical chemistry using activated materials. Analysis of activated test samples in the mass spectrometer laboratory was terminated in May 1995. The laboratory was relocated to a DOE facility at Batelle-Pacific Northwest National Laboratories in early 1996.

## D-8. Other Contracted Sites

Hughes Missile Systems Group, an aerospace research and development company, was previously located at 8444 Fallbrook Avenue in Canoga Park. The site is south of the former

Chatsworth Reservoir, which was drained in 1971 due to structural damage caused by faulting. To the north, west, and southwest of the site lie the Simi Hills, which form the drainage divide between the San Fernando Valley and the Simi Valley to the west. From 1966 to 1976, Hughes shared this site with Rocketdyne and Bunker Ramo, an electrical component design and testing company. Presently the site is occupied by the De Vries Institute and an administrative complex where Rocketdyne has office space. VOCs and radioactivity were discovered in the soils and groundwater beneath the site, exceeding regulatory levels (Hughes, 1989). The area occupies approximately 80 acres between the Chatsworth Creek drainage to the west and a low area beneath the Chatsworth Reservoir dam to the east. Elevation ranges from 879 feet above mean sea level in the central irrigated courtyard to 840 feet above mean sea level along Fallbrook Avenue, Roscoe Boulevard, and Chatsworth Creek. The vast majority of chemical products used by Hughes were used in minute quantities either under laboratory conditions or in prototype manufacturing and testing “clean” rooms employing sophisticated environmental controls (Hughes, 1989).

## **Summary Tables:** Site Facilities and Waste Management Facilities

**Table D1.** Area I

| Facility | Use | Waste |
|---|---|---|
| APTF Ponds #1, #2[1] | Cooling water catchment and emergency spill containment and treatment | Kerosene-based fuels (skimmed off), nitric acid (neutralized), monomethylhydrazine (treated with hydrogen peroxide, if spilled) |
| LETF Pond[1] | Waste treatment and storage | Corrosive liquids (NaOH, NaF) held for disposal in Class I landfill |
| Burn Pit Area | Waste treatment and storage | Solid propellants and explosives (burned and disposed of in Class I or regular landfill depending on constituents) |
| Potassium Loop[2] | Inactive testing facility | Metallic potassium meal |
| Perimeter Discharge Pond | Waste containment and storage | Kerosene-based fuels, nitric acid, monomethylhydrazine, trichloroethene, 1,1,1-trichloroethane, freon, corrosive liquids |
| R-1 Reservoir | Waste storage | Kerosene-based fuels, nitric acid, monomethylhydrazine, trichloroethene, 1,1,1-trichloroethane, freon, corrosive liquids |
| Bowl Skim Pond[3] | Catchment for Bowl test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| Bowl Retention Pond[3] | Catchment for Bowl test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| Canyon Retention Pond[3] | Catchment for Bowl test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| Canyon Skim Pond[3] | Catchment for Bowl test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |

**Notes:**
1. Not used since November 1985; closed under RCRA.
2. Closed under RCRA.
3. Inactive.

**Table D2.** Area II

| Facility | Use | Waste |
|---|---|---|
| SPA Ponds #1 and #2[1] | Container rinsate and emergency spill containment and treatment | 1,2-dimethylhydrazine, monomethylhydrazine, nitrogen tetroxide, hydrogen peroxide (hydrazines treated with hydrogen peroxide in event of spill) |
| MMH Pond (or PLF Impoundment) [1] | Spill containment and treatment | Monomethylhydrazine, nitrogen tetroxide (hydrogen peroxide used if spilled) |
| Delta Impoundment[1] | Rinsate and spill containment | Inhibited red fuming nitric acid (oxidizer), cryogenic fluorine and hydrogen, kerosene-based fuels, hydrazines, chlorinated and fluorinated solvents |
| ABSP Pond | Cooling water catchment and spill containment | Kerosene-based fuels (skimmed off), chlorinated solvents, hydraulic oil |
| Alpha Tank[3] | Storage tank | Spent TCE, stored until removed for reclamation |
| PCB Storage | Drum storage | PCBs and hazardous wastes |
| Hazardous Waste Storage | Drum storage | Solvents, alcohol, kerosene, oil, paint thinner, turco descalent, and lab packs |
| Bravo Skim Pond | Catchment for Bravo test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| Alpha Skim Pond | Catchment for Alpha test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| Alpha Retention Pond | Catchment for Alpha test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| Coca Skim Pond[2] | Catchment for Coca test area emergency spill containment | Kerosene-based fuels, trichloroethene, 1,1,1-trichloroethane, freon |
| R-2A Discharge Pond | Water containment and storage | Kerosene-based fuels, isopropyl alcohol, trichloroethene, 1,1,1-trichloroethane, freon, hydrogen peroxide, monomethylhydrazine |
| R-2B Discharge Pond | Water containment and storage | Kerosene-based fuels, isopropyl alcohol, trichloroethene, 1,1,1-trichloroethane, freon, hydrogen peroxide, monomethylhydrazine |
| CTL II Retention Pond | — | — |
| Flowmeter Catch Pond | — | — |

**Notes:**
1. Not used since 1985; closed under RCRA.
2. Inactive.
3. Generator only.

**Table D3.** Area III

| Facility | Use | Waste |
|---|---|---|
| ECL Pond[1] | Treatment and storage | Sodium hydroxide, methylene chloride, dimethyl sulfoxide, sodium azide, and other chemicals depending on current contract |
| STL-IV Ponds #1, #2[2] | Cooling water catchment and spill containment | Monomethylhydrazine, nitrogen tetroxide, chlorinated and fluorinated solvents |
| Compound A | Wastewater catchment | Hydrofluoric acid |
| Silvernale Reservoir | Water storage | Kerosene-based fuels, nitric acid, trichloroethene, 1,1,1-trichloroethane, freon, hydrogen peroxide, monomethylhydrazine |

**Notes:**
1. Closed under RCRA.
2. Not used since 1985; closed under RCRA.

**Table D4.** Area IV

| Facility | Use | Waste |
|---|---|---|
| Sodium Burn Pit | Treatment and disposal | Metallic sodium, NaK, kerosene, organic solvents, diesel fuel, oil, grease, PCBs, PCTs, terphenyls and biphenyls, cesium-137, zirconium hydride, lithium, metals, VOCs, asbestos |
| SRE Watershed | Runoff from SRE building | Asbestos |
| SNAP Reactor Building (T059) | Groundwater contamination from building T059 | Cobalt-60, iron-55, europium-152, tritium, chlorinated solvents |
| Old Landfill | Drum storage or disposal | Oil, grease, alcohols, sodium and sodium reaction products, phosphoric acid, and asbestos |
| RMDF Leachfield | Accidental release of contaminated wastewater | Strontium-90, yttrium-90, uranium, plutonium, cesium-137, cobalt-60, europium-152, tritium |
| Old Conservation Yard | Drum and equipment storage | Unknown hydrocarbons, asbestos, cesium-137 |
| ESADA Chemical Storage Yard | Drum storage | Alcohols and unknown others |
| Building 100 Trench | Burning and disposal | Construction debris and possible hazardous wastes |
| SE Drum Storage Yard | Drum storage | Unknown |
| New Conservation Yard | Drum and equipment storage | Unknown |
| Sodium Burn Facility (T133) | Equipment storage | Metallic sodium, high-pH soils, asbestos |