4.0 DISPOSAL SITE HISTORY

4.1 OWNER/OPERATOR AND OPERATIONS HISTORY

4.1.1 Current and Relevant Previous Site Owners and Operators

Since 1968, the property has been owned by Continental Assurance Co. The table below lists the previous property owners and dates of purchase based on review of records at the Wayland Town Assessor's office. Ownership information prior to 1958 was not available.

Property Ownership

OWNER	PURCHASE DATE
Continental Assurance	18 June 1968
National Boulevard Bank	14 July 1958
Norman Barnes	Gift from previous owner

According to conversations with the Wayland Assessor's Office and information provided by a town surveyor, the property was a privately-owned estate prior to 1956. RES has leased the property from 1955 to present.

4.1.2 Current and Historical Site Uses

Residential, Commercial and Industrial Activities, and Manufacturing Processes

Historic aerial photographs of the site from 1936 indicate the property was utilized for agricultural and residential purposes. No additional information was identified regarding property use prior to 1936.

The RES facility in Wayland operated from 1955 through 1995 as an engineering facility to support other Raytheon RES Company manufacturing facilities. RES researched and developed prototype electronic equipment, including design and testing of antennae and transmitters, operation of a small printed circuit board laboratory and operation of small-scale chemical processes in support of R&D. Site operations have been terminated, and the facility is closed.

Review of the processes conducted at the Wayland facility is based on a review of construction drawings, as-built layouts, engineering studies and reports, hazardous waste manifests, air source registrations, permit applications and project files. Dry and wet laboratory processes included photographic developing, plating and etching circuit boards, machining, welding, woodworking, spray painting, conformal coat assembling, environmental protocol testing, hydraulic testing, radar and antenna transmitter testing and transformer epoxy coating and baking. The following table summarizes the areas in which these processes were conducted and the estimated dates of operation. Process locations are displayed on Figure 2.

Laboratory Process Areas and Estimated Dates of Operation

Process	*Estimated Dates of Operation*	*Location*
Acoustical Testing High Bay Wave Guide Testing Vault	1955-1960s 1960s - 1970s	Building 4 ("By WAY-07")
Hydraulics Lab	1956-1995	Building 6A ("HYDRAULIC LAB")
Environmental Test Lab	1958-1995	Building 5 ("ETL")
Radar Testing Complex - Building 12/21	1957-1995	Building 12/21
Transmitter Lab	1955-1995	Building 2 ("TRANSMITTER LAB (OLD WYLE LAB)")
Transformer Lab	1955-1995	Building 2 ("XFMR LAB")
Machine Shops / Weld Shop	1955-1995	Building 3 ("OLD MACHINE SHOP") (1955-1969) Building 6 ("EXISTING MACHINE SHOP") (1969-1995)
Carpentry and Paint Shops	1955-1995	Carpentry Shop - Building 16 ("OLD Printed Circuit Board SHOP") (1960-1995) Paint Shop - Building 6 ("PAINT SHOP") (1960s-1995) Paint Shop - Building 4 (~1955s-early 1960s-)
Conformal Coat Assembly	1958-1995	Building 4 ("CCA SHOP")
AMICDO Cleaning Labs	1980s-1994	Building 5 ("AMICDO")
Chemical Lab/Plastics/Finishes/Coatings/Metallurgy/Heat Treatment Lab	1956-1969	Building 1,2 Chemical Lab - Building 1S, Second Floor ("Old Chem Lab")
Printed Circuit Board Shop	1958-1991	Building 4 (1960s-1991) ("OLD Printed Circuit Board SHOP") Building 16 (1958-1960) ("OLD Printed Circuit Board SHOP")
Microwave Design MHIC Lab	1970-1995	Building 2, Second Floor ("MHIC LAB (2nd FLR)")
MLB Lab	1975-1995	Building 4A (MLB LAB)
Photo Area/Photoplotter Lab	1971-1981 / 1981-1995	Photo Area - Building 4 ("OLD PHOTO LAB)" Photoplotter Lab - Building 4 ("PHOTO PLOTTER")

Locations of Buildings and Structures (Current and Former)

The facility is comprised of a main complex of eight attached buildings Nos. 1 through 6A (approximately 400,000 square feet), one exterior building (No. 12/21 occupying approximately 25,000 square feet) and a series of sheds and outbuildings. Historic aerial photographs indicate that Buildings 1S, 4A, 5, 6 and 12/21 were not present prior to 1957, but do appear in a 1969 photo.

4.2 RELEASE HISTORY

Based on review of RES, federal, state and local files and results of the Phase I Investigation, the following known and relevant releases of OHM have been identified at the site:

October 1975-Release of No. 6 Fuel Oil-(RES, 1976)

In October 1975, an estimated 200 to 250 gallons of No. 6 fuel oil was discharged at the outfall (OF-01, Figure 2). The release was due to failure of a heat exchanger in the boiler room and discharged via a floor drain. The release is believed to have occurred on Sunday, 12 October 1975 and was discovered on Monday at 5:30 am on 13 October 1975.

The heat exchanger was shut down and containment booms were put in place at the outfall. Oil was observed to have pooled at the outfall, and due to the low flow conditions, none reached the Sudbury River. The discharge lines were flushed, and pooled oil and impacted soil were removed offsite. Because of the age of the release, no further details are available.

November 1980-Surface Impoundment Assessment (TRC, 1991)

A Surface Impoundment Assessment was conducted by the United States Environmental Protection Agency (US EPA) in November, 1980. The study identified two sanitary wastewater treatment surface impoundments as "waste storage impoundments" based on review of aerial photographs. A Preliminary Assessment was conducted by EPA in November, 1980, and the site was subsequently listed on the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List (Site No. MAD990685554). EPA referred the site to the Massachusetts Department of Environmental Protection (MA DEP), and the site was listed as a Location to be Investigated (LTBI) on 15 January 1987.

July 1989-US Fish & Wildlife Service (TRC, 1991)

In July of 1989 the US Fish & Wildlife Service (USFWS) inadvertently conducted sediment sampling along the river bank adjacent to the RES facility and near RES's NPDES outfall as part of a study of the Great Meadows National Wildlife Refuge (GMNWR). Preliminary results were included in the TRC *Screening Site Inspection* report (TRC, 1991) and indicated elevated levels of total polynuclear aromatic hydrocarbons (PAHs up to 1,004 parts per million (ppm)), metals (including cadmium, chromium, copper, lead and mercury) and polychlorinated biphenyls (PCBs up to 117 ppm) near outfall OF-01. Contaminant levels were also higher in samples collected along the drainage swale from OF-01 than up or downstream of the facility along the river bank. TRC recommended continued investigation of the RES facility under CERCLA.

ERM conducted sampling in the wetlands in May 1990 to evaluate surface water and sediment quality associated with cross-connection of an industrial waste line (discussed on the next page). ERM conducted sampling in the wetland in July 1995 to further evaluate preliminary PCB data reported by USFWS. No elevated PCBs were detected during the 1990 sampling event, and levels less than 2 ppm were reported during the 1995 event. ERM was not able to reproduce the USFWS data results.

December 1989-Switch Gear Failure at Building 12

The primary feeder selector switch failed on 9 December 1989 at Building 12 resulting in a release of approximately 60 gallons of insulating oil. The Wayland Fire Department responded to extinguish the fire. Zecco, Inc. was contracted to clean up the spill, and the DEP was notified. Field screening of the insulating oil indicated PCBs; however, analyses by a certified laboratory indicated no PCBs at a detection limit of 2 ppm in the oil. Hazardous waste manifests indicate that soil and concrete were properly, transported, handled, and disposed at a licensed Transfer, Storage, Disposal Facility . ERM collected a soil sample from this area (HA-1) during the Phase I Investigation to evaluate soil quality as a result of the release. Results indicate non-detect for PCBs; analytical results are summarized in Table 2.

March 1990-Cross Connection of Industrial Waste Line-(ERM, 1990)

In March of 1990, a cross connection of an industrial waste line from a former photoetching laboratory into the facility storm water system was discovered and immediately disconnected. Review of OHM used in the photoetching process indicated quantities of butyl cellusolve in excess of Reportable Quantities were

potentially released through the line. RES notified the DEP, and disconnected this cross-connection.

RES contracted ERM to evaluate the potential for negative environmental impact from the butyl cellusolve release from OF-01. Sediment and surface water samples were analyzed for volatile organic compounds (VOCs including butyl cellusolve), PAHs, PCBs, pesticides and metals. Samples were collected from the discharge line, at the outfall, along the discharge swale and up and downstream of the facility along the Sudbury River. Butyl cellusolve, PCBs and pesticides were not detected; however, metals and PAHs were identified. The study concluded that contaminants posed negligible risk to human health and the environment, and therefore, remediation was not recommended. A Class-B1 Response Action Outcome (RAO) Statement was submitted to close out this release in July 1995.

October 1992-Removal of Underground Storage Tank (UST) WAY-01 (Badger, 1992)

On 13-16 October 1992, Badger Engineers, Inc. (Badger) monitored removal of a 20,000-gallon fiberglass UST used for the storage of No. 6 fuel oil. The tank was installed in the early 1980s adjacent to the boiler room (WAY-01, Figure 2). Limited oil staining of soil was observed around the stick pipe at the top of the tank and at the return line. The DEP was notified of the release and assigned Tracking No. ERB-N92-1340. Badger monitored removal of approximately five cubic yards of oil-contaminated peastone. Additional sampling was conducted to confirm clean closure of the excavation. A Release Categorization Form was submitted to DEP. The DEP responded that no further emergency remedial actions were required.

January 1996- Release of No. 6 Fuel Oil From WAY-02 Reported to DEP

As part of this Phase I Investigation, a monitoring well (MW-11) was installed downgradient of a former 20,000-gallon steel UST (WAY-02, Figure 2). The tank was installed in 1956 and used for storage of No. 6 fuel oil. RES records indicate that the tank was relined in 1970 and 1983 before it was pumped out and abandoned in place in 1988. Tetrachloroethene (PCE) was reportedly used as an occasional fuel conditioner (5 gallons of PCE for every 20,000 gallons of oil).

Oil contaminated soil was encountered from depths of five to nineteen feet below ground surface (bgs) during boring advancement and well installation. Subsequent gauging of MW-11 with a petroleum interface probe indicated 0.12 feet of petroleum product in the well. On 2 January 1996, RES verbally notified the DEP of the presence of product in accordance with MCP requirements for 72-hour release notification. RES requested approval for implementation of an Immediate Response Action (IRA) consisting of additional assessment and soil removal, if appropriate. The DEP granted approval of the IRA and issued RTN 3-13302.

ERM conducted additional assessment during January, 1996 to further evaluate the nature and extent of hydrocarbon compounds in soil and groundwater, and to determine if additional time-critical response actions were warranted under the IRA. Based on the results of this assessment, an IRA Completion Report was submitted on 4 March 1996 and, at DEP's request, an amendment to this report submitted on 28 March 1996. Results of the IRA indicated:

- hydrocarbon compounds consistent with No. 6 fuel oil are located beneath the paved court yard and Building 3 at depths ranging from 5 to 22 feet bgs;
- separate phase petroleum product has been identified in two wells near the former tank, and low concentrations of dissolved phase VOCs exist in areas immediately downgradient of the product;
- site conditions do not pose an Imminent Hazard to human health, safety, public welfare or the environment at the present time, or for the time period likely to be required until Comprehensive Response Actions can be completed;
- the unmitigated migration of OHM at the site, at present and for the time period until Comprehensive Response Actions can be completed, does not warrant a time-critical response under an IRA;
- additional response actions will be conducted as either a Release Abatement Measure (RAM) or as a Comprehensive Response Action.

March 1996- Release of OHM to Groundwater Reported to DEP

In conducting the Phase I Investigation, RES obtained knowledge of the presence of VOCs in groundwater in excess of applicable Reportable Concentrations (RCGW-1) requiring submittal of written notification to the Department. Contaminants included: 1,1-dichloroethene (2.0-4.8 ug/l); benzene (11-25 ug/l); naphthalene (30 ug/l); tetrachloroethene (6.1-17 ug/l) and trichloroethene (8.6-72 ug/l). RES submitted written Release Notification on 14 March 1996. The

Department responded issuing a Notice of Responsibility (NOR) and RTN 3-13574 on 28 March 1996.

Miscellaneous Spills 1990-1993

Based on a review of DEP's files, the following spills have been documented at the RES property. The locations of these spills were not identified in the DEP files. DEP requires no further action for closed spills.

Spills on File for 430 Boston Post Road

OHM Released	Quantity Released	Date of Release	Status
Butoxy ethanol	11-50 pounds	12 Feb 1990	Closed
#6 Fuel oil	1-10 gallons	13 Mar 1992	Closed
#6 Fuel oil	Unknown	16 Oct 1992	Closed
Miscellaneous oil	Undetermined	13 Apr 1993	Closed

4.3 OIL AND/OR HAZARDOUS MATERIAL USE AND STORAGE HISTORY

4.3.1 OHM Types, Uses, Quantities, Periods of Use & Storage

OHMs have been used in small quantities throughout the facility. Review of RES records indicates that the primary types of OHM used and stored at the facility include VOCs; SVOCs; metals; and lubricating, heating oils, and heat transfer oils, some of which contained unknown quantities of PCBs. Facility processes are identified by date and location in Section 4.1.2 and Figure 2. Both wet and dry processes occurred in various locations in the main complex (Buildings 1 through 6). OHM used in Building 12/21 included mainly oils and coolants: no wet processes are known to have occurred in Building 12/21. Areas of chemical use, chemical types (identified by generic, chemical or trade name) and process descriptions are summarized in Table 1.

From 1974 through 1989 OHM were stored and dispensed beneath an outdoor shed roof on a 40 x 6 square feet concrete pad located to the west of Building 6 (identified as CHEM, Bldg. 26 in Figure 2). The concrete pad was outfitted with a containment berm in 1981. There is no written or anecdotal evidence that spills occurred in the CHEM area.

4.3.2 Underground Storage Tanks (USTs)

Nine USTs, designated WAY-01 through WAY-09, were identified based on review of RES files and drawings. The approximate location of each UST is identified on Figure 2. Available information regarding the age, size, construction, use and closure of each UST is summarized below:

WAY-01

WAY-01 was a 20,000-gallon fiberglass tank used for storage of No. 6 fuel oil for heating from March 1980 through October 1992. Tetrachloroethylene (PCE) was reportedly used occasionally as a fuel conditioner (approximately five gallons of PCE for 20,000 gallons of fuel). Minor spillage over the life of tank use near the fill pipe resulted in removal of approximately five cubic yards of oil-impacted soil during tank removal. No other evidence of leakage or impact was observed. A report (Badger, 1992) documenting closure activities and a Release Categorization Form were submitted to DEP. DEP response indicated no further action was required.

WAY-02

WAY-02 is a 20,000 gallon steel tank used for storage of No. 6 fuel oil for heating from 1956 through 1988. PCE was reportedly occasionally used as a fuel conditioner (approximately five gallons of PCE for 20,000 gallons of fuel). Liners were installed in the tank in 1970 and 1983: the contents were removed in 1988, and the tank was removed from service. In 1988, the tank was filled with concrete and abandoned in place under a permit issued by the Wayland Fire Department because of its location below facility infrastructure.

WAY-03

WAY-03 was a 1,000-gallon steel tank used for storage of gasoline from 1958, and reportedly removed in November 1985. Documentation and telephone discussions with retired RES personnel indicated that this tank was removed. VOC analysis of groundwater analyzed at a fastwell installed downgradient of this tank resulted in no detection.

WAY-04

WAY-04 was a 1,000-gallon concrete secondary containment tank used for transformer oil overflow storage in the event of a transformer rupture from the second floor of the Building 3 Chiller Room. According to RES, no rupture occurred and the tank was never used. The tank was approved to be abandoned in place in June of 1990, and then removed in November 1992 during removal of WAY-01. Closure activities are documented in the Badger report (Badger, 1992). No evidence of a release was detected based on visual observation or laboratory analysis of soil.

WAY-05

No information was available in RES files regarding the age, size, construction or use of WAY-05. After file reviews and ground penetrating radar survey, WAY-05 was deemed to have not existed as an underground storage tank at the site.

WAY-06 & WAY-08

WAY-06 and WAY-08 were 3,010-gallon steel tanks used for storage of 10c insulating oil from 1965 through 1986. The contents were removed, and because of the inaccessibility of this location, the tanks were backfilled in place under permit of the Wayland Fire Department. PCBs were detected at 16 and 8 ppm in the oils removed from the tanks. Manifests indicate approximately 1,800 gallons of oil were removed for disposal by Cyn Oil Co.

WAY-07

WAY-07 was a concrete tank used for underwater acoustical tests inside of Building 4. This tank contained only water and was backfilled in the late 1960s. A portion of this tank was dug out to be used as a pit to gain additional elevation for wave guide testing in approximately 1971. RES personnel interviews indicate that equipment containing oil was used in the wave guide testing vault and that oil in equipment did not leak. In the 1980's, the pit portion of WAY-07 was covered with wooden plates and floor tiles. No information was available in RES files to establish the age or size of the tank or condition prior to closure.

WAY-09

WAY-09 was identified on 1956 design drawings and on RES Fire Insurance Maps dated 1958, 1970 as a 1,000-gallon fuel oil tank. This tank was believed to be abandoned in 1968 when Bldg 6 was constructed. A boring installed downgradient to this tank indicated no TPH to be present in soil or in groundwater; nonetheless, the tank was removed in May of 1996. Closure report including confirmatory samples are included in Appendix E.

Confirmatory composite samples were obtained from the bottom and each wall of the excavated hole which indicated no detection of total petroleum hydrocarbons by gas chromatography. Stock pile characterization of the soil excavated as part of this tank removal were analyzed for metals, PCBs, VOCs, and TPH. All sample results were indicated no detection except for metals which appeared at background levels.

4.3.3 Aboveground Fuel Storage Tanks (ASTs)

Two fuel oil ASTs were utilized at the facility:

- One 300-gallon double walled steel tank containing diesel fuel, installed in 1991 and removed in 1994, was located south of Bldg 6 and used by the ETL lab for a project generator.
- One 500-gallon, single-wall diesel tank was installed in August 1991 within a concrete containment berm located to the north of the hydraulics lab and used to power the current facility emergency generator.

4.3.4 Pits & Piles

Based on review of facility files, two pits are identified in Building 3. One is located beneath the stairway in the Boiler Room in Building 3. A second pit was identified in the former weld shop within Building 3. The first pit housed a condensation line connection into a storm drain. The second pit was documented on the master drain plan to be an acid pit for the old Machine Shop in Bldg. 3. This pit was analyzed for a variety of parameters (PCBs, metals, VOCs, SVOCs, oil & grease) and the results indicated no adverse impact. Upon inspection, the piping associated with the pit passed directly through and discharged to a drywell (DW-06). Contaminants identified at this location were removed during an LRA performed on October 31, 1996 (See Appendix D).

Based on visual inspection of the facility grounds, no piles were identified on site.

4.4 WASTE MANAGEMENT HISTORY

4.4.1 Land Disposal

Based on a review of historic aerial photographs from 1936 through 1988, potential filling activities and potential land disposal areas were identified at the following locations and periods:

- Surface debris and disturbed land free of vegetation were observed in the 1969 photograph located to the northwest of the former sand filter bed (LC-01). In a 1988 photograph, this area of the property appears to have been filled to a higher elevation and is vegetated woodland (FS-01 as shown in Figure 2).
- Comparison of aerials from 1936 to 1957 indicates portions of the wetlands on the western boundary of the site had been filled (FS-02 as shown in Figure 2).
- Surface debris and land disposal were apparent in the 1988 photograph in an area located adjacent to the northwest corner of the parking lot near the fitness track.

Based on review of aerial photographs, RES elected to excavate test pits, and if appropriate, analyze soil samples in the area to the northwest of the parking lot and northwest of the former leachfield. Results of test pit excavation are summarized in Section 5.3.1.

4.4.2 Subsurface Disposal

Drywells

Facility plans indicate seven dry wells (DW-01 through DW-06, and DW-08) are located around the main complex and one (DW-07) is located on the eastern side of Building 21 (Figure 2). According to RES:

- DW-01 through DW-04 may have received wastewater from the Transmitter Lab since 1955 and were abandoned in place in 1975. Operations in the Transmitter Lab included draining and changing transformer oils.
- DW-05 may have received wastewater from drains in the Old Chem Lab in Building 1 from approximately 1958 through 1969. Chemical use in this area included organic solvents, metals paints and thinners.
- DW-06 may have received wastewaters from the Old Machine Shop in Building 3 between approximately 1955 and 1969. Chemical use in the Old Machine Shop prior to 1969 was not documented.

- DW-07 is located adjacent to Building 21 and 6 feet beneath grade. This drywell was designed to collect roof water and fire water from drain down tests.

All dry wells except DW-02 & DW-07 were located and evaluated during the Phase I Investigation. DW-02 was not found; however, the suspected location for DW-02 was investigated and no contamination was found. DW-07 was not investigated since the use was restricted to collection of roof water and fire water during fire system two-inch drain flow test, and/or system maintenance.

Leachfields & Septic Systems

LC-01, an abandoned sand filter bed with underdrain to the storm system is located to the northwest of Building 2. LC-01 received both sanitary and industrial wastewaters from approximately 1955 to 1962 (Figure 2). Effluent from the sand filter bed was collected and treated in a chlorination chamber prior to discharge to the Sudbury River. The septic tank system upstream of the sand filter bed was abandoned in 1962 when the Sanitary Treatment Plant was constructed. In 1990, the abandoned septic tanks, a chlorination chamber and dosing tank were decontaminated, crushed and abandoned in place.

LC-02 is an abandoned 48 x 35 foot leachfield located on the western side of Building 12 (Figure 2). The leachfield received sanitary waste from approximately 1957 through 1991 and was subsequently abandoned beneath two feet of crushed stone. Chemicals used in this complex included oil , coolants in air compressor units and other equipment and boiler treatment chemicals. Oil from the air compressor units were the only OHM known to have been piped into the sanitary system. The boiler treatment chemicals and coolants in other equipment may have potentially entered the leaching field.

The Sanitary Treatment Plant (STP) operated from 1962 through 1995 and received sanitary wastewater and industrial wastewater between 1962 and 1972 prior to discharge to the Sudbury River. From 1972 to 1995, after the construction of the Industrial Waste Water Treatment Plant, the STP became solely a sanitary wastewater treatment facility.

4.4.3 Surface Water Discharges

Industrial wastewater has been treated by the Industrial Wastewater Treatment Plant (IWTP) located in Building 5 (Figure 2) since 1972. Industrial wastewater was discharged through a combined stormwater/non-hazardous wastewater conveyance system to the Sudbury River via a permitted National Pollutant

Discharge Elimination System (NPDES) outfall (OF-01, Figure 2) between 1972 and 1992. Industrial wastewater discharges to the river ceased in 1992. Between 1992 and 1995, evaporators were installed and utilized for non-hazardous industrial wastewater treatment. Between 1962 and 1995, the Sewage Treatment Plant (STP, 19/19A, Figure 2) treated facility wastewater which was also discharged to the Sudbury River via permitted outfall OF-01. At the end of 1995, sanitary discharge ceased as the STP was converted to a holding tank, which was pumped out by wastewater hauler on an as needed basis.

4.4.4 Discharges to Wastewater Treatment Plants

According to a 1971 facility *Water & Waste Audit Report* and *The Final Engineering Report for Raytheon Company* (Lancy, 1971), the STP received wastewater from the Transmitter Lab, Printed Circuit Board Shop, Publications/Photo Lab, MSR Circuit Model Lab, and the Environmental Test Lab. Potential OHM in these waste streams included acids, metals and volatiles from etching, plating and photographic developing. The STP was upgraded in 1975 and the majority of the STP was decommissioned in 1995. In 1996, the aeration basin and clarifier remain in operation as a holding tank and emergency overflow containment.

RES files indicate IWTP received process rinse waters, floor spills and wash downs from the Printed Circuit Board Shop in Bldg. 4, Weld Shop in Bldg. 6, and the MLB lab in Bldg. 4A.

4.4.5 Other Means of Disposal or Treatment

A Hazardous Waste Storage Shed (HWSS) equipped with containment and berming was constructed in 1980 and continues to be utilized during facility closure in 1996 (Figure 2). According to RES, any spills which occurred within the HWSS were fully contained and properly cleaned. No information was identified to determine the location of hazardous waste storage prior to 1974.

4.5 ENVIRONMENTAL PERMITS AND COMPLIANCE HISTORY

4.5.1 Permits for M.G.L. c. 21E Response Actions

No records of permits issued in response to M.G.L. c.21E Response Actions were identified by ERM. Verbal approval was issued by DEP on 2 January 1996 to conduct an Immediate Response Action (IRA) in response to petroleum product discovered on the water table near WAY-02.

4.5.2 Oil and/or Hazardous Material Storage Permits

According to RES, hazardous waste has never been stored at the facility for more than 90 days, and the facility has never applied for, nor required to obtain , a RCRA Part A or Part B permit. Hazardous waste manifests are on file from 1977 to present.

The facility has had nine underground storage tanks (USTs) for storage of petroleum products and water. The tanks, numbered "WAY-01" through "WAY-09," are described in more detail in the following table. WAY-09, a 1,000-gallon fuel oil UST, was identified on 1956 design drawings and on RES Fire Insurance plans dated 1958, 1970. The facility also had two aboveground storage tanks (ASTs) for storage of diesel fuel for operating two emergency generators, which are also included in the following table.

Summary of OHM Permits

Tank No.	Size (gal.)	Contents	Approximate Date Installed	Permit/Type	Status
WAY-01	20,000	No. 6 fuel oil	3/80	• Oil storage - Building Dept. • Remove & transport - DPS/ DFP 10/13/92	Upgraded 1990, Removed 10/92
WAY-02	20,000	No. 6 fuel oil	1956	ND	Abandoned in place - 1988
WAY-03	1,000	Gasoline	1958	Storage license - Fire Dept. due 6/86, Removal license - DPS 11/85	Removed 11/85
WAY-04	1,000	Waste oil	ND	• Remove & transport - DPS/ DFP 10/92 • Clean & fill - DPS/DFP 9/12/90	Removed 1992
WAY-05	ND	Waste oil	ND	ND	ND
WAY-06	3,000	10c Insulating oil	1965	• Remove & fill with concrete - DPS/DFP 9/11/86	Abandoned in place - 1986
WAY-07	ND	Water	ND	ND	Abandoned in place
WAY-08	3,000	10c Insulating oil	1965	• Remove & fill with concrete - DPS/DFP 9/11/86	Abandoned in place - 1986
WAY-09	1,000	Fuel oil	ND	ND	Tank removed in April 1996.
Generator	300	Diesel fuel	1990	ND	Removed 1994
Generator	500	Diesel fuel	ND	Permitted Fuel Storage	On site for facilities' emergency generator

Notes: ND - No data available
DPS/DFP - Department of Public Safety/Division of Fire Prevention

4.5.3 Wastewater Discharge Permits

ERM did not identify any wastewater discharge permits other than the facility's existing NPDES permits. NPDES permits are discussed in Section 4.5.8.

4.5.4 Groundwater Discharge Permits

ERM did not identify any groundwater discharges or groundwater discharge permits for the facility.

4.5.5 Air Quality Discharge Permits

ERM did not perform actions to identify any air emission permits for the facility. Several DEP pre-construction approval letters are in RES files. However, based on information provided to ERM by RES, the Wayland facility was a minor source with annual emissions of 1.69 tons of VOCs in 1990. The summary also reported 40 "reportable" stacks and 54 "reportable" processes. The summary identified that one notice of noncompliance (11/89) was received based on RES' input the notice of noncompliance was for the lack of pre-construction approval permitting and this was promptly corrected by RES.

The presence of natural gas-fired boilers on-site indicates emissions of combustion products such as oxides of nitrogen (NO_X) and carbon monoxide (CO) also exist. Prior to converting the boilers to natural gas in 1992, No. 6 fuel oil was fired; this would create emissions of sulfur dioxide (SO_2) and particulate matter (PM) in addition to NO_X and CO.

4.5.6 Wetlands Alteration Permits

RES reports it has a wetlands permit (#322-143) for underground conduit installation. The requirements of the permit are not stated. ERM did not identify any other wetlands alteration permits for the facility.

4.5.7 Resource Conservation and Recovery Act (RCRA) Permits

The Wayland facility is licensed as a large quantity generator of hazardous wastes and a small quantity generator of waste oil. The facility's EPA I.D. No. is MAD990685554. RES indicated that the facility has received one notice of noncompliance for hazardous waste activities (2/90) such as labeling

inaccuracies which were immediately corrected by RES. This facility has been a large quantity generator primarily due to the laboratory nature of operating prototype wet process and prototype machining. Much of RES's hazardous waste was a result of off-spec chemical, wastewaters containing trace metals or organics, mixed acids, waste oils, waste oil/solvent rags, and water treatment system sludges.

4.5.8 National Pollutant Discharge Elimination System Permits

The facility has received NPDES permits for discharge of treated sanitary wastewater and treated industrial wastewater (No. MA0001511) to the Sudbury River and discharge of stormwater (No. MAR00A401) to the Sudbury River. The original NPDES permit was received in 1972. The most recent NPDES permit on file was issued on 28 September 1990 and expired 28 September 1995. RES's records show that a renewal application was submitted in March 1995.

The NPDES permit requires that RES monitor its discharge for the following parameters:

- Maximum daily flow - 25,000 gallons per day
- Maximum monthly flow - 15,000 gallons per day
- Inorganic compounds - bimonthly
- Oil and grease - bimonthly
- Total suspended solids - bimonthly
- Total organic compounds - quarterly

RES provided the following information on NPDES permit excursions since 1991:

1995 Excursions

Parameter	Outfall	Permit Limit	Date	Discharge Value
Biotoxicity	005	LC50 = 100% C. dubia	4/95	LC50 = 62% C. dubia
		LC50 = 100% D. pulex	4/95	LC50 = 71% D. pulex
Biotoxicity	005	LC50 = 100% C. dubia	11/95	LC50 = 37.7% C. dubia
		LC50 = 100% D. pulex	11/95	LC50 = 42% D. pulex

1994 Excursions				
Parameter	**Outfall**	**Permit Limit**	**Date**	**Discharge Value**
No violations reported				

1993 Excursions				
Parameter	**Outfall**	**Permit Limit**	**Date**	**Discharge Value**
Biotoxicity	005	LC50 = 100% C. dubia	1/93	LC50 = 71% C. dubia
		LC50 = 100% D. pulex	1/93	LC50 = 62% D. pulex
Biotoxicity	005	LC50 = 100% C. dubia	2/93	LC50 = 63% C. dubia
TSS (Total settleable solids)	002	Daily maximum 0.3 ml/l	5/93	Daily maximum 0.5 ml/l
TSS (Total suspended solids)	002	50 mg/l	6/93	58 mg/l
Maximum daily flow	003	4,000 gallons per day	6/93	6,884 gallons per day
Maximum daily flow	003	4,000 gallons per day	10/93	6,288 gallons per day
pH	003	Lower limit pH = 6.5	6/93	pH = 6.0

1992 Excursions

Parameter	Outfall	Permit Limit	Date	Discharge Value
Biotoxicity	ND	LC50 = 100%	1/92	"Violation" - ND
Biotoxicity	ND	LC50 = 100%	1/92	"Violation" - ND
Al	ND	2.0 mg/l	1/92	2.41
Fecal coliform	ND	400 /100 ml	2/19/92	4,500 /100 ml
Cl residual	ND	1 mg/l	2/27/92	1.25 mg/l
BOD	ND	50 mg/l	9/92	73 mg/l *
Total flow	ND	172,695 gallons per day	1/92	"Omission"
Total flow	ND	172,695 gallons per day	4/92	"Omission"

Notes - ND = No data
/100 ml = Number of organisms counted per 100 ml sample
* = Laboratory analytical error cited

1991 Excursions

Parameter	Outfall	Permit Limit	Date	Discharge Value
TSS	001A	30 mg/l	3/6/91	30.7 mg/l
Al	001A	2.0 mg/l	3/6/91	2.15 mg/l
Fl	001A	17.0 (30 day average)	4/91	26.5
Cu	001A	0.8 (30 day average)	4/91	2.8
Cu	001A	0.8 (daily maximum)	5/91	1.07
Cu	001A	0.8 (daily maximum)	4/10/91	4.36
Cu	001A	0.8 (daily maximum)	6/5/91	1.93
Cr^{+6}	001A	0.10 mg/l (daily maximum)	12/11/91	0.17 mg/l
Oil & grease	001A	15 mg/l	6/5/91	27.3 mg/l
Oil & grease	001A	15 mg/l	6/12/91	37.0 mg/l
Oil & grease	001A	15 mg/l	8/14/91	25.7 mg/l
Oil & grease	001A	15 mg/l	9/11/91	25.7 mg/l
Fecal coliform	002A	400 /100 ml	5/91	1,500 /100 ml
Fecal coliform	002A	400 /100 ml	9/4/91	1,500 /100 ml
Fecal coliform	002A	400 /100 ml	11/15/91	35,000 /100 ml
Fecal coliform	002A	400 /100 ml	12/5/91	200,000 /100 ml
Cl residual	002A	1.0 mg/l	6/19/91	1.3 mg/l
pH	003A	6.5 to 8.0	1/91	8.6
Cooling tower b.d.	003A	4,000 gallons per day maximum	6/10/91	4,398
Cooling tower b.d.	003A	1.0 mg Cl /l	6/19/91	1.6 mg Cl /l
Biotoxicity	005	LC50 = 100% C. dubia	1/91	LC50 = 70.7% C. dubia
Biotoxicity		LC50 = 100% D. pulex	1/91	LC50 = 70.7% D. pulex

Notes - ND = No data

4.5.9 Other Local, State, and Federal Environmental Permits, OHM Storage Permits, and Permit Violation Information

No additional information was identified .

Table 1
Sheet 1 of 2
Process Chemical Use, and Hazardous Waste Generation By Area
Raytheon, Wayland, Massachusetts

Area	Process Description	Likely Chemicals Used	Likely Hazardous Waste Generated	1995 Process Drain Type	Estimated Drain that Existed Historically
AMICDO Lab	Ultrasonic Cleaning and hand soldering	Volatile organic compounds such as acetone and methanol	Flammable solvents.	Containerized	None
High Bay Wave Guide Testing Vault	Transmitter wave guide testing (at high elevations), acoustic/sonar testing.	Transformer oils.	Not identified.	Containerized	None
Hydraulics Lab	Brazing, milling, pressure testing, mechanical assembly, refrigeration, paint stripping, and repair of units.	Cleaning solvents, ethylene glycol, oils, acids and refrigeration oil.	Spent solvents, sump water containing spent solvents, waste oil, Bernite cleaning solution with sulfamic acid, lab-packs.	Containerized directly or via pumping out spill collection sump.	Incidental spills may have ended up in storm drain/trench.
Environmental Test Lab	Temperature, humidity, altitude testing, rain tests, salt spray tests. A cooling tower water treatment system was situated in this lab.	Chlorofluoro refrigerants, ethylene glycol, gasoline, hydraulic oils, mercury, petroleum-based oils, propylene glycol, acids, bases, ozone, and trichloroethylene (TCE).	Waste oil, lab-packs, waste debris/rags.	Containerized	Incidental spills may have ended up in storm drain.
Radar Testing Complex - Building 12/21	Testing radar systems, including cooling systems.	Alcohol, coolants, epoxies, mineral oil, and oils.	Waste oil, spent glycol solution, soot form boiler, lab-packs (e.g., capacitors/transformers).	Containerized	Incidental spills may have ended up in storm drain/trench
Transmitter Lab	High voltage testing.	Dielectric oils	Waste oil	Containerized	Drywell
Transformer Lab Section of Transmitter Lab	Oil baths and oil changes, painting, and baking of small protocol transformers.	Oils with trace PCBs, paints.	Waste oil, waste rags, spent flam., solvents.	Containerized	Drywell
Machine Shops / Weld Shop and Carpentry and Paint Shops	Protocol part machining, painting, woodworking, plating and chromating, fabrication.	Acetylene gases, aluminum, cadmium, copper, fiberglass resin, iron, lubricants, magnesium, methyl ethyl ketone, nickel, oils, petroleum-based oils, phenolic resin, steel, toluene, xylenes, barium, sodium dichromate, sodium hydroxide, sodium phosphate, ferrous sulfate, hydroflouric acid, spray paint, trichloroethylene (TCE), chromate solution, ethylenedaimine, nonylphenoxy polyethoxy ethanol, ethoxylated coamine, tetrasodium salts; Oakite LNC Deodorizer which contains nitric acid, and HF.	Water soluble cooling oils, oganic debris/rags, aluminum sludge from Oakite, electroplating sludge with metal hydroxides, brine from water recycling, waste oil, lab-packs, solvents, waste flammable solvents.	Containerized or water recirculating system	Rinsewaters were piped to storm system and sanitary.
Conformal Coat Assembly	Wave soldering, hand soldering, conformal coating, alcohol dip tank, vapor degreaser, semi-aqueous cleaning system.	Acetone, isopropyl alcohol, lead-tin solder, solder flux, solder oils, solvent-containing paint, solvent-containing polyurethane, terpene, trichloroethane (TCA).	Waste lead solder and solder fluid, wastewater containing trace solvents, filter media, waste rags, waste flammable solvents, lab-pack.	Containerized	None identified
Chemical Lab / Plastics / Finishes / Coatings / Metallurgy / Heat Treatment Lab	WET PROCESSES: Wet chemistry, paint spraying, soldering, metallurgical testing, plastic and metal bonding, electroplating, copper plating, lead/tin plating, and gold plating.	2-Butoxyethanol, acetic acid, acetone, alkali cleaners, ammonia, ammonium hydroxide, ammonium persulfate, ammonium thiosulfate, borates, boric acid, butyl cellusolve, caustic soda etch, chromic acid, copper sulfate, copper sulfate plating solution, diethylene glycol, fluoroboric acid, formaldehyde, gold plating solution, hydrofluoric acid, hydroquinone, isopropanol, lead-tin fluoroboric, methanol, methyl ethyl ketone, nitric acid, petroleum ethers, phosphoric acid, pumice, silver solution, sodium hydroxide, sulfuric acid, terpene, tetrahydrofuran, tetrasodium salts, toluene, trichloroethane (TCA), trichloroethylene (TCE), and trichlorofluoroethane.	No information identified	Out-of-service	Drywell

Table 1
Sheet 2 of 2
Process Chemical Use, and Hazardous Waste Generation By Area
Raytheon, Wayland, Massachusetts

Area	Process Description	Likely Chemicals Used	Likely Hazardous Waste Generated	1995 Process Drain Type	Estimated Drain that Existed Historically
Printed Circuit Board Shop	Printed circuit board fabrication and plating.	Acids, alkali cleaners, chromic acid etch solution, electroplating solution, metals, ammonium hydroxide, Copper sulfate, tin fluoroborate, HCI, HF, volatiles and organic compounds.	Developer waste with butyl cellusolve, corrosive salts (ammonium hydrogen fluoride), waste mixed acids, wastewater containing trace organics or trace metals, waste persulfate etching bath, tin/lead bath, lead anodes, ammonium hydroxide etchants.	Out-of-Service	Majority of rinse water piped to IWTP, prior to IWTP, to sanitary. One process water was piped to storm system.
Microwave Hydbrid Integrated Circuit (MHIC) Lab	Stripping, phototech, laminating, developing, cleaning, spray painting	Acetone, copper plating solution, electroless tin, ferric chloride, gold plating solution, isopropyl alcohol, iodine, solvent paint, lead-tin, photographic developing chemicals, and toluene.	Spent acid solution with chrome, wastewater with trace organics or metals, mixed acids, mixed flammable acids, (hydrochloric, nitric, phosphoric, boric); spent tin/lead bath with sodium hydroxide, spent copper bath, lab-packs.	Containerized	Rinse water to sanitary or drywell
MLB Lab	Electroless copper plating, alkaline etching, and photoprocessing.	2-Butoxyethanol, alkaline etching solution, borates, electroless copper plating solution, photoprocessing chemicals, and tetrasodium salts.	Spent sulfuric solution with chrome, nitric acid with copper, electroplating metal hydroxide, photo resist stripping containing lead, sodium persulfate solution, mixed acids, lab-pack, photoresist developer waste containing silver.	Containerized IWTP	IWTP
Photo Area / Photoplotter Lab	Photo developing and plotting.	Acetic acid, ammonia, ammonium thiosulfate, ferrous cyanide, hydroquinone, potassium aluminate, and silver.	Wastewater with trace metals, silver, or organics; waste electrostatic solution, waste rags/debris, spent flammable solvents, lab-pack.	Rinsewater containerized, water recirculating system	Rinsewater to storm and sanitary
Boiler Room	Natural gas, oil, gas capability, boilers, chiller, water treatment system, air compressors	BCT-76 potassium hydroxide, sodium hypochlorite, refrigerants, acids, bases, oils, and sulfuric acid	Wastewater with trace solvents, spent ethylene glycol, waste rags/debris, waste oil, soot from boiler, spent absorbents, cooling tower sludge, #6 fuel oil with clay absorbent.	Water to storm	Storm
Sewage Treatment Plant	Treating sanitary waste and some industrial waste.	Chlorine gas, lime, acids, defoamer, salts	Mixed acids such as sulfuric, broken mercury thermometers, lab-packs, waste oil, chromic acid/sulfuric acid mixture.	Chemicals added into sanitary system	Treated effluent to river
Industrial Waste Treatment Plant	Treating industrial waste.	Lime, acids, bases, buffer solutions	Evaporator brine, lab-packs, electroplating sludge, waste oil, waste rags.	Evaporator	Treated water to river