PRELIMINARY SITE ASSESSMENT

REMINGTON RAND PLANT
CITY OF ELMIRA
CHEMUNG COUNTY, NY

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DRAFT
EXECUTIVE SUMMARY

This report describes the results of a preliminary site assessment of the Remington Rand plant site in Elmira, New York (Figure 1). This study is based on a review of readily available information and visual reconnaissance of the property from public areas.

The approximately 83-acre site straddles the Elmira-Southport corporate boundary. The southern part comprises essentially a parking lot and athletic field; the middle part consists of industrial buildings within a chainlink fence; and the northern part is occupied by the Southside High School.

Parts of the property have been used for industrial manufacturing since as early as 1887, including P.W. Payne & Sons for manufacture and assembly of industrial steam engines, Morrow Corporation for rear assemblies for the Overland and Willys-Knight automobile, Remington Rand for typewriters and related office equipment, and American LaFrance for fire-fighting equipment. Plant operations at the site consisted of machine shops, foundry, forge shop, plating operations, metal blackening, heat treatment, pickling/painting, tumbling, and washing. After Remington Rand vacated the plant in 1972, it was subdivided. In 1977, the northern portion was purchased by the Elmira School District, and the southern part by ATL which was later acquired by Figgie International. The Southside High School and athletic fields were constructed on the northern portion after demolition of the plant structures in the late 1970s.

Aerial photographs dating back to 1938 indicate disturbed areas along the eastern and southwestern portions of the site, which may have been used for disposal of waste products from plant operations. These areas are currently grass-covered or paved parking areas. Other areas where the ground may have been affected by plant operations include drainage pits, settling ponds, coal pits, and plating operation areas. Liquid wastes may also have been discharged into a ditch leading to now Coldbrook Creek east of the plant site.

The plant site is located on glacial outwash aquifer deposits that may extend to about 100 feet in thickness. Ground water is anticipated to flow eastward. The Elmira Water Board supplies the water for the area around the plant site. Community wells are located less than a mile upgradient of the plant site. Site soils are anticipated to be permeable permitting relatively rapid infiltration where not covered by parking areas or
1.0 INTRODUCTION

This report comprises a Preliminary Site Assessment (PSA) of the Remington Rand plant site in the city of Elmira, Chemung County, New York (Figure 1).

This PSA has been performed by Dames & Moore on behalf of Unisys Corporation which inherited the assets and liabilities of Sperry Rand, a former owner and operator of the plant site [1]. The objectives of the PSA were to outline, to the extent practical using the available information, the nature and extent of storage, usage, or disposal areas for potential hazardous material, environmental migration pathways, and human or environmental exposure points, by performing a literature review.

The literature review included the collection and evaluation of historical data, including air photographs, information from state and local government agency files, published literature, and other sources. No field work was performed other than a brief visit to view the site surface conditions from the adjacent public areas.

The information collected is summarized in the sections which follow in terms of:

- Background and History
- Regional Features
- Waste Materials
- Hydrogeology
- Surface Water
- Health and Environmental Considerations

Appendix A contains a chronological summary of events associated with the Remington Rand plant site. Chemical analyses of three liquid waste streams performed in 1952 by the State Department of Health are provided in Appendix B [2]. Appendix C

* Refer to list of references that follows the figures.
provides information on waste components that may have been generated at the plant site based on laboratory analyses performed, and the types of raw materials and production processes used at the former Remington Rand plant.
expansion of Westinghouse's color television tube facility in Horseheads. The portion of the plant purchased was probably used for warehousing [34]. The purchase was financed by $1 million in industrial revenue bonds issued through the Chemung County Industrial Development Agency (IDA) [9].

In 1977, the school district purchased the northern part of the plant and soon demolished the remaining plant structures north of the "N" plant and constructed the Southside High School (Figure 7). No reports were made of any unusual odors or other conditions during demolition or excavation for construction of the new school at the site [49].

2.2.6 1973-Present Southern Half of Plant Site

In 1980, American LaFrance (ALF), a division of A.T.O. Properties, Inc. acquired the "N" plant for manufacture of fire engines and related apparatus [15]. American LaFrance remodeled the factory and lowered the floor by about 5 feet to provide sufficient clearance for fire trucks [16]. No unusual conditions were reported in removal of the wooden floor and excavation of the soils during remodeling [16].

Since 1980, three of the supply wells, producing 45 to 53°F water were alternately used for non-contact cooling of air conditioners [16]. The used water was discharged to the pond. The wells were also pumped to depress the water table to keep seepage out of the below-grade machinery pit. City water was reportedly used in the process operations and for drinking.

ALF ceased manufacturing at the "N" plant in 1985 after which most of the contents were auctioned and moved out [16]. ALF is currently part of Figgie International of Richmond, Virginia which continues to monitor and maintain the empty buildings with a small onsite security staff.

2.3 OPERATIONAL HISTORY

No information was readily available on the storage, use, or disposal of hazardous materials prior to ownership by Remington Rand. However, it is likely that Payne & Sons and Morrow Manufacturing Company were using industrial materials such as oils, spirits, solvents, and possibly plating solutions prior to 1935.
In 1936, the year before Remington Rand took over the plant, the Elmira Precision Tool Company manufactured typewriter parts [9]. With the establishment of Remington Rand in 1937, the line of products apparently expanded to include complete manufacture from raw material to finished product of typewriters and adding machines and later electric and electronic equipment [9]. In 1967, Laney Laboratories reported plant operations included cyanide heat treating and metal finishing involving cleaning, tumbling, pickling, plating, stripping, metal blackening, and conversion coating treatments [17]. Since the products generated by the plant were similar through the 35 years of operation, the plant operations were most likely similar, although technological improvements were likely incorporated. Due to expansion of facilities at the plant and later demolitioning of older buildings and smaller work forces, locations of various operations were likely changed over the operating history of the plant. Documentation of these locations changes was not found in the readily available literature.

During World War II, in addition to the manufacture of office equipment, a Remington Rand executive announced a contract with the Department of Defense for manufacture of high-explosive, anti-aircraft shells at both the Elmira and Ilion plants [10]. However, local sources only remember producing fuses for the bombs [49]. In 1942, the new building, the "N" Plant, was completed for another government contract, manufacture of the Norden Bomb Sight [9]. The information was readily available concerning waste management practices for these operations. A local resident, however, recalls as a youth scavenging the "dump area" behind the plant for explosive powders to make homemade explosives [49].

In the spring of 1952, the State Department of Health sampled wastes being discharged by the plant to surface water. Four samples were taken from various waste streams at the plant prior to discharge to surface water by the District Sanitary Engineer for the Health Department. The receiving stream entered Miller Creek (now Coldwater Creek) and then flowed about 3/4 mile to the Chemung River [2]. Results of these tests were formally transmitted to the Remington Rand plant in the spring of 1953 [2]. The Health Department informed Remington Rand that toxic wastes were being discharged [2]. Test results indicated the presence of chromium and cyanide as well as others (Appendix B).
In 1952, Remington Rand purchased the McInerney farm site near Seeley Creek about 0.5 mile south of the plant site. The farm site was apparently used for disposal of waste from the plant between the 1940s and 1967 [19].

In January 1954, a large fish kill resulting from cyanide contamination occurred on the Chemung River [20]. Investigations performed by the Conservation Department resulted in Remington Rand being attributed to the source of the contamination. The plant later acknowledged that the contents of a nickel plating machine containing cyanide in solution had been discharged on January 9 down a drain which led into Miller Creek. Disposal of all concentrated cyanide and metal solutions was supposed to be taken to a dump area. The disposal was contrary to plant orders according to the plant manager [20].

In the fall of 1958, an industrial survey form was completed by the Department of Health for the plant [21]. At this time, the plant was manufacturing and assembling office machines at the rate of about 1,000 typewriters and 150 adding machines per day. The plant employed between 4,500 and 5,800 personnel working two to three shifts per day and 5 days per week. Typical raw materials and quantities used at this time are listed on Table 1. There were three waste discharge outlet points during this period of operation (Figure 8). All three reportedly carried plating and oil waste [21]. Two of the waste streams had oil skimmers. Discharge of waste streams was to an "inlet ditch" leading to a swampy area on the east side of the railroad, and then to Miller Creek [2,17].

In mid-1958, work began by state agencies on the Chemung River Basin to provide data for enforcement of Article 12 of the Public Health Law. In late 1964, the work was completed and in early 1965 the CCHD received the final Section [22]. Shortly afterwards, a concerned citizen complained of pollution in Miller Creek and the Health Department responded by noting that an informal meeting with Remington Rand would soon be held [22].

On September 21, 1965, the CCHD took samples of Miller Creek about 25 feet below the point where the waste ditch enters the creek, to determine the effects of the plant's waste on the stream [23]. On November 12, 1965, Sperry Rand Corporation was notified of the results of the sampling [23,24] as follows:

1. Elevated concentration of zinc
2. Elevated concentration of cyanide
3. pH of one sample marginally beyond the acceptable range
4. Observation of an oil slick and gassing sludge deposits

As a result of these alleged violations, Sperry Rand Corporation was targeted by the State Health Department as a polluter in Chemung County in violation of Article 12 of the Public Works Law [25]. A case summary was prepared by the CCHD describing the discharge to the stream [23]. The report also noted that concentrated solution of plating wastes were reportedly collected and disposed of on a dump site owned by the company.

In 1965, a newspaper article stated that after 29 years "the Remington office Machine E Division Plant had ceased dumping treated industrial waste into Miller Creek" [16]. The plant manager said "the waste, primarily chromates used for plating materials, is now being stored in barrels pending conclusions of negotiations with the city for using the city sewage system." The manager stated that "the company stopped discharging chromate waste into the stream in early November (1965) and had been in contact with a company in Binghamton (NY) that reclaims it." The only waste being discharged by Remington according to the manager, was possibly a small amount of chromate contained in runoff water (rinse) and water used for cooling plating tanks.

In early 1966 after the newspaper article, the CCHD made visual observations that while the plant had stopped dumping chromate water into the stream, there was very little change in the appearance of the stream [26]. Consequently, Sperry Rand was scheduled for an enforcement hearing on February 17, 1967 [27]. CCHD recommended to the New York State Department of Environmental Conservation (NYSDEC) that the company be required to [26]:

- Perform engineering studies and report by September 1966
- Submit final plan by March 1967
- Start construction by June 1967
- Pollution abated by December 1967

In August 1966, Sperry Rand responded to the CCHD concerning the November 1965 violations [28]. The plant had thoroughly reviewed their processes and facilities connected with the drainage system carrying waste to Miller Creek. The company documented repairs and changes that were made in the system including [28]:

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1. All plating tanks containing zinc, cyanide, chromate, etc. when requiring disposal, were pumped to barrels for disposition.

2. All tanks containing paint sludges, strippers, and other contaminants were pumped into barrels for disposition.

3. All cutting oils, both water-soluble and petroleum base, when requiring a change were pumped from the machine to a portable tank which was then emptied into a tank truck for disposition.

In March 1967, Sperry Rand failed to meet the schedule set up at the enforcement hearing for supplying final plans for abatement for the stream pollution in Miller Creek [29]. Sperry Rand informed CCHD that Lancy Laboratories had been retained to perform an engineering survey of the waste treatment problem [30]. Thus began a long succession of delays in construction and threats of legal action by the state. The treatment plant was finally operative the end of April 1971 [31, 73] and operated until the plant closed in 1972. The Town of Southport landfill, which is believed to have received the sludge from the treatment plant, was probably closed during 1973.

Lancy Laboratories completed the engineering study in July 1967 [17]. The report summarized the activities and identified the source and quantity of waste being generated by the plant at that time (Tables 2 and 3).

"The Office Machines Division of the Sperry Rand Corporation employs approximately 2,200 employees. The plant operates 16 hours per day, 5 days per week, producing office machines, principally typewriters. The manufacturing operations involved for typewriter production include both mechanical and metal finishing operations. Included in the latter category are cleaning, tumbling, pickling, heat treating, buffing, polishing, plating, stripping, metal blackening, and conversion coating treatments."

"The process water used for the wet process treatments above is pumped from five company wells having combined pumping capacity of 2,760 gallons per minute (gpm). Of this total, however, only 250 gpm are used for metal finishing operations. For sanitary purposes, approximately 52,000 gallons per day (gpd) are purchased from the city of Elmira. The division is partly situated in both Elmira..."
and Southport, the Elmira city line roughly splitting the property in two equal parts. Sanitary wastes from the entire plant are discharged to the city of Elmira sanitary sewer system."

"Industrial wastes are generated in cyanide heat treating and in metal finishing operations such as cleaning, tumbling, pickling, plating, stripping, metal blackening, and conversion coating treatments. [Table 3] lists all the various process solutions used in these operations, as well as their volumes and their dumping frequency."

"Without treatment, these metal finishing and heat treating operations would produce an effluent containing cyanide, hexavalent chromium, trivalent chromium, iron, copper, and nickel and would be high in soil and suspended solids. In addition, the pH of the effluent water would vary from high to low, coincident with the dumping of alkaline or acidic process solutions."

Lancy Laboratories proposed that an in-plant waste treatment system be installed for the chemical waste treatment of the industrial wastes generated at the plant prior to discharge to the Chemung River by way of Millers Creek at the existing storm sewer.

Sludge generated from the waste treatment facility was originally proposed to go to the company-owned landfill [32], but in early 1968, the town of Southport was reported to be willing to accept the 750 cubic feet per month of treated sludge from the plant at their trash and rubbish landfill [33]. No information on the disposal of the sludge was readily available from the literature. The CCHD preferred this to disposal on company property [33]. The Town of Southport landfill was probably closed in 1973 [73]. According to Lancy Laboratories, the type and quantity of sludge resulting from chemical waste treatment would be as follows:

1. Neutralized Wire Pickle Sludge - 250 cubic feet per month
2. Sludge Bed Filters - 400 cubic feet per month
3. Tumbling Sludge Settling Ponds - 100 cubic feet per month

There was no literature readily available that provided information on the final disposal of the sludge, but it is assumed that since the County Health Department preferred disposal at the Town of Southport landfill, that this was the place of final disposal.
The Remington Rand plant shut down operations in 1972 and sold the plant properties in 1973 [9]. Westinghouse Electric purchased part of the facility in 1973 for use as warehouse space [34]. In 1975, the CCHD investigated an oil film on Coldbrook Creek (formerly Miller Creek) [35]. The investigation showed that oil from a transformer being moved at the warehouse had been emptied by a contractor. The oil had flowed into Coldbrook Creek via a storm drain at the plant. Westinghouse personnel stopped the contractor when it was noticed by an employee. CCHD took samples of the oil and water from the creek [32]. No testing results were available concerning these samples. Analyses would most likely have included tests for detection of PCBs.

No information was readily available concerning the waste management practices employed by American LaFrance from 1980 to 1985. However, it is possible that their operations used hazardous materials, generated hazardous waste, and may have included plating operation.

2.4 CURRENT SITE CONDITIONS

The site is bounded by a vacant parcel owned by the City of Elmira City School District to the south, residential housing to the west and north, and Consolidated Rail Corporation to the east [54]. The present owners of the 82.96-acre property are City of Elmira City School District and Figgie International Inc. of Richmond, Virginia [55].

In terms of current usage and conditions, the site can be divided into three (Figure 2): the southern part comprising essentially a parking lot and athletic field; the middle part consisting of industrial buildings within a chainlink fence; and the northern part occupied by the Southside High School.

Near the southern boundary, the property is thinly vegetated with overgrown brush. This area extends across to both east and west boundaries. A large concrete box culvert that formerly transmitted water under the railroad exists in this area along the eastern boundary; the drainage swales are filled in. Northward, the overgrown area thins into a grass athletic field, no longer in use. A partly paved parking lot occupies the western part of the area.
The industrial area which dominates the center portion of the property is enclosed by a fence on all sides and is attended by security guards. The buildings are constructed of brick, with glass windows extending upwards to intersect the metal roofs. The buildings in the eastern portion of the area appear vacant and poorly maintained with broken windows, no doors, and in a state of collapse. The large building on the western portion is in better condition and appears to be in use. The parking lots, driveway, and lawns surrounding the buildings show no signs of being maintained. Near the northern border of the industrial area with the high school is a large detention basin which appears to be an outlet for storm drainage pipes for the plant. The water detained in this basin, outlets by a small channel flowing eastwards through a large concrete culvert under the railroad to intersect with Coldbrook Creek, the outlet stream from Miller Pond.

The high school with its parking lots, athletic fields, and academic buildings dominates the remaining portion of the site.
4.0 WASTE MATERIALS

The purpose of this section is to summarize the nature and extent of possible waste areas present at the plant site and characterize the probable nature of the waste components to the extent practicable using the available information. The history of operations conducted at the plant site was described earlier in Section 2.3. Little information was readily available covering the periods prior to, and after Remington Rand ownership, although hazardous materials were doubtless used and waste products generated during these periods also.

4.1 WASTE DISPOSAL

During the period of operation by Remington Rand plant, from 1937 to 1972, the primary products produced were typewriters and office machines [9]. In 1967, the production involved both mechanical and metal finishing operations. Included in the latter category were cleaning, tumbling, pickling, heat treating, buffing, polishing, plating, stripping, metal blackening, and conversion coating treatment [17]. Tables 1, 2, and 3 provide a list of raw materials used and waste products produced in the production operations. During WWII, the plant also produced primers for high explosive anti-aircraft shells, Norden bomb sights, and related war articles [9,10,11]. Disposal of waste products reportedly involved both land disposal and discharge to surface water [2,18,46]. The products generated at the Remington Rand plant were similar throughout its 35-year history. The waste products are also anticipated to be similar as are the methods of operation, although technological changes are anticipated to have occurred.

4.1.1 Land Disposal

As early as 1938, aerial photography indicates surface disturbed areas were present (Figure 13). One area is north of the pond and power plant on the east side of the site, and another on the south side. By 1955, the "N" plant and a parking area had been constructed over the southern area, and a disturbed area existed along the railroad tracks on the southeastern part of the plant site (Figure 14). The disturbed area north of the pond was significantly enlarged by this time (Figure 14). These areas may have been disposal areas for plant waste products. By 1976, the southern disturbed area appeared to be well
vegetated, indicating non-use for an extended period (Figure 15). The area north of the power plant appears to have been used for a laydown or staging area at this time.

Fly ash, and bottom ash from the power plant may be present in these plant areas. Based on the information available, disposal of wastes on the plant site may be presumed to have occurred until sometime after 1965.

4.1.2 Disposal to Surface Waters

During the same period as land disposal was occurring, liquid wastes were being discharged to surface waters (Figure 8). The results of chemical analyses of surface water performed in 1952 are also provided in Appendix B [2]. The discharged waters were noted to have excessive chromium. Based on sampling performed in 1965, the discharge stream was recorded to have elevated amounts of zinc and cyanide [28]. The pH of one of the three samples taken was recorded at 9.6, which was above the 9.5 discharge limit. Observations by the Chemung County Health Department of the stream channel, about 25 feet below the point where the waste ditch enters the main stream, indicated an oil film and gassing sludge deposits [23].

The storm drain system, as recorded in the 1967 Lancy Laboratory report [17], collected waste products from various parts of the plant (Figure 17). Prior to the installation of the treatment facility, untreated wastes were collected and discharged to the drainage ditch [22]. The 1958 Industrial Report states that at that time plating waste, cooling water, blowdown water from the boiler, and drainage from the plating and oil storage room in Building 49 were all discharged directly to the drainage ditch. Cutting oils were also most likely discharged as three oil skimmers were included in the discharge system (Figure 8). By comparing the department number shown on Figure 17 with those listed in Table 3, the locations of various plant operations can be determined. The location of the plating operation and related operations where heavy metal and cyanide solutions were used were located in Department 19. Reduced copies of selected Lancy Laboratory drawings are provided in Appendix D. These drawings show the equipment layout and type of solutions used in various operations.

The information available relates to post-WWII plant operations. The basic operations most likely did not change significantly over the period of operation; however,
the location of the various departments within the plant most likely changed when the assembly lines were relocated in 1963 [52]. The 36-inch storm line shown on Figure 8 most likely transported the wastes to the discharge channel in the early pre-WWII years. The size of the line in comparison with the culverts noted in the 1958 Industrial Report indicates the 36-inch line would be of sufficient size to transport all of the plant waste streams. Plating operations were most likely originally in building 49 and were probably in use prior to 1937 when Remington Rand acquired the site.

Considering the types of materials being transported, the pipes would most likely experience sludge buildup. This was confirmed by a letter from Remington Rand after the company had cleaned the lines and blocked off or rerouted others [28].

4.1.3 Subsurface Disposal

In addition to the surface water discharge, there was also apparently direct discharge to the subsurface. A drainage pit was noted to be in existence near the wire-pickling operation in building 44 when Lancy Laboratories performed the study in 1967 (Figure 17). Lancy proposed adding a sump into which sodium hydroxide (NaOH) could be added to control the pH when the sulfuric acid (H\textsubscript{2}SO\textsubscript{4}) for pickling was dumped. The drainage pit had an overflow to the storm drain leading to Miller Creek.

Details of the construction of the tumbling sludge settling ponds located east of the plating area department 19 were not readily available (Figure 17). If these areas are unlined, infiltration of liquid wastes may have occurred. Also, there may be more than one location of these ponds. The Lancy Laboratory drawings show the post-WWII location, but the pre-WWII location is unknown. The 1938 photograph does not indicate the presence of the ponds except the natural spring-fed pond.

A french drain was noted around the sludge filters located between the northwest corner of Building 66 and the settling ponds. The drain and filters may be part of the Lancy Laboratory addition for a treatment system; however, only details for the settling tank were noted on the drawings. The sludge filters may have been in operation prior to the treatment facility. A four-inch collection line was installed with the french drain and most likely directed the flow to the storm drain system (Appendix D).
4.2 MCINERNEY FARM SITE

The McInerney farm site, located about 0.5 mile south of the plant, was purchased in 1952. In 1987, during construction of the Chemung Correctional Facility, buried drums and contaminated soils were encountered in excavations. One of the drums encountered bore the name *Rand Corporation* [58].

Three areas of disposal have been observed to exist at the McInerney farm site:

- North of Seeley Creek
- On the south side of Seeley Creek
- Within the Chemung Correctional Facility construction area

Available laboratory test results on material removed from four pits inside the prison construction area have indicated the presence of relatively low levels of some volatile organic compounds such as ethylbenzene, toluene, xylene, and several semivolatile organic compounds in some of the samples tested. These compounds are common components of oils and paint wastes. In a few samples, EP toxicity tests have released the presence of a number of heavy metals (As, Hg, Se, Ba, and Cr) and some PCBs at very low levels, generally below 1 ppm. Laboratory test results of the soils and waste material encountered are summarized in Table 4. Waste products similar to those encountered at the farm site may be anticipated to occur at the plant site if land disposal occurred in the plant area [58].

4.3 OTHER OPERATIONS ON RAND PROPERTY

In 1941, the Elmira plant of Remington Rand was fulfilling a contract with the Navy for primers for high explosive anti-aircraft shells [10]. Very little information was available on the extent of this operation, or in what part of the plant it was performed. Explosive powder and waste products may have been disposed of in the area now occupied by the parking lot on the south side of the "N" plant, and the recreation area south of the plant [49,57].

The "N" plant was operated until November, 1943 by the Rand Corporation. In 1943, the Navy took over operation of the plant until production ended in October, 1944
[53]. No readily available information was encountered on waste products associated with this operation.

The plant site has, since the 1880s, been used for industrial purposes, primarily forging and milling steel products. In 1975, during ownership by Westinghouse, a spill occurred from a transformer containing oil. Waste oils and associated solvents would have been used in the various other plant operations by P.W. Payne Brothers Company and the Willys-Morrow Company. Waste products could have been disposed of in the plant area by the previous companies.

Figure 18 indicates the approximate locations used for the storage, handling, or disposal of potential hazardous materials or waste products based on the available information reviewed.

4.4 WASTE COMPONENT CHARACTERISTICS AND BEHAVIOR

The waste components listed in Tables 1, 2, and 3, and identified in the samples of soil and waste collected from the Chemung Correctional Facility trenches, are described in terms of their characteristics and behavior in Appendix C. This information was adapted and compiled from:


7.0 HEALTH AND ENVIRONMENTAL CONSIDERATIONS

The possible disposal areas and potential contaminated areas are well vegetated or used as parking areas having asphalt or stone covering. There are no signs of distressed vegetation as observed from nearby public areas. The areas have unrestricted access, and on the northern portion of the site, a possible former plating area forms part of the Southside High School playing fields. The more recent plating area (1967) located on the west side of the property underlies the high school building and grassed area by the South Main Street entrance.

Surface water drainage is toward Coldbrook Creek or into Elmira storm drains. The flow from both will eventually enter the Chemung River.

Prevailing wind direction is from the northwest and south-southwest. There have been no reported air quality complaints received by the Chemung Health Department in relation to the plant site.

The plant site is underlain by glacial outwash that may exceed 100 feet in thickness. The outwash is considered an aquifer being used for domestic, industrial, and municipal water supplies. The area around the plant is serviced by the Elmira Water Board. Five wells are located on the plant site that were used for plant operations. Ground water is expected to flow in an easterly direction beneath the site. Community wells are located about 1 mile upgradient, to the north, of the site.
### TABLE 1

**RAW MATERIALS USED AT THE REMINGTON RAND PLANT IN 1958***

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel anodes</td>
<td>3,000 lbs per month</td>
</tr>
<tr>
<td>Steel</td>
<td>1,000,000 lbs per month</td>
</tr>
<tr>
<td>Sodium cyanide</td>
<td>6,000 lbs per month</td>
</tr>
<tr>
<td>Zinc</td>
<td>500 lbs per month</td>
</tr>
<tr>
<td>Copper anodes</td>
<td>300 lbs per month</td>
</tr>
<tr>
<td>Chromic acid and powder</td>
<td>40 lbs and 15 gallons per week</td>
</tr>
<tr>
<td>Cutting oils</td>
<td>10,000 gallons per month</td>
</tr>
<tr>
<td>Paint</td>
<td>5,330 gallons per month</td>
</tr>
<tr>
<td>Solid alkali cleaner (Oakite)</td>
<td>22,000 lbs per month</td>
</tr>
<tr>
<td>Liquid cleaners (Nistripper)</td>
<td>2,200 gallons per month</td>
</tr>
</tbody>
</table>

Production: 1,000 typewriters per day

150 adding machines

*From 1958 Industrial Survey Report prepared by Department of Health [21].
<table>
<thead>
<tr>
<th>No.</th>
<th>Waste Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Solvent-oil sludges resulting from the periodic cleaning of vapor degreasers</td>
</tr>
<tr>
<td>2.</td>
<td>Solvent emulsions resulting from the power washing machine cleaners and rust</td>
</tr>
<tr>
<td></td>
<td>preventives</td>
</tr>
<tr>
<td>3.</td>
<td>Soluble coolants resulting from coolants from mechanical operations</td>
</tr>
<tr>
<td>4.</td>
<td>Oil wastes resulting from rust preventive oil dips</td>
</tr>
<tr>
<td>5.</td>
<td>Paint wastes from water wash paint spray booths</td>
</tr>
<tr>
<td>6.</td>
<td>Phenolic wastes from organic paint strippers</td>
</tr>
<tr>
<td>7.</td>
<td>Rinse water after cyanide plating</td>
</tr>
<tr>
<td>8.</td>
<td>Rinse waters after cyanide heat treating and cyanide nickel stripping</td>
</tr>
<tr>
<td>9.</td>
<td>Rinse waters after chromium plating</td>
</tr>
<tr>
<td>10.</td>
<td>Rinse waters after nickel plating</td>
</tr>
<tr>
<td>11.</td>
<td>Rinse waters following cyanide flux removal</td>
</tr>
<tr>
<td>12.</td>
<td>Rinse waters after sulfuric acid wire pickling</td>
</tr>
<tr>
<td>13.</td>
<td>Solid cyanide wastes from heat treating</td>
</tr>
<tr>
<td>14.</td>
<td>Cyanide wastes from filter back flushing</td>
</tr>
<tr>
<td>15.</td>
<td>Nickel wastes from filter back flushing</td>
</tr>
<tr>
<td>16.</td>
<td>Cyanide wastes from spent cyanide nickel stripping baths</td>
</tr>
<tr>
<td>17.</td>
<td>Spent acid and alkali process solutions and sludges resulting from their</td>
</tr>
<tr>
<td></td>
<td>intermixing</td>
</tr>
<tr>
<td>18.</td>
<td>Acid and alkali rinse waters following nontoxic treatment process</td>
</tr>
<tr>
<td>19.</td>
<td>Soaps and solids containing wastes from tumbling operations</td>
</tr>
<tr>
<td>20.</td>
<td>Soaps and solids containing wastes from tumbling operations</td>
</tr>
</tbody>
</table>

*From 1967 report prepared by Lancy Laboratories [17].
**TABLE 3**

**PLANT OPERATION AND WASTE PRODUCTS IN 1967**

Remington Office Machines Division
Sperry Rand Corporation

Elmira, New York

<table>
<thead>
<tr>
<th>I. PLATING AREA (DEPARTMENT 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stevens Automatic Plater</td>
</tr>
<tr>
<td>Process Treatment</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>(a) Alkaline electroclean</td>
</tr>
<tr>
<td>(b) Alkaline electroclean</td>
</tr>
<tr>
<td>(c) Hydrochloric acid dip</td>
</tr>
<tr>
<td>(d) Water displacing dip</td>
</tr>
</tbody>
</table>

(Water layer removed)

2. Nickel Rack Strip (McDermid SR) 100 gallons once every 2 weeks

3. Chromium Plating Line
   (a) Alkaline cleaner          250 Weekly
   (b) Hydrochloric acid dip     190 Once every 2 weeks
   (c) Chromium rack strip      190 Once every 3 months

4. Aluminum Conditioning
   (a) Alkaline etch             50 Once every year
   (b) Chromate desmutter (Oakite 34) 5 Once every 6 weeks

5. Barrel Nickel Plating Line
   (a) Alkaline clean            350 Weekly
   (b) Hydrochloric acid dip     190 Weekly

6. Basket Nickel Plating Line
   (a) Alkaline electroclean     180 Weekly
   (b) Alkaline clean            180 Weekly
   (c) Hydrochloric acid dip     80 Weekly

(d) Acidic burr removal Rosheen Fe

7. Pickle Line (Adjacent to Basket Nickel Line)
   (a) Alkaline cleaner          220 Weekly
   (b) Inhibited hydrochloric acid dip 75 gal Monthly

8. Steel Blackening Line
   (a) Alkaline cleaner (two tanks) 650 Weekly
   (b) Hydrochloric acid dip      350 Weekly
   (c) Acidic burr removal Rosheen Fe Once every 6 months
   (d) Neutralize                 350 Weekly
   (e) Hot chromic acid rinse     350 Once every 2 months
### TABLE 3 (Continued)

#### II. HEAT TREATMENT (DEPARTMENT 16)

<table>
<thead>
<tr>
<th>Process</th>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Alkaline clean (three tanks)</td>
<td>270</td>
<td>Weekly</td>
</tr>
<tr>
<td>(b) Hydrochloric acid dip (two tanks)</td>
<td>180</td>
<td>Once every 2 weeks</td>
</tr>
</tbody>
</table>

#### III. WIRE PICKLING

<table>
<thead>
<tr>
<th>Process</th>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Sulfuric acid pickle (10 percent H2SO4)</td>
<td>3,800</td>
<td>Once every 2 months</td>
</tr>
<tr>
<td>(b) Lime neutralize</td>
<td>1,500</td>
<td>Once every 2 months</td>
</tr>
</tbody>
</table>

#### IV. PAINT AREA (DEPARTMENT 25)

1. Phosphate Washer

<table>
<thead>
<tr>
<th>Process</th>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Alkaline clean</td>
<td>650</td>
<td>Once every 2 weeks</td>
</tr>
<tr>
<td>(b) Iron phosphate</td>
<td>650</td>
<td>Once every 6 months</td>
</tr>
<tr>
<td>(c) Rust preventive</td>
<td>650</td>
<td>Not dumped</td>
</tr>
</tbody>
</table>

2. Alkaline Rack Strip

<table>
<thead>
<tr>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,700</td>
<td>Not dumped (sludge removed from tank bottom once a year)</td>
</tr>
</tbody>
</table>

3. Alkaline Work Strip

<table>
<thead>
<tr>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>390</td>
<td>Same as above</td>
</tr>
</tbody>
</table>

4. Cold Paint Strip (Phoenix)

<table>
<thead>
<tr>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>Once every 6 months</td>
</tr>
</tbody>
</table>

#### V. FLUX REMOVAL AREA (DEPARTMENT 40)

1. Cyanide cleaner

<table>
<thead>
<tr>
<th>Volume (gal.)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>290</td>
<td>Daily</td>
</tr>
</tbody>
</table>

### POWER WASHING MACHINES

<table>
<thead>
<tr>
<th>Location and Washer Identification</th>
<th>Type of Compound</th>
<th>Volume (gal.)</th>
<th>Anticipated Dumping Frequency and Disposition</th>
</tr>
</thead>
</table>
| Department 1
Cincinnati Washer (wash, rust preventive, dry) | Phosphate cleaner (Pennsalt Fosbond #25) | 500           | Once every 2 months (Sanitary sewer via tumbling sludge settling ponds) |

| Department 12
Simplicity Vibra Washer (wash, rinse, infra dry) | Alkaline cleaner (Peqco Kleen 174) | 650           | Weekly (Sanitary sewer via tumbling sludge settling ponds) |

| Department 5
Cincinnati Washer (wash, rust preventive, dry) | Phosphate Clean (Pennsalt Fosbond #25) | 500           | Once every 2 months (Sanitary sewer via tumbling sludge settling ponds) |

| | Solvent emulsion rust preventive (Sunoco) | 300           | Once every 2 months (Waste oil hauler) |

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TABLE 3 (Continued)

<table>
<thead>
<tr>
<th>Department 27</th>
<th>Phosphate cleaner (Pennsalt Fosbond #25)</th>
<th>350</th>
<th>Once every 2 months (Sanitary sewer via tumbling sludge settling ponds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detroit Products Co. Power Washer (wash, rust preventive, dry)</td>
<td>Solvent emulsion rust preventive (Sunoco)</td>
<td>160</td>
<td>Once every 2 months (Waste oil hauler)</td>
</tr>
</tbody>
</table>

*From 1967 report by Laney Laboratories [17].

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NOT TO SCALE


Dames & Moore, A Professional Limited Partnership

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