Administrative Record

932001

02-8803-24-SI
REV. NO. 0

FINAL DRAFT
SITE INSPECTION REPORT
~~U.S.~~ VANADIUM
NIAGARA FALLS, NEW YORK

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8803-24
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 16, 1988

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

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RONALD M. NAMAN
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SITE NAME:	~~U.S.~~ Vanadium Corp of America	**EPA ID NO.:**	NYD980535413
ADDRESS:	3801 Highland Avenue	**LATITUDE:**	43° 07' 05.5"N
	Niagara Falls, New York 14305	**LONGITUDE:**	079° 02' 44.3"W

1.0 SITE SUMMARY

The ~~U.S.~~ Vanadium Site is listed in CERCLIS as being located at 3801 Highland Avenue in Niagara Falls, New York. The facility at that address generates baghouse dusts which are disposed of at a landfill on Witmer Road, also in Niagara Falls, New York. Therefore, the landfill is considered to be the site rather than the facility itself, and it is the landfill that is addressed in this report.

The landfill site on Witmer Road, Niagara Falls, New York is located on the Tonawanda Plain approximately 1 mile northwest of the Niagara River, and 3 miles south of the Niagara Escarpment. The site is in an area characterized by very low relief and is not in a floodplain. An intermittent stream/drainage ditch runs along the east and south boundaries of the site. The vicinity of the site is heavily industrialized, although residential areas are located approximately 0.5 mile west, and 0.3 mile south of the site. Groundwater was reportedly used for drinking by two households approximately 0.25 mile north of the site, but these households now receive their water from a public water supply system.

The site was owned by the Vanadium Corporation of America from 1920 to 1964. The Vanadium property covered 62 acres. In 1964, the site was purchased by the Pittsburgh Metallurical Company, which subsequently changed its name to Airco Inc.

In 1979, SKW Alloys, Inc., bought the Airco Alloys division of Airco Inc., and acquired the western 37 acres of the Witmer Road landfill property, while Airco retained the eastern 25 acres of the original site. The facility at 3801 Highland Avenue is also now owned by SKW Alloys, Inc.

According to a Niagara County Health Department report, Vanadium Corporation disposed of between 350,000 and 594,000 tons of brick, wood, ash, calcium hydroxide, ferrochrome silicon slag, ferromanganese slag, old machinery, demolition debris, and raw materials from 1960 to 1964. Most of this disposal allegedly occurred on the property presently owned by Airco. Similar wastes were reportedly disposed of by the Pittsburgh Metallurgical Company and Airco on both the present SKW and Airco properties. Prior to 1970, some slags from Airco were hauled off site for use as fill and as roadbed material by Frionia Brothers, Inc. Since 1970, Hasley Trucking purchased some of Airco's slag and hauled it off site for use in reclamation projects.

In 1971, Airco installed baghouse collectors at its plant on 3801 Highland Avenue and began to dispose of slurried dusts at the 62-acre property, principally in the area currently owned by Airco. The portion of the original site that is presently owned by Airco contains a landfill that is reportedly capped and closed. Its exact size is unknown, although most of the 25 acres is landfill. The substances reportedly disposed of by Airco are brick, coke, concrete, carbon fines, and graphite plant waste in addition to the above-mentioned slurried dusts. Storage and/or disposal of various materials such as coke, ores, and raw materials occurred on the present SKW property. A Part 360 permit was issued to Airco in the 1980s.

As previously mentioned, SKW Alloys, Inc., acquired 37 acres of the western portion of the site in 1979. In 1980, SKW obtained a New York State Department of Environmental Conservation (NYSDEC) permit to operate a solid waste disposal site at this Witmer Road property. Under this permit SKW disposes of ferrochrome silicon alloy and ferro silicon alloy baghouse dusts generated at the 3801 Highland Avenue facility. These dusts are slurried before landfilling, and a leachate collection system has been installed. Collected leachate is used to slurry fresh batches of baghouse dust. SKW's NYSDEC permit expired, and it is currently operating on an extension until renewal is approved. The landfill on SKW's property consists of three cells and totals approximately 5 acres in size. An Order on Consent has been issued, and cells 1 and 2 are to be closed by September 30, 1988.

Seven paired sets of monitoring wells surround both properties and are sampled and analyzed quarterly for pH, specific conductance, total dissolved solids (TDS), chemical oxygen demand (COD), and total organic carbon (TOC). Concentrations of barium, chromium, iron, manganese, silicon, and zinc are measured annually. Each pair of wells consists of a "shallow" and a deep well. The "shallow" wells are finished at depths of from 8.5 to 11 feet, and the deep wells are completed in the permanent groundwater table of the glacial till and stratified sediments, just at the interface between this layer and the underlying Lockport Dolomite. This bedrock formation is encountered at depths of 11.1 to 24.2 feet. Groundwater flow is toward the south to southwest, as determined from an isopotential map constructed for the site.

Groundwater sampling conducted between March 1979 and April 1987 indicates that both up-gradient and downgradient deep wells have exceeded New York State (NYS) GA (i.e., groundwater) standards for iron, manganese, and barium on various dates. Downgradient deep wells have exceeded the NYS groundwater standards for hexavalent chromium on two dates for one well and on one date for the other downgradient well. These data indicate a potential observed release into the till aquifer. New York State groundwater standards for pH have been exceeded in one upgradient deep well on numerous occasions and in a centrally located well on two dates, but not in downgradient deep wells.

Both upgradient and downgradient shallow wells have exceeded NYS standards for hexavalent chromium, iron, and manganese. Standards for pH were exceeded in upgradient shallow wells and in the centrally located well on all sampling dates for which there are data. There were no abnormalities in pH for downgradient shallow wells.

Samples from an on-site drainage ditch/intermittent stream show extremely elevated pH levels (pH 11-12), and extremely variable concentrations of barium, chromium, iron, silicon, and zinc. The concentration of chromium (both total and hexavalent) increases in a downstream direction as this water flows over the SKW property, thus indicating that this metal potentially originates on the SKW property. Concentrations of hexavalent chromium are between 3 and 10 times greater in downstream samples than in upstream samples for each sampling date. Concentrations of this substance were above class GA standards for 10 of 11 downstream sampling events, and approximately 67 percent of upstream sampling events.

Personnel from NUS Region 2 FIT visited the SKW property on June 30, 1988, and observed a white chalky substance around the foundations of former U.S. Vanadium buildings that had previously been razed. A chalky substance was also observed in the surface waters of the above-mentioned drainage ditch and in ponded water along the southern property line of the site, indicating potential off-site migration of this substance. No readings were obtained on the OVA flame ionization unit or the HNu photoionizer upon disturbance of the water in the drainage ditch.

Large mounds of uncovered wastes and slag were observed on the Airco property, and a large mound of slag was observed on Niagara-Mohawk property adjacent to the eastern Airco property line. According to Herb Feder (of SKW Alloys), the slag on Niagara-Mohawk property is most likely from U.S. Vanadium, while the waste on the Airco properly is most likely Airco's, although some of the waste may have been from U.S. Vanadium.

Because of the existence of relatively large amounts of previous sampling data, no samples were collected by NUS personnel.

Ref. Nos. 1,2,4,6,7,8,9

2.0 SITE INSPECTION NARRATIVE

2.1 EXISTING ANALYTICAL DATA

2.1.1 EP Toxicity Data

SKW Alloys disposes of its baghouse dust in its NYSDEC-permitted Witmer Road landfill. This dust is very fine and of low density. Its approximate composition is as follows (from Snyder, 1980):

Parameter	Percent Composition
Fe Si	93
Mg O	1
$Fe_2 O_3$	2
$Al_2 O_3$	-
Other	4

Additionally, chromium, copper, zinc, manganese, nickel, and cobalt are present in a combined concentration of less than 1 percent. The pH of all of this material ranges from 9 to 10.

EP toxicity analyses of these dusts by the Radian Corporation indicate that both selenium (2mg/L) and chromium (14 mg/L) exceed the maximum allowable concentrations of 1.0 mg/L and 5.0 mg/L, respectively. EP toxicity testing was performed using the procedure outlined in 40 CFR Part 261, Appendix II. Furthermore, in a report entitled "Review of the Application for Solid Waste Management Facility for S.K.W. Alloys, Inc., Witmer Road Site, Town of Niagara, NY" by Wegman Engineers, reference is made to EPA Leaching Potential Tests conducted on a soil sample from the site using the baghouse dusts. Concentrations of chromium in the resultant leachate ranged from 15 to 89 mg/L, indicating that attenuation of chromium by the soil is poor. Also from the above-cited report is the following statement: "Although it has been reported that ferro-chrome silicon furnace dust has been classified as nonhazardous by the U.S. EPA and NYSDEC, according to S.K.W. officials, the potential hazard for chromium concentrations in the groundwater exceeding EPA limits is still great."

2.1.2 Groundwater Data

Although specific information on sampling techniques and analytical methods employed was not available, groundwater sampling conducted between March 1979 and April 1987 indicates that both upgradient and downgradient deep wells have exceeded New York State GA (i.e., groundwater) standards for iron, manganese, and barium, on various dates. Downgradient deep wells have exceeded the NYS groundwater standards for hexavalent chromium on two dates for one well

(1/8/85 and 4/15/87, well No. 12), and on one date for the other (1/8/85, well No. 5). These data indicate a potential observed release of chromium into the till aquifer. New York State groundwater standards for pH have been exceeded in one upgradient deep well (No. 3) on numerous occasions and in a centrally located well (No. 13) on two dates, but not in downgradient deep wells.

Both upgradient and downgradient shallow wells have exceeded NYS standards for hexavalent chromium, iron, and manganese. Standards for pH were exceeded for upgradient shallow wells and the centrally located well on all sampling dates for which there are data. There were no abnormalities in pH for downgradient shallow wells.

Analysis of the data reveals no obvious trends, except perhaps an influx of basic (pH 10-12) water into upgradient wells, especially the shallow wells. It is noteworthy that concentrations of hexavalent chromium are greater in upgradient shallow wells than in downgradient shallow wells (maximum values: 0.546 mg/L upgradient vs. 0.193 mg/L downgradient), and the greatest concentration is found in the centrally located shallow well (No. 13, 0.674 mg/L). Extreme fluctuations in the concentrations of the different parameters both over time and between sampling locations confound the discovery of any patterns that may be present.

2.1.3 Other Data

Although specific information on sampling techniques and analytical methods employed was not available, samples collected from an on-site drainage ditch/intermittent stream conducted between March 1979 and April 1987 by SLC Consultants/Contractors, Inc., shows elevated pH levels (pH 11-12) and extreme variations in the concentrations of barium, chromium, iron, silicon, and zinc (see Table 1).

TABLE 1

Variability in Magnitude of Concentrations of Pollutants From Waters of an On-Site Drainage Ditch, 1979-1987*

Parameter	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Magnitude of Variation
Barium	<0.1	6.3	63X
Chromium (total)	0.023	2.640	115X
Chromium (hexavalent)	0.005	1.27	254X
Iron	0.02	0.481	24X
Silicon	<0.01	6.4	640X
Zinc	<0.005	0.247	49X

*Data from all sampling dates and both upgradient and downgradient sampling locations

both properties. Personnel from NUS Corporation Region 2 FIT reported observing a white chalky substance around the foundations of former U.S. Vanadium buildings that had previously been razed. This chalky substance was also observed in the surface waters of the drainage ditch and in ponded water along the southern property line of the site, indicating potential off-site migration of this substance. No readings were obtained on the OVA flame ionization or HNu photoionization detectors upon disturbance of the water in the ditch.

Large mounds of uncovered waste and slag were observed on the Airco property, and a large mound of slag was seen on Niagara-Mohawk property adjacent to the eastern Airco property line. According to Herb Feder (of SKW Alloys), the slag on Niagara-Mohawk property is most likely from U.S. Vanadium, while the waste on Airco property is most likely its own, although some of the waste may have been from U.S. Vanadium.

Examination of boring logs from both SKW and Airco properties indicates that industrial fill varying in thickness from 1 to 9 feet, is also found throughout the site. This fill is composed of slag, cinders and fly ash.

A previous inspection by E&E (1987) revealed waste piles of baghouse dust at various locations throughout the site. Inspectors from Wegman Engineers (1981) expressed concern that the finer particles of the baghouse dust may become mobilized by vehicular traffic and high winds. The Wegman Engineers report also states that dust had been detected on properties east of the site (the predominant wind direction being west), and concluded that although this dust "cannot be attributed solely to the S.K.W. Landfill facility, there is every reason to believe that a significant portion has been contributed by the S.K.W. facility."

More recent communications with NYSDEC and the Niagara County Health Department indicate that presently the slurried dusts take on the consistency of concrete upon drying, and therefore are not subject to wind mobilization. Thus, airborne dust was historically a problem, although the magnitude and extent of the problem is unknown. It is unknown whether these dusts are still present in the environment.

Since there is no documented target population, and because a relatively large data base of previous sampling results was available and provided enough information to document an observed release into the groundwater, no sampling was conducted by NUS Corporation, Region 2 FIT.

Ref. Nos. 1, 2, 5, 6, 8, 9, 15, 16, 17

The upstream location is on the property line border between SKW and Airco, and the downstream sampling location is approximately 500 feet to the west. The concentration of chromium (both total and hexavalent) increases in a downstream direction as the surface water flows over the SKW property, thus indicating that this substance potentially originates on the SKW property. Concentrations of hexavalent chromium are between 3 and 10 times greater in downstream samples than in upstream samples for each sampling date. It should also be noted that concentrations from the upstream sampling location were above class GA standards for approximately 67 percent of the sampling events, and 10 of 11 downstream samples were above the standard.

Analytical protocols for this aqueous sampling are not known.

Ref. Nos. 2, 3, 4, 5, 6

2.2 WASTE SOURCE DESCRIPTION

The property that U.S. Vanadium owned from 1920 to 1964 is now occupied by two separate owners: Airco Inc. and SKW Alloys. The ensuing discussion will maintain this distinction when appropriate.

Between 1920 and 1964 U.S. Vanadium reportedly disposed of brick, wood, ash, calcium hydroxide, and iron slag. The reported total of these materials is between 350,000 and 594,000 tons, most of which was allegedly disposed of on the current Airco property. From 1964 until 1979, Pittsburgh Metallugical Company (subsequently Airco) disposed of similar wastes, although the amount from this interval is unknown. In 1971, Airco installed baghouse collectors at its plant, and began to dispose of slurried dusts at these properties, principally in the area currently owned by Airco. A 1983 report (Ref. No. 8) states that 6000 tons of ferrochrome silicon, and 43,000 tons of slurried ferrosilicon dusts were disposed of by Airco. The portion of the original site that is currently owned by Airco contains a landfill that has reportedly been capped and closed. The exact size is unknown, although landfill comprises the majority of the 25 acres. Other substances reportedly disposed of by Airco are brick, coke, concrete, carbon fines, and graphite plant wastes. Storage and/or disposal of various materials such as coke, ores, and raw materials occurred on the present SKW property. Up to 102,000 tons of baghouse dust had reportedly been disposed of by SKW in their NYSDEC-permitted landfill as of 1986.

On-site inspections by Ecology and Environment, Inc., (E&E) on August 26, 1987, and NUS Corporation, Region 2 FIT on June 30, 1988, both revealed the presence of various waste piles on

2.3 GROUNDWATER ROUTE

Bedrock in the Niagara Falls area consists of sedimentary rocks, including dolomite, shale, limestone, and sandstone units, that dip approximately 0.5 percent to the south. The Lockport Dolomite directly underlies the entire region south of the Niagara Escarpment, extending almost to Erie County , and is the principal groundwater source in the Niagara Falls area. In order of increasing depth below the Lockport Dolomite, are found the Clinton and Medina groups, and the Queenston Shale of the Richmond Group.

The overburden in the area contains three types of unconsolidated deposits. Immediately above the Lockport Dolomite is a layer of glacial till and regolith, and an unsorted mixture of boulders, sand, and clay deposited by glaciers. Above this is a layer of clays, silts, and fine sands of lacustrine origin, which form the surface soils of most of the region. Sand and gravel deposits overlie the lacustrine deposits in isolated areas, and were deposited by glacial melt streams and by wave action of the larger ancestors of the Great Lakes. In addition, the soil type in the unsaturated zone is Odessa silty clay loam of the Odessa-Lakemont-Ovid association. This is a poorly drained, fine-textured soil that is predominantly reddish in color.

Groundwater does occur in these unconsolidated deposits, but the uppermost 10-25 feet of the Lockport Dolomite is the major water-bearing structure for this area. The groundwater is found in three types of openings: bedding joints, vertical joints, and solution cavities.

Bedding joints transmit most of the water in the Lockport Dolomite. They are formed by slight dissolution of the rock along fractures associated with bedding planes. The separation is generally is less than one-eighth inch, but these planar openings persist laterally for 3 to 4 miles, thus making them effective conduits.

Vertical joints are significant water-bearing openings only in the upper 10 - 25 feet of the Lockport Dolomite, where they are most abundant. Vertical joints may also connect bedding planes in this upper area.

Solution cavities are most abundant in the upper 10 - 15 feet of the rock, and are formed by dissolution of pockets of gypsum by percolating groundwater. These pockets increase the capacity of the rock to store water, but have little effect on the water-transmitting ability of the formation.

The Lockport Formation outcrops along the Niagara Gorge approximately 1 mile northwest of the site. Groundwater in bedding planes discharges at this outcropping, and thus this bedrock aquifer is hydraulically connected to the Niagara River.

Site-specific information on geology and hydrogeology for both the SKW and Airco properties is available from the report entitled "Support Document for an Application to Construct and Operate a Solid Waste Management facility at SKW Alloys, Inc." by Snyder Engineering, 1980 (Ref. No. 6), and is outlined below.

The bedrock underlying the site is the previously discussed Lockport Dolomite, with minor amounts of sulfate (gypsum) and sulfide (pyrite, galena, sphalerite). The bedrock dips gently to the south with a pronounced low in the southwest section of the SKW property. The depth to refusal varied from 11.1 feet to 24.2 feet over both SKW and Airco properties. Immediately above the Lockport Dolomite is a layer of dense loamy glacial till with an extreme range in texture from clay and silt to gravel and occasional boulders. The thickness of this layer varies from 0.6 to 6.7 feet. Water-sorted stratified sediments were found in most, but not all boreholes, and varied in thickness from 0.6 to 9.5 feet. This material consists of a mix of dolomitic rock fragments and clay, and is patchily distributed throughout both properties. Above this is a silty-clay, mostly stone-free lake sediment that was found at all boring sites. It contains fine silt lenses and vertical dessication cracks, and varies in thickness from 2.0 to 12.5 feet. Its permeability was measured at less than 3.5×10^{-6} cm/sec ranging to 8.8×10^{-9} cm/sec. The uppermost layer on site consists of fill varying from 1 to 9 feet in thickness. This fill ranges in texture from coarse to powdery, and consists of slag, cinders, and fly ash.

Site-specific information on groundwater occurrence, quality, and flow direction is also available from the Snyder Engineering report (Ref. 6). A total of 14 wells at seven locations on the 62-acre SKW/Airco site were installed circa 1979. A shallow (depth: 8.5-11.0 feet) and a deep well were installed at each location. The deep wells were installed in the glacial till overlying the bedrock in a permanent groundwater table.

Data from several boreholes on both SKW and Airco properties indicate the presence of a natural silty-clay layer varying in thickness from 2.0 to 12.5 feet, at a depth of 1.0 to 9.0 feet below ground surface. The permeability of this silty-clay is less than 3.5×10^{-6} cm/sec, and ranges to 8.8×10^{-9} cm/sec. This layer limits downward percolation of water and, in so doing, creates a seasonal perched water table. This unconfined aquifer has been reported as being as little as 3 feet below the ground surface. Dense loamy glacial till, interspersed with patches of water-sorted stratified sediments, underlie the silty-clay and overlie the Lockport Dolomite bedrock.

A second aquifer is found in the glacial till under artesian conditions. The hydraulic conductivity in this layer is in the range of 1×10^{-4} to 1×10^{-6} cm/sec. This aquifer is represented by the water in the deep wells, and is expected to move laterally with relative ease.

An isopotential map was constructed from average water levels of five deep wells measured from February 19 to May 8, 1979. This map indicates that the net flow of groundwater in the till aquifer is toward the south to southwest, with a pronounced low on the piezometric surface in the southwest corner of the property. This is consistent with the depth to bedrock data, and is indicative of a potential groundwater "sink" to the southwest of the property. This sink could be a fissure, joint intersection, bedding plane, a nearby pumped well, or other industrial activity. Data from shallow wells suggest that the flow of perched water in the silty-clay layer is similar to that of the lower layers.

As mentioned in Section 2.1.2, groundwater samples collected between 1979 and 1987 by SLC Consultants/Constructors, Inc., indicate that both upgradient and downgradient deep wells have exceeded New York State GA (i.e., groundwater) standards for iron, manganese, and barium on various dates. Downgradient deep wells have exceeded the NYS groundwater standards for hexavalent chromium on two dates for one well (1/8/85 and 4/15/87, well No. 12), and on one date for the other (1/8/85, well No. 5). These data indicate that an observed release of chromium into the till aquifer has occurred. Since chromium is a constituent of wastes disposed of on site, this observed release is attributable to the site. New York State groundwater standards for pH have been exceeded in one upgradient deep well (No. 3) on numerous occasions, and in a centrally located well (No. 13) on two dates, but not in downgradient deep wells.

Both upgradient and downgradient shallow wells have exceeded NYS standards for hexavalent chromium, iron, and manganese. Standards for pH were exceeded for upgradient shallow wells and the centrally located well on all sampling dates for which there are data. There were no abnormalities in pH for downgradient shallow wells.

Analysis of the data reveals no obvious trends, except perhaps an influx of basic (pH 10-12) water into upgradient wells, especially the shallow wells. It is noteworthy that concentrations of hexavalent chromium are greater in upgradient shallow wells than in downgradient shallow wells (maximum values: 0.546 mg/L upgradient vs. 0.193 mg/L downgradient), and the greatest concentration is found in the centrally located shallow well (No. 13, 0.674 mg/L). Extreme fluctuations in the concentrations of the different parameters both over time and between sampling locations confound the discovery of any patterns which may be present.

Groundwater was reportedly used for drinking by two households located near Witmer and Pennsylvania Roads, approximately 0.25 mile north of the site, but these households are now

supplied by a public water supply system. It is also worth noting that these wells were north of the site, and thus upgradient, and were therefore unlikely to be affected by contaminants from the site.

Since there is no documented target population, and because a relatively large data base of previous sampling results was available and provided enough information to document an observed release of hexavalent chromium into the groundwater, no sampling was conducted by NUS Corporation, Region 2 FIT.

Net precipitation in this area is approximately 9 inches per year.

Ref. Nos. 2, 4, 6, 14

2.4 Surface Water Route

An intermittent stream that connects to an on-site drainage ditch runs along the east and south boundaries of the site. The ultimate fate of the surface waters in this system is unknown. The closest permanent surface waters are the Niagara River, approximately 6000 feet to the west, and Gill Creek, approximately 5000 feet to the east. Because of the very low relief in the area, a definite migratory pathway cannot be determined.

Water intakes for the Niagara Falls water supply are in the Niagara River, but are located in Wheatfield, upstream from the site. The other above-mentioned surface waters are not used for drinking. The Niagara River is used for recreational boating and fishing. There are no wetlands, nor is there critical habitat for any federally endangered species within 1 mile of the site.

Sampling from an on-site drainage ditch conducted between March 1979 and April 1987 by SLC Consultants/Constructors, Inc., shows elevated pH levels (pH 11-12) and extreme variations in the concentrations of barium, chromium, iron, silicon, and zinc (see Table 1, above). The upstream sampling location is on the property line border between SKW and Airco, and the downstream sampling location is approximately 500 feet to the west. The concentration of chromium (both total and hexavalent) increases in a downstream direction as the water flows over the SKW property, indicating that this substance potentially originates on the SKW property. Concentrations of hexavalent chromium are between 3 and 10 times greater in downstream samples than in upstream samples for each sampling date. It should be noted that concentrations from the upstream sampling location exceeded class GA standards in approximately 67 percent of the sampling events, and 10 of 11 downstream samples exceeded the standard.

Because there are no established criteria for maximum allowable concentrations of these parameters in surface waters, sediments, or soils, the concentrations indicated by the sampling results must be compared to other criteria in order to determine what, if any, hazard they represent to the environment. It has been determined that all values are within naturally occurring concentrations found in soil, and the concentrations of barium and chromium are below the maximum allowable EP Toxicity concentrations; however, the values for both barium and chromium are above national drinking water standards (the only two of this group for which there are standards), and the values for barium, chromium, and iron are above NYSDEC groundwater standards. The pH values found in these waters are above NYSDEC criteria for all classes of surface water.

Because EP Toxicity data indicate that chromium is readily leached from the baghouse dusts and that on-site soils exhibit poor retention of chromium, and concentrations are greater in a downstream direction indicating that this is not natural background, it is likely that the chromium is derived from waste on site. It also is likely that this is the origin of chromium found in groundwater.

Since a definite migratory pathway cannot be determined, since there is no target population within 3 miles downstream of the site, and since sufficient information was available to identify the contaminants on site, no sampling of this medium was conducted by NUS Corporation, Region 2 FIT.

One-year 24-hour rainfall in this area is 2.5 inches.

Ref. Nos. 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13

2.5 Air Route

Although no readings above background were detected in the ambient air on the OVA and HNu prior to and upon disturbance of the waste sources during the site inspection of June 30, 1988, fine dust has reportedly been wind-transported away from the site and detected on properties to the east. Since this dust contains chromium, amongst other constituents, there is potential for harm to animals and humans via direct inhalation. Contamination of soil and leaching of contaminants is also of concern.

There are no known historic landmarks within 1 mile of the site.

Ref. Nos. 1, 3, 5

2.6 Actual Hazardous Conditions

Although there have been no documented observed incidents of direct physical contact with hazardous substances at the facility involving a human being (not including occupational exposure) or a domestic animal, NYSDEC personnel have stated that areas east of the facility (i.e., areas where the windblown dust may exist) are crossed by a number of trails where youngsters ride their all-terrain vehicles, motorcycles, etc. Since these activities create dust, direct contact may occur.

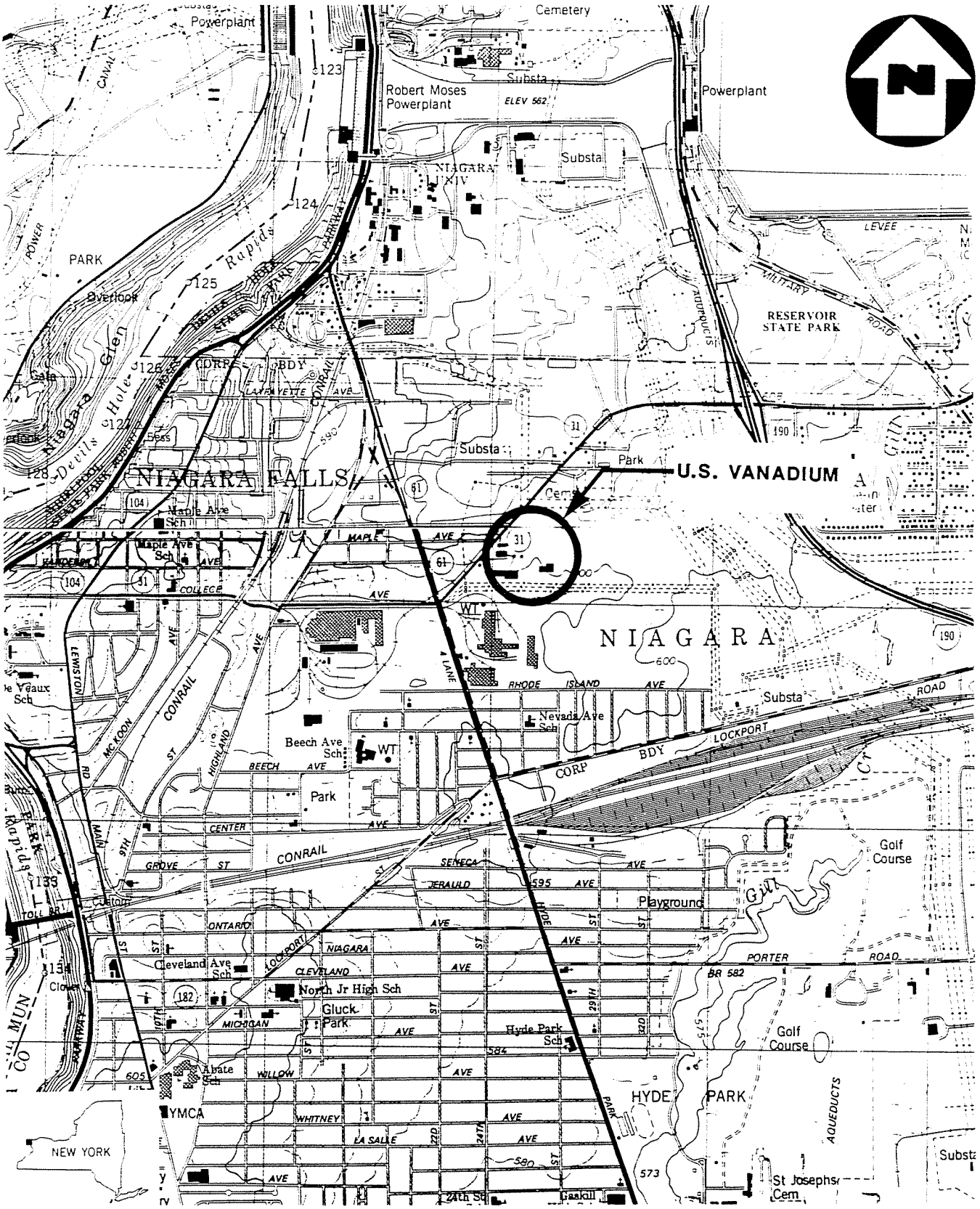
No other actual hazardous conditions pertaining to human or environmental contamination have been documented. Specifically:

- Contamination has not been documented either in organisms in a food chain leading to humans or in organisms directly consumed by humans.
- A fire marshall has not certified that the facility presents a significant threat and there is no demonstrated threat based on field observation.
- There have been no documented incidents of damage to flora (e.g., stressed vegetation) or to fauna (e.g., fish kill) that can be attributed to the hazardous material at the facility.
- There is no documented contamination of a sewer or storm drain without a point source to which the contamination can be attributed.

3.0 MAPS AND PHOTOS

U.S. Vanadium
Niagara Falls, New York

Contents



(QUAD) NIAGARA FALLS, N.Y.

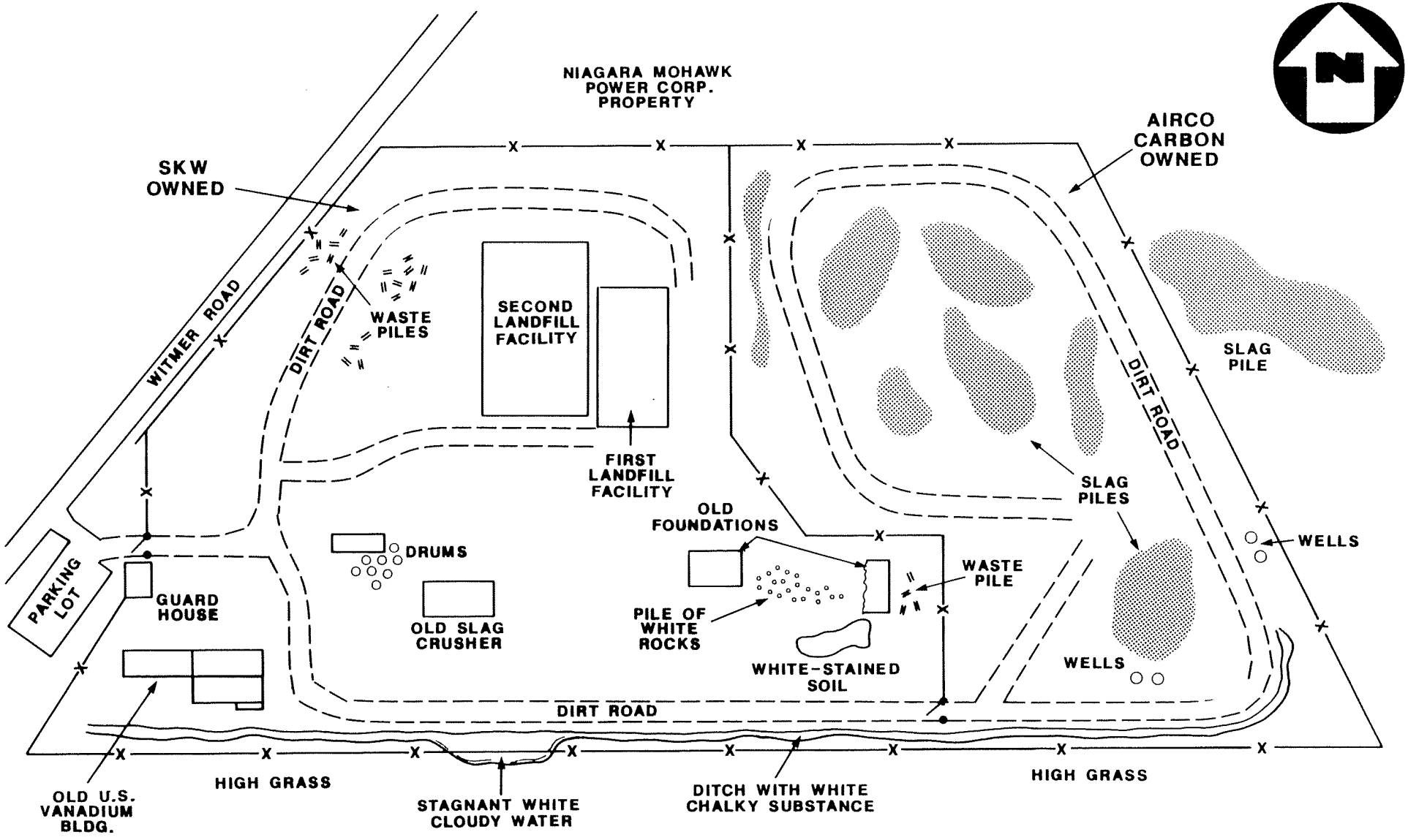
FIGURE 1

SITE LOCATION MAP

U.S. VANADIUM, NIAGARA FALLS, N.Y.

SCALE : 1" = 2000'

NUS CORPORATION



SITE MAP

U.S. VANADIUM, NIAGARA FALLS, N.Y.

(NOT TO SCALE)

FIGURE 2

NUS CORPORATION

02-8803-24-SI
Rev. No. 0

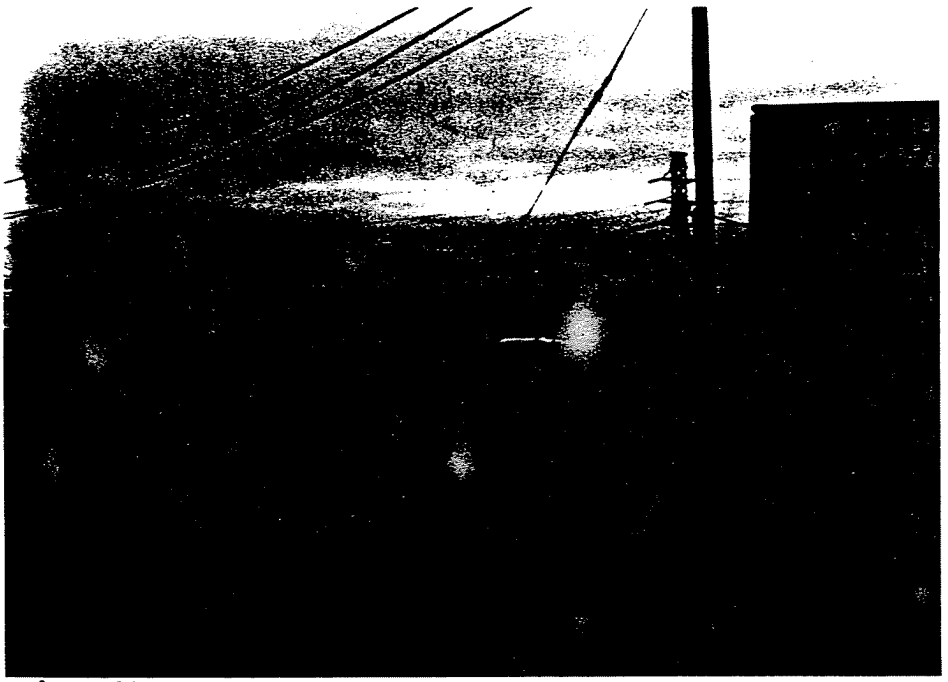
U.S. VANADIUM
NIAGARA FALLS, NEW YORK
JUNE 30, 1988

PHOTO LOG

ALL PHOTOS TAKEN BY E. TORPEY

Photo No.	Description	Time
1P-5	Looking southeast at SKW.	0917
1P-6	At northwest corner of SKW property looking east.	0926
1P-7 - 1P-10	At north central section of SKW looking east and southeast at Airco.	0933
1P-11	Debris pile along east edge of SKW property.	0933
1P-12 and 13	Old foundations of U.S.Vanadium buildings in southeast corner of SKW property.	0937
1P-14	Looking west along south border at drainage ditch.	0942
1P-15	Looking south at ponded water.	0949
1P-16	Old U.S.Vanadium building in southwest corner.	0952
1P-17	Slag on east edge of Airco property.	1006
1P-18	Debris in west portion of Airco property.	1009
1P-19	Drainage ditch in southeast corner of Airco property.	1016
1P-20	Looking north at slag piles on Niagara Mohawk property.	1017

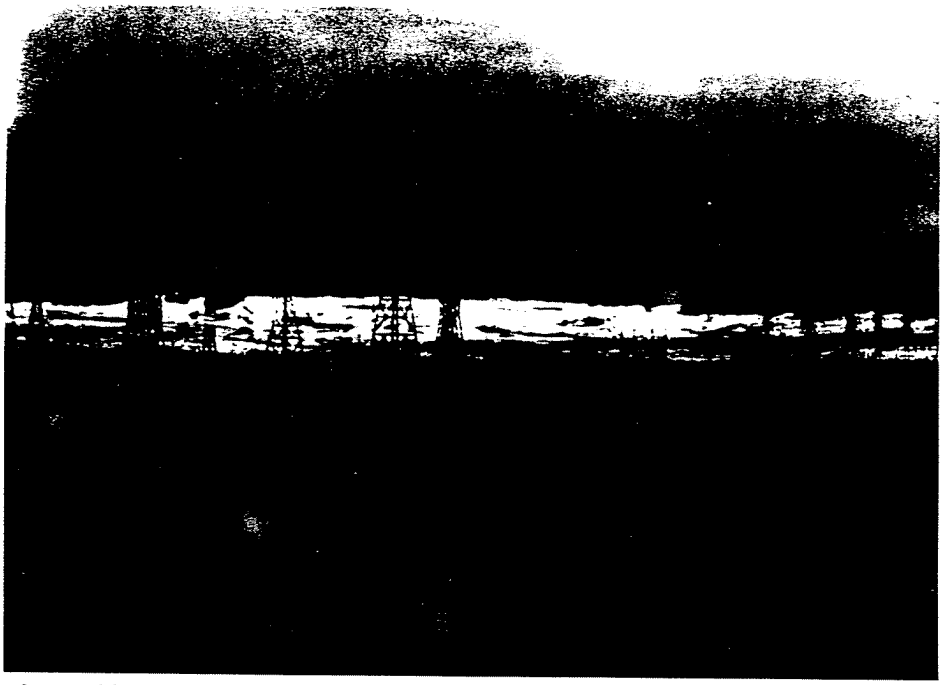
U.S. VANADIUM
NIAGARA FALLS, NEW YORK



1P-5 June 30, 1988 0917
Looking southeast at SKW.

1P-6 June 30, 1988 0926
At northwest corner of SKW property looking east.

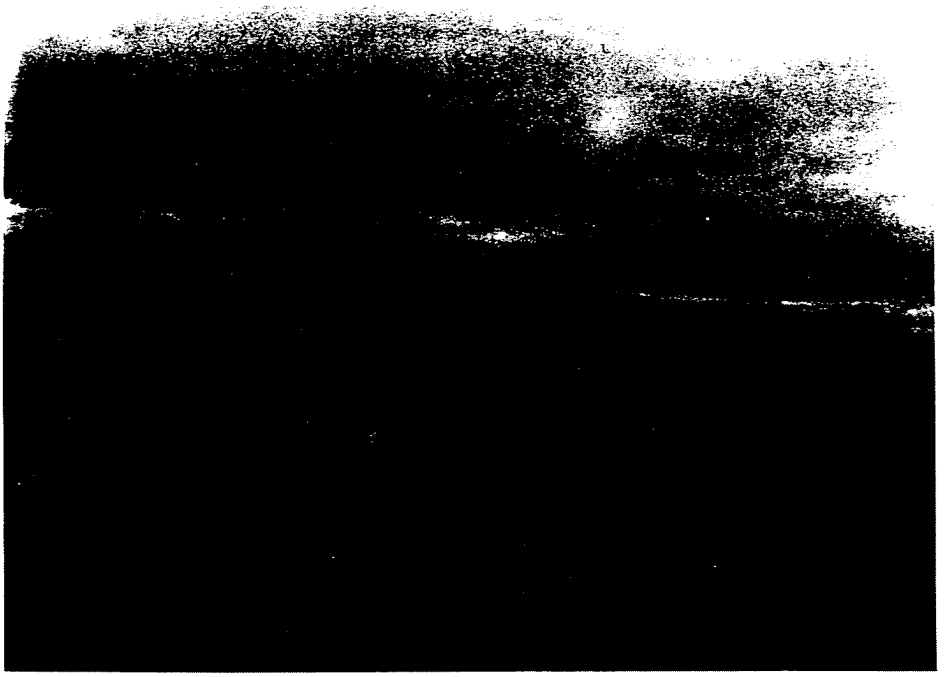
U.S. VANADIUM
NIAGARA FALLS, NEW YORK



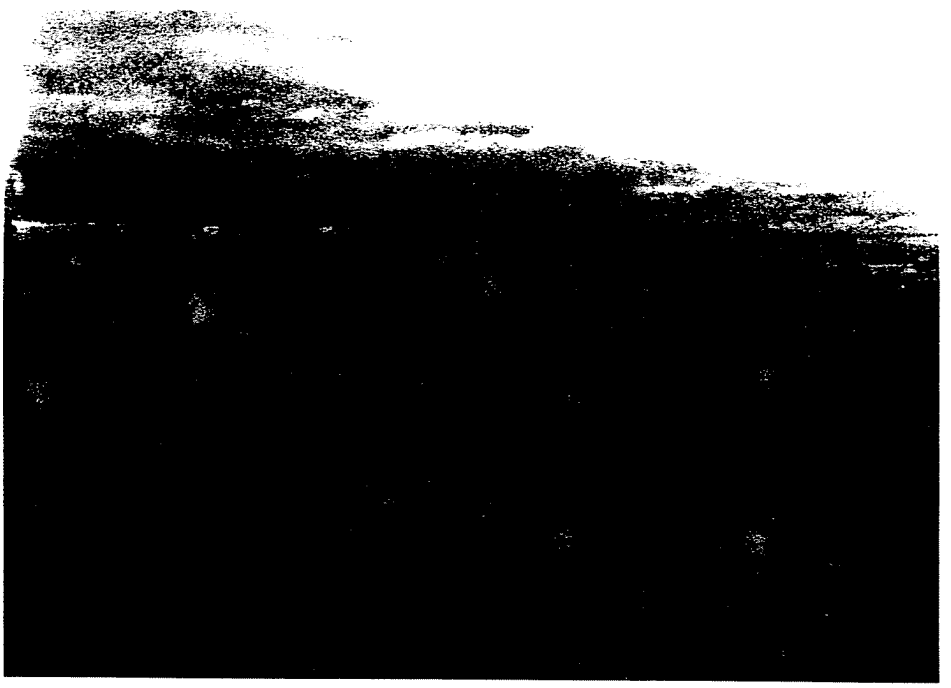
1P-7 June 30, 1988 0933
At north central section of SKW looking east and southeast at Airco.

1P-8 June 30, 1988 0933
At north central section of SKW looking east and southeast at Airco.

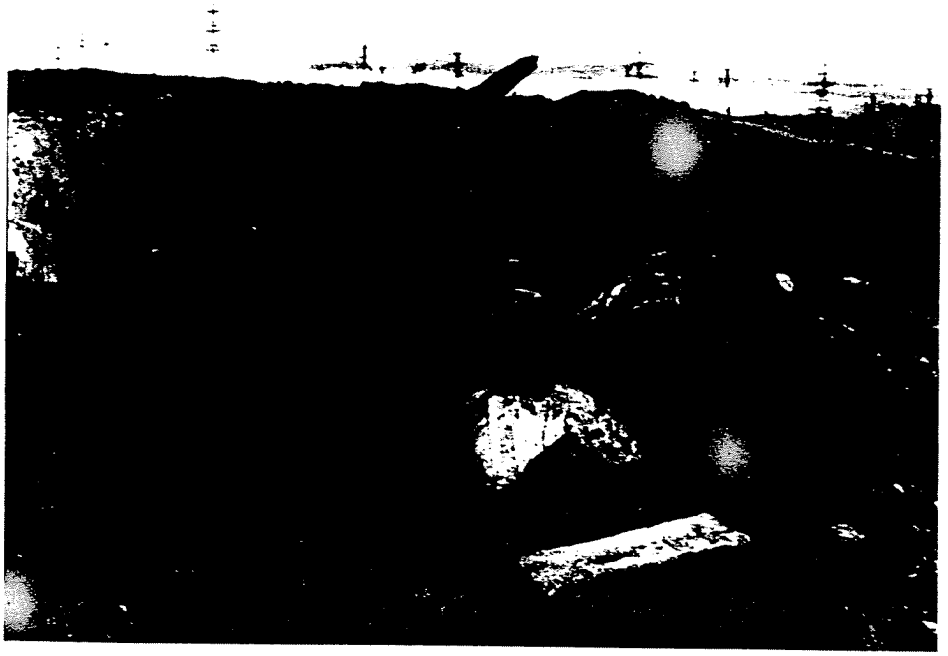
U.S. VANADIUM
NIAGARA FALLS, NEW YORK



1P-9 June 30, 1988 0933
At north central section of SKW looking east and southeast at Airco.

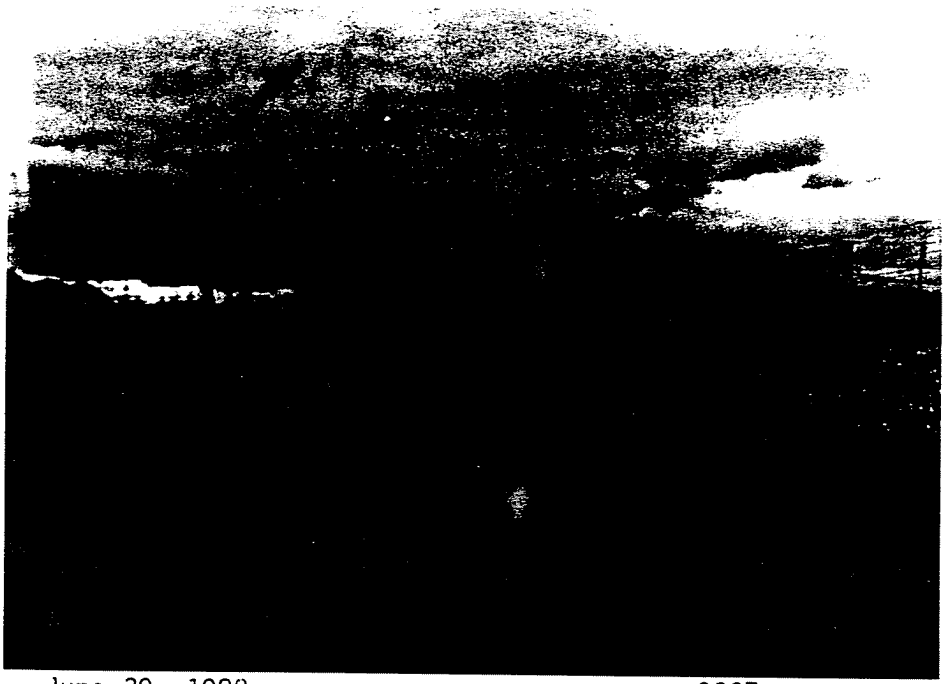


1P-10 June 30, 1988 0933
At north central section of SKW looking east and southeast at Airco.

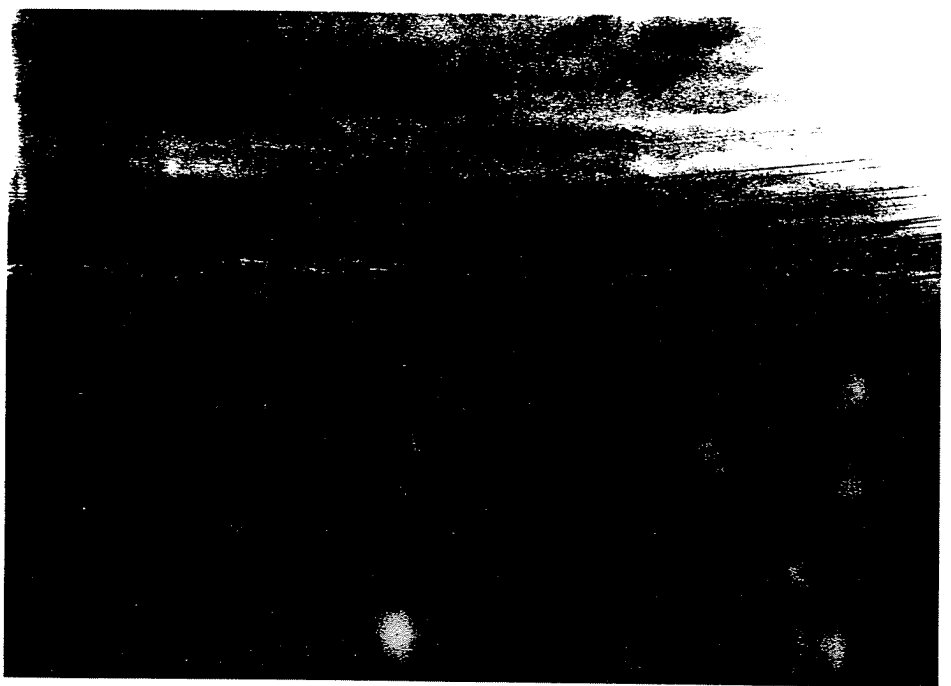


1P-11 June 30, 1988 0933
Debris pile along east edge of SKW property.

U.S. VANADIUM
NIAGARA FALLS, NEW YORK



1P-12 June 30, 1988 0937
Old foundations of US. Vanadium buildings in southeast corner of SKW property.



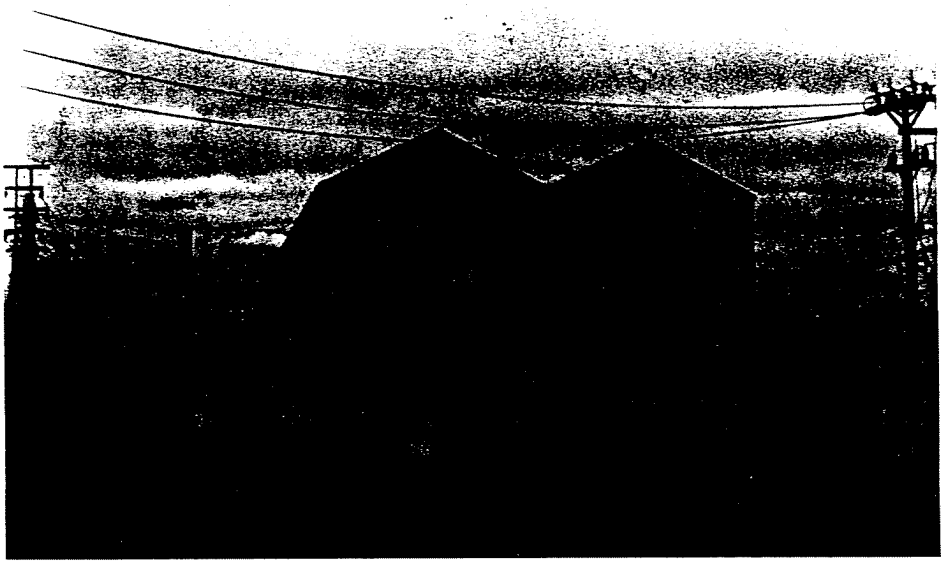
1P-13 June 30, 1988 0937
Old foundations of US. Vanadium buildings in southeast corner of SKW property.

U.S. VANADIUM
NIAGARA FALLS, NEW YORK

1P-14 June 30, 1988 0942
Looking west along south border at drainage ditch.

1P-15 June 30, 1988 0949
Looking south at ponded water.

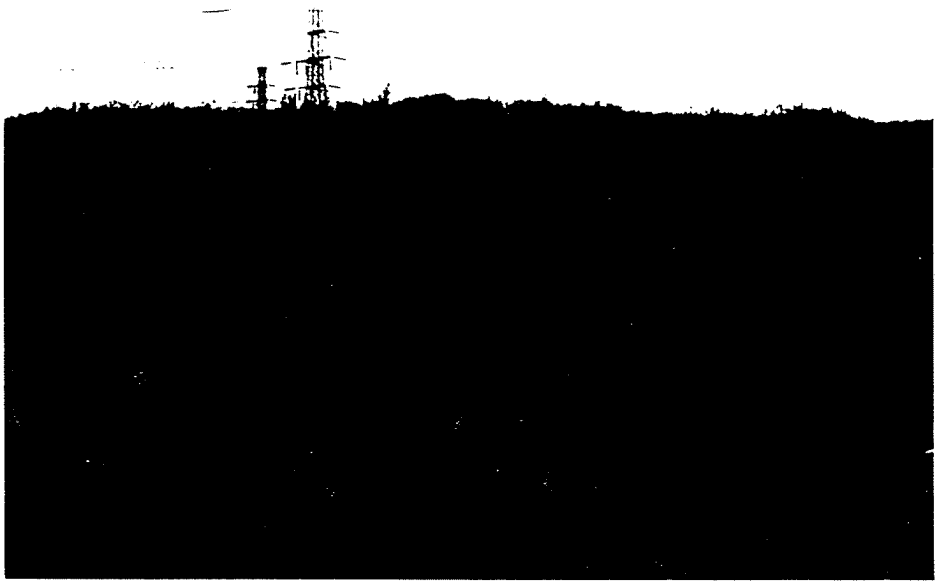
U.S. VANADIUM
NIAGARA FALLS, NEW YORK



1P- 16 June 30, 1988 0952
Old U.S. Vanadium building in southwest corner.

1P- 17 June 30, 1988 1006
Slag on east edge of Airco property.

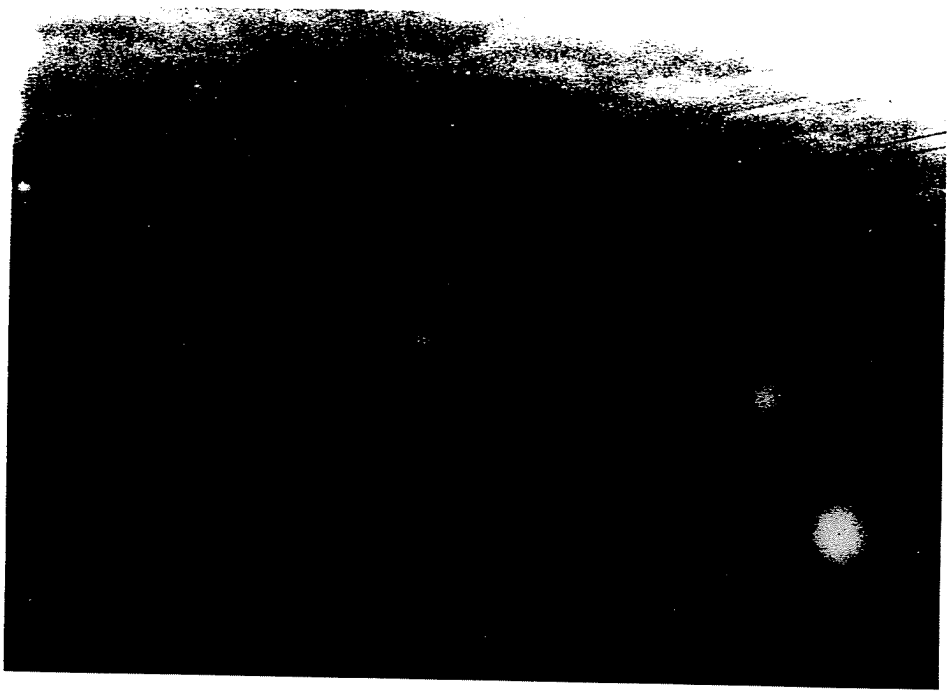
U.S. VANADIUM
NIAGARA FALLS, NEW YORK



1P-18 June 30, 1988 1009
Debris in west portion of Airco property.

1P-19 June 30, 1988 1016
Drainage ditch in southeast corner of Airco property.

NUS CORPORATION
U.S. VANADIUM
NIAGARA FALLS, NEW YORK



1P-20 June 30, 1988 1017
Looking north at slag piles on Niagara Mohawk property.

4.0 SITE INSPECTION SAMPLING RESULTS

Environmental samples were not collected as part of the site inspection of June 30, 1988. Previous sampling conducted by Snyder Engineering was adequate for evaluation of the site. These data are presented in Section 2.1 of this report, and in the indicated references.

Ref. Nos. 3, 4, 6

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 62-acre former U.S. Vanadium Site is presently owned by SKW Alloys, Inc. (37 acres), and Airco, Inc. (25 acres). Because similar waste types were/are disposed of on site by all three companies, responsibility for contamination is difficult to determine. However, that determination is beyond the scope of this report, and is left to others to resolve, when and if it is deemed appropriate.

Environmental degradation of groundwater and the waters of the on-site drainage ditch/intermittent stream system has been documented and is at least partially attributable to the U.S. Vanadium/Airco/SKW Site.

Chromium is a known constituent of the wastes of both Airco and SKW, and has been shown to readily leach from these wastes. Retention of chromium by on-site soils has also been shown to be poor.

The presence of hexavalent chromium in downgradient deep wells, compared to its absence in upgradient deep wells, indicates that an observed release has occurred. Hexavalent chromium in both upgradient and downgradient shallow wells indicates contamination of the shallow water table, although its source is unknown. The shallow well centrally located between SKW and Airco properties exhibited the greatest concentration of hexavalent chromium of all wells; however, an explanation of this observation is elusive.

Increasing concentrations of hexavalent chromium in a downstream direction in the waters of the on-site drainage ditch/intermittent stream indicate that this is not natural background, and that hexavalent chromium is possibly derived from on-site waste. Concentrations in downstream samples are between 3 and 10 times greater than in upstream samples.

Elevated pH in both deep and shallow upgradient wells, and in the centrally located wells, indicates that an influx of basic water may be occurring. Although a definitive causal link cannot be established, this high pH could potentially be due to the calcium hydroxide that is documented as a waste product disposed of on the site. This could also explain the elevated pH found in the drainage ditch/intermittent stream. High pH cannot be ruled out as a possibility because of the natural carbonate geology of the area.

It must be noted that groundwater is no longer used for drinking, and that no definite migratory pathway of waters in the drainage ditch/intermittent stream can be determined.

Although the environmental degradation of waters on site is of concern, the greatest concern is the historical potential off-site migration of airborne baghouse dusts. A 1981 report by Wegman

Engineers expressed concern that the finer particles of the baghouse dust may become mobilized by vehicular traffic and high winds. That report also states that dust had been detected on properties east of the site. However, recent communications with NYSDEC and the Niagara County Health Department indicate that presently the slurried dusts take on the consistency of concrete upon drying, and thus are not subject to wind mobilization. Therefore, airborne dust was historically a problem, although the magnitude and extent of the problem is not known. If still present in the environment, these dusts may be a current concern.

As previously mentioned, the baghouse dust has been shown to contain chromium, amongst other constituents, and hence may have presented (or may still present), potential for harm to animals and humans via direct inhalation. Soil contamination and leaching of hazardous substances from dusts that may have migrated off site are also concerns.

It should be noted that ferrochrome silicon furnace dust has reportedly been classified as nonhazardous by the U.S. EPA and NYSDEC; however, chromium contamination of the environment may have occurred as a result of inadequate containment of this dust.

In light of the above, the ~~U.S.~~ Vanadium Site should be given a medium priority for further action. Although both NYSDEC and the Niagara County Health Department are involved in certain aspects of this site, little attention has been paid to the historical problem of airborne dust. The fate of this dust and its effect on the environment warrant further investigation, as do contamination of groundwater and waters of the on-site drainage ditch/intermittent stream.

6.0 REFERENCES

1. Field Notebook No. 0271, U.S. Vanadium, TDD No. 02-8803-24, Site Inspection, June 30, 1988, NUS Corp. Region 2 FIT, Edison, New Jersey.

2. New York State Department of Environmental Conservation (NYSDEC), Engineering Investigations at Inactive Hazardous Waste Sites, Phase I Investigation, SKW Alloys, Inc., January 1988; by Ecology and Environment, Inc.

3. Radian Corporation, Analytical Results of Solid Waste Samples from SKW Alloys, Inc. (EP Toxicity Analyais), November 6, 1984.

4. SLC Consultants/Contractors, Inc., Groundwater sample analysis results for SKW Alloys, Inc., June 15, 1987.

5. Review of the Application for Solid Waste Management Facility for S.K.W. Alloys, Inc., Witmer Road Site, Town of Niagara, NY, April 7, 1981, by Wegman Engineers.

6. Support Document for an Application to Construct and Operate a Solid Waste Management Facility at SKW Alloys, Inc. Witmer Road Site, Town of Niagara, New York, Landfill Cell Number Two, December 5, 1980; by Richard R. Snyder, P.E.

7. U.S. Department of the Interior, Geological Survey Topographic Maps, 7.5 minute series, "Niagara Falls" 1980, "Lewiston" 1980.

8. Hopkins, Michael, Niagara County Hazardous Waste Sites, Niagara County Health Department Involvement and Concerns, November-December, 1983.

9. U.S. Environmental Protection Agency, Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Hazardous Waste - Disposal Sites, March, 1985.

10. Preliminary Assessment Report, TDD No. 02-8703-48, NUS Corp., Region 2 FIT, June 9, 1987.

11. Letter to Mr. Stuart M. Fox, Environmental Analyst, New York State Department of Environmental Conservation, Region 9, from Ronald F. Spears, Jr., Supervisor, Environmental Compliance, Airco Carbon, a Division of BOC, Inc., 5p plus attachments, July 31, 1984.

12. Water Quality Regulations, Surface Water and Groundwater Classifications and Standards, New York State Codes, Rules and Regulations, Title 6, Chapter X, Parts 700-705, New York State Department of Environmental Conservation, March 31, 1986.

13. U.S. Government, Code of Federal Regulations, 40 CFR, Part 141, 1986.

14. Telecon Note: Conversation between Paul Dickey, Niagara County Health Department, and J.B. Gebler, NUS Corp., September 7, 1988.

15. Telecon Note: Conversation between Jack Tygert, New York State Department of Environmental Conservation, and J.B. Gebler, NUS Corp., September 8, 1988.

16. Telecon Note: Conversation between Bob Armbrust, New York State Department of Environmental Conservation, Division of Air, and J.B. Gebler, NUS Corp. September 8, 1988.

17. Telecon Note: Conversation between Maury Vaugham and Paul Dickey, Niagara County Department of Health, and J.B. Gebler, NUS Corp., September 8, 1988.

6.0 REFERENCES
(Cont'd)

18. Contact Report: personal communication between James Snider, Senior Wildlife Biologist, New York State Department of Environmental Conservation, Region 9, and Jon Sundquist, Ecology and Environment, Inc. June 2, 1987.

REFERENCE NO. 1

F

NUS CORPORATION

II

0271

U.S. VANADIUM
02-8803-24
SITE MANAGER - E. TORPEY
LOGBOOK #0271
JUNE 28, 1988

GUIDANCE FOR PROPER USE OF LOG BOOKS

Purpose

- Serves to document onsite activities and be understandable to an outside reader.
- Provides the basis for later written reports.
- Used as an evidentiary document and may be used in legal proceedings.

Distribution

- Controlled by the project manager and distributed as appropriate to personnel designated by the project manager.

General Procedures

- Record information in language which is objective and factual.
- Use ink. Waterproof ink is recommended.
- Leave first two pages blank. They serve as space for the table of contents to be added when the log book is complete.
- The first written page identifies the date, time, TDD number, site name, location, NUS personnel and their responsibilities, other non-NUS personnel and observed weather conditions.
- Start on a new page at the start of each day's field activities. This page should identify date, time, TDD number, site name and location, NUS personnel and their responsibilities, other non-NUS personnel and observed weather conditions.
- List all persons leaving or entering the site.
- Information recorded in the log book should be in chronological order.
- Sign and date each page, log all entries using a 24 hour clock. Entries should be time logged every 15 to 30 minutes.
- Corrections are to be lined through and initialed. No erroneous notes are to be made illegible.
- Include a sketch or map of the site which can be used to locate photo or sample locations. Note landmarks, indicate north, and if possible include an approximate scale. Include as many sketches and maps as necessary.
- A person not present when field activities were being documented should read each completed page, and countersign and date when satisfied that the written notes are understandable.

Specific Field Activities To Be Documented

- Record the who, what and where of field activities.
- Indicate sampling and photo locations on a site sketch or map.
- As part of the chain of custody procedure, recorded in situ sampling information must include sample number, date, time, sampling personnel, sample type, designation of sample as a grab or composite, and any preservative used.
- Information for in-situ measurements must include a sample ID number, the date, time, and personnel taking measurements. Pertinent in-situ measurements include but are not limited to pH, temperature, conductivity, flow measurements, continuous air monitoring measurements, and trace gas analysis. If infield calculations are necessary they must be checked and signed by a second team member.
- Create a photo log to document photos taken in the field. These must include date, time, photographer, sample number, roll number, frame number, photo ID number and description. Indicate if the film is for slides or prints in the column for roll number. Photo ID numbers can be added at the time the photo log is assembled.
- Record onsite health and safety measures used. Describe observed potential hazards to health and safety. Document the level of protection used, decontamination procedure used and specific decontamination solutions.
- When sampling is complete, a summary log is to be completed. It must include date, time, sample number, description, field book reference page, and the number and date of the chain of custody form on which the sample is listed. Indicate whether or not the sample was split.
- Record details regarding relevant information obtained during onsite interviews. Include names of persons interviewed, the interest group represented, their address and phone number.
- Record any other relevant information which would be difficult to generate at a later date.

Date 9/7/88

Reviewed/Approved

U S. Vanadium
6 30 88
02 5503-24

Table of Contents

weather cond - cool (~50°F), overcast, wind 0 5 mph from west (copied with logbook from Health and Safety Field Log)

PS Rentz 7-5-88

B. Torpey Site Manager
P. Morton SSO
K. Bogdan asst. site manager

9:00 Arrive at site
9:15 Ran Skip + Dick Snyder arrive

9:17 IP 1 → S panoramic view looking N → SE piles in NW corner are old raw material iron ore coke

9:26 IP-6 looking E

9:29 IP 7 → 11 looking E at Airco property

9:33 IP-12 debris pile along E edge of SKW property

9:37 IP 13+4 old foundations of US Ind in SE corner of SKW prop

9:43 IP-15 picture looking W along S border of stagnant greenish chalky water in drainage ditch lime waste

9:49 IP-16 looking S at ponded H2O

Beth Torpey 6-30-88 RKS 7/11/88

9:32 IP 17 Old USU bar/disk in SW corner

10:00 Meet with Herb Feder

2 walk along S side

10:06 IP 18 slag in E edge on other side of AirCO prop.

Herb Feder says there is a fox that habitats the EF

10:09 IP 19 debris in western portion which has been here since 19 before 1980

Herb Feder's SW didn't want back S of Airco prop. b/c they thought it might be a "Love Canal type but he says it didn't turn out that way.

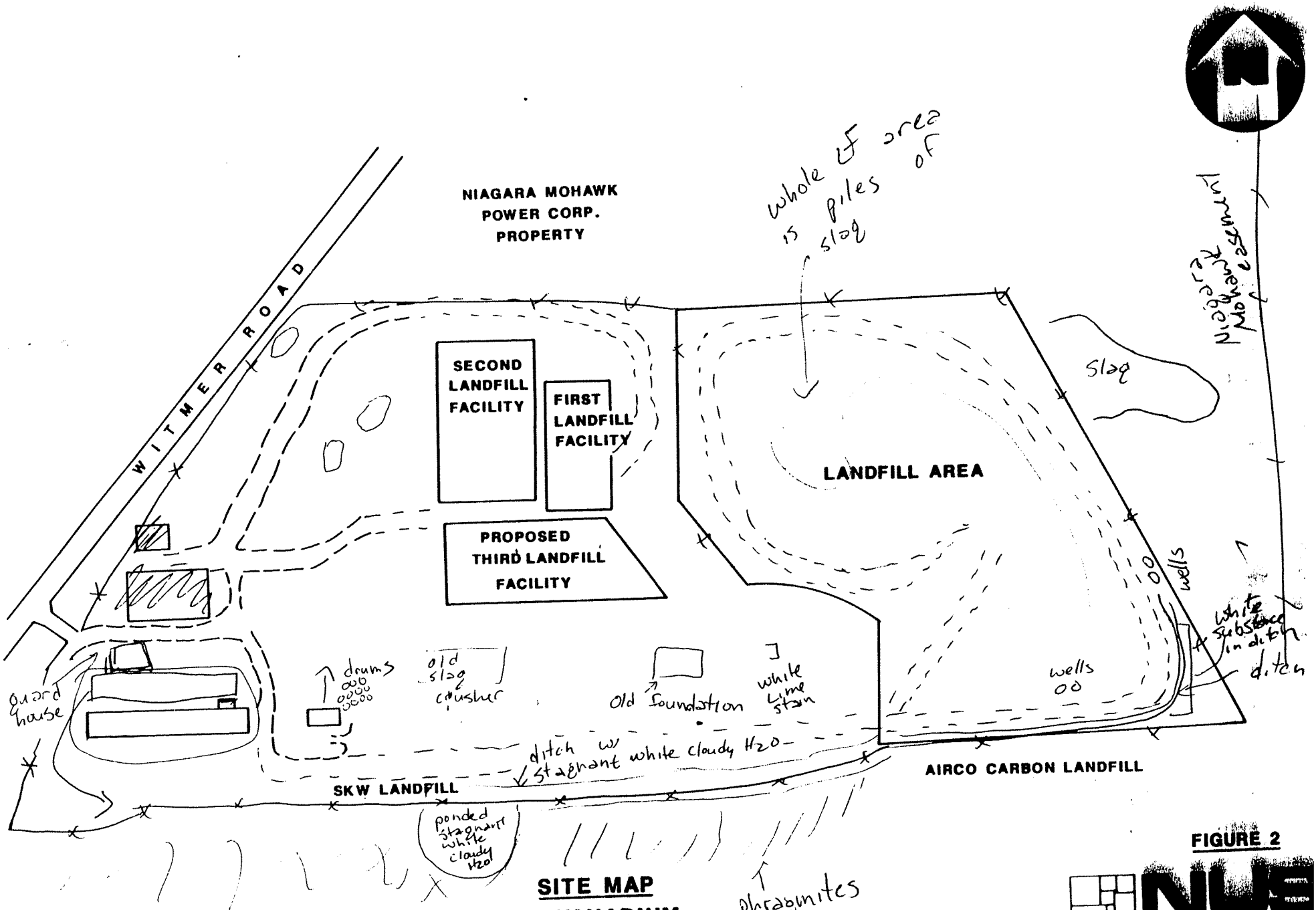
10:16 IP 20 picture of white chalky substance in drainage ditch in SE section of Airco

10:17 IP 21 - looking N at slag piles on Airco prop.

10:30 leave property

Since the property (both halves) is currently active, it is difficult to determine what waste is from US Vanadium. According to Ron Stipp, the old slag from US Vanadium has been covered over + none of the waste can be seen on the surface on the SKW section. In the southern section of the SKW property are old buildings + foundations from USV. Around the old foundations a white chalky substance was apparent on the soil. This substance was also observed in a drainage ditch + in ponded water on the other side of the fence. off-site migration is apparent. The ponded water was white, stagnant, cloudy + looked like it was solid until disturbed. We disturbed an area in the ditch + took readings from the OVA + HNU + got nothing. The Airco section consists of large mounds of uncovered waste. Herb Feder said that some of it was from USV but most of it was Airco's. A large mound of slag was outside the fence on Niagara Mohawk property + was most likely from USV. There are 3 monitoring wells that are sampled quarterly by a private consultant for both sections of the property.

Beth Torpey 6-30-88 7/15/88



SITE MAP
US VANADIUM,
NIAGARA FALLS, N.Y.

SCALE UNKNOWN

FIGURE 2

NUS CORPORATION

6-30-88 U.S. Vanadium 02-8808-24

Photo log

photo #	Description	Time
1P-1→5	Panoramic view, taken from the west looking N → SE	9:17
1P-6	At NW corner looking E	9:26
1P 7→11	At N-Central section of ~~Airco~~ SKW looking E → SE at Airco	9:29
1P -12	Debris pile along E edge of SKW property	9:37
1P-13+14	Old foundations of USV buildings in SE corner of SKW prop.	9:37
1P-15	Looking W along S border at drainage ditch	9:42
1P-16	Looking S at ponded water	9:49
1P-17	Old USV building in SW corner	9:52
1P-18	Slag on E edge of Airco prop.	10:06
1P-19	Debris in W portion of Airco prop.	10:09
1P-20	Drainage ditch in SE corner of Airco prop.	10:16
1P-21	looking N at slag piles on Niagara Mohawk property	10:17

REFERENCE NO. 2

Draft

ND-2900 01771

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE I INVESTIGATION

SKW ALLOYS, INC., SITE NUMBER 932001
TOWN OF NIAGARA, NIAGARA COUNTY

January 1988

Prepared for:
New York State Department
of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, Commissioner
Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., Director

Prepared by:
Ecology and Environment, Inc.

A592

TABLE OF CONTENTS

Table of Contents (Cont.)

LIST OF ILLUSTRATIONS

LIST OF TABLES

1. EXECUTIVE SUMMARY

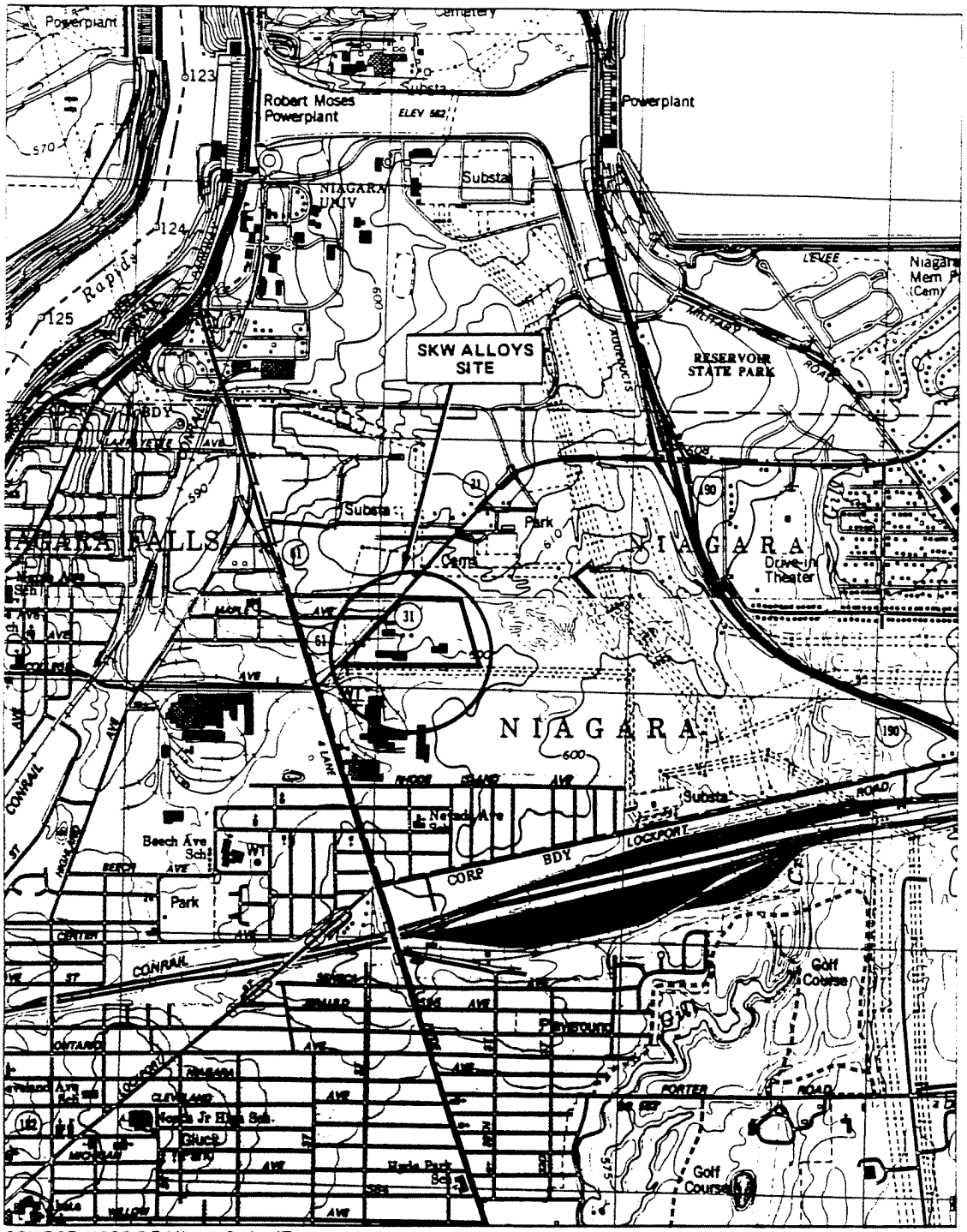
1.1 SITE BACKGROUND

The SKW Alloys, Inc. landfill (SKW Alloys) site is located on Witmer Road in the City of Niagara Falls, New York. This site has been used by SKW Alloys, Inc. and former owners to dispose of ferro chrome silicon alloy dust, ferro manganese slag, ferro chrome silicon slag, ferro silicon dust, calcium hydroxide, and miscellaneous refuse including but not limited to old machinery and raw materials. The landfill is currently operating under a New York State Department of Environmental Conservation (NYSDEC) permit.

The SKW Alloys site occupies approximately 37 acres consisting of a landfill area comprising approximately 5 acres, and the surrounding grounds and buildings. The site exhibits little relief except at the landfill area which rises 25 to 30 feet above the adjacent land surfaces. Additionally, various waste piles on site exhibit up to 20 feet of relief. Standing water was observed adjacent to the landfill area during a recent site inspection conducted by Ecology & Environment, Inc., (E & E).

1.2 PHASE I EFFORTS

The site was visited on August 26, 1987 by E & E personnel to conduct a physical inspection of the site in support of this investigation. Prior to the inspection, all available state, federal, and municipal files were reviewed, and individuals having knowledge of the site were contacted. The site inspection consisted of a walk-over



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Lewiston, NY–ONT, 1980 and Niagara Falls, NY–ONT, 1980.

Figure 1–1 LOCATION MAP

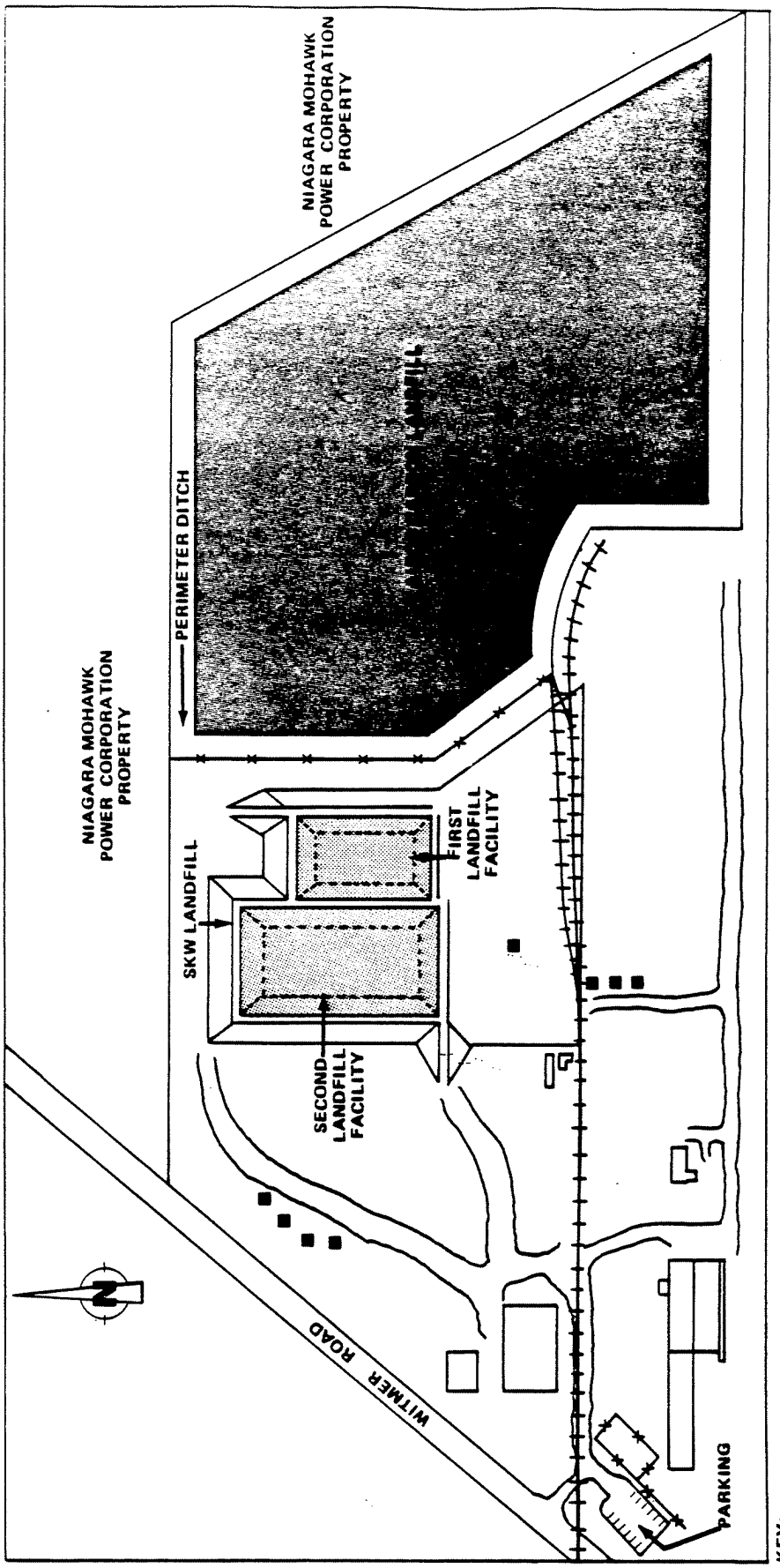


Figure 1–2 SITE MAP -SKW ALLOYS

survey around the perimeter and into adjacent areas of the site. Of interest to the inspection were:

- Overall site conditions; and
- Determination of former waste disposal areas.

1.3 ASSESSMENT

In general, the landfill area appears to have been maintained in good condition with the exception of an area where slurry was spilled onto the berm area of one of the disposal cells. The adjacent surrounding grounds were maintained in poorer condition. Waste piles of metal, woodchips and scrap, and baghouse dust were noted at various locations throughout the site. Piles of mixed raw materials, apparently removed from the plant facility, also were noted during the site inspection.

1.4 HRS SCORE

A preliminary application of the Hazard Ranking System (HRS) was made to quantify the risk associated with this site. As the Phase I investigation is limited in scope, not all the information needed to fully evaluate the site is available. An HRS score was completed on the basis of the available data. Absence of necessary data may result in an unrealistically low HRS score.

Under the HRS, three numerical scores are computed to express the site's relative risk or damage to the population and the environment. The three scores are:

- S_M reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility by routes involving groundwater, surface water, or air. It is a composite of separate scores for each of the three routes (S_{GW} = groundwater route score, S_{SW} = surface water route score, and S_A = air route score).

- S_{FE} reflects the potential for harm from substances that can explode or cause fires.

- S_{DC} reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

The preliminary HRS score was:

S_M = 22.61 (S_{GW} = 38.78; S_{SW} = 5.09; S_A = 0)
S_{FE} = not scored
S_{DC} = 0

2. PURPOSE

This Phase I investigation was conducted under contract to the New York State Department of Environmental Conservation (NYSDEC) Superfund Program. The purpose of this investigation was to provide a preliminary evaluation of the potential environmental or public health hazards associated with past disposal activities at the SKW Alloys, Inc. landfill site. This initial investigation consisted of a detailed file review of available information and a site inspection. This evaluation includes both a narrative description and preliminary HRS score. The investigation at this site focused on the landfill area, and adjacent areas where industrial wastes alledgedly had been disposed of from 1920 to the present.

3. SCOPE OF WORK

The Phase I effort involved:

- The review of available information from state, municipal, and private files;
- Interviews with individuals with knowledge of the site; and
- A physical inspection of the site.

State files reviewed were maintained by the New York State Department of Environmental Conservation (NYSDEC) Region 9 in Buffalo, New York. County files reviewed were maintained by Niagara County Department of Health. Private files which were reviewed are maintained by SKW Alloys, Inc., at the Highland Avenue, Town of Niagara facility. Items reviewed were:

- Groundwater and EP Toxicity sample analysis; and
- Engineering reports.

Mr. Michael Hopkins of the Niagara County Health Department was contacted in person on May 1, 1987, to discuss information maintained in the county files.

A site inspection was conducted by E & E on August 26, 1987. During the inspection, Anthony Kruk, engineering manager of SKW

Alloys, Inc. was interviewed. Photographs were taken during the site inspection and are included in Appendix A.

No samples were collected by E & E although monitoring of air quality was performed using a HNu photoionizing organic vapor detector. A physical inspection of the site and review of pertinent USGS 7.5 minute topographic maps was completed. A summary of agencies contacted, along with contact persons and addresses is presented in Table 3-1.

Table 3-1

SOURCES CONTACTED FOR THE NYSDEC PHASE I
INVESTIGATION AT SKW ALLOYS SITE

New York State Department of Environmental Conservation,
Region 9
600 Delaware Avenue, Buffalo, New York 14202
Telephone Number: (716) 847-4585

- Division of Solid Hazardous Waste
  Contact: Lawrence Clare, Ahmed Tayyebi, James Goehrig
  Date Contacted: May 8, 1987
  Information: EP Toxicity sample analysis results

- Division of Regulatory Affairs
  Contact: Paul Eismann
  Date Contacted: May 8, 1987, and June 2, 1987
  Information: Permits; wetlands information.

- Division of Environmental Enforcement
  Contact: Joann Gould
  Date Contacted: May 6, 1987
  Information: Enforcement actions

- Division of Water
  Contact: Rebecca Anderson
  Date Contacted: June 2, 1987
  Information: Floodplain locations

- Bureau of Wildlife
  Contact: James R. Snider
  Date Contacted: June 2, 1987
  Information: Critical habitat locations

Niagara County Health Department
10th and East Falls Street, Niagara Falls, New York, 14302
Telephone Number: (716) 284-3128
Contact: Michael Hopkins
Dates Contacted: May 1, 1987
Information: Site ownership and history
Site operations and reasons for suspected contamination
Correspondence concerning site
Groundwater use

City of Niagara Falls
Utilities Department, Division of Water
Buffalo Avenue and 53rd Street, Niagara Falls, New York
Telephone Number: (716) 278-8248
Date Contacted: June 15, 1987
Information: Well water usage

Town of Niagara Water Department
7105 Lockport Road, Niagara, New York
Telephone Number: (716) 297-2150
Contact: Dean Brown
Date Contacted: June 15, 1987
Information: Well water usage

City of Niagara Falls, Parks Division
Hyde Park, Niagara Falls, New York
Telephone Number: (716) 278-8341
Date Contacted: June 15, 1987
Information: Surface water usage

Table 3-1 (Cont.)

SKW Alloys, Inc.
3801 Highland Avenue
Niagara Falls, New York
Telephone Number: (716) 285-1252
Contact: Anthony Kruk
Date Contacted: August 26, 1987
Information: Site history, background information, groundwater analysis results, engineering reports

4. SITE ASSESSMENT

4.1 SITE HISTORY

The SKW Alloys, Inc. landfill site on Witmer Road in the City of Niagara Falls, New York was owned by the Vanadium Corporation of America from 1920 to 1964. During this period, Vanadium Corporation disposed of between 350,000 and 594,000 tons of brick, wood, ash, calcium hydroxide, and iron alloy slags. Most of this disposal allegedly occurred on the adjacent property which is now owned by Airco Carbon (Niagara County Health Department [NCHD] 1984).

The SKW/Airco properties were bought by Pittsburgh Metallurgical Company in 1964. This company subsequently changed its name to Airco Inc., and continued to dispose of similar classes of wastes on the SKW/Airco properties. Airco installed baghouse collectors at their plant in 1971 and began to dispose of slurried dusts at these properties, principally in the area currently owned by Airco. Storage and/or disposal of various materials such as coke, ores, and raw materials occurred on the present SKW property (NCHD 1984).

In 1979, SKW bought the Airco Alloys division of Airco Inc., and acquired 37 acres of the Witmer Road landfill property, while Airco retained the eastern portion of the property. SKW obtained a NYSDEC permit for operation of a solid waste disposal site at their Witmer Road property in 1980. Under this permit SKW disposes of ferrochrome silicon alloy and ferro silicon alloy baghouse dusts generated at their Niagara Falls facility located at 3801 Highland Avenue. These dusts are slurried with water before landfilling. A leachate collection system has been installed for the landfill.

Once collected, leachate is used to slurry fresh batches of baghouse dust. Several monitoring wells are located around the SKW and adjacent properties. These wells are sampled quarterly and analyzed for total dissolved solids (TDS), chemical oxygen demand (COD), total organic carbon (TOC), barium, chromium (total and hexavalent), iron, manganese, silica, and zinc. Specific conductance and pH measurements are also taken on the samples. SKW's NYSDEC permit has expired and they are currently operating on an extension until renewal is approved (Kruk 1987, NYSDEC 1986, NCHD 1984, Snyder 1980).

4.2 SITE TOPOGRAPHY

The SKW site is located on the Tonawanda Plain approximately 1 mile northwest of the Niagara River in the City of Niagara Falls, New York. The river gorge represents the most topographic relief in the area, running in a south-north direction and rising approximately 250 feet near the vicinity of the site. This site is located 3 miles south of the Niagara Escarpment and the area is characterized by very low relief. Lake Ontario is located approximately 12 miles to the north (USGS 1980).

The site elevation is approximately 600 feet above mean sea level, and is not in a floodplain. The nearest wetland is approximately 2.5 miles to the north of the site (NYSDEC 1987). The site is located in the highly industrialized northern area of the City of Niagara Falls. Residential areas occur 0.5 mile west of the site and New York Power Authority power lines bound the site to the south (USGS 1980). Airco Corporation is directly adjacent to the east. This property also contains a former landfill that was operated by Airco Corp. but is now capped and closed (Kruk 1987).

Groundwater is used for drinking purposes by two families approximately 0.25 mile north of the site (Hopkins 1987).

4.3 SITE HYDROLOGY

4.3.1 Regional Geology and Hydrology

The geology of the Niagara Falls area is well understood because of its simplicity and because of the excellent exposures of bedrock along the Niagara River gorge and the Niagara Escarpment.

The overburden in the Niagara Falls area is relatively thin. Three types of unconsolidated deposits are present. The lowermost is glacial till and regolith, an unsorted mixture of boulders, clay, and sand deposited by glaciers, which directly overlies the bedrock. This is covered by clays, silts, and fine sands of lacustrine origin. These are the surface soils throughout most of the region. In isolated spots, sand and gravel deposits are found above the lacustrine soils. These were deposited by glacial melt streams and by wave action of the larger ancestors of the Great Lakes.

The bedrock in the Niagara Falls area consists of nearly flat-lying sedimentary rocks, including dolomite, shale, limestone, and sandstone units. The several beds of bedrock slope southward approximately 30 feet per mile.

The entire region south of the Niagara escarpment, and extending almost to Erie County, is directly underlain by the Lockport Dolomite. The Clinton and Albion groups underlie the Lockport but crop out only along the escarpment and in the gorge of the Niagara River. These units are underlain by the Queenston shale. This unit is the uppermost bedrock unit under the plain north of the escarpment.

Groundwater in the Niagara Falls area occurs in both the unconsolidated deposits and in the bedrock. The bedrock, specifically the Lockport Dolomite, is, however, the principal source of groundwater in the Niagara Falls area. Three types of bedrock openings contain the groundwater: bedding joints, vertical joints, and solution cavities.

The bedding joints, which transmit most of the water in the Lockport, are fractures along prominent bedding planes which have been widened up to 1/8 inch by solution of the rocks. These joints extend several miles thus constituting effective water conduits.

The vertical joints are generally too short and sparse to account for significant groundwater storage and transmission, except in the top 10-25 feet of bedrock. Solution cavities, formed when gypsum is dissolved, are also not important components of the aquifer. Although they increase the storage capacity of the aquifer, they are isolated and do not contribute to groundwater transmission.

Two distinct sets of groundwater conditions exist in the Lockport Dolomite. The first is the upper 10 to 25 feet of the bedrock. This

region is highly fractured resulting in moderate permeabilities. In some areas in the region, a confining layer of clay above this zone can produce artesian groundwater conditions. The second class of groundwater conditions is found deeper in the bedrock, where at least seven different permeable zones have been identified. These zones are surrounded by impermeable bedrock and are not likely hydraulically connected (Johnston 1964).

4.3.2 Site Geology and Hydrogeology

Soil conservation survey reports and results of several onsite or nearby boreholes were used to describe the site geology and hydrogeology. The soil at this site is Odessa silty clay loam of the Odessa-Lakemont-Ovid association. This is a poorly drained, fine textured soil that is predominantly reddish in color. The underlying bedrock is the Lockport Dolomite (Higgins et al. 1972).

Specific soil information is available from subsurface soil boring logs. These borings indicate that the overburden consists of:

- Dense loamy glacial till with an extreme range in texture, from clay and silt to gravel and occasional boulders. This material ranges from 0.6 to 2 feet thick and directly overlies the bedrock;

- Water sorted stratified sediments which are characterized by a mixture of dolomitic rock fragments and overlying clay. This layer is found between the overlying clay and glacial till;

- A silty-clay lake sediment with a thickness varing from 2 to 12.5 feet containing fine silt lenses and vertical dessication cracks; and

- Fill with a thickness ranging from 1.3 to 9 feet. This fill consists primarily of slag, cinders, and fly ash (Spears 1978).

Site hydrology information is available from monitoring wells and piezometers installed on site. The following information was obtained by these groundwater studies:

- Bedrock is encountered at various depths ranging from 11 feet to 24 feet;

- A natural perched water table exists above the silty clay layer during most of the year. This water table may be encountered as little as 3 feet below ground surface;

- The permanent groundwater table is located approximately 20 feet below ground surface. Groundwater flow is expected to be to the southwest (SLC Consultants 1987).

For purposes of HRS scoring, the Lockport Dolomite is considered the aquifer of concern. This aquifer is expected to be encountered from 10 to 25 feet below land surface. The permeability of the Lockport Dolomite depends on fracturing, weathering, and solutioning of the bedrock beneath the site (Johnston 1962).

4.3.3 Hydraulic Connections

As discussed above, the aquifer of concern at this site is the Lockport Dolomite bedrock aquifer. The Lockport can be divided into two zones on the basis of water-transmitting properties. The upper 10 to 25 feet of rock is a moderately permeable zone that contains relatively abundant bedding planes and vertical joints enlarged by dissolution of dolomite and abundant solution cavities left by dissolution of gypsum. These zones are more than likely hydraulically connected. The remainder of the formation contains low to moderately permeable bedding planes of which as many as seven may be major water-bearing zones that are surrounded by fine-grained crystalline dolomite. These zones are probably not hydraulically connected. The Lockport group outcrops along the Niagara Gorge approximately 1 mile northwest of the site. Groundwater in bedding planes discharges from the bedrock at this outcropping. The bedrock aquifer is thus hydraulically connected to the Niagara River.

The seasonal shallow perched aquifer is likely not connected to the bedrock aquifers due to confining soil layers of silty clay (Johnston 1962).

In order to determine the occurrence and direction of groundwater movement below the SKW Alloys site, measurements of the depth to the water were taken at both the shallow and deep wells on site. Based on average measured water elevations of five deep wells on site for the period February 19 through May 8, 1987, an isopotential contour map was constructed (Snyder 1980). This isopotential map indicates that the net flow of groundwater in the deeper till-bedrock aquifer is toward the south to southwest, with a pronounced low in the southwest corner of the property. This observation is also consistent with depth-to-bedrock data, and is suggested to reflect the intersection of geologic joints or fissures, or a nearby industrial pumping well. Shallow well data indicate that the perched groundwater within the silty clay overburden mimics the direction of movement in the lower layers (Snyder 1980).

4.4 SITE CONTAMINATION

Two classes of waste disposal have occurred on the SKW Alloys site. From 1920 to 1964, Vanadium Corporation disposed of between 350,000 and 594,000 tons of brick, wood, ash, calcium hydroxide, and iron alloy slags. A majority of this disposal may have occurred on the adjacent Airco Alloys property. Currently, SKW Alloys disposes of slurried baghouse dust in a NYSDEC-permitted landfill on the site. EP toxicity analyses of these dusts indicate high concentrations of selenium (2 mg/L), total phenols (0.36 ug/L), and chromium (14.0 mg/L). Up to 102,000 tons of dust have been disposed of at this site to date (NYSDEC 1986).

Groundwater monitoring wells surrounding the site are sampled quarterly. Samples are analyzed for pH, conductivity, TDS, COD, and TOC. Additionally, the metals barium, chromium, iron, manganese, silicon, and zinc are measured annually (NCHD 1984). Monitoring wells located in the southwest section of the landfill are considered downgradient based on subsurface hydrogeologic investigations (Snyder 1980). The most recent sampling report (April 15, 1987) indicates that downgradient wells exceeded New York Class GA drinking water

standards for iron, manganese, and hexavalent chromium. Upgradient wells also exceeded standards up for iron and manganese (SLC Consultants 1987). These data indicate a release of chromium to the groundwater from the SKW landfill or the adjacent Airco landfill. Additional monitoring well installation would be required to determine the source of the chromium release.

5. PRELIMINARY APPLICATION OF THE HAZARD RANKING SYSTEM

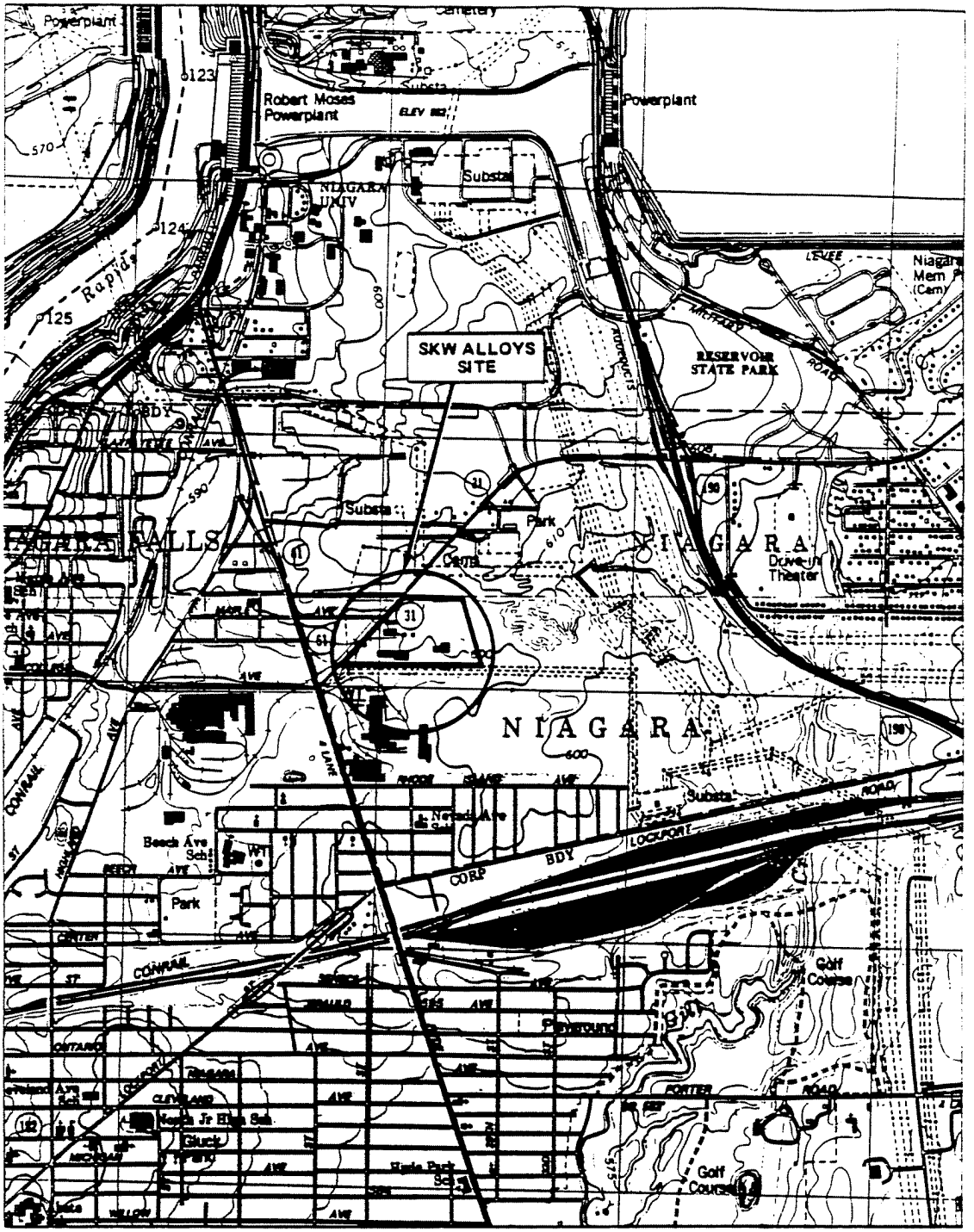
5.1 NARRATIVE SUMMARY

The SKW Alloys site covers approximately 37 acres in the Town of Niagara, Niagara County, New York. Vanadium Corporation of America used this site and the adjacent Airco Carbon property to dispose of ferrochrome silicon slag, ferromanganese slag, calcium hydroxide, old machinery, demolition debris, and raw materials from 1920 to 1964. Airco Alloys also used this site for disposal of similar industrial wastes from 1964 to 1979. SKW Alloys, Inc. bought the Airco Alloys production facility and a portion of the landfill facility in 1979 and currently landfills slurried ferrochrome silicon and ferrosilicon baghouse dusts under a NYSDEC permit.

The exact quantity of wastes is difficult to determine but it is believed to be in excess of 102,000 tons.

According to tests conducted by Radian Corporation and SLC Consultants between 1979 and 1987, the groundwater was found to be contaminated with elevated levels of chrome, manganese, barium, and iron, and the facility wastes were above EP Toxicity values for selenium, chrome, and phenols.

The site is located in the Town of Niagara in the northern, industrialized section of the City of Niagara Falls. A residential area is approximately 0.5 mile to the west. Approximately 58,299 people live within 3 miles of the site. Groundwater is used for drinking water purposes by two households within 0.25 mile of the site.



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Lewiston, NY–ONT, 1980 and Niagara Falls, NY–ONT, 1980.

SCALE

0 ½ 1 MILE

0 .5 1 KILOMETER

Figure 5–1 LOCATION MAP

FIGURE 1

HRS COVER SHEET

Facility Name: SKW Alloys, Inc.

Location: Witmer Road, Niagara Falls, New York

EPA Region: II

Person(s) in Charge of Facility: Anthony H. Kruk

Manager - Maintenance and Engineering

SKW Alloys, Inc.

Name of Reviewer: Dennis Sutton Date: September 15, 1987

General Description of the Facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action; etc.)

The SKW Alloys, Inc. site occupies a 37-acre industrial landfill located on Witmer Road, Town of Niagara. This landfill contains ferrochrome silicon slag, ferrochrome silicon alloy dust, ferromanganese slag, ferro silicon dust, calcium hydroxide and miscellaneous refuse. The facility accepts baghouse dust waste from SKW's plant on Highland Avenue in Niagara Falls. The area is primarily industrial with private residences to the west.

It has been reported that in addition to industrial wastes, old machinery and raw material had been placed on site in a random manner before the construction of the current landfill.

The primary concern is migration of contaminants found in the groundwater on site. There is also a possibility of soil contamination from the waste landfilled. Groundwater is used for drinking water within 0.20 mile of the site. The groundwater flow appears to be toward the Niagara River, 1.5 miles to the west.

Scores: S_M = 22.61 (S_{gw} = 38.78 S_{sw} = 5.09 S_a = 0)

S_{FE} = Not scored

S_{DC} = 0

D1773

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					3.5
Ground Water Use	0 1 2 (3)	3	9	9	
Distance to Nearest Well/Population Served	0 4 6 8 (10) 12 16 18 20 24 30 32 35 40	1	10	40	
Total Targets Score			19	49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			22,230	57,330	
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	38.78		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	(0) 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3	
Distance to Nearest Surface Water	0 (1) 2 3	2	2	6	
Physical State	0 1 2 (3)	1	3	3	
Total Route Characteristics Score			7	15	
3 Containment	0 1 2 (3)	1	3	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	(0) 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			6	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			3,276	64,350	
7 Divide line 6 by 64,350 and multiply by 100		S_{SW} =	5.09		

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Observed Release	(0) 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line [1] is 0, the S_a = 0. Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
[4] Multiply [1] x [2] x [3]				35,100	
[5] Divide line [4] by 35,100 and multiply by 100		S_a =	0		

FIGURE 9
AIR ROUTE WORK SHEET

	s	s^2
Groundwater Route Score (S_{gw})	38.78	1,503.89
Surface Water Route Score (S_{sw})	5.09	25.91
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		1,529.80
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		39.11
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		22.61

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Fire and Explosion Work Sheet										Not Scored			
Rating Factor	Assigned Value (Circle One)									Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1								3	1		3	7.1
2 Waste Characteristics													7.2
Direct Evidence	0				3					1		3	
Ignitability	0	1	2	3						1		3	
Reactivity	0	1	2	3						1		3	
Incompatibility	0	1	2	3						1		3	
Hazardous Waste Quantity	0	1	2	3	4	5	6	7	8	1		8	
Total Waste Characteristics Score												20	
3 Targets													7.3
Distance to Nearest Population	0	1	2	3	4	5				1		5	
Distance to Nearest Building	0	1	2	3						1		3	
Distance to Sensitive Environment	0	1	2	3						1		3	
Land Use	0	1	2	3						1		3	
Population Within 2-Mile Radius	0	1	2	3	4	5				1		5	
Buildings Within 2-Mile Radius	0	1	2	3	4	5				1		5	
Total Targets Score												24	
4 Multiply 1 x 2 x 3												1,440	
5 Divide line 4 by 1,440 and multiply by 100										S_{FE} = Not scored			

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Incident	(0) 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	(0) 1 2 3	1	0	3	8.2
3 Containment	0 (15)	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 (3)	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 (4) 5	4	16	20	
Distance to a Critical Habitat	(0) 1 2 3.	4	0	12	
Total Targets Score			16	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	21,600	
7 Divide line 6 by 21,600 and multiply by 100		S_{DC} = 0			

FIGURE 12
DIRECT CONTACT WORK SHEET

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

Instructions: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

Facility Name: SKW Alloys Corp.

Location: Witmer Road

Date Scored: September 9, 1987

Person Scoring: Dennis Sutton

Primary Source(s) of Information (e.g., EPA region, state, FIT, etc.):

NYSDEC Region 9 files, Buffalo, New York
Niagara County Health Department Files, Niagara Falls, NY
SKW Alloys Corp. files, Niagara Falls, NY

Factors Not Scored Due to Insufficient Information:

Comments or Qualifications:

Fire and Explosion score not computed as site has not been declared a fire hazard by a fire marshal.

GROUNDWATER ROUTE

1. OBSERVED RELEASE

Contaminants detected (3 maximum):

Hexavalent Chromium
Iron
Manganese

Rationale for attributing the contaminants to the facility:

Downgradient wells have higher contaminant levels than upgradient wells
Ref. No. 11

* * *

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/storage:

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual lake or seasonal evaporation (list months for seasonal):

Net precipitation (subtract the above figures):

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Permeability associated with soil type:

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Phenols
Hexavalent Chromium
Selenium
Ref. Nos. 11, 15

Compound with highest score:

Hexavalent Chromium
Ref. No. 16

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (give a reasonable estimate even if quantity is above maximum):

102,000 tons
Ref. No. 14

Basis of estimating and/or computing waste quantity:

Ref. No. 14

* * *

5. TARGETS

Groundwater Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Drinking Water
Ref. No. 17

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Witmer and Pennsylvania Ave.
Ref. No. 17

Distance to above well or building:

0.2 Miles
Ref. No. 13

Population Served by Groundwater Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

2 families near Witmer and Pennsylvania Ave.
Ref. No. 17

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

NA
Ref. No. 7

Total population served by groundwater within a 3-mile radius:

2 families x 4 people/family = 8 people

D1773

SURFACE WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

None detected

Rationale for attributing the contaminants to the facility:

* * *

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

0.5%
Ref. No. 13

Name/description of nearest downslope surface water:

Niagara River
Ref. No. 13

Average slope of terrain between facility and above-cited surface water body in percent:

1.3%
Ref. No. 13

Is the facility located either totally or partially in surface water?

No
Ref. No. 13

Is the facility completely surrounded by areas of higher elevation?

No
Ref. No. 13

1-Year 24-Hour Rainfall in Inches

2.5
Ref. No. 1

Distance to Nearest Downslope Surface Water

1.5 miles
Ref. No. 13

Physical State of Waste

Solid, sludge
Ref. Nos. 2, 3, 14

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Landfill, piles
Ref. Nos. 2, 1

Method with highest score:

No liner
Piles not covered
Ref. No. 1

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Hexavalent Chromium
Selenium
Phenols
Ref. Nos. 11, 14, 15

Compound with highest score:

Hexavalent Chromium
Ref. No. 16

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (give a reasonable estimate even if quantity is above maximum):

102,000 tons
Ref. No. 14

Basis of estimating and/or computing waste quantity:

Ref. No. 14

* * *

5. TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreation
Ref. No. 7

Is there tidal influence?

NA
Ref. No. 13

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

NA
Ref. No. 13

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

NA
Ref. No. 13

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

NA
Ref. No. 10

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

NA
Ref. No. 7

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

NA
Ref. No. 7

Total population served:

0
Ref. No. 7

Name/description of nearest of above water bodies:

NA
Ref. No. 7

Distance to above-cited intakes, measured in stream miles:

NA
Ref. No. 7

AIR ROUTE

1. OBSERVED RELEASE

Contaminants detected:

None detected

Date and location of detection of contaminants:

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3. TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within the view of the site?

FIRE AND EXPLOSION

Not Scored

1. CONTAINMENT

Hazardous substances present:

Type of containment, if applicable

* * *

2. WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

* * *

3. TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to a Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within the view of the site?

Population Within 2-Mile Radius

Buildings Within 2-Mile Radius

DIRECT CONTACT

1. OBSERVED INCIDENT

Date, location, and pertinent details of incident:

None observed

* * *

2. ACCESSIBILITY

Describe type of barrier(s):

Site is fenced and guarded, waste is not covered
Ref. No. 2

* * *

3. CONTAINMENT

Type of containment, if applicable:

Piles, landfill
Ref. Nos. 2, 3

* * *

4. WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Hexavalent Chrome
Selenium
Phenols
Ref. Nos. 15, 11

Compound with highest score:

Hexavalent Chrome
Ref. No. 16

* * *

5. TARGETS

Population within one-mile radius

3,540
Ref. No. 4

Distance to critical habitat (of endangered species)

NA
Ref. No. 10

REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found:

Reference Number	Description of the Reference
1	Barrett, K.W., S.S. Chang, S.A. Hans, A.M. Platt, 1982, Uncontrolled Hazardous Waste Site Ranking System Users Manual, Mitre Corporation. Document Location: Ecology and Environment, Buffalo, NY.
2	Ecology and Environment, Inc., August 26, 1987, Site inspection logbook and photolog. Document Location: Ecology and Environment, Buffalo, NY.
3	Kruk, Anthony, Engineering and Maintenance Manager, SKW Alloys, Inc., August 1987, personal communication. Document Location: Ecology and Environment, Buffalo, NY.
4	Graphical Exposure Modeling System (GEMS) Volume 3, June 1987, Graphics and Geodata Handling, prepared for the USEPA Office of Pesticides and Toxic Substances Exposure Evaluation Division, Federal Plaza, New York, New York. Document Location: Ecology and Environment, Buffalo, NY.
5	Higgins, B.A., P.S. Puglia, R.P. Leonard, T.D. Yoakun, W.A. Wirtz, 1972, Soil Survey of Niagara County, New York, USDA Soil Conservation Service. Document Location: Ecology and Environment, Buffalo, NY.
6	Johnson, Richard H., 1964, Groundwater in the Niagara Falls Area, New York, State of New York Conservation Department, Water Resources Commission, Bulletin GW-53. Document Location: Ecology and Environment, Buffalo, NY.
7	Hopkins, Michael, June 1987, personal communication, Niagara County Health Department, Niagara Falls, New York. Document Location: Ecology and Environment, Buffalo, NY.
8	Murtagh, William, 1976, The National Register of Historic Places, U.S. Department of the Interior, National Park Service, Washington, D.C. Document Location: Ecology and Environment, Buffalo, NY.
9	New York State Department of Environmental Conservation (NYSDEC), wetlands map. Document Location: Region 9 files, Buffalo, New York.
10	Snider, James, wildlife biologist, personal communication, June 1987, NYSDEC Region 9, Buffalo, New York. Document Location: Ecology and Environment, Buffalo, NY.
11	SLC Consultants/Contractors, Inc., June 1987, Groundwater sample analysis results for SKW Alloys, Inc. Document Location: Ecology and Environment, Buffalo, New York.
12	United States Geological Survey, The Effect of Niagara Power Project on Groundwater Flow in the Upper Part of the Lockport Dolomite, Niagara Falls Area, Survey Report 86-4150. Document Location: Ecology and Environment, Buffalo, New York.
13	United States Geological Survey, 1980, Niagara Falls and Lewiston, New York quadrangles, 7.5-Minute Series (Topographic), Washington, DC. Document location: Ecology and Environment, Buffalo, NY.

D1773

Reference Number	Description of the Reference
14	New York State Department of Environmental Conservation, Division of Solid and Hazardous Waste, Inactive Hazardous Waste Disposal Report. Document Location: Ecology and Environment, Buffalo, NY.
15	Radian Corporation, November 6, 1984, Analytical Results of the solid waste samples from SKW Alloys, Inc. Ferroalloy facility, Niagara Falls, NY. Document Location: Ecology and Environment, Buffalo, NY.
16	Sax, N. Irving, 1984, Dangerous Properties of Industrial Materials, 6th ed. Document Location: Ecology and Environment, Buffalo, NY.
17	Brown, Dean, 1987, personal communication, Town of Niagara Water Department. Document Location: Ecology and Environment, Buffalo, NY.

D1773

REFERENCE NO. 3

Draft

RADIAN
CORPORATION

November 6, 1984

Mr. Art Elmquest
SKW Alloys, Inc.
P. O. Box 368
Niagara Falls, New York 14302

Dear Mr. Elmquest:

Please find enclosed the analytical results of the solid waste samples that were gathered at the SKW Alloy Ferroalloy facility in Niagara Falls, New York. Please append this data to the trip report you received earlier.

Sincerely,

Ronald J. Dickson

Ronald J. Dickson
Environmental Engineer

RJD/ver

Enclosure

7655 Old Springhouse Road / McLean, Virginia 22102 / (703) 734-2600

ANALYSIS RESULTS FOR SKW - NIAGARA FALLS, NEW YORK

SAMPLE: FERROSILICON EMISSION CONTROL DUST

POLLUTANT	EP TOXICITY (MG/L)		ASTM DISTILLED WATER LEACH (MG/L)	TOTAL ANALYSIS (MG/KG)
AG	0.0060		<0.0020	<2.0000
AS	0.0600		1.5000	73.0000
BA	0.2700		0.1800	24.0000
CD	0.0040		<0.0020	<1.8000
CR	0.2500		0.1800	170.0000
CU	0.6400		0.0680	170.0000
FE	0.8400		0.0110	6000.0000
HG	0.0009		<0.0005	0.2500
MN	17.0000		0.5800	1000.0000
NI	0.1700		0.0920	13.0000
PB	0.2100		<0.0020	30.0000
SB	<0.0300		<0.0300	<1.6000
SE	2.0000	1.000	5.3000	0.6400
U	NA		NA	NA
V	NA		NA	NA
ZN	21.0000		0.0300	960.0000
CL	440.0000		1500.0000	NA
CNFREE	NA		NA	NA
CNTOTAL	NA		NA	NA
CR6	<0.0200		<0.0200	NA
	26.0000		75.0000	NA
NO3	6.5000		<0.1000	NA
RADIOACT	NA		NA	NA
SO4	580.0000		1700.0000	NA
TDS	2200.0000		6100.0000	NA
Total phenolics	0.36		0.70	

ANALYSIS RESULTS FOR SKW - NIAGARA FALLS, NEW YORK

AMPLE: FERROCHROMESILICON EMISSION CONTROL DUST

LUTANT	EP TOXICITY (MG/L)	ASTM DISTILLED WATER LEACH (MG/L)	TOTAL ANALYSIS (MG/KG)
G	<0.0020	<0.0020	<1.2000
S	0.0600	0.0170	15.0000
A	0.1100	0.0330	5.2000
D	<0.0020	<0.0020	<0.1000
R	14.0000	44.0000	1800.0000
U	0.1300	<0.0010	24.0000
E	0.1600	<0.0080	710.0000
G	0.0008	<0.0005	0.3600
N	8.9000	0.0090	260.0000
I	0.2300	<0.0030	13.0000
B	1.8000	<0.0020	18.0000
B	0.3800	1.3000	28.0000
E	0.0180	0.6000	2.7000
I	NA	NA	NA
,	NA	NA	NA
N	35.0000	0.2900	1100.0000
L	330.0000	160.0000	NA
NFREE	NA	NA	NA
NTOTAL	NA	NA	NA
R6	<0.0200	<0.0200	<0.0200
	1.1000	9.9000	NA
D	6.9000	<0.1000	NA
ADIOACT	NA	NA	NA
D	320.0000	1250.0000	NA
D	4000.0000	2700.0000	NA

Draft

ANALYSIS RESULTS FOR SKW - NIAGARA FALLS, NEW YORK

SAMPLE: FERROCHROMESILICON SLAG

POLLUTANT	EP TOXICITY (MG/L)	ASTM DISTILLED WATER LEACH (MG/L)	TOTAL ANALYSIS (MG/KG)
AG	<0.0020	<0.0020	<0.6300
AS	0.0030	0.0100	7.3000
BA	0.0300	0.0810	39.0000
CD	<0.0020	<0.0020	<0.0970
CR	0.0140	0.0180	57.0000
CU	0.0080	<0.0010	91.0000
FE	0.4300	<0.0080	2100.0000
HG	0.0010	<0.0005	0.1900
MN	0.3100	0.0010	130.0000
NI	0.0060	0.0070	42.0000
PB	0.0460	0.0040	10.0000
SB	<0.0320	<0.0320	1.7000
SE	0.0120	0.0060	0.2900
U	NA	NA	NA
V	NA	NA	NA
ZN	0.3100	<0.0030	80.0000
CL	38.0000	5.3000	NA
CNFREE	NA	NA	NA
CNTOTAL	NA	NA	NA
CR6	<0.0200	<0.0200	<0.0200
F	0.1600	1.0000	NA
NO3	0.5300	<0.1000	NA
RADIOACT	NA	NA	NA
SO4	8.2000	40.0000	NA
TDS	455.0000	320.0000	NA

Draft

Organics Analysis
For Ferrosilicon Bag-
house Dust
SKW Alloys, Niagara Falls, NY

Compound	Concentration (ppm)
3,3-Dimethyl hexane[a]	4.5
1,2-Benzenedicarboxylic acid butyl-2-methyl propylester[a]	1.7

[a]This compound is a product of sample preparation and analysis.

REFERENCE NO. 4

REFERENCE NO. 4

Draft

SLC Consultants/Constructors, Inc.

June 15, 1987

SKW Alloys, Inc.
3801 Highland Avenue
Niagara Falls, NY 14305

ATTENTION: Art Elmquest

Dear Mr. Elmquest:

Please find attached the results from the analysis performed on the samples taken on April 15, 1987 and the deep and shallow well elevations.

The "long list" of parameters was run per the agreement with the NYSDEC. The shallow wells were also sampled where there was enough sample and analyzed.

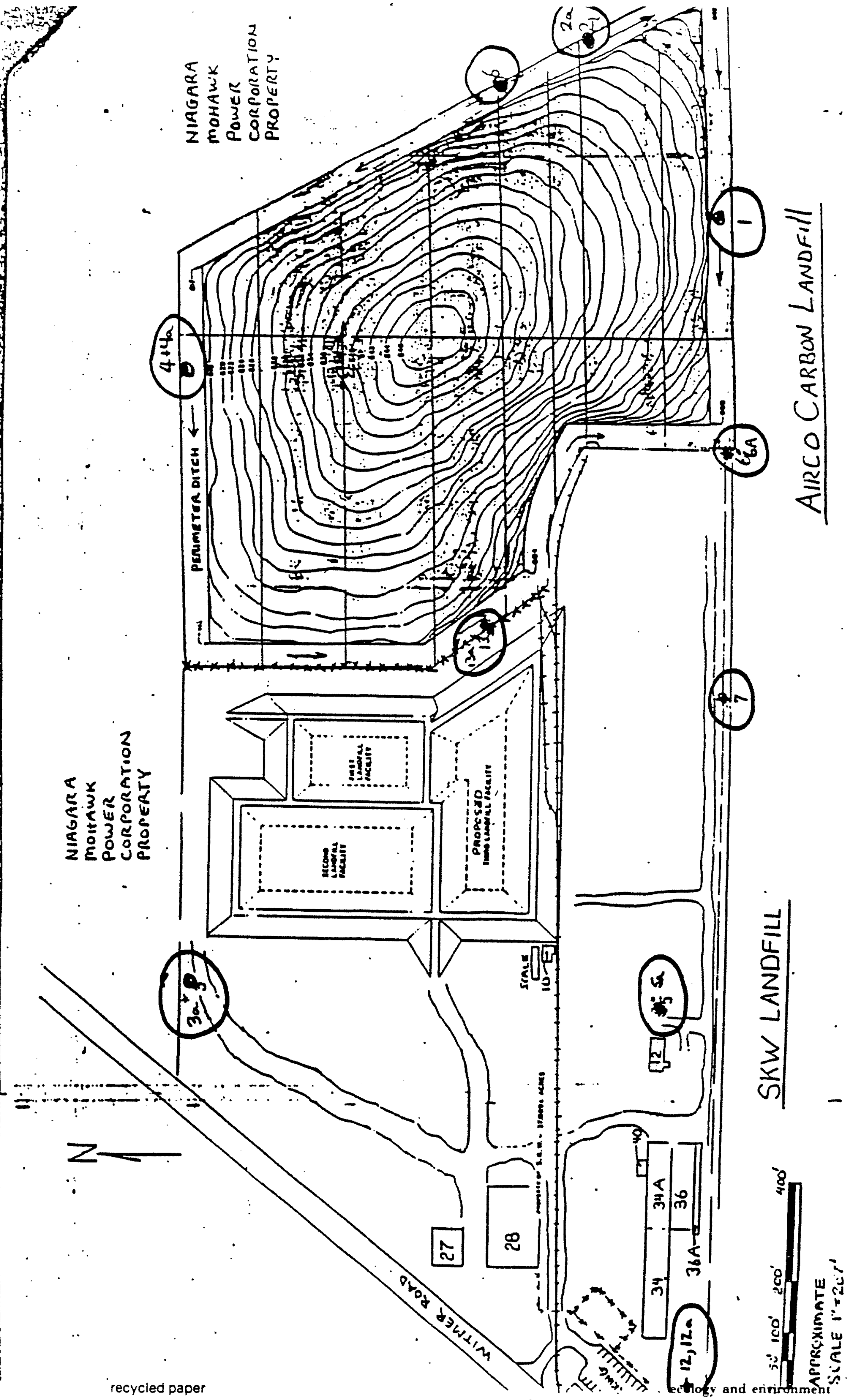
Please call with any questions.

Sincerely,

Donald J. Kuhn
President
SLC CONSULTANTS/CONSTRUCTORS, INC.

DJK/rk
Attach.: Witmer Road Sampling Report
cc Joseph E. Cumbo, Chief Chemist

Draft


NIAGARA MOHAWK POWER CORPORATION PROPERTY
PERIMETER DITCH
AIRCO CARBON LANDFILL
NIAGARA MOHAWK POWER CORPORATION PROPERTY
FIRST LANDFILL FACILITY
SECOND LANDFILL FACILITY
PROPOSED THIRD LANDFILL FACILITY
SCALE
SKW LANDFILL
WITMER ROAD
27
28
34
34A
36
36A
12
49
APPROXIMATE SCALE 1"=200'
0 100' 200' 400'

WATER ELEVATIONS*

	1	1A	2	2A	3	3A	4	4A	5	5A	12	12A	13	13A
10/10/84	592.61	DRY	599.32	601.72	598.02	604.64	601.04	603.17	578.08	595.38	583.05	DRY	589.73	598.56
1/7/85	597.39	595.98	599.94	602.27	598.38	606.62	603.57	604.46	579.87	595.73	586.94	592.34	591.84	599.35
4/3/85	599.96	599.85	601.45	602.41	598.02	607.37	606.59	605.71	581.42	595.98	588.02	593.58	594.01	599.31
7/25/85	593.14	DRY	598.32	601.14	598.93	605.36	601.34	603.24	579.76	595.76	582.56	DRY	590.45	DRY
10/31/85	591.59	DRY	599.09	601.90	596.13	603.30	601.48	603.84	579.24	596.73	583.97	DRY	590.16	599.18
1/23/86	599.75	599.37	601.32	602.52	596.00	605.51	606.70	605.58	581.24	597.04	587.15	593.34	593.69	599.38
4/1/86	599.54	599.78	600.88	602.13	594.77	605.11	606.19	604.99	581.80	596.60	586.74	592.69	593.72	599.05
8/2/86	594.23	595.63	598.99	601.70	594.95	604.62	602.92	603.35	579.83	596.46	584.48	590.93	591.23	598.05
10/1/86	593.99	595.44	599.81	602.53	593.91	605.68	602.73	604.35	583.08	597.20	586.72	590.81	592.49	599.44
1/27/87	599.09	600.07	600.64	601.81	594.58	604.87	605.31	604.10	589.63	596.49	588.80	592.25	596.15	599.28
4/14/87	**	**	601.34	602.15	593.87	605.47	607.12	605.79	590.61	596.92	589.73	593.21	597.53	599.33

*Prior to Evacuation
**Well broken - no sample

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 1

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79	7.30	1200		10	<2	0.10	<0.01		1.23	0.95	9.8	0.82
4/11/79	7.30	1350		10	2	0.01	<0.01		1.00	1.10	9.0	0.99
5/14/79	7.65	1000		18	5	0.15	0.01		1.10	0.80	4.9	0.75
6/11/79	7.45	1100		6.4	17	0.10	<0.01		1.60	0.88	6.2	0.70
12/14/79	6.85	1250		6	20	0.15	<0.02		1.1	0.24	—	0.41
1/16/80	7.80	1200	774	<2	54	0.1	<0.02		0.26	0.26	10	0.31
4/11/80	6.75	1400	1280	8	39	<0.1	<0.02	<0.01	0.02	0.19	6.1	0.74
7/8/80	7.25	1300	1020	12	110	0.1	0.02		0.22	0.18	4.3	0.17
10/30/80	—	—	—	—	—	—	—	—	—	—	—	—
1/7/81	6.9	1150	847	<20	4		0.096	<0.005	<0.050	0.055	7.0	<0.050
4/7/81	7.58	1010	878	18.9	10	<0.2	<0.005	<0.005	<0.05	0.02	10.2	0.27
6/22/81	6.97	1140	1074	21.6	2	0.40	0.016	0.010	<0.05	0.051	3.4	0.190
10/29/81	7.05	960	1064	17.2	14	<0.2	<0.005	<0.005	<0.05	0.115	0.70	0.01
1/6/82	7.00	1870	782	8.1	<1	<0.2	<0.005	<0.005	<0.050	0.079	9.5	0.040
4/14/82	6.95	830	784	<2.00	11.5	0.214	<0.005	<0.005	<0.050	0.081	8.30	0.240
7/27/82	7.10	670	660	14.9	24.4	<0.200	0.148	<0.005	<0.050	0.048	7.60	<0.050
10/20/82	7.50	699	536	15.4	30.7	<0.200	<0.005	<0.005	0.095	0.210	8.32	<0.050
3/1/83	6.92	870	788	<2.0	71.6	<0.2	0.005	0.005	<0.05	0.035	8.3	0.390
7/21/83	7.31	840	694	42.2	57.9							
10/26/83	7.12	790	854	5.76	117.0							
2/24/84	7.30	800	654	2.9	10.4	1.9	<0.005	<0.005	<0.05	0.059	5.8	0.15
4/11/84	7.01	780	700	12.7	8.9	0.01						
7/13/84	7.22	740	442	16	15							
10/11/84	7.42	940	760	13	13							

Continued on next page.

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 1 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85	7.28	800	770	<5	130	0.080	0.034	0.009	1.58	0.083	0.93	0.439
4/3/85	7.30	700	690	7.2	12							
7/25/85	7.25	1000	950	24	22							
10/31/85	7.02	1000	730	3.7	<10							
1/23/86	7.59	1000	750	4.7	89							
4/2/86	7.60	1100	670	11	12	0.062	<0.01	<0.01	0.308	0.044	7.90	0.390
8/4/86	7.45	900	730	<5	5							
10/2/86	7.25	1000	660	7.8	17							
1/28/87	7.15	990	630	<5	18							
4/15/87	WELL BROKEN - NO SAMPLE											

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 1A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	7.44	760	740	18	11							
7/25/85		INSUFFICIENT SAMPLE OR DRY										
10/31/85			D R Y									
1/23/86	7.67	1100	790	9.9	38							
4/2/86	7.70	1500	1200	89	17	0.042	<0.01	<0.01	1.80	0.725	5.54	0.207
8/4/86			D R Y									
10/2/86			D R Y									
1/28/87	7.90	2000	1600	110	11							
4/15/87		W E L L	B R O K E N	-	N O	S A M P L E						

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 2

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79						0.05	0.02		0.64	12.0	8.8	0.15
4/11/79						0.05	<0.01		1.40	1.1	6.4	0.18
5/14/79	7.8	500		22	9	0.10	0.01		0.40	0.35	2.6	0.06
6/1/79	7.95	495		7.2	11	<0.10	<0.01		2.5	0.60	4.4	0.27
12/14/79	7.70	460	338	2	<5	<0.05	<0.02		0.43	0.11	—	0.03
1/16/80	8.0	500	256	<2	32	0.1	<0.02		1.90	0.51	4.0	0.27
4/11/80	7.55	550	443	6	15	<0.1	<0.02	<0.01	0.21	0.25	3.8	0.13
7/8/80	7.55	440	300	9	52	0.1	0.02		0.96	0.26	2.7	0.02
10/30/80	7.60	460	268	4	<5	<0.1	<0.02	<0.02	1.7	0.37	42	0.01
1/7/81	7.2	565	617	<20	3		0.064	<0.005	0.156	0.116	2.5	<0.050
4/7/81	7.71	510	412	40.6	7.8	<0.2	<0.005	<0.005	0.05	0.074	4.9	0.066
6/22/81	7.50	430	300	26.7	2.3	<0.20	0.006	<0.005	0.05	0.133	8.2	0.046
10/29/81	7.45	450	310	32.5	15	<0.2	<0.005	<0.005	<0.05	0.156	0.20	0.015
1/6/82	7.50	380	266	50.5	20.1	<0.2	<0.005	<0.005	<0.050	0.068	4.0	0.047
4/14/82	7.75	360	294	2.26	11.0	<0.200	<0.005	<0.005	<0.050	0.064	4.0	<0.010
7/27/82	7.61	280	374	47.5	17.9	<0.200	0.043	0.009	<0.050	0.106	5.40	<0.050
10/20/82	7.85	443	284	<5.0	26.7	<0.200	<0.005	<0.005	<0.050	0.200	6.84	<0.050
3/1/83	7.55	360	354	11.0	46.6	<0.2	0.012	0.011	<0.05	0.083	4.3	<0.050
7/21/83	7.99	280	240	24.7	31.1							
10/26/83	8.74	270	834	0.38	56.2							
2/24/84	9.90	220	112	31.5	15.3	<0.2	<0.005	<0.005	<0.05	<0.005	2.5	<0.02
4/11/84	9.46	210	140	11.7	6.0	0.04						
7/13/84	11.08	675	142	<5.0	5							
10/11/84	10.91	330	150	24	5.3							

Continued on next page.

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 2 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85	11.73	870	36	26	18	0.047	0.028	0.012	0.160	<0.050	<0.4	0.003
4/3/85	11.58	1100	460	4.7	7							
7/25/85	11.65	2000	520	10	12							
10/31/85	11.43	2800	610	15	<10							
1/23/86	12.15	1900	570	16	6.0							
4/2/86	12.2	1500	480	17	<10	0.073	0.039	0.033	0.08	<0.03	2.50	0.115
8/4/86	12.20	2000	1100	20	6							
10/2/86	11.90	1700	410	17	<10							
1/28/87	11.80	2300	580	21	<10							
4/15/87	10.40	1500	380	<5	13	0.063	0.023	0.012	0.124	<0.005	3.08	0.010

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 2A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	12.14	5000	1200	75	10							
7/25/85	12.23	6300	1300	43	<10							
10/31/85	11.7	2700	1300	19	<10							
1/23/86	12.61	5500	1300	20	870							
4/2/86	12.7	5300	1900	13	<10	0.46	0.517	0.428	0.242	<0.03	0.640	0.306
8/4/86	12.70	200	5000	14	4							
10/2/86	12.50	5800	1300	24	<10							
1/28/87	12.15	6100	1400	19	<10							
4/15/87	10.60	5900	1500	67	14	0.452	0.495	0.356	0.092	<0.005	0.536	<0.01

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 3

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79	—	—		--	—	0.25	0.02		0.47	2.0	23.0	0.12
4/11/79	10.30	950		69	24	0.05	0.03		4.20	1,2	12.4	0.44
5/14/79	9.15	600		53	15	<0.05	0.03		9.0	0.75	4.8	0.28
6/11/79	8.80	600		42	26	<0.10	<0.01		10.3	0.27	2.9	0.14
12/14/79												
1/16/80	7.95	500	266	59	40	<0.1	<0.02		16.4	0.61	2.6	0.22
4/11/80	7.50	550	487	68	25	<0.1	<0.02		3.6	1.26	4.8	0.37
7/8/80	6.85	490	370	25	32	0.1	0.02		22	0.46	0.8	0.05
10/30/80	--	—	—	—	15	<0.1	<0.02	<0.02	42	1.07	2.8	0.22
1/7/81	9.1	350	307	180	40		0.021	<0.005	<0.050	0.020	3.0	<50
4/7/81	8.05	360	256	99.5	78	<0.2	<0.005	<0.005	0.16	0.028	3.0	0.010
6/22/81	7.97	350	238	92.1	5.5	0.24	<0.005	<0.005	0.07	<0.02	5.0	0.013
10/29/81	8.75	360	250	99.4	54	<0.2	<0.005	<0.005	<0.05	<0.020	3.40	0.050
1/6/82	8.55	310	236	101	32.5	<0.2	<0.005	<0.005	0.075	<0.020	3.5	0.010
4/14/82	7.95	400	276	118	12.0	0.226	<0.005	<0.005	<0.050	<0.020	1.70	<0.010
7/27/82	8.48	340	352	139	37.5	<0.200	<0.005	<0.005	0.114	0.029	1.48	<0.050
10/20/82	8.00	303	262	166	48.0	<0.200	<0.005	<0.005	0.054	<0.020	6.78	<0.050
3/1/83	9.28	245	198	132	40.6	<0.2	<0.005	—	0.069	<0.02	3.71	<0.050
7/21/83	9.70	230	204	42.2	43.3							
10/26/83	10.41	330	294	29.5	46.7							
2/24/84	9.37	240	244	65.0	50.0	*	*	*	*	*	1.8	*
4/11/84	10.02	2400	2000	116	5.0	*						
7/13/84			D R Y									
10/11/84	*	*	*	<5	2.3							

* = Insufficient Sample

Continued on next page.

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 3 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85			D R Y									
4/3/85	9.84	360	200	90	26							
7/25/85		INSUFFICIENT SAMPLE OR DRY										
10/31/85		INSUFFICIENT SAMPLE										
1/23/86		INSUFFICIENT SAMPLE OR DRY										
4/2/86			D R Y									
8/4/86			D R Y									
10/2/86			D R Y									
1/28/87			D R Y									
4/15/87			D R Y									

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 3A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	I. S.											
7/25/85	INSUFFICIENT SAMPLE OR DRY											
10/31/85	I. S.											
1/23/86	10.12	330	280	41	23							
4/2/86	9.90	450	230	97	35	0.062	0.149	0.327	8.90	0.250	36.7	0.365
8/4/86	10.15	5200	380	130	19							
10/2/86	11.00	590	380	140	36							
1/28/87	10.89	610	330	56	11							
4/15/87	10.20	860	380	140	23	0.325	0.835	<0.01	42.0	1.62	67.0	0.429

I.S. = Insufficient Sample

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 4

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79	7.45	1050		102	28	0.20	0.02		0.62	5.5	11.0	0.83
4/11/79	7.55	1150		4	6	0.15	0.01		0.41	3.8	11.5	0.38
5/14/79	7.35	1150		25	5	0.05	0.02		0.85	1.25	4.6	0.33
6/11/79	7.45	1100		9.6	18	<0.10	<0.01		1.6	0.99	4.6	0.44
12/14/79	7.45	950	596	40	<5	0.08	<0.02		0.32	0.01	—	0.060
1/16/80	7.45	1000	684	<2	80	<0.1	<0.02		0.15	1.18	5.0	0.19
4/11/80	6.90	1450	1380	<2	43	0.4	0.02	<0.01	0.05	0.57	5.4	0.67
7/8/80	7.05	1600	1290	6	100	0.2	<0.02		0.20	0.64	3.6	0.38
10/30/80	7.85	1050	642	2	<5	<0.1	<0.02	<0.02	0.56	0.28	4.7	0.19
1/7/81	7.4	960	803	<20	3		0.064	0.02240	<0.050	0.067	5.2	<0.050
4/7/81	7.35	1400	1290	16.1	13.9	<0.2	<0.005	<0.005	<0.05	0.475	7.4	0.468
6/22/81	6.85	2200	1970	22	1.5	0.75	0.007	<0.005	<0.05	0.770	<5.0	0.457
10/29/81	6.90	2250	1960	88	23	<0.2	<0.005	<0.005	<0.05	0.622	0.40	0.094
1/6/82	6.85	2650	2318	18.2	<1	<0.2	<0.005	<0.005	0.379	0.508	5.5	0.490
4/14/82	7.05	2600	2400	140	9.5	<0.200	0.029	0.027	<0.050	0.550	5.70	0.540
7/27/82	7.01	2700	2700	39.7	37.1	<0.200	0.295	<0.005	<0.050	0.532	4.98	0.160
10/20/82	7.65	2580	2070	14.9	37.8	<0.200	<0.005	<0.005	0.105	0.453	7.42	0.140
3/1/83	6.95	2520	2252	15.4	66.4	<0.2	0.0069	0.005	0.162	0.426	6.1	0.388
7/21/83	7.3	2250	1746	18.5	50.3							
10/26/83	7.38	1300	1040	14.9	96.4							
2/24/84	7.10	2100	1790	88.5	58.5	3.1	<0.005	<0.005	<0.05	0.813	4.6	0.19
4/11/84	6.86	1900	1780	19.5	4.4	0.04						
7/13/84	7.07	2700	1710	585	20							
10/11/84	7.16	1700	1300	<5	6.6							

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 4 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85	7.48	900	760	9.5	76	0.058	0.059	0.039	4.67	0.247	<0.4	0.299
4/3/85	6.87	1200	1400	80	12							
7/25/85	7.15	2000	1500	83	44							
10/31/85	7.20	1300	620	3.7	<10							
1/23/86	7.25	1800	1300	10	89							
4/2/86	7.45	2000	1500	11	12	0.105	0.010	<0.01	6.42	0.499	15.7	0.766
8/4/86	7.45	400	1500	13	8							
10/2/86	7.40	1600	960	10	<10							
1/28/87	7.10	1900	1200	18	31							
4/15/87	7.0	1900	1400	36	21	0.078	<0.01	<0.01	3.43	0.711	7.99	0.302

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 4A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	12.23	2500	1800	110	14							
7/25/85	12.25	7400	1700	82	38							
10/31/85	11.85	3000	1400	29	12							
1/23/86	12.70	7200	1800	30	10							
4/2/86	12.8	6000	2000	24	19	0.122	0.698	<0.01	0.082	<0.03	0.735	0.086
8/4/86	12.70	5900	1900	50	18							
10/2/86	12.55	6800	1500	36	18							
1/28/87	12.20	6800	1600	20	<10							
4/15/87	10.60	7900	2000	25	18	0.159	0.714	0.546	0.119	<0.005	0.386	<0.087

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 5

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79	7.30	1200		8	<2	<0.50	0.01		4.1	2.5	7.8	0.37
4/11/79	7.55	1050		4	<2	0.05	0.01		5.9	1.4	7.0	0.15
5/14/79	7.40	7.40		24	<2	0.05	<0.01		6.0	1.35	4.6	0.30
6/11/79	7.40	1000		20	23	<0.10	<0.01		5.7	1.02	4.3	0.14
12/14/79												
1/16/80	7.65	1000	626	4	70	<0.1	0.02		5.90	0.52	5.3	0.07
4/11/80	7.00	1150	1410	10	62	0.1	0.08		0.91	1.10	3.6	0.15
7/8/80	7.20	950	754	5	95	<0.1	<0.02		2.1	0.62	3.2	0.05
10/30/80	7.50	1000	606	5	<5	<0.1	<0.02	<0.02	10.5	1.68	6.6	0.30
1/7/81	7.2	980	565	80	4		0.030	0.01310	<0.05	0.218	1.6	<0.050
4/7/81	7.48	940	708	47	20	<0.2	<0.005	<0.005	0.16	0.281	5.5	0.033
6/22/81	7.00	850	656	40	1.3	0.43	0.008	<0.005	<0.05	0.210	6.4	<0.010
10/29/81	7.08	900	640	36.9	31	<0.2	<0.005	<0.005	0.13	0,231	3.9	<0.050
1/6/82	7.10	880	674	32.3	10.4	<0.2	<0.005	<0.005	0.305	0.176	5.5	0.017
4/14/82	7.19	690	756	33.9	12.5	<0.200	<0.005	<0.005	<0.050	0.280	4.20	<0.010
7/27/82	7.27	700	684	53.1	48.2	<0.200	0.142	<0.005	<0.050	0.197	3.42	<0.050
10/20/82	7.65	906	712	86.2	59.4	<0.200	<0.005	<0.005	<0.050	0.137	7.92	<0.050
3/1/83	7.27	690	494	71.3	86.5	<0.2	0.009	0.009	<0.05	0.153	3.61	<0.050
7/21/83	7.33	700	454	51.9	30.5							
10/26/83	7.41	670	554	28.0	115.0							
2/24/84	7.58	780	670	35.0	7.5	1.8	<0.005	<0.005	<0.05	0.460	3.1	<0.02
4/11/84	7.07	760	600	29.3	6.4	0.08						
7/13/84	7.23	820	648	140	35							
10/11/84	7.21	800	580	157	48							

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 5 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85	7.53	620	570	23	110	0.128	0.089	0.056	48.5	0.579	<0.4	0.296
4/3/85	7.15	850	620	140	34							
7/25/85	7.20	960	740	31	14							
10/31/85	7.53	1000	690	22	14							
1/23/86	7.51	900	690	27	72							
4/2/86	8.00	900	550	32	25	0.101	0.040	<0.01	42.9	0.552	11.5	0.192
8/4/86	7.45	840	710	28	14							
10/2/86	7.40	820	680	29	13							
1/28/87	7.30	900	590	57	28							
4/15/87	7.0	870	570	32	25	0.076	<0.01	<0.01	27.6	0.493	5.92	0.087

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 5A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	I.S.											
7/25/85	7.39	1600	1200	242	66							
10/31/85	7.62	1500	1100	360	100							
1/23/86	7.46	510	390	440	76							
4/2/86	7.85	440	320	41	25	0.142	0.143	0.060	4.32	1.59	13.4	0.172
8/4/86	7.90	930	380	490	16							
10/2/86	7.65	1000	620	67	22							
1/28/87	7.80	550	370	73	<10							
4/15/87	7.6	500	190	110	28	0.523	0.500	0.193	52.7	6.63	52.5	0.887

I.S. = Insufficient Sample

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 6

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79	11.75	4100		14	8	0.15	0.25		0.07	0.03	2.9	0.02
4/11/79	12.05	4100		6	7	0.10	0.23		0.06	0.01	1.5	<0.005
5/14/79	11.55	4000		41	2	0.10	0.30		0.04	0.01	1.6	0.01
6/11/79	11.85	3350		24	8	0.10	0.13		0.05	<0.01	4.4	<0.01
12/14/79	11.40	6000	1310	34	8	0.15	0.07		0.08	<0.005	—	0.015
1/16/80	12.30	6000	1230	10	15	0.1	0.19		0.06	0.02	0.5	0.02
4/11/80	11.70	3700	991	18	16	0.1	0.25	0.18	0.02	0.01	0.8	<0.01
7/8/80	11.30	4400	1160	19	10	0.3	0.16		0.02	0.02	0.6	0.01
10/30/80	12.10	4300	856	8	8	<0.1	0.06	<0.02	0.03	0.02	0.9	<0.01
1/7/81			STREAM FROZEN									
4/7/81	12.05	4000	1104	95.3	18.3	0.29	0.144	0.040	<0.05	<0.02	0.70	0.012
6/22/81	9.10	135	62	19.6	<1	<0.20	0.033	<0.005	<0.05	<0.02	3.4	0.020
10/29/81	11.30		NO FLOW									
1/6/82		2100	690	24.2	14.1	<0.2	0.248	0.042	0.058	<0.020	2.5	0.050
4/14/82	11.05	1450	658	18.1	11.0	0.250	0.195	0.053	<0.050	<0.020	1.80	<0.010
7/27/82			NO FLOW									
10/20/82			NO FLOW									
3/1/83	11.18	2210	746	34.3	60.3	<0.2	0.023	0.014	<0.05	<0.02	1.61	<0.050
7/21/83			DRY									
10/26/83	11.99	1460	506	21.5	18.4							
2/24/84	12.29	2200	970	34.0	40.0	4.9	0.33	0.17	<0.05	0.017	2.1	<0.02
4/11/84	11.68	1200	1020	22.5	15.3	0.12						
7/13/84			DRY									
10/11/84			NO FLOW									

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 6 (cont'd.)

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Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85	12.27	2500	1100	20	34	0.137	0.135	0.086	<0.050	<0.050	<0.4	0.016
4/3/85	11.41	1600	540	110	27							
7/25/85		INSUFFICIENT SAMPLE OR DRY										
10/31/85	9.40	240	180	83	24							
1/23/86	8.46	2100	700	18	9.1							
4/2/86	12.5	2800	840	36	27	0.113	0.179	0.116	0.063	<0.03	1.59	0.080
8/4/86	7.90	320	230	50	16							
10/2/86	11.30	540	190	30	11							
1/28/87		F R O Z E N										
4/15/87	11.50	2100	530	33	22	0.085	0.103	0.095	0.051	<0.005	2.27	<0.01

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 6A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/16/80	12.20	5500	1070	10	15	0.1	0.30		0.05	<0.01	0.6	0.01
4/11/80	11.75	3650	1410	10	12	0.1	0.39		0.04	0.01	0.05	<0.01
7/8/80	11.55	4200	1140	9	15	0.4	0.72		0.02	0.01	1.1	<0.01
10/30/80	11.90	3200	546	6	6	<0.1	0.19	<0.02	0.04	0.02	1.5	0.01
1/7/81	STREAM FROZEN											
4/7/81	11.91	2900	858	18.9	18.3	0.21	0.300	0.100	<0.05	<0.02	3.6	<0.01
6/22/81	10.05	225	118	19.6	1	0.26	0.158	0.021	<0.05	<0.02	6.0	0.012
10/29/81	11.40	3400	125	35.1	25	<0.2	0.658	0.426	<0.05	0.020	0.2	<0.050
1/6/82	11.25	2380	742	44.4	25.6	<0.2	0.461	0.098	0.053	<0.020	3.5	0.067
4/14/82	11.15	1900	798	13.6	15.5	<0.200	0.469	0.243	<0.050	<0.020	2.50	<0.010
7/27/82	NO FLOW											
10/20/82	NO FLOW											
3/1/83	11.15	1925	718	29.9	6.94	<0.2	0.599	0.283	<0.05	<0.02	1.71	<0.050
7/21/83	DRY											
10/26/83	12.06	1760	662	21.9	12.0							
2/24/84	12.4	2700	1100	75.3	33.0	6.3	0.21	0.10	<0.05	0.018	1.9	<0.02
4/11/84	11.67	880	920	23	7.6	0.06						
7/13/84	DRY											
10/11/84	NO FLOW											
1/8/85	12.48	2200	870	25	31	0.180	0.305	0.258	0.215	<0.050	<0.4	0.016
4/3/85	11.48	1500	530	18	22							
7/25/85	INSUFFICIENT SAMPLE OR DRY											
10/31/85	11.54	2800	720	29	<10							
1/23/86	STREAM FROZEN											

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITTMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 6A (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/2/86	12.3	4300	1100	28	26	0.275	0.463	0.450	0.159	<0.03	1.38	0.105
8/4/86	12.45	310	1200	45	8							
10/2/86	12.00	1900	520	27	16							
1/28/87			F R O Z E N									
4/15/87	11.40	3400	960	27	20	0.226	0.333	0.306	0.308	0.021	2.22	0.011

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 7

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
3/7/79	11.70	3500		19	10	0.05	0.48		0.06	0.01	3.3	0.01
4/11/79	11.80	2800		10	8	0.10	0.59		0.18	0.03	5.0	0.01
5/14/79	11.60	3950		22	12	0.20	0.95		0.02	0.01	2.5	0.01
6/11/79	12.10	7000		28	9	0.20	1.1		0.02	<0.01	0.8	<0.01
12/14/79	11.40	6000		22	8	0.15	0.17		0.12	<0.005	—	0.015
1/16/80	12.30	7000	1440	22	12	<0.1	0.35		0.06	<0.01	0.5	0.01
4/11/80	11.75	3800	1520	12	14	0.2	1.6		0.02	<0.01	0.05	0.02
7/8/80	11.65	7800	1950	17	15	0.9	2.2		<0.02	<0.01	<0.01	<0.01
10/30/80	12.30	7500	1520	2	8	0.5	0.82	0.03	0.07	0.02	0.5	0.01
1/7/81			STREAM FROZEN									
4/7/81	12.05	6100	1804	45.4	27.4	0.37	1.73	1.27	<0.05	<0.02	0.50	<0.01
6/22/81	10.77	630	268	14.5	1.0	0.40	0.384	0.130	<0.05	<0.02	6.4	<0.010
10/29/81	11.52	4700	290	38	37	<0.2	1.800	0.860	<0.05	0.022	0.2	<0.05
1/6/82	11.35	2170	680	52.5	24.1	<0.2	0.438	0.114	0.066	<0.020	3.0	0.029
4/14/82	11.20	2400	1044	11.3	36.5	0.214	1.25	0.851	<0.050	<0.020	1.30	<0.010
7/27/82			NO FLOW									
10/20/82			NO FLOW									
3/1/83	11.55	5300	1694	25.5	6.54	<0.2	2.640	0.980	<0.05	<0.02	2.9	<0.050
7/21/83			DRY									
10/26/83	12.29	2840	944	18.8	13.2							
2/24/84	12.36	2700	1030	15.7	9.2	4.9	0.88	0.55	<0.05	0.014	1.9	<0.02
4/11/84	11.71	900	900	32	9.8	0.06						
7/13/84			DRY									
10/11/84			NO FLOW									

Continued on next page.

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 7 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/8/85	7.69	3700	1500	15	40	0.276	0.927	0.561	<0.050	<0.050	<0.4	0.009
4/3/85	11.43	1500	500	4.1	25							
7/25/85	12.22	6800	1700	54	13							
10/31/85	11.70	1800	850	22	18							
1/23/86	12.12	3600	1100	26	8.3							
4/2/86	12.3	2700	770	25	25	0.181	0.403	0.371	0.202	<0.03	1.62	0.247
8/4/86	12.65	210	1600	26	5							
10/2/86	12.15	2600	710	320	63							
1/28/87			F R O Z E N									
4/15/87	11.10	2400	740	80	22	0.148	0.281	0.244	0.481	0.064	2.74	<0.01

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 12

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/16/80	7.70	1150	734	2	72	<0.1	0.02		0.26	0.11	4.5	0.06
4/11/80	7.00	1350	1220	<2	76	<0.1	<0.02		0.02	0.15	5.4	0.08
7/8/80	7.30	1450	1070	<2	130	<0.1	<0.02		0.27	0.21	3.8	0.02
10/30/80	7.90	1450	842	7	<5	0.5	<0.02	<0.02	3.8	1.39	9.8	0.05
1/30/81	7.5	1250	720	<20	1		0.124	0.01250	<0.050	0.105	2.8	<0.050
4/7/81	7.05	980	796	63	7.8	<0.2	0.017	<0.005	<0.05	0.217	5.5	0.023
6/22/81	7.15	900	706	<5	1.3	0.41	0.017	0.008	<0.05	0.133	6.0	0.101
10/29/81	7.11	1005	800	67.3	26.5	<0.2	<0.005	<0.005	<0.05	0.156	0.5	0.016
1/6/82	7.25	890	720	18.2	6.4	<0.2	<0.005	<0.005	<0.050	0.088	7.0	0.183
4/14/82	7.20	800	686	11.3	48.0	<0.200	<0.005	<0.005	<0.050	<0.020	6.10	0.018
7/27/82	7.49	910	810	37.2	37.1	<0.200	0.088	<0.005	<0.050	0.052	3.95	<0.050
10/20/82	7.80	1850	1540	5.32	39.4	<0.200	<0.005	<0.005	<0.050	0.134	6.78	<0.050
3/1/83	7.15	980	868	17.6	70.8	<0.2	0.053	<0.005	<0.05	0.038	6.51	<0.050
7/21/83	7.80	790	572	53.8	52.6							
10/26/83	8.39	670	518	50.3	102.0							
2/24/84	7.95	670	546	10.0	16.8	1.4	0.018	0.016	<0.05	0.019	4.6	<0.02
4/11/84	7.51	680	540	19.5	8.3	0.05						
7/13/84	7.56	775	514	<5.0	25							
10/11/84	7.58	940	550	12	10							
1/8/85	7.43	610	580	23	150	0.082	0.163	0.084	1.36	0.076	<0.4	0.034
4/3/85	7.20	740	520	23	10							
7/25/85	7.41	1100	800	38	11							
10/31/85	7.39	1400	930	11	20							
1/23/86	8.05	840	630	18	55							

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 12 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/2/86	7.60	890	580	13	17	0.068	<0.027	0.023	0.068	0.034	6.84	<0.05
8/4/86	7.82	1300	630	12	17							
10/2/86	7.55	1200	840	16	<10							
1/28/87	7.48	960	610	15	12							
4/15/87	6.80	920	620	13	21	0.061	0.073	0.064	0.117	0.010	5.92	0.013

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 12A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	I.S.											
7/25/85	INSUFFICIENT SAMPLE OR DRY											
10/31/85			D R Y									
1/23/86	7.49	630	460	84	88							
4/2/86	7.65	600	370	54	39	<0.03	<0.01	<0.01	<0.05	0.399	6.22	0.008
8/4/86			D R Y									
10/2/86			D R Y									
1/28/87	7.25	800	530	37	25							
4/15/87	6.60	720	450	26	30	0.032	<0.01	0.030	1.17	0.269	5.58	<0.01

I.S. = Insufficient Sample

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 13

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l						
						Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
1/16/80	8.00	1000	682	4	110	<0.1	0.02		0.79	1.84	4.9	0.08
4/11/80	8.50	1050	1010	<2	25	0.3	0.02		0.60	0.28	5.0	0.14
7/8/80	7.75	1050	717	<2	70	<0.1	0.02		0.06	0.19	3.2	0.03
10/30/80	7.70	1100	582	2	<5	<0.1	<0.02	<0.02	3.4	1.83	7.1	0.23
1/30/81	7.6	1100	626	25	1		0.153	0.00810	<0.050	0.241	3.4	<0.050
4/7/81	8.25	970	742	4.9	10.8	0.23	<0.005	<0.005	<0.05	0.185	5.6	0.071
6/22/81	7.25	940	672	<5.0	1.5	0.22	0.016	0.013	<0.05	0.139	8.8	0.151
10/29/81	7.30	985	750	67.3	29	<0.2	0.022	<0.005	<0.05	0.180	0.6	0.054
1/6/82	7.40	865	700	10.1	2.5	<0.2	<0.005	<0.005	<0.050	0.137	6.5	0.089
4/14/82	7.32	800	702	29.4	16.0	<0.200	<0.005	<0.005	<0.050	0.136	5.50	0.056
7/27/82	7.48	760	658	22.5	23.0	<0.200	0.078	<0.005	<0.050	0.097	4.45	<0.050
10/20/82	8.08	1080	724	<5.0	20.4	<0.200	<0.005	<0.005	<0.050	0.155	7.58	<0.050
3/1/83	7.02	1060	934	11.4	59.5	<0.2	0.007	<0.005	<0.05	0.177	5.4	0.125
7/21/83	7.60	890	756	13.9	25.3							
10/26/83	7.55	800	682	9.60	107.0							
2/24/84	7.84	860	668	2.9	20.0	1.3	0.005	<0.05	<0.05	0.129	4.5	0.023
4/11/84	7.31	820	720	15.0	16.5	0.03						
7/13/84	7.48	970	636	<25	15							
10/11/84	7.53	760	760	11	16							
1/8/85	12.23	780	680	12	100	0.048	0.038	0.007	1.23	0.223	<0.4	0.042
4/3/85	7.20	860	660	53	12							
7/25/85	7.37	1000	840	27	13							
10/31/85	7.22	1000	710	3.7	12							
1/23/86	8.12	910	680	12	36							

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SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 13 (cont'd.)

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/2/86	11.1	1200	740	15	25	0.087	<0.01	<0.01	6.32	0.372	17.2	0.311
8/4/86	7.59	1200	790	6.6	<1							
10/2/86	7.45	970	630	8.0	<10							
1/28/87	7.45	1000	690	<10	<10							
4/15/87	6.80	990	790	5.1	14	0.035	<0.01	<0.01	0.318	0.135	5.70	0.056

SLC CONSULTANTS/CONSTRUCTORS, INC.

WITMER ROAD SAMPLING PROJECT

SAMPLE LOCATION NO. 13A

Sample Date	pH Units	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Cr(VI)	Fe	Mn	Si	Zn
4/3/85	10.36	520	260	95	13							
7/25/85	INSUFFICIENT SAMPLE OR DRY											
10/31/85	10.51	540	320	26	15							
1/23/86	11.14	440	270	21	6.7							
4/2/86	12.3	440	180	15	19	<0.03	0.703	0.674	0.094	<0.03	11.5	0.095
8/4/86	11.35	2000	350	26	9							
10/2/86	11.15	580	310	26	11							
1/28/87	10.20	310	220	22	45							
4/15/87	9.60	310	200	20	<10	<0.01	0.714	0.632	0.040	<0.005	9.22	<0.01

REFERENCE NO. 5

WEGMAN ENGINEERS

REVIEW OF THE APPLICATION FOR SOLID WASTE MANAGEMENT FACILITY FOR S.K.W. ALLOYS, INC. WITMER ROAD SITE, TOWN OF NIAGARA, NY

I. INTRODUCTION

At the request of the Town Board, Wegman Engineers has reviewed the document entitled "Support Document For An Application To Construct And Operate A Solid Waste Management Facility At S.K.W. Alloys, Inc., Witmer Road Site, Town of Niagara, NY, Landfill Cell #2" prepared by Richard R. Snyder, P.E. dated December 5, 1980. The report was accompanied by drawings dated December 12, 1980 and marked AAD-3,4,5,6,8,9,10 and 11 inclusive and Nos. 3501,3502,3503,3504,3505,3506 and 3507.

II. PROJECT DESCRIPTION

S.K.W. Alloys, Inc. desires to construct and operate a non-hazardous industrial solid waste facility called landfill

Alloys, Inc. adjacent to Witmer Road in the Town of Niagara, NY. Landfill Cell #2 will be constructed adjacent to existing Landfill Cell #1 presently being operated by S.K.W. Alloys, Inc. The size of the S.K.W. property is 37 acres of which 3.4 acres will be utilized for landfill operations. Existing Landfill Cell #1 occupies approximately 2 acres. The purpose of the landfill is to provide a depository for baghouse dust which will be generated by the S.K.W. plant during the next year of operations. Landfill Cell #2 as proposed by S.K.W. is a rectangularly shaped facility measuring 220'x375' to the top inside the edge of its berms. The height of the fill in the cell is approximately 34' to the highest point. A 2.8 to 3% slope is provided in the longest dimension and a 7.9 slope is provided in the shorter dimension from the geometric center of the finished facility.

The waste to be deposited consists of ferro-chromium silicon dust and ferro-silicon dust totalling 11,000 tons per year, each constituent providing fifty (50%) percent of the total. The landfill facility will be operated 8 hours per day, 6 days a week and it is intended that the entire site be fenced, the sole access being through a gate which is monitored by plant security personnel.

The waste generated results from the manufacture of ferro-silicon and ferro-chromium silicon alloys. These alloys are produced in an electric arc furnace and the resulting waste is termed baghouse dust. Baghouse dust is comprised of very fine particles of low specific gravity. The principal ingredients in the waste is ~~ferric silicon and~~ silicon dioxide with minor amounts of magnesium oxide, aluminum oxide and ferric oxide. Trace amounts of chromium, copper, zinc, manganese, nickel and cobalt are also present in a total concentration of less than 1%.

The baghouse dust is presently transported to Landfill Cell #1 in a concrete mixing truck which is partially filled with water

The mix provides a flowable mass from the concrete truck such that the slurry can be discharged from the concrete truck by chute into the Landfill Cell without being rehandled. The slurry is deposited at select points along the berm of the landfill and, being liquid, distributes itself in a fan-type pattern to a depth of roughly 3 to 4 inches. In a matter of a few days the material dries into a clump-like mass and then appears to revert back to a finely compacted granular substance resembling coarse beach sand. It is estimated that approximately seven such truckloads will be deposited in the Landfill Cell each day. No cover material is placed on top of the deposited baghouse dust and the material appears to consolidate sufficiently to support the weight of an individual walking across the top of the pile. The berms enclosing existing Landfill Cell #1 are reported to be native clay soil with a topping of well compacted baghouse dust.

The leachate collected in the leachate collection system sterilizer is pumped out and reused with the slurry mixing water for conditioning the baghouse dust prior to transport back to the site. All such leachate is therefore recycled in the disposal process and accordingly is not discharged into the sewer system or otherwise disposed of.

The S.K.W. Facility is located immediately adjacent and downstream of the Airco Properties, considering the directional flow of groundwater and surface water. The Airco application has previously been submitted to the Town for a Permit.

The 37 acre site contains many piles of solid waste deposited by previous Owners of plant facilities now being operated by S.K.W. Alloys, Inc. These wastes are uncovered, thus unbuffered from the winds, and in general are a blight to the area. ← Airco proposal

The Support Document for the Application contains detailed site analyses with discussions of the geology and soils, hydrogeology, surface water, precipitation, evaporation and wind effects. The [illegible] of the facility, processing of the waste and the method of disposal on the existing landfill. Site water quality monitoring was performed and analyses of same are documented in the report. Groundwater sampling has been obtained from four wells, two of which are located on the upstream boundary of the S.K.W. property, one being at the property line separating the Airco Properties and the S.K.W. property. Two wells are located on the downstream side of the S.K.W. property adjacent to that of the Niagara Mohawk Power Corporation. Baseline monitoring data for both the surface and groundwaters have been obtained and tabulated in the report. Also tablulated in the report are soil boring data by Earth Dimensions, Inc. and hydraulic calculations and reports by Frontier Technical Associates on groundwater. Permeability tests and particle size analysis have been determined by the Calspan Corp. from soil samples obtained from the site. Of particular interest was a soil attenuation study conducted on one soil sample obtained from the site

utilizing furnace dust and analyzing the collected leachate generated. Elements analyzed included chromium and aluminum. The testing procedure followed the EPA Leaching Potential Tests as summarized in the New York State DEC Publication, Solid Waste Management Facility Content Guidelines for Plans and Specifications, SW-P8 (5M-9/77). The conclusion was that the attenuation of chromium by the soil is poor. Concentrations of chromium in the leachate ranged from 15 to 89 milligrams per liter on each of the four separate dates the tests were conducted. Although it has been reported that ferro-chrome silicon furnace dust has been classified as non-hazardous by the USEPA and NYSDEC, according to S.K.W. officials, the potential hazard for chromium concentrations in the groundwater exceeding EPA limits is still great.

III. ENGINEERING COMMENTARY

A. General

The plans and report prepared in connection with the S.K.W. [illegible] application for a Solid Waste Management Facility are fairly complete and detailed. However, all of the statements and conclusions drawn in the report are not well substantiated based upon the data and analyses presented in the report. In addition, field observations by the writer in the company of the Town Building Inspector raised serious questions concerning certain statements made in the report which attempts to minimize the environmental impact of the proposed facility. There is no question that the proposed mode of landfill cell construction and leachate collection is far superior than the open dumping practiced in years past. However, certain environmental impacts noted by the writer should be addressed by the S.K.W. Alloys, Inc. management before application approval can be granted.

B. Leachate

Although it reportedly has been determined that the ferro-chrome silicon wastes have been classified as non-hazardous by the USEPA and NYSDEC, the leachate potential tests conducted by Calspan and reported in their January 23, 1979 letter [illegible] potential concentration of chromium in the amount of

15 to 89 milligrams per liter. The maximum allowable concentration of toxic contaminants in the EPA extraction process (EP) for chromium is 5.0 milligrams per liter according to the Federal Register, Page 33122, dated May 19, 1980. The fact that furnace dust 36/40 is the waste product of the S.K.W. Alloys, Inc. manufacturing process, is cause for concern of the possible contamination of groundwater with chromium. In addition, widely fluctuating concentrations of ferric iron and manganese measured in the background groundwater and the downgradient groundwater make it very difficult to ascertain the source of the excessive concentrations. Thus control of the leachate from this proposed facility is of paramount importance and will require that optimum controlmeasures be instituted to ensure that this facility is not contributing to the overall degraded condition of the groundwater. The proposed landfill facility to handle the S.K.W. wastes could not be considered adequate to serve as a hazardous waste disposal facility should the furnace dust be declared a toxic or hazardous substance.

C. Site Monitoring

As previously stated, background water quality data and downgradient groundwater data fluctuate to a great extent rendering it difficult to determine the impact caused by the proposed facility. Concentrations of both iron and manganese entering the site from adjacent property to the north have been recorded on the order of 50 to 100 times the allowable quality standards for Class GA groundwater. Furthermore, background groundwater data coming off the Airco property at well location 13 show an excessively high iron and manganese content on the order of 10 times the quality standards for Class GA groundwater. The reason for this upsurge is not given. In addition, samples of the intermittent stream at the ingress station show 2 to 7 times the maximum limitations for discharge to Class GA surface waters for total chromium, while at the egress surface at location 7 which exits the site, chromium concentrations

in the intermittent stream varied from 3 to 20 times the limitations for discharge to Class GA surface waters. This would indicate that some chromate contamination of the surface waters is taking place on the S.K.W. Alloys, Inc. site. Site monitoring of chromium, iron and manganese in both the groundwater wells and the intermittent stream should be continued on a quarterly basis to ascertain whether or not the facility is effectively controlling the exit of these contaminants into the groundwater and surface streams. Such elements as pH, conductivity, COD, TOC, barium, silicon, zinc and dissolved solids may be tested semi-annually after 1 year of quarterly sampling if no significant changes are recorded in test results.

D. Dust Control

At present, the operations conducted by S.K.W. Alloys, Inc. utilize no direct dust control procedures except for the mixing of the furnace dust with water in a concrete truck to facilitate the transport and deposition of the furnace [illegible] Landfill Cell. Statements made in the report that the majority of the dusts handled or generated during the dry portions of the year by truck traffic are of large particle size and therefore will not have an impact on off-site areas is not substantiated by the evidence and observations made by the writer. Fine dust is very easily generated by disturbing the surface of the ramps and access roads around the Landfill Cell Facility. In addition, the material deposited on the landfill while still damp resembles a lumpy clay material that disintegrates readily when handled. The dried dust however on other portions of the landfill surface are large and granular resembling rather coarse beach sand. The question is raised what happened to the finer particles at the surface of the fill? It is the opinion of the writer that the fine particles at the surface of the landfill have been blown away with the high winds prevalent from the west and onto properties

fronting on Military Road in the Town of Niagara. Although it is conceded that the source of such dust material detected in the rear of the properties along Military Road cannot be attributed solely to the S.K.W. landfill facility, there is every reason to believe that a significant portion has been contributed by the S.K.W. facility. The wetting of the furnace dust with the concrete mixer undoubtedly controls dust generation during the transport and placing of the dust in the landfill. However, after the material becomes dried out there is no further control of potential fugitive dust from the facility. Seven trucks per day driving up the ramps and on top of the berms can generate enough dust in the area to constitute an objectionable condition both for the moment and over a long period of time. These particularly fine dusts are easily disturbed by the wind or vehicular movement, and as such require some means of containment thus preventing them from becoming air-borne. In the opinion of the writer, a preferred method for collecting, transferring dust from both the ferro-chrome silicon and ferro-silicon processes would be to bag the material in plastic and place it in the landfill with a crane or other type of hoisting device. Dust clouds created by truck movement on the berms and ramps and roadways across the site should be controlled either by applying a black top pavement or water spraying immediately prior to the vehicular transport of the material to the landfill.

E. Landfill Cell Construction

A comparison of the elevations of Landfill Cell #2 indicate bottom elevations at the foot of the inside berm to vary between a high of 598.25 to a low of 595.45. Detail A drawing No. 3503 stipulates that there is a 10 foot

minimum depth to bedrock which elevation calculates to be 581.85. Referring to drawing AAD-10, which depicts the structure contour map of the Lockport dolomite bedrock beneath the site, the elevation of the top of the rock from the extreme southwest corner of Landfill Cell #2 to the extreme northeast corner varies between elevation 585 and 595. As it is desired to have at least 5 feet of clearance between the underside of the waste fill material in the landfill and the top of bedrock and/or water table according to Part 360 of the State Environmental Conservation Law, there is insufficient clearance at the northeast corner of the landfill facility. The bottom elevations of Cell #2 should be adjusted accordingly to provide the necessary 5' clearance. Drawing Nos. 3502, 3503 and 3506 will require modification to correct this deficiency.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. The drawings and report submitted by S.K.W. Alloys, Inc. in support of their application for a solid waste management facility at the Witmer Road site, Town of Niagara, will require modification to address the environmental concerns raised in paragraph III above.

B. The disposal of solid wastes at the S.K.W. Facility should be limited to the furnace dust originating solely from the S.K.W. Alloys, Inc. ~~plant~~ at the ~~Witmer Road site~~, Niagara, NY. If at anytime the furnace dust wastes are determined to be toxic or hazardous according to the EPA Hazardous Waste Management System regulations, a new facility should be required designed to handle such type wastes and a new application submitted to the State and the Town of Niagara.

C. Further information should be provided in the report by S.K.W. Alloys, Inc. on the matter of semi-annual inspections offered in Section 5 on the site closure plan concerning settlement, cover soil integrity, erosion control, vegetation and buffers, monitoring wells and leachate control systems. These items are inadequately covered in the report and on the drawings and should be explained in more detail as to

D. A sieve analysis of the furnace dust as discharged from the manufacturing facility into the concrete trucks should be furnished. In addition, a second sieve analysis of the dried material contined in the landfill should be provided.

E. S.K.W. Alloys, Inc. should be required to submit an annual operations report to the Town of Niagara containing all water quality monitoring data, total and daily volumes of solid wastes deposited, equipment used, personnel employed and any construction or other pertinent developments which occur over the course of the year. A copy of the required annual report to the New York State Department of Environmental Conservation would suffice.

F. The Town should have the right for its Building Inspector or other authorized personnel to periodically visit the site, inspect the facility and examine operational records to check for compliance with the permit requirements issued by the Town and to investigate any complaints or problems arising from the operation of the facility.

G. The Town may wish to consider requiring S.K.W. Alloys, Inc. to post a bond in the amount equal to twice the estimated cost of closure of the landfill and continued monitoring for up to 10 years after closure. This should be a matter of standard policy for all landfills, but could be waived at the discretion of the Town Board.

Respectfully submitted,

George R. Schevon, P.E.
Vice President

GRS:ab

cc: Robert Merino, Town Attorney
John Teare

Wegman ENGINEERS
Leonard S. Wegman Co. Inc. 100 East 42nd Street, New York, NY 10017 Telephone 212 661-4210

April 7, 1981

Supervisor and Town Board
Town of Niagara
Municipal Building
7105 Lockport Road
Niagara Falls, NY 14305

Attention: Hon. Calvin Richards
Supervisor

Re: S.K.W. Alloys, Inc.
Landfill Application

Gentlemen:

Enclosed is a copy of our report dated April 7, 1981 regarding the referenced application. Our Commentary and Recommendations are based on the documents furnished to the Town by S.K.W. Alloys, Inc. and a site inspection conducted by the undersigned in the company of Mr. James Walsh, Building Inspector, on [illegible].

Please do not hesitate to contact us if you have any questions regarding the report.

Very truly yours,

LEONARD S. WEGMAN CO. INC.

George R. Schevon, P.E.
Vice President

ORIGINAL COPY
Not To Be Removed From
Building Inspectors Office.

GRS:ab
Enc.
5010

cc: Mr. R. Merino, Town Attorney (w/encl.)
Mr. J. Walsh, Building Inspector (w/encl.)
Mr. J. Teare (w/encl.)

Wegman ENGINEERS

Leonard S. Wegman Co. Inc. 330 West 42nd Street, New York, NY 10036 Telephone 212 [illegible]

July 13, 1981

Supervisor and Town Board
Town of Niagara
7105 Lockport Road
Niagara Falls, New York 14304

Att: Mr. James Walsh
Building Inspector

Re: SKW Alloys, Inc., Landfill Permit Application

Gentlemen:

The subject of fugitive dust control was discussed with Mr. Donald Kuhn of Secure Landfill Contractors, and Mr. Richard Snyder, consultant to SKW. Aside from the procedures described in the attachment to Mr. Snyder's July 10, 1981 letter to the Town of Niagara, the following is recommended as conditions for the permit:

1. Existing landfill No. 1 shall be closed out and covered pursuant to New York State Part 360 regulations as soon as new field No. 2 construction is completed.

2. Construction of new field No. 2 shall be completed within 10 weeks of the effective date of this permit.

3. Peripheral Berm elevations for new field No. 2 shall be kept a minimum of four feet above the top of the slurry deposits. When the field's authorized maximum fill elevation is reached, the remaining four foot high berm may be cut down and used to provide part of the cover material for closing out the field.

In view of the fact that the fill in existing field No. 1 is at or near final elevation, it is recommended that the Town Board permit raising of the peripheral berm for field No. 1 along with an increase in the final finished grade sufficient to accommodate the interim fill until the new field is constructed.

Should all of the procedures described and referenced herein be diligently practiced by the SKW operations staff, a reasonable control of fugitive dust will be achieved with a minimum impact on air quality in the affected area of the town.

Please advise if we can be of further assistance in this matter.

Very truly yours,

LEONARD S. WEGMAN CO. INC.

George J. Schevon, P.E.
Vice President

cc: J. Teare

REFERENCE NO. 6

SUPPORT DOCUMENT FOR
AN APPLICATION TO CONSTRUCT AND OPERATE
A SOLID WASTE MANAGEMENT FACILITY
AT
SKW ALLOYS, INC.
WITMER ROAD SITE
TOWN OF NIAGARA,
NEW YORK
LANDFILL CELL NUMBER TWO

SUPPORT DOCUMENT FOR

AN APPLICATION TO CONSTRUCT AND OPERATE

A SOLID WASTE MANAGEMENT FACILITY

AT

SKW ALLOYS, INC.

WITMER ROAD SITE

TOWN OF NIAGARA,

NEW YORK

LANDFILL CELL NUMBER TWO

This report has been prepared under the guidance and direction of Richard R. Snyder, P.E. State of New York Licensed Professional Engineer No. 54616

Richard R. Snyder

Richard R. Snyder, P.E.
December 5, 1980

Alteration of this report by any person not acting under the direction of a Professional Engineer Licensed to practice in New York is a violation of the law.

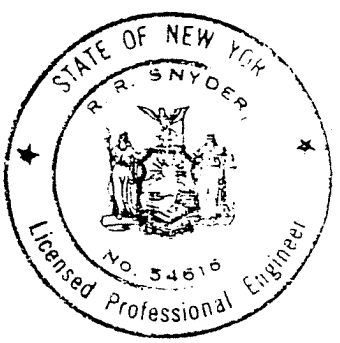


Table of Contents

Table of Contents

Table of Contents

LIST OF FIGURES

LIST OF TABLES

CREDITS

The following have contributed to this report:

Secured Landfill Contractors, Inc. - Over all responsibility for project coordination.

Calspan Corporation - Performed analyses on various site monitoring well and surface water samples.

Earth Dimensions, Inc. - Performed soil borings (with interpretations) and installed monitoring wells.

Ivan R. Klettke L.S. and Neal Klettke EIT - Performed site surveys.

Frontier Technical Associates - Provided consultation on site's hydrogeology.

SECTION 1

SITE DESCRIPTION

1.1 Introduction

The purpose of this section is to provide background information concerning the SKW Alloys, Incorporated, Witmer Road Landfill Site with respect to its impact upon the surrounding community. Specific items which are addressed include the following:

1. Site property boundaries as laid out by a certified surveyor,
2. Local government control and zoning ordinances,
3. Description of area within a one mile radius of the site, and
4. Site description based upon aerial survey and past site utilization practices.

1.2 Site Location

The SKW Alloys, Incorporated, Witmer Road Landfill Site is located in the Northwest corner of the Town of Niagara (refer to Figure 1-1, U.S. Geological Survey, N.F. Ontario - N.Y., SE/4 Niagara Falls 15' quadrange N4300 - W7900/7.5).

The entire site consists of approximately 37 acres of which about 3.4 additional acres will be dedicated to solid waste management. The existing operating landfill

occupies approximately 2 acres. This will continue to provide an environmentally acceptable depository for certain baghouse dusts which will be generated during the next year of plant operation. It is bounded as follows: West - Witmer Road; North - Niagara Mohawk Power Company right of way; East - Airco Properties, Inc.; and South - Niagara Mohawk Power Company.

A survey of the entire site was prepared by a licensed land surveyor. Please refer to Survey prepared by Ivan R. Klettke, AAD-4 and Drawing DO351 based upon this survey. Included on these drawings are base line location and monitoring well coordinates and elevations, and boring elevations and coordinates.

The Town of Niagara zoning classification which pertains to the Witmer Road Site is heavy industrial. This represents no conflict with past or future utilization of a portion of this site as a solid waste management facility.

An application for a Land Use Permit is to be filed with the Town of Niagara.

In addition, a previous application was submitted to the New York State Department of Environmental Conservation for a Permit to Operate a Solid Waste Management Facility. This site has been permitted by both the Town of Niagara and the New York State Department of

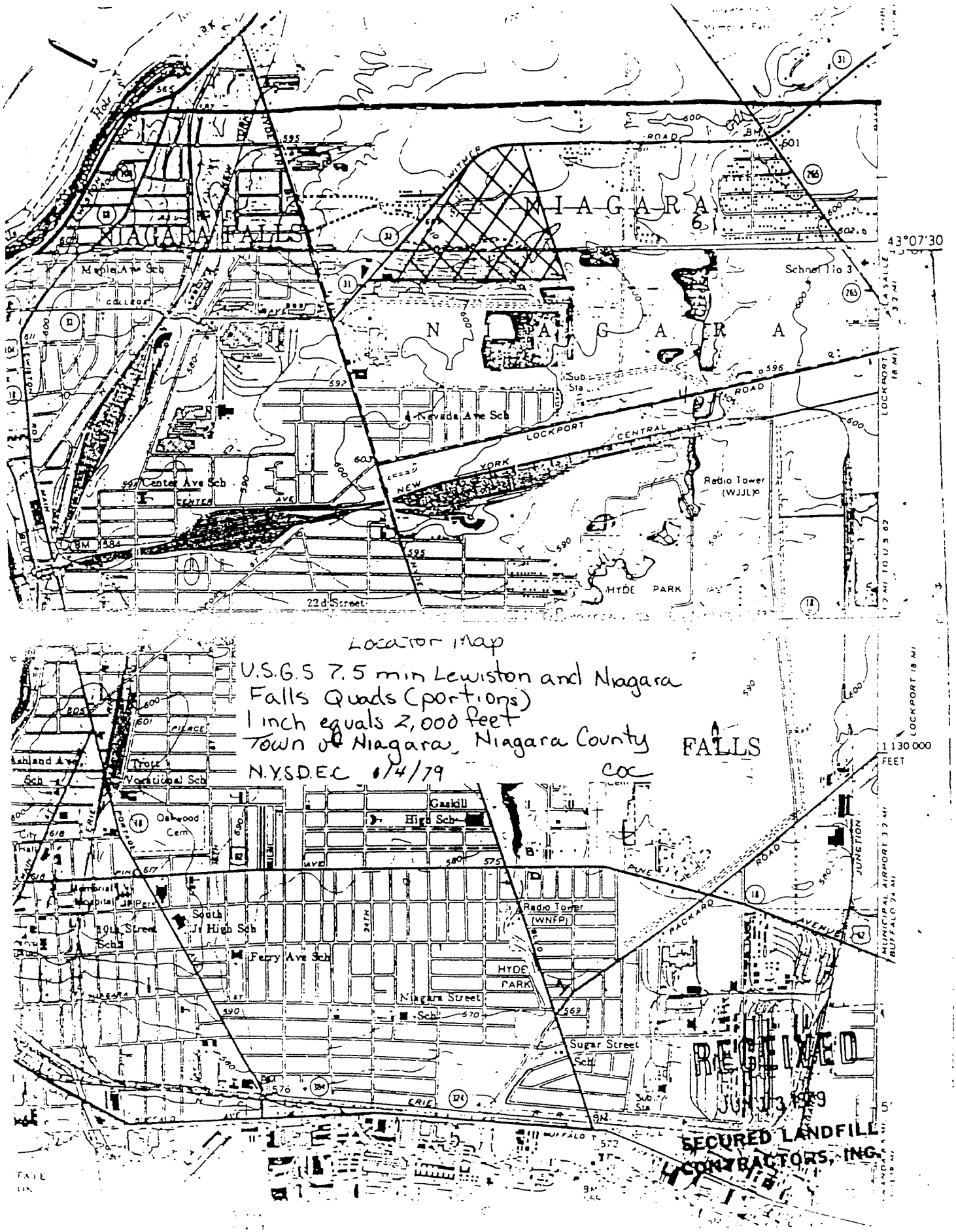

Location Map
U.S.G.S 7.5 min Lewiston and Niagara Falls Quads (portions)
1 inch equals 2,000 feet
Town of Niagara, Niagara County
N.Y.S.D.E.C. 6/4/79
COC
NIAGARA FALLS
NIAGARA
43°07'30
1 130 000 FEET
RECEIVED
JUN 13 1979
SECURED LANDFILL
CONTRACTORS, INC.

Figure 1-1

Environmental Conservation. The landfill is now being operated on a daily basis.

1.4 Site Surroundings

The Niagara River is located approximately 1.5 miles west and the Niagara Power Project about 1.0 miles north of the site (refer to Figure 1-1). In addition, Gill Creek (a small perennial stream) is located approximately 0.5 miles east of the site and flows from north to south toward the Niagara River which is designated as Class A - Special Waters (International Boundary Waters). No potable water wells are known to be located within the immediate area of the site.

The surrounding area is generally of low relief. [illegible] of the Town of Niagara. A large portion of the Niagara Falls residential area lies to the east and south of the site. The closest significant residential area is located approximately 0.3 miles south of the site. To the east lies a large tract of Niagara Mohawk Power Company land and to the north the power project's reservoir.

1.5 Past Utilization

The SKW Alloys, Incorporated site (refer to AAD-4) contains several buildings (laboratory, engineering, administrative and miscellaneous storage buildings).

These are located along the western and southern boundaries. In recent years, large portions of the site have been utilized for storage of coke, wood chips and iron turnings, purchased raw materials, ores and other raw materials. In addition, some slag may have been disposed of on this portion of the site. These uses are in addition to the current landfill.

The monitoring data (both surface and groundwater), geology, hydrogeology, site ecology and land utilization have been developed for the site. This was done for the following reasons:

1. To monitor for any environmental effects from past disposal of similar type materials (ferrochrome and ferrosilicon wastes),
2. To determine significance of various site factors (geology, hydrogeology, etc.) upon required methodology for future disposal, and
3. To gain a more complete understanding of the site.

Based upon anticipated future production, the following waste generation rates are expected:

Waste	Quantity tons/year
1) Ferrochromium silicon dust	5,500
2) Ferrosilicon dust	5,500

These materials will continue to be landfilled at the Witmer Road property. The proposed landfill facility #2 will be utilized for disposal of ferrosilicon dust while the ferrochromium silicon dust will continue to receive disposal in the first landfill facility or a future facility. In addition, ferrochromium silicon slag will continue to be generated. Presently, most of this material is marketed.

1.6 Site Topography and Slopes

Both an aerial survey (refer to AAD-6) and a topographic map (refer to AAD-3) have been prepared. These provide a clear picture of the phisical condition of the site. The only change in the sites topography

as indicated on Drawing DO351.

SECTION 2

SITE ANALYSIS

2.1 Introduction

The purpose of this section is to evaluate the site's physical suitability for the proposed operation. Consideration will be given to the following factors:

1. geology and soils,
2. hydrology,
3. surface water,
4. atmospheric factors, and
5. site ecology and land utilization.

A thorough investigation of each area is essential, since severe environmental impacts can result if any potential site deficiencies are not properly provided for.

Much of the information concerning the site's geological and hydrological characteristics has been provided in work done by P. Michael Terlecky, Ph.D. P.G. (Frontier Technical Associates, Inc.) and Mr. Donald Owens, (Soil Scientist, Earth Dimensions, Inc.).

2.2 Geology and Soils

2.2.1 Bedrock

The bedrock underlying the Airco Alloys, Inc. site is Lockport Dolomite, (Ca, Mg $(CO_3)_2$) with minor amounts of

sulfate (gypsum) and sulfide (pyrite, galena, sphalerite) minerals. The dolomite lies nearly flat, but does exhibit a regional dip of approximately ½% to the south or locally approximately 30 to 40 feet per mile. Variations in the erosional surface result in local differences in the dip of the bedding and contour of the bedrock surface.

Interpretation of the data relating to the depth of refusal indicates that the bedrock gently dips to the south with a pronounced low in the bedrock surface around monitoring well #5. More detailed information concerning bedrock contours is found on Dwg. AAD-10 (Structure Contour Map on the Lockport Dolomite).

2.2.2 Unconsolidated Sediments and Fill

loamy glacial till which varies in thickness from approximately 0.6 to 7 feet. This material presents an extreme range in texture, from clay and silt to gravel and occasional boulders.

Water sorted stratified sediments (found between lake sediment and glacial till) were encountered in borings 2, 3, 5, 6, 8, 9, 10 and 11. This material is characterized by the mixing of dolomitic rock fragments of varying dimensions with the overlying clay.

A silty-clay mostly stone free lake sediment was found at all boring sites. Its thickness varies from two to 12.5 feet. This sediment also contains fine silt lenses and vertical dessication cracks.

Most borings indicated the presence of a fill-type material. Both the depth and types of fill are variable. Its depth varies from zero feet to 9.0 feet, while its texture ranges from a loose powdery slag to coarse size slag.

A summary of the original soil boring logs obtained during the installation of the piezometers and site characterization borings is presented by Table 2-1. Additional borings have been taken and are presented in Tables 2-2 and 2-3. In addition, a series of drawings have been prepared (refer to Dwgs. AAD-8, 9 and 10) to show the depth and lateral distribution of the bedrock, thickness of silty clay unit, and thickness of overburden (fill plus natural overburden).

2.3 Hydrology

In order to determine the occurrence, direction of movement, and the quality of the site's groundwater, a total of 10 wells were originally installed at five locations on the original 62 acre Airco-SKW site (refer to Dwg. AAD-5). Since this time, 4 more wells have been installed at monitoring points #12 and #13.

At each site, two wells (one shallow and one deep) were installed. All shallow wells were installed to a depth of between 8.5 and 11.0 feet, while the deep wells were installed in the glacial till overlying the bedrock.

TABLE 2-1

THICKNESS OF VARIOUS UNCONSOLIDATED
SEDIMENT AND TILL LAYERS*

Boring Number	Fill Thickness	Clay Thickness	Water Sorted Stratified Sediments Thickness (ft)	Glacial Thickness (ft)	Depth To Refusal (ft)
1	1.3	6.2	---	3.6	11.1
2	4.5	3.0	4.6	2.4	14.5
3	6.0	2.0	5.0	2.2	15.2
4	6.0	4.0	---	6.7	16.7
5	2.5	11.0	7.0	3.7	24.2
6	8.5	7.0	5.0	2.5	23.0
7	9.0	5.5	---	3.5	18.0
8	2.5	12.5	6.0	0.6	21.6
9	4.5	10.5	1.5	4.2	20.7
10	1.3	2.2	9.5	3.1	16.1
11	2.8	5.6	0.6	3.8	12.8

*Regional Site Exploration - 1979

Data Source: Earth Dimensions, Inc. Soil Logs

TABLE 2-2 2-3

THICKNESS OF VARIOUS UNCONSOLIDATED

SEDIMENT & TILL LAYERS

TABLE 2-2

Boring	Fill	Silty & Clayey Lake Sediments	Coarse Silty Sediments	Lake	Loamy Glacial Till	Depth to Refusal	Date
12	0-2.0	2.0 - 14.5	14.5 - 17.0	17.0	17.0 - 18.0	18.0	6/12/79
13	0-3.0	3.0 - 13.0	13.0 - 18.3	18.3	18.3 - 20.0	20.0	6/12/79
14	0-1.9	1.9 - 14.0		—	14.0 - 18.8	18.8	1/29/79
15	0-2.8	2.8 - 12.3		—	12.3 - 17.5	17.5	1/30/79

Data Source: Earth Dimensions, Inc. Soil Logs

TABLE 2-3

Boring Number	Mostly slag fill	CLAYEY-SILT fill	CLAYEY-SILT lake sediment	SANDY-SILT lake sediment	SILTY-SAND lake sediment	SANDY-SILT/ CLAYEY-SILT lake sediment	Glacial till	Refusal	Date
16	0-1.0		1.0-10.0	10.0-15.5			15.5-16.5	16.5	9/19/80
17	0-1.5	1.5-2.0	2.0-4.5	4.5-12.0	12.0-16.0		16.0-19.3	19.3	9/19/80
18	0-3.5	3.5-5.0	5.0-7.0	7.0-17.5			17.5-18.8	18.3	9/20/80
19	0-2.0	2.0-2.8	2.8-6.0	6.0-12.0		12.0-16.5	16.5-17.1	17.1	9/20/80

Data Source: Earth Dimensions, Inc. Soil Logs

TABLE 2-4

WELLS DRILLED TO REFUSAL
2/19/79 - 7/24/79

Well Number	Top of casing elevation in feet	ELEVATION OF WATER IN FEET											
		2/19/79	3/6/79	3/7/79	4/6/79	4/10/79	4/18/79	5/2/79	5/8/79	5/14/79	6/8/79	6/11/79	7/24/79
1	604.11	597.44	599.94	599.55	599.75	599.74	599.21	598.55	598.26	597.78	595.84	595.66	592.43
2	607.18	598.85	600.6	592.58	599.76	597.74	599.88	599.86	599.45	598.53	598.12	598.13	596.05
3	608.49	604.28	605.91	594.85	605.53	599.71	600.56	604.66	604.16	598.83	604.23	596.25	602.88
4	609.9	604.19	607.04	606.23	605.27	605.71	606.04	604.49	604.98	604.62	601.88	600.94	599.4
5	601.48	582.65	583.19	582.88	582.04	581.73	581.98	581.85	581.64	581.48	581.21	581.04	580.48

12/15, 12/27, 12/28, 12/29--INSTALLATION
2/19/79 INITIAL MEASUREMENT AFTER INSTALLATION AND TWO MONTH STABILIZATION PERIOD AND BEFORE PUMPING OUT.
3/6/79 MEASURED THEN PUMPED OUT
3/7/79 MEASURED AND SAMPLED
4/6/79 MEASURED AND PUMPED
4/10/79 MEASURED AND SAMPLED
4/18/79 MEASURED ONLY
5/2/79 MEASURED ONLY
5/8/79 MEASURED AND PUMPED OUT
5/14/79 MEASURED AND SAMPLED
6/8/79 MEASURED AND PUMPED
6/11/79 MEASURED AND SAMPLED
7/24/79 MEASURED ONLY

TABLE 2-5

WELLS ... ALLED TO REFUSAL
1/1... 0 - 10/30/80

Well Number	Top of Casing Elevation in feet	ELEVATION OF WATER IN FEET							
		1/14/80[1]	1/16/80[2]	4/10/8...	4/11/80[2]	6/30/80[1]	7/8/80[2]	10/28/80[1]	10/30/80[2]
3	608.49	606.19	596.81	604.5	595.98	604.41	600.42	601.11	594.99
5	601.48	579.88	580.09	589.3	580.81	579.42	579.12	580.48	580.6
12	597.55	585.35	586.62	587.6	586.15	584.98	584.67	584.62	584.66
13	603.16	592.36	588.15	593.0	590.06	591.4	591.82	590.58	590.6

TABLE 2-6

SH...LOW WELLS
1/14/... 0 - 10/30/80

Well Number	Top of Casing Elevation in feet	ELEVATION OF WATER IN FEET							
		1/14/80[1]	1/16/80[2]	4/10/80	4/11/80[2]	6/30/80[1]	7/8/80[2]	10/28/80[1]	10/30/80[2]
3A	610.31	606.01	606.06	606.03	606.08	604.91	606.8	603.58	603.76
5A	600.76	594.96	596.96	596.7...	596.83	596.37	596.28	597.03	596.83
12A	597.81	593.31	593.23	593.2...	593.64	586.53	590.67	590.89	DRY
13A	604.87	599.57	599.45	599.52	599.6	594.92	594.94	DRY	DRY

1 - Evacuated only

2 - Sampled

TABLE 2--7

SHALLOW WELLS
4/6/79 - 7/24/79

Well #	Top of casing elevation in feet	ELEVATION OF WATER IN FEET								
		4/6/79	4/10/79	4/18/79	5/1/79	5/8/79	5/14/79	6/8/79	6/11/79	7/24/79
1A	605.14	599.78	599.59	599.73	599.76	598.84	598.2	596.98	596.91	595.23 (dry)
2A	608.36	601.86	601.70	601.98	601.40	601.33	600.62	599.01	598.79	598.54
3A	610.30	606.14	605.83	606.31	605.9	605.97	605.85	605.64	605.52	604.6
4A	611.81	605.29	605.21	606	605.55	604.3	604.02	603.65	603.25	603.09
5A	600.76	597.07	597.08	596.88	596.51	596.47	596.43	596.33	597.06	595.88

INSTALLATION DATE 3/19/79

All 2 inch PVC

This arrangement of the wells allows data to be obtained concerning water levels and water quality in both the zone that would be most affected by the landfill operations and in a zone where there is close proximity to a regional aquifer.

Measurements of the depth to the water in the original "deep" wells were made twenty times over a period from February, 1979 through October, 1980. Samples were taken to analytically determine the ground water quality. Tables 2-4 and 2-5 presents a summary of water depth measurements obtained from "deep" wells. Measurements of static water levels in the original "shallow" wells were made seventeen times from April, 1979 through October, 1980. Tables 2-6 and 2-7 present a summary of the static ground water levels obtained from the "shallow" wells. Tables 2-5 and 2-6 present the data from the wells installed during June, 1979. These wells are 12, 12A, 13 and 13A.

Examination of the data from the paired wells indicates that groundwater on the site exists under two distinct regimes: (1) under artesian conditions (water rises above the till layer and in some instances, above the groundwater levels in the lacustrine silty-clay) and (2) water table conditions (unconfined aquifer) which are characteristic of the silty-clay unit. Data from

observation wells 5 and 5A are particularly noteworthy in this regard, with groundwater levels dipping sharply in the till-bedrock unit while the "perched" water mimics the lower groundwater to a lesser degree.

Previous studies of the Lockport Dolomite (Groundwater in the Niagara Falls Area, New York, by Richard H. Johnston, Geologist, U.S. Geological Survey 1964) indicates that water movement occurs primarily through horizontal bedding plane fractures, which have been widened very slightly by solution of the rock. Vertical joints are not important factors in the dolomite water bearing characteristics. These joints are fractures in the rock which must be widened by solution before they can become effective water-bearing openings. The porosity of Lockport Dolomite is low.

Most recharge to this dolomite occurs where the dipping bedding planes intersect the surface or surficial deposits. Cavities in the dolomite result from solution of gypsum. These cavities increase the ability of the dolomite to store water but probably have little effect on the water-transmitting ability of the formation. Therefore, the continuous bedding and joints determine the permeability of the bedrock rather than the large but isolated cavities resulting from solution of gypsum.

The character and interrelationships of the three

types of water-bearing openings result in two distinct sets of ground-water conditions in the dolomite: (1) a moderately permeable zone at the top of the rock, generally 10 to 15 feet thick, characterized by both vertical and bedding joints that have been widened by solution and by gypsum cavities, and (2) remainder of formation consists of bedding joints surrounded by essentially impermeable rock.

2.3.1 Unconsolidated Sediments - Glacial Till and Water Sorted Stratified Sediment

The water in the "deep" wells represents water which flows into the SKW site along the top of the rock in the glacial till and where present in the water sorted stratified sediment. The water-sorted stratified sediments, particularly the sandy strata, will allow ground water to travel laterally. Near the bedrock, ground-water is expected to move with relative ease through the glacial till material.

Using average values from Table 2-4 for the period 2/19 - 5/8/79, an isopotential contour map was constructed (Dwg. AAD-11). Individual data points for that period did not exhibit wide variations, so that average values were employed. This isopotential map illustrates an imaginary surface connecting points to which water rises in tightly cased wells from a given point in the glacial

till (top of bedrock). Groundwater flow is perpendicular to the isopotential lines in the direction of higher to lower potential. The net flow of groundwater in the deeper aquifer can be seen to be towards the south to southwest. The spacing of the isopotential contours is indicative of the slope of the potentiometric surface and therefore, the hydraulic gradient under which the groundwater is flowing within that aquifer. The glacial till unit materials are not uniform with respect to particle size or sorting. The hydraulic conductivity of the zone is generally estimated to be in the range of 1×10^{-4} to 1×10^{-6} cm/sec.

A pronounced trough or low exists on the piezometric surface in the southwest corner of the property. This observation is consistent with the depth-to-bedrock data presented earlier. The concentric and radial shape of the isopotential lines with flow to the southwest tends to indicate a discharge zone or groundwater "sink" somewhere to the southwest of the property. This "sink" may be a fissure, joint intersection, bedding plane, a nearby pumped well or some other industrial activity.

2.3.2 Unconsolidated Sediments

A clay layer of varying thickness underlies the site. Tables 2-1, 2-2 and 2-3 present this data in columnar form. These tables are based upon the soil

logs. A series of undisturbed soil samples (Shelby tube) samples were taken. Locations are indicated on AAD-5. These samples were taken to determine permeabilities. The results of these tests which were performed by Calspan Corporation are presented in Table 2-8. Values of 10^{-8} to 10^{-9} cm/sec are extremely low and represent a suitable material acting as a barrier to discharge of water from the materials which are proposed for disposal in the second landfill cell.

Examination of the "shallow" well data demonstrates that the groundwater flow direction in the silty-clay region is similar to the direction of movement in the lower layers.

Examination of the site boring logs (refer to Tables 2-1, 2-2 and 2-3 for summary) indicates that a layer of industrial fill varying in thickness from zero to 9.0 feet is found on the site. The large majority of this fill, however, is not found on the site of the proposed second landfill cell. It will, therefore, have little impact on the proposed disposal facilities. This fill consists primarily of slag, cinders and fly ashes.

2.4 Surface Water

2.4.1 Site Watershed and Drainage

The site watershed is located within the Town of

TABLE 2-8

SOIL CHARACTERISTICS

Sample #	Date Collected	Natural Moisture Content	Plastic Limit	Liquid Limit	Plasticity Index	Soil Classification	% Passing #200 Sieve	Coefficient of Permeability k, cm/sec
	12/29/79	—	21	36	15	CL	98%	3.5×10^{-6}
	12/29/79	--	21	22.	1.5	ML	98%	0.7×10^{-8}
	6/8/79	22%	23	43	20	CL	90%	5×10^{-9}
	6/8/79	18%	23	29	6	CL-ML	48%	5×10^{-8}
	6/9/79	15%	13	23	10	CL	83%	1×10^{-9}
	6/9/79	11%	9	18	9	CL	64%	6×10^{-8}
	6/11/79	8%	21	43	22	CL	67%	3×10^{-9}
	6/11/79	22%	24	47	23	CL	58%	1.8×10^{-9}
	1/29/80	N.D.	N.D.	N.D.	N.D.	N.D.	89%	3.8×10^{-8}
	1/30/80	N.D.	N.D.	N.D.	N.D.	N.D.	90%	8.8×10^{-9}

N.D. = No Data

Niagara. It is bounded as follows: West-Witmer Road; North-Niagara Mohawk Power Company right-of-way; East-Airco Properties, Inc.; and South-Niagara Mohawk Power Company. The total site drainage area includes twenty-five acres (Airco Properties, Inc.) in addition to the thirty-seven acres of SKW Alloys, Inc. The only surface water entering the site is an intermittent stream which originates to the East of the site. However, this stream dries up during the late spring and summer months. Surface drainage is away from the drainage shed, along natural contours (refer to Dwg. AAD-3). The percentage of run-off is dictated both by ground slopes and soil permeabilities.

2.4.2 Floodplain Considerations

The SKW Alloys, Inc. site is not a floodplain. This is predicated upon the Federal Insurance Administration's Flood Hazard Boundary Map No. H02 for the Town of Niagara, N.Y. (Niagara County) revised on April 30, 1976.

2.4.3 Quality and Potential Environmental Effects

The proposed solid waste management facility will provide adequate environmental protection against surface water contamination. Further information concerning this matter is found in Section 3 (Operations) and Section 4 (Site Monitoring) of this Report.

1) Composition and quantities of waste generated, and

2) Waste disposal facility siting,

3) Disposal methodology, and

4) Miscellaneous operational information.

3.3.1 Waste Generation

Ferrosilicon alloy is produced in an electric arc furnace. This process produces one waste, baghouse dust.

The captured baghouse dust is very fine and of low density. The quantity of dust generated depends, in large part, on the type of alloy being produced. Under present conditions, approximately 15 tons (dry weight basis per day) of dust is being generated. This equates to approximately 5,500 tons/yr., depending upon production requirements.

An approximate composition of this material is as follows:

PARAMETER	ANALYSES
FeSi	93%
MgO	1%
Fe_2O_3	2%
Al_2O_3	---
Other	4%
pH	9-10

In addition, chromium, copper, zinc, manganese, nickel and cobalt are present in a combined concentration of less than 1%. Care must be exercised or

leaching problems might develop with the copper, nickel or chromium. However, ground water analyses do not indicate any environmental degradation.

3.3.2 Proposed Waste Disposal Facility Siting

The proposed method of disposal will be in a landfill with leachate control (refer to Dwgs. 3502, 3503).

The SKW site has previously been approved for the same wastes by the New York State Department of Environmental Conservation and the Town of Niagara. The State Permit is Number 2015, Facility Number 32504.

Boring number 11, 14, 15 and 16 are in the immediate area of the proposed landfill cell. Depths to refusal were 12.8 feet, 18.8 feet, 17.5 feet and 16.5 feet, respectively. The coefficient of permeability for Shelby tube samples at borings 11, 14 and 15 were 1.8×10^{-9} cm/sec, 3.8×10^{-8} cm/sec and 8.8×10^{-9} cm/sec, respectively. Because of the uniformity of the area, no additional permeability data from boring number 16 was obtained. The bottom of the landfill cell will not be any closer than 5.0 feet to bedrock/water table.

3.3.3. Methodology

Solid waste will be landfilled in a "controlled" area with leachate collection and site monitoring. The proposed method of disposal uses proven technology. This methodology is currently approved and used at landfill cell #1.

SECTION 4

SITE MONITORING

4.1 Purpose

The principal functions of the site monitoring program are as follows:

1) Establish baseline data,
2) Allow for early detection of any contamination, and
3) Provide evidence to confirm or refute predictions made concerning the site's operation upon the environment.

Evaluation of baseline data (obtained from monitoring locations upgradient of the site) in conjunction with data obtained from the other monitoring points will provide information pertinent to the site's effects upon both ground and surface water.

4.2 Program Design Considerations

Several factors were given consideration in the design of the site's monitoring program. The most prominent in determining the locations and control parameters for the required monitoring points are as follows:

1. Hydrological conditions,
2. Geologic and man-induced features which could affect the movement of leachate,

3. Pollution potential of site as exemplified by the type of contaminants present and the degree of attenuation afforded by subsurface sediments, and
4. Groundwater use.

An attempt was made to place all monitoring points, except for background monitoring points, in areas which represent optimum pathways for any contaminants which might migrate from the site's disposal areas.

4.3 Monitoring Points

4.3.1 Surface Water

Knowledge of the site's surface water quality is useful in the determination of leachate discharge areas. This is crucial in the establishment of the site's hydrogeology. In addition, close scrutiny must be given to any surface water quality degradation since, if present, it would represent an important component of overall environmental degradation. For purposes of this discussion, it is assumed that the site's surface water runoff must meet those limitations as specified for discharge to Class GA Surface Waters (for allowable parameter limits, refer to Table 4-1).

A stream with intermittent flow runs in a southwesterly direction across the southeast corner of the Airco property and into the SKW Alloys property. Refer to topographical map of Witmer Road Site, dated May 17, 1979, (AAD-3). It is the only significant surface

water (excluding storm water runoff) on the site.

4.3.1.1 Location

Sample point #6A is located almost exactly at the point where this stream enters SKW Alloys property, while sample point #7 is located where it exits the property. The primary purpose of samples taken at these points are to provide a means for detection of surface water contamination by site leachate or runoff.

4.3.1.2 Sampling Methodology and Analyses

Quarterly grab samples have been taken at monitoring points #6A and #7. Results from analyses of these samples are given by Tables 4-2 and 4-3. The chromium level of this surface water becomes elevated while passing through the site, while at the same time its conductivity decreases slightly. The decrease in conductivity at this high pH may indicate that some precipitation reaction is occurring. However, it is most likely caused by the addition of water from the site which has a much lower conductivity than the sample taken at point #6A. This would have a dilution effect upon the stream's contents and would result in a lower conductivity at monitoring point #7.

4.3.2 Ground Water

Analyses of water level data indicates that the groundwater found in the soil and subsoil flows generally

TABLE 4-1

LIMITATIONS FOR
DISCHARGE TO CLASS GA
SURFACE WATERS

Substance	Maximum Allowable Concentration
Barium	2.0 mg/l
Cadmium	0.02 mg/l
Chromium (Cr) (Hexavalent)	0.10 mg/l
Copper	1.0 mg/l
Iron	0.6 mg/l
Lead	0.05 mg/l
Manganese (1)	0.6 mg/l
Nickel	0.004 mg/l
Zinc	[illegible]
pH range (2)	6.5 - 8.5

NOTES: 1. Combined concentration of iron or manganese shall not exceed 1.0 mg/l.

2. When natural groundwaters have a pH outside the range indicated above, that natural pH may be one extreme of the allowable range.

in a south-westerly direction across the site (refer to isopotential map - AAD-11). This map was based upon data taken between February, 1979 and July, 1979 and did not include data from wells 12 and 13 which were installed at a later date. However, additional data since that time has not revealed any significant change in this piezometric surface. Shallow-well data demonstrated the same trends as the deeper wells with respect to groundwater levels. Because of the site's hydrogeological conditions, any groundwater contamination which might occur should be detected by monitoring wells in the unconfined aquifer underlying the site. For purposes of this discussion, it is assumed that the site groundwater must meet those quality standards as specified [illegible] limits refer to Table 4-4).

4.3.2.1 Location of Groundwater Monitoring Points

Sample points (wells) 3, 5, 12 and 13 are indicated on the site survey map showing baseline location and monitoring well coordinates and elevations (AAD-5). These wells were installed prior to the division of the 62 acre site. The isopotential map of the site's unconfined groundwater indicates that monitoring wells #3 and #13 can be used to provide background (upgradient) data while wells #5 and #12 will provide data on groundwater quality downstrem of the site's disposal areas.

TABLE 4-4

QUALITY STANDARDS FOR CLASS GA GROUNDWATER

SUBSTANCE	MAXIMUM ALLOWABLE CONCENTRATION
Barium	1.0 mg/l
Cadmium	0.01 mg/l
Chromium (hexavalent)	0.05 mg/l
Copper	1.0 mg/l
Iron	0.3 mg/l
Lead	0.025 mg/l
Manganese	0.3 mg/l
Zinc	5.0 mg/l
pH Range	6.5 - 8.5

NOTES: 1) Combines concentration of oron or manganese shall not exceed 0.5 mg/l.

TABLE 4-5

MONITORING WELL CONSTRUCTION DATA

Well Number	Date Installed	Depth to Bottom of Casing	Top of Casing Elevation	Ground Elevation	Size and Type of Casing	Installed By
3	12/28/78	14.0 ft.	608.49	607.7	2 in. Steel	EARTH DIMENSIONS INC.
5	12/29/78	24.2 ft.	601.48	599.1	2 in. Steel	
12	6/12/79	18.0 ft.	597.55	594.8	4 in. PVC	
13	6/12/79	20.0 ft.	603.16	600.9	4 in. PVC	

TABLE 4-2

INTERMITTENT STREAM DATA

Location 6A (Ingress surface)

Date	pH	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l					
						Ba	Cr(T)	Fe	Mn	Si	Zn
January 16, 1980	12.20	5500	1070	10	15	0.1	0.30	0.05	0.01	0.6	0.01
April 11, 1980	11.75	3650	1410	10	12	0.1	0.39	0.04	0.01	0.05	<0.01
July 8, 1980	11.55	4200	1140	9	15	0.4	0.72	0.02	0.01	1.1	<0.01
October 30, 1980	11.90	3200	546	6	6	<0.1	0.19	0.04	0.02	1.5	0.01

TABLE 4-3

INTERMITTENT STREAM DATA

Location 7 (Egress Surface)

Date	pH	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l					
						Ba	Cr(T)	Fe	Mn	Si	Zn
January 16, 1980	12.30	7000	1440	22	12	<0.1	0.35	0.06	<0.01	0.5	0.01
April 11, 1980	11.75	3800	1520	12	14	0.2	1.6	0.02	<0.01	0.05	0.02
July 8, 1980	11.65	7800	1950	17	15	0.9	2.2	<0.02	<0.01	<0.01	<0.01
October 30, 1980	12.30	7500	1520	2	8	0.5	0.82	0.07	0.02	0.5	0.01

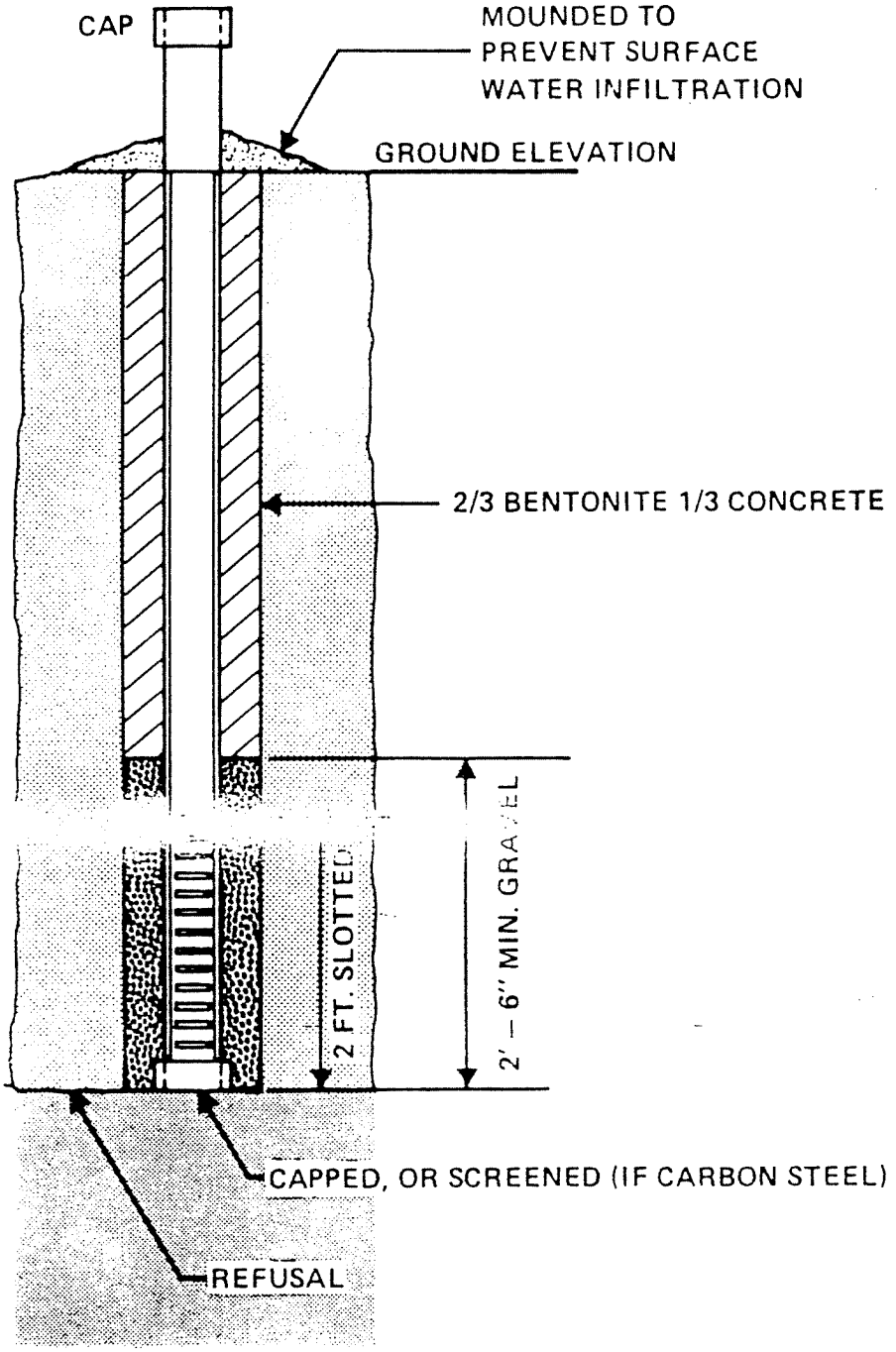
4.3.2.2 Monitoring Well Construction

The four (4) "deep" monitoring wells are constructed of PVC or carbon steel. If made of PVC, they contain a two-foot slotted section. If made of carbon steel, they contain a stainless steel well screen. Both the PVC and carbon steel wells are packed in pea gravel for approximately six inches on both sides of the slotted section or well screen and both are sealed with a two-thirds bentonite/one-third concrete mixture to prevent the surface water or any perched water from seeping downward along the pipe. Table 4-5 presents the well data in columnar form.

4.3.2.3 Sample Methodology and Analyses

Sample collection techniques must remain consistent if representative groundwater samples are to be obtained. At a minimum, the volume of the standing water must be removed. If the well recharge rate permits, two to three volumes will be removed prior to sampling. By following this technique, representative samples will be obtained and groundwater flow disruptions kept to a minimum.

Quarterly samples have been taken from monitoring wells 3, 5, 12 and 13. Results from analyses of these samples are given in Tables 4-6 through 4-9. With respect to groundwater quality based upon data generated



TYPICAL PIEZOMETER INSTALLATION

FIGURE 4–1

BLE 4-6

BACKGRC GROUNDWATER DATA

Location 3(well)

Date	pH	Cond. umhos	TDS mg/l	COD mg/l	TOC mg/l	mg/l Ba	Cr(T)	Fe	Mn	Si	Zn
January 16, 1980	7.95	500	266	59	40	<0.1	<0.02	16.4	0.61	2.6	0.22
April 11, 1980	7.50	550	487	68	25	<0.1	<0.02	3.6	1.26	4.8	0.37
July 8, 1980	6.85	490	370	25	32	0.1	0.02	22	0.46	0.8	0.05
October 30, 1980	N O S A M P L E				15	<0.1	<0.02	42	1.07	2.8	0.22

LE 4-7

BACKGROUN GROUNDWATER DATA

ocation 13 (well)

Date	pH	Cond. umhos	TDS mg/l	COD mg/l	C g/l	mg/l Ba	Cr(T)	Fe	Mn	Si	Zn
January 16, 1980	8.00	1000	682	4	0	<0.1	0.02	0.79	1.84	4.9	0.08
April 11, 1980	8.50	1050	1010	<2	25	0.3	0.02	0.60	0.28	5.0	0.14
July 8, 1980	7.75	1050	717	<2	70	<0.1	0.02	0.06	0.19	3.2	0.03
October 30, 1980	7.70	1100	582	2	<5	<0.1	<0.02	3.4	1.83	7.1	0.23

BLE 4-8

DOWN GRADIE ' GROUNDWATER DATA .

Location 5 (well)

Date	pH	Cond. umhos	TDS mg/l	COD mg/l	OC g/l	mg/l Ba	Cr(T)	Fe	Mn	Si	Zn
January 16, 1980	7.65	1000	626	4	70	<0.1	0.02	5.90	0.52	5.3	0.07
April 11, 1980	7.00	1150	1410	10	62	0.1	0.08	0.91	1.10	3.6	0.15
July 8, 1980	7.20	950	754	5	95	<0.1	<0.02	2.1	0.62	3.2	0.05
October 30, 1980	7.50	1000	606	5	<5	<0.1	<0.02	10.5	1.68	6.6	0.30

T[illegible] 4-9

DOWN GRADIEN[illegible] ROUNDWATER DATA .

[illegible]on 12 (well)

[illegible]ate	pH	Cond. umhos	TDS mg/l	COD mg/l	[illegible]l	mg/l Ba	Cr(T)	Fe	Mn	Si	Zn
[illegible]uary 16, 1980	7.70	1150	734	2	[illegible]	<0.1	0.02	0.26	0.11	4.5	0.06
[illegible]ri[illegible] 11, 1980	7.00	1350	1220	<2	[illegible]	<0.1	<0.02	0.02	0.15	5.4	0.08
[illegible]l[illegible] 3, 1980	7.30	1450	1070	<2	[illegible]	<0.1	<0.02	0.27	0.21	3.8	0.02
[illegible]t[illegible]er 30, 1980	7.90	1450	842	7	[illegible]	0.5	<0.02	3.8	1.39	9.8	0.05

to date, several preliminary conclusions can be made. They are as follows:

1. Iron concentrations greater than 1 mg/l can, in most cases, be attributed to the wells' steel casings, and
2. Appears to be no significant differences in groundwater quality upgradient and downgradient of the first landfill facility.

4.3.2.4 Summary

Evaluation of the sampling program to date has not surfaced any significant environmental impacts resulting from past site disposal practices. With respect to water quality, the layer of lacustrine silty clay below the landfilled material appears to be quite effective in attenuating migration of metals and/or acting as an impermeable barrier from the slag, air collector dusts and other refuse disposed of at the site. The isolation of the landfilled materials and prevention of leachate from migration to deeper levels is well illustrated by both hydrogeological and water quality observations.

SECTION 5
SITE CLOSURE PLAN

5.1 Purpose

The principal aim of the site closure plan is to provide a closed facility which is environmentally secure, aesthetically pleasing, and of some economic value to society. To attain this goal, the plan must meet certain objectives. They are as follows:

1. Provide sound operational procedures for site closure.
2. Establish criteria that must be addressed before planning the final site closure, and
3. Be both acceptable to the public and technically possible.

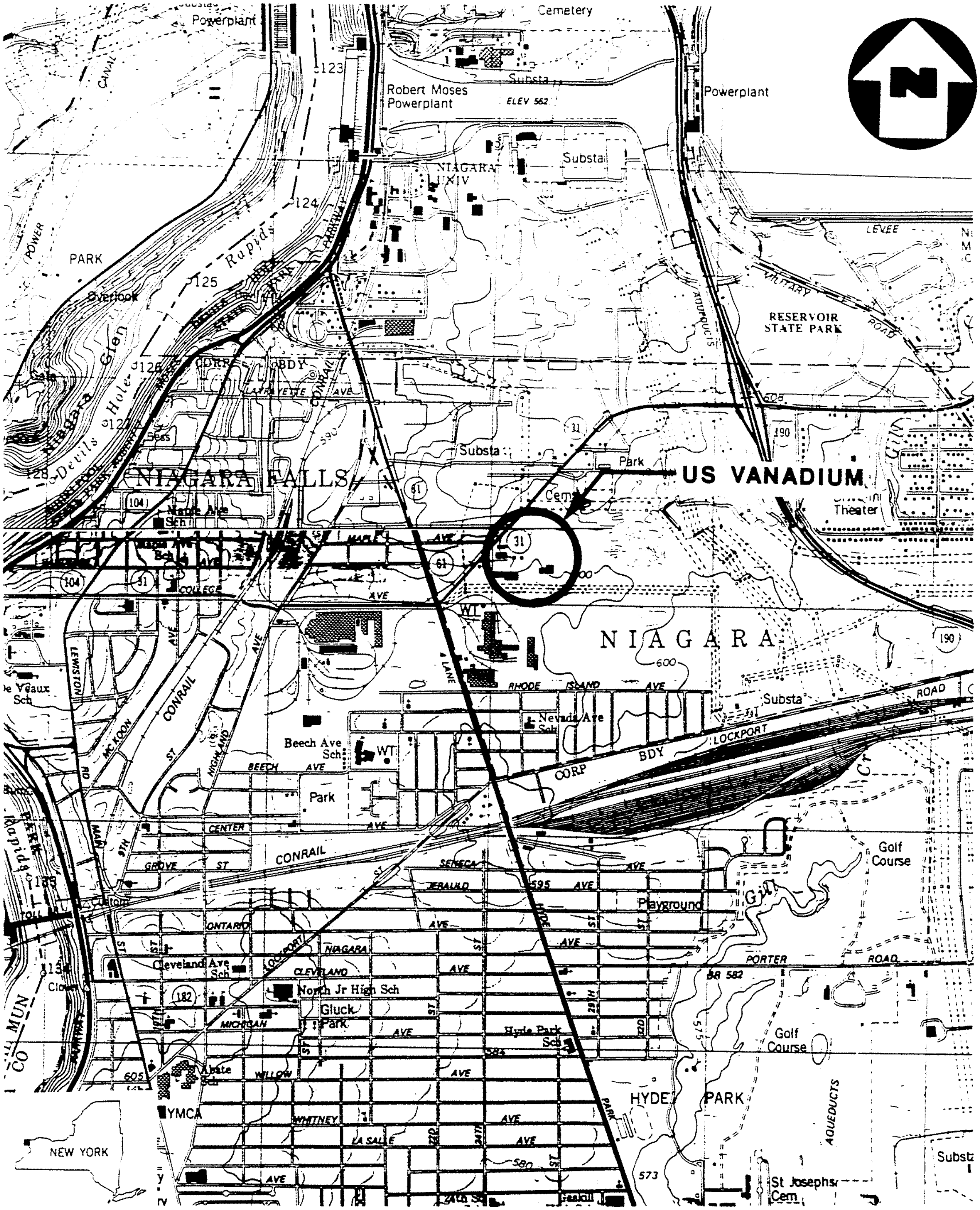
Because of the nature of this sludge, no interim cover will be utilized during the site's operation. This will allow the sludge to dewater through evaporation. During this process, the sludge pore spaces will increase. The result is a loss of volume with consequent settling. Since this should occur prior to closure, no serious post-closure settlement is anticipated.

The proposed landfill cell number 2 (refer to 3501) will provide sufficient capacity for approximately four years at anticipated plant production rates. After completion of filling, clay (maximum permeability of 10^{-7} cm/sec) will be placed to give a minimum depth of 18 inches

site closure is dependent upon three inter-related factors. These are as follows:

1. Maximum availability of permanent improvements to the landfill site after filling is completed.
2. Elimination or minimization of potential off-site conflicts with existing or future development through careful siting of fill, maintenance of open-space separation, and utilization of natural screening and buffers, and
3. Compatability with and ability to complement existing natural conditions and activities and to help meet future community land-use requirements.

REFERENCE NO. 7



(QUAD) NIAGARA FALLS, N.Y.

FIGURE 1

SITE LOCATION MAP

US VANADIUM, NIAGARA FALLS, N.Y.

NUS CORPORATION

REFERENCE NO. 8

NIAGARA COUNTY
HAZARDOUS WASTE SITES

NIAGARA COUNTY HEALTH DEPARTMENT
INVOLVEMENT AND CONCERNS

...CONFIDENTIAL...

Prepared By: Michael Hopkins
Nov.-Dec. 1983

NAME:

Airco Alloys (DEC #932001)

LOCATION:

The former and active disposal areas are located on a 62-acre area southeast of Witmer Road, 1500 feet northeast of the intersection of Hyde Park Boulevard in the Town of Niagara.

A sketch is attached.

OWNERSHIP:

This area is currently owned by SKW Alloys, Inc. (37 acres), 3801 Highland Avenue, Niagara Falls, NY 14305 and by Airco Properties, Inc. (25 acres), 4861 Packard Road, Niagara Falls, NY 14302. Past owners include Airco Alloys, Inc. and the Vanadium Corporation of America.

The contact person for the Airco property is Ronald Spears of Airco Speer Carbon Graphite (285-9381) and for SKW, the contact is William Favero (285-1252).

HISTORY:

The site was first used from 1920 to 1964 by the Vanadium Corporation for disposal of slag and refuse. The volume of slag disposed of is estimated as 594,000 tons by the IATF and as 350,000 tons in the Application for a Solid Waste Management Facility for Airco Properties, Inc. The IATF also reports that 88,000 tons of refuse were disposed of. The majority of this waste was disposed of on the property now owned by Airco. A portion of the slag may have been removed after disposal for use as fill.

Airco Alloys began using the Witmer Road site in 1964 for wastes essentially the same as those of Vanadium. In 1971, baghouse collectors were installed at the Airco Plant and the dusts collected were disposed of at this site. Waste volumes disposed of by Airco Alloys included 6000 tons of ferrochrome silicon and 43,000 tons of ferrosilicon dusts (slurried). Again, most of this disposal occurred on the present Airco property although storage of various materials such as coke, ores and raw materials occurred on the present SKW property. Some of this material was never removed.

Part 360 permits to operate disposal facilities were issued to Airco Speer and SKW during the 1980's. Both firms now operate landfills for their own use. SKW disposes of slurried ferrosilicon and ferrochrome silicon baghouse dusts in two cells occupying about 5 acres total. Airco-Speer disposes of "hard" wastes such as brick, concrete, coke, etc., and collector dust and carbon fines in their facility. Airco's permit calls for closure of about 20 acres upon completion of disposal activities. This will close the majority of the former disposal area as well.

Monitoring of eight on-site wells and of surface water on-site is performed quarterly by a mutual consultant of Airco and SKW. The results are sent to DEC-Region 9 (Robert Mitrey).

Recent inspections (Winter 1983) of both the Airco and SKW properties have confirmed much of the above information. Both active facilities were found to be essentially in compliance with codes and permit conditions.

PREVIOUS SAMPLE RESULTS:

Groundwater and surface water samples have been taken prior to issuance of 360 permits and quarterly thereafter. Analytic parameters include pH, conductivity, COD, TOC, Barium, Chromium, Iron, Manganese, Silicon and Zinc. The results of 1979 and 1980 sampling are given in Application for Solid Waste Management Facility for the Airco Properties, Inc. (1980) and Support Document for Application to Construct and Operate a Solid Waste Management Facility for SKW Alloys, Inc. (1980). Subsequent analytical reports have been sent to DEC-Buffalo.

In general, the results show minimal or no contamination of groundwater but they do show increase in total chromium occurring across the site in the surface water samples. Chromium concentrations in surface water leaving the site ranged from 0.35 to 2.2 mg/l in 1980 and were higher than background concentrations by two to three times. It was noted that conductivity decreases across the site, apparently due to dilution.

EXAMINATION OF AERIAL PHOTOS:

Examination of aerial photographs provided no new information but confirmed that disposal occurred primarily on the present Airco property. USDA (1958 and 1966) and SKW Alloys (1980) photos were used.

SOILS/GEOLOGY:

Soils at this site were studied by Earth Dimensions, Inc. prior to the design of the active landfill facilities. Details and boring logs are available in the document accompanying SKW's and Airco's applications.

Essentially, soils are characterized as consisting of 1 to 9 feet of miscellaneous fill material (waste in some cases), over 2 to 12 feet of clay, over 0 to 7 feet of water sorted stratified sediments, over 1 to 7 feet of Glacial Till. Refusal occurred at depths of 11 to 24 feet. The fill thickness is the dominate factor affecting depth to bedrock.

Bedrock is Lockport Dolomite. Bedrock reportedly dips to the south at a slope of 1/2%. The Lockport Formation may contain several water bearing zones at various depths.

GROUNDWATER:

The Support Document accompanying SKW's 360 permit application indicates that two aquifers are present beneath the site. The first is an artesian aquifer in the Lockport Formation. The second is an unconfined aquifer in the unconsolidated material. The direction of flow of the unconfined aquifer is to the southwest. The direction of flow of the bedrock aquifer has not been determined.

The nearest known drinking water well is 3500 feet north. The locations of other wells are unknown. There are no industrial users of groundwater in this area.

SURFACE WATER:

An intermittent stream passes through the site. This stream may be dry during the late spring and summer. The nearest permanent body of surface water is the Niagara River, 6000 feet west. There are no water intakes within three miles downstream on the Niagara River.

The site is not in a 100 year flood plain and is not within one mile of a designated wetland.

AIR:

The only potentially significant air emission problem associated with this site is dust. No volatile or organic wastes are known to be present.

Approximately 2000 people live within one mile of this site. The nearest population is 2000 feet southwest.

Land use within two miles includes industrial, residential and commercial in roughly even proportions.

FIRE/EXPLOSION:

Due to the nature of the wastes present, there appears to be no potential for fire at this site.

DIRECT CONTACT:

Access is restricted to the public. The wastes present should not present significant health problems if contacted.

CONCLUSIONS:

This site has been used for disposal for over 60 years and is still active. The wastes present are primarily inorganic and largely consist of slag and collector dusts. The concentration of chromium in the wastes is not known. Chromium is apparently the primary contaminant of concern. The active facilities are permitted and are essentially in compliance with Part 360.

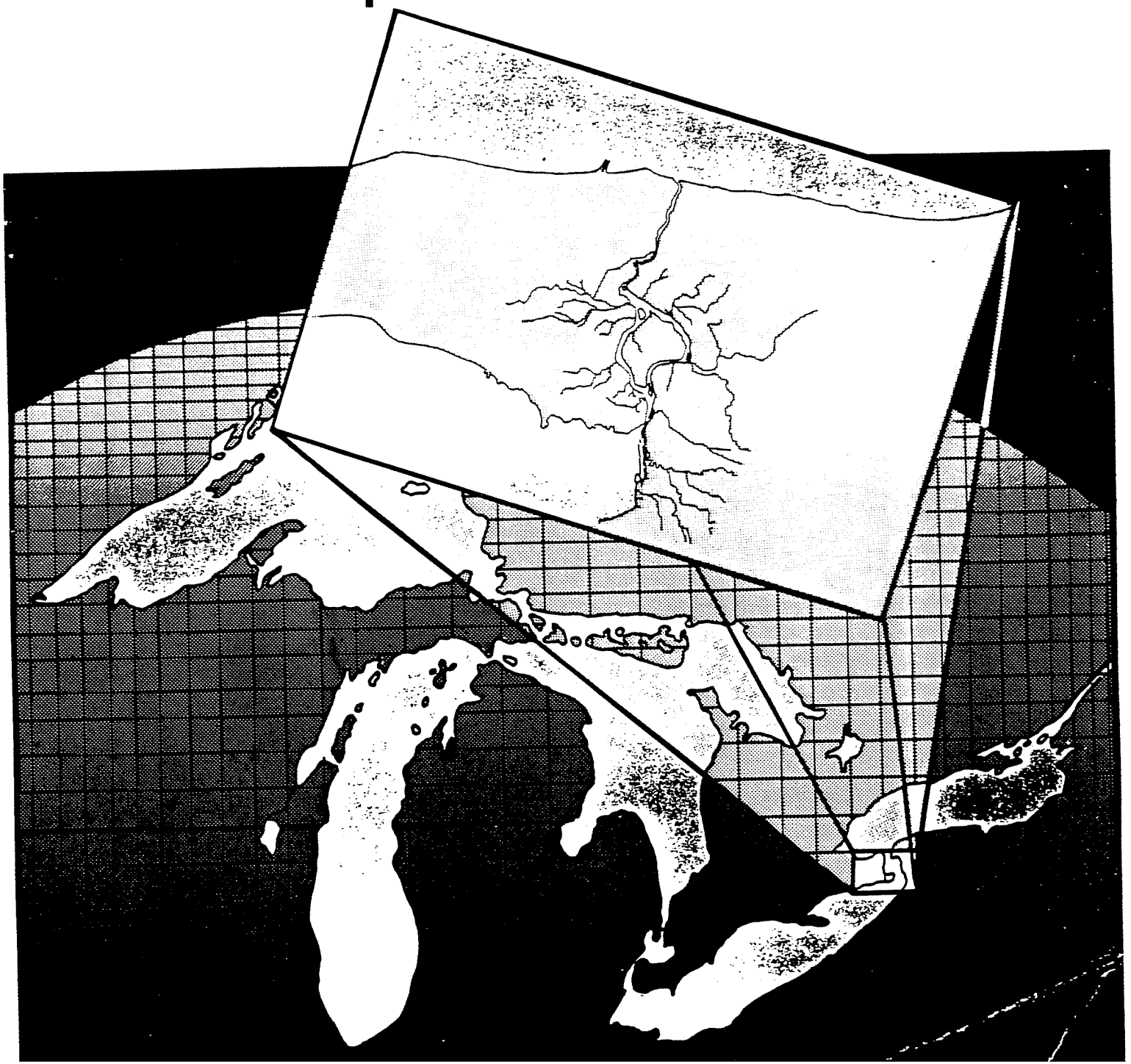
RECOMMENDATIONS:

Continued monitoring and closure of active facilities as provided by the operating permits should be adequate to prevent significant impacts from this site. No additional action beyond that specified in the operating permits is considered necessary.

REFERENCE NO. 9

EPA

Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste-Disposal Sites



1. AIRCO ALLOYS (Literature review)

NYSDEC 932001

General information and chemical-migration potential.--The Airco Alloys site, in the city of Niagara Falls, was used for the disposal of graphite plant waste and slurried flue dusts. The site is monitored quarterly, and no significant contamination has been indicated. The waste materials were deemed nonhazardous by the New York State Department of Environmental Conservation.

Overland runoff creates a large potential for surface migration from the site.

Geologic information.--The site consists of unconsolidated deposits of clay, stratified drift, and till overlying bedrock of Lockport Dolomite. Depth to bedrock ranges from 11 to 24 ft.

Hydrologic information.--The site overlies two aquifers. The lower one is the confined aquifer of the Lockport Formation, in which water-bearing zones are generally limited to fractures in the upper zones of the Formation; the upper one is an unconfined system within the unconsolidated deposits. The direction of flow is probably southwestward.

Chemical information.--The site owner collected ground-water and surface-water samples in 1979 and 1980 for chemical analysis. The ground-water samples indicated little or no contamination, but the surface-water samples indicated an elevated chromium concentration in water leaving the site. The owners plan continued monitoring.

2. AIRCO SPEER CARBON-GRAPHITE (USGS field reconnaissance)

NYSDEC 932002

General information and chemical-migration potential.--The Airco Speer Carbon-Graphite site, in the city of Wheatfield, was used during 1930-45 for the disposal of 28,800 to 144,000 yd^3 of furnace insulation, refractories, and sand as well as 2,500 gal/min of linseed oil and 7 tons of asbestos fiber and tape. Most of the area is paved to facilitate control and cleanup of process dust.

The overburden at several points on the site is only 4 to 6 ft deep, and the chemical analyses indicated high concentrations of organic priority pollutants. The potential for contaminant migration is indeterminable.

Geologic information.--The site was built on a filled area of unknown composition overlying a lacustrine silty clay. Beneath the clay is Lockport Dolomite. The U.S. Geological Survey drilled four test boring on the site in 1982; locations are shown in figure C-1. The geologic logs are on page 291.

Hydrologic information.--Ground water appears to be contained in the fractures within the bedrock and was not encountered during the 1982 drilling.

NUS CORPORATION

TELECON NOTE

CONTROL NO:	DATE: 5/20/87	TIME 3:30PM.

DISTRIBUTION: US Vanadium 02-8703-48.
Titanium Pigment Co., Inc. 02-8703-57

BETWEEN: Mike Hopkins	OF: Niagara County Health Department	PHONE: 716 (201 pd) 284-3128

AND: C. Doherty

NUS

DISCUSSION: Drinking H2O

1. There are five residential wells on Pennsylvania Ave., four of which were used for drinking water. These homes are now in the process of converting to public supply.

2. The town of Niagara Falls is supplied by a public system that has its intake on the Niagara River, in Wheatfield near Williams Road. Upstream

3. There is not a liner nor a cover on the site.

4. Mr. Hopkins stated that "contaminants" from Tam Ceramics are relatively inert and non hazardous. The site is located near Hyde Park Landfill and in comparison relatively insignificant.

ACTION ITEMS:

NUS CORPORATION

TELECON NOTE

CONTROL NO:	DATE: 5/22/87	TIME: 10.50 am

DISTRIBUTION:

U.S. Vanadium - 02-8703-48. NYQ4PA

BETWEEN: M. Hopkins	OF: Niagara County Health Dept.	PHONE: (716) 284-3128

AND: G. Doherty

(NUS)

DISCUSSION:

Site Location

Mr. Hopkins stated that:

(1) Vanadium Corporation operated plants on both Highland Ave and Witmer Rd.

(2) The only significant dumping site is ~~the RD.~~ on Witmer Road - as outlined in Niag. Co. Hazardous Waste Sites, Hopkins 1983 DEC # 932001.

(3) As far as he knows there is no problem with the Highland Ave property.

ACTION ITEMS:

* G. Dicky is currently researching the site.

NUS 067 REVISED 0581

NUS CORPORATION — TELECON NOTE

CONTROL NO.	DATE.	TIME.
02-8703-48-PA	June 15, 1987	10:30 am

DISTRIBUTION:
MS Vanadium 02-8703-48 / NYQHPA

BETWEEN:	OF:	PHONE.
Paul Lucky	Niagara Co. Health Department	(716) 284-3128

AND: G. Doherty

INUS:

DISCUSSION:

Mr. Lucky stated that Part 360 Permits are issued by the State: The monitoring of the landfills (SKW and Arco Properties) is conducted by Secure Landfill Contractors.

Residential well (mentioned in the Nia Co. Heath Dept - Concern...) taps into the overburden. Residential wells in the general area are being replaced with public water supplies. However transition is not complete.

The site is not accessible — There is a fence around the site - However does not completely mark the boundaries - (They) may dump outside the fence.

ACTION ITEMS:

↓
SKW and Arco.

NUS CORPORATION
A Halliburton Company

02-8703-48-PA

POTENTIAL HAZARDOUS WASTE SITE

PRELIMINARY ASSESSMENT

US Vanadium Site Name	NYD980535413 EPA Site ID Number
3801 Highland Avenue Niagara Falls, New York Address	02-8703-48 TDD Number

---

Date of Site Visit: 3/23/87

SITE DESCRIPTION

The US Vanadium site is an active dump 62 acres in size, located on Witmer Road, Niagara Falls, New York. The site is relatively flat with an intermittant stream running along its east and south boundaries. The Niagara River is located 6000 feet west. Land use in the area includes industrial, residential, and commercial in even proportions. The site was first used from 1920 to 1964 by the US Vanadium Corporation for the disposal of slag and refuse. In 1964 Airco Alloys began using the site. The wastes disposed of by Airco Alloys include ferrochrome silicon and ferosilicon dusts. The site is currently co-owned by the SKW Alloys Inc. and Airco Properties, Inc. Part 360 permits were issued and both firms now operate landfills within the 62 acre dump for their own use. SKW Alloys Inc. disposes of slurried ferrosilicon and ferrochrome silicon dusts on their facility. Airco Properties Inc. disposes of brick, concrete, coke and collector dusts. Sampling of surface water and monitoring wells is performed quarterly by a mutual consultant, Secure Landfill Contractors. According to a Niagara County Health Department Report, an increase in chromium was observed in surface water samples.

PRIORITY FOR FURTHER ACTION: High ___ Medium X Low ___ None ___

RECOMMENDATIONS

Further investigation of the site is recommended to better characterize its potential hazards. Although the site is continuously monitored as provided in operating permits, the presence of chromuim warrants further sampling.

Prepared by: Pauline Doherty **Date:** 6/9/87
of NUS Corporation

TIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

IDENTIFICATION
01 STATE 02 SITE NUMBER
NY [illegible]

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)
US Vanadium

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
3901 Highland Avenue

03 CITY
Niagara Falls

04 STATE | 05 ZIP CODE | 06 COUNTY | 07 COUNTY CODE | 08 CONG DIST.
NY | 14305 | Niagara | 063 | 32

09 COORDINATES
LATITUDE: 4 3° 0 7' 0 5".N
LONGITUDE: 0 7 9° 0 3' 4 4".W

10 DIRECTIONS TO SITE (Starting from nearest public road)

From 190 North take Route 31 (Witmer Road) West. The site is located on Witmer Road, 1500 feet northeast of the intersection of Hyde Park Boulevard.

III. RESPONSIBLE PARTIES

01 OWNER (if known)
SKW Alloys, Inc.

02 STREET (Business, mailing, residential)
3901 Highland Avenue

03 CITY
Niagara Falls

04 STATE | 05 ZIP CODE | 06 TELEPHONE NUMBER
NY | 14305 | (716) 285-1252

07 OPERATOR (if known and different from owner)
Airco Properties, Inc.

08 STREET (Business, mailing, residential)
4861 Packard Road

09 CITY
Niagara Falls

10 STATE | 11 ZIP CODE | 12 TELEPHONE NUMBER
NY | 14302 | (716) 285-9381

13 TYPE OF OWNERSHIP (Check one)
X A. PRIVATE ___ B. FEDERAL: _____ (Agency name) ___ C. STATE ___ D. COUNTY ___ E. MUNICIPAL
X F. OTHER: Co-ownership (Specify) ___ G. UNKNOWN

14. OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

___ A. RCRA 3001 DATE RECEIVED: __/__/__ ___ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__

X C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION BY (Check all that apply)

X YES DATE: Unknown ___ A. EPA ___ B. EPA CONTRACTOR ___ C. STATE X D. OTHER CONTRACTOR

X NO ___ E. LOCAL HEALTH OFFICIAL ___ F. OTHER: _____ (Specify)

CONTRACTOR NAME(S): Secure Landfill Contractors

02 SITE STATUS (Check one)
X A. ACTIVE ___ B. INACTIVE ___ C. UNKNOWN

03 YEARS OF OPERATION
1920 (BEGINNING) / Present (ENDING) ___ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

The wastes present are inorganic compounds, primarily slags and collector dusts. Chromium is the contaminant of concern and its concentration is unknown.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Chromium is the contaminant of concern and its concentration is unknown. The toxic effects of chromium compounds have been well demonstrated. Chromium is a heavy metal that generally exists in either a trivalent or hexavalent oxidation state. The more toxic, hexavalent chromium is soluble and rather mobile in groundwater and surface water. Hexavalent chromium is an animal carcinogen and causes kidney damage in animals and humans. Trivalent chromium is less toxic and causes contact dermatitis. Chromium is accumulated in a variety of aquatic and marine biota and passage through the food chain can be demonstrated.

IV. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste information and Part 3 - Description of Hazardous Conditions and Incidents)

___ A. HIGH (Inspection required promptly) X B. MEDIUM (Inspection required) ___ C. LOW (Inspection on time available basis) ___ D. NONE

(No further action needed. complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
Diana Messina	U.S. EPA	(201) 321-6776

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
P. Doherty		NUS Corp.	(201) 225-6160	6 / 9 / 87

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION
01 STATE 02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- X A. SOLID
- X B. POWDER, FINES
- _ C. SLUDGE
- X E. SLURRY
- _ F. LIQUID
- _ G. GAS
- _ D. OTHER: _____ (Specify)

02 WASTE QUANTITY AT SITE

(Measures of waste quantities must be independent)

Approx. TONS 643,000
CUBIC YARDS _____
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- X A. TOXIC
- _ B. CORROSIVE
- _ C. RADIOACTIVE
- X D. PERSISTENT
- _ E. SOLUBLE
- _ F. INFECTIOUS
- _ G. FLAMMABLE
- _ H. IGNITABLE
- _ I. HIGHLY VOLATILE
- _ J. EXPLOSIVE
- _ K. REACTIVE
- _ L. INCOMPATIBLE
- _ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS	643,000	tons	
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
IOC	Ferrochrome Silicon Slag		Landfill	Unknown	
IOC	Ferromanganese Slag	12604534	Landfill	Unknown	
IOC	Ferrosilicon Dust	8049170	Landfill	Unknwon	
IOC	Ferrochrome Silicon Dust		Landfill	Unknown	

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (See specific references. e.g., state files, sample analysis, reports)

Waste Disposal Site Survey, Niagara County, N.Y. U.S. EPA, 1980
Niagara County Waste Sites, Niagara County Health Department, Hopkins, 1983
Chemical, Physical and Biological Properties of Compounds Present at Hazardous Waste Sites, Clements Associates, Inc., 1985

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 3.8
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

There is potential for groundwater contamination. The site overlies two aquifers. The upper one an unconfined system within unconsolidated deposits of clay, stratified drift and till. There is a residential well 3500 feet north of the site which taps into this aquifer.

01 X B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 0
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

An intermittant stream passes through the site. The Niagara River is the nearest permanent body of surface water, 6000 ft. west. There are no water intakes within three miles downstream on the Niagara River.

01 X C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: 60,200
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

There is a potential for the contamination of air. Chromium-contaminated dust could be generated from the landfill.

01 _ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
_ POTENTIAL _ ALLEGED

No potential fire or explosive conditions exist due to the nature of the wastes.

01 X E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: 2000
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

The potential for direct contact exists due to unknown accessibility.

01 X F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: 62 (ACRES)
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

The potential for contamination of soil exists. Compounds that were disposed of in the landfill may leach into the soil.

01 X G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 0
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

There is no potential for drinking water contamination. The town of Niagara Falls is supplied by a public system which has an intake along the Niagara River. The intake is upstream from the site.

01 X H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: Unknown
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

Workers may be potentially affected by contaminated soil, water or air. The site currently receives industrial wastes from SKW and Airco.

01 X I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: 60,200
02 _ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
X POTENTIAL _ ALLEGED

Greater than 60,200 people could be exposed to potential contaminants. Contaminated air can possibly affect 60,200 people. Approximately 2000 people live within a mile of this site and may come into direct contact. An unknown number of employees of SKW Alloys Inc. and Airco Properties, Inc. may also be affected by contaminants.

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X J. DAMAGE TO FLORA — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

There is a potential for damage to flora. Contaminated groundwater may affect vegetation along the Niagara River. Contaminated surface water may affect plants near the intermittant stream.

01 X K. DAMAGE TO FAUNA — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

Potential damage to fauna exists through the contamination of surface water and groundwater. Aquatic organisms in the stream may be affected by contaminated surface water. Those in the Niagara River may be affected by contaminants in the groundwater which makes its way to the river.

01 X L. CONTAMINATION OF FOOD CHAIN — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

The potential exists for the contamination of the food chain from the ingestion of chromium-contaminated lower plant and aquatic species in the stream or the Niagara River.

01 _ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 2000 — 04 NARRATIVE DESCRIPTION

The population can potentially be affected due to the unknown means of waste containment.

01 X N. DAMAGE TO OFFSITE PROPERTY — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

The potential for damage to offsite property exists through surface runoff and/or contamination of the intermittant stream.

01 X O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

There is potential for the contamination of sewers through surface runoff. Storm drains were observed on Hyde Park Boulevard during the off-site reconnaissance.

01 X P. ILLEGAL/UNAUTHORIZED DUMPING — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
04 NARRATIVE DESCRIPTION

Both Airco Properties Inc. and SKW Alloys Inc. operate landfills within the 62 acre area with permits. There is a potential for illegal dumping due to unknown accessibility.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 60,200

IV. COMMENTS

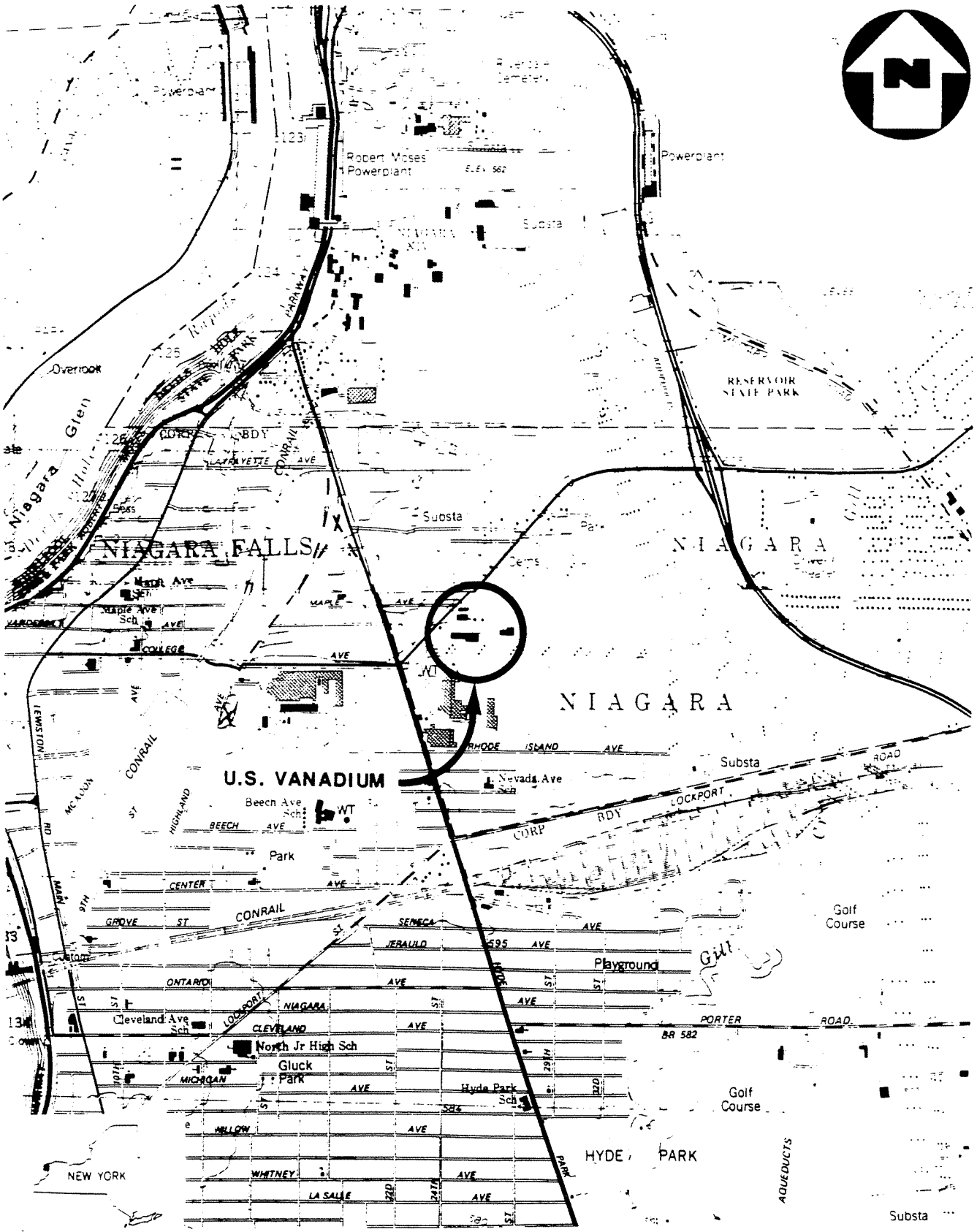
There are no photographs available. Pictures taken during the off-site reconnaissance were not of the site.

V. SOURCES OF INFORMATION (Cite specific references. e.g., state files, sample analysis, reports)

Niagara County Waste Sites, Niagara County Health Department, Hopkins, 1983
U.S. Department of Commerce, Bureau of the Census, 1980
Waste Disposal Site Survey, Niagara County, New York, U.S. EPA, 1980
USGS Topographical Maps, Niagara and Lewiston Quads, 1980
Telecon between P. Dicky, Niagara County Health Department and P. Doherty , NUS.
Off Site Reconnaissance Information Reporting Form, D. deBruijn and M. Bauman, 3/23/87.

APPENDIX A

MAPS



(QUAD)NIAGARA & LEWISTON

SITE LOCATION MAP
U.S. VANADIUM, NIAGARA FALLS, N.Y.

SCALE: 1" = 2000'

FIGURE 1

NUS CORPORATION

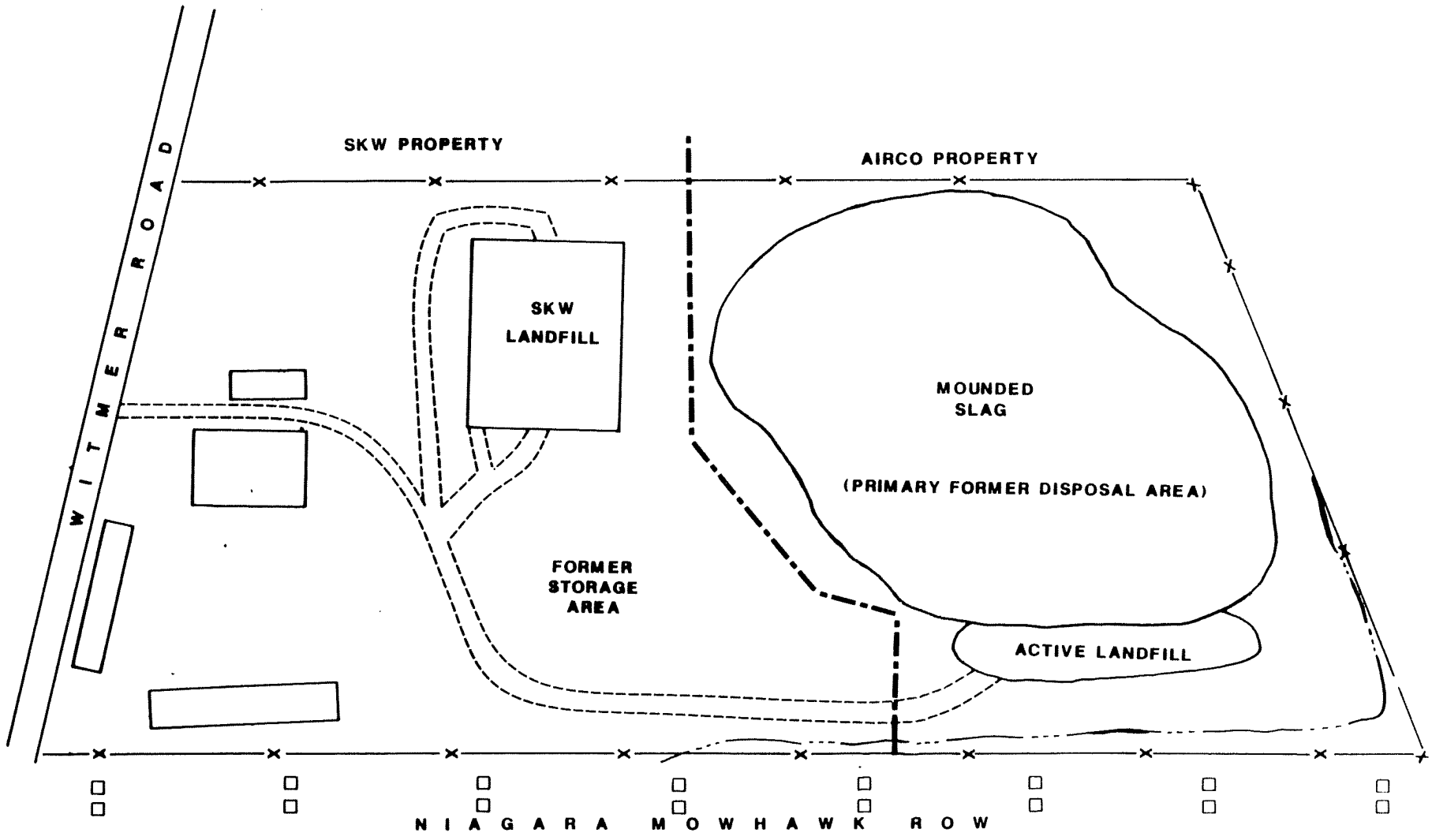


FIGURE 2

SITE MAP

U.S. VANADIUM, NIAGARA FALLS, N.Y.

(NOT TO SCALE)

NUS CORPORATION

REFERENCE NO. 10

REFERENCE NO. 11

Carbon
Division of Airco, Inc.
P.O. Box 829
Niagara Falls
New York 14302
Telephone: 716-285-6971

Draft

July 31, 1984

Mr. Stuart M. Fox
Environmental Analyst
New York State Department of
Environmental Conservation
Region 9 Office
600 Delaware Avenue
Buffalo, New York 14202-1073

Subject: Submission of Requested Items for the Renewal of the Permit to Operate Airco Properties, Inc. Witmer Road Landfill Site, DRA #90-84-0293

Dear Mr. Fox:

This letter with the appropriate attachments is in response to your letter of May 8, 1984, in which you requested that several items be submitted to the NYSDEC in order to complete our permit renewal application for the Airco Properties, Inc. Witmer Road Landfill Site. All items requested are enclosed herewith except for item 6, the variance requests. Further additional work is required on these variances. It is therefore respectfully requested that a 3-day extension until August 3, 1984 be granted in order to submit said variances.

In addition to the attachments, further background information and a discussion outlining our specific response to each item requested, follows below (responses numbered per your May 8, 1984 letter):

1. Accepted Waste List Modification

Airco Carbon respectfully requests that miscellaneous scrap wood and cardboard be approved by the NYSDEC as materials acceptable for deposition in the Witmer Road site. As in the case with all presently approved materials, these new items are non-hazardous, thus they pose no contamination threat (migratory) to the groundwater. Similarly, the cardboard poses minimal threat of becoming airborne or causing a littering problem as the quantities to be deposited at the landfill are minor compared with the other heavier material placed in the landfill and are likely to be weighted down and/or covered over by these other materials. Per our existing permit conditions, no loose paper,

office wastes and putrescible wastes will be deposited in the landfill.

The above request was made previously in letters dated August 30, 1982, copied to Mr. J. Tygert, NYSDEC, and March 30, 1984 addressed to the same. The Town of Niagara has previously approved our request. (Reference attachments A, B and C, respectively.)

2. Revised Fill Progression and Closure Plan

A revised fill progression plan was prepared jointly by SLC Consultants/Constructors, Inc. and Mr. Richard R. Snyder, P.E. (Reference attachment D with appropriate blueprints.) Both parties referenced were the primary personnel who assisted Airco Properties, Inc. in procurement of its initial permit to operate the Witmer Road site and thus are extremely knowledgable of the landfill and its operation.

In general, the new fill progression in the landfill will still proceed in annular rings around the site, gradually progressing inward and upward to the peak of the landfill. However, rather than placing final cover subsequent to the completion of a full annular ring, fill progression in each ring will be concentrated in approximate one (1) acre increments so that final cover can be achieved in a more expeditious time frame. It is estimated that one (1), one (1) acre area will be closed each year, with the first to be closed in the spring/summer of 1985.

3. "Shallow Well" Construction, Boring Logs and Perched Water Table Depth

A. "Shallow Well" Construction

The construction of the "shallow wells" is identical to that of the deep wells as described in the initial application for a "Solid Waste Management Facility for Airco Properties, Inc Witmer Road, Niagara Falls, N.Y., Site" dated April 23, 1980 and prepared for Airco by Mr. Richard R. Snyder, P.E. (hereafter referred as the initial application). Attachment E is a diagram of a typical well at the landfill site.

B. Boring Logs for the "Shallow Wells"

The installation of the "shallow wells" was done after the installation of the deep wells with the exception of "shallow well" numbered 13A. Installation was per the following schedule:

A) deep wells installed at positions numbered 1, 2 and 4 - December 29, 1978

B) "shallow wells" installed at positions numbered 1A, 2A and 4A - March 19, 1979

C) deep and "shallow well" installed at position numbered 13 and 13A - June 12, 1979

(Reference attachment F for well location)

When installed, the "shallow wells" were positioned adjacent to the deep wells of corresponding number identification. As a result of their close proximity to each other, it was reasonable to assume that the boring logs for the deep wells would have been similar to those of the "shallow wells", thus no boring analyses were performed on the shallow wells. For reference, as reported in the initial application, enclosed as attachment G find the boring analyses for the deep wells.

C. Perched Water Table Depth

The historical and present perched water table depth measurements from the shallow wells are included as attachment H. As indicated in the data, the depth to the perched water table is variable throughout the year and is at times completely non-existent at two (2) points in the landfill.

The existence of the intermittent perched water table is the result of the natural sub-surface soil conditions which exist at the landfill. As indicated in the soil boring analyses below the existing surface of the landfill there exists a layer of natural clayey silt varying from 2.0' to 12.5' in thickness (see attachment I), with permeabilities measured at less than 3.5×10^{-6} cm/sec (see attachment J). With such a low permeability, this layer is considered to be "impervious" (D.K. Todd, "Groundwater Hydrology", John Wiley and Sons, Inc., 1959), thus precipitation on the surface of the landfill is held above the natural clay layer and is prevented from totally migrating to the permanent groundwater table located below in the glacial till and sorted stratified sediments. This natural "impervious" clay layer acts as a more than suitable barrier between the materials presently deposited at the landfill and the permanent groundwater table located below the natural clay layer. This is further supported by the lack of a significant change in the chemical analyses performed on the deep wells since beginning operation of the landfill in 1982. Once the final cover is placed on the landfill, the clay enclosure created will protect against any significant environmental impact on the permanent groundwater table.

Although Attachment I, submitted with the initial application indicates that the natural clay layer depth is variable at various points in the landfill, to have upgraded this layer by adding more clay would have required the removal of ≈398,000 tons of material placed in the landfill over a period of 50 years by previous owners of the site prior to 1982. At that time and to date, if upgrading of the clay layer was required, the operation of the landfill would have been impractical and cost prohibitive.

Further, the addition of additional clay would have created a further perched water table between the new clay and the materials deposited by Airco.

4. Source and Permeability of Cover Material

A potential source of cover material and the permeability of the material is enclosed as part of attachment D.

5. EP Toxicity Test Results for Category II Materials

Category II materials are those containing carbon dusts and carbon fines from air pollution control equipment. Attachment K contains the results of the EP Toxicity Tests performed on the wastes generated at our facility, including those considered to be category II. These analyses were performed at our Murray Hill, N.J. Research Lab utilizing the procedure outlined in 40 CFR Part 261, Appendix II. At the time of the analyses due to the nature of the materials used by it in its processes, Airco Carbon had no logical reason to believe that the pesticides or herbicides listed as part of the EP Toxicity Test were present in these materials, thus they were not analyzed. It is still Airco Carbon's contention that these herbicides and pesticides are not logically present.

6. Variance Requests

See page 1.

7. Closure and Post-Closure Maintenance Monitoring Program

The program referenced above is enclosed as part of attachment D.

If there are any questions concerning this matter or if we can be of any assistance, please feel free to contact us.

Yours very truly,

AIRCO CARBON, a Division of BOC, INC.

BY Ronald F. Spears, Jr.

Ronald F. Spears, Jr.
Supervisor, Environmental Compliance

RFS:vp
Encs.

ATTACHMENT D

Draft

CLOSURE AND POST CLOSURE MAINTENANCE AND MONITORING PLAN FOR AIRCO CARBON DIVISION, AIRCO INC.'S NON-HAZARDOUS INDUSTRIAL WASTE FACILITY NO. 32S39 - PERMIT NO. 2298

1.0 Introduction

The primary objective of this closure plan is to help insure that the Airco Carbon Division, Airco, Inc.'s non-hazardous industrial landfill located near Witmer Road in the Town of Niagara will not present any danger after closure to either human health or the environment. Implementation of this plan will minimize the need for future maintenance and control, minimize, or eliminate to the extent necessary to protect human health and the environment the escape of waste constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface water, or atmosphere.

As noted in the landfill's original permit, the facility is constructed in stages as required to satisfy waste deposition requirements. While this procedure will be continued, it is important to note that Airco's generation rate for wastes which are deposited in this landfill has fallen by approximately 75 percent since 1981. This is

due to a combination of reduced plant production rates and successful implementation of measures to sell the plant's generated waste.

All cost estimates provided in this plan are based on July 1984 costs. Therefore, these estimates should be adjusted on an annual basis for inflation. In addition, a new estimate will be required whenever an approved (by NYSDEC and Town of Niagara) change in the closure plan might affect the cost of closure.

2.0 Closure

As previously noted this landfill is unique in that the operational and closure plan are closely related. The landfill's operation is in effect a progressive closure. As previously noted the landfill's fill rate to date has been significantly less than the original design rate. At present fill rates it will take a minimum of 30 years to complete the progressive closure plan for the entire 25 acre site (approximately 20 acres will be dedicated to solid waste managememt).

For purposes of closure a maximum area of one acre will be utilized for waste deposition (refer to Part 360 Engineering Report and August 22, 1980 correspondence from Donald J. Kuhn

and Richard R. Snyder to Jack Tygert of NYSDEC for description of fill procedure). Therefore the maximum area of newly deposited waste (material deposited after receipt of NYSDEC permit No. 2298) uncovered during any point in the implementation of the progressive closure plan will be one acre.

Assumptions basic to closure cost development are as follows:

1) All prices are based on July 1984 costs,
2) Clay to meet 10^{-5} cm/sec specification will be obtained from an area within 15 miles of the Airco Witmer Road site and its cost will be $10.00 per cubic yard (in place),
3) Soil capable of supporting vegetal growth will be obtained from an area within 15 miles of the Airco Witmer Road site and its in-place cost will be $15.00 per cubic yard (in place),
4) Seeding (including fine grading of topsoil with landscaping equipment will cost $2,000/acre, and
5) Maximum area to be closed at any time during site's progressive closure will be 1 acre.

Table 1 illustrates the cost estimate for final closure of the Airco landfill.

Table 1

Closure Cost Estimate

Clay	$32,300
Soil capable of supporting vegetative cover	$12,100
Seeding and Fine Grading	$ 2,000
Subtotal	$46,400
Contingency (10% of total)	$ 4,640
Administration (5% of total)	$ 2,320
Total	$53,360

3.0 Site Monitoring

The monitoring program for Airco Carbon Division, Airco, Inc.'s non-hazardous industrial waste landfill has been designed to accomodate all phases of the site's life (operation-progressive closure and post closure periods). This plan incorporates monitoring of both surface and ground waters, (refer to Section 4 of "Application for a Solid Waste Management Facility for the Airco Properties, Inc. Witmer Road, Niagara Falls, New York Site", May 1980 for details

concerning site monitoring program). To date, no significant environmental problems have been detected. With this in mind, Airco anticipates continuing this program on a semi annual basis until one year after the completion of landfilling and application of the final portion of the progressive cover. At that time, such monitoring will be reduced to an annual basis. However, in the unlikely event that a problem should be detected, additional monitoring will be implemented. Upon attainment of final elevation and completion of the progressive closure program, the site's monitoring program will consist of sampling monitoring wells # 1,2,4, and 13, and surface water monitoring points #6 and 6A.

Each sample will be analyzed for pH, conductivity, total dissolved solids, chemical oxygen demand, total organic carbon, barium, chromium (trivalent), chromium (hexavalent), iron, maganese, silicon, and zinc. Each complete sampling and analysis will cost $1,000.

4.0 Post Closure Maintenance

The goals of the post closure maintenance plans for the Witmer Road site are as follows:

1) Insure that integrity of waste cover and site drainage ditch are maintained,

2) Correct any problems that might occur at the site before they have a chance to develop to a degree which could result in adverse environmental impacts, and

3) Follow a program in which all parties (Airco, regulatory agencies, and the public) have a sense of confidence that the site will not create problems which cannot be reasonably handled with minimum impacts.

The post closure maintenance plan is as follows:

1) Airco will designate a person or persons who will be responsible for filing a Waste Management Facility maintenance report. Included in this maintenance report will be a check list as follows:

   a) Bank and cover erosion

   b) Settlement

   c) Cover soil integrity

   d) Condition of vegetative cover

   e) Condition of site drainage ditch

   f) Condition of monitoring wells.

2) The site will be physically walked by the responsible individual or individuals once every three months for the first year after site closure and semi-annually for the duration of the site's life.

3) If any problems are encountered that may be of any significant environmental concern, immediate corrective action will be undertaken. Notice of these actions will be reported to the NYSDEC explaining the nature and location of the problem and the corrective action taken.

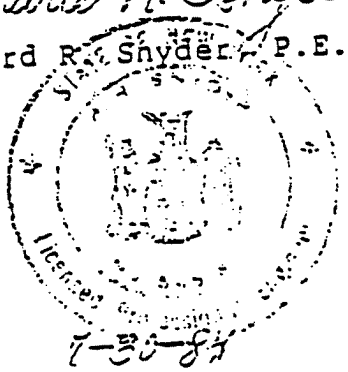
If the progressive landfill closure plan is followed according to the Part 360 Engineering plan and report, the possibility for development of significant post closure problems is minimal. Therefore, such costs are not expected to exceed $2,500 per year.

5.0 Plan Revision

This closure and post closure plan will be kept on file by the Airco Carbon Division of Airco, Inc. It will be revised whenever a change is made which affects either the method and/or cost of closure.

Richard R. Snyder

Richard R. Snyder, P.E.



DESCRIPTION AND SOURCE OF LANDFILL COVER

Low permeability cover soil can be obtained from a location near the Huntley Power Station on River Road in the Town of Tonawanda. This location presently represents one of the primary sources in this locality of low permeability soil for utilization in landfill construction. Soil from this location typically exhibits a permeability of less than 10^{-7} cm/sec and therefore far exceeds the maximum permeability requirement of 10^{-5} cm/sec as specified in the approved Part 360 Engineering Report and Plans.

While it may become necessary or prove economically attractive to use alternate sources in the future all cover material utilized at the Witmer Road site will satisfy the specifications as given in the approved Part 360 Engineering Report and Plans.

DESCRIPTION OF REVISED FILL PROGRESSION PLAN

The revised landfill cross section drawings (D-04802, D-04803, and D-04804) indicate changes in site topography since inception of construction and operation of the Witmer Road landfill. As noted in previous submittals the topography of the existing site is variable, irregular and inconsistent. This makes it impractical to provide a detailed operational plan for each specific area over the entire 25 acre site.

Since the inception of the landfill's operation, the Airco plant's waste generation rate has only been approximately 25 percent of the rate utilized in making the original estimate of a 10 year site life.

In order to apply final cover on a more timely basis, the work-fill area of the site at any given time will be reduced. This will reduce the amount of "newly" deposited waste material which is exposed to the elements during any point in time. With this exception the fill progression plan (as outlined in the Part 360 Engineering Report and August 22, 1980 correspondence from Donald J. Kuhn and Richard R. Snyder to Jack Tygert of NYSDEC) will continue to be followed.

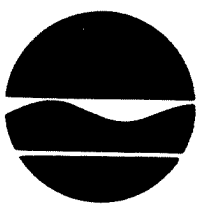
Depending upon the rate at which sections reach their designated elevations, it will probably be practical to place the two feet of low permeability cover over completed fill areas either once or twice per year. The six inches of soil capable of supporting vegetal cover should be placed every year.

REFERENCE NO. 12

WATER QUALITY REGULATIONS

SURFACE WATER AND GROUNDWATER CLASSIFICATIONS AND STANDARDS

New York State
Codes, Rules and Regulations
Title 6, Chapter X
Parts 700-705



New York State Department of Environmental Conservation

This booklet contains New York State water quality regulations which were initially promulgated in 1950. Numerical standards for groundwater (Part 703) were last revised in 1978, and major revisions were made to the surface water regulations (Part 701) in 1985. Presented here are the complete regulations with revisions through March 31, 1986 as published in the New York State Official Compilation of Codes, Rules and Regulations. Please note that printing errors in the equations for calculating ammonia standards (Appendix 31, page 502.34) have been corrected by the Department of Environmental Conservation.

PART 700

TESTS OR ANALYTICAL DETERMINATIONS

(Statutory authority: Environmental Conservation Law, § 17-0303)

Historical Note

Part repealed, new filed: April 28, 1972; Feb. 25, 1974 eff. 30 days after filing.

Section 700.1 Collection of samples. In making any tests of analytical determinations to determine compliance or noncompliance of sewage, industrial wastes or other waste discharges with established standards, samples shall be collected in such manner and at such locations as are approved by the commissioner. In approving such locations the commissioner shall be guided by the fact that:

(a) there must be prompt mixing of the discharge with the receiving waters,

(b) the mixing will not interfere with biological communities to a degree which is damaging to the ecosystem; and

(c) the mixing will not diminish other beneficial uses disproportionately.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 25, 1974 eff. 30 days after filing.

700.2 Tests or analytical determinations. Tests or analytical determinations to determine compliance or noncompliance with standards shall be made in accordance with:

(a) *Standard methods for the Examination of Water and Wastewater* (see section 700.2 of this Title);

(b) *Methods for Chemical Analysis of Water and Wastes* (see section 700.2), prepared by Environmental Protection Agency (EPA);

(c) *Water Standards of the American Society for Testing and Materials (ASTM)* (see section 700.2 of this Title); or

(d) by other methods approved by the commissioner and the administrator as giving results equal to or superior to methods listed in any of the other documents.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 25, 1974; amd. filed Nov. 5, 1984 eff. Nov. 5, 1984. Amended (a)-(c).

PART 701

CLASSIFICATIONS AND STANDARDS OF QUALITY AND PURITY

(Statutory authority: Environmental Conservation Law, §§ 3-0301[2][m], 15-0313, 17-0301)

Historical Note

Part repealed, new filed: April 28, 1972; Feb. 25, 1974 eff. 30 days after filing.

Section 701.1 Definitions. The terms, words or phrases used in Parts 700, 701, 702 and 704 of this Title shall have the following meanings:

(a) *Commissioner* shall mean the Commissioner of the Department of Environmental Conservation.

(b) *Administrator* shall mean the administrator of the United States Environmental Protection Agency.

(c) *Best usage of waters* as specified for each class shall be those used as determined by the commissioner and the administrator in accordance with the considerations prescribed by the Environmental Conservation Law and the Federal Water Pollution Control Act of 1972 (see section 705.1 of this Title).

(d) *Approved treatment* as applied to water supplies shall mean treatment accepted as satisfactory by the authorities responsible for exercising supervision over the sanitary quality of water supplies.

(e) *Source of water supply for drinking, culinary or food processing purposes* shall mean any source, either public or private, the waters from which are used for domestic consumption or used in connection with the processing of milk, beverages or foods. (When water is taken for public drinking, culinary or food processing purposes, refer to New York State Department of Health regulations—10 NYCRR Part 170.)

(f) *Primary contact recreation* shall mean recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence. Such uses include swimming, diving, water skiing, skin diving and surfing.

(g) *Secondary contact recreation* shall mean recreational activities where contact with the water is minimal and where ingestion of the water is not probable. Such uses include, but are not limited to, fishing and boating.

(h) *Saline surface waters* shall mean all waters which are so designated by the commissioner.

(i) *International boundary waters* shall mean those waters to which the water quality standards developed and adopted pursuant to the Boundary Water Treaty of 1909 and the Great Lakes Quality Agreement of 1972 apply.

(j) *Sewage, industrial waste* and *other wastes* shall have the meanings given in section 17-0105 of the Environmental Conservation Law.

(k) *Estuary* shall mean the tidal portion of a river or stream.

(l) A *thermal discharge* is one which results or would result in a temperature change of the receiving water.

(m) *Heat of artificial origin* shall mean all heat from other than natural sources including but not limited to cumulative effects of multiple and proximate thermal discharges.

(n) *Coastal waters* shall mean those marine waters within the territorial limits of the State other than estuaries and enclosed bays. Long Island Sound is designated as coastal waters for the purposes of thermal discharges.

(o) *Enclosed bays* shall mean those marine waters within the territorial limits of New York State, other than coastal waters or estuaries, in which exchange of sea water is severely limited by barrier beaches. For the purposes of thermal discharges, the following are designated as enclosed bays: Jamaica Bay, Hempstead Bay, Great South Bay Moriches Bay, Shinnecock Bay and Mecox Bay.

(p) *Oncogenic chemical* is a chemical for which the induction of tumors has been demonstrated in:

(1) humans;
(2) two mammalian species;
(3) one mammalian species, independently reproduced;
(4) one mammalian species, to an unusual degree with respect to incidence, latency period, site, tumor type or age at onset; or
(5) one mammalian species, supported by positive results in short-term tests which are indicative of potential oncogenic activity.

(q) *Acute toxic effect* is an effect that usually occurs shortly after the administration of either a single dose or multiple doses of a chemical.

(r) *Chronic toxic effect* is an effect that is irreversible or progressive or occurs because the rate of injury is greater than the rate of repair during prolonged exposure to a chemical.

Historical Note

Sec. repealed, new filed April 28, 1972; amds filed: Nov. 5, 1984, July 3, 1985 eff. 30 days after filing. Added (p)-(r).

701.2 Conditions applying to all classifications and standards. (a) In any case where the waters into which sewage, industrial wastes or other wastes effluents discharge are assigned a different classification than the waters into which such receiving waters flow, the standards applicable to the waters which receive such sewage or wastes effluents shall be supplemented by the following: "The quality of any waters receiving sewage, industrial wastes or other wastes discharges shall be such that no impairment to the best usage of waters in any other class shall occur by reason of such sewage industrial wastes or other wastes discharges."

(b) Natural waters may on occasion have characteristics outside of the limits established by the standards. The standards adopted herein relate to the condition of waters as affected by the discharge of sewage, industrial wastes or other wastes.

(c) Control of taste and odor-producing substances, toxic wastes and deleterious substances, as specified in the quality standards for fresh and saline surface waters, shall be implemented by using ambient water quality standards derived from the methodologies set forth in sections 701.3 through 701.13 of this Part, for the protection of best usage of receiving waters. These standards shall be the basis of effluent limitations for use in State pollutant discharge elimination system permits issued pursuant to Parts 750-758 of this Title. The standards will consider, to the extent possible, variations in natural or background conditions of waters, including but not limited to alkalinity, temperature, hardness and pH.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 25, 1974; amd. filed July 3, 1985 eff. 30 days after filing. Added (c).

701.3 Standards for protection of human health and potable water supplies. The standards for best usage as a source of potable water supply shall protect human health and the drinking water source. The standard shall be the most stringent of the following:

(a) 10 NYCRR Part 170 (Source of Water Supply);

(b) 10 NYCRR Part 5 (Drinking Water Supplies); or

(c) the lowest numerical value derived using the methodologies and procedures found in sections 701.4 through 701.7 of this Part.

Historical Note

Sec. amd. filed May 26, 1967; repealed, new filed: April 28, 1972; Feb. 25, 1974; renum. 701.18, new filed July 3, 1985 eff. 30 days after filing.

701.4 Procedure for deriving standards based on oncogenic effects. (a) Standards based on oncogenic effects shall be calculated using dose-response data from scientifically valid animal or human studies and a linearized multi-stage low-dose extrapolation model unless the scientific evidence is determined to be sufficient to support the use of an alternative extrapolation model.

(b) The dose response data deemed to be the most appropriate considering factors, including but not limited to route and duration of exposure, tumor type, species and statistical significance shall be used as a basis for the standard.

(c) The 95 percent lower confidence limit on the dose corresponding to an excess lifetime cancer risk of one in one million shall be the basis of the standard.

(d) An animal dose shall be converted to a human dose using the surface area conversion rule given below unless the scientific evidence is determined to be sufficient to support the use of an alternative trans-species conversion method:

$$\text{human dose (mg/kg/day)} = \left(\frac{\text{animal body weight (kg)}}{\text{human body weight (kg)}}\right)^{0.33} \times \text{animal dose (mg/kg/day)}$$

mg = milligrams of chemical
kg = kilograms of body weight

(e) The standard shall be based on an average 70 kilogram adult consuming 2 liters of water a day for 70 years.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 25, 1974; amd. filed Sept. 20, 1974; renum. 701.19, new filed July 3, 1985 eff. 30 days after filing.

701.5 Procedure for deriving standards based on nononcogenic effects. (a) Standards shall be based on a dose that does not produce an observed effect (no-observed effect level) derived from the results of scientifically valid human or animal studies determined most appropriate, considering factors, including but not limited to route and duration of exposure, effects, species and statistical significance. If a valid no-observed effect level has not been determined, a minimal effect level may be used.

(b) The no-observed-effect level (NOEL) or the minimal effect level, expressed as a dose in milligrams of chemical per kilogram of body weight, shall be divided by a safety or uncertainty factor to obtain an acceptable daily intake (ADI). The magnitude of this factor will generally range from 10 to 1,000 and shall reflect the quantity and quality of the toxicologic data, the degree of confidence in the data and the nature of the effects of concern. General rules for determining the magnitude of the safety factor are:

(1) Where valid experimental results from prolonged exposure studies of humans and one or more animal species are available, with no indication of oncogenicity:

Uncertainty factor = 10

(2) Where experimental results from prolonged exposures of humans are inconclusive or not available and valid results of long-term studies on experimental animals exist, with no indication of oncogenicity:

Uncertainty factor = 100

(3) Where experimental results of studies on human exposure are unavailable or inconclusive and valid results from long-term ingestion studies on experimental animals are not available, with no indication of oncogenicity:

Uncertainty factor = 1,000

(c) Standards shall allow no more than 20 percent of the acceptable daily intake to come from drinking water.

(d) Standards based on acute health concerns shall be derived based on an average 10-kilogram child consuming one liter of water per day.

(e) Standards based on chronic health concerns shall be derived based on an average 70-kilogram human consuming two liters of water per day.

Historical Note

Sec. repealed, filed March 20, 1967; new filed Feb. 25, 1974; amd. filed Sept. 20, 1974, renum. 701.20, new filed July 3, 1985 eff. 30 days after filing.

701.6 Procedure for deriving standards based on aesthetic consideration. Standards based on aesthetic considerations, including but not limited to taste, odor and discoloration shall be based on an evaluation of the reported levels of the chemical affecting the aesthetic quality of water.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.7 Procedure for deriving standards based on chemical correlations. When the available data are deemed insufficient for establishing a standard on the basis of sections 701.3 through 701.6 of this Part, a standard may be based on chemical correlations. Standards for chemical correlations shall be based on a relationship to a structurally similar chemical for which a standard has been established pursuant to sections 701.3 through 701.6 of this Part. The chemicals must have similar functional groups and potential metabolic and toxicologic pathways.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.8 Standards for protection of aquatic life, fish and fish propagation. (a) The standards for best usage for aquatic life, fish and fish propagation shall assure survival and propagation of aquatic life for all surface water classes except classes D and SD. For classes D and SD the standards shall permit survival. Standards for all classes shall also prevent aquatic food tainting and shall be protective of the health of human or wildlife consumers of fish and shellfish flesh for chemicals which may bioaccumulate.

(b) The United States Environmental Protection Agency water quality criteria published in 49 *Federal Register* 4551 (Feb. 7, 1984), 45 *Federal Register* 79317 (Nov. 28, 1980), Quality Criteria for Water, Environmental Protection Agency, 440/9-76-023 (July 1976), and 40 CFR part 129, effective July 1, 1984, will be used when they are applicable to New York waters and are protective of aquatic and wildlife resources unless the department derives more stringent standards using procedures below.

(c) When an appropriate Environmental Protection Agency criterion is not available for a substance, a standard shall be developed using procedures described below. These standards will be derived using results of tests on species and in water representative of New York State.

(d) The standards adopted shall be based on the most stringent results of the following methodologies and determinations pursuant to sections 701.9 through 701.13 of this Part:

(1) survival and propagation;
(2) survival;
(3) tainting of aquatic food;
(4) bioaccumulation; and
(5) chemical and aquatic species correlation considerations.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.9 Standards for survival and propagation. (a) *Standards determinations where the results of chronic tests are available.* A standard to permit survival and propagation shall be derived from a determination of the threshold for chronic toxic effects important to propagation of the test species, including, but not restricted to, embryo-larval productivity, teratogenesis or other reproductive effects, growth, long-term mortality or oncogenesis. A determination of the threshold shall be obtained from a full or partial life cycle or early life stage toxicity test from available scientific data. Where chronic test results are available from more than one test with an important, sensitive species, representative of New York waters, a geometric mean of the chronic values shall be used to derive a standard. When a chronic test does not provide a determination of the threshold for toxic effects, the lowest observed adverse effect concentration shall be multiplied by an application factor of 0.2 to obtain the standard.

(b) *Standards determinations where chronic test results are not available.* In the absence of chronic test results for sensitive species the standard shall be the concentration at which 50 percent of the specimens in an acute 48- or 96-hour toxicity test or similar short-term test survive or maintain mobility (LC_{50}), multiplied by an application factor. For metals, persistent chemicals, or chemicals of unknown persistence with an LC_{50} less than or equal to 1.0 milligram per liter (mg/l), an application factor of 0.01 shall be used. For all other nonpersistent chemicals or chemicals of unknown persistence with an LC_{50} greater than 1.0 mg/l, for sensitive species an application factor of 0.05 shall be used, or 0.03 if test results are for a species that is generally of lower sensitivity. Where an empirically determined chronic/acute ratio is available, then that chronic/acute ratio may be used in lieu of the application factor to derive a standard from acute test results with a sensitive species.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.10 Standards for fish survival. A standard to permit survival shall be based on the concentration at which no greater than 99 percent of test specimens survive an exposure period greater than 96 hours or an LC_{50} concentration from a 48- or 96-hour toxicity test or similar short-term test, multiplied by an application factor of 0.1, whichever is smaller.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing

701.11 Standards based on tainting of aquatic food. A water quality standard for aquatic food tainting will be 1/5 the concentration of a chemical that imparts a disagreeable flavor or odor to the flesh of fish or other aquatic life, wildlife or livestock that are consumed by humans and which acquire such flavor or odor because of habitation in, passage through or ingestion of waters.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.12 Standards based on bioaccumulation. A water quality standard based on bioaccumulation and human consumption of fish and shellfish shall be determined by the following formula:

$$C = \frac{A \times 2\,l/d}{0.033\,Kg/d \times BF}$$

Where C = the standard in micrograms per liter (ug/l)

A = the standard obtained using procedures in sections 701.3 through 701.7 of this Part in ug/l

2 l/d = 2 liters/day, the daily water consumption of an average 70 Kg adult (A × 2 l/d = an allowable daily intake in ug/d)

0.033 Kg/d = 0.033 kilograms of fish per day, the metric equivalent to consumption of one half pound fish per week

BF = a bioaccumulation factor in

$$\frac{ug/Kg}{ug/l}$$

These water quality standards shall also be determined using aquatic flesh levels known to be toxic to wildlife fish consumers, along with a bioaccumulation factor. Bioaccumulation factors will be determined from measured values in the scientific literature or determined using either measured or calculated octanol/water partition coefficients

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing

701.13 Standards based on chemical and aquatic species correlation considerations. Correlations shall be used to determine standards if adequate toxicologic, bioaccumulation or tainting data are not available for a particular chemical or aquatic species but sufficient information is available for a structurally similar chemical and appropriate aquatic species.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing

701.14 Ambient water quality standards. The department shall derive ambient standards for specific chemicals using the methodologies and procedures found in this Part. Such standards shall be included in Appendix 31, *infra* to this Part and entitled Ambient Water Quality Standards. In cases where more than one standard is listed for a given chemical for a water classification, the most stringent standard shall apply.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.15 Derivation of effluent limitations. (a) The ambient water quality standards found in Appendix 31, *infra*, will be the basis for water quality-based effluent limitations for use in State pollutant discharge elimination system (SPDES) permits.

(b) When deriving a water quality-based effluent limitation from an ambient water quality standard, the department may take into account factors, including but not limited to, analytical detectability, treatability, natural background levels and the waste assimilative capacity of the receiving waters.

(c) In cases where these factors indicate that achieving a water quality-based effluent limitation derived from an ambient water quality standard established for aquatic considerations would be clearly unreasonable, the department may substitute a modified water quality-based effluent limitation in conjunction with biological monitoring; or a technology-based effluent limitation in conjunction with biological monitoring; or biological monitoring alone in lieu of the water quality-based effluent limitation.

(d) For chemicals which do not appear in Appendix 31, *infra*, and which the department determines may pose a threat to aquatic life or the environment if discharged to the waters of the State, an ambient water quality value may be derived by applying the appropriate methodology from sections 701.8 through 701.13 of this Part. The water quality-based effluent limitation shall then be derived as in subdivisions (b) and (c) of this section. For any chemical for which an ambient water quality value has been derived in this manner, the department will initiate rule making to adopt an ambient water quality standard.

(e) For chemicals which do not appear in Appendix 31, *infra*, and which the department determines may pose a threat to human health if discharged into the waters of the State, an ambient water quality value may be derived by applying the appropriate methodology from sections 701.3 through 701.7 of this Part. The water quality-based effluent limitation will then be derived as in subdivision (b). For any chemical for which an ambient water quality value has been derived in this manner, the department will initiate rule making to adopt an ambient water quality standard. If none of the methodologies found in sections 701.3 through 701.7 of this Part are appropriate, an effluent limitation for use in SPDES permit may be derived by applying a general ambient water quality value of 50 ug/l for any chemical belonging to one of the following classes of chemicals:

alkanes,
aliphatic and aromatic alcohols,
aliphatic and aromatic aldehydes and ketones, aliphatic and aromatic esters,
halogenated aliphatics,
unsaturated aliphatics with an aldehyde, ketone or nitrile functional group,
aromatic hydrocarbons—benzene derivatives only, halogenated aromatic hydrocarbons,
phthalates,
polynuclear hydrocarbons,
aliphatic and aromatic nitro, cyano and amine compounds.

(f) The maximum ambient water quality value for the total of organic chemicals which have a standard or value established pursuant to sections 701.3 through 701.7 of this Part or subdivision (e) of this section, shall be 100 ug/l, except that this total shall not include any organic chemicals which have an ambient water quality standard or value of 100 ug/l or greater.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.16 Variances. (a) The department may, upon written application from the applicant for a SPDES permit or a SPDES permittee, grant a variance from one or more effluent limitations based on ambient water quality standards for the protection of aquatic life, fish and fish propagation established pursuant to section 701.8 through 701.13 of this Part. No variance may be granted which would result in an effluent limitation which would be less stringent than:

(1) an effluent limitation derived from an ambient water quality standard for the protection of human health; or

(2) the applicable technology-based effluent limitation or other applicable effluent limitation required pursuant to section 754.1 of this Title.

(b) An application for a variance must:

(1) identify the specific effluent limitation or limitations in the SPDES permit for which a variance is sought; and

(2) demonstrate that due to conditions unique and peculiar to the applicant's situation, compliance with the proposed effluent limitation would result in substantial and widespread economic and social impacts.

(c) In granting such variances, the department may impose specific conditions, including but not limited to, additional monitoring and biological studies, extending through the life of the permit, as necessary.

(d) Article 70 of the Environmental Conservation Law and the rules and regulations promulgated thereunder shall govern applications for variances.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.17 Referenced materials. All materials referenced in this Part can be purchased from the United States Government Printing Office, Washington, DC, and are available for copying and inspection at the Department of Environmental Conservation, Division of Water, 50 Wolf Road, Albany, NY 12233.

Historical Note

Sec. filed July 3, 1985 eff. 30 days after filing.

701.18 Class N. Best usage of waters. Enjoyment of water in its natural condition and where compatible, as source of water for drinking or culinary purposes, bathing, fishing and fish propagation, recreation and any other usages except for the discharge of sewage, industrial wastes or other wastes of any sewage or waste effluent.

Quality Standards for Class "N" Waters

Items	*Specifications*
1. Sewage, industrial wastes, or other wastes, waste effluents or any sewage effluents not having had filtration resulting from at least 200 feet* of lateral travel through unconsolidated earth.	None
2. Deleterious substances, hydrocarbons, substances which would contribute to eutrophication, or surface runoff containing any of such substances.	None

Historical Note

Sec. added by renum 701.3, filed July 3, 1985 eff. 30 days after filing.

* A greater distance may be required if an inspection shows that, due to peculiar geological conditions, this distance is inadequate to protect the water from pollution

701.19 Classes and standards for fresh surface waters. The following items and specifications shall be the standards applicable to all New York fresh waters which are assigned the classification of AA, A, B, C or D, in addition to the specific standards which are found in this section under the heading of each such classification.

Quality Standards for Fresh Surface Waters

Items	*Specifications*
1. Turbidity.	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
2. Color.	None from man-made sources that will be detrimental to anticipated best usage of waters.
3. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.
4. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes nor visible oil film nor globules of grease.
5. Taste and odor-producing substances, toxic wastes and deleterious substances.	None in amounts that will be injurious to fishlife or which in any manner shall adversely affect the flavor, color or odor thereof, or impair the waters for any best usage as determined for the specific water which are assigned to each class.
6. Thermal discharges.	(See Part 704 of this Title.)

CLASS "AA"

Best usage of waters. Source of water supply for drinking, culinary or food processing purposes and any other usages.

Conditions related to best usage of waters. The waters, if subjected to approved disinfection treatment, with additional treatment if necessary to remove naturally present impurities, will meet New York State Department of Health drinking water standards and will be considered safe and satisfactory for drinking water purposes.

Quality Standards for Class "AA" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 50 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 240 for 100 ml of sample.
2. pH	Shall be between 6.5 and 8.5.

3. Total dissolved solids.	Shall be kept as low as practicable to maintain the best usage of waters, but in no case shall it exceed 500 milligrams per liter.
4. Dissolved oxygen.	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l

CLASS "A"

Best usage of waters. Source of water supply for drinking, culinary or food processing purposes and any other usages.

Conditions related to best usage of waters. The waters, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, will meet New York State Department of Health drinking water standards and will be considered safe and satisfactory for drinking water purposes.

Quality Standards for Class "A" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 5,000 from a minimum of five examinations, and provided that not more than 20 percent of the samples shall exceed a coliform value of 20,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations.
2. pH	Shall be between 6.5 and 8.5.
3. Total dissolved solids.	Shall be kept as low as practicable to maintain the best usage of waters, but in no case shall it exceed 500 milligrams per liter.
4. Dissolved oxygen.	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l

CLASS "B"

Best usage of waters. Primary contact recreation and any other uses except as a source of water supply for drinking, culinary or food processing purposes.

Quality Standards for Class "B" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations, and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. pH	Shall be between 6.5 and 8.5.
3. Total dissolved solids.	None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.
4. Dissolved oxygen.	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.

CLASS "C"

Best usage of waters. The waters are suitable for fishing and fish propagation. The water quality shall be suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose.

Quality Standards for Class "C" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations, and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. pH	Shall be between 6.5 and 8.5.

3. Total dissolved solids.	None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.
4. Dissolved oxygen.	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l

CLASS "D"

Best usage of waters. The waters are suitable for fishing. The water quality shall be suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose. Due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery or stream bed conditions, the waters will not support fish propagation.

Conditions related to best usage of waters. The waters must be suitable for fish survival.

Quality Standards for Class "D" Waters

Items	*Specifications*
1. pH	Shall be between 6.0 and 9.5.
2. Dissolved oxygen.	Shall not be less than 3 milligrams per liter at any time.
3. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.

Historical Note

Sec. added by renum. and amd. 701.4, filed July 3, 1985; amd. filed Sept. 20, 1985 eff. 30 days after filing.

701.20 Classes and standards for saline surface waters. The following items and specifications shall be the standards applicable to all New York saline surface waters which are assigned the classification of SA, SB, SC or SD, in addition to the specific standards which are found in this section under the heading of each such classification

Quality Standards for Saline Surface Waters

Items	*Specifications*
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105)
2. pH	The normal range shall not be extended by more than one-tenth (0.1) pH unit.
3. Turbidity.	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
4. Color.	None from man-made sources that will be detrimental to anticipated best usage of waters.
5. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.
6. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
7. Thermal discharges.	(See Part 704 of this Title.)

CLASS "SA"

Best usage of waters. The waters shall be suitable for shellfishing for market purposes and primary and secondary contact recreation.

Quality Standards for Class "SA" Waters

Items	*Specifications*
1. Coliform.	The median MPN value in any series of samples representative of waters in the shellfish-growing area shall not be in excess of 70 per 100 ml.
2. Dissolved oxygen.	Shall not be less than 5.0 mg/l at any time.
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters for any other best usage as determined for their specific waters which are assigned to this class.

CLASS "SB"

Best usage of waters. The waters shall be suitable for primary and secondary contact recreation and any other use except for the taking of shellfish for market purposes.

Quality Standards for Class "SB" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations, and provided that not more than 20 per cent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. Dissolved oxygen.	Shall not be less than 5.0 mg/l at any time
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SC"

Best usage of waters. The waters are suitable for fishing and fish propagation. The water quality shall be suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose.

Quality Standards for Class "SC" Waters

Items	*Specifications*
1. Coliform.	The monthly medial coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced
2. Dissolved oxygen	Shall not be less than 5.0 mg/l at any time

3.	Toxic wastes and deleterious substances.	None in amounts that will interfere with use for secondary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SD"

Best usage of waters. All waters not primarily for recreational purposes, shellfish culture or the development of fishlife, and because of natural or man-made conditions cannot meet the requirements of these uses.

Quality Standards for Class "SD" Waters

Items		*Specifications*
1.	Dissolved oxygen.	Shall not be less than 3.0 mg/l at any time.
2.	Toxic wastes and deleterious substances.	None alone or in combination with other substances or wastes in sufficient amounts to prevent survival of fishlife, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Historical Note
Sec. added by renum. 701.8, filed July 3, 1985; amd. filed Sept. 20, 1985 eff. 30 days after filing.

PART 702

SPECIAL CLASSIFICATIONS AND STANDARDS

(Statutory authority: Environmental Conservation Law, §§ 3-0301[2][m], 15-0313, 17-0301)

Historical Note
Part repealed, new filed: April 28, 1972; Feb 25, 1974 eff. 30 days after filing.

Section 702.1 Class A – Special (International boundary waters).

(GREAT LAKES WATER QUALITY AGREEMENT OF 1972)

Best usage of waters. Source of water supply for drinking, culinary or food processing purposes, primary contact recreation and any other usages.

Conditions related to best usage. The waters, if subjected to approved treatment, equal to coagulation, sedimentation, filtration and disinfection with additional treatment, if necessary, to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

Quality Standards for Class A – Special Waters (International Boundary Waters)

Items		*Specifications*
1.	Coliform.	The geometric mean of not less than five samples taken over not more than a 30 day period should not exceed 1,000 per 100 ml total coliform nor 200 per 100 ml fecal coliform.
2.	Dissolved oxygen.	In the rivers and upper waters of the lakes not less than 6.0 mg/l at any time. In hypolimnetic waters, it should be not less than necessary for the support of fishlife particularly cold water species

Items	*Specifications*
3. Total dissolved solids.	Should not exceed 200 milligrams per liter.
4. pH	Should not be outside the range of 6.7 to 8.5.
5. Iron.	Should not exceed 0.3 milligrams per liter as Fe.
6. Phosphorus.	Concentrations should be limited to the extent necessary to prevent nuisance growths of algae, weeds and slimes that are or may become injurious to any beneficial water use.
7. Radioactivity.	Should be kept at the lowest practicable levels, and in any event should be controlled to the extent necessary to prevent harmful effects on health.
8. Taste and odor-producing substances, toxic wates and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to the growth and propagation of fish, or which in any manner shall adversely affect the flavor, color or odor thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
9. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to this class.
10. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
11. Thermal discharges.	(See Part 704 of this Title.)

To meet the water quality objectives referred to in the "Great Lakes Water Quality Agreement of 1972," the standards listed above shall be subject to revision from time to time after further hearings on due notice.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 26, 1974; amds. filed: Sept. 20, 1974; July 3, 1985 eff. 30 days after filing.

702.2 Class AA – Special (Lake Champlain drainage basin).

CLASS AA – SPECIAL

Best usage of waters. Any usage except for disposal of sewage, industrial wastes or other wastes.

Quality Standards for Class AA – Special Waters (Lake Champlain drainage basin)

Items	*Specifications*
1. Floating solids, settleable solids; oil; sludge deposits; toxic wastes; deleterious substances; colored or other wastes or heated liquids.	None attributable to sewage, industrial waste or other wastes.
2. Sewage or waste effluents.	None into waters of this class.

Historical Note

Sec. repealed, new filed: April 28, 1972; Feb. 26, 1974 eff. 30 days after filing, provided, however, if the application, pursuant to Parts 800 to 941, inclusive, of Title 6, of any provision of Part 701 or 702 shall be found to be invalid, the corresponding provision of Part 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.3 Special classes and standards for the Lower Hudson River, Arthur Kill, Kill Van Kull, Harlem River, Raritan Bay and Lower East River drainage basins, New York Bay area, Nassau County, including Long Island Sound, Suffolk County, Upper East River, Long Island Sound drainage basins within Queens, Bronx and Westchester Counties, and Jamaica Bay drainage basin within Kings and Queens Counties, including a certain portion of Rockaway Inlet. (a) This section applies to the waters within the following areas, which constitute the Interstate Sanitation District:

(1) the drainage basin of the Lower Hudson River, from the mouth to northern Westchester-Rockland county lines, except Saw Mill River and Sparkill Creek drainage basins;

(2) the drainage basins of Arthur Kill, Kill Van Kull, Harlem River and Raritan Bay;

(3) the drainage basin of Lower East River, from the mouth to a line across East River north of Wards Island between Stony Point in Bronx County and Lawrence Point in Queens County;

(4) New York Bay, including Gravesend Bay, Coney Island Creek, Atlantic Basin, Erie Basin, Gowanus Bay, Gowanus Canal. The Narrows and Atlantic Ocean waters off Coney Island lying westerly of a north-south line from Light Inlet at the southeasterly tip of Coney Island Peninsula to the south tip of Rockaway Point, thence along the jetty to Rockaway jetty light, thence due south to the New York - New Jersey boundary line;

(5) Nassau County, including the waters of Long Island Sound between Nassau-Queens and Nassau-Suffolk county lines, and the waters of Atlantic Ocean to the three-mile limit between said county lines;

(6) the area within Suffolk County lying west of a north-south topographical limit line and its extensions, to a point in Long Island Sound at the New York - Connecticut state boundary line due north of Miller Place Beach and to Blue Point on the south mainland, thence southward across Great South Bay to Water Island, thence three miles due south to a point in the Atlantic Ocean at the south state boundary line;

(7) certain tidal waters which are within the Upper East River and Long Island Sound drainage basins within Queens, Bronx and Westchester Counties; and

(8) Jamaica Bay drainage basin within Kings and Queens Counties, and including Rockaway Inlet, east of a north-south line drawn from Light Inlet at the southeasterly tip of Coney Island Peninsula near Manhattan Beach to the westerly shoreline west of lookout tower on Rockaway Point.

(b) Said classes and standards of quality and purity applicable thereto are set forth hereinafter and designated Class I and Class II.

CLASS "I"

Best usage of waters. The waters shall be suitable for secondary contact recreation and any other usage except for primary contact recreation and shellfishing for market purposes.

Quality Standards for Class "I" Waters

Items	*Specifications*
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105).
2. Coliform.	The monthly geometric mean total coliform value for 100 ml of sample shall not exceed 10,000, and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 2,000 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
3. Dissolved oxygen.	Shall not be less than 4.0 mg/l at any time.
4. pH.	The normal range shall not be extended by more than one-tenth (0.1) pH unit.
5. Turbidity.	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
6. Color.	None from man-made sources that will be detrimental to anticipated best usage of waters.

Items	*Specifications*
7. Taste and odor-producing substances, toxic wastes and deleterious substances.	None in amounts that will interfere with use for secondary contact recreation, or that will be injurious to edible fish or shell fish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary conditions thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
8. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to this class.
9. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
10. Thermal discharges.	(See Part 704 of this Title.)

Historical Note

Sec. amd. filed March 27, 1972; repealed, new filed: April 28, 1972; Feb. 25, 1974; amds filed: Sept. 20, 1974; Sept. 20, 1985 eff. 30 days after filing.

702.4 Class AA – Special (Upper Hudson River drainage basin).

CLASS AA – SPECIAL

Best usage of waters. Any usage except for disposal of sewage, industrial waste or other waste.

Quality Standards for Class AA – Special Waters (Upper Hudson River drainage basin)

Items	*Specifications*
1. Floating solids, settleable solids, oil, sludge deposits, toxic wastes, deleterious substances, colored or other wastes or heated liquids.	None attributable to sewage, industrial wastes or other wastes.
2. Sewage or waste effluents.	None into waters of this class.

Historical Note

Sec. amd. filed March 27, 1972; repealed, new filed April 28, 1972; repealed, filed Feb 25, 1974 eff. 30 days after filing, provided, however, if the application, pursuant to Parts 800 to 941, inclusive, of Title 6, of any provision of Part 701 or 702 shall be found to be invalid, the corresponding provision of Part 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.5

Historical Note

Sec. repealed, new filed April 28, 1972; repealed, filed Feb. 26, 1974 eff. 30 days after filing; provided, however, if the application, pursuant to Parts 800 to 941, inclusive, of Title 6, of any provision of Part 701 or 702 shall be found to be invalid, the corresponding provision of Part 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.6-702.7

Historical Note

Secs. repealed, filed March 22, 1968 eff. March 22, 1968.

702.8

Historical Note

Sec. filed May 24, 1967; repealed, new filed April 28, 1972; repealed, filed Feb. 26, 1974 eff. 30 days after filing; provided, however, if the application, pursuant to Parts 800 to 941, inclusive, of Title 6, of any provision of Part 701 or 702 shall be found to be invalid, the corresponding provision of Part 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

PART 703

GROUND WATER CLASSIFICATIONS, QUALITY STANDARDS AND EFFLUENT STANDARDS AND/OR LIMITATIONS

(Statutory authority: Environmental Conservation Law, §§ 17-0301, 17-0809)

Historical Note

Part (§§ 703.1-703.4) filed Mar. 20, 1967; repealed, new filed Apr. 28, 1972; repealed, new (§§ 703.1-703.11) filed Aug. 2, 1978 eff. 30 days after filing.

Section 703.1 Definitions. The terms, words or phrases used in this Part shall have the following meaning:

(a) *Administrator* shall mean the administrator of the United States Environmental Protection Agency.

(b) *Best usage of waters* as specified for each class shall be those uses as determined by the commissioner in accordance with the considerations prescribed by the Environmental Conservation Law.

(c) *Commissioner* shall mean the Commissioner of Environmental Conservation.

(d) *Consolidated rock* or *bed rock* is the compact or solid hard rock exposed at the surface of the earth or overlain by the unconsolidated deposits.

(e) *Department* shall mean the New York State Department of Environmental Conservation.

(f) *Disposal system* means a system for disposing of sewage, industrial waste or other wastes and including sewer systems and treatment works.

(g) *Effluent standard and/or limitation* shall mean any restriction on quantities, quality, rates and concentrations of chemical, physical, biological, and other constituents of effluents which are discharged or allowed to run from an outlet, point source or any other discharge within the meaning of Environmental Conservation Law, section 17-0501, into the unsaturated or saturated zones.

(h) *Fresh water* is that water having a chloride concentration equal to or less than 250 mg/l, or a total dissolved solids concentration equal to or less than 1000 mg/l.

(i) *Ground waters* are those waters in the saturated zone, including perched water areas.

(j) *Industrial waste* means any liquid, gaseous, solid or waste substance or a combination thereof resulting from any process of industry, manufacturing, trade, or business or from the development or recovery of any natural resources, which may cause or might reasonably be expected to cause pollution of the waters of the State in contravention of the standards adopted as provided in Environmental Conservation Law, article 17.

(k) *Land application techniques* include the following three basic methods of waste discharge application: irrigation; infiltration-percolation; and overland flow.

(l) *Land utilization practices* entails the use of plants, the soil surface, and soil matrix for removal of certain wastewater constituents.

(m) *Micrograms per liter, ug/l,* is the weight in micrograms of any specific substance or substances contained in one liter of solution.

(n) *Milligrams per liter, mg/l,* is the weight in milligrams of any specific substance or substances contained in one liter of solution.

(o) *Other wastes* means garbage, refuse, decayed wood, sawdust, shavings, bark, sand, lime, cinders, ashes, offal, oil, tar, dyestuffs, acids, chemicals, leachate, sludge, salt and all other discarded matter not sewage or industrial waste which may cause or might reasonably be expected to cause pollution of the waters of the State in contravention of the standards adopted as provided in Environmental Conservation Law, article 17.

(p) *Outlet* means the terminus of a sewer system, or the point of emergence of any water-borne sewage, industrial waste or other wastes or the effluent therefrom, into the saturated or unsaturated zones.

(q) *Pathogenic organism* shall mean any disease-producing organism.

(r) *Perched ground water* shall mean unconfined ground water separated from an underlying body of ground water by an unsaturated zone.

(s) *Person* or *persons* shall mean any individual, public or private corporation, political subdivision, government agency, municipality, industry, co-partnership, association, firm, trust, estate or any other legal entity whatsoever.

(t) *Point source* means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation or vessel or other floating stock from which pollutants are or may be discharged.

(u) *Pollutant* means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, and industrial, municipal, and agricultural waste discharged into water.

(v) *Pollution* shall mean the presence in the environment of conditions and/or contaminants in quantities of characteristics which are or may be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas of the State as shall be affected thereby.

(w) *Potable waters* are those fresh waters usable for drinking, culinary or food processing purposes.

(x) *Quality standard* shall mean such measure of purity or quality for any ground waters in relation to their best usage.

(y) *Saline water* is that water having a chloride concentration of more than 250 mg/l or a total dissolved solids concentration of more than 1000 mg/l.

(z) The *saturated zone* is that extensive portion of the earth's crust which is saturated with water. (Includes perched water areas.)

(aa) *Sewage* means the water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such ground water infiltration and surface water as may be present.

(bb) *Subsurface sewage disposal system* shall mean a disposal system which discharges sewage beneath the surface of the ground.

(cc) *Toxic pollutant* means those pollutants, or combination of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly through food chains, will, on the basis of information available to the department, cause death, disease, behavioral abnormalities, cancer, gen mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformations, in such organisms or their offspring.

(dd) *Treatment works* means any plant, disposal field, lagoon, pumping station constructed drainage ditch or surface water intercepting ditch, incinerator, area devoted to sanitary land fills or other works not specifically mentioned herein, installed for the purpose of treating, neutralizing, stabilizing or disposing of sewage, industrial waste or other wastes.

(ee) *Unconsolidated deposits* are all non- or poorly indurated soil materials above the bedrock.

(ff) The *unsaturated zone* is that portion of the earth's crust which does not contain sufficient water to fill all interconnected voids or pore spaces. Perched water bodies may exist within the unsaturated zone.

(gg) *Waste management system* includes the management of mechanical equipment crops, irrigation and monitors as an operational unit.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978 eff. 30 days after filing.

703.2 Purposes of classifications, quality standards, and effluent standards and/or limitations. The purpose of these classes, quality standards and effluent standards and/or limitations is to prevent pollution of ground waters and to protect the ground waters for use as potable water.

Historical Note

Sec. filed March 20, 1967; repealed, new filed April 28, 1972; Aug. 2, 1978 eff. 30 days after filing.

703.3 Collection of samples. (a) The determination of compliance or noncompliance of sewage, industrial waste or other waste discharges with the requirements of this Part shall be made through tests or analytical determinations of ground water or effluent samples collected in such manner as are approved by the department.

(b) The location at which ground water samples are collected shall be determined by the department. In selecting or approving such locations, the department shall consider all relevant facts, including but not limited to:

(1) the mobility of pollutants in the unsaturated zone is governed by the rate of movement of percolating water and the active pollutant attenuation mechanisms in this zone;

(2) attenuation mechanisms may remove potential pollutants in passage through topsoil and adequate thicknesses of the unsaturated zone; and

(3) attenuation of pollutant concentrations with distance may occur in the saturated zone, similar to that in the unsaturated zone, as a result of attenuation processes occuring below the water table.

(c) The location at which effluent samples are collected shall be at a point where the effluent emerges from a treatment works, disposal system, outlet or point source and prior to being discharged to the ground.

Historical Note

Sec. filed March 20, 1967; repealed, new filed April 28, 1972; Aug. 2, 1978 eff. 30 days after filing.

703.4 Tests or analytical determinations. Tests or analytical determinations to determine compliance or noncompliance with standards shall be made in accordance with:

(a) *Standard Methods for the Examination of Water and Wastewater* (see section 706.2 of this Title);

(b) *Methods for Chemical Analysis of Water and Wastes* (see section 705.2 of this Title);

(c) *Water Standards of the American Society for Testing and Materials* (see section 705.2 of this Title); or

(d) by other methods approved by the commissioner as giving results equal to or superior to methods listed above.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978; amd. filed Nov. 5 1984 eff. Nov. 5, 1984.

703.5 Classes and quality standards for ground waters. (a) *Class GA.*

(1) The best usage of class GA waters is as a source of potable water supply. Class GA waters are fresh ground waters found in the saturated zone of unconsolidated deposits and consolidated rock or bed rock.

(2) Quality standards for class GA waters shall be the most stringent of:

(i) the items and specifications applicable to such waters found in this section;

(ii) the maximum contaminant levels for drinking water promulgated by the Commissioner of Health as found in 10 NYCRR Subpart 5-1, Public Water Supplies or any subsequent revision thereto or replacement thereof;

(iii) the maximum contaminant levels for drinking water promulgated by the administrator under the Safe Drinking Water Act (see section 705.1 of this Title) and 40 CFR Part 141, effective July 1, 1978 (see section 705.1); and

(iv) the standards for raw water quality promulgated by the Commissioner of Health as found in 10 NYCRR Part 170, Sources of Water Supply or any subsequent revision thereto or replacement thereof.

(3) The following quality standards shall be applicable to class GA waters:

Items	*Specifications*
(*a*) Sewage, industrial waste or other wastes, taste or odor producing substances, toxic pollutants, thermal discharges, radioactive substances or other deleterious matter.	None which may impair the quality of the ground waters to render them unsafe or unsuitable for a potable water supply or which may cause or contribute to a condition in contravention of standards for other classified waters of the State.
(*b*) The concentration of the following substances or chemicals:	Shall not be greater than the limit specified, except where exceeded due to natural conditions:
(*1*) Arsenic (As)	0.025 mg/l
(*2*) Barium (Ba)	1.0 mg/l
(*3*) Cadmium (Cd)	0.01 mg/l
(*4*) Chloride (Cl)	250 mg/l
(*5*) Chromium (Cr) Hexavalent	0.05 mg/l
(*6*) Copper (Cu)	1.0 mg/l
(*7*) Cyanide (Cn)	0.2mg/l
(*8*) Fluoride (F)	1.5 mg/l
(*9*) Foaming Agents[1]	0.5 mg/l
(*10*) Iron (Fe)[2]	0.3 mg/l

Items	*Specifications*
(*11*) Lead (Pb)	0.025 mg/l
(*12*) Manganese (Mn)[2]	0.3 mg/l
(*13*) Mercury (Hg)	0.002 mg/l
(*14*) Nitrate (as N)	10.0 mg/l
(*15*) Phenols	0.001 mg/l
(*16*) Selenium (Se)	0.02 mg/l
(*17*) Silver (Ag)	0.05 mg/l
(*18*) Sulfate (SO_4)	250 mg/l
(*19*) Zinc (Zn)	5 mg/l
(*20*) pH Range	6.5-8.5
(*21*) Aldrin, or 1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro-*endo*-1, 4-exo-5, 8-dimethanonaphthalene.	not detectable[3]
(*22*) Chlordane, or 1, 2, 4, 5, 6, 7, 8, 8-octachloro-2, 3, 3a, 4, 7, 7a-hexahydro-4, 7-methanoindene.	0.1 ug/l
(*23*) DDT, or 2, 2-bis- (p-chlorophenyl)-1, 1, 1-trichloroethane and metabolites.	not detectable[3]
(*24*) Dieldrin, or 6, 7-epoxy aldrin.	not detectable[3]
(*25*) Endrin, or 1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-endo-1, 4-*endo*-5, 8-dimethanonaphthalene.	not detectable[3]
(*26*) Heptachlor, or 1, 4, 5, 6, 7, 8, 8-heptachloro-3a, 4, 7, 7a-tetrahydro-4, 7-methanoindene and metabolites.	not detectable[3]
(*27*) Lindane and other Hexachlorocyclohexanes or mixed isomers of 1, 2, 3, 4, 5, 6-hexachlorocyclohexane.	not detectable[3]
(*28*) Methoxychlor, or 2, 2-*bis*-(p-methoxyphenyl)-1, 1, 1-trichloroethane.	35.0 ug/l
(*29*) Toxaphene (a mixture of at least 175 chlorinated camphene derivatives).	not detectable[3]
(*30*) 2, 4-Dichlorophenoxyacetic acid (2, 4-D)	4.4 ug/l
(*31*) 2, 4, 5-Trichlorophenoxypropionic acid (2, 4, 5-TP) (Silvex)	0.26 ug/l
(*32*) Vinyl chloride (chloroethene)	5.0 ug/l
(*33*) Benzene	not detectable[3]
(*34*) Benzo (a) pyrene	not detectable[3]
(*35*) Kepone or decachlorooctahydro-1, 3, 4-metheno-2H-cyclobuta (cd) pentalen-2-one (chlordecone).	not detectable[3]

	Items	*Specifications*
(36)	Polychlorinated biphenyls (PCB) (Aroclor)	0.1 ug/l
(37)	Ethylene thiourca (ETU)	not detectable[a]
(38)	Chloroform	100 ug/l
(39)	Carbon tetrachloride (tetrachloromethane)	5 ug/l
(40)	Pentachloronitrobenzene (PCNB)	not detectable[a]
(41)	Trichloroethylene	10 ug/l
(42)	Diphenylhydrazine	not detectable[a]
(43)	bis (2-chloroethyl) ether	1.0 ug/l
(44)	2, 4, 5-Trichlorophenoxyacetic acid (2, 4, 5-T)	35 ug/l
(45)	2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin (TCDD)	3.5×10^{-5} ug/l
(46)	2 - Methyl- 4 -chlorophenoxyacetic acid (MCPA)	0.44 ug/l
(47)	Amiben, or 3-amino-2, 5-dichlorobenzoic acid (chloramben)	87.5 ug/l
(48)	Dicamba, or 2-methoxy-3, 6-dichlorobenzoic acid	0.44 ug/l
(49)	Alachlor, or 2-chloro-2', 6'-diethyl-*N*- (meth oxymethyl)-acetanilide (Lasso)	35.0 ug/l
(50)	Butachlor, or 2-chloro-2', 6'-diethyl-N- (butoxymethyl)-acetanilide (Machete)	3.5 ug/l
(51)	Propachlor, or 2-chlor-N-isopropyl-N-acetanilide (Ramrod)	35.0 ug/l
(52)	Propanil, or 3', 4'-dichloropropionanilide	7.0 ug/l
(53)	Aldicarb, [2-methyl-2-(methylthio) propionaldehyde *O*-(methyl carbamoyl) oxime] and methomyl [1-methylthioacetaldhyde *O*-(methyl-carbamoyl) oxime]	0.35 ug/l
(54)	Bromacil, or 5-broma-3-sec-butyl-6-methluracil	4.4 ug/l
(55)	Paraquat, or 1, 1'-dimethyl-4, 4'-dipyridylium	2.98 ug/l
(56)	Trifluralin, or α, α, α-trifluoro-2, 6-dinitro-, N-dipropyl-p- toluidine (Trefian)	35.0 ug/l
(57)	Nitralin, or 4-(methylsulfonyl)-2, 6-dinitro-N, N-dipropylaniline (Planavin)	35.0 ug/l
(58)	Benefin, or N-butyl-N-ethyl-α, α, α-trifluoro-2, 6- dinitro-p-toluidine (Balan)	35.0 ug/l

	Items	*Specifications*
(59)	Azinphosmethyl, or *O, O*-dimethyl-S-4 oxo-1, 2, 3-benzotriazin-3 (4H)-ylmethylphosphorodithioate (Guthion)	4.4 micrograms per liter
(60)	Diazinon, or *O, O*-diethyl O-(2)- isopropyl-4-methyl-6- pyrimidinyl)-Phosphorothioate	0.7 micrograms per liter
(61)	Phorate (also for Disulfoton), or *O, O*-diethyl-*S*-[(ethylthio) methyl]-phosphorodithioate (Thimet R), and disulfoton, or *O, O*-diethyl-S-[(2-ethylthio) ethyl] phosphorodithioate (Di-System R)	not detectable[a]
(62)	Carbaryl, or 1-naphthyl-N-methylcarbamate	28.7 micrograms per liter
(63)	Ziram, or zinc salts of dimethyldithiocarbamic acid	4.18 micrograms per liter
(64)	Ferbam, or iron salts of dimethyldithiocarbamic acid	4.18 micrograms per liter
(65)	Captan, or *N*-trichloromethylthio-4-cyclohexene-1, 2-dicarboximide	17.5 micrograms per liter
(66)	Folpet, or *N*-trichloromethylthiophthalimide	56.0 micrograms per liter
(67)	Hexachlorobenzene (HCB)	0.35 micrograms per liter
(68)	Paradichlorobenzene (PDB) (Also orthodichlorobenzene)	4.7 micrograms per liter
(69)	Parathion (and Methl parathion), or (*O, O*-diethyl-*O*-*p*-nitrophenylphosphorthioate, an methyl parathion, or *O, O*-dimethyl- *O*- *p*- ni trophenylphosphorothioate	1.5 micrograms per liter
(70)	Malathion, or *S*-1, 2-*bis* (ethoxycarbony 1) ethyl-*O, O*-dimethylphosphorodithioate	7.0 micrograms per liter
(71)	Maneb, or- manganese salt of ethylene- bis- dithiocarbamic acid	1.75 micrograms per liter
(72)	Zineb, or zinc salt of ethylene-bis-dithiocarbamic acid.	1.75 micrograms per liter
(73)	Dithane, or zincate of manganese ethylene-bis-dithiocarbemate	1.75 micrograms per liter
(74)	Thiram, or tetramethylthiuramdisulfide	1.75 micrograms per liter
(75)	Atrazine, or 2-chloro-4-ethylamino-6-isopropylamino-S-triazine	7.5 micrograms per liter
(76)	Propazine, or 2-chloro-4, 6-diissopropylamino-S-triazine	16.0 micrograms per liter

	Items	*Specifications*
(77)	Simazine, or 2-chloro-4, 6-diethylamino-S-triazine	75.25 micrograms per liter
(78)	Di-n-butylphthalate	770 micrograms per liter
(79)	Di (2-ethylhexyl) phthalate (DEHP)	4.2 milligrams per liter
(80)	Hexachlorophene, or 2, 2'-methylene-bis (3,4, 6-trichlorophenol)	7 micrograms per liter
(81)	Methyl methacrylate	0.7 milligrams per liter
(82)	Pentachlorophenol (PCP)	21 micrograms per liter
(83)	Styrene	931 micrograms per liter

Notes: [1] Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.
[2] Combined concentration of iron and manganese shall not exceed 0.5 mg/l.
[3] *Not detectable* means by tests or analytical determinations referenced in section 703.4.

(b) *Class GSA.* (1) The best usage of class GSA waters is as a source of potable mineral waters, for conversion to fresh potable waters, or as raw material for the manufacture of sodium chloride or its derivatives or similar products. Such waters are saline waters found in the saturated zone.

(2) The following quality standards shall be applicable to class GSA waters:

Items	*Specifications*
Sewage, industrial wastes or other wastes, color, taste or odor producing substances, toxic pollutants, thermal discharges, radioactive substances or other deleterious matter.	None which may impair the waters for use as sources of saline waters for the best usage outlines above or as to cause or contribute to a condition in contravention of standards for other classified waters of the State.

(c) *Class GSB.* (1) The best usage of class GSB waters is as a receiving water for disposal of wastes. Such waters are those saline waters found in the saturated zone which have chloride concentration in excess of 1,000 milligrams per liter or a total dissolved solids concentration in excess of 2,000 milligrams per liter.

(2) The following quality standards shall be applicable to class GSB waters:

Items	*Specifications*
Sewage, industrial wastes or other wastes, color, taste or odor producing substances, toxic pollutants, thermal discharges, radioactive substances or other deleterious matter.	None which may be deleterious, harmful, detrimental or injurious to the public health, safety or welfare or which may cause or contribute to a condition in contravention of standards for other classified waters of the State.

(3) Class GSB shall not be assigned to any ground waters of the State unless the commissioner finds that adjacent and tributary ground waters and the best usage thereof will not be impaired by such classification.

Historical Note

Sec. filed March 20, 1967; repealed, new filed: April 28, 1972; Aug. 2, 1978; amd. filed Nov. 5, 1984 eff. Nov. 5, 1984. Amended (a)(2)(iii).

703.6 Effluent standards and/or limitations for discharges to class GA waters.
(a) The effluent standards and/or limitations in schedules I and II of this section apply to a discharge from a point source or outlet or any other discharge within the meaning of Environmental Conservation Law, section 17-0501 which discharge will or may enter the unsaturated or saturated zones.

(b) The department may establish additional effluent standards and/or limitations as set forth in section 703.7 of this Part.

(c) The effluent standards and/or limitations shall be incorporated in SPDES permits (under Part 750 *et seq.* of this Title) for discharges to ground waters, where applicable.

Schedule I

Applicability. The following effluent standards and/or limitations shall apply to all class GA waters in New York State.

Biological organisms. Coliform and/or pathogenic organisms shall not be discharged in amounts sufficient to render fresh ground waters detrimental to public health, safety or welfare.

Chemical characteristics.

	Substance	*Maximum allowable concentration in mg/l (unless otherwise noted)*
(1)	Aluminum	2.0
(2)	Arsenic	0.05
(3)	Barium	2.0
(4)	Cadmium	0.02
(5)	Chloride	500
(6)	Chromium (Cr) (Hexavalent)	0.10
(7)	Copper	1.0
(8)	Cyanide	0.40
(9)	Fluoride	3.0
(10)	Foaming Agents[1]	1.0
(11)	Iron[2]	0.6
(12)	Lead	0.05
(13)	Manganese[2]	0.6
(14)	Mercury	0.004
(15)	Nickel	2.0
(16)	Nitrate (as N)	20
(17)	Oil and Grease	15
(18)	Phenols	0.002
(19)	Selenium	0.04
(20)	Silver	0.1
(21)	Sulfate	500
(22)	Sulfide	1.0
(23)	Zinc	5.0
(24)	pH Range[3]	6.5-8.5
(25)	Aldrin, or 1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro-*endo*-1, 4-exo-5, 8-dimethanonaphthalene	not detectable[4]
(26)	Chlordane, or 1, 2, 4, 5, 6, 7, 8, 8-octachloro-2, 3, 3a, 4, 7, 7a-hexahydro-4, 7-methanoindene	0.1 ug/l

	Substance	Maximum allowable concentration in mg/l (unless otherwise noted)
(27)	DDT, or 2, 2-bis-(p-chlorophenyl)-1, 1, 1-trichloroethane and metabolites	not detectable[4]
(28)	Dieldrin, or 6, 7-epoxy aldrin	not detectable[4]
(29)	Endrin, or 1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-endo-1, 4-*endo*-5, 8-dimethanonaphthalene	not detectable[4]
(30)	Heptachlor, or 1, 4, 5, 6, 7, 8, 8-heptachloro-3a, 4, 7, 7a-tetrahydro-4, 7- methanoindene and metabolites	not detectable[4]
(31)	Lindane and other Hexachlorocyclohexanes or mixed isomers of 1, 2, 3, 3, 5, 6-hexachlorocyclohexane	not detectable[4]
(32)	Methoxychlor, or 2, 2-*bis*-(*p*-methoxphenyl)-1, 1, 1-trichloroethane	35 ug/l
(33)	Toxaphene (a mixture of at least 175 chlorinated camphene derivatives)	not detectable[4]
(34)	2, 4- Dichlorophenoxyacetic acid (2, 4-D)	4.4 ug/l
(35)	2, 4, 5-Trichlorophenoxypropionic acid (2, 4, 5-TP) (Silvex)	0.26 ug/l
(36)	Vinyl chloride (chloroethene)	5.0 ug/l
(37)	Benzene	not detectable[4]
(38)	Benzo (a) pyrene	not detectable[4]
(39)	Kepone or decachlorooctahydro-1, 3, 4-metheno-2H-cyclobuta (cd) pentalen-2-one (chlordeone)	not detectable[4]
(40)	Polychlorinated biphenyls (PCB) (Aroclor)	0.1 ug/l
(41)	Ethylene thiourea (ETU)	not detectable[4]
(42)	Chloroform	100 ug/l
(43)	Carbon tetrachloride (tetrachloromethane)	5 ug/l
(44)	Pentachloronitrobenzene (PCNB)	not detectable[4]
(45)	Trichloroethylene	10 ug/l
(46)	Diphenylhydrazine	not detectable[4]
(47)	bis (2-chloroethyl) ether	1.0 ug/l
(48)	2, 4, 5-Trichlorophenoxyacetic acid (2, 4, 5-T)	35 ug/l
(49)	2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin (TCDD)	3.5×10^{-6} ug/l
(50)	2- Methyl-4- chlorophenoxyacetic acid (MCPA)	0.44 ug/l

	Substance	Maximum allowable concentration in mg/l (unless otherwise noted)
(51)	Amiben, or 3-amino-2, 5-dichlorobenzoic acid (chloramben)	87.5 ug/l
(52)	Dicamba, or 2-methoxy-3, 6-dichlorobenzoic acid	0.44 ug/l
(53)	Alachlor, or 2-chloro-2', 6'-diethyl-*N*- (methoxymethyl)-acetanilide (Lasso)	35.0 ug/l
(54)	Butachlor, or 2-chlor-2', 6'-diethyl-N- (butoxymethyl)-acetanilide (Machete)	3.5 ug/l
(55)	Propachlor, or 2-chlor-N-isopropyl-N-acetanilide (Ramrod)	35.0 ug/l
(56)	Propanil, or 3', 4'-dichloropropionanilide	7.0 ug/l
(57)	Aldicarb, [2-methyl-2-(methylthio) propionaldehyde *O*-(methyl carbamoyl) oxime] and methomyl [1-methylthioacetaldehyde *O*- (methyl-carbamoyl) oxime]	0.35 ug/l
(58)	Bromacil, or 5-broma-3- sec-butyl-6-methluracil	4.4 ug/l
(59)	Paraquat, or 1, 1'-dimethyl-4, 4'-dipyridylium	2.98 ug/l
(60)	Trifluralin, or α, α, α-trifluoro-2, 6-dinitro-N-dipropyl-p-toluidine (Treflan)	35.0 ug/l
(61)	Nitralin, or 4-(methylsulfonyl) -2, 6-dinitro-N, N-dipropylaniline (Planavin)	35.0 ug/l
(62)	Benefin, or N-butyl-N- ethyl-α, α, α-trifluoro- 2, 6- dinitro-p-toluidine (Balan)	35.0 ug/l
(63)	Azinphosmethyl, or *O*, *O*-dimethyl-*S*- 4- oxo-1, 2, 3-benzotriazin-3 (4H)- ylmethylphosphorodithioate (Guthion)	4.4 ug/l
(64)	Diazinon, or *O*, *O*-diethyl *O*-(2-isopropyl- 4- methyl- 6-pyrimidinyl)-phosphorothioate	0.7 ug/l
(65)	Phorate (also for Disulfoton), or *O*, *O*- diethyl-*S*-[(ethylthio) methyl] -phosphorodithioate (Thimet R), and disulfoton, or *O*, *O*-diethyl-*S*- [(2-ethylthio) ethyl] phosphorodithioate (Di-System R)	not detectable[4]
(66)	Carbaryl, or 1-naphthyl-N-methylcarbamate	28.7 ug/l

	Substance	Maximum allowable concentration in mg/l (unless otherwise noted)
(67)	Ziram, or zinc salts of dimethyldithiocarbamic acid	4.18 ug/l
(68)	Ferbam, or iron salts of dimethyl-dithiocarbamic acid	4.18 ug/l
(69)	Captan, or *N*-trichloromethylthio-4-cyclohexene- 1, 2-dicarboximide	17.5 ug/l
(70)	Folpet, or *N*-trichloromethylthiophthalimide	56.0 ug/l
(71)	Hexachlorobenzene (HCB)	0.35 ug/l
(72)	Paradichlorobenzene (PDB) (also orthodichlorobenzene)	4.7 ug/l
(73)	Parathion (and Methyl parathion), or (*O*,-O-diethyl-*O*-*p*-nitrophenylphosphorthioate, and methyl parathion, or *O*, *O*-dimethyl-*O*-*p*- nitrophenylphosphorothioate.	1.5 ug/l
(74)	Malathion, or *S*-1, 2- *bis* (ethoxycarbonyl) ethyl- *O*, *O*-dimethylphosphorodithioate	7.0 ug/l
(75)	Maneb, or-manganese salt of ethylene- bis- dithiocarbamic acid	1.75 ug/l
(76)	Zineb, or zinc salt of ethylene-bis-dithiocarbamic acid	1.75 ug/l
(77)	Dithane, or zincate of manganese ethylene- bis- dithiocarbamate	1.75 ug/l
(78)	Thiram, or tetramethylthiuramdisulfide	1.75 ug/l
(79)	Atrazine, or 2- chlor- 4- ethylamino- 6- isopropylamino-S-triazine	7.5 ug/l
(80)	Propazine, or 2-chloro-4, 6-diisopropylamino-S-triazine	16.0 ug/l
(81)	Simazine, or 2- chloro-4, 6-diethylamino-S-triazine	75.25 ug/l
(82)	di-n-butylphthalate	770 ug/l
(83)	Di (2-ethylhexyl) phthalate (DEHP)	4.2 mg/l
(84)	Hexachlorophene, or 2, 2'-methylene-bis (3, 4, 6-trichlorophenol)	7 ug/l
(85)	Methyl methacrylate	0.7 mg/l
(86)	Pentachlorophenol (PCP)	21 ug/l

	Substance	Maximum allowable concentration in mg/l (unless otherwise noted)
(87)	Styrene	931 ug/l

Notes: [1] Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.

[2] Combined concentration of iron and manganese shall not exceed 1.0 mg/l

[3] When natural ground waters have a pH outside the range indicated also that natural pH may be one extreme of the allowable range.

[4] *Not detectable* means by tests or analytical determinations referenced in section 703.4 of this Part.

Schedule II

Applicability. In addition to the effluent standards and/or limitations in Schedule I, the following also apply in the counties of Nassau and Suffolk:

Chemical Characteristics.

	Substance	Maximum allowable concentration in mg/l
(1)	Dissolved Solids, Total	1000
(2)	Nitrogen, Total (as N)	10

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.7 Additional effluent standards and/or limitations. (a) The department, after consultation with the State Department of Health, may establish on a case by case basis more stringent effluent standards and/or limitations than those set forth in schedule I or II of section 703.6 of this Part and may impose effluent standards and/or limitations for a toxic pollutant or any substance not included in schedule I or II, when necessary, to prevent pollution and protect the ground waters for their best usage. The department shall consider rules and regulations promulgated by the administrator or the New York State Department of Health in establishing such standards and/or limitations. Additionally, the department shall consider action levels for compounds determined to exhibit toxic effects which are established by the New York State Commissioner of Health.

(b) Circumstances under which the department may consider more stringent effluent standards and/or limitations include, but are not limited to:

(1) a discharge to an aquifer which is the sole or principal source of a potable water supply;

(2) an existing or proposed discharge is directly on or into consolidated rock or bed rock;

(3) a discharge containing one or more substances which in combination with precipitation and/or natural soil constituents is likely to produce a toxic pollutant; or

(4) where adverse accumulative or synergistic effects can be established for constituents in a discharge.

(c) Where a discharge is proposed or exists which would or does contain a pollutant for which there is a quality standard under this Part but there is no applicable effluent standard and/or limitation under this Part for such a pollutant, the department, after consultation with the New York State Department of Health,

shall establish effluent standards and/or limitations for such pollutant on a case by case basis.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.8 Modifications of effluent standards and/or limitations.

(a) (1) A person responsible for a discharge subject to this Part may petition in writing for a modification of the effluent standards and/or limitations found in section 703.6 or established pursuant to section 703.7 of this Part.

(2) Such person shall have the burden of establishing to the satisfaction of the commissioner, after his consultation with the New York State Commissioner of Health, that one or more of the effluent standards and/or limitations are unnecessarily restrictive as to a particular discharge in that such modification of certain standards and/or limitations would, notwithstanding noncompliance with such standards and/or limitations, prevent pollution and protect the ground waters for their best usage.

(b) The regulations contained in Part 753 of this title prescribing procedures for notice and public participation shall apply whenever a person petitions for a modification of effluent standards and/or limitations established pursuant to section 703.6 of this Part.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.9 Studies and monitoring. (a) The department may require the submission of information by any person responsible for a discharge in order that the department may evaluate the short- and/or long-term effect the discharge may have on ground waters of the State or for the purpose of determining additional effluent standards and/or limitations or modifications thereto, as set forth in sections 703.7 and 703.8 of this Part, respectively. Such information may include, but is not limited to:

(1) a statement of the property to be affected by a discharge and the extent to which such property is under the control of the person responsible for such discharge;

(2) a geohydrologic analysis of the aquifer(s) which may be affected;

(3) a determination of the direction and rate of movement of the discharge and the natural ground water;

(4) an evaluation of adverse effects a discharge may have on any aquifer, source of potable water supply, or other surface and ground waters of the State; and

(5) an evaluation of the ability of unconsolidated deposits, consolidated rock or bed rock and the ground waters to attentuate potential pollutants such that the best usage of the ground waters is maintained.

(b) The department may require the installation and operation of monitoring facilities in order to assure compliance with effluent standards and/or limitations or to evaluate the effect of the discharge on the quality of the ground water. Specific monitoring requirements shall be established by the department on a case-by-case basis and as may be required by Part 756 of this Title.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.10 Exceptions. (a) *Activities and conditions.* The effluent standards and/or limitations for discharges to class GA waters set forth in section 703.6 of this Part are not applicable to the following activities:

(1) the discharge of sewage without the admixture of industrial waste or other wastes when:

(i) a disposal system, point source or outlet consists of a subsurface sewage disposal system designed, constructed and maintained in accordance with guidelines and standards satisfactory to the department;

(ii) monitoring facilities are utilized in accordance with requirements as may be specified by the department; and

(iii) the disposal system is designed to discharge, and discharges, less than 30,000 gallons per day;

(2) normally accepted agricultural practice of utilizing chemicals and fertilizers for growing of crops for human and animal consumption; and

(3) the potential renovative capabilities of a waste management system employing land application techniques and land utilization practices may be permitted for a discharge, provided it has been demonstrated to the satisfaction of the commissioner, after his consultation with the New York State Commissioner of Health, that:

(i) there shall be no actual or potential public health hazard;

(ii) applicable water quality standards shall be met in the saturated zone; and

(iii) applicable water quality standards shall not be contravened in any adjacent waters of the State.

(b) Nothing contained in this section shall be construed to allow any discharge which would preclude the best usage of class GA waters specified in section 703.5 of this Part.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.11 Assignment of ground water classifications and quality standards. The ground water classifications and quality standards enumerated in subdivisions (a) and (b) of section 703.5 of this Part are assigned to all the ground waters of the State of New York.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

PART 704

CRITERIA GOVERNING THERMAL DISCHARGES

(Statutory authority: Environmental Conservation Law, §§ 15-0313, 17-0301)

Historical Note

Part (§§ 704.1—704.4) added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

Section 704.1 Water quality standard for thermal discharges. (a) All thermal discharges to the waters of the State shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water.

(b) The criteria contained in this Part shall apply to all thermal discharges and shall be complied with, except as provided in this Part.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.2 Criteria governing thermal discharges. (a) *General criteria.* The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part:

(1) The natural seasonal cycle shall be retained.

(2) Annual spring and fall temperature changes shall be gradual.

(3) Large day-to-day temperature fluctuations due to heat of artificial origin shall be avoided.

(4) Development or growth of nuisance organisms shall not occur in contravention of water quality standards.

(5) Discharges which would lower receiving water temperature shall not cause a violation of water quality standards and section 704.3 of this Part.

(6) For the protection of the aquatic biota from severe temperature changes, routine shut down of an entire thermal discharge at any site shall not be scheduled during the period from December through March.

(b) *Special criteria.* The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part:

(1) *Non-trout waters.* (i) The water temperature at the surface of a stream shall not be raised to more than 90 degrees Fahrenheit at any point.

(ii) At least 50 percent of the cross sectional area and/or volume of flow of the stream including a minimum of one-third of the surface as measured from shore to shore shall not be raised to more than five Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin or to a maximum of 86 degrees Fahrenheit whichever is less.

(iii) At least 50 percent of the cross sectional area and/or volume of flow of the stream including a minimum of one-third of the surface as measured from shore to shore shall not be lowered more than five Fahrenheit degrees from the temperature that existed immediately prior to such lowering.

(2) *Trout waters.* (i) No discharge at a temperature over 70 degrees Fahrenheit shall be permitted at any time to streams classified for trout.

(ii) From June through September no discharge shall be permitted that will raise the temperature of the stream more than two Fahrenheit degrees over that which existed before the addition of heat of artificial origin.

(iii) From October through May, no discharge shall be permitted that will raise the temperature of the stream more than five Fahrenheit degrees over that which existed before the addition of heat of artificial origin or to a maximum of 50 degrees Fahrenheit whichever is less.

(iv) From June through September no discharge shall be permitted that will lower the temperature of the stream more than two Fahrenheit degrees from that which existed immediatly prior to such lowering.

(3) *Lakes.* (i) The water temperature at the surface of a lake shall not be raised more than three Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin.

(ii) In lakes subject to stratification as defined in Part 652 of this Title, thermal discharges that will raise the temperature of the receiving waters shall be confined to the epilimnion.

(iii) In lakes subject to stratification as defined in Part 652 of this Title, thermal discharges which will lower the temperature of the receiving waters shall be discharged to the hypolimnion, and shall meet the water quality standards contained in Parts 701 and 702 of this Title in all respects.

(4) *Coastal waters.* (i) The water temperature at the surface of coastal waters shall not be raised more than four Fahrenheit degrees from October through June nor more than 1.5 Fahrenheit degrees from July through September over that which existed before the addition of heat of artificial origin.

(ii) The water temperature at the surface of coastal waters shall not be lowered more than four Fahrenheit degrees from October through June nor more than 1.5 Fahrenheit degrees from July through September from that which existed immediately prior to such lowering.

(5) *Estuaries or portions of estuaries.* (i) The water temperature at the surface of an estuary shall not be raised to more than 90 degrees Fahrenheit at any point.

(ii) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be raised to more than four Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin or a maximum of 83 degrees Fahrenheit whichever is less.

(iii) From July through September, if the water temperature at the surface of an estuary before the addition of heat of artificial origin is more than 83 degrees Fahrenheit an increase in temperature not to exceed 1.5 Fahrenheit degrees at any point of the estuarine passageway as delineated above, may be permitted.

(iv) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be lowered

more than four Fahrenheit degrees from the temperature that existed immediately prior to such lowering.

(6) *Enclosed bays.* No additional temperature change except that which occurs naturally shall be permitted in enclosed bays.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.3 Mixing zone criteria. The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part.

(a) The department shall specify definable, numerical limits for all mixing zones (e.g., linear distances from the point of discharge, surface area involvement, or volume of receiving water entrained in the thermal plume).

(b) Conditions in the mixing zone shall not be lethal in contravention of water quality standards to aquatic biota which may enter the zone.

(c) The location of mixing zones for thermal discharges shall not interfere with spawning areas, nursery areas and fish migration routes.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.4 Additional limitations or modifications. (a) An applicant may apply for a modification of the criteria set forth in sections 704.2 and 704.3 of this Part.

(b) Upon receipt of such application, the commissioner shall confer with the U.S. Environmental Protection Agency and shall transmit to that agency information to enable the administrator to fulfill responsibilities under Federal Law.

(c) The applicant shall have the burden of establishing to the satisfaction of the commissioner that one or more of the criteria are unnecessarily restrictive as to a particular project in that a modification of such criterion, or criteria, as the case may be, would assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made.

(d) The applicant shall consult with the Department of Environmental Conservation to determine appropriate studies which shall be conducted by the applicant. Prior approval shall be obtained by the applicant for a program of studies that will determine the impact of any proposed modification. Such studies shall include, but shall not be limited to:

(1) A comparative analysis of environmental effects of the thermal discharge on the receiving waters when subject to the stated criteria of this Part, and when subject to the applicant's proposed modification.

(2) An analysis of the different discharge modes (e.g., surface or subsurface) and the advantages and disadvantages of each mode with regard to effects on aquatic life.

(e) A public hearing shall be held upon the application.

(f) The commissioner may authorize a modification of the stated criteria, which modifications shall be conditioned upon post-operational experience. The commissioner may require additional treatment of, or change in, a thermal discharge in the event that post-operational experience shows a trend toward impairment by the discharge of the quality of the receiving waters for the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the body of water.

Historical Note

Sec. filed Aug. 12, 1969; repealed, new filed: April 28, 1972; Sept. 20, 1974 eff. 30 days after filing.

704.5 Intake structures. The location, design, construction and capacity of cooling water intake structures, in connection with point source thermal discharges, shall reflect the best technology available for minimizing adverse environmental impact.

Historical Note

Sec. filed Sept. 20, 1974 eff. 30 days after filing.

704.6 Applicability of criteria. (a) In determining that a discharge existing prior to July 25, 1969 has violated the standard for thermal discharges, as provided in subdivision (a) of section 704.1 of this Part, the violation of any of the criteria contained in this Part shall not constitute evidence of a violation of such standard unless it is also shown that the violation of such criteria has contributed to the violation of the standard.

(b) The provisions of subdivision (a), subparagraphs (1)(iii), (2)(iv), (3)(iii), (4)(ii), (5)(iv), and paragraph (b)(6) of section 704.2 of this Part, and section 704.3, shall apply only to thermal discharges which have been brought into existence subsequent to July 31, 1973, or to which the criteria contained in this Part were intended to apply pursuant to any certification issued by the commissioner pursuant to section 401(d) of the Federal Water Pollution Control Act amendments of 1972.

(c) Whenever the commissioner has reason to believe that a thermal discharge, existing prior to the adoption of this Part, does not conform to subdivision (a) of section 704.1 of this Part, he may impose appropriate criteria contained in this Part upon such thermal discharge, unless, after public hearing, the owner or operator of any such thermal discharge establishes to the satisfaction of the commissioner that either such thermal discharge does conform to such subdivision (a) or that any such criteria are more stringent than necessary to assure conformance with such subdivision (a).

Historical Note

Sec. filed Sept. 20, 1974 eff. 30 days after filing.

PART 705

REFERENCES

(Statutory authority: Environmental Conservation Law, § 3-0301[2][m])

Historical Note

Part (§§ 705.1-705.3) filed Nov. 5, 1984 eff. Nov. 5, 1984.

Section 705.1 Federal statutes or regulations. The following Federal statutes or regulations have been referenced in Parts 700-704 of this Title:

(a) *40 CFR* means title 40 of the *Code of Federal Regulations* (Protection of the Environment).

(b) The Safe Drinking Water Act, 42 USC 300f *et seq.*, effective July 1, 1978.

(c) The Federal Water Pollution Control Act of 1972, 33 USC 466 *et seq.*, effective October 18, 1972.

(d) All United States publications referenced above are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Historical Note

Sec. filed Nov. 5, 1984 eff. Nov. 5, 1984.

705.2 Books. The following books have been referenced in Parts 700-704 of this Title:

(a) *Standard Methods for the Examination of Water and Wastewater*, 12th edition, 1965, American Public Health Association (APHA), American Water Works Association (AWWA), and Water Pollution Control Federation (WPCF); 2626 Pennsylvania Avenue NW, Washington, DC 20037.

(b) *Methods for Chemical Analysis of Water and Wastes*, 1974, Environmental Protection Agency (EPA); Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(c) *Water Standards of the American Society for Testing and Materials* means 1968 Book of ASTM Standards, Part 23, Water; Atmospheric Analysis; published in October 1968 by the American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103.

Historical Note

Sec. filed Nov. 5, 1984 eff. Nov. 5, 1984.

705.3 Availability. All material referenced in Parts 700-704 of this Title is available for copying and inspection at the Department of Environmental Conservation, Division of Water, 50 Wolf Road, Albany, NY 12233.

Historical Note

Sec. filed Nov. 5, 1984 eff. Nov. 5, 1984.

APPENDIX 31

(cf. Part 701)

AMBIENT WATER QUALITY STANDARDS

The following ambient water quality standards (units are micrograms/liter unless otherwise noted) apply to the designated water classifications. The chemical name is listed with associated Chemical Abstract Service registry numbers in brackets where applicable. Separate standards, where warranted, are listed for Classes A and AA based on human and aquatic life protection. Where more than one standard is listed for a classification, the most stringent standard applies. A letter note referencing the basis of the standard appears following the criterion and refers to Table 1. Special interpretive remarks are provided following the water classification list, as necessary.

The *acid-soluble form* of a substance is defined as the part of the substance that passes through a 0.45 micrometer membrane filter after the sample is acidified to pH 1.5 to 2.0 with nitric acid.

APPENDIX 31

Table 1

Basis for Establishment of Ambient Water Quality Standards

Consideration	*Note*	*Methodology used to establish standards*	*Rules and regulations section reference*
Human	A	Oncogenic	701.4
	B	Nononcogenic	701.5
	C	Aesthetic	701.6
	D	Chemical correlation	701.7
Aquatic	H	EPA published criteria	701.8(b)
	I	Propagation (chronic toxicity); chronic tests available	701.9(a)
	J	Propagation (chronic toxicity); chronic tests not available	701.9(b)
	K	Survival (acute toxicity)	701.10
	L	Aquatic food tainting	701.11
	M	Bioaccumulation	701.12
	N	Chemical and aquatic species correlation	701.13

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Acenaphthene [83-32-9]	AA;AA-s;A;A-s (Human)	20	C
Aldicarb [116-06-3]	AA;AA-s;A;A-s (Human)	7	B
Aldrin [309-00-2]	AA;AA-s;A;A-s (Aquatic)	•	
	B;C	•	
	D	•	
	SA;SB;SC	•	
	SD	•	
	Remarks: •Refer to standards for "Aldrin and Dieldrin"		
Aldrin and Dieldrin [309-00-2; 60-57-11]	AA;AA-s;A;A-s (Aquatic)	0.001	H
	B;C	0.001	H
	D	0.001	H
	SA;SB;SC	0.001	H
	SD	0.001	H
	Remarks: Applies to sum of aldrin and dieldrin.		
Alkyl dimethyl benzyl ammonium chloride [68391-01-5]	AA;AA-s;A;A-s (Aquatic)	•	
	B;C	•	
	Remarks: • Refer to standards for "Quaternary ammonium compounds."		
Aluminum, ionic	AA;AA-s;A;A-s (Aquatic)	100	I
	B;C	100	I
Aminocresols [95-84-1; 2835-95-2; 2835-99-6]	AA;AA-s;A;A-s (Human)	•	
	AA;AA-s;A;A-s (Aquatic)	••	
	B;C	••	
	D	••	
	Remarks: • Refer to standards for Phenolic Compounds •• Refer to standards for Phenols—Total Unchlorinated.		

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Ammonia	AA;AA-s;A;A-s (Human)	2000*	10 NYCRR Part 170
	AA;AA-s;A;A-s (Aquatic)	**	H
	B;C	**	H
	D	**	H

Remarks: * NH_3 + NH_4 as N

** unionized ammonia only as NH_3; formulae for calculating standards at varying pH and temperature for different classes are as follows:

Corrected equations are provided below:

AA;AA-s;A;A-s; B; C;

~~AWQC (mg/l) = 0.031 [f(T)/g(pH)]~~ AWQC (mg/L) = 0.031 [f(T)/g(pH)]

T = Temperature in °C and

g(pH) = 1 ; if pH ≧ 7.7

~~g(pH) = 10[0.74(7.7-pH)] ; if pH < 7.7~~ $g(pH) = 10^{[0.74\,(7.7-pH)]}$; if pH < 7.7

f(T) = 1 ; if T ≧ 10°C

~~f(T) = 1 + 10(0.78-pH) / 1 + 10(pK_T-pH) ; if T < 10°C~~ $f(T) = \frac{1 + 10^{(9.73-pH)}}{1 + 10^{(pK_T-pH)}}$; if T < 10°C

$pK_T = 0.000 + \frac{2730}{(T + 273.2)}$

D;

AWQC (mg/L) = 0.15 [f(T)/g(pH)]

~~g(pH) = 1 + 10[1.03(7.32-pH)]~~ $g(pH) = 1 + 10^{[1.03\,(7.32-pH)]}$

f(T) as above

Arsenic [NA]	AA;AA-s;A;A-s (Human)	50	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	190*	H
	B;C	190*	H
	D	360*	H
	SA;SB;SC	63*	H
	SD	120*	H

Remarks: * Dissolved arsenic form.

Azinphosmethyl [86-50-0]	AA;AA-s;A;A-s (Aquatic)	0.005	J
	B;C	0.005	J
	SA;SB;SC	0.01	J
Barium [NA]	AA;AA-s;A;A-s (Human)	1,000	10 NYCRR Part 5
Benzidine [92-87-5]	AA;AA-s;A;A-s (Aquatic)	0.1	H
	B;C	0.1	H
	D	0.1	H

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Beryllium (Acid-Soluble) [NA]	AA;AA-s;A;A-s (Aquatic)	11* or 1,100**	H
	B;C	11* or 1,100**	H

Remarks: * when hardness is less than or equal to 75 ppm

** when hardness is greater than 75 ppm

Bis (2-ethylhexyl) phthalate [117-81-7]	AA;AA-s;A;A-s (Aquatic)	0.6	I
	B;C	0.6	I
Boron (Acid-Soluble) [NA]	AA;AA-s;A;A-s (Aquatic)	10,000	J
	B;C	10,000	J
	SA;SB;SC	1,000	J
Cadmium [NA]	AA;AA-s;A;A-s (Human)	10	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	*	I
	B;C (aquatic)	*	I
	D (aquatic)	**	H

Remarks: * exp (0.7852 [ln (ppm hardness)] - 3.490)

** exp (1.128 [ln (ppm hardness)] - 3.828)

All standards except (Human) apply to acid soluble form.

Carbofuran [1563-66-2]	AA;AA-s;A;A-s (Human)	15	B
	AA;AA-s;A;A-s (Aquatic)	1.0	J
	B;C	1.0	J
	D	10	K
Chloride [NA]	AA;AA-s;A;A-s (Human)	250,000	10 NYCRR Part 170
Chlorobenzene [108-90-7]	AA;AA-s;A;A-s (Human)	20	C
	AA;AA-s;A;A-s (Aquatic)	5	I
	B;C	5	I
	D	50	I
Chloroform [67-66-3]	AA;AA-s;A;A-s (Human)	0.2	A
2-Chloronaphthalene [91-58-7]	AA;AA-s;A;A-s (Human)	10	D

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Chromium [NA]	AA;AA-s;A;A-s (Human)	50	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	*	H
	B;C	*	H
	D	**	H
	Remarks: * exp (0.819 [ln (ppm hardness)] + 1.561) ** exp (0.819 [ln (ppm hardness)] + 3.688) All standards except (Human) apply to acid-soluble form.		
Chromium (VI) (Acid-Soluble) [NA]	AA;AA-s;A;A-s (Aquatic)	11	H
	B;C	11	H
	D	16	H
	SA;SB;SC	54	H
	SD	1,200	H
Cobalt (Acid-Soluble) [NA]	AA;AA-s;A;A-s (Aquatic)	5	I
	B;C	5	I
Copper [NA]	AA;AA-s;A;A-s (Human)	200	10 NYCRR Part 170
	AA;AA-s;A;A-s (Aquatic)	*	H
	B;C	*	H
	D	**	H
	SA;SB;SC	2.0	H
	SD	3.2	H
	Remarks: * exp (0.8545 [ln (ppm hardness)] - 1.465) ** exp (0.9422 [ln (ppm hardness)] - 1.464) All standards except (Human) apply to acid-soluble form.		
Cyanide [NA]	AA;AA-s;A;A-s (Human)	100	10 NYCRR Part 170
	AA;AA-s;A;A-s (Aquatic)	5.2*	H
	B;C	5.2*	H
	D	22*	H
	SA;SB;SC	1.0*	H
	SD	1.0*	H
	Remarks: * as free cyanide - the sum of HCN and CN expressed as CN.		
2,4-D [94-75-7]	AA;AA-s;A;A-s (Human)	100	10 NYCRR Part 5

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
DDT, DDD, and DDE [50-29-3; 72-54-8; 72-55-9]	AA;AA-s;A;A-s (Human)	0.01	A
	AA;AA-s;A;A-s (Aquatic)	0.001	H
	B;C	0.001	H
	D	0.001	H
	SA;SB;SC	0.001	H
	SD	0.001	H
Demeton [8065-48-3; 298-03-3; 126-75-0]	AA;AA-s;A;A-s (Aquatic)	0.1	J
	B;C	0.1	J
	SA;SB;SC	0.1	J
Diazinon [333-41-5]	AA;AA-s;A;A-s (Aquatic)	0.08	J
	B;C	0.08	J
Dichlorobenzenes [95-50-1; 106-46-7; 541-73-1]	AA;AA-s;A;A-s (Human)	20*/30**	C
	AA;AA-s;A;A-s (Aquatic)	5	I,N
	B;C	5	I,N
	D	50	L
	Remarks: * applies to meta (1,3-) isomer only ** applies to para (1,4-) isomer only Other standards apply to total dichlorobenzenes		
1,2-Dichloroethane [107-06-2]	AA;AA-s;A;A-s (Human)	0.8	A
2,4-Dichlorophenol [120-83-2]	AA;AA-s;A;A-s (Human)	0.3	C
	AA;AA-s;A;A-s (Aquatic)	*	
	B;C	*	
	D	*	
	Remarks: * Refer to standard for Phenols—Total Chlorinated		
Dieldrin [60-57-1]	AA;AA-s;A;A-s (Aquatic)	0.001*	H
	Remarks: * Refer to standard for "Aldrin and Dieldrin" combined.		
Dyphylline [479-18-5]	AA;AA-s;A;A-s (Human)	50	D
Endosulfan [115-29-7]	AA;AA-s;A;A-s (Aquatic)	0.009	H
	B;C	0.009	H
	D	0.22	H
	SA,SB,SC	0.001	H
	SD	0.034	H

Substance /CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Endrin [72-20-8]	AA;AA-s;A;A-s (Human)	0.2	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	0.002	H
	B;C	0.002	H
	D	0.002	H
	SA;SB;SC	0.002	H
	SD	0.002	H
Fluoride [NA]	AA;AA-s;A;A-s (Human)	1,500	10 NYCRR Part 170
	AA;AA-s;A;A-s (Aquatic)	*	J
	B;C	*	J
	D	**	J
	Remarks: * (0.02) exp (0.907[1n (ppm hardness)] + 7.394) ** (0.1) exp (0.907 [1n (ppm hardness)] + 7.394)		
Gross Alpha Radiation [NA]	AA;AA-s;A;A-s (Human)	15pCi/l*	10 NYCRR Part 5
	Remarks: * 15 picocuries per liter, excluding radon and uranium.		
Gross Beta Radiation [NA]	AA;A (Human)	1,000 pCi/l*	10 NYCRR Part 170
	Remarks: * 1,000 picocuries per liter, excluding strontium-90 and alpha emitters.		
Heptachlor and heptachlor epoxide [76-44-8; 1024-57-3]	AA;AA-s;A;A-s (Human)	0.009	A
	AA;AA-s;A;A-s (Aquatic)	0.001	H
	B;C	0.001	H
	D	0.001	H
	SA;SB;SC	0.001	H
	SD	0.001	H
Hexachlorobutadiene [87-68-3]	AA;AA-s;A;A-s (Human)	0.5	A
	AA;AA-s;A;A-s (Aquatic)	1.0	J
	B;C	1.0	J
	D	10	K
	SA;SB;SC	0.3	J
	SD	3.0	K
Hexachlorocyclohexanes [58-89-9; 319-84-6; 319-85-7; 319-86-8; 6108-10-7; 608-73-1]	AA;AA-s;A;A-s (Aquatic)	0.01	H
	B;C	0.01	H
	D	2	H
	SA;SB;SC	0.004	H
	SD	0.16	H
	Remarks: applies to sum of all isomers.		

Substance /CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Hexachlorocyclo-pentadiene [77-47-4]	AA;AA-s;A;A-s (Human)	1.0	C
	AA;AA-s;A;A-s (Aquatic)	0.45	J
	B;C	0.45	J
	D	4.5	K
	SA;SB;SC	0.07	K
	SD	0.7	K
Hydrazine [302-01-2]	AA;AA-s;A;A-s (Aquatic)	*	J
	B;C	*	J
	D	**	K
	Remarks: * 5 ug/L at < 50 ppm hardness and 10 ug/L at > 50 ppm hardness ** 50 ug/L at < 50 ppm hardness and 100 ug/L at ≥ 50 ppm hardness		
Hydrogen sulfide [7783-06-4]	AA;AA-s;A;A-s (Aquatic)	2.0*	H
	B;C	2.0*	H
	SA;SB;SC	2.0*	H
	Remarks: * undissociated		
Hydroquinone [123-31-9]	AA;AA-s;A;A-s (Aquatic)	2.2	J
	B;C	2.2	J
	D	4.4	K
Iron [NA]	AA;AA-s;A;A-s (Human)	300	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	300	J
	B;C	300	J
	D	300	K
Isodecyl diphenyl phosphate [29761-21-5]	AA;AA-s;A;A-s (Aquatic)	1.73	I
	B;C	1.73	I
	D	22	K
Isothiazolones, Total (Isothiazolinones) (Includes 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one)	AA;AA-s;A;A-s (Aquatic)	1	J
	B;C	1	J
	D	10	K

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Lead			
[NA]	AA;AA-s;A;A-s (Human)	50	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	*	H
	B;C	*	H
	D	**	H
	SA;SB;SC	8.6	H
	SD	220	H
	Remarks: * exp (1.266 [1n (ppm hardness)] - 4.661)		
	** exp (1.266 [1n (ppm hardness)] - 1.416)		
	All standards except (Human) apply to acid-soluble form.		
Linear alkyl benzene sulfonates (LAS)			
[NA]	AA;AA-s;A;A-s (Aquatic)	40*	J
	B;C	40*	J
	Remarks: * LAS with side chains greater than 13 carbons only.		
Magnesium			
[NA]	AA;AA-s;A;A-s (Human)	35,000	B
Malathion			
[121-75-5]	AA;AA-s;A;A-s (Aquatic)	0.1	H
	B;C	0.1	H
	SA;SB;SC	0.1	H
Manganese			
[NA]	AA;AA-s;A;A-s (Human)	300	10 NYCRR Part 5
Mercury			
[NA]	AA;AA-s;A;A-s (Human)	2	10 NYCRR Part 5
Methoxychlor			
[72-43-5]	AA;AA-s;A;A-s (Human)	35	10 NYCRR Part 170
	AA;AA-s;A;A-s (Aquatic)	0.03	H
	B;C	0.03	H
	SA;SB;SC	0.03	H
Methylene bisthiocyanate			
[6317-18-6]	AA;AA-s;A;A-s (Aquatic)	1.0	J
	B;C	1.0	J
Mirex			
[2385-85-5]	AA;AA-s;A;A-s (Aquatic)	0.001	H
	B;C	0.001	H
	D	0.001	H
	SA;SB;SC	0.001	H

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Naphthalene			
[91-20-3]	AA;AA-s;A;A-s (Human)	10	C
Niacinamide			
[98-92-0]	AA;AA-s;A;A-s (Human)	500	B
Nickel (Acid-Soluble)			
[NA]	AA;AA-s;A;A-s (Aquatic)	*	H
	B;C	*	H
	D	**	H
	SA;SB;SC	7.1	H
	SD	140	H
	Remarks: * exp (0.76 [1n (ppm hardness)] + 1.06)		
	** exp (0.76 [1n (ppm hardness)] + 4.02)		
Nitrate			
[NA]	AA;AA-s;A;A-s (Human)	10,000*	10 NYCRR Part 5
	Remarks: * as N		
Nitrilotriacetate (NTA)			
[NA]	AA;AA-s;A;A-s (Aquatic)	5,000	J
	B;C	5,000	J
Nitrite			
[NA]	AA;AA-s;A;A-s (Aquatic)	100* or 20**	J
	B;C	100* or 20**	J
	Remarks: * warm water fishery waters		
	** cold water fishery waters		
Nitrobenzene			
[98-95-3]	AA;AA-s;A;A-s (Human)	30	C
Parathion and Methyl Parathion			
[56-38-2; 298-00-0]	AA;AA-s;A;A-s (Aquatic)	0.008	I,N
	B;C	0.008	I,N
Pentachlorophenol			
[87-86-5]	AA;AA-s;A;A-s (Human)	*	
	AA;AA-s;A;A-s (Aquatic)	0.4	I
	B;C	0.4	I
	D	**	I
	Remarks: * Refer to standard for Phenolic compounds (total phenols).		
	** Refer to standard for Phenols, total chlorinated		
Phenol			
[108-95-2]	AA;AA-s;A;A-s (Human)	*	
	AA;AA-s;A;A-s (Aquatic)	**	I
	B;C	**	I
	D	**	I
	Remarks: * Refer to standard for Phenolic compounds (total phenols).		
	** Refer to standard for Phenols, total unchlorinated		

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Phenolic compounds (total phenols)			
[NA]	AA;AA-s;A;A-s (Human)	1	10 NYCRR Part 170
Phenols, total chlorinated			
[NA]	AA;AA-s;A;A-s (Human)	*	
	AA;AA-s;A;A-s (Aquatic)	1.0	L
	B;C	1.0	L
	D	1.0	L
	Remarks: * Refer to standard for Phenolic compounds (total phenols)		
Phenols, total unchlorinated			
[NA]	AA;AA-s;A;A-s (Aquatic)	5.0	L
	B;C	5.0	L
	D	5.0	L
Phenyl ether			
[101-84-8]	AA;AA-s;A;A-s (Human)	10	C
Polychlorinated Biphenyl, PCB			
[NA]	AA;AA-s;A;A-s (Human)	0.01	A
	AA;AA-s;A;A-s (Aquatic)	0.001	H
	B;C	0.001	H
	D	0.001	H
	SA;SB;SC	0.001	H
	SD	0.001	H
Quaternary ammonium compounds (including dimethyl benzyl ammonium chloride and dimethyl ethyl benzyl ammonium chloride)			
[NA]	AA;AA-s;A;A-s (Aquatic)	10	J
	B;C	10	J
Radium 226			
[NA]	AA (Human)	3 pCi/L*	10 NYCRR Part 170
	Remarks: * 3 picocuries per liter.		
Radium 226 plus Radium 228			
[NA]	AA;AA-s;A;A-s (Human)	5 pCi/L*	10 NYCRR Part 5
	Remarks: * 5 picocuries per liter.		

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Selenium			
[NA]	AA;AA-s;A;A-s (Human)	10	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	1.0*	I
	B;C	1.0*	I
	Remarks: * all standards except (Human) apply to acid-soluble form.		
Silver			
[NA]	AA;AA-s;A;A-s (Human)	50	10 NYCRR Part 5
	AA;AA-s;A;A-s (Aquatic)	0.1*	I
	B;C	0.1*	I
	D	**	H,K
	SD	2.3	H
	Remarks: * ionic silver ** exp (1.72 [ln (ppm hardness)] - 6.52) acid-soluble form applies to D and SD classes.		
Strontium 90			
[NA]	AA;AA-s;A;A-s (Human)	8pCi/L*	10 NYCRR Part 5
	Remarks: * If two or more radionuclides are present, the sum of their doses shall not exceed annual potential dose of 4 millirems per year.		
Styrene			
[100-42-5]	AA;AA-s;A;A-s (Human)	50	C
Sulfate			
[NA]	AA;AA-s;A;A-s (Human)	250,000	10 NYCRR Part 5
Sulfite			
[NA]	AA;AA-s;A;A-s (Aquatic)	200	J
	B;C	200	J
Tetrachlorobenzenes			
[95-94-3; 634-66-2; 634-90-2]	AA;AA-s;A;A-s (Human)	10	C
2,3,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)			
[1746-01-6]	AA;AA-s;A;A-s (Aquatic)	0.000001	M
	B;C	0.000001	M
	D	0.000001	M
Thallium (Acid-Soluble)			
[NA]	AA;AA-s;A;A-s (Aquatic)	8	I
	B;C	8	I
	D	20	K

Substance [CAS No.]	*Water classes*	*Standards micrograms/liter*	*Notes*
Theophylline [58-55-9]	AA;AA-s;A;A-s (Human)	40	B
Toxaphene [8001-35-2]	AA;AA-s;A;A-s (Aquatic)	0.005	H
	B;C	0.005	H
	D	1.6	H
	SA;SB;SC	0.005	H
2,4,5-TP (Silvex) [93-72-1]	AA;AA-s;A;A-s (Human)	10	10 NYCRR Part 5
Trichlorobenzenes [87-61-6; 108-70-3; 120-82-1; 12002-48-1]	AA;AA-s;A;A-s (Human)	10	C
	AA;AA-s;A;A-s (Aquatic)	5	I,N
	B;C	5	I,N
	D	50	L
	SA;SB;SC	5	I,N
	SD	50	L
	Remarks: Applies to sum of isomers.		
1,1,2-Trichloroethane [79-00-5]	AA;AA-s;A;A-s (Human)	0.6	A
Triphenyl phosphate [115-86-6]	AA;AA-s;A;A-s (Aquatic)	4	J
	B;C	4	J
	D	40	K
Tritium [NA]	AA;AA-s;A;A-s (Human)	20,000 pCi/l*	10 NYCRR Part 5
	Remarks: * 20,000 picocuries per liter; if two or more radionuclides are present, the sum of their annual dose equivalent to the total body or any organ shall not exceed 4 millirems per year.		
Vanadium (Acid-Soluble) [NA]	AA;AA-s;A;A-s (Aquatic)	14	J
	B;C	14	J
	D	190	K
Zinc [NA]	AA;AA-s;A;A-s (Human)	300	10 NYCRR Part 170
	AA;AA-s;A;A-s (Aquatic)	30	I
	B;C	30	I
	D	*	H
	SA;SB;SC	58	H
	SD	170	H
	Remarks: * exp (0.83 [ln (ppm hardness)] + 1.95) All standards except (Human) apply to acid-soluble form.		

REFERENCE NO. 13

code of federal regulations

Protection of Environment

40

PARTS 100 TO 149

Revised as of July 1, 1986

REFERENCE NO. 14

NUS CORPORATION — TELECON NOTE

CONTROL NO:	DATE: 9/7/88	TIME: ~1000 hrs.

DISTRIBUTION: U.S. Vanadium

BETWEEN: Paul Dicky	OF: Niagara Co. Health Dept.	PHONE: (716) 284-3128

AND: J. B. Gebler (NUS)

DISCUSSION:

I asked Paul Dickey for updated information about water usage in the area of above site, specifically referencing a June 15, 1987 telecon between Paul Dicky & Pauline Doherty (NUS). He told me:

- Homes on Pennsylvania Ave are now on public water
- There are 2 homes on Delaware Ave. that are not hooked up to public water, but plan to do so shortly. Also, Paul Dicky told me that the people at these homes do not use the well water for drinking

ACTION ITEMS:

J. B. Gebler 9/7/88

NUS 067 REVISED 0581

REFERENCE NO. 15

NUS CORPORATION AND SUBSIDIARIES — TELECON NOTE

CONTROL NO:	DATE:	TIME:
	Sept. 8, 1988	~10:30 hrs.

DISTRIBUTION:

U.S. Vanadium 02-8803-24

p. 1 of 2

BETWEEN:	OF:	PHONE:
Jack Taygert	NYSDEC	(716) 847-4585

AND:

J.B. Gebler NUS

DISCUSSION:

I asked Jack Taygert a number of questions pertaining to NYSDEC's position on the U.S. Vanadium site (which they know as SKW), I found out the following:

- there is no Phase II investigation planned for the immediate future
- in J. Taygert's opinion, the problems associated w/ the air borne dust have been rectified by use of slurrying; as of his last visit ~"a few yrs. ago"
- the dust was not subject to becoming wind-borne, he said the dust is now under control
- the dust is from previous disposal operations, current operations are O.K.
- areas east in Niagara-Mohawks property (right of way) have a number of trails which are used by youngsters to ride dirt bikes, ATV's, etc and these activities kick up dust
- the existing soil problem is site specific to the U.S.V. site (i.e. the entire 62-acre property); not one owner or the other
- because GW is not used, the emphasis or priority

ACTION ITEMS:

NUS 067 REVISED 0685

NUS CORPORATION AND SUBSIDIARIES — TELECON NOTE

CONTROL NO:	DATE:	TIME:
	Sept 8, 1988	~ 1030 hrs.

DISTRIBUTION:
U.S. Vanadium
p. 2 of 2

BETWEEN:	OF:	PHONE:
Jack Taygert	NYSDEC	(716) 847-4585

AND: J.B. Stobb — NUS

DISCUSSION:

placed upon the site by DEC, NYS DOH, & local health dept. is less than if it were used.

- J.T. related the concept that in terms of a cost/benefit analysis: the cost of cleaning up the dust problem by, for example, removal of the mass quantities of waste would probably be greater than the benefit derived from this removal
- Reports of a problem related to dust causing harm to ~~cars~~ automobiles in an area east of the site where cars are unloaded for subsequent transport to other areas (dealers?). J.T. wasn't positive if this was just a matter of washing dust off cars or if the cars required refinishing.
- fugitive dusts are from whole site and these dusts are easily spotted – they are blue gray in color and "silty" in texture, and break down into v. fine particles. Native soils are reddish.
- J.T. suggested that a possible solution would be to cover areas affected w/ soil & vegetation to keep dust down
- He suggested I talk to Bob Arm brust of Div. of Air

ACTION ITEMS:

J.B. Stobb 9/8/

NUS 067 REVISED 0685

REFERENCE NO. 16

NUS CORPORATION — TELECON NOTE

CONTROL NO.	DATE:	TIME:
	Sept. 8, 1988	2/100 hrs.

DISTRIBUTION:
02-8803-24
U. S. Vanadium

BETWEEN:	OF:	PHONE:
~~Bob~~ Bob Armbrust	NYSDEC division of Air	(716) 847-4565

AND: J.B. Gebler NUS

DISCUSSION:

I explained ~~to~~ Bob Armbrust who I was, who NUS was, and what we do, & then asked if his division investigating the dust problem @ the site. He explained to me that the Div. of Air is a Permitting Agency & that their field work is handled by Niagara Co. Health Dept. The NCHD does the field inspections & recommends what action Div. of Air takes. Bob Armbrust told me that there were complaints about dusts from a neighboring firm, and that at one point in time the bags were broken - emitting dust. He said that SKW was not violating their permits at this point in time, and that EPA's LIDAR unit was up there now & will be looking @ SKW (amongst others) to see if they are polluting the air. He seemed unaware of the chromium problem associated w/ the dusts and once he found this out he indicated that he would pursue this problem further. He suggested I talk w/ Maury Vaughan at NCHD.

~~ACTION ITEMS:~~

J.B. Gebler
9/8/88

NUS 067 REVISED 0581

REFERENCE NO. 17

NUS CORPORATION AND SUBSIDIARIES — TELECON NOTE

CONTROL NO:	DATE:	TIME:
	Sept. 8, 1988	~ 1130 hrs.

DISTRIBUTION:
U. S. Vanadium
02-8803-24

BETWEEN:	OF:	PHONE:
Maury Vaughan/Paul Dibley	Niagara County Dept. of Health	(716) 284-3129

AND: D. B. Gebler NUS

DISCUSSION:
I explained to Maury Vaughan that I was interested in information pertaining to a dust problem @ U.S. Vanadium/SKW/Airco. He said he could remember any recent complaints and directed me to Paul Dibley (to whom I spoke yesterday). I explained to Paul Dicley that I was now interested in problems associated with dust from the DSS site. P. Dicley told me that the slurried dusts drop to a consistancy close to concrete and that there are no problems with blowing dusts now. He said ~~graphite~~ (DBS) graphite dusts were recently a problem @ Airco, but no problems with the baghouse dusts that I am concerned about. He told me that the dusts are presently disposed of within the landfill and thus present no problems. He was of the opinion that the dusts would have minor (if any) affect in the area. I explained to him that a 1981 report I have discussed the problem (i.e. Wegman engineering report), and he noted that there has been no problem since he had been there (since ~1985). I discussed the concept that this must be a historical problem.

ACTION ITEMS:

D. B. Gebler
9/8/88

CONTACT REPORT

AGENCY	:	New York State Department of Environmental Conservation, Region 9
ADDRESS	:	600 Delaware Ave., Buffalo, NY 14202
PHONE	:	(716)847-4550
PERSON CONTACTED	:	James Snider, Senior Wildlife Biologist
TO	:	Jon Sundquist
DATE	:	June 2, 1987
SUBJECT	:	Critical Wildlife habitats near potential hazardous waste sites in Niagara County

In preparation of Phase 1 reports on potential hazardous waste sites in New York for the NYSDEC, information about nearby critical wildlife habitats is necessary. The following information is provided by Mr. James Snider of the Bureau of Wildlife, NYSDEC Region 9.

Except for the seasonal appearance of migratory birds, including, possibly the bald eagle, there are no critical habitats of endangered species within 2 miles of the suspected waste sites listed below:

- SKW Alloys
  Witmer Road at Maryland Ave.
  Niagara Falls, NY
- Dussault Foundries
  2 Washburn Street
  Lockport, NY
- North Love Canal
  Near Cleghorn Drive
  Lewiston, NY
- Carborundum Building 82
  Buffalo Ave.
  Niagara Falls, NY
- Ross Steel Company
  4237 Pine Ave.
  Niagara Falls, NY
- Frontier Bronze
  4870 Packard Rd.
  Niagara Falls, NY
- Roblin Steel
  101 East Ave.
  N. Tonawanda, NY

recycled paper ecology and environment

REFERENCE NO. 18

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	HRS	Max. Score	PRO
1 Observed Release	0 (45)	1	45	45	45
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	18
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	8
Total Waste Characteristics Score			26	26	26
5 Targets					
Ground Water Use	0 (1) 2 3	3	3	9	3
Distance to Nearest Well/Population Served	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	0
Total Targets Score			3	49	3
6 If line 1 is 45, multiply 1 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5			3510	57,330	3510
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} = 6.12			6.12

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	HRS	Max. Score	PRO
1 Observed Release	0 45	1	0	45	45
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 3	2	2	6	
Physical State	0 1 2 3	1	3	3	
Total Route Characteristics Score			7	15	
3 Containment	0 1 2 3	1	3	3	
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	18
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8	8
Total Waste Characteristics Score			26	28	26
5 Targets					
Surface Water Use	0 1 2 3	3	0	9	6
Distance to a Sensitive Environment	0 1 2 3	2	0	6	0
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	0
Total Targets Score			0	55	6
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5			0	64,350	7020
7 Divide line 6 by 64,350 and multiply by 100		S_{sw} = 0.00			10.91

Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	HRS	Max Score	PRO
1 Observed Release	(0) 45	1	0	45	45
Date and Location:					
Sampling Protocol:					

If line 1 is 0, the S_a = 0. Enter on line 5.
If line 1 is 45, then proceed to line 2.

2 Waste Characteristics					
Reactivity and Incompatibility	(0) 1 2 3	1		3	0
Toxicity	0 1 2 3	3		9	9
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	8
	Total Waste Characteristics Score		0	20	17
3 Targets					
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	30
Distance to Sensitive Environment	0 1 2 3	2		6	0
Land Use	0 1 2 3	1		3	3
	Total Targets Score		0	39	33
4 Multiply 1 x 2 x 3				35,100	25245
5 Divide line 4 by 35,100 and multiply by 100		S_a =	0		71.92

AIR ROUTE WORK SHEET

HRS

	S	S^2
Groundwater Route Score (S_{gw})	6.12	37.45
Surface Water Route Score (S_{sw})	0.00	0.00
Air Route Score (S_a)	0.00	0.00
$S_{gw}^2 + S_{sw}^2 + S_a^2$		37.45
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		6.12
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		3.54

WORKSHEET FOR COMPUTING S_M

PRO

	S	S^2
Groundwater Route Score (S_{gw})	6.12	37.45
Surface Water Route Score (S_{sw})	10.91	119.02
Air Route Score (S_a)	71.92	5172.49
$S_{gw}^2 + S_{sw}^2 + S_a^2$		5328.96
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		73.00
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		42.20

WORKSHEET FOR COMPUTING S_M