PRELIMINARY Health Assessment for

INTERIM

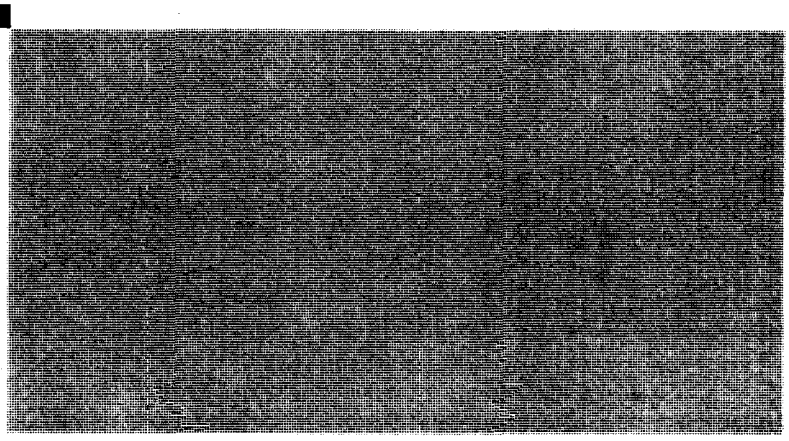
AIRCO PLATING COMPANY, INC.

MIAMI, DADE COUNTY, FLORIDA

CERCLIS NO FLD004145140

FEBRUARY 26, 1992

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry



THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104 (i) (7) (A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in the site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

The conclusion and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

INTERIM PRELIMINARY PUBLIC HEALTH ASSESSMENT

AIRCO PLATING COMPANY, INC.

MIAMI, DADE COUNTY, FLORIDA

CERCLIS NO. FLD004145140

Prepared by

Florida Department of Health and Rehabilitative Services

Under Cooperative Agreement with the

Agency for Toxic Substances and Disease Registry

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104 (i)(6)(F) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term "health assessment" shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessment, risk evaluations, and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR prepared this Interim Health Assessment using available data and information. ATSDR will re-evaluate this site and prepare an updated health assessment as warranted by the availability of additional data and information and as resources permit.

SUMMARY

The Airco Plating Company National Priorities List (NPL) site is located in Miami, Dade County, Florida. Contaminants present in on-site surface soil, subsurface soil and ground water at levels of probable health concern include plating wastes and solvents: cadmium, chromium, trans-1,2-dichloroethene, nickel, tetrachloroethene, trichloroethene, and zinc. This site is of indeterminate public health hazard because limited available data do not indicate that humans are being or have been exposed to levels of contamination that would be expected to cause adverse health effects. Data are not available for all environmental media to which humans may be exposed. Municipal water is available in this area. Because contaminated soil is covered with asphalt and the area has not been surveyed for private potable wells downgradient, no population has been identified as at risk of exposure to on-site contaminants. When soil remediation is carried out, unprotected remediation workers, on and off-site workers and nearby residents could be exposed to contaminants via airborne dust and vapors. Although municipal water is available in this area, private well usage around the site should be determined.

BACKGROUND

A. Site Description

The Airco Plating Company is located at 3650 N.W. 46th Street, Miami, Florida, approximately 4 miles northwest of downtown Miami (Figure 1). The area surrounding the site consists of a mixture of light industry, warehouses, retail operations, and residential housing.

Principal processes at the plant involve zinc plating; however cadmium, nickel, copper, tin, chromium and brass plating are also utilized. In June 1957, Airco Plating obtained approval from the former Florida State Board of Health to construct and operate an on-site waste disposal plant which included three percolation ponds to dispose of cyanide, chromic acid, other acid wastes, and alkali sludge wastes. The permit required these wastes to be segregated, treated separately, discharged into the ponds, and allowed to seep into the ground. During a U.S. Environmental Protection Agency (EPA) inspection in January 1971, it was found that other water and wastes associated with the plating process were being discharged directly to the seepage ponds without treatment. This wastewater was reported to contain cadmium, copper, zinc, and tin.

After 1971, the company received several corrective action notices issued by the Dade County Pollution Control Board; in 1973 Airco Plating was ordered to pump sludge out of the seepage ponds. The company was also ordered to correctly treat their waste water in accordance with Dade County standards, in order for the waste water to be discharged to the Miami municipal sewage system. A water main connecting the plant's effluent to the sewage system was installed in 1973. Since 1982, pretreatment sludges have been separated from the waste water and have been transported to a hazardous waste facility regulated under Subtitle C of the Resource Conservation and Recovery Act (RCRA).

During an initial investigation in July 1985, EPA discovered that one of the areas believed to have been used for waste disposal had been partially covered with asphalt pavement and lawn. Soil and ground water from near the ponds contained contaminants associated with electroplating.

EPA's Field Investigation Team, NUS, performed an Expanded Site Investigation (ESI) in December 1986 and January 1987. Surface soil, subsurface soil, and shallow and deep ground water were sampled and found to contain metals and solvents associated with electroplating.

B. Site Visit

A site visit was conducted by staff from the Florida Department of Health and Rehabilitative Services (HRS) Health Office and an ATSDR Regional Representative in February 1989. A follow-up site visit was conducted by staff from the Dade County Department of Health in April 1991. Airco is currently operational and plant buildings cover one-half to two-thirds of the 1.5 acre site. Most of the remainder of the site is paved with asphalt including those areas noted on the site map as the former locations of the

seepage ponds (Figure 2). There is no physical evidence of these ponds on-site. The area behind the main building is paved and an out building and piles of metal and machine parts rest on the pavement. The front of the building faces 46th Street and asphalt pavement runs nearly to curb.

Site access is restricted by a 6-foot high chain-link fence. Three stands of barbed wire run around the top of the fence, and coiled barbed wire is wrapped around the strands. Coiled barbed-wire is also installed along the bottom of the chain-link fence. The separate parking area adjacent to the site is also fenced and is fitted with a locking gate topped with barbed-wire. The site is posted with "No Trespassing" signs.

Information reviewed indicates the presence of a large-capacity industrial well on-site. A water tower was observed to the south at the Douglas Freight and Salvage Plant and it is probable that some of the businesses in the area may also have industrial wells that may affect the flow direction of area ground water.

C. Demographics, Land Use, and Natural Resource Use

Airco plating is located in a heavily developed area of Miami that allows mixed zoning. Over 150 mobile homes and several dozen additional residences are located within 1/4 mile of the site. Some of the closest mobile homes are within 450 feet of the site in a mobile home park housing about 200 people, including children. Mobile home parks in the area are connected to the City of Hialeah water system. However, the manager of the nearest park said many of the local residences have been there since the 1940s and the "frame" homes in the area could have private wells.

There are four municipal wells within 3 miles of the site which are the Hialeah, Preston, and Upper and Lower Miami Springs well fields. The nearest is approximately 2 miles away, and all are upgradient. Presently, these wells provide only 5-10 percent of the Dade County Water and Sewer Authority (WASA) total system output, due to WASA's heavy reliance on water from the Northwest Well Field approximately 10 miles west of the site. Water from the less-used well fields is mixed with water from the Northwest Well field and distributed to the Hialeah and Preston water treatment plants. The Dade County WASA installed air strippers at the Preston Plant in 1987 and air strippers should be operational at the Hialeah plant by 1990. At that time, the Hialeah, Preston, and Upper and Lower Miami Springs Well fields will again become operational (FIT, 1987).

An industrial well is located on the site and there may be others in the area. See Figure 2 for the locations of other buildings in the vicinity. The FIT inspection report noted the layout of the buildings around the site and named the shops and businesses. It became apparent during the site visits that some of these businesses have changed ownership.

D. Health Outcome Data

Based on the evaluations performed as part of this preliminary health assessment, there are not indications that humans have been exposed to site-related contaminants. In addition, there were no community health concerns identified during this evaluation. Therefore, health outcome data were not evaluated in conducting this health assessment.

COMMUNITY HEALTH CONCERNS

Dade County Department of Environmental Resources Management representatives are concerned metals and volatile organic compounds found at this site have contributed to the degradation of local ground water. This shallow ground water represents the upper level of the potable water for this area; however, municipal water is available. The nearest municipal well is approximately 2 miles away, and is located hydrogeologically upgradient, meaning it is unlikely the contaminated ground water plume will recharge this well.

The nearest residences are mobile homes which are supplied with municipal water. The area has not been surveyed for downgradient, private, potable or irrigation wells; therefore, it is not known if human exposure to metals is occurring via dermal, inhalation or ingestion exposure to ground water. An industrial well is located on the site and there may be others in the area. The extent of worker exposure to contaminated ground water is unknown.

The Dade County Environmental Health Director indicated in December 1991, that there were no community health concerns related to this site.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

To identify possible facilities that could contribute to the ground water, surface water, soil, and air contamination near the Airco Plating Company site, HRS search the 1987, 1988, and 1989 Toxic Release Inventory (TRI). TRI is developed by the EPA from chemical information provided by certain industries. TRI data did not contain information on the release of site-related contaminants on-site and in off-site areas within the site vicinity.

A. ON-SITE CONTAMINATION

The Expanded Site Investigation (NUS, 1988) was conducted using several portable survey instruments. Monitoring and surveying for air contamination was performed at the start of field activities and throughout the project. Additionally, field analytical screening was performed on selected water and soil samples.

On-site samples were collected from areas upgradient and downgradient of the seepage ponds and from within the ponds. A building prevented direct sampling of the third pond; however, samples were collected nearby. Three surface soil samples (2 to 7 inches below land surface), eleven subsurface soil samples (3 to 4 feet below land surface), twenty-one subsurface saturated zone soil samples, and ground water from nine temporary monitoring wells and one

permanent monitoring well were analyzed during the Extended Site Investigation. The contaminants present on site at levels of probable health concern are shown in Table I.

Summarized NUS (1988) monitoring data indicate the shallow temporary monitoring wells contain cadmium, chromium, trans-1,2-dichloroethene and also contained trichloroethene and vinyl chloride which are environmental degradation products of tetrachloroethene.

Table 1
On-Site Contamination

MEDIA	CONTAMINANT	CONCENTRATION RANGE			UNIT
Surface Soil	Cadmium	720	-	810	mg/kg
	Chromium (Total)	1,800	-	3,800	mg/kg
	Nickel	330	-	730	mg/kg
Subsoil	Cadmium	60	-	1,300	mg/kg
	Chromium (Total)	45	-	9,500	mg/kg
	Nickel	45	-	1,100	mg/kg
	Tetrachloroethene	0.17	-	J14	mg/kg
Ground Water	Cadmium	160	-	5,600	µg/L
	Chromium (Total)	830	-	58,000	µg/L
	Chromium (6+)*			570	µg/L
	trans-1,2-Dichloroethene	4.0	-	69	µg/L
	Copper	J260	-	J3,100	µg/L
	Nickel	550	-	2,900	µg/L
	Tetrachloroethene	35	-	270	µg/L
	Zinc	J7,600	-	J89,000	µg/L
	Trichloroethene	J5	-	16	µg/L

J - estimated value
mg/kg - parts per million
µg/L - parts per billion
* - only one sample

B. OFF-SITE CONTAMINATION

Background samples were collected off site as part of the Expanded Site Investigation (NUS, 1988). For surface and subsurface soil, one sample (for each) was collected upgradient to serve as a control. For soil samples from the subsurface saturated zone and for the ground water samples from temporary monitoring wells, three samples were collected upgradient of the facility (for each) to serve as background samples. Background levels were below levels of contaminants found on site.

Eight saturated zone soil samples and six temporary monitoring wells samples were taken downgradient and off site. Most permanent monitoring wells are located off-site; four are upgradient and six are downgradient. The shallowest permanent ground water monitoring wells are 20 feet below land surface, the intermediate wells are 45 feet below land surface and the deepest wells are 75 feet below land surface. Most of temporary monitoring wells are located at the water table surface. The contaminants present off site at levels of probable health concern are listed in Table II.

TABLE II
Off-Site Contamination

MEDIA	CONTAMINANT	CONCENTRATION RANGE			(UNIT)
Subsoil	Cadmium	2.4	-	140	mg/kg
	Chromium	BDL	-	1,900	mg/kg
	Nickel	BDL	-	98	mg/kg
Ground Water	Cadmium	410	-	1,400	µg/L
	Chromium	360	-	11,000	µg/L
	trans-1,2-Dichloroethene	30	-	290	µg/L
	Nickel	340	-	1,100	µg/L
	Tetrachloroethene	100	-	410	µg/L
	Trichloroethene	J7	-	130	µg/L
	Vinyl Chloride*			26	µg/L
	Zinc	4,200	-	14,000	µg/L

J - estimated value
BDL - below detection level
mg/kg - parts per million
µg/L - parts per billion
* - only one sample

C. QUALITY ASSURANCE/QUALITY CONTROL

Surface and subsurface soil and ground water samples were collected and analyzed for cyanide as part of the Expanded Site Investigation (ESI). Based on the earlier site survey, cyanide was expected to occur in relatively high concentrations in samples from the seepage pond areas. However, most of the

cyanide results were declared invalid because of laboratory deficiencies with respect to EPA QA/QC requirements.

Other QA/QC data included in the ESI are analyses of the sand pack placed around the well screen, a field blank consisting of water from the nearby fire hydrant and water from the water trucks used during drilling operations, and the deionized (DI) water from the portable DI unit on site. In each medium, several analytes did not pass QA/QC requirements and the corresponding samples were declared invalid. The conclusions presented in this preliminary health assessment are based on the data from the ESI/FIT report. The validity of these conclusions is directly dependent on the quality of the data provided.

D. PHYSICAL HAZARDS

No physical hazards were noted during the site visits or mentioned in any of the site-related documentation reviewed for this Preliminary Health Assessment.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

The expanded site screening clearly identified ground water and soil contamination at the Airco Plating Facility. However, the extent of soil contamination has not been defined, and the extent and flow direction of ground water contamination has not been identified. These differences in on-site and off-site ground water contamination are difficult to address without additional information about area and site hydrogeology. Specifically, the on-site industrial well's influence on the area's ground water should be investigated, and sample differences possibly resulting from well depth and well construction (temporary vs. permanent) should be considered.

The Biscayne Aquifer is the environmental pathway of greatest concern because of its importance as the sole source of southeast Florida's drinking water. Past Airco Plating waste management practices acted to recharge the aquifer directly through percolation ponds. The highly transmissive character of the surficial deposits and geologic units that underlie the site facilitate the rapid movement of contaminated ground water into and through the Biscayne Aquifer. The surficial deposits at the site consist of a thin soil and 40 to 45 feet of white to tan, medium to coarse-grained sand which contains limestone rubble and oolite. These surficial deposits are comprised of the sands of the Pamlico Formations and Miami Oolite.

The Miami oolite overlies the Pleistocene-aged Fort Thompson Formation. The Fort Thompson Formation is 100 - 110 feet thick in the area and includes layers of porous and nonporous limestone and quartz sand. Ground water dissolution created extensive lateral and vertical cavities in the limestone layers. Some cavities later filled with quartz sand and shells and clay, but others remained open, thus increasing the permeability of the formation.

The base of the Fort Thompson Formation is underlain by the Miocene-aged Tamiami and Hawthorn Formations, both of which consist of sandy clay and shell layers with numerous limestone and quartz sand lenses. Together these two formations make up the aquiclude that separates the Biscayne Aquifer from the underlying Floridan Aquifer. The Floridan Aquifer consists of limestone and dolostone units of post Paleocene to Eocene ages. The Floridan Aquifer is non-potable in this area because of high levels of chlorides, sulfates and dissolved solids.

The existence of contaminants in soil can serve as a reservoir for further contamination because of the ability of contaminants to mobilize in surface water or ground water. Rainfall run-off could carry contaminants to surface water if much of the contaminated soil was not paved. There are no ditches, streams, or drainage ways located on site. Surface water leaving the site drains across the parking lot adjacent to the site (west) and onto the storage yard of the property to the south. The nearest drainage canal is over 0.5 mile to the southwest.

Air monitoring done by the FIT was not adequate for use by EPA for the Hazard Ranking System. Since the area's ground surface is either vegetated or covered by buildings or parking lots, the release of particulates is unlikely. Sampling to determine airborne levels of VOCs would be useful for assessing the potential for exposure to volatile contaminants.

Environmental pathways of greatest potential concern are those that allow human exposure. These include 1) ground water movement of contaminants, 2) air movement of contaminated dust or vapors, and 3) rainfall run-off which may carry small amounts of contaminated sediments and soils off site and potentially into off site surface waters (most of the site is paved). On-site and off-site soil and biota probably do not represent environmental exposure pathways due to the urban nature of the area. Pavement covered all areas of the site observed during the site visit and no edible biota were observed in the area.

B. HUMAN EXPOSURE PATHWAYS

Contamination of soils and ground water could result in human exposure to site contaminants via several routes of human exposure.

Low levels of volatile organic compounds were detected in the on-site industrial well. Process waters from this well could provide an exposure pathway for inhalation of volatile compounds from ground water or possibly via dermal absorption. It is unlikely that industrial-use well water would be ingested since this water from this well is used in the plating operation.

Private potable wells could be located downgradient, and present a potential source for contaminant ingestion, and dermal absorption or inhalation of volatile compounds from ground water.

Ingestion, inhalation, and dermal absorption of contaminant laden dust or vapors may eventually occur on site if soil removal is undertaken. Nearby residents and remedial workers would be at increased risk of such exposures.

PUBLIC HEALTH IMPLICATIONS

Contaminants at levels of concern both on site and off site include cadmium, chromium, nickel, tetrachloroethene, trans-1,2-dichloroethene, copper, zinc, trichloroethene and vinyl chloride in the soil and ground water. The probability of human contact with contaminated ground water and soil is not known because insufficient information is available on soil exposure and a well survey and subsequent monitoring have not been done.

Contaminants detected at possible health concern levels can be separated into five groups: 1) cadmium, chromium, and nickel, and trichloroethene which occur in the soil and ground water on and off the site; 2) trans-1,2-dichloroethene and tetrachloroethene, which occur in on-site soil and ground water and in off-site ground water; 3) zinc, which occurs in ground water both on and off the site 4) copper, which occurs in on-site ground water; and 5) vinyl chloride, a biological metabolite of tetrachloro-ethene, that occurs only off site. The toxicologic effects of these compounds are summarized below.

Toxic effects statements can be misleading because they may be based on animal data and adverse health effects reported at high exposure rates in animals and humans. Data extrapolation is difficult because dose-response may not be linear and may be related to length of exposure time in addition to exposure levels, and because differences in intraspecies responses may be small or very large. Human toxic response variability also adds to the uncertainty associated with making toxicity predictions. Human variability factors include genetic makeup, age, sex, the state of an individual's health, previous exposure to chemicals and psychological factors. The uncertainty in predicting toxicity is reflected in the probabilistic nature of most of the toxicity assessments that are made. They deal with a population not an individual, and try to predict what percentage of people in the population will show a particular effect at a particular dose. This is the best that can be done, and even this limited type of prediction is filled with uncertainties (Kamrin, 1988).

Exposure to elevated levels of heavy metals over long periods of time may present health problems because they can accumulate to toxic levels in the body. Toxic effects in humans attributed to cadmium exposure include chronic kidney dysfunction, anemia, pulmonary disease, possible adverse effects on the endocrine system, defects in sensory functions, hypertension, and bone damage. Cadmium is relatively mobile in water. Hexavalent chromium toxicity has been linked with liver and kidney damage, internal hemorrhage, dermatitis and respiratory damage (ATSDR, 1989).

Many nickel compounds are highly soluble in water. Several nickel compounds are mutagenic and can cause cell transformation. In humans, nickel and nickel compounds can cause sensitization dermatitis, and occupational exposure has been associated with an increased incidence of cancer of the lung and nasal cavity (ATSDR, 1988).

Animal and occupational studies indicate that metabolic changes may occur because of the interaction of zinc and other metals in the diet. Exposure to

Populations at future risk of exposure to soil contaminants include soil removal or construction workers.

The following recommendations are to be carried out to protect public health from the potential risks resulting from exposure to hazard substances present at the Airco Plating site.

1. A survey for private wells should be conducted in the area hydrogeologically downgradient from the site because tetrachloroethene, trans-1,2-dichloroethene, trichloroethene and vinyl chloride are present in the deeper monitoring wells, and some of the residences in the area date back to an era when city water was not available. However, such surveys should be based on more specific contaminant location and movement data than exist at the time this health assessment was prepared. That is, the extent, flow speed and flow direction of the ground water contamination plume should be determined, and the reservoir of contaminants in the soil should be characterized.

2. The location of downgradient high capacity industrial wells should be determined and their effects on the flow rate and the direction of the area ground water should be assessed.

3. Conduct indoor air monitoring at the AIRCO facility to determine if VOCs are being released from ground water used for industrial operations.

4. The Airco Plating site has been evaluated for follow-up health activities. There are no indications humans have been or are being exposed to onsite and/or offsite contaminants. Therefore, this site is not being considered for follow-up activities at this time. However, if data become available suggesting that human exposure to hazardous substances at levels of public health concern is currently occurring or has occurred in the past, ATSDR will reevaluate this site for health follow-up activities.

5. If future ATSDR evaluations indicate that a significant completed exposure pathway exists or that the community has expressed specific health concerns, then health outcome data bases should be evaluated in future assessments of this site.

cadmium can cause changes in the distribution of zinc, with increases of zinc stored in the liver and kidneys, organs where cadmium also accumulates. Excessive intake of zinc may cause copper deficiencies and result in anemia. Alone, zinc in the diet of animals has been shown to retard growth and produce defective mineralization of bone (Clement Associates, 1985).

Interaction between all of the metals found on the site may increase the toxicity over that which would be predicted for each metal separately, thereby lending to a potential increase in the overall toxicity and adverse health effects resulting from exposure to on-site and off-site soil, and ground water. (Marlowe and others, 1985)

Very little information concerning exposure only to trans-1,2-dichloroethene is available. There are no reports of carcinogenicity or teratogenicity in animals or humans (ATSDR, 1989).

Vinyl chloride and trichloroethene are biological degradation products of tetrachloroethene. These three compounds readily leach into the ground water, especially in soils of low organic content. Both tetrachloroethene and vinyl chloride have been shown to be teratogenic and mutagenic in animals and trichloroethene has shown to be mutagenic but not teratogenic. Adverse human health effects attributable to low-level inhalation exposures to vinyl chloride include liver damage, adverse lung effects, poor circulation in the fingers, changes in the ability of the blood to carry oxygen, and increased risk of cancer of the liver, brain, lungs and possibly other organs. Kidney and liver disorders and central nervous system depression have been reported for animal exposed to subchronic and chronic levels of tetrachloroethene and trichloroethene respectively (ATSDR, 1989; Clement Associates, 1985).

CONCLUSIONS AND RECOMMENDATIONS

Based on available information this site is an indeterminate public health hazard. This category denotes sites with incomplete information. The limited available data do not indicate that humans are being or have been exposed to levels of contamination that would be expected to cause adverse health effects. Data are not available for all environmental media to which humans may be exposed. Florida HRS staff will work with the EPA to insure the Remedial Investigation includes sampling of those media which may play a role in human exposure to site contaminants.

Process waters from the on-site industrial well could provide an exposure pathway for inhalation of volatile organic compounds from ground water or via dermal absorption. The presence of other such process wells in the area are unknown. Private, potable or irrigation wells located downgradient from the site have not been identified, and present a potential source for ingestion, dermal absorption, and inhalation of contaminants from ground water.

Human exposure to cadmium, chromium, nickel, and tetrachloroethene could occur via airborne dust particles and vapors on site and off site during soil removal or construction operations. Current exposure potential is limited by the fact that most of the soil in the area is covered with asphalt.

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CERTIFICATION

This Preliminary Health Assessment was prepared by the Florida Department of Health and Rehabilitative Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health assessment was initiated.

Technical Project Officer, SPS, RPB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health assessment and concurs with its findings.

Director, DHAC, ATSDR

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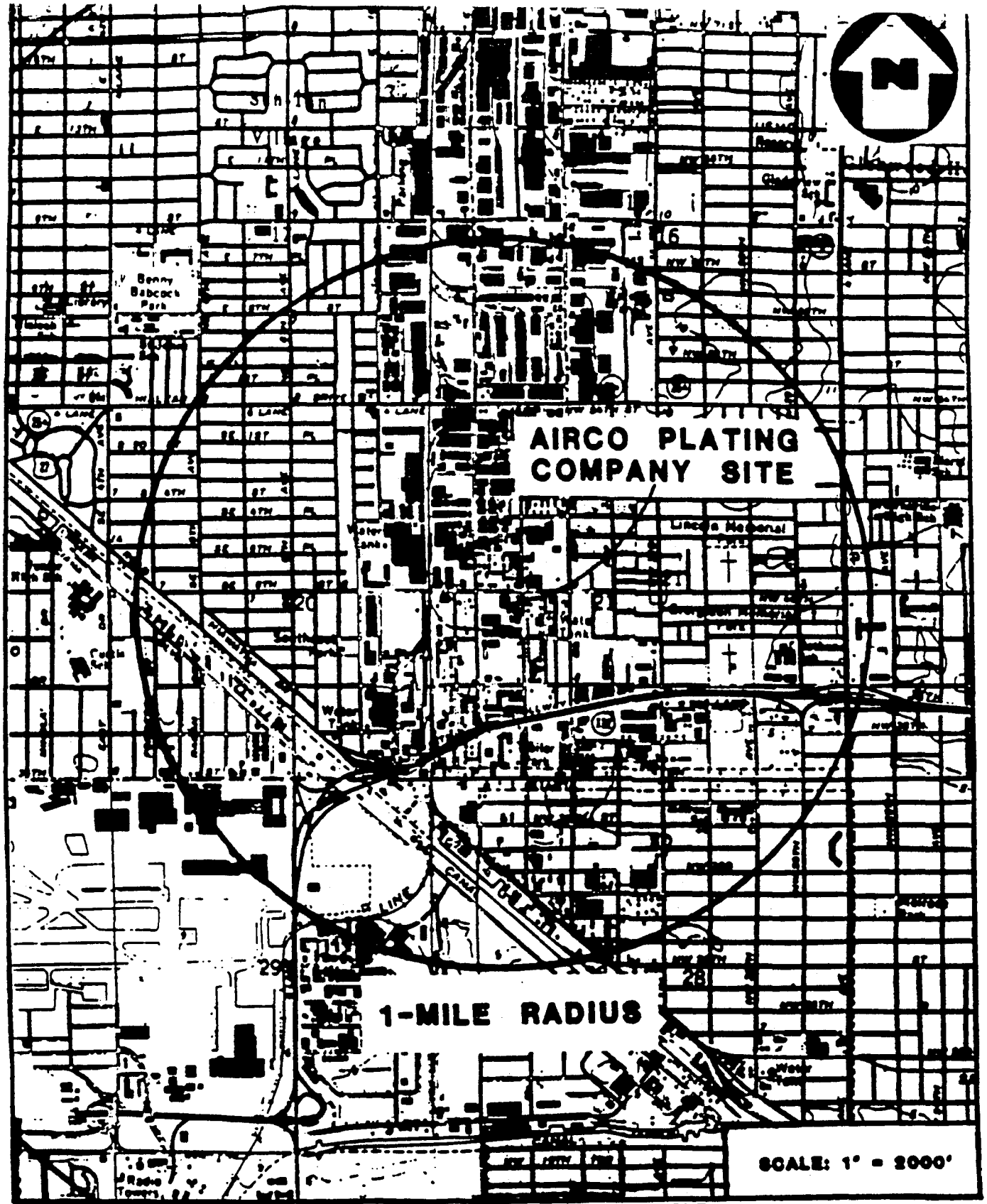
U.S. Geological Survey, 1969A (PR1969) Hialeah, Florida quadrangle, 7.5 minute series topographic map.

U.S. Geological Survey, 1969B (PR1969) Miami, Florida quadrangle, 7.5 minute series topographic map.

APPENDICES

FIGURE 1 Site Location

FIGURE 2 Site Layout



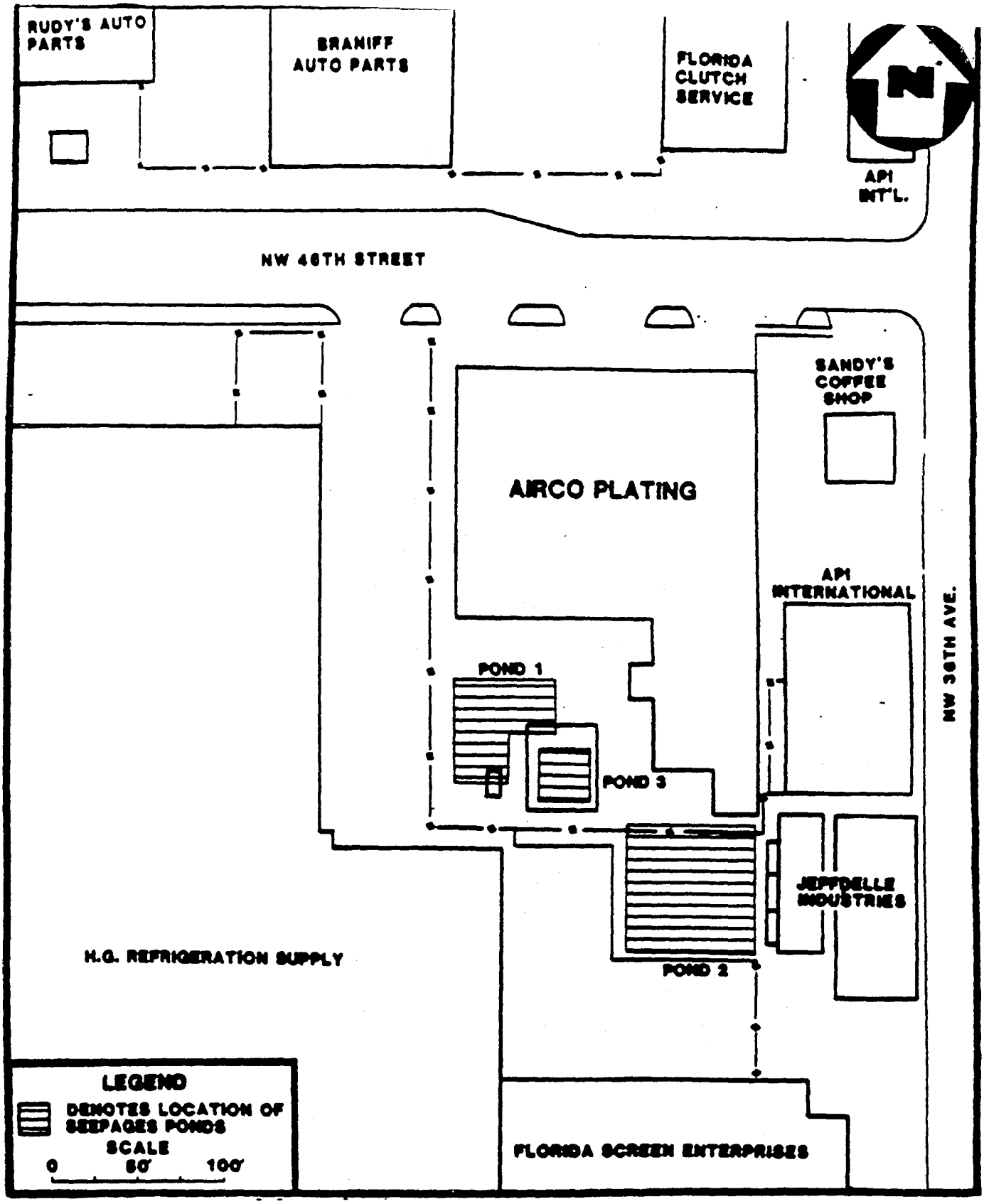
BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE QUADRANGLE HIALEAH, FLORIDA 1981 & MIAMI, FLORIDA 1968.

SITE LOCATION
AIRCO PLATING COMPANY SITE
MIAMI, FLORIDA

FIGURE ES-1

NUS CORPORATION
A Halliburton Company

FIGURE 1
16



SITE LAYOUT AND SEEPAGE POND LOCATIONS AIRCO PLATING COMPANY SITE MIAMI, FLORIDA

FIGURE ES-2

NUS CORPORATION
A Halliburton Company

FIGURE 2