PRELIMINARY Health Assessment for

STANDARD AUTO BUMPER CORPORATION

CERCLIS NO. FLD004126520

HIALEAH, DADE COUNTY, FLORIDA

MAY 31 1990

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

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, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, this Health Assessment has been conducted using available data. Additional Health Assessments may be conducted for this site as more information becomes available.

The conclusions 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.

PRELIMINARY HEALTH ASSESSMENT

Standard Auto Bumper Corporation

National Priorities List Update #7 Site

Hialeah, Dade County, Florida

MAY 31 1990

Prepared by:

Florida Department of Health and Rehabilitative Services

Under Cooperative Agreement with the

Agency for Toxic Substances and Disease Registry

SUMMARY

The Standard Auto Bumper Corporation proposed National Priorities List (NPL) site is located in Hialeah, Dade County, Florida. Contaminants in on-site surface soil, subsurface soil, and ground water at levels likely to be of health concern include the following plating wastes: chromium, copper, iron, lead, nickel, and zinc. Polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) have also been found both on site and in the immediate vicinity. The presence of PCBs and PAHs cannot be attributed to use at the facility on the basis of currently available information. This site is of potential public health concern because of the risk to human health from possible exposure to hazardous substances at levels that may result in adverse health effects. The site has been under a removal Administrative Order by consent with the Environmental Protection Agency (EPA) since April 1987 and contaminated soil removal is under way. The population of concern includes workers on the site and workers from surrounding businesses that may come in contact with soil from the off-site drainage areas. The area has not been surveyed for down gradient private potable wells but city water is available to the area.

BACKGROUND

A. Site Description

The Standard Auto Bumper Corporation is an active chromium electroplating facility located at 2500 West 3rd Court, approximately six miles northeast of downtown Miami (see Figure 1). Development in the area surrounding the 0.8-acre site includes a mixture of light industry, warehouses, retail operations and residential housing. The Red Road Canal is located approximately 300 feet west of the site. Before 1972, untreated wastewater from the electroplating process was discharged behind the facility into a gravel bed between the process building and railroad tracks. This wastewater drained north and eventually percolated into the ground (site inspections indicated wastewater 600 feet north of the outlet point). In 1978, Standard Auto began pretreating the plating waste prior to discharging it into a percolation pit and drainfield system. Untreated wastewater from the electroplating and stripping process was stored in a diked concrete area and was treated by reducing hexavalent chromium to the trivalent state. Approximately 60,000 gallons of plating rinsewater and 750 gallons of strip solutions were treated each month (Florida Department of Environmental Regulation (DER), 1985).

Since 1979, treated wastewater has been discharged into the Hialeah sewer system under a permit with Dade County Environmental Resource Management (DERM). Disposal of metal plating sludge has been contracted by Ray Ballie Trash Hauling, Inc., and Chem-Waste Management. Currently, this sludge is removed by Compliance Technology.

The Standard Auto Bumper Corporation site has been the subject of a number of investigative and enforcement activities since it began operation in 1959. These include inspections by Florida Department of Health and Rehabilitative Services Dade County Public Health Unit and DERM personnel that revealed plant practices of discharging wastes to the ground surface and later the discharge of untreated wastes to the sewer system, the facility's trash dumpster, a parking lot soakage pit and an on-site drain (NUS, 1987). A waste dumping citation was issued by DERM in 1982; and, in 1983, DERM determined that illegal discharges had not ceased and a final notice was issued. The site was investigated in 1985 by EPA Region IV, as part of the Florida Prototype Rapid Sample Screening Project, and plating industry wastes were found on the site. NUS conducted a Field Investigation Team (FIT) Expanded Site Investigation (ESI) in 1987 that confirmed these findings. Standard Auto Bumper Corporation has been under a removal Administrative Order by consent with EPA since April 1984. By early July 1989, soils were removed to the water table in the drainage area west of the site and south of the building to the property edge. Soils from the "sludge pit" north of the site are presently being excavated (mid July 1989). Off-site excavation may be necessary based on high levels of chromium found in soils that have been excavated to date.

B. Site Visit

A site visit was conducted by staff from the Florida Department of Health and Rehabilitative Services Health Office and the Agency for Toxic

Substances and Disease Registry (ATSDR) in February 1989. Plant buildings cover 0.5 to 0.6 of the 0.8-acre site. The north, east and half of the south side of the property are paved with asphalt. The remainder, the west side and half of the south side were covered with packed gravel. Drains north of the site (indicated in Figure 2) were observed, but there was no evidence of a discharge ditch behind the site.

Site access is limited with the north, south, and west sides of the site bounded with a 6-foot high chain-link fence. Three strands of barbed-wire top the fence and guard dogs are kept on site. The site was dusty and outside the building (north and south of the building) are stockpiles of unplated metal.

According to the 1985 EPA site screening, process water is supplied by an on-site industrial well and the Hialeah municipal water system. No water towers were observed at this site or in the immediate area, but it is possible that some area businesses may have industrial wells that could affect ground water gradient or intercept a contaminant plume.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. On-Site Contamination

The ESI was conducted with the use of several portable survey instruments. Monitoring and surveying for air contamination were performed at the beginning of field activities and throughout the project. Additionally, field analytical screening was performed on selected water and soil samples. Air monitoring performed by NUS was not appropriate for the Hazard Ranking System.

On-site samples were collected in the vicinity of the former disposal areas and from other areas of interest, including the effluent drainage path and site periphery. Ten surface soil samples (9"-13" below the land surface), eight subsurface soil samples (5'-7' below the land surface), and eight temporary monitoring wells (20'-50' below the land surface) ground water samples were analyzed for the extended site investigation.

The contaminants likely to be of health concern are listed below. Not included in the tables are polynuclear aromatic hydrocarbons (PAHs): benzo(a)anthracene, chrysene, benzo(b and/or k)fluoranthene, benzo(a)pyrene, indeno-(1,2,3-ed)pyrene, and dibenzo(a,h)anthracene, which were detected at similar levels to background samples. Both background levels and on-site levels exceed those likely to be of health concern if soil were inhaled, ingested or absorbed through the skin.

Because these contaminants are also found off site at control sample locations and because they are not associated with the electroplating process, they may not be under Superfund jurisdiction. Residues of the pesticide DDT detected in the on-site soil are not included here, because they were detected at low levels.

Table of On-site Contaminants

Media	Contaminant	Range (units)
Surface Soil	Chromium	13 J - 8,300 J mg/kg
	Copper	11 J - 9,000 J mg/kg
	Nickel	46 - 24,000 mg/kg
Subsurface Soil	Chromium	7.2 J - 1,600 mg/kg
	Nickel	14 - 3,100 mg/kg
Ground Water	Cadmium	10 ug/L
	Chromium	88 - 16,000 ug/L
	Copper	370 J - 6,300 J ug/L
	Iron	1,600 - 30,000 ug/L
	Lead	8 J - 810 J ug/L
	Nickel	22 - 34,000 ug/L
	Zinc	29 - 3,000 ug/L

J - Estimated Value

B. Off-Site Contamination

Background samples were collected for all of the media tested on site as part of the ESI: two samples each of subsurface soil and ground water were collected upgradient (due east across the street and northeast across the street). In addition to the background samples, four surface soil samples, four subsurface soil samples and four ground water samples were collected. The contaminants present off site at levels of health concern are listed below.

Table of Off-site Contaminants

Media	Contaminant	Range (units)
Surface Soil	Chromium	5 J - 415 mg/kg
	Nickel	25 - 620 mg/kg
Subsurface Soil	Chromium	72.5 J - 110 J mg/kg
	Nickel	120 - 260 mg/kg
Ground Water	Benzene	3.4 ug/L
	Chromium	23 - 300 ug/L
	Lead	48 J - 140 J ug/L
	Nickel	830 - 2,400 ug/L
	Zinc	80 - 470 ug/L

J - estimated value

C. Physical Hazards

Site access is restricted by fencing and guard dogs. Most employees on site should be familiar with racks of metal and machine parts, plating processes, and plating machinery that would be considered physical hazards for the public.

DEMOGRAPHICS

The Standard Auto Bumper Corporation site is located in a heavily developed area of Hialeah that allows mixed zoning. Twenty percent of the land within a 1-mile radius of the site is occupied by commercial and industrial facilities which are fairly evenly distributed around the site. Residential communities occupy 60 percent of the area, and the remaining 20 percent is occupied by recreational parks (Hialeah Racetrack and Walker Park) and schools (Walters, Filer, Johnson, and Bright). NUS (1987) estimated that more than 10,000 people live within a one-mile radius of the site and another 1,000 people work within the same area.

There are four municipal wells within 3 miles of the site, the Hialeah, Preston, Upper Miami and Lower Miami wells, with the nearest 4,200 feet away. Presently, these wells provide only 5 to 10 percent of the Dade County Water and Sewer Authority (WASA) total system output because of WASA's heavy reliance on water from the northwest wellfield located approximately ten miles west of the site. Water from these less-utilized wellfields is mixed with water from the northwest wellfield and distributed to the Hialeah and Preston water treatment plants. The Dade County WASA installed air strippers (to remove volatile contaminants) at the Preston plant in 1987. Air strippers should be operational at the Hialeah Plant by 1990. At that time, the Hialeah, Preston and the Upper and Lower Miami Springs wellfields will again become completely operational (NUS, 1987). Area residents may utilize individual wells for irrigation and other purposes which could expose people and animals to waterborne contaminants from the Biscayne Aquifer.

An industrial well is located on site and supplies process water. There may be other process wells for industrial use in the area. See Figure 2 for the locations of other buildings in the vicinity of the site.

EVALUATION

A. Site Characterization

1. Environmental Media

The NUS ESI verified ground water and soil contamination at the Standard Auto Bumper Corporation site. However, the lateral and vertical extent of soil and ground water contamination have not been defined. Based on water level data, NUS defined the shallow ground water flow direction as west-southwest toward the Red Road Canal; however, flow direction is also variable depending on seasonal rainfall and levels of water in the canal. The sample from the facility's industrial well (50 feet deep) contained cyanide at 20 ug/L, which is below the maximum concentration level (MCL) health standard of 80 ug/L; and 248 ug/L of nickel, which is above the MCL of 30 for nickel (EPA, 1985). The NUS (1987) data summary did not include values for the deeper monitoring wells, this means no elevated levels were detected. If the shallow water level is 6 feet below the land surface, and if the shallow water moves toward the canal because of hydraulic head differences, contamination in the deepest water on site will be difficult to address without additional information about site hydrology. NUS states that since the gradient is larger in the shallow wells than the deeper wells, shallow ground water flow can be considered the dominant flow at the site. However, the influence of the on-site industrial well on area ground water should be evaluated and differences in the analytic results which could result from well depth and construction type (temporary versus permanent) should also be assessed.

A ground water model for the site could more accurately assess the flow rate and direction of area ground water if the area is surveyed for the location of other large capacity wells. Because cyanide and nickel were present in the deeper monitoring wells (EPA, 1985) and because some of the area residences date back to an era when city water may not have been available, a local survey for private potable wells would help define potential contaminant exposures of public health concern.

Air monitoring performed by NUS (1987) was not adequate for EPA for the Hazard Ranking System. Better air monitoring data might allow assessment of exposure to on-site contaminants via airborne particles and vapors.

2. Demographics and Land Use

The NUS (1987) ESI adequately covered the land use and demographics in the area near to the site.

3. Quality Assurance/Quality Control (QA/QC)

Soil from the sand pack placed around the monitoring well screens was analyzed as part of the ESI QA/QC. In addition, field water samples were collected from a nearby water hydrant, an on-site water faucet, and water tanks used during drilling operations. The soil from the sand pack did not contain any organic or inorganic contaminants above their respective minimum detection limits. No appreciable concentrations of inorganic or organic contaminants were detected in the quality control water samples. The conclusions presented in this Preliminary Health Assessment are based on the NUS ESI (1987) the validity of these conclusions is dependent on the quality of the data provided.

B. Environmental Pathways

Environmental pathways of greatest concern are those that could allow human exposure. These include: 1) ground water movement of contaminants, 2) air movement of contaminated dust or vapors, 3) rainfall run-off (or ground water movement) which may carry contaminated sediments and soils off site and into off-site surface waters, and 4) biota which may accumulate contaminants from soil, surface water or ground water.

Contaminants in ground water at levels likely to be of health concern are: chromium, copper, iron, lead, nickel and zinc. Chromium, nickel and zinc have also been found off site at levels likely to be of health concern in ground water. Because of its importance as the sole drinking water source of South Florida, and because past Standard Auto Bumper Corporation waste management practices acted to directly contaminate the aquifer through percolation areas, the Biscayne Aquifer, and the Red Road Canal which may receive recharge from the shallow ground water, are important environmental pathways of concern.

The highly transmissive character of the surficial deposits and geologic units that underlie the site facilitate rapid movement of contaminated ground water into and through the Biscayne Aquifer. The surficial deposits consist of a thin soil, 28 feet of white to tan, medium to coarse-grained quartz sand, which contains limestone rubble, and oolite sand from 28 feet to the top of the limestone unit at 47 to 49 feet below land surface. These surficial deposits make up the Pamlico and Miami Oolite Formations and overlie a thin layer of reef limestone, the Key Largo Limestone, which overlies the Pleistocene-aged Fort Thompson Formation.

The Fort Thompson Formation is 100-110 feet thick in the area and includes layers of porous limestone and quartz sand. Ground water dissolution created extensive lateral and vertical cavities in the limestone layers. Some cavities were later filled with quartz sand, shells, and clay; but others remained open increasing the permeability of the formation. The base of the Fort Thompson Formation is the effective limit of the Biscayne Aquifer in this area.

The underlying sandy clay and shell layers with numerous limestone and quartz sand layers, the Miocene-aged Tamiami and Hawthorn Formations, make up the aquiclude that separates the Biscayne Aquifer from the Floridan Aquifer. The Floridan Aquifer consists of limestone and dolostone units of post-Paleocene to Eocene ages. The Floridan Aquifer is not potable in this area because of high levels of chloride, sulfate and dissolved solids.

Regional ground water flow is to the southeast or east, which correlates with the calculated deep flow direction at the site. However, shallow ground water flow at the site is to the west, possibly because of the strong influence of the Red Road Canal on the shallow portion of the Biscayne Aquifer.

NUS (1987) considered shallow ground water flow to be the dominant flow at the site because a larger gradient was calculated between the shallow ground water wells than between the deep ground water wells. The flow of contaminants via shallow ground water into the Red Road Canal could introduce a secondary environmental exposure route through contamination of fish.

Contaminants of surface soils and subsurface soils at levels likely to be of health concern levels are: chromium, copper, and nickel. Chromium and nickel have also been found off site at probable levels of health concern in both surface and subsurface soils. Contaminants in soil can serve as a reservoir for further ground water contamination because of their ability to mobilize in surface water or ground water. Alternatively, these contaminated soils may also serve as a source for airborne particles or vapors. Presently, most of these soils have an asphalt pavement cover on-site and gravel pack cover in the drainage or "swale" area. Although there are no ditches, streams, or drainage ways located on site, surface water readily enters the gravel pack behind the site. The packed gravel area also extends beneath the railroad that parallels the rear of the site.

C. Human Exposure Pathways

Contamination of soils and ground water could result in the following potential human exposure pathways:

1) Process waters from the on-site industrial well could provide an exposure pathway for inhalation of contaminants from ground water or exposure via dermal absorption. However, it is unlikely that industrial-use well water would be ingested. The use of this water is not addressed in the ESI, nor is potential exposure of plant employees to this water.

2) Ingestion, inhalation and dermal absorption of contaminant-laden soil or dust may occur on site especially if soil removal is undertaken. Employees at this site and businesses in the area could be exposed to contaminated soil and dust. Approximately 45 single and multiple family dwellings are located within 0.25 mile of the site (to the northeast and southwest). Residents of these homes could also potentially be exposed to contaminated dust.

3) Ingestion of contaminated fish from affected surface water or dermal absorption of contaminated surface water and sediments from Red Road Canal are potential exposure routes. Game, crops, livestock and consumable wild plants probably could not be considered as potential exposure pathways in this densely populated urban area. Because shallow ground water flow is toward the canal, metal contaminants may be linked to this site, although this site may not be the exclusive source of metals in the canal.

4) Private potable wells may also be located downgradient of the site, potentially presenting a pathway for ingestion, dermal absorption or inhalation of contaminants from ground water.

PUBLIC HEALTH IMPLICATIONS

Contaminants at levels likely to be of health concern both on site and off site include metals in the soil and ground water. There is no documented evidence of human exposure to metals at the present time. However, human contact with the soil, and ground water may have occurred in the past and could occur now or in the future. The probability of human contact with contaminated ground water is not known because a well survey and subsequent monitoring of potentially identified wells have not been done.

Contaminants detected at levels likely to be of health concern can be separated into five groups: 1) chromium and nickel which occur in the soil and ground water on site and off site, 2) zinc which is present in ground water on site and off site, 3) copper which is present in on-site surface soil and on-site ground water, and 4) iron and lead which are present only in on-site ground water. The toxic effects of these chemicals 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 are difficult because dose-response is not linear and may be related to length of exposure time in addition to exposure levels, and because the differences in intraspecies responses may be small or large. Human toxic response variability also adds to the uncertainties associated with making toxicity predictions. Human variability factors include genetic makeup, 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 that 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).

Some metals are insoluble in water, but hexavalent chromium is quite soluble in aqueous solutions. Hexavalent chromium has been linked with liver and kidney damage (Clement Assoc., 1985). Injuries related to industrial exposure (inhalation exposure) include increased incidences of diseases of the nose and increased cancer incidence.

Copper is among the more mobile metals in the environment and is toxic to humans at high levels. Exposure to copper fumes causes irritation to the upper respiratory tract, nausea, and metal fume fever. If sufficient concentrations of copper salts reach the gastrointestinal tract, they act as irritants and can produce salivation, vomiting, gastritis, and diarrhea. Elimination of ingested copper by vomiting and diarrhea generally protects the patient from more serious systemic toxic effects. Chronic ingestion of copper salts may result in anemia, and copper salts on the skin may produce an itching eczema (Clement Assoc., 1985).

Elemental iron and many iron compounds are insoluble in water. Iron also tends to bind with organic and inorganic matter. There is some evidence that ingestion of high concentrations of certain soluble iron salts may cause fetal damage. The ingestion of excess amounts of iron can irritate the gastrointestinal tract. Chronic inhalation of iron-containing dusts and fumes can cause siderosis, a benign lung disease (Clement Assoc., 1985).

Some industrially produced lead compounds are readily soluble in water. Low blood lead levels have been associated with high blood pressure (no apparent threshold value). Increased risk of stroke, heart attack (and death), and kidney dysfunction have also been reported at low levels of ingestion and inhalation exposure (Hammond and Belile, 1980). Children are especially susceptible to lead toxicity because they have greater sensitivity to lead and they absorb relatively greater relative amounts via the intestine. Repeated low doses may accumulate to toxic levels because lead is excreted very slowly. Lead exposure may also adversely affect brain development and function in fetuses and small children (Center for Disease Control, 1985).

Many nickel compounds are highly soluble in water and several are mutagenic and cause cell transformations. In humans, nickel and nickel compounds can cause sensitization dermatitis, and occupational exposure (inhalation exposure) has been associated with an increased incidence of cancer of the lung and nasal cavity (Clement & Assoc., 1985).

The amounts of zinc found in ground water on the site and downgradient may not occur at levels high enough to cause interactions of zinc and other metals in the diet. However, interactions between all of the metals found on the site may increase the specific toxicity over that which would be predicted for each metal separately. An increase in specific toxicity could lead 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 (Marlow, et al. 1985).

CONCLUSIONS AND RECOMMENDATIONS

Based upon information reviewed, it is concluded that this site is of potential public health concern because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted in the Human Exposure section above, human exposure to metals may be occurring and may have occurred in the past via airborne dust particles and vapors. As indicated above, most of the soils in the area are covered with asphalt pavement.

Assessment of the health implications of ingestion of contaminated ground water, which also contains metals, is limited by a lack of information. The function of the on-site industrial well in the plating process is not known.

Also unknown are the presence of private potable wells or other large capacity industrial wells, and their influence on the general direction of ground water flow and the specific movement of the contamination plume. The populations at risk of exposure to on-site contaminants potentially include on-site soil removal workers, users of private or industrial wells downgradient of the site, and anyone who may eat fish from Red Road Canal, which probably receives contaminants from the shallow ground water which recharges it.

The following steps are recommended to protect public health from potential risks from exposure to hazardous substances present at the Standard Auto Bumper site.

1. The location of high capacity industrial wells in the area should be determined and the effect that these well(s) and the on-site industrial well have on the flow rate and the ground water flow direction should be analyzed. Based on this information, it should be determined if the on-site well is downgradient of the plume, and if there could be worker exposure to contaminants from the ground water in the plating process. If worker exposure could occur, then this water and indoor air should be monitored for metals.

2. Based on the determined direction of ground water flow, the area downgradient of the site should be surveyed for private potable wells.

3. Based on the available data, there are contaminants in soil and ground water on the Standard Auto Bumper Corporation site, and what is presumed to be downgradient of the site. Sampling has not been sufficient to delineate contamination plumes in any of these media. Once these plumes have been defined, then plume movement can be established. Hydrogeologic properties in the area will also have to be established and the above recommendations may need to be altered based on the determination of the contamination plume size direction, and movement rate, or as more information becomes available about the site.

4. It should be determined whether ground water enters the Red Road Canal west of the site; and if it does, this off-site surface water should be monitored for metals. If surface water monitoring reveals contaminants at levels of concern for health, then it should be determined if edible biota, fish, etc., from the canal are consumed.

5. In accordance with the Comprehensive Environmental Response Compensation, and Liability Act of 1980 as amended, the Standard Auto Bumper Corporation site has been evaluated for appropriate follow-up with respect to health studies. Inasmuch as there is no extant documentation or indication in the information and data reviewed for this Health Assessment that human exposure to off site and on site contaminants is currently occurring or has occurred in the past, this site is not being considered for follow-up health studies at this

time. When indicated by public health needs, and as resources permit, the evaluation of additional relevant health outcome data and community health concerns, if available, is recommended.

This Health Assessment was prepared by the Florida Department of Health and Rehabilitative Services Office of Toxicology and Hazard Assessment under a cooperative agreement with ATSDR. The Division of Health Assessment and Consultation and the Division of Health Studies of ATSDR have reviewed this Health Assessment and concur with its findings.

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U.S. Geological Survey, 1969b (PR1960) Miami, Florida Quadrangle, 7.5 minute series topographic map.

APPENDICES

1. Figure #1 - Location of Standard Auto Bumper site in Hialeah, Dade County, Florida

2. Figure #2 - Detail of Standard Auto Bumper site note. Gilda Bakery is currently operational