Public Health Assessment for

MRI CORPORATION
TAMPA, HILLSBOROUGH COUNTY, FLORIDA
CERCLIS NO. FLD088787585
JULY 28, 1998

DEPARTMENT OF HEALTH AND HUMAN SERVICES
IC HEALTH SERVICE
y for Toxic Substances and Disease Registry

PUBLIC HEALTH ASSESSMENT

MRI CORPORATION

TAMPA, HILLSBOROUGH COUNTY, FLORIDA

CERCLIS NO. FLD088787585

Prepared by:

Florida Department of Health
Bureau of Environmental Toxicology
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Community: ATSDR also needs to learn what people in the area know about the site and what concerr they may have about its impact on their health. Consequently, throughout the evaluation process, ATS. actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

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Summary

MRI site in Tampa, Florida, was proposed to the National Priorities List (NPL) on June 14, 1996 and listed on the NPL December 23, 1996. It was a chemical detinning plant, between 1979 and 1986, located in a sparsely populated industrial area of east Tampa. Although soil, sediments, and groundwater are contaminated, this site poses no apparent public health hazard because of incomplete exposure pathways.

This public health assessment evaluates the potential for health effects from exposure to on-site soils, sediment, and groundwater. Off-site contamination was not addressed due to lack of data. Since public access is restricted by a fence and undeveloped land surrounding the site, contact with on-site soils is an incomplete exposure pathway. The area around the site is mostly undeveloped or industrial; therefore, public access to contaminated sediments are minimal. Groundwater at the site is contaminated with cyanide and lead, but currently no one is drinking the groundwater at the site.

No actions have been taken to remediate the site but the Environmental Protection Agency (EPA) is currently developing a work plan for a Remedial Investigation/ Feasibility Study (RI/FS) which will further characterize the extent of contamination and evaluate cleanup alternatives. No community health concerns have been identified. We recommend that no one drink the contaminated groundwater. We also recommend he characterization of the extent of off-site groundwater contamination, the sampling of nearby private wells for metals and cyanide, and the sampling of offsite sediments. We recommend the reevaluation of exposure pathways if future use of the land surrounding the site changes.

Background

In this public health assessment (PHA), the Florida Department of Health (DOH) in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), evaluates the public health significance of the MRI Corporation site. Specifically, Florida DOH decides whether health effects are possible from exposure to on-site related contaminants and recommends actions to reduce or prevent possible health effects. This is the first assessment Florida DOH has conducted on this site. The Comprehensive Environmental Response, Compensation an Liability Act of 1980 (CERCLA or Superfund) authorizes the ATSDR to conduct PHAs at hazardous waste sites.

A. Site Description and History

The MRI Corporation site is located at 9220 Stannum Street in an industrial area east of Tampa, Florida (Figure 1 and 2, Appendix A). From 1979 to 1986, the MRI Corporation (MRI) operated a chemical detinning plant. MRI chemically recovered tin from scrap metal and recycled cans. Byproducts of the process include spent plating solution and sludge containing waste metals and organic chemicals. MRI mixed the spent plating solution with cooling water and discharged it into a ditch leading to Six Mile Creek (See Figure 2). MRI disposed of the sludge in on-site sludge ponds (1). Currently, the site is abandoned.

In 1984, the Florida Department of Environmental Regulation (FDER) cited MRI for four violations of their waste effluent permit. In July 1990, the Environmental Protection Agency (EPA) completed a Screening Site Inspection (1). The EPA completed a Supplemental Screening Site Inspection Report in 1992 (2).

On June 14, 1996, the EPA proposed adding MRI Corporation site to the Superfund National Priorities List (NPL). The EPA listed MRI Corporation on the NPL on December 23, 1996. The EPA is currently developing a work plan for a Remedial Investigation/Feasibility Study (RI/FS) which will further characterize the extent of contamination and evaluate alternatives for cleaning up the site (3).

B. Site Visit

On August 14, 1996, Virginia Beard of the Hillsborough County Health Department and Julie Smith of the Florida Department of Health, Bureau of Environmental Toxicology, visited the site. The site is in an industrial park and is bordered by many active, light-industrial businesses. Sparse grass and brush cover the site, along with concrete pads. A six-foot chain link fence topped with barbed wire encloses the site. Ringlift Ring Power Corporation borders the site on the west. Vines have grown over the barbed wire fence and completely cover it, allowing possible access from the west.

Stannum Street, Simms Crane and Compressed Air Systems Inc. border the site on the south. A no trespassing sign is visible from Stannum Street. An open building, formerly the machine shop, is on the southern edge of the site. A stream, railroad tracks, and wetlands border the site on the east. A drainage pipe from the site empties into a ditch on the east. The ditch empties into Six Mile Creek. Wetlands north of the site limit access.

C. Demographics, Land and Natural Resource Use

Demographics

The area immediately surrounding the site is industrial or undeveloped. Based on the 1990 Census, we estimate that 100 persons live within a one-mile radius of the site, mostly to the northwest. The Orient Park residential area is northwest of the site, but outside of the one-mile radius. The racial makeup of the area is about 80% white, 6% Hispanic, and 14% other. Based on the 1990 Census, there were only two children under age 9 and seven persons over age 65 living within a mile of the site. The median family income is about $30,000. There are no schools within the one-mile radius (1).

Land and Natural Resource Use

The MRI Corporation site occupies 6.3 acres in an industrial park with other active, light- industry. Undeveloped land and orchards are north and east of the site. Surface water runoff from the site flows into Six Mile Creek. Six Mile Creek flows into the Tampa Bypass Canal which then flows into McKay Bay, 2.7 miles to the west. The public uses McKay Bay for recreation and the Bay is home for several endangered species (1).

Most area residents use municipal water, but the 1990 Census identified 33 private wells within one mile of the site (4). However, based on our observation, the area within 3/4 of a mile of the site is industrial and the closest water wells are industrial and monitoring wells. Private wells that may be used for drinking water are on the outer edge of the one mile radius in the Orient Park neighborhood. Private wells are probably not impacted by groundwater contamination at this time. Municipal drinking water wells are 1.5 miles southwest of the site and three miles north of the site (1).

Groundwater in the shallow aquifer flows west-southwest but nearby streams and well downdraw may influence the direction (1). The top of the shallow aquifer is eight feet below the site. The top of the Floridan Aquifer, the water source for municipal wells, is 100 feet below the site(1).

Health Outcome Data

The DOH maintains health outcome databases to generate site specific data if warranted. The need to search these databases is not warranted at this time because it is unlikely that a completed exposure pathway exists.

Community Health Concerns

The community did not have any health concerns. Consultations with the Hillsborough County Health Department, the Florida Department of Environmental Protection and the EPA did not identify any additional community health concerns.

Environmental Contamination

A. On-Site Contamination

To evaluate contaminants in soil, sediment and groundwater, the maximum concentrations of all contaminants were identified and were compared with the ATSDR screening values to choose chemicals for further evaluation (Table 1A-1D, Appendix B). If the maximum contaminant concentration exceeded the ATSDR screening value, the contaminant was retained for further evaluation. If the maximum contaminant oncentration was less than the screening value, it was eliminated from further evaluation. If ATSDR did not have a screening value for a contaminant, the contaminant was retained for further discussion. Iron, magnesium, calcium, potassium and sodium because they are essential to human nutrition (7). The contaminants retained for further evaluation are called the chemicals of concern. Classifying a contaminant as a chemical of concern does not necessarily mean exposure to this contaminant will be associated with illness. It simply serves to narrow the focus of this public health assessment to those compounds most likely associated with human exposure at levels above health guidelines (Table 1A-1D, Appendix B).

We defined the on-site boundary as the area within the fence and the ditch outside of the fence on the east side (Figure 3, Appendix A). In 1984, FDER tested MRI's waste water and found oil and grease, mercury, cyanide and cadmium. The results were not available. In July 1990, EPA found cyanide, chromium, lead, nickel, manganese, mercury, and zinc above background levels in the surface and subsurface soil (Table 1A and 1B, Appendix B). They found elevated levels of organic chemicals in the sediments (Table 1C, Appendix B). A variety of polyaromatic hydrocarbons (PAH), trichloroethene, dieldrin and Aroclor 1254 were also present. EPA also found cyanide in the groundwater (Sampling locations are in Figure 3 and results are in Table 1D). In 1992, the EPA found antimony, chromium, aluminum, lead, and manganese in surface soil above background and screening levels. In subsurface soil, aluminum was above background and screening levels (2,5). Private wells in Orient Park, north of the site, have not been tested for metals or cyanide (6). Surface water data was not availabl

B. Off-site Contamination

The off-site area includes the area outside of the fence in Figure 3, excluding the ditch between the fence and railroad tracks on the east side. Available data for inclusion in this PHA does not include any off-site sampling.

C. Quality Assurance and Quality Control

In preparing this assessment, we relied on the information provided in the referenced documents. We assume that adequate quality assurance and quality control measures were followed regarding chain of custody, laboratory procedures, and data reporting. The analyses, conclusions, and recommendations in this PHA are valid only if the referenced documents are complete and reliable.

D. Physical and Other Hazards

There are no obvious physical hazards at the site. To find industrial facilities that could add to the contamination near the MRI Corporation site, the 1987-1993 EPA Toxic Chemical Release Inventory (TRI) database was searched. EPA developed TRI from the chemical release information (air, water, and soil) provided by certain industries. We found thirteen facilities in the 33619 ZIP code reported releases from 1987-1993. This ZIP code covers a rectangular area about 1.5 miles north and east, 3 miles west, and 5 miles south of MRI. Facilities which reported releases of contaminants that are of concern at MRI include Trademark Nitrogen Corporation, This facility is 508 feet southwest of MRI and released manganese and zinc into the air. If people are exposed to contamination from MRI, exposures to compounds in air from other sources could contribute to their total exposure. No data is available to assess exposure to these compounds.

Other facilities outside the one-mile radius from MRI which reported releases include Florida Steel Corporation, 1.3 miles west of MRI, which released chromium, copper, aluminum oxide, manganese, lead, nickel, and zinc into the air. Reeves Southeastern Corp. Galvanizing Division, 1.9 miles northwest of MRI, released zinc into the air. Reeves Southeastern Corp. Wire Division, 1.2 miles northeast of MRI, released lead and zinc into air and water. Universal Auto Radiator Manufacturing Company, 1.3 miles east of MRI, released copper into the air.

Two sites on the National Priorities list are nearby. They are Stauffer Chemical Company and Helena Chemical Company. Stauffer is about 1.2 miles northwest of MRI and Helena Chemical Company is 50 feet beyond Stauffer.

Pathway Analysis

The amount of contact that people have with hazardous substances is essential to assessing the public health significance of a chemical. Chemical contaminants in the environment have the potential to harm human health, but only if people have contact with those contaminants.

An exposure pathway is the process by which an individual comes into contact with contaminants. The exposure pathway consists of five elements; 1) an original source of contamination like an industrial site, 2) an environmental media like air or groundwater which moves contamination from the source to a place where people can contact the contamination, 3) a place where people could contact the contaminated soil or groundwater like topsoil or a drinking water well, 4)a route of exposure like drinking contaminated water or touching contaminated soil, and 5) a group of people who can potentially come in contact with the contamination like people living or working near the contaminated site. A completed exposure pathway includes all of these elements.

The public health findings for communities surrounding the MRI site are based on a review of past and present environmental data to identify past, present, and future exposure pathways. We identified exposure pathways that we determined are of public health significance in this assessment.

A. Potential Exposure Pathways

Groundwater
The most significant public health threat at the site is the future potential drinking or washing with contaminated groundwater. The extent of off-site groundwater contamination has not been determined. If contaminated groundwater moves offsite, it may impact private wells in the area. Contaminants may eventually move into the Floridian Aquifer threatening municipal wells. Therefore, groundwater is a potential future exposure pathway.

Soil
The on-site soil is contaminated, but several factors limit access and reduce the potential of accidentally ingesting, inhaling or touching the soil. A fence surrounds most of the site. Undeveloped land, such as wetlands and orchards, limit access on the north and east while businesses in the industrial park, limit access on the south and west of MRI. Presently access to soils is unlikely and exposure to on-site soils is an incomplete exposure pathway. However, if land use around the site changes in the future, the exposure pathway may also change. Therefore, on-site soil is a potential future exposure pathway.

B. Eliminated Exposure Pathways

Sediment

Effluent (run off) from site operations contaminated sediment in the ditch on the eastern site boundary. Public access to the ditch is unlikely due to the undeveloped land surrounding the site and lack of residential areas near the site. It is also unlikely that contaminated sediment would travel to a location where the public could be exposed. The ditch meanders 1.2 miles before it reaches Six Mile Creek, then another 2.9 miles before it reaches McKay Bay. McKay Bay is the closest body of water used for fishing and recreation. Since access to the sediments is unlikely, this exposure pathway was eliminated from further consideration.

Public Health Implications

A. Toxicological Evaluation

Groundwater consumption is currently a potential exposure pathway. The pathway will be completed if the contaminated groundwater reaches private or municipal wells and people ingest it. We estimated an exposure dose of each contaminant a person might receive by drinking the contaminated groundwater (8). For non-cancerous compounds, we estimated the exposure dose that an elementary school child, weighing 24 kilograms, would receive drinking about a half liter of contaminated groundwater per day, 250 days per year for 6 years. Children represent a sensitive subpopulation ana doses that are protective of children are most likely protective of adults. For carcinogenic compounds, we estimated an exposure dose that an adult, weighing 70 kilograms, would receive over a lifetime of drinking 2 liters contaminated groundwater per day.

To evaluate each contaminant of concern, we compared our estimate of exposure with health guidelines. These health guidelines provide perspective on the relative significance of human exposure to contaminants at the site. These values alone, however, cannot determine the potential health threat of a particular chemical. If exposure estimates were less than the health guideline, the contaminant was not evaluated further. If exposure estimates exceeded the health guideline or if there was no health guideline, the estimated exposures were compared with doses in human or animal studies. See the table below for comparison of exposure estimates from MRI to health guidelines.

To evaluate if the non-cancerous contaminants of concern are likely to pose a health threat under site-specific exposure conditions, we compared estimate of exposure doses to health guidelines such as ATSDR's Minimal Risk Level (MRL's) and EPA's Reference Doses (RfD's; see table below). RfD's and MRL's are an estimate of daily

-xposure of a human being to a chemical that is likely to be without an appreciable risk , adverse health effects over a specified duration of exposure (7).

For possible cancer-causing chemicals, we compared estimates of exposure to EPA's cancer slope factors. We used a slope factor to estimate an upper-bound probability of an individual developing cancer from a lifetime of exposure to a particular level of a potential carcinogen (7).

Comparison of Estimated Exposed Dose from Drinking Groundwater with Health Guidelines

Non- Cancer					Cancer			
Contaminant	Estimated Daily Dose mg/kg/d	Non-Cancer Health Guideline (mg/kg/d)	Source	Exceeds Non-cancer Health Guideline	Estimated Lifetime Dose $(mg/kg/d)^{-1}$	Carcinogenic Health Guideline $(mg/kg/d)^{-1}$	Source	Exceeds Cancer Health Guideline
Aluminum	3.0	—	—	—	0.3	—	—	—
Beryllium	0.0002	0.005	RfD	NO	0.000015	4.3	Slope Factor	NO
Chromium VI	0.02	0.005	RfD	YES	0.001	—	—	—
Cyanide	0.8	0.05	MRL	YES	0.07	—	—	—
Lead	0.2	—	—	—	0.01	—	—	—
Manganese	0.011	0.14	RfD	NO	0.0009	—	—	—
Nickel	0.5	0.02	RfD	YES	0.04	—	—	—
Tin	0.4	0.6	RfD	NO	0.03	—	—	—
Vanadium	0.2	0.003	MRL	YES	0.001	—	—	—
Zinc	0.8	0.005	MRL	YES	0.007	—	—	—

RfD: Reference Dose, EPA's non-cancer health guideline
MRL: Minimum Risk Level, ATSDR's non-cancer health guideline
Slope Factor: EPA's carcinogenic health guideline
—: Comparison values do not exist. See analysis below.
mg/kg/d: milligrams of contaminant per kilogram body weight per day

Aluminum

We do not anticipate adverse health effects from ingestion of aluminum in contaminated groundwater. The estimated average daily dose is 4.6 times lower than a level causing adverse developmental effects in rats. The estimated lifetime average daily dose was 91 times lower than the lowest level without causing adverse effects in a chronic exposure mouse study (9). EPA has not developed a slope factor for oral carcinogenic effects.

Beryllium

We do not anticipate adverse health effects from ingestion of beryllium in contaminated groundwater. The estimated average daily dose was 25 times lower than the EPA's RfD. The estimated lifetime average daily dose was almost 30,000 times lower than EPA's cancer risk slope factor. See table for comparisons.

Chromium

We do not anticipate non-cancer health effects from ingestion of chromium in contaminated groundwater. The estimated average daily dose exceeded the EPA's reference dose, but was three times lower than levels causing adverse health effects in short term (acute) health studies in humans. The estimated lifetime average daily dose was 570 times lower than levels causing adverse health effects in long-term human studies (10).

Because epidemiology studies of workers and animal studies showed that inhalation of some chromium IV compounds cause lung cancer, the EPA classified chromium as a known carcinogen. We did not find any conclusive studies showing cancer from oral exposure to chromium VI in animals or humans. We are, therefore, unable to determine the increased risk of cancer, if any, from chromium in the groundwater.

Cyanide

Ingestion of contaminated groundwater would expose adults and children to cyanide. The estimate of a child's potential cyanide exposure is above the ATSDR intermediate exposure MRL. No comparison values exist for chronic or carcinogenic effects of cyanide. We could not find any studies suggesting cyanide can cause cancer in humans or animals. EPA has determined that cyanide is not classifiable as to its human carcinogenicity.

The estimate of an elementary school child's potential cyanide exposure is one and a half times higher than the lowest human fatal dose reported. The estimate; however, is half the average human fatal dose. The estimate of a child's exposure is the same dose that caused labored respiration and hypoactivity in rats. The estimate of a child's exposure is two times the level causing thyroid gland hypofunction and behavioral problems in pigs. The estimate is higher than the level that caused rapid kidney cell growth and vomiting in pigs (11).

We estimate, in the future, that children would have an increased risk of labored respiration, hypoactivity, thyroid gland problems, behavioral problems, kidney problems and vomiting from cyanide in the groundwater. However, there is currently little risk associated with ingestion of the contaminated groundwater.

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ᴞrinking contaminated groundwater would expose adults and children to lead. The estimate of a child's exposure to lead by drinking contaminated groundwater was eight times higher than a level that caused a decrease in erythrocyte ALA-D (blood enzymes) in a human study. This study detected increases in erythrocyte protoporphyrin in females, but not males. Erythrocyte protoporphyrin is involved in the blood's oxygen carrying capacity. The estimate of a child's exposure to lead by drinking contaminated groundwater was three times higher than a level that decreased a monkey's performance in a learning discrimination test. The estimate of a child's exposure was eleven times higher than a level that caused rats to have irregular estrous (reproductive) cycles (12).

The estimate of an adult's chronic exposure to lead by drinking contaminated groundwater was lower than the lowest doses of lead in animal studies investigating the incidence of cancer. However, the high doses of lead given to these animals is difficult to compare with the low levels that humans are exposed to. Therefore, these estimates do not provide a sufficient basis for our assessment. We are unable to determine the increased risk of cancer, if any, from lead in the groundwater.

We estimate, in the future, children would be at an increased risk of blood enzyme problems, learning problems and reproductive cycle problems from lead in the groundwater. There is currently little risk since no one is drinking the contaminated groundwater.

Manganese

We do not anticipate adverse health effects from ingestion of manganese in contaminated groundwater. The estimated average daily dose was lower than EPA's RfD. The estimated lifetime average daily dose was 65 times lower than the level causing adverse effects in humans chronically exposed to manganese (13). EPA has not developed a slope factor for oral carcinogenic effects.

Nickel

We do not anticipate non-cancer health effects from ingestion of nickel in contaminated groundwater. The estimated lifetime average daily dose is 25 times lower than the level causing adverse effects in dogs that are chronically exposed (14).

Because epidemiology studies of workers and animal studies showed inhalation of nickel compounds could cause lung cancer, the EPA classified nickel as a known human carcinogen. Lifetime drinking water studies in rats and mice showed nickel acetate was noncarcinogenic. We are unable to determine the increased risk of cancer, if any, from the nickel in groundwater.

Tin

We do not anticipate adverse health effects from ingestion of tin in contaminated groundwater. The estimated average daily dose was lower than EPA's RfD. The estimated lifetime average daily dose is 2.3 times lower than levels causing adverse effects following chronic exposure in rats and mice (15). EPA has not developed a slope factor for oral carcinogenic effects.

Vanadium

We do not anticipate adverse health effects from ingestion of vanadium in contaminated groundwater. The estimate of an elementary school child's potential vanadium exposure dose is above the ATSDR intermediate exposure MRL. However, the estimated average daily dose was 38 times lower than the level that caused adverse effects in rats. The estimated lifetime average daily dose was 390 times lower than the levels that cause adverse effects in mice over a lifetime of exposure (16). EPA has not developed a slope factor for oral carcinogenic effects.

Zinc

We do not anticipate adverse health effects from ingestion of zinc in contaminated groundwater. The estimate of an elementary school child's potential zinc exposure is above the ATSDR intermediate exposure MRL. However, the estimated average daily dose is 6 times lower than the level causing adverse effects in humans. The estimated lifetime average daily dose is 290 times lower than the levels causing adverse health effects in humans exposed over a lifetime (17). EPA has not developed a slope factor for oral carcinogenic effects.

B. Health Outcome Data

Health outcome data for the community around this site was not evaluated. Since past or current exposure is unlikely, there is little justification or community demand for an evaluation of health outcome data at this time. If future environmental investigations find complete exposure pathways, health outcome data review will be considered as appropriate.

C. Community Health Concerns

We were unable to identify any community health concerns.

D. Summary of Public Comment for the Draft Public Health Assessment

Stories regarding the draft assessment appeared in the Tampa Tribune on August 6, 1997. The Hillsborough County Health Department passed out copies of a fact sheet at local churches and libraries. The fact sheet summarized the draft assessment's conclusions and recommendations and announced the report's availability. The

Department of Health solicited public comments through October 1, 1997. They did not receive any comments on the draft assessment.

Conclusions

Based on the information reviewed and cited in this public health assessment, we conclude:

1. The MRI Corporation site poses no apparent public health hazard because no one is currently being exposed to the contaminated groundwater. If, in the future, people drink contaminated groundwater, the concentrations of cyanide and lead in the groundwater could cause illness.

2. The extent of groundwater contamination offsite has not been characterized.

3. Most residents within a one mile area of the site consume municipal water. Private wells are located on the outside of the one mile area and currently do not represent a health threat.

4. More sediment and surface water data are needed to assess the public health threat.

5. Large portions of undeveloped land on the site may impact public health findings if development occurs in the future.

Recommendations

The recommendations and advice in this public health assessment are based upon the referenced data and information. Additional data could alter these recommendations.

1. Insure that no one uses the contaminated groundwater as a source of drinking water. Private well surveys should be performed to completely determine the drinking water characteristics of the area.

2. Sample private wells within one mile of the site for metals and cyanide.

3. Determine the extent of off-site groundwater contamination.

4. Collect off-site sediment and surface water samples and analyze for site-related contaminants.

5. Reevaluate the on-soil exposure pathway if land use on the site changes.

The conclusions and recommendations in this report are based on the information reviewed. If additional information becomes available, we will evaluate it to determin' what, if any, additional actions are necessary. We plan to review the Remedial Investigation and Feasibility Study report when it becomes available. The conclusions and recommendations in this report are site specific and are not necessarily applicable to other sites.

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CERTIFICATION

The MRI Corporation Public Health Assessment was prepared by the Florida Department of Health, Bureau of Environmental Toxicology, 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 consultation was begun.

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

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

Chief, SPS, SSAB, DHAC, ATSDR

References

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(3) Personal Communication with Randy Bryant, South Florida Superfund Section. Environmental Protection Agency. 4/8/97.

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(9) ATSDR. July 1992. Toxicological Profile for Aluminum. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(10) ATSDR. April 1993. Toxicological Profile for Chromium. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(11) ATSDR. August 1995. Toxicological Profile for Cyanide. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(12) ATSDR. May 1994. Toxicological Profile for Lead. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(13) ATSDR. July 1992. Toxicological Profile for Manganese. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(14) ATSDR. August 1995. Toxicological Profile for Nickel. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(15) ATSDR. September 1992. Toxicological Profile for Tin. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(16) ATSDR. July 1992. Toxicological Profile for Vanadium. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(17) ATSDR. May 1994. Toxicological Profile for Zinc. Agency for Toxic Substances and Disease Registry, US Public Health Service.

(18) MRI Corporation. 1978. Process Description for MRI Corporation. Tampa. Hillsborough County, Florida.

Appendix

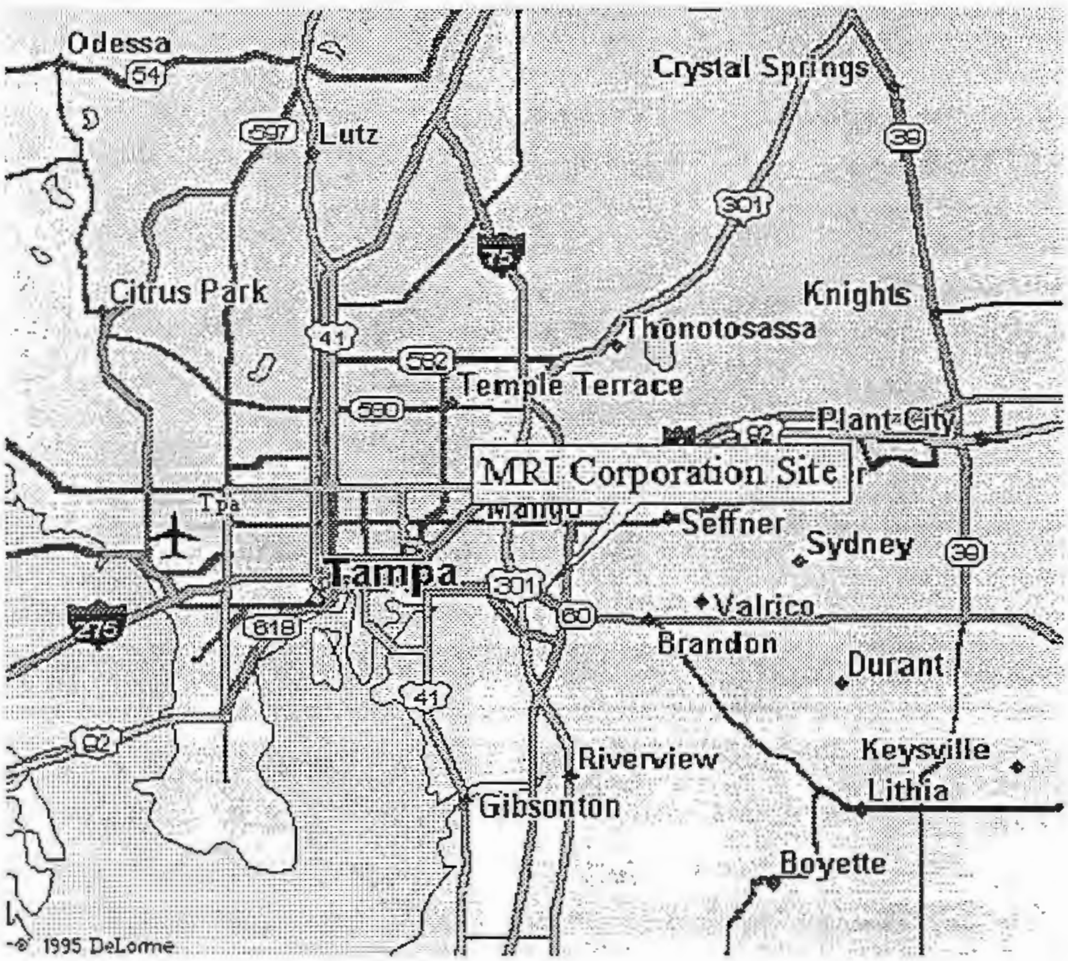

Figure 1
MRI Corporation Site

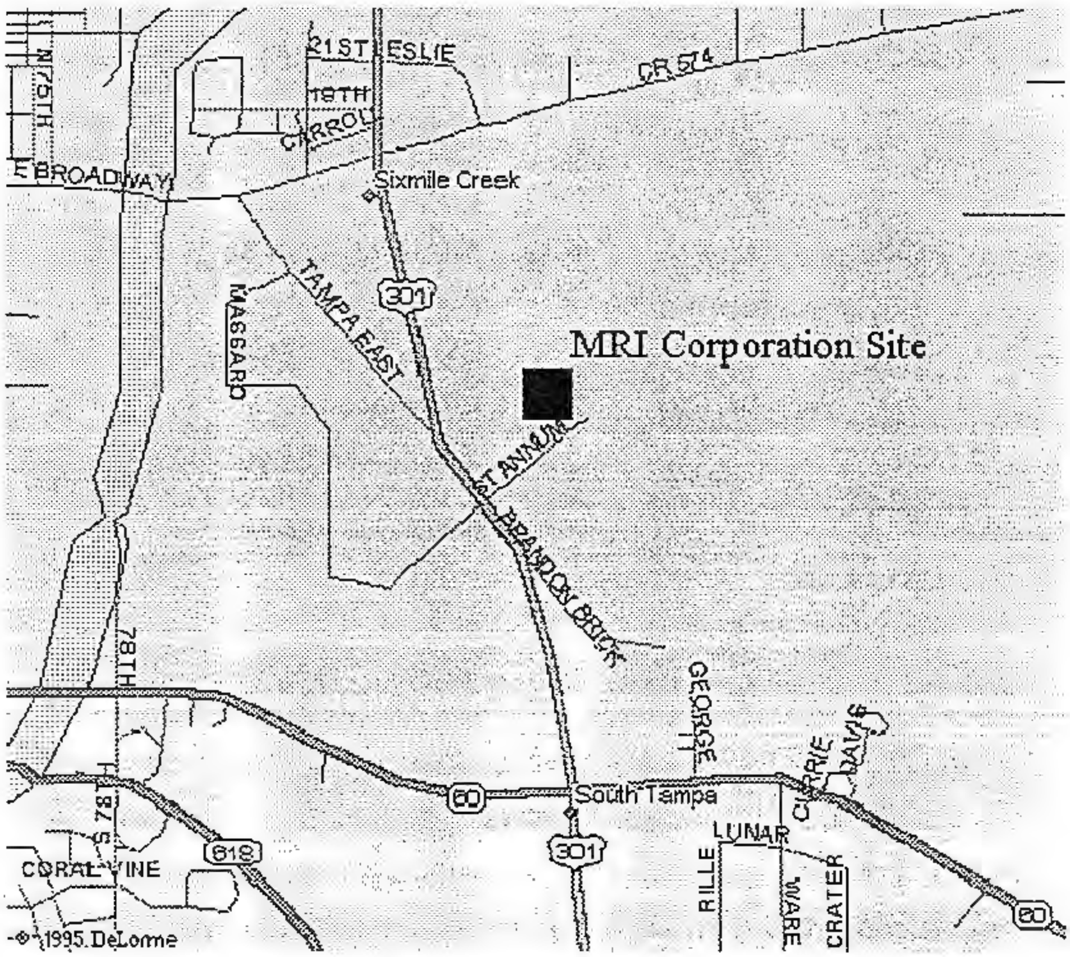

Figure 2

MRI Corporation Site

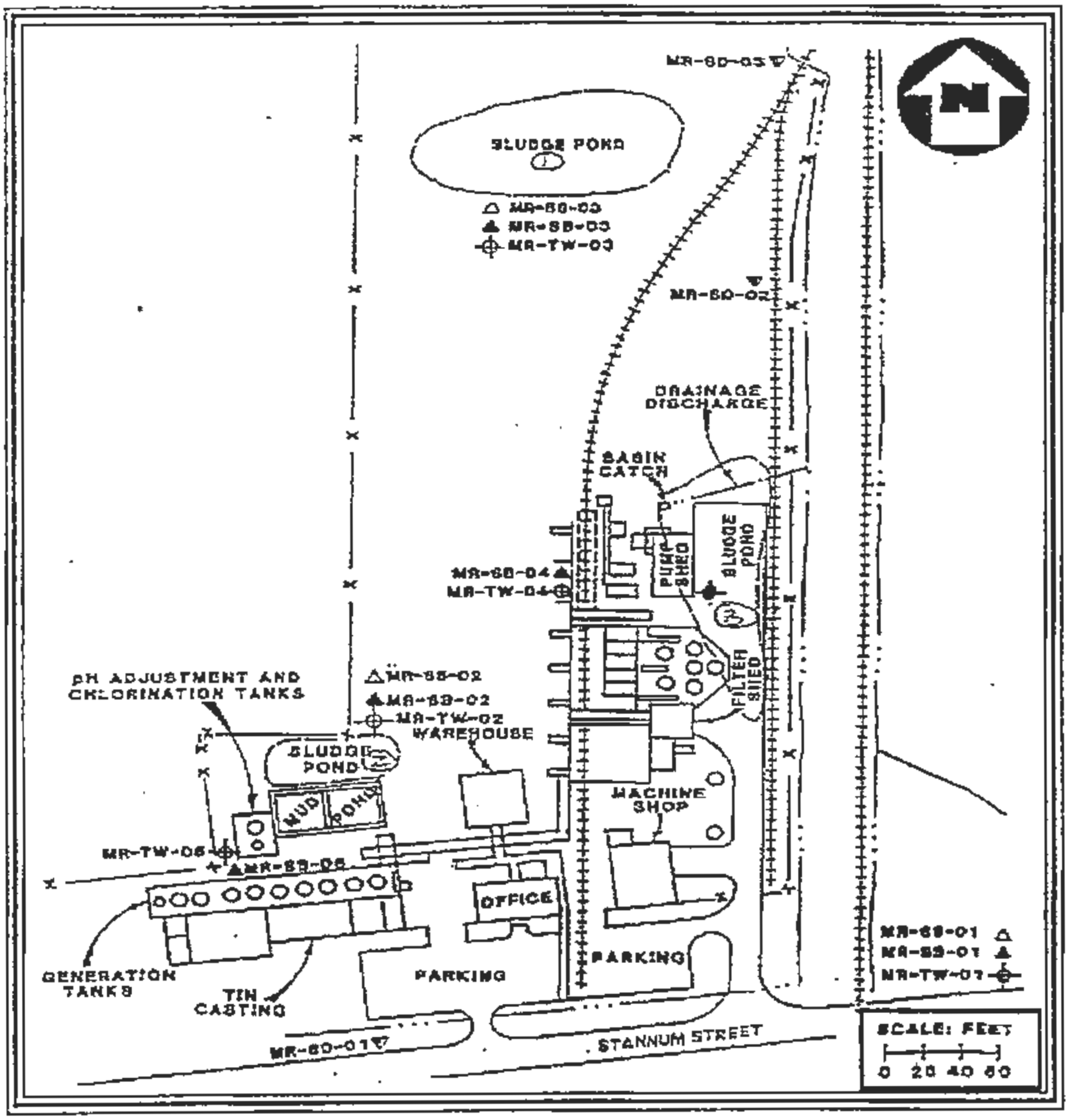

Figure 3
MRI Corporation
Adapted from NUS, 1990

Table 1A

Surface Soil Data					
Chemical	**Maximum Value (mg/kg)**	**Source**	**Screening Value (mg/kg)**	**Source**	**Retain Chemical for Further Evaluation**
Aluminum	42000	(1)	N.A.		YES
Arsenic	6	(2)	20	Chronic EMEG Child	NO
Barium	200	(2)	4000	RMEG Child	NO
Cadmium	16	(2)	40	Chronic EMEG Child	NO
Calcium	66000	(2)	N.A.		NO
Chromium	230	(2)	300	RMEG Child	NO
Cobalt	12	(2)	N.A.		YES
Copper	370	(2)	N.A.		YES
Cyanide	1.5	(2)	3000	Int. EMEG Child	NO
Iron	1200000	(2)	N.A.		NO
Lead	8700	(2)	N.A.		YES
Magnesium	2700	(2)	N.A.		NO
Manganese	740	(2)	N.A.		YES
Mercury	20	(2)	100	Int. EMEG Child	NO
Nickel	33	(2)	1000	RMEG Child	NO
Potassium	1000	(1)	N.A.		NO
Sodium	35000	(1)	N.A.		NO
Tin	25	(2)	N.A.		YES
Vanadium	30	(2)	200	Int. EMEG Child	NO
Zinc	2500	(1)	20000	Chronic EMEG Child	NO
Benzoic Acid	0.97	(1)	200000	RMEG Child	NO
Butyl benzyl phthalate	0.051	(1)	10000	RMEG Child	NO
Ethylbenzene	0.015	(1)	5000	RMEG Child	NO
PCB 1254	1.4	(1)	1	Chronic EMEG Child	YES
Phenylbutenoic acid	0.8	(1)	N.A.		YES
Trichloroethene	0.046	(1)	60	CREG	NO
Xylene	0.007	(1)	10000	Int. EMEG Child	NO

EMEG: ATSDR's Environmental Media Evaluation Guidelines
RMEG: Reference Dose Media Evaluation Guide
CREG: Cancer Risk Evaluation Guide for a one in a million excess cancer risk
Int: Intermediate duration exposure
Chronic: Long term exposure
N.A.: Screening value not available
mg/kg: milligrams of chemical per kilogram of soil

Table 1B

Subsurface Soil Data					
Chemical	Maximum Value (mg/kg)	Source	Screening Value (mg/kg)	Source	Retain Chemical for Further Evaluation
Aluminum	180000	(1)	N.A.		YES
Arsenic	6700	(2)	20	Chronic EMEG Child	YES
Barium	56	(1)	4000	RMEG Child	NO
Calcium	7200	(1)	N.A.		NO
Chromium	49	(1)	300	RMEG Child	NO
Cobalt	8.1	(2)	N.A.		YES
Copper	90	(2)	N.A.		YES
Cyanide	19	(1)	3000	Int. EMEG Child	NO
Iron	110000	(2)	N.A.		NO
Lead	340	(1)	N.A.		YES
Magnesium	530	(1)	N.A.		NO
Manganese	520	(2)	N.A.		YES
Mercury	0.61	(1)	100	Int. EMEG Child	NO
Nickel	20	(2)	1000	RMEG Child	NO
Potassium	990	(1)	N.A.		YES
Selenium	3.5	(1)	100	Chronic EMEG Child	NO
Sodium	3700	(1)	N.A.		NO
Vanadium	18	(1)	200	Int. EMEG Child	NO
Zinc	590	(2)	20000	Chronic EMEG Child	NO

Table 1C

Sediment Data					
Chemical	**Maximum Value (mg/kg)**	**Source**	**Screening Value (mg/kg)**	**Source**	**Retain Chemical for Further Evaluation**
Aluminum	5200	(1)	N.A.		YES
Barium	39	(1)	4000	RMEG Child	NO
Calcium	7600	(1)	N.A.		NO
Chromium	25	(1)	300	RMEG Child	NO
Copper	44	(1)	N.A.		YES
Cyanide	0.87	(1)	3000	Int. EMEG Child	NO
Iron	2500	(1)	N.A.		NO
Lead	540	(1)	N.A.		YES
Magnesium	350	(1)	N.A.		NO
Manganese	130	(1)	N.A.		YES
Mercury	0.92	(1)	100	Int. EMEG Child	NO
Nickel	13	(1)	1000	RMEG Child	NO
Sodium	4900	(1)	N.A.		NO
Vanadium	5.3	(1)	200	Int. EMEG Child	NO
Zinc	0.49	(1)	20000	Chronic EMEG Child	NO
Benzo(a)pyrene	0.3	(1)	0.1	CREG	YES
Benzo(b)fluoranthene	0.051	(1)	N.A.		YES
Chrysene	1.1	(1)	N.A.		YES
Dieldrin	0.000028	(1)	3	Chronic EMEG Child	NO
Fluoranthene	0.64	(1)	20000	Int. EMEG Child	NO
Pyrene	0.72	(1)	2000	RMEG Child	YES
Trichloroethene	0.013	(1)	60	CREG	NO

Table 1D

Groundwater Data					
Chemical	Maximum Value (ug/L)	Source	Screening Value (ug/L)	Source	Maximum Value Exceed Screening Value
Aluminum	190000	(1)	N.A.		YES
Barium	690	(1)	700	RMEG Child	NO
Beryllium	11	(1)	0.008	CREG	YES
Calcium	130000	(1)	N.A.		NO
Chromium	930	(1)	50	RMEG Child	YES
Cyanide	52000	(1)	500	Int EMEG Child	YES
Iron	42000	(1)	N.A.		NO
Lead	10000	(18)	N.A.		YES
Magnesium	17000	(1)	N.A.		NO
Manganese	670	(1)	N.A.		YES
Mercury	1.4	(1)	N.A.		YES
Nickel	30000	(18)	200	RMEG Child	YES
Potassium	45000	(1)	N.A.		NO
Sodium	9000000	(1)	N.A.		NO
Vanadium	1000	(1)	30	Int EMEG Child	YES
Zinc	5000	(18)	3000	Chronic EMEG Child	YES

mg/L: mg of chemical per liter of groundwater