ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

UNITED METALS INCORPORATED
MARIANNA, JACKSON COUNTY, FLORIDA
EPA FACILITY ID: FLD098924038
OCTOBER 25, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
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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PUBLIC HEALTH ASSESSMENT

UNITED METALS INCORPORATED

MARIANNA, JACKSON COUNTY, FLORIDA

EPA FACILILTY ID: FLD098924038

Prepared by:

Bureau of Community Environmental Health
Florida Department of Health
Under cooperative agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

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FOREWORD

This document summarizes public health concerns at a former battery recycling facility in Florida. A number of steps are necessary to do such an evaluation:

1. Evaluating exposure: Florida DOH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is found on the site, and how people might be exposed to it. Usually, Florida DOH does not collect its own environmental sampling data. We rely on information provided by the Florida Department of Environmental Protection (DEP), U.S. Environmental Protection Agency (EPA), and other government agencies, businesses, and the public.

2. Evaluating health effects: If there is evidence that people are being exposed - or could be exposed - to hazardous substances, Florida DOH scientists will take steps to determine whether that exposure could be harmful to human health. The report focuses on public health - the health impact on the community as a whole - and is based on existing scientific information.

3. Developing recommendations: In the evaluation report, Florida DOH outlines its conclusions regarding any potential health threat posed by a site, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of Florida DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies - including the EPA and Florida DEP. However, if there is an immediate health threat, Florida DOH will issue a public health advisory warning people of the danger, and will work to resolve the problem.

4. Soliciting community input: The evaluation process is interactive. Florida DOH starts by soliciting and evaluating information from various government agencies, the organizations responsible for cleaning up the site, and the community surrounding the site. Any conclusions about the site are shared with the groups and organizations that provided the information. Once an evaluation report has been prepared, Florida DOH seeks feedback from the public. If you have questions or comments about this report, we encourage you to contact us.

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1.0 Summary and Statement of Issues

1.1 Summary

The Florida Department of Health (DOH) prepared this public health assessment report in response to the US Environmental Protection Agency (EPA) proposing the United Metals Incorporated (UMI) site to its Superfund National Priorities List (NPL). Between 1979 and 1989, UMI recycled automotive batteries at a rural site in Jackson County, Florida. Disposal of acid wastewater in on-site holding ponds resulted in on-site soil and ground-water contamination. Surface water run-off resulted in sediment contamination in a nearby creek. As of early 2005, the contamination has not affected nearby private drinking water wells.

For current exposures, the UMI site is categorized as a no apparent public health hazard for nearby residents. If in the future the site is converted for residential use, long-term exposure to on-site soil and shallow groundwater could cause adverse health effects, including a moderate to high increased risk of cancer. The EPA and the site owner should continue to restrict site access. Nearby drinking water wells should be sampled annually for metals. For past exposures, the UMI site is categorized as no public health hazard because there is no known completed exposure pathway.

1.2 Statement of Issues

In September 2002, the US Environmental Protection Agency (EPA) proposed the United Metals, Incorporated (UMI) hazardous waste site to its Superfund National Priorities List (NPL). In April 2003, the EPA added the UMI site to its list of finalized National Priorities List. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, or Superfund) requires the Agency for Toxic Substances and Disease Registry (ATSDR) to prepare a public health assessment for each site within a year of the site being proposed to the NPL. The Florida DOH conducted this public health assessment under a cooperative agreement with and funding from ATSDR.

This is the first public health assessment (PHA) of this site by either Florida DOH or the ATSDR; however, Florida DOH and ATSDR prepared a more limited Health Consultation (HC) report in September 2002. The HC findings include the site being a “Public Health Hazard” due to physical hazards on the property and that the extent of the contamination of soil and groundwater at the property had not been adequately characterized. This PHA considers data contained in the December 2002 EPA Remedial Investigation (RI) report as well as previous reports.

In this PHA, Florida DOH evaluates the past, current, and future potential for exposures to chemicals at and near the UMI site. The likelihood of exposures to cause illnesses is then discussed, as is the need for additional actions to protect public health.

2.0 Background

2.1 Site History

The United Metals Incorporated (UMI) facility began operations in 1979. From 1979 to 1989, UMI recycled copper, brass, tin, and aluminum. UMI also recycled lead and plastic from auto batteries. The facility sold the recycled lead and plastic to smelting and extruding facilities. UMI produced as much as 5,000 gallons of acidic wastewater each day and treated it using precipitation and neutralization.

The Florida Department of Environmental Protection (DEP), formerly the Florida Department of Environmental Regulation (DER), first investigated the site in 1980. While investigating the nearby Sapp Battery site, Florida DEP traced metal contamination in Dry Creek to the UMI facility. Florida DEP found elevated levels of lead, zinc, nickel and manganese in the Dry Creek / Chipola River water and sediments immediately downstream of the site. Shallow groundwater under the UMI site moves toward the southeast, southwest and northwest, discharging to Dry Creek and eventually into the Chipola River system.

In March 1981, Florida DEP found elevated levels of zinc and lead in the groundwater and holding pond water at UMI. The pond water was strongly acidic. Florida DEP estimated UMI processed 10,000 to 12,000 car batteries every week and generated 2,500 to 5,000 gallons of metal-containing acid waste per week.

In May 1982, the US Environmental Protection Agency (EPA) investigated the site and found elevated levels of cadmium in groundwater. The EPA also found elevated levels of arsenic, cadmium, chromium, iron, lead, nickel and zinc in the processed wastewater. In July 1982, the Florida DEP found elevated levels of cadmium and lead in the holding pond water and groundwater.

In 1983, UMI dredged and filled in the holding pond. In July 1986, the EPA found elevated levels of lead in the soil. UMI ceased operations in 1989.

In 1993 and 1994, the EPA found elevated levels of aluminum, arsenic, cadmium, chromium, iron, lead, manganese, nickel and vanadium in on-site soil and groundwater. They found lead in both on-site and off-site surface soil. Holding pond sediment contained elevated levels of arsenic, antimony and lead. Soil from the drainage area west of the site had elevated lead levels. Stormwater runoff from UMI drains into Dry Creek and eventually into the Chipola River.

In December 2002, an EPA contractor released a Draft Remedial Investigation (RI) report of the UMI site. In addition to metals contamination, this report found pesticides in on-site groundwater. A chronology of site history is included in Appendix A.

2.2 Site Description

The United Metals Incorporated (UMI) site is on the east side of state Highway 71 near Simsville in rural Jackson County (Figures 2-1 and 2-3, Appendix B). Simsville is approximately 10 miles southeast of Marianna, Florida. Most of the 180-acre UMI site is wooded. Battery recycling operations took place on 24 acres surrounded by a chain-link fence. Five structures are currently on the site: an office building, a health center, a vehicle maintenance shop, a battery recycling building and a plastic pellet process building.

Farmland, pasture, and undeveloped wetlands surround the site. There are single-family residences within 1/2 mile to the northeast, southwest, south and east of UMI. The site slopes slightly to the south-southwest toward the Chipola River. Patches of bare ground exist around the battery recycling building. Leftover equipment and materials, including plastic chips from the plastic recycling operation, are scattered around the site.

2.2.1 Demographics - The area within 1 mile of the site encompasses one U.S. Census Bureau block group. In 2000, approximately 179 people lived within 1 mile of the site. About 30% were under the age of 18 and 15% over the age of 65. Of the total population, 2% were black, 91% were white, 6% were Hispanic, and 1% were American Indians, Asians and other racial/ethnic groups (US Bureau of the Census 2000).

2.2.2 Land Use - The site is in a primarily agricultural and undeveloped area of Jackson County, Florida. There are several single-family residences to the southwest, and a few to the south, east and northeast.

2.2.3 Natural Resource Use - The UMI site and surrounding areas use drinking water taken from the Floridan aquifer. Private well depths in the area typically range from 100 to 150 feet deep.

2.3 Site Visit

In 1995, the Florida DEP noted holes in the UMI fence and sign of trespass. The Florida DOH and the Jackson County Health Department (CHD) visited the site in October 2001 and November 2003. They noted the facility's gate was locked and no signs of recent trespass. A representative of the Jackson CHD visited the site in May 2005. He noted that the gate is kept lock and saw no signs of trespass.

3.0 Community Health Concerns

On December 10, 2002, the Florida DOH and the Jackson CHD held a public meeting for the community surrounding the UMI facility. At that meeting they presented the findings and conclusions of the 2002 Health Consultation and recorded/answered community health concerns. The following is a list of community questions and concerns and Florida DOH responses.

Concern: **How high is this site on the National Priorities List (NPL)?**

Response: EPA gave the UMI site a score of 30.77. This score qualifies UMI as a NPL site. The EPA does not rank sites in order of best to worst.

Concern: **What are the other metals at the site besides lead?**

Response: There are seven metals in the soil at levels above regulatory limits. There are eight metals in the groundwater at levels above regulatory limits. Only arsenic, lead and manganese present a potential health concern.

Concern: **Could the levels of lead found in drinking water wells be fluctuating because of drought?**

Response: Levels of metals and other contaminants in groundwater used as drinking water can fluctuate with rising and falling groundwater levels. Other factors that can affect contaminant levels include how the samples were taken and tested, and the level of sediment in the sample at the time of collection.

Concern: **To clean up the ground under the concrete slabs, will the buildings have to be taken down?**

Response: The highest levels of surface soil contamination appear to occur under the concrete building slabs. The EPA will decide the best way to clean up the contaminants under the building slabs.

Concern: **Are the open containers (water tanks) on the property a mosquito hazard?**

Response: The water in the tanks could be a mosquito hazard, as well as a drowning hazard for trespassers. The Florida DOH has recommended to the owner and EPA that the tanks be drained and removed. (Note: In August 2005, the site owner reported to the Florida DOH that each tank has been drained and that holes were drilled in the bottom to prevent water collecting in the tanks.)

Concern: **What has been the supervision of the site since the business closed?**

Response: The property owner has been monitoring the site since the operations ceased in 1989. The site is fenced with locked gates and there is no recent evidence of trespass.

Concern: **For well water, should (or how should) we get filters to purify?**

Response: In 2001 and 2002, the Jackson County Health Department and the EPA tested nearby drinking water and didn't find any contamination from the UMI site. Based on this sampling, it is up to the well owner to test for contaminants and provide remediation.

Concern: **Can you smell or taste lead in water?**

Response: No.

Concern: **Is the contamination in the Floridan aquifer? How about a confining layer?**

Response: To date, neither Florida DEP nor EPA have found contamination associated with the UMI site in the deep Floridan aquifer used as a drinking water source. This may be due to a confining layer above the Floridan aquifer.

Concern: **Why has cleanup taken so long?**

Response: There are many NPL and hazardous waste sites that the EPA is responsible for cleaning up. There are also limited cleanup funds. These sites are complex and take a lot of time and resources to assess before cleanup can begin.

Concern: **What is the quantity of the contamination? What is its movement? What is its potential to affect area wells?**

Response: The majority of site-related contamination is on the UMI site. There appears to have been some movement of metals contamination off of the site to the southwest in ditches along the roads and in a wetland across Highway 71. There is limited potential for site-related contamination to reach area wells.

Concern: **Would the contamination have any effect on grazing animals, or others? Are there grazable areas on the site (the area of contamination)?**

Response: The Florida DOH assesses the threat to human health from hazardous waste sites. Most of the contamination appears to be confined to the UMI site. The site is currently fenced and not accessible for grazing.

Concern: **Are wells east of the site contaminated with lead?**

Response: The Remedial Investigation concluded that shallow groundwater does appear to move to the east from the eastern portion of the site. However, drinking water in the deeper Floridan aquifer is anticipated to move

generally east to west. Lead has not been found at levels of public health concern in off-site groundwater and drinking water west of the site.

4.0 Discussion

In this section, Florida DOH reviews the available site information (for this site, water and soil data), including information on the chemical concentrations present in the soil and water. No air data for this site was available for review. Florida DOH then makes judgments about how people can contact chemicals. Finally, Florida DOH attempts to predict whether, if people were to contact these chemicals, those chemicals could affect their health.

The public health assessment process has inherent uncertainties because:

- Science is not 100% certain,
- The risk assessment process is inexact,
- Information on the site and on actions (and interactions) of chemicals is never complete, and
- Opinions on the implications of known information differ.

Florida DOH also uses wide safety margins when setting health-related threshold values. The assumptions, interpretations, and recommendations made throughout this public health assessment are conservative in the direction of protecting public health.

4.1 Environmental Contamination

This section examines environmental data collected at and near the site, sampling adequacy, and contaminants of concern. The maximum concentration and comparison values for the contaminants of concern in the various media are listed in Appendix C. Contaminants of concern are selected by considering the following factors:

1. Contaminant concentrations on and off the site. The only contaminants eliminated from further consideration were those in which both the background and on-site concentrations are below standard comparison values-although background concentrations are useful in determining if contaminants are site-related. This is necessary to assess the public health risk of all contaminants detected, whether site-related or not.

2. Field data quality, laboratory data quality, and sample design.

3. Community health concerns.

4. For media (soil, water and/or air) providing complete and potential exposure pathways, comparison of maximum concentrations with published ATSDR standard comparison values. The ATSDR's published standard comparison values are media-specific concentrations used to select contaminants for further evaluation. They are not used to predict health effects or to set cleanup levels.

When ATSDR standard comparison values are absent, other regulatory guidelines can be used.

5. For complete and potential exposure pathways, a comparison of maximum concentrations with toxicological information published in ATSDR toxicological profile documents. These profiles are chemical-specific and summarize toxicological information found in scientific literature.

The following ATSDR standard comparison values were used (ATSDR 2002), in order of priority, to select contaminants of concern:

1. EMEGs (Environmental Media Evaluation Guides) - The ATSDR derives EMEGs from their Minimal Risk Levels (MRLs) using standard exposure assumptions. MRLs are estimates of daily human exposure to a chemical likely to be without an appreciable risk of noncancerous illnesses, generally for a year or longer.

2. RMEGs (Reference Dose Media Evaluation Guides) - The ATSDR derives RMEGs from the EPA's Reference Dose (RfD) using standard exposure assumptions. RfDs are estimates of daily human exposure to a chemical likely to be without an appreciable risk of noncancerous illness, generally for a year or longer.

3. CTLs (Cleanup Target Levels) - CTLs are the Florida Department of Environmental Protection's (DEP) maximum allowable concentrations of contaminants in soil (SCTLs) and groundwater (GCTLs). Florida DEP CTLs are enforceable and are required to be equal to or more strict (i.e., lower) than federal standards. Florida DEP CTLs were used when ATSDR does not have an applicable standard comparison value.

Using the components listed above, the following chemicals were selected for further evaluation based on potential human exposure pathways in on-site groundwater and on-site and off-site surface soil and sediment:

- Aluminum
- Antimony
- Arsenic
- Cadmium
- Chromium
- Iron
- Lead
- Manganese
- Mercury
- Sodium
- Vanadium
- Benzo(a)pyrene
- Aldrin / Dieldrin

This list is slightly different than the contaminants of concern in the 2002 Florida DOH/ATSDR Health Consultation. Benzo(a)pyrene and aldrin/dieldrin are added to the list, and nickel is removed. In 2002, the EPA tested the soil and water but did not find nickel at levels above comparison values. Exposure to nickel was not determined to be a major health concern in the 2002 Health Consultation.

Furthermore, identification of a contaminant of concern in this section does not necessarily mean that exposure will cause illness. Identification serves to narrow the focus of the public health assessment to those contaminants most likely to impact public health.

This Public Health Assessment (PHA) first discusses the contamination that exists on site and then the site related contamination that occurs off site. "On site" is defined as the area inside the fence or within 100 feet of the fenced property boundary. "Off site" is the area more than 100 feet outside the fenced property boundary, as shown in Figure 2-3, Appendix B.

4.1.1 On-Site Contamination

4.1.1.1 On-Site Surface Soil – In 2002, the EPA tested approximately 255 surface soil samples over the UMI site. They collected surface soil samples between 0 and 6 inches below land surface in open areas around the site, below the concrete building slabs and from a pile of waste soil located on the site. The results for on-site soil analyses are summarized in Table 1, Appendix C. For the purpose of this PHA, on-site surface soil has been adequately characterized.

4.1.1.2 On-Site Groundwater – In 2002, the EPA tested 10 on-site groundwater monitoring wells and two on-site deep production wells (140 ft). Even though two of these wells were located just outside the fenced property boundary, all 12 wells are considered "on-site". The results for on-site groundwater analyses are summarized in Table 2, Appendix C. For the purpose of this PHA, on-site groundwater has been adequately characterized.

4.1.2 Off-Site Contamination

4.1.2.1 Off-Site Surface Sediment – In 2002, the EPA tested surface sediment from ditches along the roads leading to the UMI site and in a wetland located to the west of Highway 71 (Figure 2-3). They collected these surface sediment samples between 0 and 6 inches below land surface. The results for off-site surface sediment analyses are summarized in Table 1, Appendix C. For the purpose of this PHA, off-site surface sediment has been adequately characterized.

4.1.2.2 Off-Site Groundwater – In 2002, the EPA tested drinking water from six off-site Floridan aquifer private drinking water wells (approximately 100+ ft). These wells are a source of drinking water for the surrounding residential community. The results for off-site groundwater analyses are summarized in Table 2, Appendix C. For the purpose of this PHA, off-site groundwater has been adequately characterized.

4.1.3 Quality Assurance and Quality Control - This PHA uses existing environmental data. Florida DOH assumes these data are valid because government consultants or consultants overseen by government agencies collected and analyzed the environmental samples. Florida DOH also assumes that consultants who collected and analyzed these samples followed adequate quality assurance and quality control measures concerning chain-of-custody, laboratory procedures, and data reporting.

The completeness and reliability of the referenced information determine the validity of the analyses and conclusions drawn for this public health assessment. In each of the preceding on-site and off-site contamination subsections, the adequacy of the data was evaluated to estimate exposures. The estimated data and presumptive data were assumed valid due to the qualifications of the sampling agency and analytical laboratory. This assumption is protective of public health by assuming that a contaminant exists when in fact it might not exist.

4.2 Physical Hazards

During the October 2001 site visit, Florida DOH noted the site was fenced with locking gates. Large, open tanks located to the south of the plastic pellet process building contained significant amounts of water. Florida DOH determined the water in these tanks to be a drowning hazard for trespassers. The 2002 Health Consultation recommended removal of the water in these tanks.

In 2003, the Florida DOH visited the UMI site and observed water in the tanks.

In June 2005, a representative of the Jackson County Health Department visited the UMI site and observed that the tanks were full of water to the top. Florida DOH recommends to the owner and EPA that the water be drained and the tanks removed, even though the site is relatively secure.

In August 2005, the site owner reported to the Florida DOH that each tank had been drained and that holes were drilled in the bottom to prevent water from collecting in the future.

4.3 Pathways Analyses

Chemical contaminants in the environment can harm people's health, but only if people have contact with those contaminants at a high enough concentration (dose) to cause a health effect. Knowing or estimating the frequency with which people could have contact with hazardous substances is essential to assessing the public health importance of these contaminants. To decide if people can contact contaminants at or near a site, Florida DOH looks at the human exposure pathways. An exposure pathway has five parts. These parts are:

1. a source of contaminants, like a hazardous waste site,
2. an environmental medium like air, water or soil that can hold or move the contamination,
3. a point where people come in contact with a contaminated medium, like drinking water or soil in a garden,

4. an exposure route like drinking contaminated water from a well or eating contaminated soil on homegrown vegetables, and
5. a population who could be exposed to the contaminants.

An exposure pathway is eliminated if at least one of the five parts referenced above is missing and will not occur in the future. Exposure pathways not eliminated are either completed or potential. For completed pathways, all five pathway parts exist and exposure to a contaminant has occurred, is occurring, or will occur. For potential pathways, at least one of the five parts is missing, but could exist. Also for potential pathways, exposure to a contaminant could have occurred, could be occurring, or could occur in the future.

4.3.1 Completed Exposure Pathways - There are no known past, present, or future completed exposure pathways for the United Metals, Inc. (UMI) site.

4.3.2 Potential Exposure Pathways - The following subsection lists potential human exposure pathways.

4.3.2.1 On-Site Surface Soil – If, in the future, the UMI site is converted to commercial or residential use, people could be exposed to on-site contaminants in surface soil. Exposure might occur by accidental ingestion of surface soil or inhalation of contaminated dust.

4.3.2.2 On-Site Groundwater – If, in the future, the UMI site is converted to commercial or residential use, people could be exposed to contaminants by drinking on-site groundwater.

4.3.2.3 Off-Site Surface Sediment – If, in the future, the UMI site is converted to commercial or residential use, people could be exposed to off-site contaminants in surface sediment. Exposure might occur by accidental ingestion of surface sediment or inhalation of contaminated dust.

4.3.2.4 Off-Site Groundwater – Sampling shows private drinking water wells are not contaminated, thus eliminating any past or current exposure pathways. If, in the future, contaminants from the UMI site moved into the same aquifer the private wells tap, people could be exposed to off-site contaminants in groundwater.

4.4 Public Health Implications

In the following sections, exposure levels and possible health effects that might occur in people exposed to the contaminants of concern at the site are discussed.

4.4.1 Toxicological Evaluation - In this subsection, exposure levels and possible health effects that might occur in people exposed to the contaminants of concern at the site are discussed. Also in this subsection, general ideas such as the risk of illness, dose response and thresholds, and uncertainty in public health assessments are discussed as well.

To evaluate exposure, the daily dose of each contaminant of concern found at the site is estimated. Kamrin (1988) explains a dose in this manner:

> "...all chemicals, no matter what their characteristics, are toxic in large enough quantities. Thus, the amount of a chemical a person is exposed to is crucial in deciding the extent of toxicity that will occur. In attempting to place an exact number on the amount of a particular compound that is harmful, scientists recognize they must consider the size of an organism. It is unlikely, for example, that the same amount of a particular chemical that will cause toxic effects in a 1-pound rat will also cause toxicity in a 1-ton elephant."
>
> "Thus instead of using the amount that is administered or to which an organism is exposed, it is more realistic to use the amount per weight of the organism. Thus 1 ounce administered to a 1-pound rat is equivalent to 2000 ounces to a 2000-pound (1-ton) elephant. In each case, the amount per weight is the same: 1 ounce for each pound of animal. This amount per weight is the dose. We use dose in toxicology to compare the toxicity of different chemicals in different animals."

In expressing the daily dose, milligrams of contaminant per kilogram of body weight per day (mg/kg/day) are used. A milligram is about the weight of a postage stamp and a kilogram is about 2 pounds.

To calculate the daily dose of each contaminant, standard assumptions about body weight, ingestion and inhalation rates, exposure time length, and other factors needed for dose calculation are used (ATSDR 1992). In calculating the dose, it is assumed people are exposed to the maximum concentration measured for each contaminant in each medium.

To estimate exposure, Florida DOH uses the maximum concentration of each contaminant found on the site. Although the UMI site has been widely sampled, unidentified "hot spots" with even higher concentrations may exist.

To estimate possible future exposure from incidental ingestion of on-site surface soil and off-site surface sediment, Florida DOH makes the following assumptions: (1) children between the ages of 1 and 6 ingest an average of 200 milligrams (mg) of soil per day, (2) adults ingest an average of 100 milligrams of soil per day, (3) children weigh an average of 15 kilograms (kg), (4) adults weigh an average of 70 kg, and (5) children and adults ingest soil at the maximum concentration measured for each contaminant.

To estimate possible future exposure from drinking on-site and off-site groundwater, Florida DOH makes the following assumptions: (1) children between the ages of 1 and 6 ingest an average of 1 liter of water per day, (2) adults ingest an average of 2 liters of water per day, (3) children weigh an average of 15 kilograms (kg), (4) adults weigh an average of 70 kg, and (5) children and adults ingest contaminated groundwater at the maximum concentration measured for each contaminant.

4.4.1.1 On-Site Surface Soil - If in the future children and adults are exposed to on-site surface soil, they could be exposed to metals at levels high enough to cause adverse health effects. Although levels of antimony, arsenic, cadmium, chromium, iron and lead in on-site

surface soil were above the comparison values, only arsenic and lead at the maximum concentrations and worst-case exposure scenarios are a public health concern.

If a person was exposed to the maximum concentration of arsenic in on-site surface soil daily for a period of 30 years, there is a chance that person would experience an increased risk of adverse health effects including melanosis and keratosis of the skin, cerebrovascular disease and increased risk of stroke. Additionally, arsenic is a known carcinogen and a worst-case exposure scenario could lead to a moderate to high increased risk of lung and other cancers from ingestion of on-site surface soil (ATSDR 2000).

If a person was exposed to the maximum concentration of lead in on-site surface soil daily for a period of 30 years, there is a chance that person would experience decreased enzyme activity and heme synthesis. There is no clear indication whether or not this decrease would cause an adverse health effect. The calculated dose was greater than the dose reported to cause disruption of conditioned responses and motor activity, decreased spermatozoa mobility, impotence, impaired righting reflex and reversal learning deficit in animals. There is insufficient evidence from human studies to determine whether lead is a carcinogen in humans by the oral route of exposure (ATSDR 1999).

4.4.1.2 On-Site Groundwater – If in the future children or adults drink on-site groundwater at the UMI site, they could be exposed to metals and pesticides at levels high enough to increase the risk of both cancer and non cancer illnesses. Although levels of aluminum, cadmium, iron, lead, manganese, vanadium, aldrin and dieldrin in on-site groundwater were above the comparison values, only the metals arsenic and manganese and the pesticides aldrin and dieldrin at the maximum concentrations and worst-case exposure scenarios are a public health concern.

If a person was exposed to the maximum concentration of arsenic in on-site groundwater daily for a period of 30 years, they would have a moderate to high increased theoretical risk of cancer (ATSDR 2000).

If a person was exposed to the maximum concentration of manganese in on-site groundwater daily for a period of 30 years, they would have an increased theoretical risk of mild neurological defect. There is insufficient evidence to suggest whether manganese is a carcinogen in humans by the oral route of exposure (ATSDR 2000).

If a person was exposed to the maximum concentration of the pesticides aldrin or dieldrin in on-site groundwater daily for a period of 30 years, they would have a low to moderate increased theoretical risk of cancer (ATSDR 2002).

Off-Site Surface Sediment – If in the future children and adults come into contact with off-site surface sediment, they could be exposed to lead at levels high enough to cause adverse health effects. Only lead in off-site surface sediment was above the comparison values. At the maximum concentration and worst-case exposure scenario, lead in off-site surface sediment could present a public health concern.

Based on conversations with the community, however, it is unlikely that people are currently coming into daily contact with the maximum concentration of lead in off-site surface sediment. It is more likely that they are having no or little exposure to lead in off-site surface sediment, and therefore are not likely to experience any adverse health effects.

If a person was exposed to the maximum concentration of lead in off-site surface sediment daily for a period of 30 years, there is a chance that person would experience decreased enzyme activity and heme synthesis. There is no clear indication whether or not this decrease would cause an adverse health effect.

The calculated dose was greater than the dose reported to cause disruption of conditioned responses and motor activity, decreased spermatozoa mobility, impotence, impaired righting reflex and reversal learning deficit in animals. There is insufficient evidence to suggest whether lead is a carcinogen in humans by the oral route of exposure (ATSDR 1999).

4.4.1.4 Off-Site Groundwater – There is no current indication of exposure in the community to site-related contaminants in off-site drinking water.

In September 2004, the Jackson County Health Department sampled one private well near the UMI facility. The sample showed a result of lead over the maximum contaminant level (MCL). A purged confirmation sample in January 2005 came back as non-detect. Follow-up sampling performed at 10 wells near the UMI in February 2005 showed one well with an exceedance of the lead MCL. A purged confirmation sample came back below the MCL. Based on the purged well results there does not appear to be high levels of lead in the groundwater, rather the lead MCL exceedances could be a result of materials used in the well construction.

In Section 7.0 of this report, Florida DOH recommends follow-up sampling and analyses of area drinking water wells if contamination is found in on-site deep groundwater.

4.4.2 Risk of Illness, Dose Response/Threshold and Uncertainty - Appendix D discusses limitations on estimating the risk of illness, the theory of dose response and the concept of thresholds. Appendix D also discusses the sources of uncertainty inherent in public health assessments.

4.5 Health Outcome Data

The Florida DOH did not review health outcome data at the UMI site because no evidence supports exposure to residents currently or in the past.

5.0 Child Health Considerations

5.1 Children

Children could be at greater risk than adults from exposure to hazardous substances emitted from waste sites. Children are more likely exposed because they play outdoors and because they could bring food into contaminated areas. Children are shorter than adults and therefore children breathe dust, soil, and heavy vapors close to the ground. Pound for pound of body

weight, children drink more water, eat more food, and breathe more air than do adults. The obvious implication for environmental health is that children can have much greater "doses" than adults to contaminants that are present in soil, water, and air (ATSDR 1998).

Contamination at the UMI site that could affect children includes: arsenic in on-site surface soil and on-site groundwater; lead in on-site surface soil and off-site surface sediment, arsenic and manganese in on-site groundwater; and pesticides (aldrin and dieldrin) in on-site groundwater.

If, in the future, children and adults live on the UMI site, exposure to the above-listed chemicals could occur by ingestion of surface soil, airborne dust and shallow groundwater. The children currently living around the UMI site have been tested for lead in their blood and no elevated blood lead levels were found. An August 2002 Florida DOH Health Consultation presents the findings of blood testing in area children.

6.0 Conclusions

The United Metals, Inc. site is categorized as a no apparent public health hazard. Site access is restricted and there is no current association of on-site contaminants in groundwater used as a drinking water source by the surrounding community. The Florida DOH is not aware of any off-site residents who are currently exposed to contaminants at levels likely to cause an increased risk of illness.

Also, it is unlikely that people are currently coming into daily contact with the maximum concentration of lead in off-site surface sediment. Based on conversations with the community, it is more likely that they are having no or little exposure to lead in off-site surface sediment, and therefore are not likely to experience any adverse health effects.

There is no evidence of past exposures in the surrounding community to contamination from the United Metals, Inc. site. The highest levels of contamination appear to be confined to the immediate area of battery recycling operations. This area is fenced with locking gates.

The United Metals, Inc. site could be a public health concern in the future. If in the future people are exposed daily to on-site surface soil or on-site shallow groundwater, they could become ill. There are no known current completed exposure pathways that could cause adverse health effects for nearby residents.

If, in the future, the site is used for commercial and/or residential purposes, people exposed on a daily basis to the maximum contamination found in on-site surface soil, off-site surface sediment and/or on-site groundwater daily for 30 years could be at an increased risk of cancer and other illnesses. Specifically:

- Daily exposure for 30 years to arsenic in on-site soil and on-site groundwater could result in a moderate to high increased risk for lung cancer in people.

- Daily exposure for 30 years to lead in on-site surface soil and off-site surface sediment could increase the potential for disruption of conditioned responses and motor activity,

decreased motility of spermatozoa, impotence, impaired righting reflex and reversal learning deficit in animals. It is not clear whether these same effects would be seen in humans.

- Daily exposure for 30 years to manganese in on-site groundwater could increase the potential for nerve degeneration, altered brain enzymes and mild neurological signs in people.

- Daily exposure for 30 years to the pesticides aldrin and dieldrin in on-site shallow groundwater could result in a moderate to high increased theoretical risk for cancer in people.

7.0 Recommendations

1. Ensure continued restriction of access to the site. This recommendation has been made to the property owner and the EPA.

2. Monitor the off-site deep aquifer (drinking water) wells in the surrounding community, if contamination is found in on-site deep groundwater. This recommendation is being made to the EPA.

8.0 Public Health Action Plan

This section describes what the ATSDR and the Florida DOH plan to do at this site. The purpose of a Public Health Action Plan is to reduce any existing health hazards and to prevent any hazards from occurring in the future. The ATSDR and Florida DOH will do the following:

1. The Florida DOH, Bureau of Community Environmental Health will inform and educate nearby residents about the public health threats associated with this site.

2. The Florida DOH, Bureau of Community Environmental Health will continue to work with the EPA in assessing the public health threat.

3. The Florida DOH, Bureau of Community Environmental Health has recommended the site owner and EPA ensure restricted site access.

4. The Florida DOH, Bureau of Community Environmental Health has recommended the EPA monitor area drinking water wells for site-related contaminants, if on-site contaminants are found in the deep groundwater. Florida DOH will evaluate EPA's deep groundwater data as they become available.

9.0 Public Comment Period

The Florida DOH provided an opportunity in the final draft stage of this document for the general public to comment on Agency findings or proposed activities from July 7, 2005 – August 29, 2005. The purposes of this activity were to: (1) provide the public, particularly the community associated with a site, the opportunity to comment on the public health findings contained in the public health assessment; (2) evaluate whether the community health concerns have been adequately addressed; and (3) provide any additional information. **The Florida DOH received no public comments during this period.**

10.0 References

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APPENDIX A. SITE CHRONOLOGY

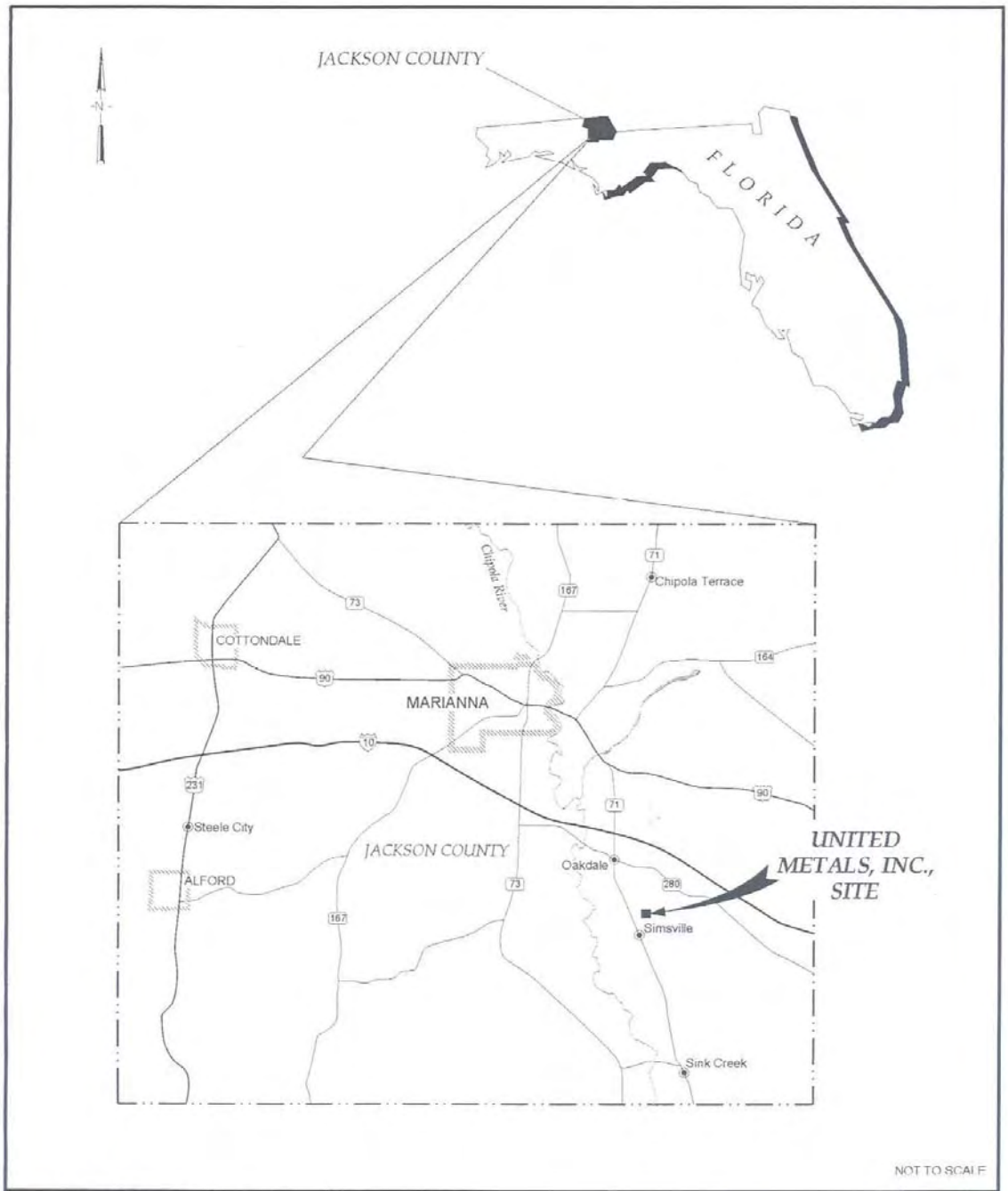
UNITED METALS, INC.
CHRONOLOGY

Fall, 1979	Initial construction of the United Metals Inc. (UMI) facility.
March, 1980	Investigation of metals contamination in Dry Creek (by Sapp Battery, another recycler in the watershed) leads Florida Dept. of Environmental Regulation (FDER) inspectors to UMI. Owned by Howard Odom, UMI "collects and sells" copper, brass, tin, and aluminum, as well as lead and plastic, most associated with lead/acid and nickel/cadmium auto batteries.
September, 1980	The Northwest Florida Water Management District (NWFWMD) determines that the groundwater at the UMI site is likely to move in all directions from the operation, except to the northeast, eventually draining into the Chipola River system.
January, 1981	Sampling of wastewater in a holding pond at UMI finds higher-than-background levels of copper, lead and sulfate. A pH of 1.2 classifies the wastewater as a D001 listed hazardous waste.
March, 1981	The FDER investigates UMI, concludes the operation processes 10,000 - 12,000 auto batteries per week, generating 2,500 - 5,000 gallons of metal-containing acid waste per week. Estimated period of groundwater contamination is 18 months prior (Fall, 1979). Analysis of groundwater and pond water finds higher-than-background levels of zinc and lead in groundwater and pond water, and 1.5 pH of pond water.
April - August, 1981	The FDER collects off-site water and sediment samples and finds higher-than-background levels of lead, zinc, nickel and manganese in the Chipola River system, especially immediately downgradient of the UMI property. Fecal coliforms also detected in water in Chipola River system. Limited samples of fish and clam tissue finds lead, cadmium and chromium at 0.1 - 0.5 milligrams per kilogram (mg/kg).
1981	The FDER and UMI owner enter into consent order over wastewater treatment and contamination issues.
May, 1982	A U.S. EPA Preliminary Assessment finds higher-than-background level of cadmium in groundwater sample and higher-than-background levels of zinc, lead, arsenic, cadmium, iron, nickel and chromium in the process wastewater.

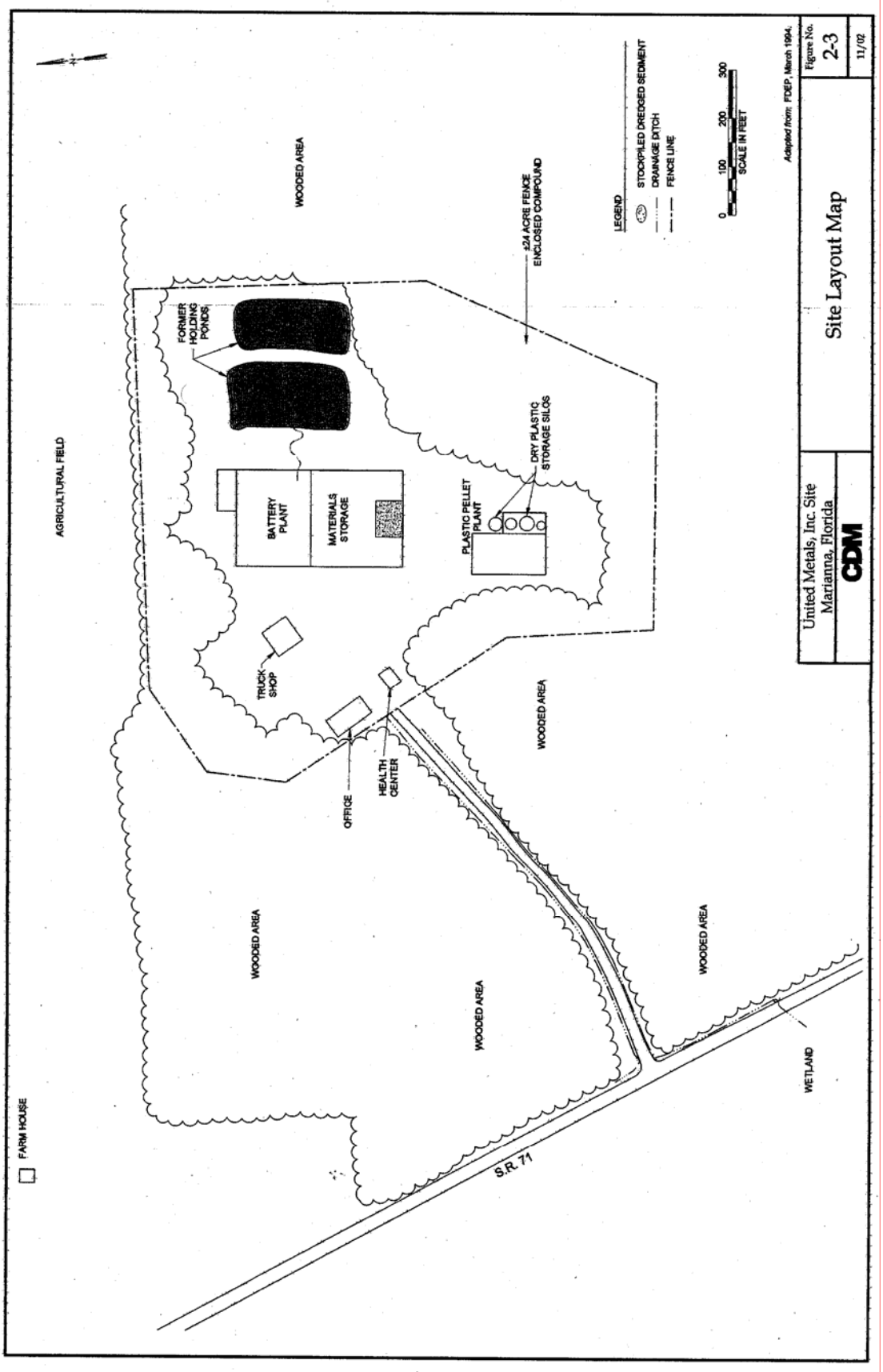
UNITED METALS, INC.
CHRONOLOGY
(continued)

July, 1982	The FDER samples groundwater and pond water on UMI property and finds higher-than-background levels of cadmium and lead.
September, 1982	The FDER notifies owner of noncompliance with 1981 Consent Order.
June, 1983	Approximately 1,000,000 gallons of wastewater are removed from the pond and approximately 1,200 cubic yards of contaminated sediment is removed from the pond and roadside drainage ditches. Disposition of water and soil is not documented, but at least 200 cubic yards of contaminated pond sediment is stored on the property in the main process building. The pond is filled in.
1984	Quarterly groundwater monitoring results submitted by UMI indicate near compliance with primary drinking water standards for cadmium and lead. New FDER Operating Permit issued to UMI.
July, 1986	The U.S. EPA collects and analyzes soil samples at UMI and finds lead at 8,330 - 13,000 mg/kg. A sample of waste in a battery hopper (waste container) finds lead at 160,000 mg/kg. An EP Toxicity test for the waste sample reports a concentration of 29 micrograms per liter (ug/L), which is above the MCL of 5.0 ug/L.
October, 1986	The U.S. EPA issues an Amended Complaint and Compliance Order to UMI; proposes $21,150.00 fine.
July, 1989	UMI purchased by Anrich Industries, Inc. from Florida Small Business Administration. Site operations cease.
1993 - 1994	The U.S. EPA (ABB Environmental Services, Inc.) conducts an Expanded Site Inspection at UMI and finds lead in on-site and off-site surface soil ranging from 119 - 10,900 mg/kg. Groundwater samples reveal elevated levels of aluminum, arsenic, cadmium, chromium, iron, lead, manganese, nickel and vanadium. A composite sample of the stockpiled pond sediment finds elevated levels of metals, especially arsenic (61 mg/kg), antimony (556 mg/kg) and lead (106,000 mg/kg).
Winter 2001-2002	The U.S. EPA (CDM Federal) prepares a Remedial Investigation (RI) Work Plan for the UMI property and affected surroundings.

APPENDIX B. FIGURES



United Metals, Inc., Site Marianna, Florida CDM	Site Location Map	Figure No. 2-1 11/02


FARM HOUSE
AGRICULTURAL FIELD
WOODED AREA
FORMER HOLDING PONDS
±24 ACRE FENCE ENCLOSED COMPOUND
BATTERY PLANT
MATERIALS STORAGE
PLASTIC PELLET PLANT
DRY PLASTIC STORAGE SILOS
TRUCK SHOP
OFFICE
HEALTH CENTER
WOODED AREA
WOODED AREA
WOODED AREA
WOODED AREA
WETLAND
S.R. 71
LEGEND
STOCKPILED DREDGED SEDIMENT
DRAINAGE DITCH
FENCE LINE
0
100
200
300
SCALE IN FEET
Adapted from: FDEP, March 1994.
United Metals, Inc. Site
Marianna, Florida
CDM
Site Layout Map
Figure No.
2-3
11/02

APPENDIX C. TABLES

Table 1: On-site and off-site soil and sediment sample results

Analyte	Comparison Value	Off-Site Surface Sediment	On-Site Surface Soil	On-Site Waste Pile	Under Slab
Metals					
Aluminum	100,000 / 1Million †	24,000	6,200	2,400	2,800
Antimony	20 / 300 †	**272**	**593**	**270**	**2,145**
Arsenic	20 / 200 †	16	**480**	**20**	**1,209**
Barium	4,000 / 50,000 †	69	36	61	130
Calcium	na	81,981	110,000	26,000	22,803
Cadmium	50 / 700 †	24	18	4.5	**58**
Chromium	200 / 2,000 †	76	116	9.0	**296**
Cobalt	4,700 / 110,000 §	2.8	*	0.66	6
Copper	110 / 76,000 §	57	76	27	95
Iron	23,000 / 480,000 §	**29,506**	15,827	3,000	14,440
Lead	400 / 920 §	**16,434**	**18,646**	**58,000**	**142,614**
Magnesium	na	14,000	64,000	6,800	200
Manganese	3,000 / 40,000 †	742	1,276	45	660
Mercury	3.4 / 26 §	**6**	*	0.31	0.35
Nickel	1,000 / 10,000 †	47	162	12	117
Potassium	na	620	380	220	640
Selenium	300 / 4,000 †	2.4	0.54	*	1.1
Silver	390 / 9,100 §	12	19	5.5	33
Sodium	na	190	540	400	330
Vanadium	200 / 2,000 †	121	144	5.3	150
Zinc	20,000 / 200,000 †	196	344	44	413
Volatiles					
Acetone	20,000 / 200,000 †	0.44	0.250	*	1.7
Toluene	10,000 / 100,000 †	0.002	0.003	0.002	*
Freon 11	20,000 / 200,000 †	0.005	0.011	*	*
2-MP	3,000 / 40,000 †	*	0.330	*	*
Acetophenone	5,000 / 70,000 †	*	*	0.950	*
Benzaldehyde	5,000 / 70,000 †	*	0.080	0.360	*
B(a)A	1.4 / 5 §	*	0.083	*	*
B(b)F	1.4 / 4.5 §	*	0.210	0.036	*
B(ghi)P	2,300 / 41,000 §	*	0.110	*	*
B(k)F	15 / 52 §	*	0.180	*	*
B(a)P	0.1 / 0.5 ‡	*	**0.110**	*	*
B(2-e)P	76 / 280 §	*	0.780	28	3.4
Chrysene	140 / 450 §	*	0.210	0.081	*
Di-n-B	7,300 / 140,000 §	*	0.340	*	*
Di-n-O	1,500 / 27,000 §	*	*	0.430	*
I(1,2,3-cd)P	1.5 / 5.3 §	*	0.130	*	*
MBK	5.1 / 34 §	*	*	*	0.390
MEK	30,000 / 400,000 †	*	*	*	0.690
MIK	220 / 1,500 §	*	*	*	0.054
2-MN	80 / 560 §	*	*	0.071	0.025
Napthalene	1,000 / 10,000 †	*	*	0.057	0.680
Phenanthrene	2,000 / 30,000 †	*	*	0.110	*
Phenol	30,000 / 400,000 †	*	*	0.066	*
Pyrene	2,000 / 20,000 †	*	*	0.038	*
Pesticides / PCBs					
α - Chlordane	30 / 400 ‡	*	0.0021	*	*
γ - Chlordane	30 / 400 ‡	*	0.0022	*	*
Heptachlor	30 / 400 †	*	0.0059	*	*

† - Reference Dose Media Evaluation Guide - ATSDR comparison value (ATSDR 2001).
‡ - Environmental Media Evaluation Guide - ATSDR comparison value (ATSDR 2001).
§ - FDEP Soil Cleanup Target Level (residential / commercial)
na = not applicable or not available
* = not detected
Note: All units in milligrams per kilogram (mg/kg) = parts per million (ppm)
Note: Bolded values exceed comparison values

Table 2: On-site and off-site groundwater and water sample results

Analyte	Comparison Value	On-Site Surface Water	On-Site Groundwater	Off-Site Groundwater	Wastewater
Metals					
Aluminum	20,000 / 70,000 ‡	*	**57,000**	*	640
Arsenic	3 / 10 †	*	*	**9.7**	*
Barium	700 / 2,000 †	30	37	36	80
Beryllium	20 / 70 †	*	2.0	*	*
Calcium	na	43,000	86,000	49,000	32,000
Cadmium	5 / 20 †	*	**80**	*	2.9
Chromium	100 §	*	5.8	*	8.2
Cobalt	100 / 400 ‡	*	14	*	*
Copper	1,300 §	*	90	*	66
Iron	300 §	**590**	**10,000**	**760**	**1,400**
Lead	15 §	*	**49**	4.5	**550**
Magnesium	na	14,000	28,000	11,000	2,000
Manganese	500 / 2,000 †	360	**1,800**	33	180
Mercury	2 §	*	1.3	*	0.28
Nickel	200 / 700 †	*	61	*	78
Potassium	na	1,600	1,900	1,800	6,300
Selenium	50 / 200 †	*	15	1.5	*
Silver	50 / 200 †	*	5.6	*	*
Sodium	160,000 §	2,300	40,000	**200,000**	4,900
Strontium	6,000 / 20,000 †	*	*	290	*
Vanadium	30 / 100 ‡	*	**36**	*	*
Zinc	3,000 / 10,000 ‡	*	130	790	1,600
Volatiles					
Carbon Disulfide	1,000 / 4,000 †	22	*	*	*
Toluene	200 / 700 ‡	*	1.0	*	1.0
Pesticides / PCBs					
α - Chlordane	5 / 20 †	0.031	*	*	*
Heptachlor	5 / 20 †	*	0.067	*	*
Aldrin	0.3 / 1.0 †	*	**0.93**	*	*
Dieldrin	0.5 / 2.0 †	*	**0.79**	*	0.047

† - Reference Dose Media Evaluation Guide (RMEG) - ATSDR comparison value (ATSDR, 2001).
‡ - Environmental Media Evaluation Guide (EMEG) - ATSDR comparison value (ATSDR, 2001).
§ - FDEP Groundwater Cleanup Target Level (Minimum Criteria Organoleptic)
na = not applicable or not available
* = not detected
Note: All units in micrograms per liter (ug/L) = parts per billion (ppb)
Note: Bolded values exceed comparison values

Table 3. Potential Exposure Pathways

PATHWAY NAME	SOURCE	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	TIME
Shallow Groundwater	On-Site Groundwater	Groundwater Well (On-site)	Ingestion	Unknown	Possibly Future
Surface Soil	On-Site Soil	Surface Soil (On-site)	Ingestion / Inhalation	Unknown	Possibly Future
Surface Sediment	On-Site Soil	Surface Sediment (Off-site)	Ingestion / Inhalation	Unknown	Possibly Future
Deep Groundwater (Floridan Aquifer)	On-Site Deep Groundwater	Deep Groundwater Well (Off-site)	Ingestion	Unknown	Possibly Future

APPENDIX D. RISK OF ILLNESS

RISK OF ILLNESS, DOSE RESPONSE/THRESHOLD, AND UNCERTAINTY IN PUBLIC HEALTH ASSESSMENTS

Risk of Illness

In this public health assessment, the risk of illness is the chance that exposure to a hazardous contaminant is associated with a harmful health effect or illness. The risk of illness is not a measure of cause and effect-only an in-depth health study can identify a cause and effect relationship. Instead, Florida DOH uses the risk of illness to decide if the site needs a follow-up health study and to identify possible associations.

The greater the exposure to a hazardous contaminant (dose), the greater the risk of illness. The amount of a substance required to harm a person's health (toxicity) also determines the risk of illness. Exposure to a hazardous contaminant above a minimum level increases everyone's risk of illness. Only in unusual circumstances, however, do many persons become ill.

Information from human studies provides the strongest evidence that exposure to a hazardous contaminant is related to a particular illness. Some of this evidence comes from doctors reporting an unusual incidence of a specific illness in exposed individuals. More formal studies compare illnesses in people with different levels of exposure. Nevertheless, human information is very limited for most hazardous contaminants, and scientists must frequently depend upon data from animal studies. Hazardous contaminants associated with harmful health effects in humans are often associated with harmful health effects in other animal species. There are limits, however, to relying only on animal studies. For example, scientists have found some hazardous contaminants are associated with cancer in animals, but lack evidence of a similar association in humans. In addition, humans and animals have differing abilities to protect themselves against low levels of contaminants, and most animal studies test only the possible health effects of high exposure levels. Consequently, the possible effects on humans of low-level exposure to hazardous contaminants are uncertain when information is derived solely from animal experiments.

Dose Response/Thresholds

The focus of toxicological studies in humans or animals is identification of the relationship between exposure to different doses of a specific contaminant and the chance of having a health effect from each exposure level. This dose-response relationship provides a mathematical formula or graph that is used to estimate a person's risk of illness. The actual shape of the dose-response curve requires scientific knowledge of how a hazardous substance affects different cells in the human body. There is one important difference between the dose-response curves used to estimate the risk of non-cancer illnesses and those used to estimate the risk of cancer: the existence of a threshold dose. A threshold dose is the highest exposure dose at which there is no risk of illness. The dose-response curves for non-cancer illnesses include a threshold dose that is greater than zero. Scientists include a threshold dose in these models because the human body can adjust to varying amounts of cell damage without illness. The threshold dose differs for different contaminants and different exposure routes. It is estimated from information gathered in human and animal studies. By contrast, the dose-response curves used to estimate the risk of cancer assume no threshold dose (or, in other words, the cancer threshold dose is zero). This assumes a single contaminant molecule could be sufficient to cause a clinical case of cancer. Such an assumption is very conservative; indeed, many scientists also believe a threshold dose greater than zero exists for the development of cancer.

Uncertainty

All risk assessments, to varying degrees, require the use of assumptions, judgments, and incomplete data. These contribute to the uncertainty of the final risk estimates. Some more important sources of uncertainty in this public health assessment include environmental sampling and analysis, exposure parameter estimates, use of modeled data, and present toxicological knowledge. These uncertainties can cause risk to be overestimated or underestimated. And because of the uncertainties described below, this public health assessment does not represent an absolute estimate of risk to persons exposed to chemicals at or near the United Metals, Inc.

Environmental chemistry analysis errors can arise from random errors in the sampling and analytical processes, resulting in either an over- or under-estimation of risk. These errors can be controlled to some extent by increasing the number of samples collected and analyzed and by sampling the same locations over several different periods. These actions tend to minimize any uncertainty caused by random sampling errors.

Two areas of uncertainty affect exposure parameter estimates. The first is the exposure-point concentration estimate. The second is the estimate of the total chemical exposures. In this assessment maximum detected concentrations were used as the exposure point concentration. Using the maximum measured value is considered appropriate because one cannot be certain of the peak contaminant concentrations, and cannot statistically predict peak values. Nevertheless, this assumption introduces uncertainty into the risk assessment that could over or underestimate the actual risk of illness. When selecting parameter values to estimate exposure dose, default assumptions and values within the ranges recommended by the ATSDR or the EPA were used. These default assumptions and values are conservative (health protective) and can contribute to the overestimation of risk of illness. Similarly, the maximum exposure period was assumed to have occurred regularly for each selected pathway. Both assumptions are likely to contribute to the overestimation of risk of illness.

There are also data gaps and uncertainties in the design, extrapolation, and interpretation of toxicological experimental studies. Data gaps contribute uncertainty because information is either not available or is addressed qualitatively. Moreover, the available information on the interaction among chemicals found at the site, when present, is qualitative; that is, a description instead of a number-a mathematical formula cannot be applied to estimate the dose. These data gaps can tend to underestimate the actual risk of illness. In addition, there are great uncertainties in extrapolating from high to low doses, and from animal to human populations. Extrapolating from animals to humans is uncertain because of the differences in the uptake, metabolism, distribution, and body organ susceptibility between different species. Human populations are also variable because of differences in genetic constitution, diet, home and occupational environment, activity patterns, and other factors. These uncertainties can result in an over or underestimation of risk of illness. Finally, there are great uncertainties in extrapolating from high doses to low doses, and controversy in interpreting these results. Because the models used to estimate dose-response relationships in experimental studies are conservative, they tend to overestimate the risk. Techniques used to derive acceptable exposure levels account for such variables by using safety factors. Currently, there is much debate in the scientific community about the extent to which the actual risks are overestimated and what the resultant risk estimates really mean.

Glossary

Acute Exposure: Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.

Adverse Health Effect: A change in body function or the structures of cells that can lead to disease or health problems.

ATSDR: The Agency for Toxic Substances and Disease Registry. ATSDR is a federal health agency in Atlanta, Georgia, that deals with hazardous substance and waste site issues. ATSDR provides information about harmful chemicals in the environment and how people can protect themselves from contact with chemicals.

Background Level: An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific-environment.

Cancer: A group of diseases that occur when cells in the body become abnormal and grow, or multiply, out of control.

Carcinogen: Any substance shown to cause tumors or cancer in experimental studies.

CERCLA: See Comprehensive Environmental Response, Compensation, and Liability Act.

Chronic Exposure: A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be *chronic*.

Completed Exposure Pathway: See Exposure Pathway.

Comparison Value: (CVs) Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): CERCLA was enacted in 1980. It is also known as Superfund. This act concerns releases of hazardous substances into the environment, the cleanup of these substances, and the health issues related to hazardous waste sites. ATSDR was created by this act.

Concentration: How much or the amount of a substance present in a certain amount of soil, water, air, or food.

Contaminant: See Environmental Contaminant.

Dose: The amount of a substance to which a person might be exposed, usually on a daily basis. Dose is often explained as "amount of substance(s) per body weight per day."

Dose / Response: The relationship between the amount of exposure (dose) and the change in body function or health that results.

Duration: The amount of time (days, months, years) that a person is exposed to a chemical.

Environmental Contaminant: A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than those found in Background Level, or what would be expected.

Environmental Media: Usually refers to the air, water, and soil in which chemicals of interest are found. Sometimes refers to the plants and animals that are eaten by humans. Environmental Media is the second part of an Exposure Pathway.

U.S. Environmental Protection Agency (EPA): The federal agency that develops regulations and enforces environmental laws to protect the environment and public health.

Epidemiology: The study of the factors that determine how often, in how many people, and in which people disease will occur.

Exposure: Coming into contact with a chemical substance.(For the three ways people can come in contact with substances, see Route of Exposure.)

Exposure Assessment: The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.

Exposure Pathway: A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or become exposed to) the chemical.

ATSDR defines an exposure pathway as having five parts:

Source of Contamination,
Environmental Media and Transport Mechanism,
Point of Exposure,
Route of Exposure, and
Receptor Population.

When all five parts of an exposure pathway are present, it is called a Completed Exposure Pathway. Each of these five terms is defined in this Glossary.

Hazardous Waste: Substances that have been released or disposed of and, under certain conditions, could be harmful to people who come into contact with them.

Health Effect: ATSDR deals only with Adverse Health Effects (see definition in this Glossary).

Intermediate Exposure: Any chemical exposure that has occurred for more 14 days but less than one year (365 days).

Ingestion: Swallowing something, as in eating or drinking. It is a way a chemical can enter the body (See Route of Exposure).

Inhalation: Breathing: It is a way a chemical can enter the body (See Route of Exposure).

MRL: Minimal Risk Level: An estimate of daily human exposure-by a specified route and length of time-to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.

NPL: The National Priorities List: (Which is part of Superfund.) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site requires investigation or clean up, or both, to determine whether people can be exposed to chemicals from the site.

No Apparent Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals might have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.

No Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.

PHA: Public Health Assessment. A report or document that looks at chemicals at a hazardous waste site and determines whether people could be harmed from coming into contact with those chemicals. The PHA also determines whether possible further public health actions are needed.

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For example, the area of a playground containing contaminated dirt, a contaminated spring used for drinking water, a location where fruits or vegetables are grown in contaminated soil, or a backyard area where someone might breathe contaminated air.

Public Health Hazard: The category is used in PHAs for sites that show credible evidence of chronic, site-related chemical exposure that could result in adverse health effects.

Public Health Hazard Criteria: PHA categories given to a site that tell whether people could be harmed by conditions present at the site. Each is defined in the Glossary. The categories are:

(a) Urgent Public Health Hazard
(b) Public Health Hazard
(c) Indeterminate Public Health Hazard
(d) No Apparent Public Health Hazard
(e) No Public Health Hazard

Reference Dose (RfD): An estimate, with safety factors (see safety factor) built in, of the daily, life-time exposure of human populations to a possible hazard that is not likely to cause harm to the person.

Route of Exposure: The way a chemical can get into a person's body. There are three exposure routes:

- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

Sample: A small number of people chosen from a larger population (See Population).

Source (of Contamination): The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an Exposure Pathway.

Toxic: Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.

Toxicology: The study of the harmful effects of chemicals on humans or animals.

CERTIFICATION

This United Metals Incorporated Public Health Assessment was prepared by the Florida Department of Health 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 begun. Editorial review was completed by the cooperative agreement partner.

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

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