

Health Consultation

BARNES BATTERY RECYCLING

COTTONDALE, JACKSON COUNTY, FLORIDA

EPA FACILITY ID: FLSFN0407051

JULY 3, 2002

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation 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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HEALTH CONSULTATION

BARNES BATTERY RECYCLING

COTTONDALE, JACKSON COUNTY, FLORIDA

EPA FACILITY ID: FLSFN0407051

Prepared by:

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

Summary and Statement of Issues

This health consultation has two principal purposes. The first is to determine if the levels of cadmium, chromium, copper and lead in the blood of three residents living near the Barnes Battery Recycling site are a public health threat. The second is to determine if the levels of volatile organic compounds (VOCs), extractables, metals, pesticides and polychlorinated biphenyls (PCBs) in soil, sediments, potable water, ground water and surface water are also a public health threat.

In May and June 2001, the Florida Department of Health (DOH) coordinated blood testing of three residents for four metals: cadmium, chromium, copper, and lead. The Florida DOH found the measured levels of these metals were not likely to cause illness and notified the residents. The couple living on the site, however, do not believe governmental agencies are doing enough to help them.

From March to May 2001, the Jackson County Health Department (CHD) collected potable well and tap water samples for metals and pH analyses. They found low pH levels and elevated lead and copper levels in the on-site resident's tap water. They also found elevated levels of copper in a nearby resident's tap water. Low pH levels appear to be dissolving lead and copper from the pipes, plumbing fixtures or both inside the houses. The Florida DOH determined that the first draw lead level found in the tap water of the house on the site is of public health concern. Florida DOH recommended the on-site resident continue to use a filter on their tap water faucet to remove the lead. The Florida DOH recommends the Florida Department of Environmental Protection (DEP) continue to assess the wells with low pH and consider neutralization of the water for those homes with metal plumbing.

In September/October 2001, the Florida DOH reviewed U.S. Environmental Protection Agency (EPA) soil and water test results. The Florida DOH determined the volatile organic compounds (VOCs), extractables, metals, pesticides, and polychlorinated biphenyls (PCBs) found in soil and/or water on and off site were below the Agency for Toxic Substances and Disease Registry's (ATSDR's) health-based comparison values. Except for the low pH water dissolving lead from the plumbing inside the house on the site, there is no apparent public health threat at or near this site.

General Background Information

Lead Battery Recycling Sites:

Lead battery recycling sites like Barnes Battery Recycling usually contain a variety of wastes (e.g., lead, plastic, hard rubber). At these sites metallic lead and lead compounds are the principal contaminants of concern. Other metals (e.g., cadmium, copper, arsenic, antimony and selenium) are often present, but usually at much lower concentrations than lead and often below hazardous concentrations (EPA 1992).

During lead-acid battery recycling operations, battery breaking (cracking) is the first step. Subsequent steps include component separation, lead smelting and refining. Whether in blast, reverberatory or rotary furnaces, the smelting process separates the metal from impurities. Refining is the final step in chemically purifying recycled lead (EPA 1992).

Environmental Lead Exposure

People living near hazardous waste sites may be exposed to lead by breathing air, drinking water, eating foods, or swallowing or touching dust or dirt that contains lead (ATSDR 1999a).

In addition to workers exposed to lead in the workplace, several other population groups at risk for potential exposure to high levels of lead can be identified: preschool-age children and fetuses, white males between 40 and 59 years of age, and those persons (“sniffers”) who purposely inhale leaded gasoline vapors. Individuals living near sites where lead was produced or sites where lead was disposed, and individuals living near one of the 1,026 NPL hazardous waste sites where lead has been detected in some environmental media also may be at risk for exposure to high levels of lead (ATSDR 1999a).

Exposure of the general population to lead is most likely to occur through the ingestion of contaminated food and drinking water, and by the inhalation of lead particulates in ambient air. Direct inhalation of lead accounts for only a small part of the total human exposure; however, lead that is adsorbed to soil may be inhaled as dust and reentrainment (coughed up and swallowed) of lead-contaminated dust is common.

Lead dust is likely to be found in places where lead is mined or smelted, where car batteries are made or recycled, where electric cable sheathing is made, where fine crystal glass is made, or where certain types of ceramic pottery are made. People can bring lead home in the dust on their hands or clothes if lead is used in the place where they work. Pets can also bring lead into the home in dust or dirt on their fur or feet if they spend time in places that have high levels of lead in the soil. Once lead falls onto soil, it usually sticks to soil particles. Lead may remain stuck to soil particles in water for many years (ATSDR 1999a).

The source of lead in most homes is most likely pipe or solder in the home’s plumbing. The most common cause is corrosion, a reaction between the water and the lead pipes or solder. Dissolved oxygen, low pH (acidity) and low mineral content in water are common causes of increase of corrosion. Any electric current traveling through the ground wire will accelerate the corrosion of lead in the pipes (EPA 1993).

Public water treatment systems are now required to use control measures to make water less acidic. Sources of lead in drinking water include lead that can come out of lead pipes, faucets, and leaded solder used in plumbing. Plumbing that contains lead may be found in public drinking water systems, and in houses, apartment buildings, and public buildings that are more than 20 years old.

“Plumbing installed before 1930 is most likely to contain lead. Copper pipes have replaced lead pipes in most residential plumbing. However, the use of lead solder with copper pipes is widespread. Corrosion control devices for individual households include calcite filters and other devices. Calcite filters should be installed in the line between the water source and any lead service connections or lead soldered pipe” (EPA 1993).

Lead levels in drinking water are likely to be highest if (EPA, 1993):

- a home has faucets or fittings of brass which contain lead or
- a home has copper pipes with solder and the house is less than five years old or there is naturally soft water or water often sits in the pipes for several hours

EPA recommends flushing cold water pipes by running the water until it becomes as cold as it will get. This could take as little as 5 to 30 seconds if there has been recent heavy water use such as showering or toilet flushing. Otherwise, it could take 2 minutes or longer. The more time water has been sitting in your home’s pipes, the more lead it may contain.

Site Description and History

The Barnes Battery Recycling site is on Sapp Road, south of Cottondale in a rural area of Jackson County, Florida. A house and barn are on the western portion of this 26-acre site (Figures 1 and 2). The eastern portion of the property consists of overgrown fields and a cypress wetland (part of the old Briar Bay wetlands). North, south, east, and west of the site are homes and farmland.

Beginning in the 1970s, Mr. Barnes allegedly operated a battery reclamation business on the eastern portion of this site. For several years he reportedly used a hydraulic ram to crack open about 1,000 batteries per day (EPA 2001). In the mid 1980s Mr. Barnes ceased operations and sold the property. Chipped battery casings are, however, still evident on the site.

In the 1980s, the Florida Department of Environmental Regulation (now the Department of Environmental Protection (DEP)) visited the site but did not find signs of a battery recycling operation. In the early 1990s the Florida DEP installed a double ethylene dibromide (EDB) filter on the on-site drinking water well. EDB is a pesticide used to control soil nematodes.

In 1999, Florida DEP found evidence of a battery recycling operation at this site. Investigators found numerous discarded battery casings and metallic lead pieces within 20 feet of the on-site house, and scattered in the swamp on the eastern portion of the site. A severe drought in the past 2 years has exposed more chipped battery casings in the swampy eastern portion of the site.

Discussion

Biological Investigation

Blood Testing:

The on-site residents are concerned that they have been exposed to contamination, and as a result have suffered urinary infections, bladder cancer, and numerous other tumors. They are also concerned that a child who lived with them off and on during the 1990s developed speech problems. In 2000, the on-site residents had the child tested but did not find any evidence of lead poisoning. Additionally, in the 1980s the Jackson CHD conducted county-wide blood lead testing for children but did not find any cases of lead poisoning in this area.

The Florida DOH coordinated blood testing for the two current and one former on-site residents. All three participants were adults. On May 30, 2001, the Jackson CHD collected 6 milliliters of blood from each person. They also collected blood samples for chromium analysis in red top tubes and then centrifuged the tubes, separating the serum. The analysis for chromium requires serum rather than whole blood. The Jackson CHD packaged the samples in envelopes inside styrofoam containers for overnight shipment to the National Medical Services Laboratory. National Medical Services (NMS) Laboratory analyzed the blood samples for cadmium, chromium, copper and lead and notified the Florida DOH of the results. The Florida DOH informed the participants of their results via phone and mail. As authorized by the participants, the Florida DOH also shared the test results with their family physicians, EPA and Florida DEP. Since the investigation was a public health investigation rather than research involving human subjects, ATSDR granted a Institutional Review Board waiver.

Blood Test Results and Interpretation:

DOH compared the blood levels of cadmium, chromium, copper, and lead to studies in ATSDR's Toxicological Profiles and also to the March 2001 National Health and Nutrition Examination Survey (NHANES)(CDC 2001). NHANES is a national survey of the general U.S. population. DOH concluded the blood cadmium, chromium, copper and lead levels in the two current and one former resident of the Barnes Battery Recycling site are not likely to cause illness.

Cadmium

Only one of the three participants had measurable levels of cadmium in their blood. The amount in their blood was less than 1.2 micrograms per liter (ug/L). This level is within an acceptable range and is not likely to cause illness. The national background level for cadmium in the blood cited in NHANES is 0.7 - 1.2 micrograms per deciliter (ug/L) in females and 0.8 - 1.1 ug/L in males. In one study, cadmium in smokers ranged from 1.4 - 4.0 ug/L and 0.4 - 1.0 ug/L in non-smokers (ATSDR 1999b).

Chromium

Chromium was not detected in the blood of any of the three participants. Therefore, the levels of chromium in their blood are not likely to cause illness.

Copper

Copper was detected in the serum of all three participants at Barnes Battery Recycling site. The copper levels, however, were all less than 110 micrograms per deciliter and are not likely to cause illness. The NMS laboratory reference range is 80-130 micrograms per deciliter. Serum copper levels are only reflective of recent exposure.

Lead

All three participants at the Barnes Battery Recycling site had blood lead levels of less than 6 micrograms per liter (ug/dL). These levels are within an acceptable range and are not likely to cause illness. The geometric mean blood lead concentrations for the entire U.S. population (CDC 2001) are:

20-39 yrs. old	1.4 ug/dL
40-59 yrs. old	1.9 ug/dL
60 yrs and up	2.5 ug/dL

Although the participants' blood lead levels were slightly higher than the national geometric mean, they were not likely to cause illness.

Environmental Investigation

Soil and Sediment Testing:

In June 2001, a contractor for the U.S. Environmental Protection Agency (EPA) collected soil samples from the Barnes Battery Recycling site (Figure 3). EPA's contractor collected six surface soil samples (0-12" deep), six sub-surface soil samples (>12" deep), and four sediment samples (Figure 3). Three of the 16 samples were off-site background samples. EPA's contractor analyzed these samples for volatile organic compounds, extractables, metals, pesticides, and polychlorinated biphenyls (PCBs) using EPA-approved methods.

Soil and Sediment Results and Interpretation:

Except for lead, all of the concentrations of volatile organic compounds, extractables, metals, pesticides, and PCBs in the surface soil, subsurface soil, and sediments were below ATSDR guidelines (Tables I, II, and III). Two samples (BB03SS and BB04SS) had lead concentrations above the Florida DEP's Soil Cleanup Target Level (FDEP 1999) for residential properties—acute exposure levels (400,000 parts per billion (ppb)). ATSDR does not have a comparison value for

lead in soils. Even though the lead levels of these two soil samples were above FDEP's guidance concentrations, DOH does not expect any illness from lead exposure to the surface soil, subsurface soil, or sediments.

An estimate of exposure to lead from inhaling soil dust was unnecessary because the three residents were tested and their blood lead levels were not elevated. The blood lead levels show there is no current lead exposure to the individuals on-site.

Therefore, on this site the Florida DOH does not expect any illness from exposure to the identified contaminants at measured levels in the surface soil, subsurface soil, or sediments.

Water Testing:

In March 2001, a nearby resident complained that their well water tasted bitter and was staining plumbing fixtures green. The Jackson County Health Department (CHD) tested 21 area wells and found low pH (<4.3) in nine wells along Sapp Road, including the well on the Barnes Battery Recycling site (Figure 4 and 5). Investigators did not, however, find excessive levels of lead or other metals in the wells. The owners of the house on the site reported experiencing numerous leaks from their copper plumbing during the 1990s. The owner of the house on the site also reported replacing their corroded metal well casing. Although some nearby residents have replaced their copper plumbing with polyvinyl chloride (PVC), the on-site house still has copper plumbing.

In May 2001, the Jackson CHD sampled the on-site resident's well for purgeables, nitrates, lead, nickel, cadmium, arsenic, copper, and sulfates. No contaminants were detected in the well. They also sampled the tap water (first draw) from the on-site resident's home and a neighbor's home, both of which have copper plumbing. Also in May, the Florida DOH notified the Florida DEP about the acidity (low pH) in the ground water under this site. The Florida DEP is considering ways to neutralize the acidity.

In July 2001, EPA's contractor installed and sampled five temporary groundwater monitoring wells: one background and four on site. EPA's contractors also tested six drinking water wells and two surface water samples. They analyzed for volatile organic compounds, extractables, metals, pesticides, and PCBs.

Water Test Results and Interpretation:

The Jackson CHD did not find any contaminants in the ground water from the on-site well. The water from the tap inside the house, however, had 260 parts per billion (ppb) of lead and 4,100 ppb copper. The neighbor's tap water inside their house also had elevated lead (6.4 ppb) and copper (9,700 ppb). The levels of other metals in the tap water (arsenic, cadmium, nickel and sulfate) were below detection limits.

The concentrations of volatile organic compounds, extractables, metals, pesticides, and PCBs in the tap water, the monitoring well, the drinking water well, and the surface water samples collected by EPA's contractor were all below ATSDR guidelines (Table IV-VII). Therefore, DOH does not expect any illness from these exposures.

Child Health Initiative

This health consultation addresses nearby residents, including children who might play outdoors. Children thus are a primary concern. Children are not small adults; a child's exposure can differ from an adult's exposure in many ways. Children drink more fluids, eat more food, and breathe more air per kilogram of body weight than do adults. Children also have a larger skin surface in proportion to their body volume. A child's diet often differs from an adult's. A child's behavior and lifestyle influence exposure. Children are closer to the ground—they crawl on the floor, they put things in their mouths and they can ingest inappropriate substances such as dirt or paint chips. Children also spend more time outdoors than do adults. Finally, children do not have the judgment of adults in avoiding hazards (ATSDR 1999a).

Exposure to volatile organic compounds (VOCs), extractables, metals, pesticides and polychlorinated biphenyls (PCBs) in soil, sediments, potable water, ground water and surface water on site and off site are unlikely to cause illnesses in children. Lead in the water at the tap of the on-site home, however, is of health concern for children.

Conclusions

The measured levels of cadmium, chromium, copper, and lead in the blood of the three participants at the Barnes Battery Recycling site were not likely to cause illness.

The measured levels of volatile organic compounds, extractables, metals, pesticides, and polychlorinated biphenyls (PCBs) in on- and off-site soil, sediments, potable water, ground water, and surface water were below health-based comparison values. Therefore, the levels of these chemicals are unlikely to cause illness.

Low pH levels in ground water under this site apparently dissolve lead and copper from the plumbing inside the house. Although the blood lead levels of those living in this house are unlikely to cause illness, the levels of lead in the water at the tap are still of concern, especially for children.

For the reasons listed above, the Barnes Battery Recycling site is categorized as a no apparent health hazard.

Recommendations/Public Health Action Plan

- (1) The on-site residents should not drink their tap water unless they remove lead from their drinking water by using a filter with an indicator.
- (2) The Florida Department of Environmental Protection should continue to assess the wells with low pH and consider neutralization of the water for those houses with copper plumbing.
- (3) The Jackson County Health Department should continue to check semi-annually the lead and copper concentrations at the tap of the two homes with copper plumbing and elevated lead and copper levels until the pH is adjusted.

ATSDR Glossary of Terms

Cancer Effect Level (CEL) – the lowest dose of chemical in a study, or group of studies, that produces statistically significant increases in the incidence of cancer (or tumors) between the exposed population and its appropriate control.

Minimal Risk Level (MRL) – an estimate of daily exposure of a human being to a chemical (in mg/kg/day) that is likely to be without an appreciable risk of deleterious effects (noncarcinogenic) over a specified duration of exposure. MRLs are based on human and animal studies and are reported for acute (≤ 14 days), intermediate (15-364 days), and chronic (≥ 365 days). MRLs specific chemicals are included in ATSDR's Toxicological Profiles.

Parts Per Million (ppm) – a common basis of reporting water analysis. One part per million (ppm) equals 1 pound per million pounds of water.

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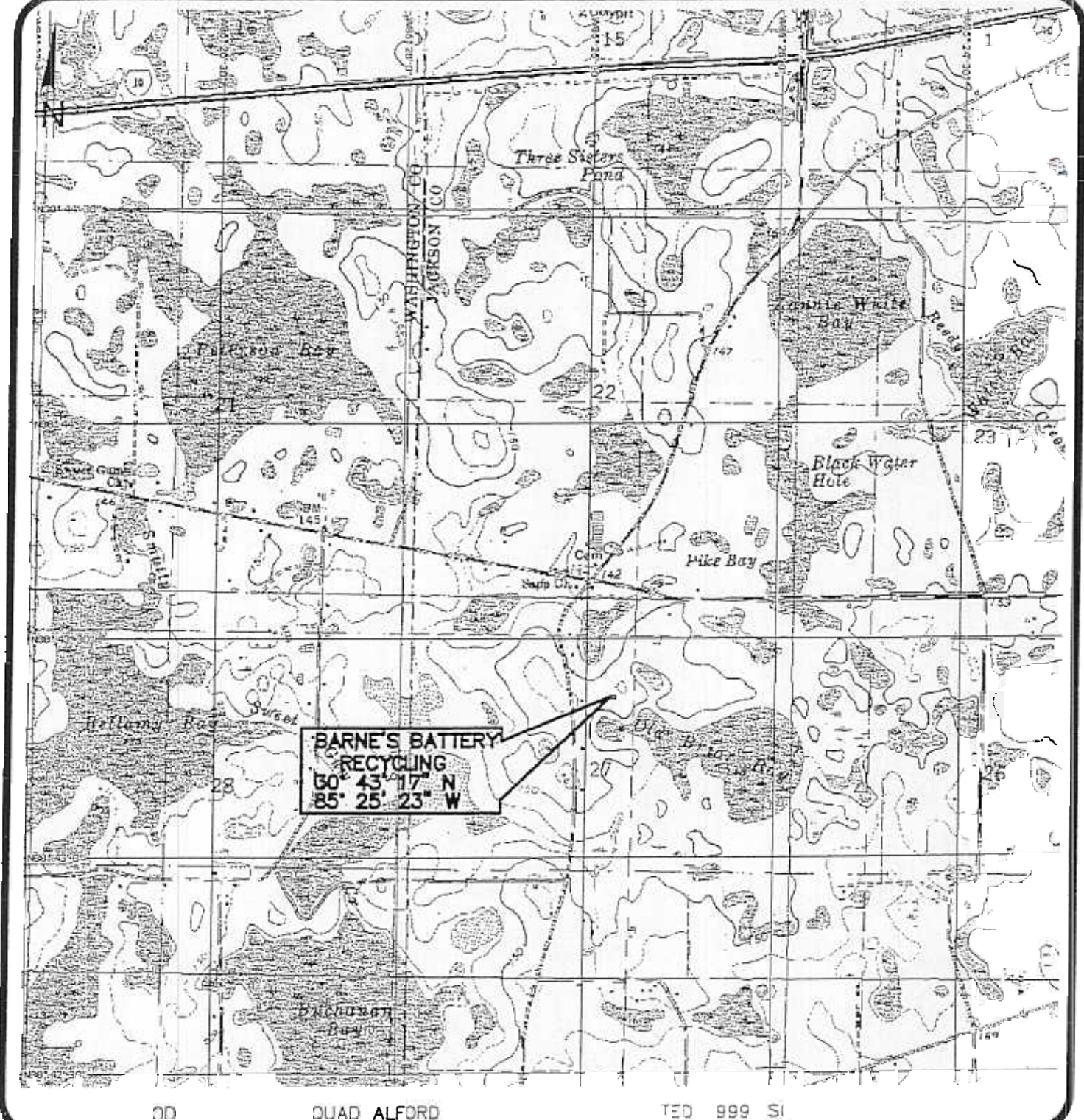
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BARNES BATTERY RECYCLING
JACKSON COUNTY
COTTONDALE, FLORIDA

SITE LOCATION MAP
FIGURE

MAP



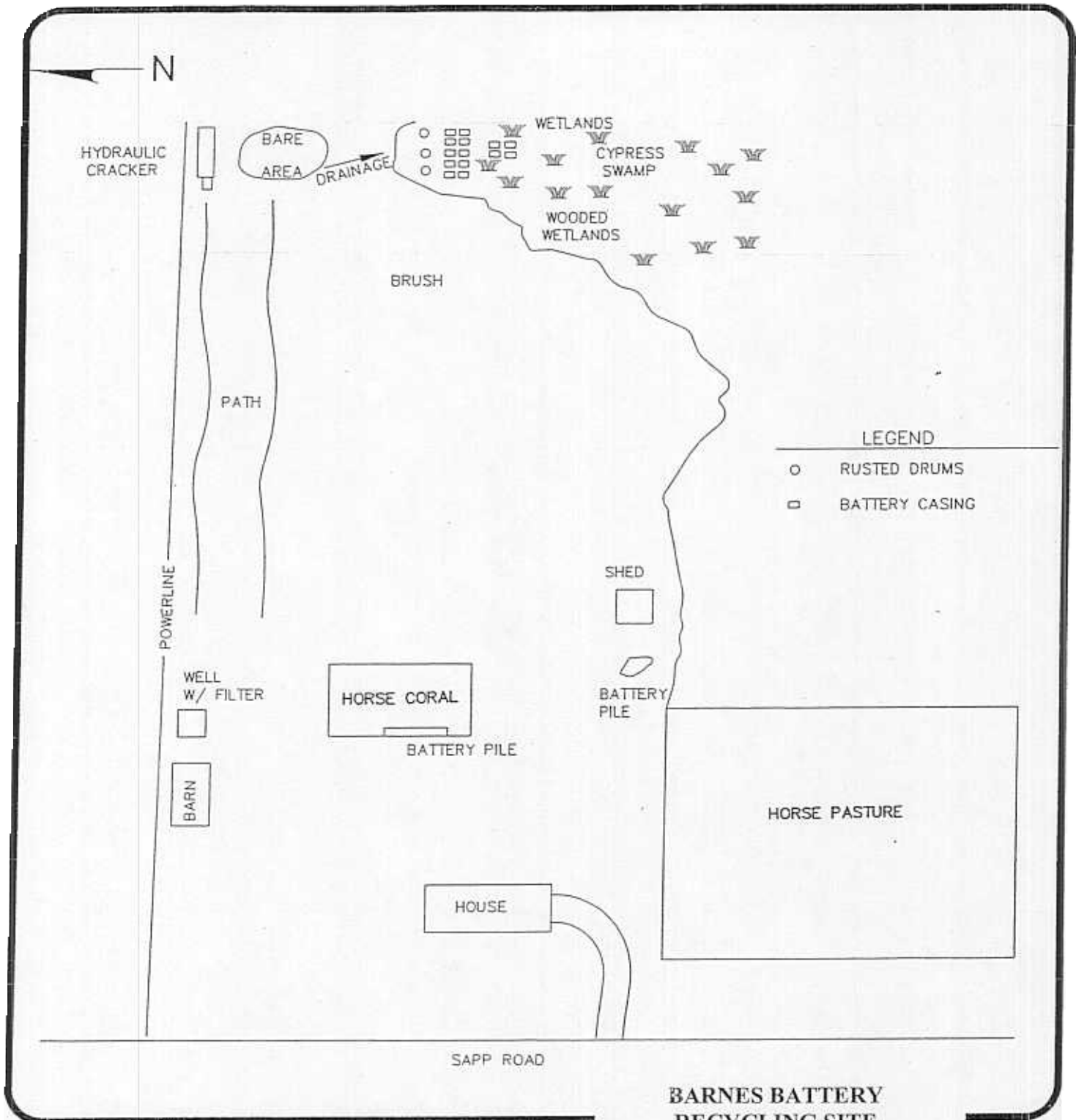
ROY F. WESTON, INC



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**BARNES BATTERY
RECYCLING SITE**

**SITE LAYOUT MAP
FIGURE 2**

BARNES BATTERY RECYCLING
JACKSON COUNTY
COTTONDALE, FLORIDA



ROY F. WESTON, INC.

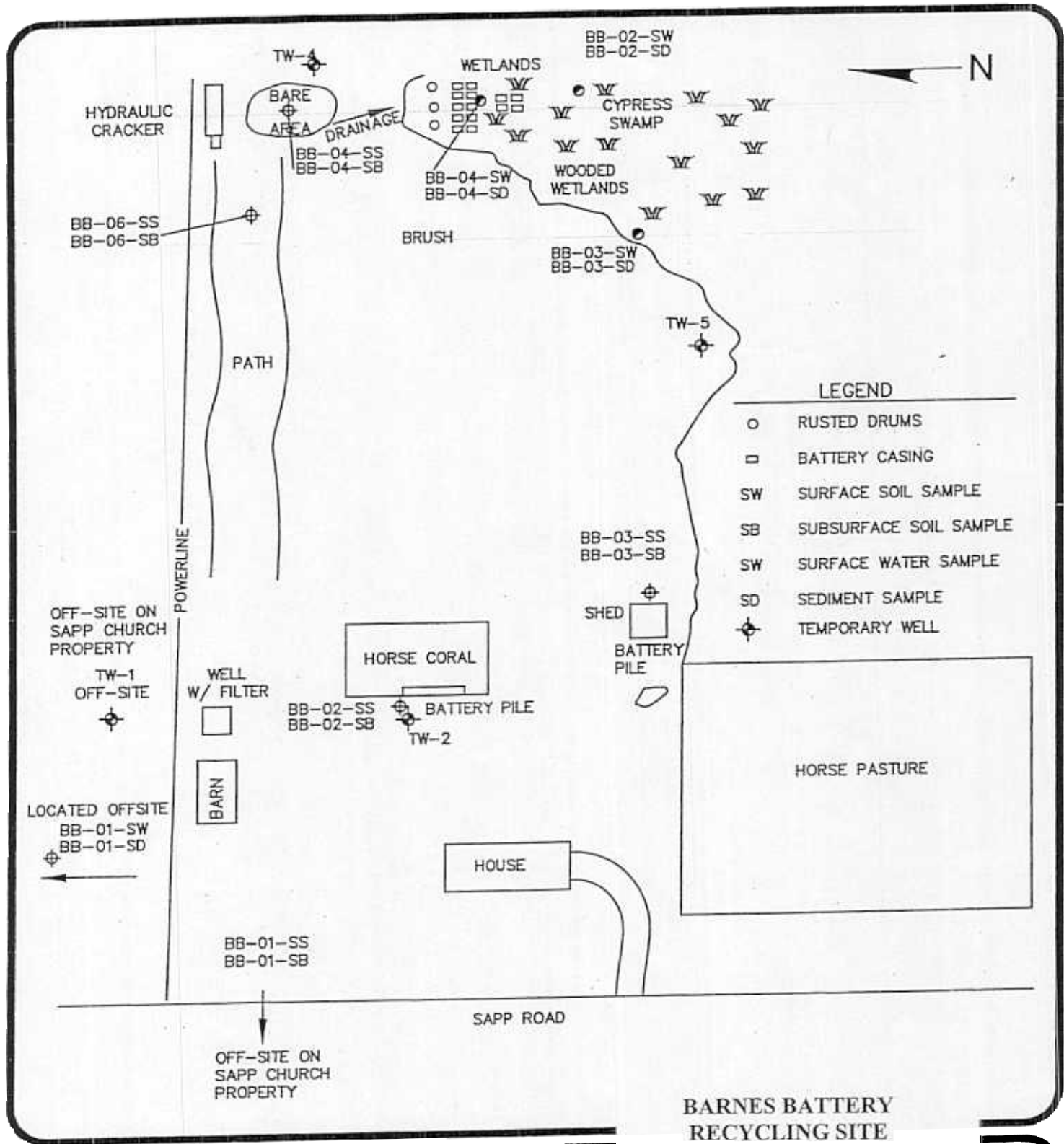


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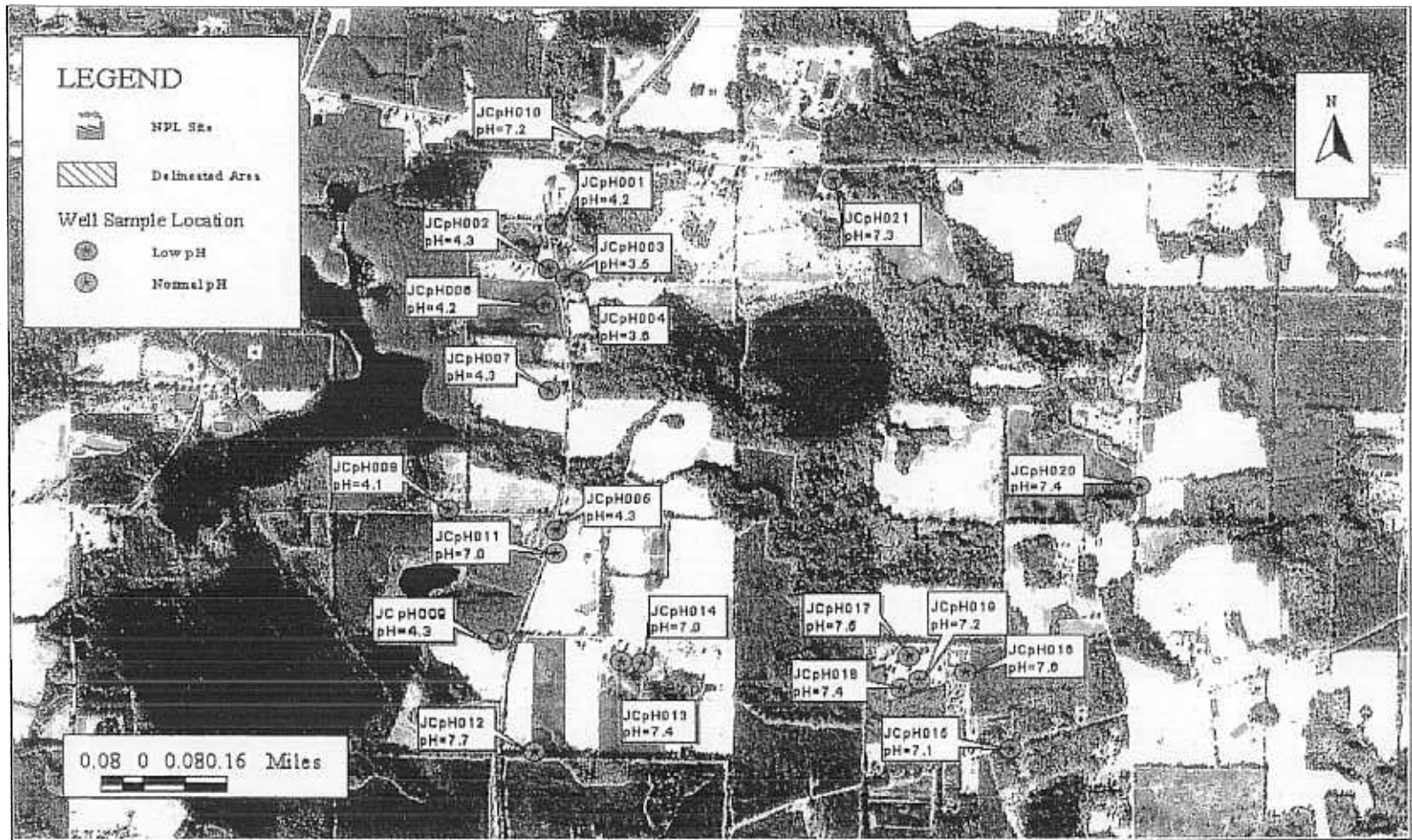
**BARNES BATTERY RECYCLING
JACKSON COUNTY
COTTONDALE, FLORIDA**

**SOIL SAMPLING LOCATIONS
FIGURE 3**

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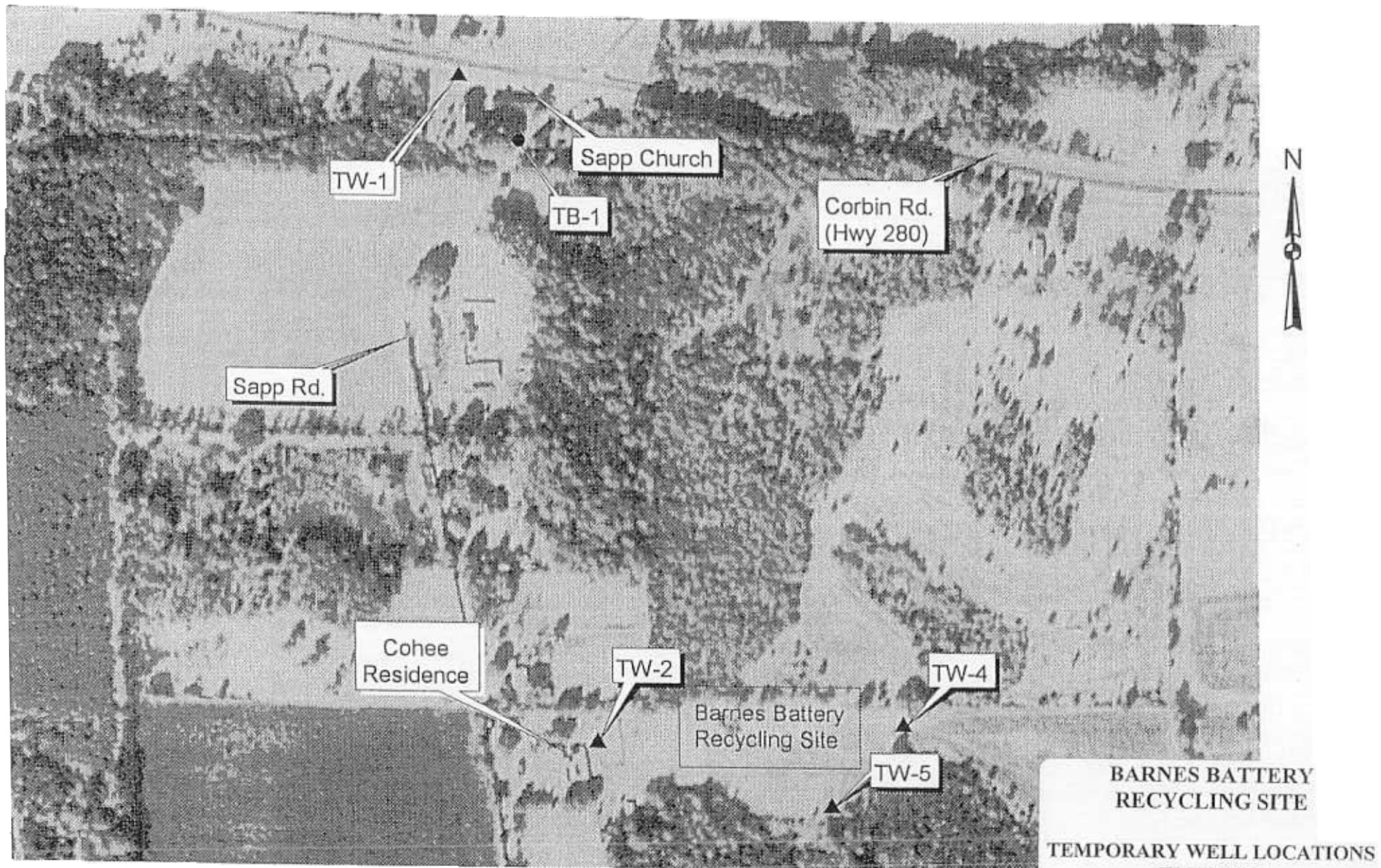
Barnes Battery Site Investigation Jackson County

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**BARNES BATTERY
RECYCLING SITE**

**pH in WELL WATER
FIGURE 4**

Figure 1. Barnes Battery Recycling, General Area



**BARNES BATTERY
RECYCLING SITE**
TEMPORARY WELL LOCATIONS
FIGURE 5

0.1 0 0.1 0.2 0.3 Miles

▲ Temporary Well
● Temporary Benchmark

Barnes Battery Recycling Site
Table I
EPA Surface Soil Testing Results
June 2001 Sampling Event

Contaminant	BB01SS	BB02SS	BB03SS	BB04SS	BB05SS	BB06SS	ATSDR Comparison Values (soil)
Chromium	6000	4400	7800	5200	3400	98000	200,000 (RMEG/child - hexavalent)
Copper	2800	4000	12000	1,300,000	4100	29000	None
Cyanide	ND	ND	ND	ND	ND	1400	1,000,000 (RMEG/child)
Lead	6900	26000	1200000	2400000	54000	8100	400,000 (FDEP1999)*
Total Mercury	120J	ND	170J	160J	130J	150J	None
Vanadium	16000	ND	14000	14000	ND	26000	200,000 (Intermediate EMEG/child)
Chlordane	2.9 J	ND	ND	ND	ND	ND	30,000 (Chronic EMEG/child)
Methyl Butyl Ketone	ND	ND	ND	ND	ND	ND	None
Methylene Chloride	ND	ND	ND	ND	ND	ND	3,000,000 (Chronic EMEG/child)
Chloroform	ND	ND	ND	ND	ND	ND	100,000 (CREG)
3/4 Methylphenol	ND	ND	ND	ND	ND	ND	None

All units are in ppb

SS=surface soil sample 0-12"

A= average value

J=Estimated value

ND=analyzed for but not detected

NA=not analyzed

Only those soil and sediment samples with detected contaminants are shown.

BB01SS & BB01SB are background samples

All ATSDR Comparison Values listed are used for evaluating child health risks

RMEG - Reference Dose Media Evaluation Guide

EMEG - Environmental Media Evaluation Guide

CREG - Cancer Risk Evaluation Guide for 1x 10⁻⁶ excess cancer risk

*Note- Florida Department of Environmental Protection (FDEP) guidance used as no ATSDR lead comparison value

Barnes Battery Recycling Site
 Table II
 EPA Subsurface Soil Testing Results
 June 2001 Sampling Event

Contaminant	BB01SB	BB02SB	BB03SB	BB04SB	BB05SB	BB06SB	ATSDR Comparison Values (soil)
Chromium	5000	46000	19000	20000	3500	41000	200,000 (RMEG/child - hexavalent)
Copper	3200	5800	36000	4500	2500	6600	None
Cyanide	NA	NA	NA	NA	NA	NA	1,000,000 (RMEG/child)
Lead	5400	6400	130000	6700	5700	6700	400,000 (FDEP 1999)*
Total Mercury	150J	170J	150J	ND	250J	140J	None
Vanadium	ND	100000	48000	62000	ND	110000	200,000 (Intermediate EMEG/child)
Chlordane	ND	ND	ND	ND	ND	ND	30,000 (Chronic EMEG/child)
Methyl Butyl Ketone	ND	ND	ND	ND	6J	ND	None
Methylene Chloride	ND	ND	ND	ND	ND	ND	3,000,000 (Chronic EMEG/child)
Chloroform	ND	ND	ND	ND	ND	ND	100,000 (CREG)
3/4 Methylphenol	ND	ND	ND	ND	ND	ND	None

All units are in ppb

SB=subsurface soil sample >12"

A= average value

J=Estimated value

ND=analyzed for but not detected

NA=not analyzed

Only those soil and sediment samples with detected contaminants are shown.

BB01SS & BB01SB are background samples

All ATSDR Comparison Values listed are used for evaluating child health risks

RMEG - Reference Dose Media Evaluation Guide

EMEG - Environmental Media Evaluation Guide

CREG - Cancer Risk Evaluation Guide for 1x 10⁻⁶ excess cancer risk

*Note- Florida Department of Environmental Protection (FDEP) guidance used as no ATSDR lead comparison value

Barnes Battery Recycling Site
 Table III
 EPA Sediment Testing Results
 June 2001 Sampling Event

Contaminant	BB01SD	BB02SD	BB03SD	BB04SD	ATSDR Comparison Values (soil)
Chromium	16000	5900	4400	26000	200,000 (RMEG/child - hexavalent)
Copper	6500	13000	5000	20000	None
Cyanide	2300	ND	ND	ND	1,000,000 (RMEG/child)
Lead	20000	58000	640000	170000	400,000 (FDEP 1999)*
Total Mercury	ND	1100J	420J	300J	None
Vanadium	44000	ND	ND	64000	200,000 (Intermediate EMEG/child)
Chlordane	ND	ND	ND	ND	30,000 (Chronic EMEG/child)
Methyl Butyl Ketone	ND	ND	ND	ND	None
Methylene Chloride	ND	ND	ND	ND	3,000,000 (Chronic EMEG/child)
Chloroform	ND	ND	ND	ND	100,000 (CREG)
3/4 Methylphenol	86J	ND	ND	ND	None

All units are in ppb

SD=sediment sample

A= average value

J=Estimated value

ND=analyzed for but not detected

NA=not analyzed

Only those soil and sediment samples with detected contaminants are shown.

BB01SS & BB01SB are background samples

All ATSDR Comparison Values listed are used for evaluating child health risks

RMEG - Reference Dose Media Evaluation Guide

EMEG - Environmental Media Evaluation Guide

CREG - Cancer Risk Evaluation Guide for 1x 10⁻⁶ excess cancer risk

*Note- Florida Department of Environmental Protection (FDEP) guidance used as no ATSDR lead comparison value

Barnes Battery Recycling Site
 Table IV
 Tap Water Testing Results
 May 2001 Sampling Event

Contaminant	On-site resident	Off-site resident	ATSDR Comparison Value (Drinking Water)
Copper	4100	9700	1300 (MCLG)
Lead	260	6.4	15 (FDEP)

All units are in ppb

Lead results are from first draw sample (the water that immediately comes out when the tap is first opened)

MCLG - Maximum Contaminant Level Goal for Drinking Water (EPA)

FDEP - Florida Department of Environmental Protection Guideline

Barnes Battery Recycling Site
 Table V
 EPA Potable Water Testing Results
 June 2001 Sampling Event

Contaminant	BB01PW	BB02PW	BB03PW	BB04PW	BB05PW	ATSDR Comparison Values (Drinking Water)
Chromium	3.5	ND	ND	ND	ND	100 (MCL)
Copper	ND	36	ND	18	ND	1300 (MCLG)
Lead	ND	5.5	ND	2.6	ND	15 (FDEP)
Strontium	26	6	18A	12	29	6000 (RMEG/child)
Vanadium	ND	ND	ND	ND	ND	30 (Intermediate EMEG/child)

All units are in parts per billion (ppb)

PW=potable water

A= average value

J=Estimated value

ND=analyzed for but not detected

NA=Not analyzed

All ATSDR Comparison Values listed are used for evaluating child health risks

BB01PW=Background well

FDEP - Florida Department of Environmental Protection Guideline

MCL- Maximum Contaminant Level for Drinking Water (EPA)

LTHA - Lifetime Health Advisory for Drinking Water (EPA)

EMEG - Environmental Media Evaluation Guide (ATSDR)

MCLG - Maximum Contaminant Level Goal for Drinking Water (EPA)+A6

RMEG - Reference Dose Media Evaluation Guide

Barnes Battery Recycling Site

Table VI

EPA Water Groundwater Testing/Temporary Wells Results

June 2001

Sampling Event

Contaminant	TW-1	TW-2	TW-4	TW-5	ATSDR Comparison Value (Drinking Water)
Chromium	ND	18 & 4	ND	ND	100 (MCL)
Copper	ND	5.5 & 7	6.9	ND	1300 (MCLG)
Lead	0.97A	3.0 & 0.59	0.56	0.65	15 (FDEP)
Chlorobenzene	ND	0.56 AJ	ND	ND	100 (MCL)
Napthalene	ND	9.0 J	ND	ND	200 (Intermediate EMEG/child)
Phenol	ND	1.8 J	ND	ND	4000 (LTHA)
Vanadium	ND	7.4	ND	ND	30 (Intermediate EMEG/child)

Note: Results are in parts per billion (ppb); TW-1 is a background well

N-2 is an on-site well; TW-1, TW-4 & TW-5 are off-site wells

TW=Temporary Well

If 2 results are noted, results were recorded for low and high turbidity respectively

There is no TW-3

A= average value

J=Estimated value

ND=analyzed for but not detected

All ATSDR Comparison Values listed are used for evaluating child health risks

FDEP - Florida Department of Environmental Protection Guideline

MCL- Maximum Contaminant Level for Drinking Water (EPA)

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Barnes Battery Recycling Site
 Table VII
 Surface Water Testing Results
 June 2001 Sampling Event

Contaminant	BB01SW	BB02SW	ATSDR Comparison Value (Drinking Water)
Chromium	1.9	2.4	100 (MCL)
Copper	ND	ND	1300 (MCLG)
Lead	ND	ND	15 (FDEP)
Chlorobenzene	ND	ND	100 (MCL)
Napthalene	NA	NA	200 (Intermediate EMEG/child)
Phenol	ND	ND	4000 (LTHA)
Vanadium	ND	ND	30 (Intermediate EMEG/child)

Note: Results in parts per billion (ppb)

BB01SW is a background sample

SW=surface water

ND=analyzed for but not detected

NA=not analyzed

BB01SW & BB02SW were the only 2 surface water samples taken during this event

All ATSDR Comparison Values listed are used for evaluating child health risks

FDEP - Florida Department of Environmental Protection Guideline

MCL- Maximum Contaminant Level for Drinking Water (EPA)

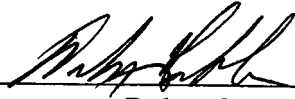
LTHA - Lifetime Health Advisory for Drinking Water (EPA)

EMEG - Environmental Media Evaluation Guide (ATSDR)

MCLG - Maximum Contaminant Level Goal for Drinking Water (EPA)

CERTIFICATION

The Barnes Battery Recycling Site Health Consultation was prepared by the Florida Department of Health, Bureau of Environmental Epidemiology, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.



Debra Gable
Technical Project Officer,
SPS, SSAB, DHAC
ATSDR

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



Roberta Erlwein
Section Chief,
SSAB, DHAC,
ATSDR