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North Carolina

Department of Human Resources

Ulah Battery Lead Reclamation Site

PROPOSED CLEANUP ACTION

Division of Health Services
Solid Waste Management Section
Superfund Branch

June 1988

N.C. DEPARTMENT OF HUMAN RESOURCES
Ulah Battery Lead Reclamation Site

PUBLIC INFORMATION MEETING ANNOUNCEMENT

MONDAY, JULY 25, 1988
at 7:00 p.m.

in the
RANDOLPH COUNTY HEALTH DEPARTMENT
CONFERENCE ROOM

IRA McDowell Governmental Center

2222 South Fayetteville Street
Asheboro, North Carolina

The purpose of the meeting is to receive public comment on the cleanup action plan for the Ulah Battery Lead Reclamation site located on SR 1219 in Randolph County. The meeting will also allow the public the opportunity to ask questions regarding the cleanup action.

North Carolina Department of Human Resources
Division of Health Services
Solid Waste Management Section
Superfund Branch

Ulah Battery Lead Reclamation

WRITTEN DECLARATION

This written declaration is issued under the North Carolina General Statutes 130A-310.3(a). Ulah Battery Lead Reclamation operated as an unincorporated battery recycling facility from approximately 1965 until 1981 in Asheboro, Randolph County, North Carolina. Based upon information available to the Department, the Secretary of the Department of Human Resources has declared that Ulah Battery Lead Reclamation endangers the public health and the environment.

FINDINGS OF FACT

1. On 29 January 1987, the Superfund Branch conducted a site investigation at a site known as Ulah Battery Lead Reclamation. The site is located two miles south of Asheboro on State Road 1219.

2. The Ulah Battery Lead Reclamation site was used to reclaim lead from automotive batteries from approximately 1965 until 1981. The facility operated as an unincorporated family owned business in a residential area.

3. During the Superfund Branch investigation three disposal areas were identified:

   a. A battery processing area located at the end of the driveway.
   b. A large battery casing pile located behind a residence.
   c. A large battery casing pile located about 500 ft. west of the processing area.

4. Soil samples show surface soil lead content at Ulah Battery Lead Reclamation ranging from 37 parts per million (ppm) to more than 144,000 ppm total lead.

5. Soil and battery casing samples previously taken by the Randolph County Health Department show 38,000 ppm total lead and 7.5 ppm extractable lead. The maximum concentration of contaminants for the characteristic of EP (extraction procedure) toxicity is 5.0 ppm as defined by 40 CFR 261.24.

6. Nine children live in the immediate vicinity of the waste piles. One four year old child living at the site had a blood level concentration greater than 40 ug/dl which constitutes Class III lead poisoning as determined by Memorial Hospital in Chapel Hill (25 ug/dl is the current standard). The child's mother stated that the child frequently eats dirt and a soil sample collected from her driveway contained 106,811 ppm lead.

7. Many toxicological studies have shown an association between lead contaminated soil and increased lead absorption, particularly in children. Elevated blood lead levels have been reported among children exposed to soil concentrations as low as 500 ppm. Recent studies indicate that hearing thresholds and neurological development can be affected at levels below the current blood lead standard of 25 ug/dl.

8. Ten residences adjacent to the battery casing waste piles use groundwater as a primary drinking water source.

9. Groundwater samples collected on 29 January 1987 do not show the presence of lead above EPA interim primary drinking water standards of 0.05 ppm lead. However, an extractable lead level above 5.0 ppm indicates the potential for lead migration to the groundwater at levels above the EPA interim primary drinking water standard of 0.05 ppm. Analysis of soil and battery casings show extractable lead levels at 7.5 ppm. Therefore, there is a potential for groundwater contamination above the EPA interim primary drinking water standard of 0.05 ppm for lead at the Ulah Battery Lead Reclamation Site.

WHEREFORE based upon the foregoing facts and conclusions, the Secretary of Human Resources hereby declares, pursuant to North Carolina General Statutes 130A-310, that the above premises is an inactive hazardous substance or waste disposal site which endangers the public health and environment.

This 14 day of June, 1988.

By: William L Meyer
William L. Meyer, Chief
Solid Waste Management Section
Department of Human Resources

By: George V. Elliott
George V. Elliott, Health Director
Randolph County Health Department

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SUMMARY

The Ulah Battery Lead Reclamation site is located approximately 2 miles south of Asheboro in Randolph County on State Road 1219. The site spans 20 to 25 acres of the rural residential community of Ulah (maps attached).

The site was used as a battery breaking operation between the years 1965 and 1981. Lead plates were removed and melted in drums. Broken battery casings were used to pave driveways or were discarded into one of three disposal areas as indicated on the attached map. Battery acid was allowed to spill onto the ground.

Samples collected in 1986 by the NC Division of Health Services indicate lead concentrations in the soil of 14%. Subsequent sampling indicates soil levels of 7% lead. The highest concentrations of lead in the soil were found in the battery processing area located approximately at the juncture of the Hammond, King, and Coble properties. Since this processing area is located primarily on the King property, it will be referred to as the King property processing area in this report. Groundwater and surface water samples collected in January 1987 were not contaminated. Blood samples were also collected from several children living along SR 1219 in 1986 by the Randolph County Health Department. One child had a blood lead level almost twice the current standard. At the present time local residents and wildlife are exposed to the on-site contamination only through direct contact.

The King property processing area, with elevated lead concentrations in the soil in the percent range, poses a health threat through direct contact and a potential environmental threat to groundwater and surface water. Removal of the battery casings and excavation of up to one foot of soil is proposed as the method of removing the direct contact exposure route and of minimizing the threat of contamination to groundwater and surface water. Removal and other remedial alternatives are discussed in the section entitled "Alternatives".

PURPOSE AND NEED

Elevated levels of 6% or 7% lead have been detected in soils in the battery processing area located at the end of State Road 1219. The King property battery processing area has the highest concentrations of lead in the soil.

The purpose of this project is to remove the threat of direct contact exposure and to minimize a potential threat to groundwater and surface water. Excavation of contaminated soils and battery casings is proposed. The remainder of the document will present cleanup alternatives along with any related environmental consequences in the following format: ALTERNATIVES, AFFECTED ENVIRONMENT, and ENVIRONMENTAL CONSEQUENCES.

ALTERNATIVES

Nine alternatives for addressing the broken battery casings and contaminated soil at the Ulah Battery site have been identified and evaluated. Criteria for evaluating the alternatives include technical feasibility, removal of the source of contamination, risk of worker exposure, and future use of the property. Discussion of each remedial alternative begins with a description of the alternative followed by a brief evaluation based on the above criteria.

1. Removal and Off-site Disposal as a Hazardous Waste:

   Removal and Off-site Disposal involves excavation of contaminated soils and battery casings and hauling, in a covered truck, to an off-site hazardous waste disposal facility. Excavation would be followed by backfilling with clean soil. The ground surface would be graded in a manner to conform to the surrounding terrain and to prevent ponding. The soil will then be seeded to prevent erosion.

   Removal and off-site disposal is a technically feasible alternative which would eliminate the source of contamination. Worker exposure would be limited to excavation activities. Future uses of the site would not be limited.

2. Cementation/Fixation with Off-site Disposal:

   The Cementation/Fixation process immobilizes wastes by solidification in a cement matrix. The contaminated soils and broken battery casings would be mixed with a setting agent such as lime or portland cement. Solidification in a cement block should reduce the leachability of the lead. The block(s) of waste could then be disposed of in a non-hazardous waste landfill. The excavated area would be backfilled and seeded as in Alternative 1.

Cementation/Fixation would not likely be technically feasible due to the high clay content of the soil. It is difficult to obtain a homogenous mixture of clayey soils with setting agents. Increased handling of the waste would increase the potential for worker exposure. Burial of the solidified waste off site would remove the source of contamination and would not limit future uses of the property.

3. Cementation/Fixation with On-site Disposal:

Cementation/Fixation processes for Alternative 3 are the same as for Alternative 2. With Alternative 3 the solidified waste would be buried on-site, likely in the pit or trench in which mixing occurred. Cementation would allow on-site disposal as a non-hazardous waste.

Cementation/Fixation would not likely be technically feasible, as mentioned in Alternative 2, due to the clay content of the soils at the Ulah Battery Site. Burial of insufficiently blended waste and cement on site could extend the area of contamination instead of removing the source. Increased handling of the waste would again increase worker exposure. Burial of the solidified waste on site would limit future uses of the property.

4. Vitrification:

Vitrification is the fixation of hazardous wastes in a glass matrix. Electrodes are inserted into the contaminated soils. Graphite, applied to the land surface, connects the electrodes to the soil. A high current of electricity produces the high temperatures necessary to melt the soil. Significant levels of soil silicates are necessary for effective melting and glass formation. During vitrification some organic compounds are volatilized and must be collected through a vacuum system. After the melt cools, non-volatile organic and inorganic compounds are fixed in a glass matrix.

Efficiency of vitrification is affected by soil moisture; therefore, sites with high water tables or high recharge would not be good candidates for vitrification. Underground utilities in the area will also interfere with the process. Therefore, vitrification would not likely be technically feasible. Vitrification allows the waste to be immobilized in place and thus minimizes the potential for worker exposure. A reduction in land use possibilities will result from the fixation of waste in place.

5. Soil Flushing/Soil Washing:

Soil Flushing is an in-situ extraction of contaminants from soils and is accomplished by passing extractant solvents through the soils using an injection/recirculation process. These solvents may include: water, water-surfactant mixtures, acids or bases (for inorganic compounds), chelating agents, oxidizing agents or reducing agents. Soil Washing consists of similar treatments, but the soil is excavated and treated at the surface in a soil washer. Soil Flushing is more applicable in situations where the contamination is deep in the soil rather than primarily surficial as in the case at the Ulah Battery site.

Soil Flushing/Soil Washing may not be technically feasible at the Ulah Battery site because this method may not effectively remove lead bound to clays. Soil Flushing/Soil Washing has the advantage that if successful, the source of contamination is removed. Since Soil Washing involves excavation and treatment at the surface in a soil washer, it has the same handling problems and increased risk of worker exposure that are encountered in the Stabilization/Fixation alternative. In addition Soil Flushing and Soil Washing both generate a contaminated solvent (water) stream which must be treated and/or disposed of as a hazardous waste. Future use of the property should not be limited.

6. Recycling of Battery Casings:

Recycling was explored as a means of waste reduction. Recycling of the casings is an attractive option for disposal of the two large battery casing piles at the site. This alternative will be evaluated during the future remediation of these areas. Recycling may be used in conjunction with any of the above alternatives.

The King property processing area does not have a large volume of disposed battery casings available for recycling. Therefore, recycling is not as feasible as it would be with the remediation of the other casing piles.

The technical feasibility of this alternative will depend on the compositional requirements set by the recycler. Recycling would assist in removal of the source of contamination. Worker exposure would be limited to excavation activities. Recycling would not affect future use of the property.

7. Capping

Capping involves covering the waste with a compacted clay base overlain by a synthetic liner, a drainage layer, and topsoil. The topsoil would be sloped and seeded to prevent ponding and erosion.

Capping is a technically feasible alternative which would immobilize the wastes and eliminate the direct contact hazard, but would not remove the source of contamination. Worker exposure would be minimal.

The major disadvantage of capping is that future use of the property is highly limited. The capped area would need to be fenced and maintained to ensure that the area is not disturbed. Trees would have to be removed to prevent roots from damaging the integrity of the cap. Capping would also require the addition of two to five feet of cover material. This would be difficult to achieve in a residential area.

8. Removal and Off-Site Disposal in a Solid Waste Landfill

Removal and off-site disposal involves excavation of contaminated soils and battery casings and disposing of the waste in a solid waste landfill.

The soils and battery casings at the site are hazardous wastes by characteristic of EP (extraction procedure) toxicity. EP toxicity indicates the potential for hazardous constituents to leach into groundwater. Disposal of hazardous waste in a Solid Waste landfill is prohibited by North Carolina Solid Waste Management Rules (10 NCAC 10G). Therefore, this option is not feasible.

9. No Action:

If no action is taken the source of contamination will remain a problem. The potential for health affects resulting from lead exposure would still exist. Further mention is made of the No Action alternative in the section on Environmental Consequences.

Removal and off-site disposal as a hazardous waste most closely meets the set criteria and is therefore the preferred remedial alternative for removing the direct contact hazard and minimizing the threat to groundwater and surface water. Alternatives 2,3,4,5 and 6 do not appear to be technically feasible. Alternatives 2,3 and 5 would increase worker exposure to contaminants. Alternatives 2 and 3 may not effectively eliminate the source of contamination due to the nature of the soils on site. Also, Alternatives 3,4 and 7 would limit future uses of the property. Alternative 8 is prohibited by Solid Waste Management Rules. If Alternative 9, No Action, is selected, direct contact exposure will continue to be a problem.

AFFECTED ENVIRONMENT

Designated Areas

No critical habitats, public parks or forests, recreational areas, historic sites, wetland areas, or prime or unique agricultural lands are located within a 1 mile radius of the site (References 1,2,3,4). The Uhawarrie National Forest, located less than 2 miles from the site, is the closest protected area to the site.

The area is currently rural residential, and undeveloped lands. The Hammond, King, and Coble properties are zoned residential/agricultural (Reference 5). The field behind the Hammond house appears to have once been used for farming. Removal of contaminated soils and casings from the King property processing area should prevent contaminated runoff from infiltrating potential agricultural soils.

Air Quality

The removal of contaminated soils from the Ulah Battery site could only potentially affect air quality during actual excavation activities. Alternatives 1, 2, 5, 6, 7, and 8 will involve excavation activities. These activities are not projected to be longer than 2 weeks duration. Dust suppression methods will be implemented to prevent off-site migration of dust and to protect worker health.

Water Quality

Groundwater wells sampled at the residences along State Road 1219 did not indicate lead levels above detection limit. The nearest surface water body downgradient from the site did not indicate the presence of lead above background levels. Removal of contaminated soils and battery casings and backfilling with clean soil should reduce the possibility of lead entering surface water runoff or leaching down to the groundwater. Alternatives 1, 2, 4, 6, 7, and 8 should reduce the risk of surface water or groundwater contamination. It is uncertain whether Alternative 3 (Cementation/Fixation with On-site Burial) would be effective in reducing the risk of surface water or groundwater contamination (See Environmental Consequences Section). Soil Flushing (Alternative 5) could result in contamination of shallow aquifers.

Noise Levels

An increase in noise level will occur temporarily during remediation activities due to heavy equipment operation. No permanent changes in noise level should occur being that no changes in land usage will occur as a result of the proposed activity.

ENVIRONMENTAL CONSEQUENCES

The following is a discussion of the environmental consequences resulting from each of the remedial alternatives.

Removal and Off-site Disposal:

Excavation of battery casings of up to one foot of soil will remove the direct contact hazard. Backfilling the area with clean soil will prevent direct contact exposures should residual lead contamination exceed a one foot soil depth.

Although the project focus is to remove the direct contact hazard health threat, excavation and backfill should reduce the risk of surface water and groundwater contamination. Removal of surface contamination should reduce the lead concentration in surface water runoff. The highly impermeable clay occurring within a few inches of the surface to a depth of at least 18 inches (based on soil sampling activities) will likely impede migration of lead into the groundwater.

Cementation/Fixation With Off-Site Disposal:

Cementation/Fixation is designed to permanently fix contaminants in a cement matrix. The fixed waste may then be buried in a sanitary landfill. The predominantly clayey soils of the site do not blend well with cement and other solidifiers. The ineffective blending would likely not allow complete fixation of the waste. Incomplete fixation may allow the leaching of lead from the soil/cement into the groundwater.

Cementation/Fixation With On-Site Disposal

The ineffective blending of the waste would again likely not allow complete fixation. Incomplete fixation in conjunction with the deeper burial area required for the larger volume of waste, may extend the area of contamination.

Vitrification:

This remedial alternative is not known to pose any environmental problems. The technical feasibility of this alternative prohibits application to this site.

Soil Flushing/Soil Washing:

Washing of soils and battery casings produces a problem of disposing of the wash water. The large volume of waste soil and casings will require a large volume of water or extraction fluids. Arrangements for disposal or treatment of the extraction fluid will then be necessary.

Capping

Capping of the contaminated soils may provide an adequate means of immobilizing the contaminant; however, this would require continued site maintenance and security. The residential and agricultural lands surrounding the site increase the probability of future soil disturbing activity. This would renew exposure routes sought to be corrected by this project.

Removal and Off-Site Disposal in a Solid Waste Landfill

Disposal of hazardous waste in a Solid Waste landfill presents the possibility of lead leaching into the groundwater.

No Action:

If no action is taken towards site remediation, direct contact exposure will remain a problem. There are several children residing on State Road 1219. Ingestion of lead by children playing in the soils may still occur unless the route of direct contact exposure is removed. The potential for groundwater and surface water contamination also remains.

REPORT PREPARED BY: Charlotte Varlashkin - Hydrogeologist

Jack Butler - Environmental Engineer

Stan Atwood - Environmental Chemist

REFERENCES

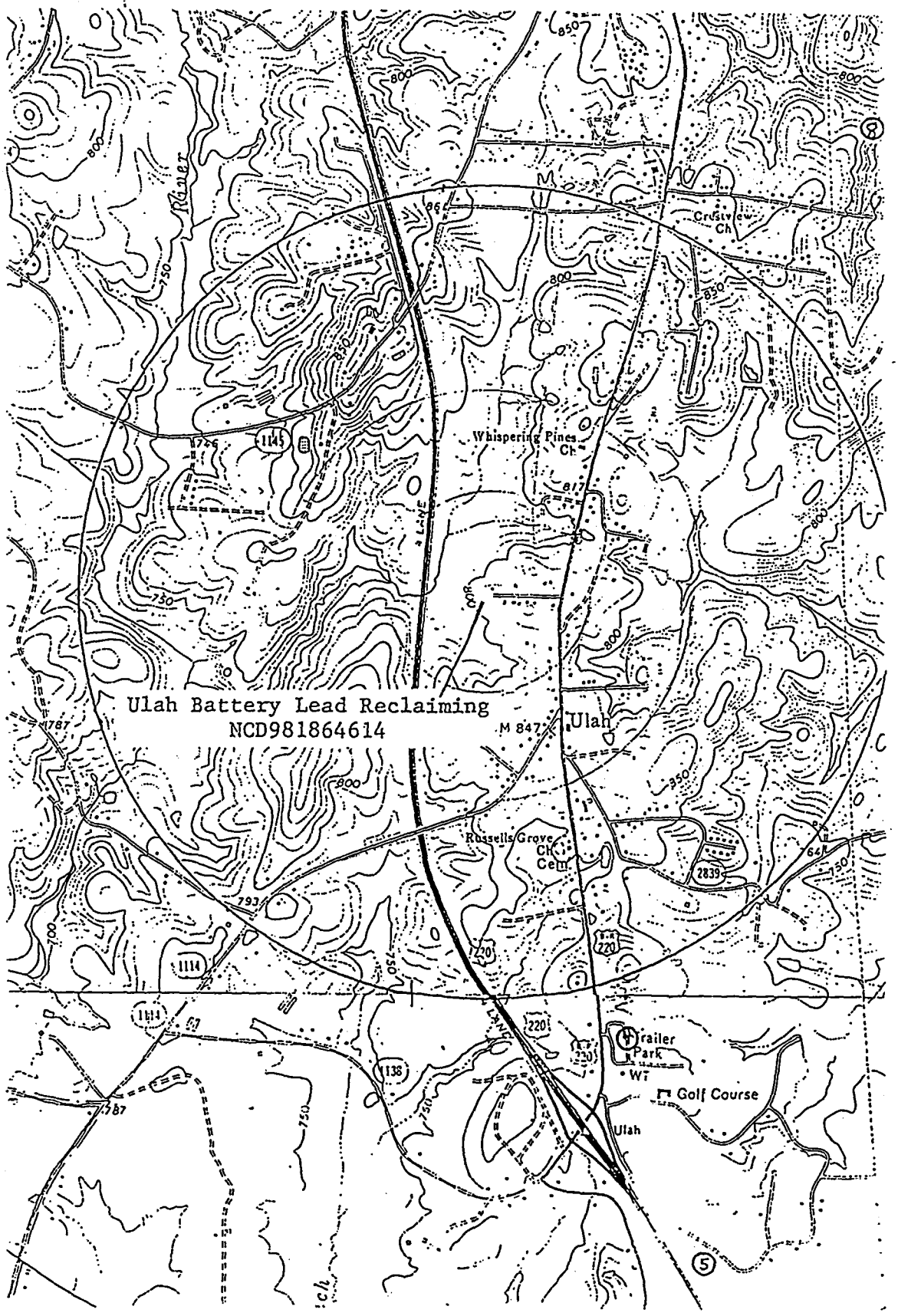
1. Letter from W. Parker, U.S. Department of Interior, to P. DeRosa, DHR Solid Waste Management Section, Superfund Branch, June 21, 1985.

2. Memorandum to CERCLA Unit staff from P. DeRosa, Superfund Branch, August 12, 1986.

3. Telecom to T. Ellis, Department of Agriculture from C. Varlashkin, Superfund Branch, June 7, 1988.

4. Telecom to Historic Sites Office, Department of Cultural Resources from C. Varlashkin, Superfund Branch, June 7, 1988.

5. Telecom to Randolph County Zoning office from C. Varlashkin, Superfund Branch, June 13, 1988.



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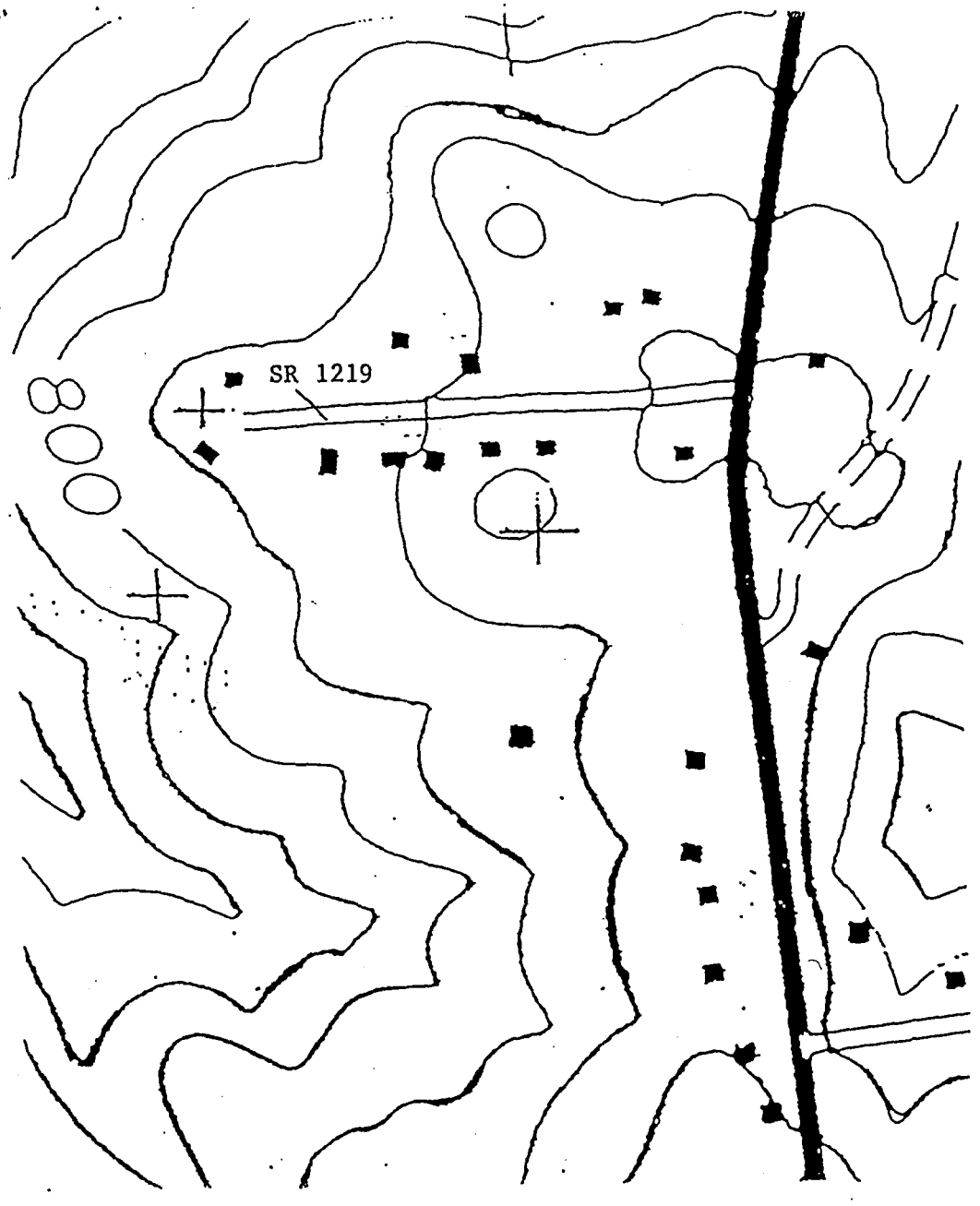

Ulah Battery Site

Battery Processing Areas

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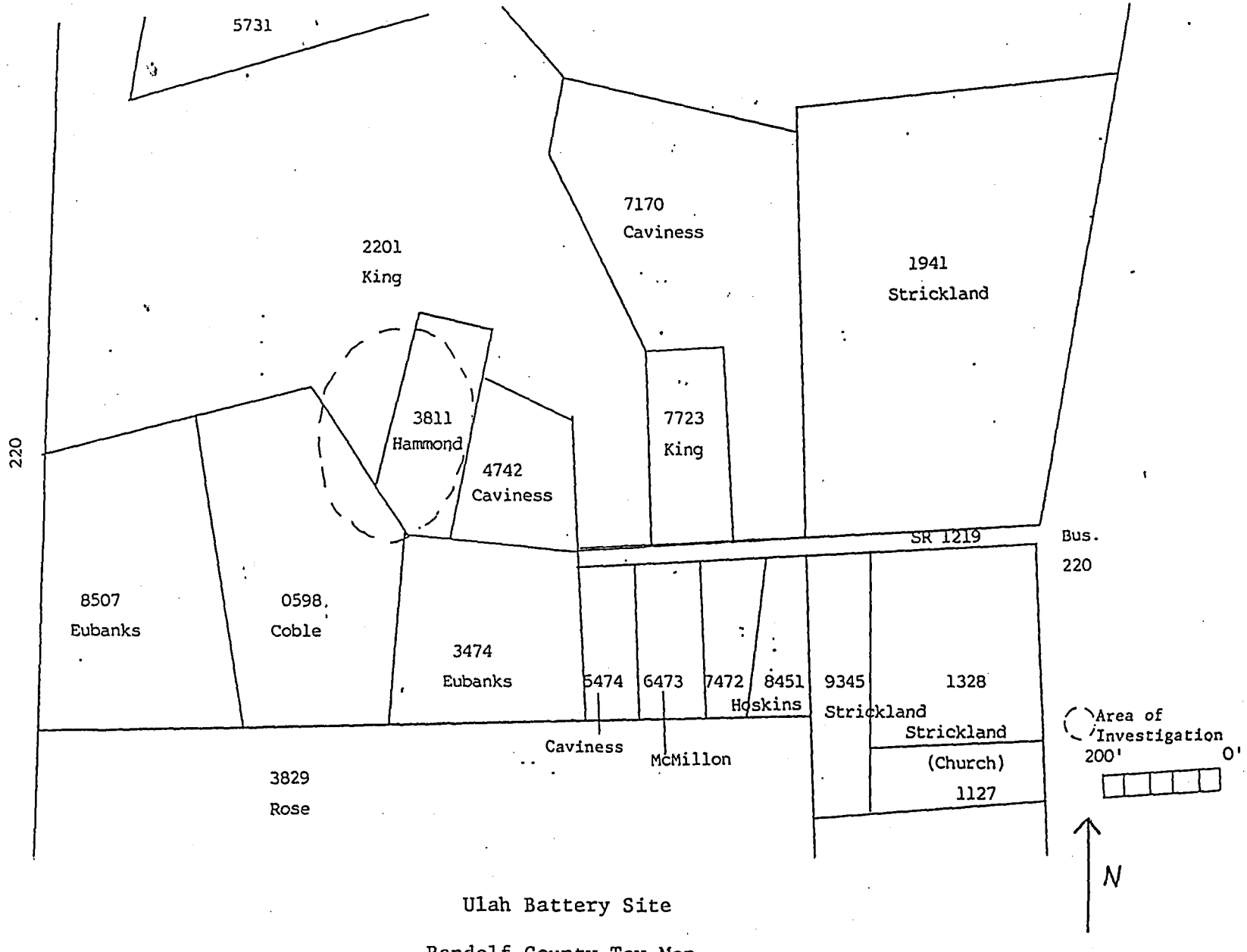

Ulah Battery Site

Randolf County Tax Map