



DEPARTMENT OF THE ARMY

**UNITED STATES ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA 35890-5000**

May 13, 1992

REPLY TO
ATTENTION OF

MICOM Environmental Office

Mr. Charles R. Horn
Water Division
Alabama Department of Environmental
Management
1751 Congressman W.L. Dickinson Drive
Montgomery, Alabama 36130

Dear Mr. Horn:

Reference the enclosed letter from the Alabama Department of Environmental Management on March 27, 1992, regarding Notice of Violation.

The U.S. Army Missile Command has tasked the U.S. Army Corps of Engineers for the Resource Conservation and Recovery Act Facility Investigation at the arsenic impoundment and also with the design and execution of an interim remedial action. The interim remedial project will include the diversion of a drainage ditch, relocation of utilities, removal of vegetation, and capping of the site. The Resource Conservation and Recovery Act Facility Investigation will determine rate and extent of contamination.

Since the 1986 Notice of Violation, the U.S. Army Missile Command Environmental Office has investigated the DDT landfill, the sanitary landfill and the open burning ground as a part of a Resource Conservation and Recovery Act Facility Investigation. The sanitary landfill and open burning ground is currently under investigation by the U.S. Army Corps of Engineers. All environmental reports generated have been submitted to your agency for review.

Scheduled for the closed portion of the sanitary landfill and the open burning ground are interim remedial actions which will begin the mitigation process for correction of groundwater contamination.

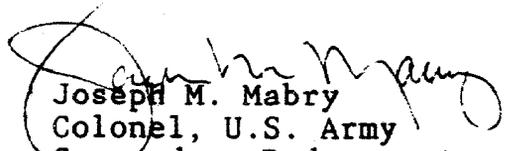
The U.S. Army Missile Command has planned a Corrective Measures Study that will be utilized in the development and evaluation of corrective action alternatives and recommendations of the selected corrective measure to be taken at the sanitary landfill and open burning ground for an overall final clean-up of the site.

Detailed information regarding the schedules and implementation of the above work is enclosed. Concurrence and coordination by higher headquarters, U.S. Army Materiel Command will be required for these actions.

Schedules presented are subject to the availability of funds and timely review and approval from state and federal regulators.

Questions or comments about this matter may be directed to Bruce Whisenant, Environmental Management Office, 205-955-6969.

Sincerely,


Joseph M. Mabry
Colonel, U.S. Army
Commander, Redstone Arsenal
Support Activity

Enclosures

RESPONSE TO NOTICE OF VIOLATION
AT
REDSTONE ARSENAL

1.0 References:

- 1.1. Letter, Alabama Department of Environmental Management, 27 March 1992, subject: Notice of Violation.
- 1.2. Letter, Alabama Department of Environmental Management, 21 January 1986, subject: Notice of Violation.
- 1.3. Letter, U.S. Army Missile Command, Redstone Arsenal, 7 March 1986, subject: Response to Notice of Violation Issued in 1986.
- 1.4. Letter, Alabama Department of Environmental Management, 2 May 1986, subject: Review of Responses to Notice of Violation Issued in 1986.
- 1.5. Geraghty and Miller, Inc., 1991 Phase I Report RCRA Facility Investigations at Unit 1, Unit 2, and Selected Unit 3 Areas, Redstone Arsenal, Consulting report prepared for U.S. Army Corps of Engineers, December 1991.
- 1.6. LaMoreaux, P.E. and Associates, Inc. (PELA), 1988a, Remedial Investigation Engineering Report, Redstone Arsenal, Alabama, Unit 1 DDT and Sanitary Landfills and Unit 2 Open Burn/Open Demolition Area. Volumes I through VII. Consulting Report Prepared for U.S. Army Corps of Engineers, September 1988.
- 1.7. LaMoreaux, P.E. and Associates, Inc. (PELA), 1988b, Confirmation Report, Unit 3 Investigations, Redstone Arsenal, Alabama. Volumes I through VI. Consulting Report Prepared for U.S. Army Corps of Engineers, July 1988.
- 1.8. LaMoreaux, P.E. and Associates, Inc. (PELA), 1988c, Remedial Action Plans for Redstone Arsenal, Alabama, Unit 1 DDT and Sanitary Landfills and Unit 2 Open Burn/Open Demolition Area. Consulting Report Prepared for U.S. Army Corps of Engineers, September 1988.
- 1.9. LaMoreaux, P.E. and Associated, Inc. (PELA), 1989, Upgrade Confirmation Report and Assessment of Remedial Alternatives for Selected Unit 3 Sites, Redstone Arsenal, Alabama. Volumes I through V. Consulting Report Prepared for U.S. Army Corps of Engineers, April 1989.

2.0. The following paragraphs are provided in response to reference 1.1. In general, all these sites follow the basic flow chart as presented in Figure 1.

2.1 Response for Unit No. RSA-56 (i.e. closed arsenic impoundments). This unit is also called Area U.

2.1.1 Based upon data collected (surface water and fish tissue) no determination can be given regarding the cause of the minor fish kill experienced in early February 1992.

2.1.2 Redstone Arsenal recognizes, based upon surface water sampling and analyses, that low concentrations of arsenic are present in surface waters adjacent to the impoundments in question.

2.1.3 In 1989, Redstone Arsenal conducted a groundwater investigation at RSA-56 (i.e. Area U). This engineering evaluation was conducted by LaMoreaux, P.E. and Associates, Inc., (PELA). Groundwater monitoring data has indicated low concentrations of arsenic (11 ppb at well RS049 and 13 ppb at well RS051) and concentrations of solvents (22 ppb of methylene chloride and 49 ppb of trichloroethene in well RSA 49; and 18 ppb of methylene chloride in well RS050). Based upon these results, Redstone Arsenal has programmed in FY 92 a RCRA Facility Investigation to determine rate and extent of groundwater contamination at RSA56.

2.1.4 Redstone Arsenal has tasked the U.S. Army Corps of Engineers (USACE) to conduct a RCRA Facility Investigation (RFI) at RSA-56 to delineate rate and extent of contamination. The RFI is expected for award in September 1992 subject to the availability of funds.

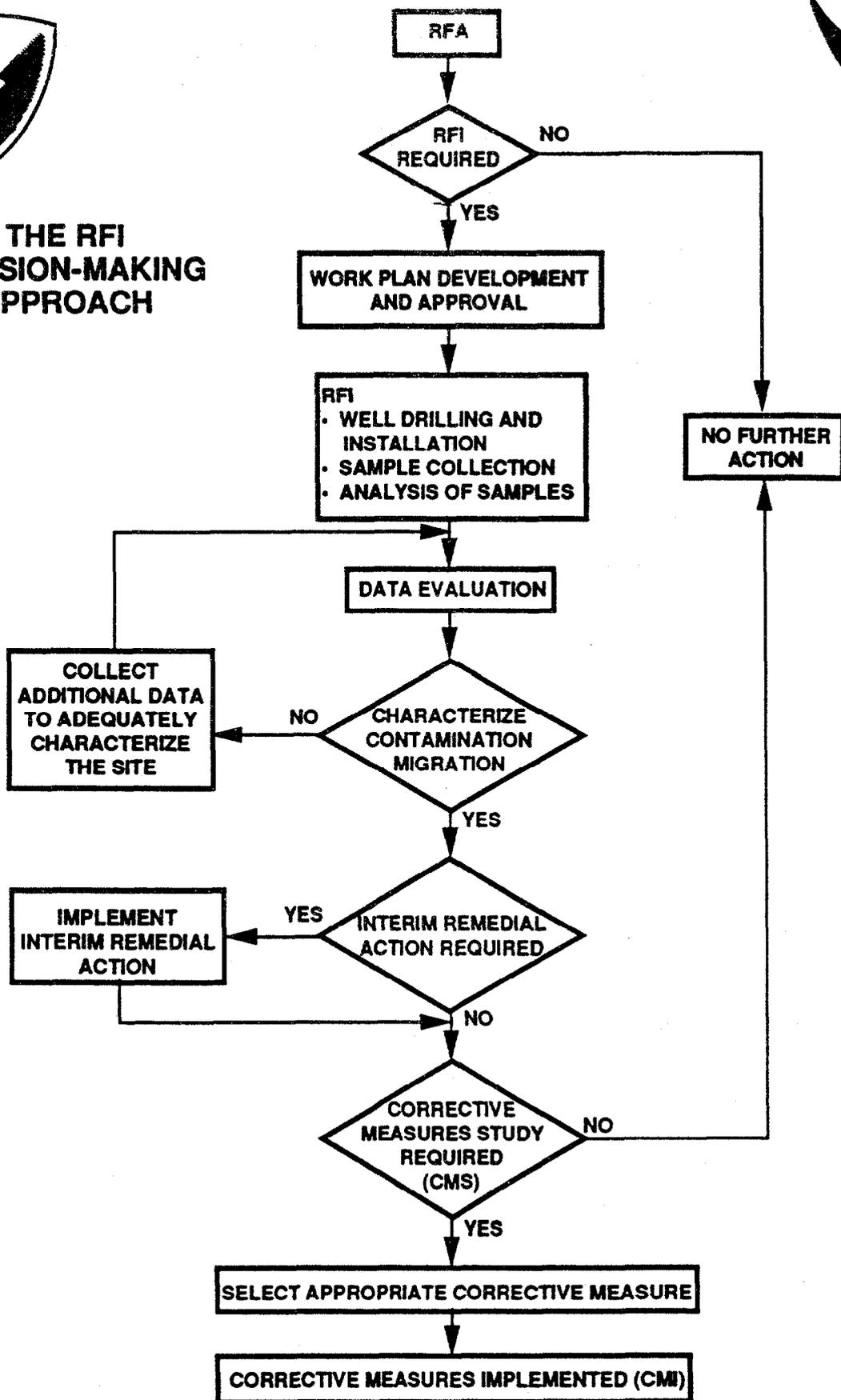
2.1.5 Redstone Arsenal has also proposed an Interim Remediation Action (IRA) at this location to minimize/mitigate the surface water degradation due to releases from the lagoons. The project involves the relocation of utilities, rerouting of the ditch, clearing of vegetation, and the capping of the area to eliminate the infiltration of precipitation and surface water run on. This IRA has been tasked to the U.S. Army Corps of Engineers, Huntsville Division for the design. The schedule of design and construction for the IRA is divided into two phases as follows:

2.1.5.1 Phase I - Relocation of Ditch and Utilities

Huntsville Division is to design for the relocation of the ditch and utilities. Design to be completed approximately 45 days after receipt of funds. Construction to be performed by RSA's contractor and completed within 90 days after award of construction contract.



THE RFI DECISION-MAKING APPROACH



2.1.5.2 Phase II - Capping Site

Huntsville Division is to design, advertise, and award a contract for the clearing of vegetation and the capping of the lagoon. The contract will then be turned over to Mobile District for the execution of construction. The design, advertisement, and award should take approximately 6 months after the receipt of funds.

2.1.6 Redstone Arsenal is also, in accordance with the Clean Water Act, preparing the National Pollutant Discharge Elimination System (NPDES) permit application for Redstone Arsenal. The facilities to be included in this application will be inclusive of RSA-56 (i.e. Area U). This permit application will be submitted by 1 October 1992.

2.2. Response for DDT Landfill.

2.2.1 The DDT Waste Soils Landfill includes an area of approximately 2.5 acres and was used to dispose of soils contaminated with DDT that were excavated as part of the DDT Migration Abatement Program. Soils and sediments contaminated with DDT were disposed of in the DDT Waste Soils Landfill from July 1979 to August 1982, after which the landfill was capped and covered with 2 ft or more of compacted clay. The DDT Waste Soils Landfill was closed and is monitored under a Closure Post-Closure Plan (1983) as regulated by ADEM.

2.2.2 Investigations at this site began in 1978 with the installation of monitor wells and lysimeters for the proposed DDT Waste Soils Landfill. Monitoring wells for the sanitary landfill were installed in 1981. Additional monitoring wells were installed around the DDT Waste Soils Landfill in 1984 to replace damaged wells and to supplement the existing monitoring well network.

2.2.3 In response to the 1986 NOV, RSA investigated and assessed the extent and nature of ground-water contamination resulting from disposal operations at the DDT and closed sanitary landfills, and to evaluate remedial alternatives. The USACE, acting on behalf of the U.S. Army Materiel Command for the U.S. Army Missile Command (MICOM) of RSA, contracted PELA to perform a remedial investigation/feasibility study (RI/FS)-type study of the site. Monitor wells, including five overburden wells (RS086, RS087, RS088, RS089, and RS091) and four bedrock wells (RS092, RS093, RS094, and RS095), were installed by PELA. Ground-water samples from these and the existing monitor wells, soil/waste samples, and surface-water samples were collected by PELA. A report entitled "Remedial Investigation Engineering Report, Redstone Arsenal, Alabama, Unit 1, DDT and Sanitary Landfills and Unit 2, Open Burn/Open Demolition Area" was submitted by PELA to the USACE in September of 1988 (PELA, 1988a). The report includes

soil/waste quality data, water-level and water-quality data, geologic logs and cross-sections, and monitor-well construction details. PELA (1988a) concluded that the DDT Waste Soils Landfill was successfully containing the DDT waste and was not contributing to any local soil or ground-water contamination.

2.2.4 The DDT Waste Soils Landfill is lined and capped with compacted clay and reportedly does not contribute to any local soil or ground-water contamination (PELA, 1988a). The clay liner and cover were installed to inhibit the infiltration of surface water run-on and precipitation into the wastes, thereby minimizing the generation of leachate. PELA (1988a) reported that DDT had not been detected in ground-water samples collected since 1985. Under RSA's solid waste disposal permit with ADEM, monitor wells installed around the perimeter of the DDT landfill are sampled semi-annually by RSA environmental personnel. The samples are analyzed for DDT, polychlorinated biphenyls (PCBs), pH, specific conductance, total organic halogens, and total organic carbon and annually for phenols and selected inorganic constituents. With the exception of one deep overburden monitor well (RS010), DDT has not been detected in the monitor wells since the sampling began in 1981. DDT is periodically detected in the single monitor well; the presence of the DDT in the samples from this well may be due to well construction (no bentonite seal or grout in the annular space) and development procedures, rather than the actual presence of DDT in the ground-water in the vicinity of the landfill.

2.3 Response for Sanitary Landfill.

2.3.1 The sanitary landfill, which occupies approximately 66 acres, has been used since 1973 for disposal of a variety of wastes including typical household waste, waste oil, hospital infectious waste, construction debris, asbestos, and ash from incinerated paper. Closed portions of the sanitary landfill include disposal trenches oriented east-west and a rubble fill, located in the southern part. The closed landfill consists of three to four disposal trenches that are approximately 25 ft wide, 400 ft long, and greater than 20 ft deep. Wastes disposed in the closed trenches included household waste, paper products, waste oil, and construction debris. The land surface of the closed disposal trenches is hummocky and covered with grass. The ground is unstable and subsurface gas can be observed escaping from the soil.

2.3.2 Located on the north end is the closed waste oil pits. The pits were used from 1976 until 1982 to dispose of waste lube oil, boiler plant fuel oil and sludges, oil spill residues, and sewage treatment plant grease trap solids.

2.3.3 The active portion of the sanitary landfill is permitted and operated as a solid waste disposal facility under Alabama Department of Environmental Regulations (ADEM) regulations (Permit Number 45-03R).

2.3.4 Soil and ground-water contamination, including VOCs, BNAs, and metals, was detected in the vicinity at the former waste oil pits and closed portions of the sanitary landfill.

2.3.5 A total of 31 monitor wells have been installed during previous investigations. The monitor wells include 25 overburden monitor wells (RS010, RS011, RS015, RS077, RS078, RS079, RS080, RS081, RS082A, RS083A, RS084, RS085, RS086, RS087, RS088, RS090, RS091, RS169, RS170, RS171, RS172, RS173, RS174, RS176, and RS178) and six bedrock wells (RS092, RS093, RS094, RS095, RS175, and RS177). All of the monitor wells are existing; all but two (RS010 and RS082A) are suitable for monitoring.

2.3.6 Redstone Arsenal, in response to the 1986 NOV, is in continuing investigation of the closed portions of the sanitary landfill. The USACE, acting on behalf of RSA, contracted Geraghty and Miller, Inc. to perform a RCRA Facility Investigation study of the site. This investigation (refer to reference 1.5) includes test pits, soil borings surface soil sampling, sediment sampling, surface water sampling and ground-water sampling to determine rate and extent of contamination. The complete delineation of the contamination is expected in Phase II of this RFI study.

2.3.7 Redstone Arsenal has tasked the USACE to conduct an interim remedial action (IRA) at the sanitary landfill. The proposed project involves the design and construction of IRA to mitigate ground-water contamination. The U.S. Army Corps of Engineers, Huntsville Division, has been tasked to develop a statement of work for the design of the IRA. The statement of work will be forwarded in June 1992 to the U.S. Army Corps of Engineers, Savannah District, for contract actions. Award of the design of the IRA is expected in August 1992. Design completion of the IRA is expected in January 1993, followed by construction contract award in March 1993. This project schedule is based upon the availability of funds and timely review by state and federal regulators.

2.3.8 Redstone Arsenal has tasked the USACE to prepare a Corrective Measure Study (CMS). The CMS is to develop and evaluate corrective action alternatives and to recommend the selected corrective measure to be taken at this site. CMS is expected to be completed in May 1993.

2.4 Response for the Burning Ground Area.

2.4.1 The open burn/open detonation (OB/OD) areas, is located in the southern part of RSA near the Tennessee River. The OB/OD areas are recognized as a "miscellaneous unit" as regulated under 40 CFR 264, RCRA Subpart X. An application for a RCRA Part B permit has been submitted and is pending approval by EPA. The OB/OD area is used to dispose and decontaminate explosives and explosive contaminated materials and to dispose of reactive wastes

by thermal treatment. The reactive wastes include bulk propellants, propellant-contaminated solvents, and non-hazardous propellant contaminated waste such as rags and wood containing 4% or less propellant. Prior to January 1986, solvents and solvent-contaminated materials were routinely incinerated directly on the ground at two open burn pads of the Open Burn Area located in the northwest. Liquids have not been burned regularly on unprotected ground since 1986.

2.4.2 Propellant-contaminated wastes are currently thermally treated in two elevated open burn pans and one temporary open burn pan located on the northeast corner. Three additional pans are currently being constructed.

2.4.3 Two "contaminated waste burn trenches" located in the southeast were used to incinerate materials contaminated with propellants. The Contaminated Waste Burn Trenches were originally designed for incineration of packaging and pallets used to ship munitions. In 1984, it was discovered that the trenches have also been used to dump and burn waste solvents from an RSA explosive production area (AEHA, 1986), and such activities were ceased. In 1991, the use of these trenches to incinerate packaging and pallets were ceased.

2.4.4 In response to the 1986 NOV, RSA investigated the potential for ground-water contamination resulting from disposal operations and evaluated remedial alternatives. The USACE, acting on behalf of RSA, contracted PELA to perform an RFI type study. Monitoring wells, including nine overburden wells (RS096, RS097, RS098, RS099, RS100, RS107, RS108, RS109, and RS110) and five bedrock wells (RS102, RS103, RS104, RS105, and RS106), were installed by PELA. Ground-water samples from these and nine existing monitoring wells as well as soil/waste samples and surface water samples were collected by PELA. The report entitled "Remedial Investigation Engineering Report, Redstone Arsenal, Alabama, Unit 1, DDT and Sanitary Landfills and Unit 2, Open Burn/Open Demolition Area" was submitted by PELA to the USACE in September of 1988 (PELA, 1988a). The report includes soil/waste quality data, water-level and water-quality data, geologic logs and cross-sections, and monitoring well construction details. PELA (1988a) concluded that organic contaminants had been detected and were highest in the monitoring wells downgradient from the Contaminated Waste Burn Trenches.

2.4.5 In previous investigation (AEHA, 1986 and PELA, 1988a), results of analyses of soil samples collected near the contaminated waste burn trenches showed VOCs, BNAs, and metals to be detected in the soils. Contaminants detected in the ground-water samples from wells in the vicinity of the contaminated waste burn trenches included VOCs, BNAs, and metals. Explosives were detected in one ground-water sample from a monitoring well located in the area of the contaminated waste burn trenches (PELA, 1988a).

VOCs, trace concentrations of BNAs, and explosives have been detected in soil samples from the open burn area (AEHA, 1986 and PELA, 1988a). VOCs were detected in ground-water samples from monitor wells located west of the pads. VOCs were detected in groundwater samples from monitor wells in the immediate vicinity of the open burn pans (PELA, 1988a). Soil samples near the pans did not have detectable contaminants. Soil and ground-water sampling were not conducted within the open detonation area. However, explosives were detected in soil samples collected by the AEHA (1986) at the open burn area located northwest of the open detonation area. Soil sampling conducted by the AEHA (1986) indicated that the area around the popping furnace and rocket washout pad to be possible contamination source areas. Analysis of surface-water samples for VOCs and BNAs showed that none of these constituents were detectable in the surface waters (PELA, 1988a).

2.4.6 Redstone Arsenal is in continuing investigation of the open burn/open detonation area. The USACE, action on behalf of RSA contracted Geraghty and Miller, Inc. to perform a RCRA Facility Investigation study of this site. This on-going investigation (refer to reference 1.5) is being conducted to delineate the contamination plume.

2.4.7 Redstone Arsenal has tasked the USACE to conduct an interim remedial action (IRA) at the OB/OD area. The proposed project involves the design and construction of IRA to mitigate groundwater contamination. The U.S. Army Corps of Engineers, Huntsville Division, has been tasked to develop a statement of work for the design of the IRA. The statement of work will be forwarded in June 1992 to the U.S. Army Corps of Engineers, Savannah District, for design contract execution. Award of the design contract of the IRA is expected in August 1992. Design completion of the IRA is expected in January 1993, followed by construction contract award in April 1993. The schedule is subject to the availability of funds and timely review and approval from state and federal regulators.

2.4.8 Redstone Arsenal has tasked the USACE to prepare a corrective measure study (CMS). The CMS is to develop and evaluate corrective action alternatives and to recommend the selected corrective measure to be taken at this site. CMS is expected to be completed in May 1993.

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT



Zeigh Pegues, Director

Guy Hunt
Governor

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

March 27, 1992

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Field Offices:

110 Vulcan Road
Birmingham, AL
35209
(205) 942-6168
FAX 941-1603

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

4 Perimeter Road
Mobile, AL
36615
(205) 479-2336
FAX 479-2593

David S. Branham, Director
Directorate of Engineering & Housing
REDSTONE ARSENAL
AMSM-EQ
Redstone Arsenal, AL 35898

Dear Mr. Branham:

Pursuant to Code of Alabama 1975, §22-22-9(f), Redstone Arsenal is hereby notified that on February 6, 1992 near Building 5451 at the closed arsenic impoundments (Unit No RSA-56) it violated Code of Alabama 1975, §22-22-9(i)(3) by discharging wastewater without a permit. The resulting discharge caused a minor fish kill. Investigation of soils and water quality indicate high concentrations of arsenic which have impacted or have a potential threat to water quality. Fish tissue analysis taken after the event indicate an abnormally high concentration of heavy metals in those fish sampled.

In addition, pursuant to Code of Alabama 1975, §22-22-1 et. seq., Redstone Arsenal is hereby notified that it is in violation of State law by failing to remediate surface and groundwater contamination at the DDT Landfill, the sanitary landfill and the burning ground area which have been directed in previous violation notices.

Not later than May 15, 1992, Redstone Arsenal is requested to submit to the Department a preliminary assessment and a schedule of implementation for removal of contaminated material at these sites. In addition, this submittal should also include a site evaluation for the extent of groundwater contamination and corrective action. Such submittals shall be mailed or delivered to Mr. Jim Moore at the Department and should arrive at the Department's Montgomery Office by the required submittal date. Failure to submit the document(s) required by this notice is a violation of the Code of Alabama 1975, §22-22-1 et seq. (1988 Cum. Supp.), as amended, for which civil penalties or criminal fines may be imposed.

Should you have questions concerning this matter, please contact Mr. Moore at (205) 271-7848.

Sincerely,

Charles R. Horn
Chief
Water Division

cc: EPA
Dan Cooper
Sonja Massey
Steven Jenkins

APPENDIX A
ADMINISTRATIVE RECORD

ENCLOSURE	DATE	CORRESPONDENCE	PAGE
1	23-Jun-65	Safety Office Memorandum	A-1
2	2-Mar-92	Fish Kill Report from Dept. of Conservation and Natural Resources	A-2
3	4-Mar-92	Memorandum for Repair of Waterline Near Old Arsenic Pond (5400 Area)	A-14
4	8-Mar-94	Letter to ADEM (Mr. Charles Horn) from MICOM Environmental Office	A-15
5	27-Mar-92	Notice of Violation from ADEM for Discharging Wastewater without a Permit	A-16
6	15-Apr-92	Letter to ADEM (Mr. Charles Horn) from MICOM Environmental Office	A-18
7	13-May-92	Letter to ADEM (Mr. Charles Horn) from MICOM Environmental Office	A-21
8	27-Jan-93	Memorandum for Record, Presentation for Interim Remedial Action for RSA-56 & RSA-139	A-23
9	5-Feb-93	Letter to ADEM (Mr. Jim Moore) from MICOM Environmental Office	A-38
10	10-Mar-93	Concurrence Letter from ADEM Approving 35% Design of Interim Remedial Action	A-39
11	31-Mar-93	Memorandum, Coordination Meeting for 95% Design of Interim Remedial Action	A-40
12	20-Apr-93	Memorandum for Record, In-process Review Meeting for Interim Remedial Action	A-41
13	14-May-93	Memorandum, Record of Environmental Consideration	A-46
14	19-May-93	Memorandum, Review of 95% Design of Interim Remedial Action for Area U	A-47
15	18-Jun-93	Concurrence Letter from ADEM Approving 95% Design of Interim Remedial Action	A-48
16	15-Jul-93	Memorandum, Authorization to Advertise for Construction Bid for Cap Design at RSA-56 and RSA-139.	A-49
17	15-Oct-93	Memorandum, Draft-Final Site Characterization Report Work Plan for RSA-46, 47, 51, 56, 122, and 139.	A-50
18	12-Apr-95	Memorandum, COE Pre-final Inspection for Clay Cap at RSA-56 and 139	A-52
19	17-Apr-95	Memorandum, COE Final Inspection for Clay Cap at RSA-56 and 139	A-54

56/139

SMIDW-EE

Contamination of Old Plants Area 2

C, Safety Ofc, AMSC
ATTN: Mr. Cook

Post Engineer, AMSC

JUN 23 1965

Mr. Gieseke/eh/876-3122

1. Sketch Nr 140164 attached depicts the area formerly known as Plants Area 2. Shown in red are the locations of the old sludge pits. Also shown in blue is the site approved by the Master Planning Board for the Calibration Laboratory as of 20 January 1964.
2. This complex was originally designed and constructed for a World War II chemical munitions manufacturing and loading plant. The residue of this enterprise was diverted into several large pits in the area. These pits are contaminated with arsenic residuum, and are surrounded with a chain link fence to keep unauthorized personnel from wandering into the pit areas.
3. A project is being developed to demolish the remaining old buildings in the vicinity of the Calibration Lab. (Building 5435)
4. The rubble of these buildings will be disposed of in the pits, then topped with soil and converted into either parking areas or landscaped to remove the present existing eyesore. The areas will be appropriately marked for subsurface hazard as all areas outside of the pits have been cleared.

Signed
William R. Henry
Post Engineer

WILLIAM R. HENRY
Post Engineer

1 Incl
Dwg 140164

→ THIS IS IN REFERENCE TO AREA U - NOW
CALLED RSA 56, RSA 139, RSA 122

M. Schoder AM SMI-ER
2/11/94



AREA 4

STATE OF ALABAMA

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

64 NORTH UNION STREET
MONTGOMERY, ALABAMA 36130

GUY HUNT
GOVERNOR

JAMES D. MARTIN
COMMISSIONER

William C. Goolsby
ASSISTANT COMMISSIONER

DIVISION OF GAME AND FISH
CHARLES D. KELLEY
DIRECTOR

SAM L. SPENCER
ASSISTANT DIRECTOR

March 2, 1992

District I Fisheries Biologist
P. O. Box 366
Decatur, AL 35602

Commander
U.S. Army Missile Command
AMSMI - RA - EH - EQ
Attn: Dan Dunn, Building 7613
Redstone Arsenal, AL 35898-5120

Dear Mr. Dunn,

As requested, I am enclosing the report concerning the February 11th, 1992 fish kill in the tributary to Huntsville Spring Branch. This report summarizes the types, sizes, weights and replacement value of the fish killed. Conditions as observed during the investigation are also included. Please call me at (205) 353-2634, if you have any questions.

Sincerely,

ALABAMA GAME AND FISH DIVISION

Doug Darr
District I Fisheries Biologist
Fisheries Section

cc: Fred Harders, Fisheries Section Chief

enclosure

ENCL. 2

A-7



STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

64 NORTH UNION STREET
MONTGOMERY, ALABAMA 36130

GUY HUNT
GOVERNOR

JAMES D. MARTIN
COMMISSIONER

William C. Goolsby
ASSISTANT COMMISSIONER
MEMORANDUM

February 19, 1992

DIVISION OF GAME AND FISH
CHARLES D. KELLEY
DIRECTOR

SAM L. SPENCER
ASSISTANT DIRECTOR

TO: Fred R. Harders, Chief
Fisheries Section

FROM: Jerry R. Hooper
District I Fisheries Supervisor

Doug Darr for

SUBJECT: Fish Kill Report for an Unnamed Tributary to Huntsville
Spring Branch on the Redstone Arsenal (Madison County)

A report is enclosed which details our investigation of a fish kill in an unnamed tributary to Huntsville Spring Branch, Madison County. The fish kill began on or before February 6th and was investigated by Alabama Game and Fish Division personnel on Wednesday, February 12, 1992. Doug Darr, Phil Ekema, and I investigated this fish kill. Danny Dunn, Environmental Management Office of Redstone Arsenal, assisted our investigation.

Dead fish were found in a 0.5 mile section of the creek. The value of the twenty-six fish killed (an estimated 1.1 pounds) was \$18.16. In addition, six dead or dying fish were collected by Redstone Arsenal personnel on February 12th for tissue analysis.

Enclosure

INVESTIGATION OF A FISH KILL IN AN UNNAMED
TRIBUTARY TO HUNTSVILLE SPRING BRANCH

Madison County, Alabama

on

FEBRUARY 12, 1992

by

Douglas P. Darr
District I Fisheries Biologist

and

Phillip D. Ekema
District I Biologist Aide

and

Gerald R. Hooper
District I Fisheries Supervisor

ALABAMA GAME AND FISH DIVISION

Introduction

A fish kill occurred in a 0.5 mile section of an unnamed tributary to Huntsville Spring Branch on or before February 7, 1992. A cause of the fish kill was not determined, but sampling by Redstone Arsenal personnel indicated that the tributary was receiving arsenic from closed surface impoundments.

Report of Kill

Danny Dunn (955-6967) and Bruce Whisenant (955-6969) of the Environmental Management Office of Redstone Arsenal reported the fish kill to the Decatur Office of the Alabama Game and Fish Division at 1:10 p.m. on February 12th, 1992.

Conditions Observed

The unnamed creek where the fish kill occurred is a tributary to Huntsville Spring Branch which is a tributary to Indian Creek. Indian Creek enters the Tennessee River at T.R.M. 321. The stream flows through the Tennessee River flood plain. The bottom material is hard with very little fine organic matter or silt. Beaver activity and woody debris causes numerous small pools. The stream depth varies from a few inches to three feet. At the time of the investigation, the water was clear with a visibility of at least three feet.

The unnamed creek flows adjacent to disposal ponds which have been capped (Unit Number RSA-56). These closed surface impoundments have received "arsenic-contaminated wastes and wastewater from lewisite manufacturing facilities. Lewisite is a chemical warfare agent containing arsenic" (from attached printed material provided by Redstone Arsenal personnel). The closed site covers approximately two acres. "The disposal ponds were filled and capped in 1972, with parts of the ponds being filled with asphalt rubble." The area is currently "vegetated with grass, briars, and pine trees."

Investigation

The investigation reported here was conducted by Gerald R. Hooper, Phillip D. Ekema, and Douglas P. Darr of the Alabama Game and Fish Division. Danny Dunn, Environmental Management Office of Redstone Arsenal, assisted with the investigation. Water quality was measured by the Environmental Management Office of Redstone Arsenal on February 6th and February 12th. Their measurements on

February 12th were: dissolved oxygen averaging 11.3 ppm and pH ranging from 7.2 to 7.3.

Because Redstone Arsenal personnel measured dissolved oxygen and pH, only water hardness was measured by the Alabama Game and Fish Division personnel. Water hardness on February 12th was 87 ppm at a point in the stream adjacent to the Water Treatment Plant Number 3. This point was in the middle of the fish kill area.

Samples were collected by Redstone Arsenal personnel on February 6 and 12, 1992 for arsenic determination. The set of samples on February 6th included water values of: 18.1 ppb of arsenic 100 yards upstream of Building 5451 (Photography Laboratory) at the corner of the fence, 17.6 ppb at Building 5451, and 18.2 ppb at the Water Treatment Plant Number 3. A sample of a crystal (soil) exposed at the pond site adjacent to the tributary (across the stream from Building 5451) contained 486.5 ppb of arsenic.

On February 12th, Redstone Arsenal personnel again measured for arsenic. Arsenic levels in the water samples were: <10 ppb near Building 5437, 21.0 ppb at the ponds, 18.4 ppb at Viper Road, and 17.6 ppb at the Water Treatment Plant Number 3. The soil was again tested near Building 5451 and contained 9,800 ppb of arsenic.

Fish were collected on February 12, 1992 for tissue analysis by Redstone Arsenal personnel and the results were:

<u>METAL</u>	<u>CONTROL</u>	<u>"SHAD"</u>	<u>REDHORSE SUCKER</u>
Arsenic	<10 ppm	<10 ppm	<10 ppm
Cadmium	0.5 ppm	0.8 ppm	0.725 ppm
Chromium	1.55 ppm	1.73 ppm	1.85 ppm
Copper	2.6 ppm	6.9 ppm	11.6 ppm
Lead	0.5 ppm	3.0 ppm	2.0 ppm

The tissue analysis results from the fish kill area were higher than those of the control (except for arsenic which was not detected in any of the fish samples). When compared with results from whole fish from South Carolina (USEPA STORET data from SCDHEC), results from the fish kill samples were above the ninety-ninth percentile for cadmium, below the ninetieth percentile for chromium, above the ninety-ninth percentile for copper, and between the ninetieth and ninety-fifth percentile for lead. This would indicate possible metal contamination in the stream.

Dead fish were found in the stream from Viper Road to about fifty yards upstream of Mills Road. The condition of the fish varied from live to being dead about a day. Some fish had an external fungus infection. Live fish were seen in the lower portion of the area investigated, although some of the live fish were lethargic. The investigation continued downstream until no dead or moribund fish were observed.

Moribund fish which were observed were included in the total count. The entire kill area was surveyed so the count did not need to be expanded. Some fish may have been consumed by scavengers or have lodged under log jams; therefore, the numbers presented here are conservative. In addition, six fish were collected February 11th by Redstone Arsenal personnel for tissue analysis.

Fish Killed

The attached table presents species, numbers, sizes, and values of the dead and dying fish observed by Alabama Game and Fish Division personnel. Common names are from A List of Common and Scientific Names of Fishes from the United States and Canada, the fourth edition of the American Fisheries Society (AFS) Special

Publication Number 12 (1980). Weights were calculated based upon length by using Length-Weight Relationships of Alabama Fishes by Wayne E. Swingle (1965). Monetary values were derived from Monetary Values of Freshwater Fishes and Fish-Kill Counting Guidelines, AFS Special Publication Number 13 (1982) and reflect a 37.1% cost-of-living increase since its publication. Weights of the non-game fish found were not listed in these references, and therefore the weight of the non-game fish were not included in this report.

A total of twenty-three game fish with an extrapolated weight of 1.1 pounds were observed. These fish were calculated to be worth \$17.91. Also found were three non-game fish; these fish were calculated to be worth \$0.25. This yields twenty-six fish killed which were calculated to be worth \$18.16.

Conclusions

1. A fish kill occurred in a tributary to Huntsville Spring Branch, Madison County, Alabama, on or before February 6th, 1992.
2. Twenty-six fish weighing 1.1 pounds were killed. Most of the fish were game fish (23). The estimated value of the fish killed was \$18.16. In addition, Redstone Arsenal personnel collected six dead or moribund fish for tissue analysis.
3. The cause of the fish kill was not determined; however, the stream appears to be receiving arsenic and other metals in levels above normal. A possible source of this contamination is the closed surface impoundments.

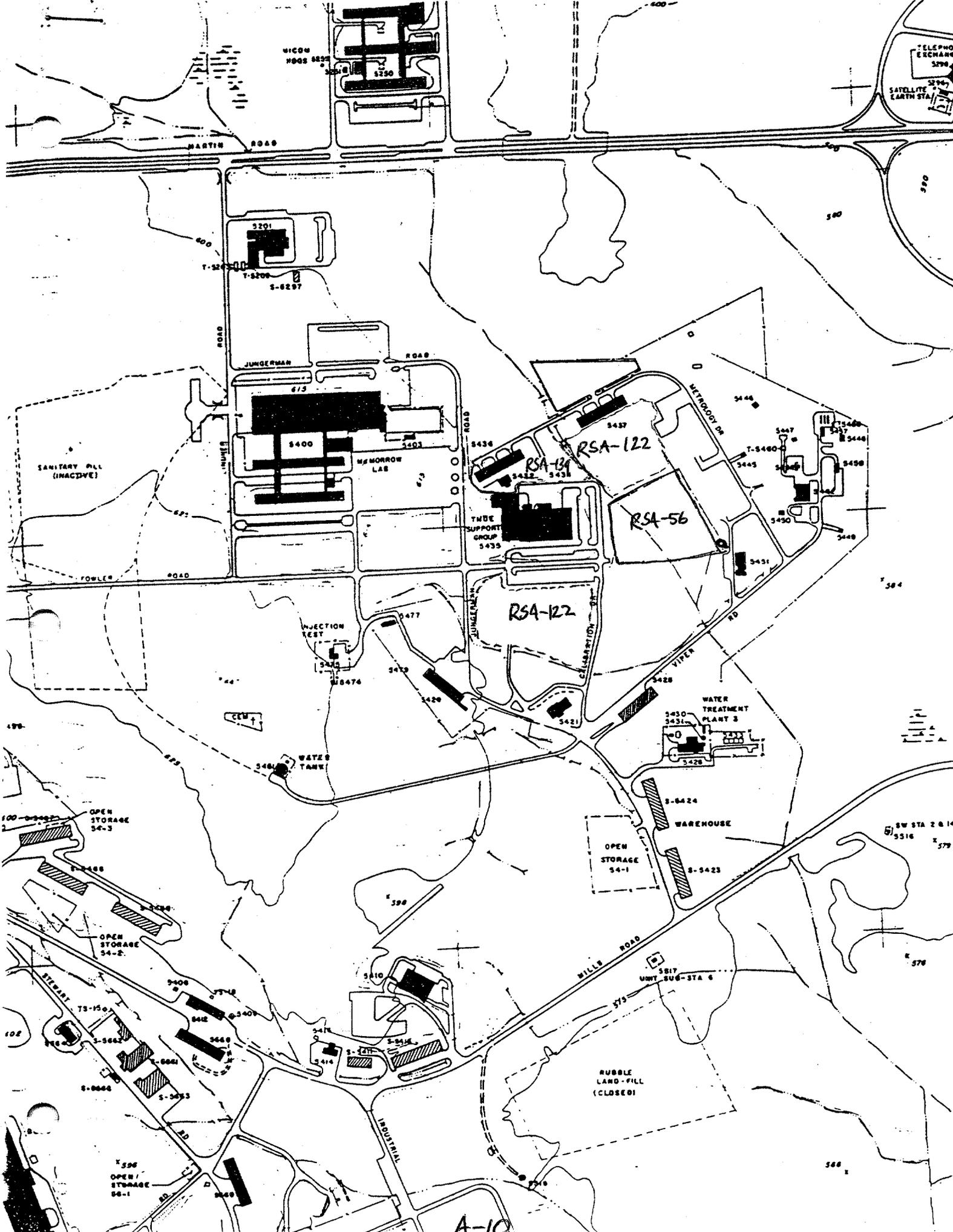
SPECIES, TOTAL LENGTHS, AND VALUES OF FISH KILLED
 Unnamed Tributary to Huntsville Spring Branch, Madison County

February 12, 1992

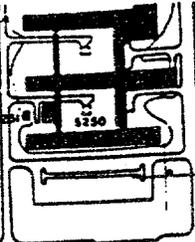
SPECIES	LENGTH IN INCHES					Total	Total Weight (lb.)	Monetary Value
	3	4	5	6	7			
Green Sunfish	11	8	2			21	0.7	\$15.45
Warmouth					1	1	0.3	1.51
Bluegill			1			1	0.1	0.95
Minnow spp.	1	1		1		3	*	0.25
GRAND TOTALS						26	1.1	\$18.16

*Not found in length-weight relationship book.

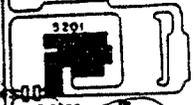
A-109



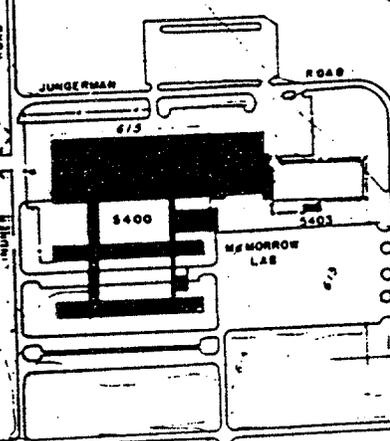
WICOM
HOQS 882



MARTIN ROAD



T-5200
T-5208
S-8297



SANITARY HALL
(INACTIVE)



RSA-122

RSA-56



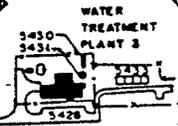
RSA-122



INJECTION TEST



WATER TANK



WATER TREATMENT PLANT 2

WAREHOUSE

OPEN STORAGE 54-3

OPEN STORAGE 54-2

OPEN STORAGE 54-1

OPEN STORAGE 54-1

RUBBLE LAND-FILL (CLOSED)

A-10

Unit Number: RSA-56 (continued)

Particulars: This unit received wastewater containing arsenic from lewisite manufacturing operations.

Source of Waste: Troop training or manufacturing operations at the facility.

Disposition of Waste: The wastes were allowed to stay in place during the closure.

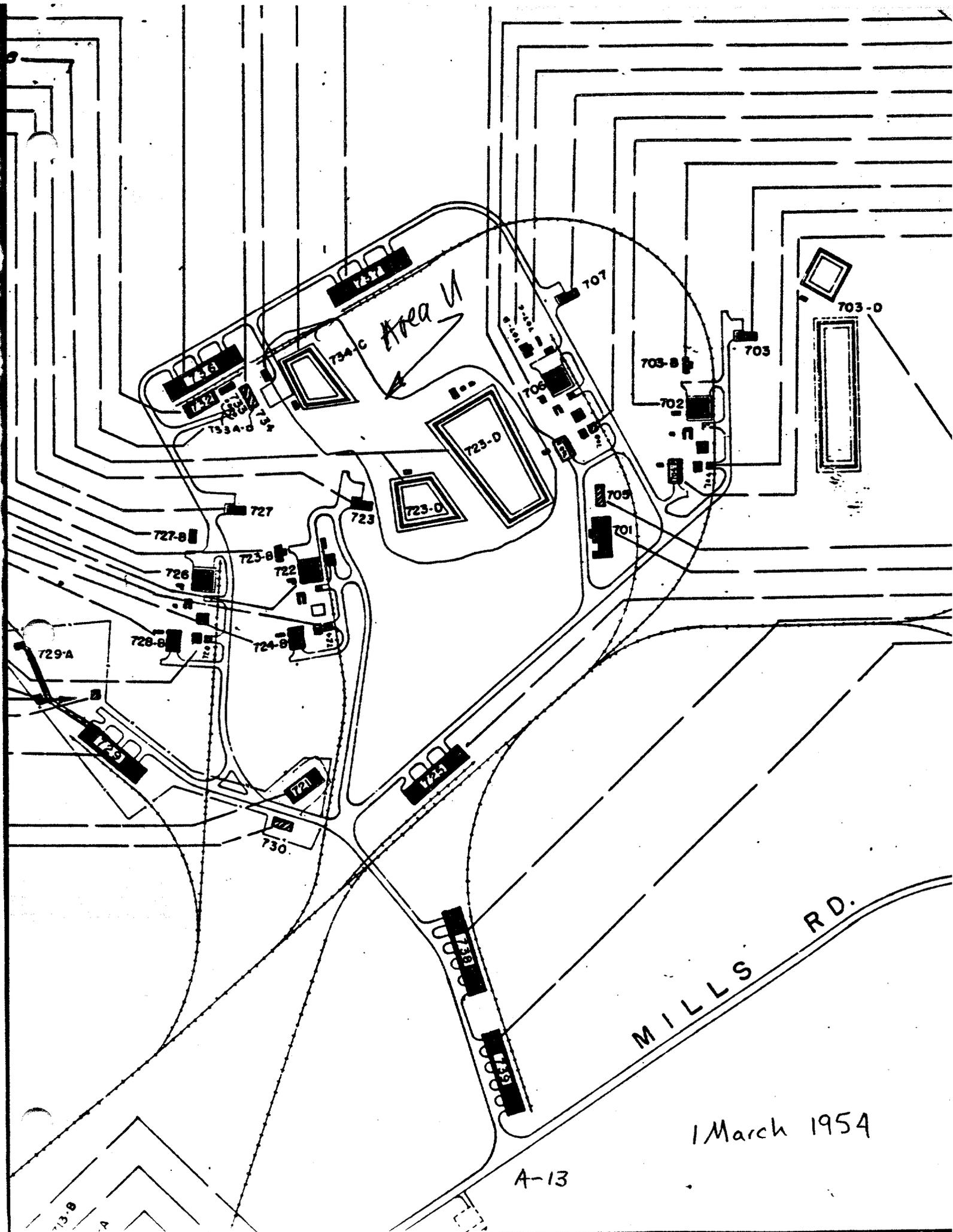
Release Controls:

Liner:	Curb:	Level Controls:	Diking:
Sumps:	Ind. Sewer:	Overflow Controls:	Leak Det.:

Details: These ponds were unlined. Ground-water wells have been installed at this unit.

Release History: During previous investigations (PELA, 1988b and PELA, 1989), high concentrations of arsenic were detected in the sediment samples collected from the bottom of the closed impoundments. Arsenic was detected in low concentrations (below the primary drinking water standard MCL) in two of the four wells sampled. In 1988, ground-water samples were collected from monitor wells in the vicinity of Area U; trichloroethene and methylene chloride were detected in the samples.

Release Pathways: Soil, ground water, and surface water.



Area II

MILLS RD.

1 March 1954

A-13

MAR 04 1992

AMSMI-RA-EH-EQ (200)

Mr. Schroder/ecm/6-8607

MEMORANDUM FOR AMSMI-RA-EH-RM-SA

SUBJECT: Repair of Waterline Near Old Arsenic Pond (5400 Area)

1. References:

- a. Letter, BAMSI, Inc., 24 Feb 92, SAB.
- b. Memorandum, AMSMI-EQ, 9 May 89, subject: Environmental Review of Earthwork and Ground Disturbance Projects at Redstone Arsenal (Encl 1).
- c. DEH SOP 200-01-3, Project Work in Environmentally Sensitive Areas (Encl 2).

2. The MICOM Environmental Office agrees that the waterline in the area of the subject pond should be abandoned in place as soon as possible. We also concur in abandoning the sewerline in place as soon as practical.

3. Reference 1b has been issued several times, the latest in May 89. Signs have been placed around the subject arsenic ponds designating them as contaminated areas. In the case described in reference 1a, these signs were ignored, the fence was taken down and repairs were made without any notification to the MICOM Environmental Office. As a matter of record, ground disturbance anywhere in the vicinity of building 5435-5451 and associated facilities should be avoided unless it is cleared in accordance with reference 1c. Known toxic disposal sites are shown on enclosures 3 & 4. Routing of a new waterline and/or sewer line must consider the above recommendations and will require cooperation and coordination with all parties involved.

4. The point of contact on this matter is Mr. Bruce Whisenant or Mr. Bill Schroder, AMSMI-EQ, 876-6122.

Encls

151 MSW
RONALD A. HAGLER
Chief, Environmental
Management Office

CF:

AMSMI-RA (w/encl)
AMSMI-RA-EH (w/encl)
AMSMI-RA-EH-EN (w/encl)
AMSMI-RA-EH-JC (w/encl)
AMSMI-RA-EH-RD (w/encl)
AMSMI-RA-EH-RM (w/encl)

AMSMI-RA-EH-EQ RECORD COPY

Rec'd #2 34



DEPARTMENT OF THE ARMY
UNITED STATES ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA 35898

MAR 08 1994

MICOM Environmental Office

Mr. Charles R. Horn
Water Division
Alabama Department of Environmental
Management
1751 Congressman W.L. Dickinson Drive
Montgomery, Alabama 36130

Dear Mr. Horn:

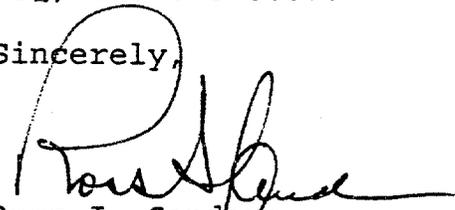
Reference our letter to you of May 13, 1992, regarding the Notice of Violation issued March 27, 1992 for discharging waste water without a permit at a closed Arsenic Pond on Redstone Arsenal, Alabama.

The Contractor (V & W Construction, Moss Point, Mississippi) started work on the referenced project on February 18, 1994. The contract time for completion is 365 days, however, we expect the work to be completed sooner if weather permits.

The Stormwater being discharged at RSA-56 is being monitored in accordance with the NPDES permit AL0000019, effective May 1, 1993.

Questions or comments about this action may be addressed to Mr. Bill Schroder, AMSMI-RA-EQ, 205-876-8607.

Sincerely,


Ross I. Sanders
Colonel, U. S. Army
Commander, Redstone Arsenal
Support Activity

Copies Furnished:
CESAM-PM-SP
CEHND-PM-EP

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT



Guy Hunt
Governor

Pegues, Director

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

March 27, 1992

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Field Offices:

110 Vulcan Road
Birmingham, AL
35209
(205) 942-6168
FAX 941-1603

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

2204 Perimeter Road
Mobile, AL
36615
(904) 479-2336
FAX 479-2593

David S. Branham, Director
Directorate of Engineering & Housing
REDSTONE ARSENAL
AMSMI-EQ
Redstone Arsenal, AL 35898

Dear Mr. Branham:

Pursuant to Code of Alabama 1975, §22-22-9(f), Redstone Arsenal is hereby notified that on February 6, 1992 near Building 5451 at the closed arsenic impoundments (Unit No RSA-56) it violated Code of Alabama 1975, §22-22-9(i)(3) by discharging wastewater without a permit. The resulting discharge caused a minor fish kill. Investigation of soils and water quality indicate high concentrations of arsenic which have impacted or have a potential threat to water quality. Fish tissue analysis taken after the event indicate an abnormally high concentration of heavy metals in those fish sampled.

In addition, pursuant to Code of Alabama 1975, §22-22-1 et. seq., Redstone Arsenal is hereby notified that it is in violation of State law by failing to remediate surface and groundwater contamination at the DDT Landfill, the sanitary landfill and the burning ground area which have been directed in previous violation notices.

Not later than May 15, 1992, Redstone Arsenal is requested to submit to the Department a preliminary assessment and a schedule of implementation for removal of contaminated material at these sites. In addition, this submittal should also include a site evaluation for the extent of groundwater contamination and corrective action. Such submittals shall be mailed or delivered to Mr. Jim Moore at the Department and should arrive at the Department's Montgomery Office by the required submittal date. Failure to submit the document(s) required by this notice is a violation of the Code of Alabama 1975, §22-22-1 et seq. (1988 Cum. Supp.), as amended, for which civil penalties or criminal fines may be imposed.

Should you have questions concerning this matter, please contact Mr. Moore at (205) 271-7848.

Sincerely,

Charles R. Horn
Chief
Water Division

cc: EPA
Dan Cooper
Sonja Massey
Steven Jenkins

SUBJECT: Notice of Violation (NOV) Issued on
27 Mar 92, to Redstone Arsenal from Alabama
Department of Environmental Management (ADEM)

3. In response to item 1b, information from ongoing investigation work and corrective measures planned for the sites will be described. These measures will include pumping groundwater from the site and treating by filtering the water.

4. The POC on this matter is Ronald A. Hagler, 876-6122.

JOSEPH M. MABRY
Colonel, QM
Commander, RASA

2

Memorandum from

DEPUTY POST COMMANDER

TO: AMSMI-CS
AMSMI-DCG
AMSMI-CG

SUBJECT: Notice of Violation (NOV) Issued on
27 Mar 92, to Redstone Arsenal from Alabama
Department of Environmental Management (ADEM)

1. The Notice of Violation (NOV) consists of two parts:

a. Arsenic ponds (Unit RSA-56) which has surface water contamination.

b. Previous 1986 NOV (i.e. failure to remediate groundwater contamination) at these sites; DDT Landfill, Sanitary Landfill, and Open Burning Ground.

2. The NOV must be responded to by RSA by 15 May 92. Response to item 1a above includes the description of interim corrective measures and further investigation of the site. These measures include the diversion of a drainage ditch, relocation of utilities, removal of vegetation and the capping of the site. The site has also been scheduled for additional investigation which will determine the rate and extent of contamination.



DEPARTMENT OF THE ARMY

UNITED STATES ARMY MISSILE COMMAND

REDSTONE ARSENAL, ALABAMA 35896-5000

15 APR 1992

REPLY TO
ATTENTION OF

MICOM Environmental Office

Mr. Charles R. Horn
Chief, Water Division
1751 Congressman W.L. Dickinson Drive
Montgomery, Alabama 36130

Dear Mr. Horn:

Reference letter, Alabama Department of Environmental Management (ADEM), March 27, 1992, RE: Notice of Violation (NOV).

The U.S. Army Missile Command has tasked the U.S. Army Corps of Engineers (USACE) for the RCRA Facility Investigation (RFI) at the arsenic impoundment and also with the design and execution of an interim remedial action (IRA). The IRA project will include the diversion of a drainage ditch, relocation of utilities, removal of vegetation, and capping of the site. The RFI will determine rate and extent of contamination.

MICOM, since the 1986 NOV, has investigated the DDT landfill, the sanitary landfill and the open burning ground as a part of a RCRA Facility Investigation. The sanitary landfill and open burning ground is currently under investigation by the USACE.

Scheduled for the sanitary landfill and the open burning ground are interim remedial actions (IRA) which will begin the mitigation process for correction of groundwater contamination.

MICOM has planned a Corrective Measures Study (CMS) that will be utilized in the development and evaluation of corrective action alternatives and recommendations of the selected corrective measure to be taken at the sanitary landfill and open burning ground for an overall final clean-up of the site.

Detailed information regarding the schedules and implementation of the above work is enclosed. Concurrence and coordination by higher headquarters, U.S. Army Materiel Command (AMC) will be required for these actions.

Questions or comments about this matter may be directed to Bruce Whisenant, Environmental Management Office, 205-955-6969.

Sincerely,

Joseph M. Mabry
Colonel, U.S. Army
Commander, Redstone Arsenal
Support Activity

Enclosure



DEPARTMENT OF THE ARMY

UNITED STATES ARMY MISSILE COMMAND

REDSTONE ARSENAL, ALABAMA 35896-5000

May 13, 1992

REPLY TO
ATTENTION OF

MICOM Environmental Office

Mr. Charles R. Horn
Water Division
Alabama Department of Environmental
Management
1751 Congressman W.L. Dickinson Drive
Montgomery, Alabama 36130

Dear Mr. Horn:

Reference the enclosed letter from the Alabama Department of Environmental Management on March 27, 1992, regarding Notice of Violation.

The U.S. Army Missile Command has tasked the U.S. Army Corps of Engineers for the Resource Conservation and Recovery Act Facility Investigation at the arsenic impoundment and also with the design and execution of an interim remedial action. The interim remedial project will include the diversion of a drainage ditch, relocation of utilities, removal of vegetation, and capping of the site. The Resource Conservation and Recovery Act Facility Investigation will determine rate and extent of contamination.

Since the 1986 Notice of Violation, the U.S. Army Missile Command Environmental Office has investigated the DDT landfill, the sanitary landfill and the open burning ground as a part of a Resource Conservation and Recovery Act Facility Investigation. The sanitary landfill and open burning ground is currently under investigation by the U.S. Army Corps of Engineers. All environmental reports generated have been submitted to your agency for review.

Scheduled for the closed portion of the sanitary landfill and the open burning ground are interim remedial actions which will begin the mitigation process for correction of groundwater contamination.

The U.S. Army Missile Command has planned a Corrective Measures Study that will be utilized in the development and evaluation of corrective action alternatives and recommendations of the selected corrective measure to be taken at the sanitary landfill and open burning ground for an overall final clean-up of the site.

AN EQUAL OPPORTUNITY EMPLOYER

A-21

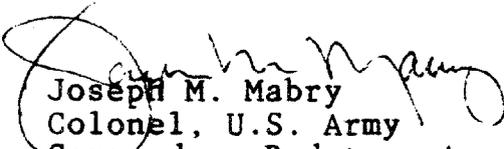
ENCL. 7

Detailed information regarding the schedules and implementation of the above work is enclosed. Concurrence and coordination by higher headquarters, U.S. Army Materiel Command will be required for these actions.

Schedules presented are subject to the availability of funds and timely review and approval from state and federal regulators.

Questions or comments about this matter may be directed to Bruce Whisenant, Environmental Management Office, 205-955-6969.

Sincerely,


Joseph M. Mabry
Colonel, U.S. Army
Commander, Redstone Arsenal
Support Activity

Enclosures

27 January 1993

MEMORANDUM FOR RECORD

SUBJECT: Interim Remedial Design, RSA 56 and 139, Presentation Meeting

1. Subject meeting was held at the U.S. Army Missile Command, Environmental Office, AMSMI-EQ, Building 7613, Redstone Arsenal at 0830, 15 January 1993. Enclosure 1 is the list of attendees.
2. Mr. Bill Schroder opened the meeting and passed out a copy of the Notice of Violation (NOV) issue by the Alabama Department of Environmental Management dated 27 March 1992 (encl 2), which initiated the requirement for the IRD. Mr. Schroder briefed the attendees on the Army Installation Restoration Program at Redstone and then turned the meeting over to Ms. Dorothy Richards.
3. Ms. Richards explained that RSA 56 and 139 were formerly arsenic ponds used in the production of lewisite and high arsenic levels have been detected. She stated that CEHND has been tasked by Redstone, MICOM to develop the Interim Remedial Design and the project has been funded under the Army IR portion of the DERA Work Plan, approved on 4 December 1992. The funding must be obligated during FY93. The objective of the design is an interim action, and no new sampling or analysis is to be done. A delivery order for a RCRA Facility Investigation was issued in December 1992 for these sites.
3. Mr. Wilson Walters explained that no digging can be done within the berm areas, due to the fact that the areas were used in the manufacture of lewisite. Memorandum dated 24 September 1990, subject: "Chemical Operations Involving Lewisite", and AMC Regulation 385-131, "Safety for Chemical Agents" governs Army policy.
4. Mr. Art Dohrman discussed the Scope of Work for Design Alternatives I and II, which are as follows:

Alternative I:

- o Place 2 ft soil cap over former lagoons
- o Eliminate point source
- o Reroute the following utilities:
 - sanitary force main
 - potable water lines
 - steam lines

CEHND-PM-EP

SUBJECT: Interim Remedial Design, RSA 56 and 139. Presentation Meeting.

- electric

- o Erosion control along existing stream
- o Relocate Bldg 5436/5437 access road
- o Monitoring of arsenic levels upstream and downstream
- o Fencing and signage to restrict access

Alternative II:

- o Includes all measures described for Alternative I
- o In addition, reroutes stream around site

5. BAMS I representatives said that CESAM was designing a contract to reroute the sanitary sewer, and CEHND should not reroute the sanitary sewer line around RSA 139. They said that the sanitary sewer line around RSA 56 should be rerouted by CEHND. Mr. Schroder said that coordination involving communication lines should be conducted with Jack Ruddy, 6-2414. Ms. Richards added that CESAM will conduct the constructability review.

6. Ms. Richards presented the design schedule, and estimated costs, which are as follows:

Presentation to RSA	15 Jan 93
35% design	2 Feb 93
Submit 35% to ADEM	9 Feb 93
35% design review meeting	11 May 93
95% design	3 May 93
Submit 95% to ADEM	10 May 93
95% design review meeting	8 Jun 93
100% design	16 Jun 93
Contract advertised	28 Jun 93
Contract awarded	12 Aug 93

Design Cost:

Alternative I:	\$100,000
Alternative II:	\$150,000
Construction Cost:	
Alternative I:	\$710,000
Alternative II:	\$980,000

Mr. Schroder said that he would contact ADEM to request one month review period with an on board review meeting.

7. Mr. Meyer said that he could develop the 1391 documentation for the project.

CEHND-PM-EP

SUBJECT: Interim Remedial Design, RSA 56 and 139. Presentation Meeting.

8. Mr. Schroder stated that those present concurred with the concept and requested that CEHND proceed to the 35% design for Alternative I, as scheduled.

9. Copy of briefing package is enclosure 3.

3 Encls

Dorothy Richards
DOROTHY RICHARDS
Project Manager

CF:
ED Read/File
PM Read
PM-EP Richards/East
ED-CS Dohrman/Brown
AMSMI-EQ Schroder/Northridge

LORD - RICHARDS	CEHND-PM-EP	5-308
ART DOHRMAN	CEHND-ED-CS	5-3278
William Stephensen	CEHND-PM-EP	955-129
Bruce Whisenant	CEHND-ED-ES	955-3958
William Kevin Meyer, P.E.	AMSMI-RA-EH-MP	876-395
BILL SCHRODER	AMSMI-RA-EQ	876-860
Wilson Walters	CEHND-ED-SI	955-5853
Ellis Gilliland	CEHND-ED-CS	955-3898
RON BROWN	CEHND-ED-CS	955-5242
Gary Gunter	CEHND-ED-CS	955-3211
DAVE ALDRIDGE	CEHND-ED-ME	955-5180
JOHN RILEY	AMSMI-RA-EH-EN	876-6101
CRAIG NORTHIDGE	AMSMI-RA-EH-EQ	955-6967
LARRY KUSTER	BAMSI	876-254
Jarad Jarvis	AMSMI-RA-EH-RM-SA	876-2281
Billy Hardin	BAMSI	876-543
Robert Spray	BAMSI	876-5068
Bill Tunstall	BAMSI	876-2831
ART MILLER	BAMSI-FE	955-6209

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT



Guy Hunt
Governor

Paigh Pegues, Director

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

March 27, 1992

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Field Offices:

110 Vulcan Road
Birmingham, AL
35209
(205) 942-6168
FAX 941-1603

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

2204 Perimeter Road
Mobile, AL
36615
(205) 479-2336
FAX 479-2593

David S. Branham, Director
Directorate of Engineering & Housing
REDSTONE ARSENAL
AMSM-EQ
Redstone Arsenal, AL 35898

Dear Mr. Branham:

Pursuant to Code of Alabama 1975, §22-22-9(f), Redstone Arsenal is hereby notified that on February 6, 1992 near Building 5451 at the closed arsenic impoundments (Unit No RSA-56) it violated Code of Alabama 1975, §22-22-9(i)(3) by discharging wastewater without a permit. The resulting discharge caused a minor fish kill. Investigation of soils and water quality indicate high concentrations of arsenic which have impacted or have a potential threat to water quality. Fish tissue analysis taken after the event indicate an abnormally high concentration of heavy metals in those fish sampled.

In addition, pursuant to Code of Alabama 1975, §22-22-1 et. seq., Redstone Arsenal is hereby notified that it is in violation of State law by failing to remediate surface and groundwater contamination at the DDT Landfill, the sanitary landfill and the burning ground area which have been directed in previous violation notices.

Not later than May 15, 1992, Redstone Arsenal is requested to submit to the Department a preliminary assessment and a schedule of implementation for removal of contaminated material at these sites. In addition, this submittal should also include a site evaluation for the extent of groundwater contamination and corrective action. Such submittals shall be mailed or delivered to Mr. Jim Moore at the Department and should arrive at the Department's Montgomery Office by the required submittal date. Failure to submit the document(s) required by this notice is a violation of the Code of Alabama 1975, §22-22-1 et seq. (1988 Cum. Supp.), as amended, for which civil penalties or criminal fines may be imposed.

Should you have questions concerning this matter, please contact Mr. Moore at (205) 271-7848.

Sincerely,

Charles R. Horn
Chief
Water Division

A-27

cc: EPA
Dan Cooper

REDSTONE ARSENAL

AREA 56/139

INTERIM REMEDIAL DESIGN

REDSTONE INTERIM RD BACKGROUND

- RSA-56

- Former Arsenic ponds - received arsenic contaminated wastes and wastewater from lewisite manufacturing facilities
- High arsenic levels detected in sediment samples 1988-89

- RSA-139

- Former Arsenic waste lagoon - received discharges from Bldgs 5436 & 5437, possible arsenic-contaminated wastes and wastewater from lewisite manufacturing facilities
- High arsenic levels detected in soil samples Sep 1990

REDSTONE INTERIM RD BACKGROUND

- Notice of violation issued by ADEM 1992 as a result of fish kill
- Arsenic detected in surface water samples
- CEHND tasked to perform Interim Remedial Design
- Funded under Army IR portion of DERA Work Plan approved 4 Dec 92
- Funds must be obligated in FY93

REDSTONE INTERIM RD

OBJECTIVE

- Interim action
- No new sampling/analysis
- RFI to be conducted

REDSTONE INTERIM RD ORDNANCE CONSIDERATIONS

- References:

- Memorandum dated 24 Sep 90, subject: Chemical Operations Involving Lewisite
- AMC Reg 385-131, "Safety for Chemical Agents"

REDSTONE INTERIM RD

Alternative I

- Place 2 ft soil cap over former lagoons
- Eliminate point sources
- Reroute utilities
 - sanitary force main
 - potable water line
 - steam lines
 - electric
- Erosion control along existing stream
- Relocate Bldg 5436/5437 access road
- Monitoring of arsenic levels upstream & downstream
- Fencing and signage to restrict access

REDSTONE INTERIM RD

Alternative II

- Includes all measures described for Alternative I
- In addition, reroutes stream around site

REDSTONE INTERIM RD

Design Schedule

- Presentation to RSA Jan 15, 1993
- 35% Design Feb 2, 1993
- Submit 35% to ADEM Feb 9, 1993
- 35% Design review meeting Mar 11, 1993
- 95% Design May 3, 1993
- Submit 95% to ADEM May 10, 1993
- 95% Design review meeting Jun 8, 1993
- 100% Design Jun 16, 1993
- Contract advertised Jun 28, 1993
- Contract awarded Aug 12, 1993

REDSTONE INTERIM RD

Cost

- Design cost
 - Alt I \$100,000
 - Alt II \$110,000
- Construction Cost
 - Alt I \$710,000
 - Alt II \$980,000

REDSTONE INTERIM RD

Outstanding questions

- Concurrence from RSA and ADEM on
 - Design approach
 - Schedule
- 1391 Documentation



DEPARTMENT OF THE ARMY
UNITED STATES ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA 35890-5000

FEB 05 1993

REPLY TO
ATTENTION OF

MICOM Environmental Office

Mr. Jim Moore
Alabama Department of Environmental Management
1751 Congressman W.L. Dickinson Drive
Montgomery, Alabama 36130

Dear Mr. Moore:

Reference letter, Alabama Department of Environmental Management, March 27, 1992, Regarding: Notice of Violation, EPA ID Number AL7210020742.

The U.S. Army Missile Command has tasked the U.S. Army Corps of Engineers with the Resource Conservation and Recovery Act Facility Investigation at the arsenic impoundment and also the design and execution of an interim remedial action.

The 35 percent interim design for this area will be submitted for your review by the Corps of Engineers under a separate cover sheet. In order to lend the greatest speed to the completion of this project, request that you review and return your comments within 10 working days.

The U.S. Environmental Protection Agency will be furnished a copy of this letter as well as the 35 percent interim remedial design.

Any questions should be addressed to Mr. Craig Northridge, 205-955-6967.

Sincerely,

Ross I. Sanders
Ross I. Sanders
Colonel, U.S. Army
Commander, Redstone Arsenal
Support Activity



Leigh Pegues, Director

Guy Hunt
Governor

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

March 10, 1993

Field Offices:

110 Vulcan Road
Birmingham, AL
35209
(205) 942-6168
FAX 941-1603

Ross I. Sanders
Colonel, OD
Commander, Redstone Arsenal
Support Activity
AMSMI-RA-EH-EQ
Redstone Arsenal
Redstone Arsenal, Alabama 35898-5000

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

RE: Redstone Arsenal 35% Interim Remedial Design for RSA-56 and
RSA-139

Dear Colonel Sanders:

2204 Perimeter Road
Mobile, AL
36688
(205) 450-3400
FAX 479-2593

We have reviewed the 35% Interim Remedial Design for RSA-56 and RSA-139 which entails placing a 2 ft. soil cap over the two former arsenic lagoons, and rerouting utilities. At this time, we concur with the said design.

If you have any questions, please call this office.

Sincerely,

Joseph E. Downey, Chief
Engineering Unit
Special Projects

/ta

cc: Dixie Beaty, Land Division
Jim Moore, Water Division
Dorothy Richards



DEPARTMENT OF THE ARMY
HUNTSVILLE DIVISION, CORPS OF ENGINEERS
P. O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF

CEHND-PM-EP (200-1b)

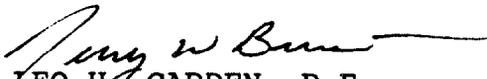
31 March 1993

MEMORANDUM FOR Commander, U.S. Army Missile Command, ATTN:
AMSMI-RA-EH (Dr. David Branham), Redstone
Arsenal, AL 35898-5400

SUBJECT: Coordination Meeting for 95% Design of Interim Remedial
Design, RSA 56 and 139, Redstone Arsenal

1. Subject meeting is scheduled for 14 April 1993, 1300-1600, in the Mission Status Room, U.S. Army Corps of Engineers, Huntsville Division, 106 Wynn Drive.
2. The purpose of the meeting is to allow Redstone Arsenal personnel opportunity to comment during the 95% design process and provide coordination with the design team on any issues needing resolution.
3. Recommend you notify Master Planning, Real Estate, Safety and Public Affairs to provide representation.
4. If you have any questions, please contact Ms. Dorothy Richards, Project Manager, at 955-3088.

FOR THE COMMANDER:


LEO H. CARDEN, P.E.
Director of Programs
and Project Management

CF:
Commander, U.S. Army Missile Command, ATTN: AMSMI-EH-EQ
(Schroder/Northridge), Redstone Arsenal, AL 35898-5400

A-40

ENCL. 11

20 April 1993

MEMORANDUM FOR RECORD

SUBJECT: In Process Review Meeting, Interim Remedial Design, RSA 56 and 139

1. Subject meeting was held on 14 April 1993, 1300, in the Mission Status Room, 106 Wynn Drive. Enclosure 1 is list of attendees.
2. Ms. Dorothy Richards opened the meeting with introductions and a brief history of the sites and project. The rest of the meeting was devoted to reviewing the preliminary 95% drawings and specifications. Enclosure 2 is meeting agenda.
3. The following comments were noted:
 - ADEM on board review scheduled for 4 June 1993. Exact time and location to be determined.
 - Bill Schroder wants to open the fence across Metrology Drive and remove the barricade.
 - Bill Schroder prefers each area, RSA-56 and RSA-139, to be fenced separately, and the access gates to be double six foot gates (12 foot wide), to allow maintenance vehicle access.
 - It was agreed to route the road east of the steam pit and bridge the steam lines over the road.
 - Design to require contractor to move temporary storage container 59 and drum racks, as directed by the Corps of Engineers. Coordination shall be made with Mr. Art Parrow, USATA.
 - Redstone representatives agreed to 7 May 1993 for submittal of the 95% cost estimate.
 - Redstone Arsenal needs "Paragraph 9 of the 1391 document, Statement of Work".
 - Mr. Bob Nore, CEHND-ED-SY, stated contract should include UXO support on site during construction.
 - Redstone representatives notified CEHND design team that an underground storage tank is located at the north east corner of building 5435. Bill Schroder said he would pursue existing work order for tank removal.

- Mr. Schroder said he could make available to Mr. Art Dohrman the borrow area logs, Borrow Area 10.

- Mr. Parrow said the truck access will need to be maintained to the back of building 5435. Design should maintain the same road width and radius.

- Mr. Schroder said he would have Borrow Area 10 sampled for HTW.

- Mr. Schroder said the design should include a traffic control plan, during construction.

- The sanitary force main is not included in the scope of this project. Redstone has a separate project redesigning entire system. Mr. Gilliland recommended that the force main be cut and capped near the project boundaries by Redstone.

- Corrugated metal storm drainage pipe was discovered on site visit by Mr. Gunter and Mr. Dohrman. Storm drainage to be incorporated into the design.

- The preliminary 95% specifications were available for review at the meeting.

4. If you have any questions, or wish to add to the minutes, contact Ms. Dorothy Richards, 955-3088.


DOROTHY RICHARDS

2 Encls

CF:

ED-CS Dohrman/Brown/Gunter/Hasse/Gilliland/Riffel/Ruther

ED-ES Young/McCowan/Hardy/Sykes

ED-SY Hester/Walters/Nore

ED-ME Haley/Anderson/Weber

PM-EP East/Matthews/Richards/Read

ED Read/File

AMSMI-RA-EQ Schroder

AMSMI-RA-EH-EN Coulston

AMSMI-RA-EH-MP Meyer/Brown

CESAM-C Palmer

USATA Parrow

AMSMI-SF Lynn

ATTENDANCE SHEET
IN PROGRESS REVIEW MEETING
INTERIM REMEDIAL DESIGN,
RSA 56 AND 139,
REDSTONE ARSENAL

APRIL 14, 1993

<u>NAME</u>	<u>ORGANIZATION</u>	<u>PHONE/FAX NUMBER</u>
DOROTHY RICHARDS	CEHND-PM-EP	955-3088 / 955-4664
ART DOHEMAN	CEHND-ED-CS	955-3278
JEFF COULSTON	AMSMI-RA-EH-EN	842-0235
BRADFORD McCANN	CEHND-ED-ES	955-3773
MARY YOUNG	CEHND-ED-ES	955-3975
William Kevin Meyer	AMSMI-RA-EH-MP	876-3255
Giannina Brown	AMSMI-RA-EH-MP	955-6473
Willie R. Palmer	SAM-C	876-1751 / 876
ART PARROW	USATA	876-6855
Gladys Hester	CEHND-ED-SY	955-4267
Jerry Haley	CEHND-ED-ME	955-5348
Jerry Weber	"	955-5153
Gail Hardy	CEHND-ED-EE/PS	955-4163
Tom Sykes	CEHND-ED-ES/PS	955-5182

IN PROGRESS REVIEW MEETING AGENDA

INTERIM REMEDIAL DESIGN,
RSA 56 AND 139,
REDSTONE ARSENAL

APRIL 14, 1993

- I. INTRODUCTION
- II. PROJECT BACKGROUND
- III. SCHEDULE FOR DESIGN COMPLETION
- IV. REVIEW OF DRAWINGS AND SPECIFICATIONS
- V. OPEN DISCUSSION

A-45

~~ENCL 2~~ KH
5/10/99

RECORD OF ENVIRONMENTAL CONSIDERATION

TITLE: Interim Corrective Measures for Arsenic Lagoons, RSA-56 and RSA-139

Description of Proposed Action:

Redstone Arsenal is required to perform the subject action in a response to a Notice of Violation (NOV) from the Alabama Department of Environmental Management (ADEM) in March of 1992 (ENC-1).

Construction work will include placing a 2 1/2 foot thick earthen cap over two former arsenic lagoons; eliminating point source discharge to the area; rerouting utilities around the site, including water lines, steam lines, and electrical lines; placing erosion control material along the existing drainage ditch; rerouting storm drainage around the site; relocating an access road; and installing fencing around the site. No intrusive work will be conducted on the existing caps. Vegetation removal will be necessary prior to the start of this work. A copy of the Scope of Work and site maps are attached (ENC-2).

Maintenance will include landscaping, periodic mowing of grass, and quarterly monitoring of the surface water as required by ADEM and the RSA NPDES Permit A10000019.

ANTICIPATED DATE OF THE PROPOSED ACTION : AUGUST 1993

CONCLUSION: This action has been evaluated in accordance with paragraph 4-2 of AR 200-2 and the screening criteria of A-30 and A-31 of Appendix A, AR 200-2. There are no circumstances which would require an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). The action qualifies as a Categorical Exclusion Number A-7, per AR 200-2, Appendix A.

Proponent of Action Morris W Schroder Date 5/14/93
Morris W. Schroder, General Engineer,
MICOM Environmental Office
AMSMI-RA-EQ

Prepared by Morris W Schroder Date 5/14/93

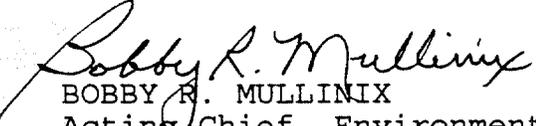
Approved by David S. Branham Date 5/9/93
David S. Branham
MICOM Environmental Officer
AMSMI-RA-EQ

19 MAY 1993

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Review of 95% Design of Interim Remedial Treatment for Area U (Former Arsenic Ponds Near BLDG 5451) at RSA

1. A meeting was held on 15 January 1993 from 0830 to 1030 in the DEH Conference Room on the 35% Interim Design. The Huntsville Division of the COE presented their draft Remedial Design of Area U and the related concerns (force main, water line, stormwater, etc.).
2. A representative from your division attended this meeting. Enclosed is a copy of 95% design for review. If there are any problems or major concerns please contact the MICOM Environmental Office. Your cooperation is appreciated.
3. The point of contact for this action is Craig T. Northridge, MICOM Environmental Office, 955-6967.


BOBBY R. MULLINIX
Acting Chief, Environmental
Management Office

DISTRIBUTION:
AMSMI-RA-EH-EN
AMSMI-RA-EH-MP-PC (Meyer)
AMSMI-RA-EH-MP-PR (Brown)
AMSMI-SF (Lynn)
AMXTM-J-TMDE (B-5435/Parrow)



Jim Folsom
Governor

Leigh Pegues, Director

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130-1463
(205) 271-7700
FAX 271-7950
270-5612

June 18, 1993

Colonel Ross I. Sanders, Commander
U.S. Army, Redstone Arsenal Support Activity
Department of the Army Missile Command
Redstone Arsenal, Alabama 35989

Field Offices:

110 Vulcan Road
Birmingham, AL
35209-4702
(205) 942-6168
FAX 941-1603

Re: RSA 56 & 139

Dear Colonel Sanders:

We received the plans and specifications for Interim Remedial Design, RSA 56 & 139, Redstone Arsenal, Alabama. We have no comments and no objections to the design.

P.O. Box 953
Decatur, AL
35602-0953
(205) 353-1713
FAX 340-9359

If you have any questions, please contact me at (205) 271-7936.

Sincerely,

A handwritten signature in black ink, appearing to read "James M. Coles", written over a horizontal line.

James M. Coles
Industrial Branch
Water Division

2204 Perimeter Road
Huntsville, AL
35894-51131
(205) 450-3400
FAX 479-2593

cc: Morris W. Schroder
AMSMI-RA-EH-EQ
Department of the Army Missile Command
Redstone Arsenal, Alabama 35989

Dorothy Richards
CEHNO-PM-EP
Post Office Box 1600
Huntsville, Alabama 35807-4301

A-48

ENCL. 15





DEPARTMENT OF THE ARMY
HUNTSVILLE DIVISION, CORPS OF ENGINEERS
P. O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF

CEHND-PM-MD

15 July 1993

MEMORANDUM FOR Commander, U.S. Army Engineer District, Mobile,
ATTN: CESAM-PM-SP (Charles L. Smith), P.O. Box
2288, Mobile, AL 36628

SUBJECT: Interim Remedial Design, RSA 56 and 139, Redstone
Arsenal, AL

1. The finalized plans and specifications for subject project were sent to you on 16 July 1993, which included an original and one copy.
2. You are hereby authorized to advertise and open bids for this contract.
3. Funds in the amount of \$1,000,000 are included in the DERP IR Program Work Plan and will be provided prior to award of contract. Funds must be obligated prior to 30 September 1993.
4. If you have any questions or comments, please contact Ms. Dorothy Richards, 205-955-3088.

FOR THE COMMANDER:

LEO H. CARDEN, P.E.
Director of Programs and
Project Management

CF:
Commander, U.S. Army MICOM, Building 7613, ATTN: AMSMI-RA-EH-EQ
(Morris W. Schroder), Redstone Arsenal, AL 35898

A-49

ENCL. 16



DEPARTMENT OF THE ARMY
HUNTSVILLE DIVISION, CORPS OF ENGINEERS
P. O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF

CEHND-PM-EP

15 October 1993

MEMORANDUM FOR AMSMI-RA-EQ (Bill Schroder)

SUBJECT: Draft-Final Site Characterization Work Plan of RSA-46, RSA-47, RSA-51, RSA-56, RSA-122, and RSA-139, Redstone Arsenal

1. Reference facsimile transmission sheet from Jim Barksdale, EPA, to Bill Schroder, AMSMI-EQ, 14 October 1993, subject: SAB, in which Mr. Barksdale requested an explanation of page 1-2, paragraph 1.2.1 (encl 1).
2. The intent of the statement of work developed for this delivery order was to adequately characterize the sites and determine magnitude. This information will be used to clearly define the contract requirements for the risk assessments which will follow under a separate delivery order. The risk assessment will be performed under the same contract but under a separate delivery order.
3. Redstone's recent nomination to the NPL has caused guidance to change from RCRA to CERCLA. The EPA has been in the process of reissuing the risk assessment guidance documents. Phasing in the risk assessment after the collection of data will allow for better understanding of the requirements to be followed. A feasibility study for these sites has been programmed for this fiscal year with an anticipated award of April 1994. A statement indicating this will be added to the Final Site Characterization Work Plan.
4. The contractor, during preliminary records review, was made aware of an interim remedial action at RSA-56 and RSA-139, which will be awarded for construction this fiscal year. Full coordination of the field investigation activities and the proposed remedial design was accomplished between the Corps of Engineers, Huntsville and the contractor. A statement to this effect will be included in the Final Site Characterization Work Plan.
5. Any questions or comments may be directed to Dorothy Richards, 205-955-3088.

Encl

JOHN D. MATTHEWS, P.E.
Chief, Environmental and Support
Programs Division

A-50

ENCL. 17

INTERIM REMEDIAL DESIGN, RSA 56 AND 139
REDSTONE ARSENAL, AL

SCOPE OF WORK:

The scope of work shall include placing a 2 1/2 foot thick cap over two former arsenic lagoons; eliminating point source discharge to the area; rerouting utilities around the site, including water lines, steam lines and electrical lines; placing erosion control material along existing drainage ditch; rerouting storm drainage around the site; relocating an access road; and installing fencing.

A-51

~~FACT-2 KH~~
REAREAL 5/18



DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
OFFICE OF THE AREA ENGINEER
P.O. BOX 8162, REDSTONE ARSENAL, AL 35808-0162

17 April 95
Rec. For R. Kad...
at 1020

REPLY TO
ATTENTION OF:

CESAM-CD-NA (415)

STEVENS/dlc/876-4118/12 April 1995

MEMORANDUM FOR: Commander, U.S. Army Missile Command, ATTN: AMSMI-RA-EMP-MP,
Redstone Arsenal, Alabama 35898-5340

SUBJECT: Contract DACA01-94-C-0044, Interim Remedial Action, Sites 56 and 139,
Redstone Arsenal.

1. A Prefinal Inspection was held on 10 April 1995 for the above referenced
contract. Listed below are attendees and noted deficiencies.

ATTENDEES

REPRESENTING

Steve Arendale	Corps of Engineers
Paul T. Carr	Corps of Engineers
Darron Miles	V&W Construction & Services Company
Herbert Plyler	EMP-IR
Scott Smith	EMP-MP
Wade Wooley	Corps of Engineers

NOTED DEFICIENCIES

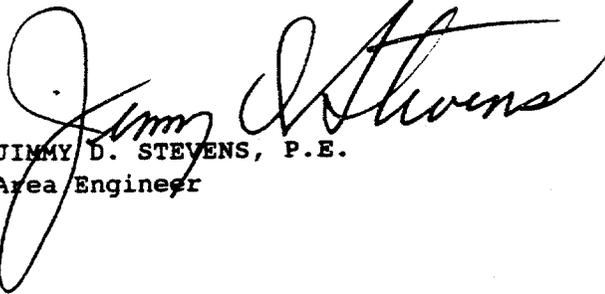
1. Topsoil to asphalt edge.
2. Remove asphalt at existing curb and gutter to allow for proper drainage.
3. Dirt clods need to be pulverized or removed.
4. Lawn area debris larger than 1 inch shall be removed.
5. Field area debris larger than 3 inches shall be removed.
6. Provide proper drainage from parking lot to catch basin No. 3.
7. Lawn areas require additional fine grading so as to allow for proper mowing.
8. Areas of erosion at Site 56 requires repairing.
9. Repair roller mark at tie-in to Calibration Drive.
10. Place asphalt at core drill holes.
11. Remove rip-rap from creek at southeast corner of Site 139.
12. Remove concrete from old bridge abutment.
13. Fence concrete bases need proper finish.
14. Remove all scrap concrete.
15. Provide proper drainage at borrow site No. 2.
16. Repair erosion on slope at borrow site No. 2.
17. Install metal jacket on valves at pit and at main tie-in.
18. Adjust hanger on condensate line next to pit.
19. Insulate drip piping and receiver section at bridge.
20. Adjust hangers between existing main and first expansion loop to straighten pipe.

A-52

ENCL. 18

2. The contractor has been advised to correct the deficiencies as soon as practicable.

FOR THE COMMANDER:



JIMMY D. STEVENS, P.E.
Area Engineer



DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
OFFICE OF THE AREA ENGINEER
P.O. BOX 8162, REDSTONE ARSENAL, AL 35808-0162

REPLY TO
ATTENTION OF:

CESAM-CD-NA (415)

CARR/mfj/876-4118/March 1995

MEMORANDUM FOR: Commander, U.S. Army Missile Command, ATTN: AMSMI-RA-EMP-MP,
Redstone Arsenal, Alabama 35898-5340

SUBJECT: Contract No. DACA01-94-C-0044, Interim Remedial Action, Sites 56 and
139, Redstone Arsenal, Alabama

1. A Final Inspection was held on 17 April 1995 for the above referenced
contract. Listed below are attendees and noted deficiencies.

ATTENDEES

Paul T. Carr
Darron Miles
Herbert Plyler
Scott Smith
Willie Woulard

REPRESENTING

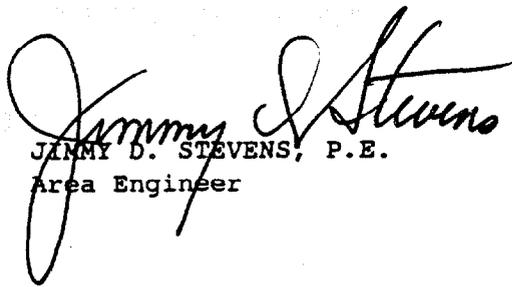
Corps of Engineers
V & W Construction & Services Company
EMP-IR
EMP-MP
V & W Constuction & Services Company

NOTED DEFICIENCIES

1. Areas of erosion at Site 56 requires repairing
2. Provide proper drainage at borrow site no. 2.
3. Repair erosion on slope at borrow site no. 2.

2. The contractor has been advised to correct those deficiencies as soon as
practicable.

3. Work under this contract was accepted for Beneficial Occupancy on 17 April
1995. This establishes a warranty period through 16 April 1996.


JIMMY D. STEVENS, P.E.
Area Engineer

A-54

ENCL. 19