

# ADEM



## ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

POST OFFICE BOX 301463 ♦ 1751 CONG. W. L. DICKINSON DRIVE 36109-2608  
MONTGOMERY, ALABAMA 36130-1463  
(334) 271-7700

JAMES W. WARR  
DIRECTOR

FOB JAMES, JR.  
GOVERNOR

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### MEMORANDUM

**To:** Wm. Gerald Hardy, Chief *WGH*  
Hazardous Waste Branch  
Land Division *9/29/98*

**Through:** Larry Bryant, Chief *LJB*  
Governmental Facilities Section  
Hazardous Waste Branch  
Land Division

**From:** Kristy Wright *KW*  
Governmental Facilities Section  
Hazardous Waste Branch  
Land Division

**Subject:** Environmental Indicators Memorandum: Evaluation of Redstone Arsenal Status  
Under the RCRIS Corrective Action Environmental Indicator Event Codes  
(CA725 and CA750)  
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Facsimiles: (334)  
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### I. PURPOSE OF MEMO

This memo presents an evaluation of Redstone Arsenal's (RSA) facility status in relation to the following RCRIS corrective action codes:

1. Human Exposure Controlled Release Determination (CA725)
2. Groundwater Releases Controlled Determination (CA750)

The applicability of these event codes at Redstone adheres to the definitions found in the Data Element Dictionary for RCRIS.

Concurrence by the Hazardous Waste Branch Chief is required prior to entering these event codes into RCRIS. Dating and signing above satisfies your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations



## II. HUMAN EXPOSURES CONTROLLED DETERMINATION (CA725)

There are five (5) national status codes under CA725. These status codes are:

1. YE - Yes, Applicable as of this date.
2. NA - Previous determination is no longer applicable as of this date.
3. NC - No control measures necessary.
4. NO - Facility does not meet definition.
5. IN - More information needed.

The first three (3) status codes listed above were defined in the January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in the June 1997 Data Element Dictionary.

Note that CA725 is designed to measure human exposures over the entire facility (i.e., the code does not track SWMU specific actions or success). Every area at the facility must meet the definition before a YE or NC can be entered for CA725. The NO status code should be entered if there are current unacceptable risks to humans due to release of hazardous wastes or hazardous constituents from any SWMU(s) or AOC(s). The IN status code is designed to cover those cases where insufficient information is available to make an informed decision on whether or not human exposures are controlled. If an evaluation determines that there are both unacceptable and uncontrolled current risks to humans at the facility (NO) along with insufficient information on contamination or exposures at the facility (IN), then the priority for the EI recommendation is the NO status code.

In EPA Region 4's opinion, the previous relevance of NA as a meaningful status code is eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN to the existing YE and NC status codes. In other words, YE, NC, NO and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA725. Therefore, it is Region 4's opinion that only YE, NC, NO and IN should be utilized to categorize a facility for CA725. No facility in Region 4 should carry a NA status code.

This particular CA725 evaluation is the first evaluation performed by ADEM for Redstone. Because assumptions have to be made as to whether or not human exposures to current media are plausible and, if plausible, whether or not controls are in place to address these plausible exposures. This memo first examines each environmental media (i.e., soil, groundwater, surface water, and air) at the entire facility including any offsite contamination emanating from the facility rather than from individual areas or releases.

After this independent media by media examination is presented, a final recommendation is offered as to the proper CA725 status code for Redstone Arsenal.

The discussions, interpretations, and conclusions presented herein regarding contamination and exposures at the facility are based on the following reference documents:

- Preliminary Site Inspection for Redstone Arsenal, 1992
- Interim RCRA Facility Assessment Report for Redstone Arsenal, September 1989
- Site Management Plan, Redstone Arsenal, March 1995
- Identification and evaluation of potential SWMUs and Areas of concern at RSA February 1991
- Installation Action Plan for Redstone Arsenal, March 1998
- Corrective Measure Studies for RSA, April 1993
- RCRA Part B permit submittal for the Hazardous Waste Storage Area, December 1996

### III. FACILITY SUMMARY

Redstone Arsenal is located in southern Madison County, Alabama, and is bounded by the City of Huntsville to the north and east, and the Tennessee River to the south. The towns of Madison and Triana are northwest of the facility respectively. The geographical location of the facility is 34 degrees, 38 minutes, 00 seconds latitude and 86 degrees, 38 minutes, 45 seconds longitude.

RSA encompasses approximately 38,300 acres, and the Department of the Army controls 36,459 acres of the total, of which approximately 15,500 acres are woodlands, 5,360 acres are leased for agricultural use, and approximately 12,000 acres are used for test ranges. The George C. Marshall Space Flight Center (MSFC) of the National Aeronautics and Space Administration (NASA) leases 1,841 acres in the central part of RSA. Thiokol Chemical Corporation (Thiokol), a government owned, contractor-operated facility, previously used a portion in the Southeast of RSA to develop solid rocket propellants. This area is now referred to as the Redstone Arsenal Rocket Engine

Facility. International Specialty Products leases approximately 10 acres of land in the central portion of the facility for production of iron carbonyl. Approximately 2,900 acres are owned by the Tennessee Valley Authority (TVA) and 4,100 acres of the Wheeler National Wildlife Refuge (WNWR) are within the boundary of RSA.

The facility's current regulatory status is that of a hazardous waste treatment, storage, and disposal (TSD) facility. The regulated units for this TSD facility are a Hazardous Storage Area (HWSA) consisting of nine (9) Hazardous Waste Storage Units (HWSU) and a Thermal Treatment Area (TTA) also known as the Open Burn/Open Detonation Area (OB/OD Area). This area operates under Interim Status. Also, EPA added Redstone Arsenal to the National Priority List on May 31, 1994.

In September of 1989, EPA conducted an Interim RCRA Facility Assessment (RFA) at RSA. The U.S. Army hired Geraghty & Miller Inc. to re-evaluate the EPA RFA studies, and to identify, describe and evaluate any other additional sites at RSA. EPA's Interim RFA report was used as a basis for the G&M report that cataloged 286 sites (273 SWMUs and 13 AOC). There were four additional sites discovered since 1992, (RSA-140, RSA-141, RSA-143 and RSA-144) for a total of 290 identified sites. Of the 290 sites, cleanup of 216 is the responsibility of the Army. Seventy-four (74) sites are located on MSFC and this cleanup is the responsibility of NASA. There are 114 Army sites that are considered to be active. Of the remaining 102 sites, 15 are considered "no further action". There are a total of 87 DERA eligible sites that are currently being investigated.

The sites were reorganized into 18 Operable Units. The process by which this was achieved was by dividing the Arsenal property by watersheds, critical and sensitive ecological habitats, soil types, and land use.

#### **IV. MEDIA BY MEDIA DISCUSSION OF CONTAMINATION AND THE STATUS OF PLAUSIBLE HUMAN EXPOSURES**

##### Groundwater

Releases from SWMUs have contaminated groundwater above relevant action levels. The primary contaminants in groundwater are VOCs. Currently, there are 3 active groundwater Interim Remedial Actions at Redstone Arsenal. These are RSA-10, RSA-13, and RSA-142. All of these plants are designated to remove elevated levels of VOCs in the groundwater.

The extent of groundwater contamination from other SWMUs have not been defined since they are still being investigated. Currently, Redstone Arsenal is relatively open to the public, except for certain restricted areas. Much of the area is open land.

Groundwater at RSA is not currently being used as a source of drinking water. Plausible human receptors at the site include the following: A groundskeeper, plausible on-site workers, and others that make visits to RSA and are incidentally exposed to surface soil as they walk across the ground. A trespasser may gain access to restricted areas of the site for short periods. A sportsman may enter the non-restricted areas of RSA for walking, hiking, fishing and hunting. Also, the on-site resident is included as a worst-case scenario for exposure to on-site soil and groundwater.

### Surface Water

The Tennessee River marks the southern boundary of RSA and flows west. Huntsville Spring Branch, McDonald Creek, and the Indian Creek are major tributaries of the Tennessee River that flows relatively southward to the River. All surface drainage leaving RSA empties into the Tennessee River. Approximately 90 percent of the drainage first passes through Wheeler Reservoir, located in the central and southwest portion of RSA, before entering the Tennessee River. All of these surface water bodies have been sampled in the past and no significant levels of contamination in the surface water were encountered.

Surface water associated with the facility is not reasonably expected to be contaminated at this time. Because contamination is not reasonably expected to have occurred, there are no plausible human exposures that must be controlled due to contaminated surface water.

### Soils

Soil is contaminated on-site and plausible on-site human exposures are controlled by Interim Remedial Measures. The clean-up of soils at Redstone Arsenal has historically been a removal of the contamination or on-site encapsulation. To date 16 sites have been cleaned up by soil removal. The potential pathways for human exposure are: on-site construction workers, trespassers, and groundkeepers. However, these possible human exposures are controlled by Soil Remedial Interim action at the sites. There are four (4) soil remedial actions at RSA. These sites are RSA-49, RSA-14, RSA-56, and RSA-139. Remedial actions include installation of a RCRA and Clay Cap and Soil Vapor Extraction System. The contaminants of concern are arsenic and VOCs. Other soil remedial actions includes RSA-45 Underground Storage Tank Excavation, RSA-53-54-55-60-101-102-103-105-106 DDT Migration Abatement Program, RSA-124 DDT Water Treatment Plant Removal, and RSA-130 Inactive Radiographic Lab Septic Tank and soil removal.

There are approximately 38 sites that will require remedial actions. Extent of soil contamination at other SWMUs, if any, are unknown at this time. Other SWMUs at Redstone are currently being investigated.

Air

Releases to air from soil, groundwater and/or surface water contamination by SWMUs and/or AOCs at the facility is not expected to be occurring above relevant action levels. Therefore, there is no human exposure to contamination via an air route.

**V. STATUS CODE RECOMMENDATION FOR CA725**

Based on the preceding media-by-media evaluation human exposure is not completely controlled for groundwater, surface water, and soil. Although there are some control for human exposure at the site, the entire facility has not been fully assessed to make a determination at this time. Thus, it is recommended that CA 725 NO be entered into RCRIS.

**VI. GROUNDWATER RELEASES CONTROLLED DETERMINATION (CA750)**

There are five (5) status codes listed under CA750:

1. YE Yes, applicable as of this date.
2. NA Previous determination is no longer applicable as of this date.
3. NR No releases to groundwater.
4. NO Facility does not meet definition.
5. IN More information needed.

The first three (3) status codes listed above were defined in January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in June 1997 Data Element Dictionary.

The status codes for CA750 are designed to measure the adequacy of actively (e.g., pump and treat) or passively (e.g., natural attenuation) controlling the physical movement of groundwater contaminated with hazardous constituents above relevant action levels. The designated boundary (e.g., the facility boundary, a line upgradient of receptors, the leading edge of the plume as defined by levels above action levels or cleanup standards, etc.) is the point where the success or failure of controlling the migration of hazardous constituents are measured for active control systems. Every contaminated area at the facility must be evaluated and found to have the migration of contaminated groundwater controlled before a "YE" status code can be entered. If contaminated groundwater is not controlled in any area(s) of the facility, the NO status code should be entered. If there is not enough information at certain areas to make an informed decision as to whether groundwater releases are controlled, then the IN status code should be entered. If an evaluation determines that there are both uncontrolled groundwater releases for certain units/areas (NO) and insufficient information at certain units/areas of groundwater contamination (IN), then the priority for the EI recommendation should be the NO status code.

In Region 4's opinion, the previous relevance of NA as a meaningful status code is eliminated by the June 1997 Data Element Dictionary's inclusion of NO and IN to the existing YE and NR status codes. In other words, YE, NR, NO and IN cover all of the scenarios possible in an evaluation or reevaluation of a facility for CA750. Therefore, it is Region 4's opinion that only YE, NR, NO and IN should be utilized to categorize a facility for CA725. No facility in Region 4 should carry a NA status code.

This evaluation for CA750 is the first formal evaluation performed for Redstone Arsenal. Please note that CA750 is based on the adequate control of all contaminated groundwater at the facility. The following discussions, interpretations, and conclusions on contaminated groundwater at the facility are based on the following reference documents:

- Preliminary Site Inspection for Redstone Arsenal, 1992
- Interim RCRA Facility Assessment Report for Redstone Arsenal, September 1989
- Site Management Plan, Redstone Arsenal, March 1995
- Identification and evaluation of potential SWMUs and Areas of concern at RSA February 1991
- Installation Action Plan for Redstone Arsenal, March 1998

- Corrective Measure Studies for RSA, April 1993
- RCRA Part B Permit submittal for the Hazardous Waste Storage Area, December 1996

#### **VII. STATUS CODE RECOMMENDATION FOR CA750**

Based on the information obtained in the reference documents and the media-by-media discussion regarding groundwater, it appears that in some areas of the facility groundwater releases are being controlled by treatment systems. Some other areas, however, are still under investigation to assess groundwater contamination. Therefore, it is recommended that CA750 NO be entered into RCRIS.

#### **VIII. SUMMARY OF FOLLOW-UP ACTIONS**

Redstone Arsenal will proceed with the ongoing and future investigations of the Environmental Restoration Army (ERA) account eligible sites under the CERCLA process (RI/FS, PP, ROD, remedial design and remedial action). Other SWMUs eligible under the Operation and Maintenance Program will be investigated under the RCRA Program.