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MEMORANDUM

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Subject: Evaluation of Status Under the RCRIS Corrective Action
Environmental Indicator Event Codes (CA725 and CA750)
Marshall Space Flight Center, Huntsville Alabama
EPA ID Number: ALD 800 013 863

I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of Marshall Space Flight Center's status in relation to the following corrective action event codes defined in the Resource Conservation and Recovery Information System (RCRIS):

- 1) Human Exposures Controlled Determination (CA725),
- 2) Groundwater Releases Controlled Determination (CA750).

The application of these event codes at Marshall Space Flight Center adheres to the event code 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. Your concurrence with the interpretations provided in the following paragraphs and the subsequent recommendations is satisfied by dating and signing above.

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- 2) NA Previous determination no longer applicable as of this date.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 January 1995 Data Element Dictionary for RCRIS. The last two (2) status codes were defined in 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 status code can be entered for CA725. The NO status code should be entered if there are current unacceptable risks to humans due to releases 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 Marshall Space Flight Center. Because assumptions have to be made as to whether or not human exposures to current media contamination 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, 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 Marshall Space Flight Center.

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

- Remedial Investigation/Feasibility Study Work Plan
- MSFC Surface Media Remedial Investigation (RI) Report

III. FACILITY SUMMARY

MSFC is located in north central Alabama on approximately 1,840 acres near the center of Redstone Arsenal (RSA). The irregularly shaped site is roughly 3 miles long on its north-south axis and 2 miles wide on its east-west axis.

MSFC is NASA's principal propulsion development center. Its scientists, engineers, and support personnel play a major role in the National Space Transportation System by managing space shuttle mission activities, including the microgravity laboratory. In addition, MSFC will be a significant contributor to several of NASA's future programs, including the Reusable Launch Vehicle (X-33), International Space Station, and Advanced X-ray Astrophysics Facility, as well as research on a variety of space science applications.

The facility is made up of natural settings, test stands, and various buildings. Buildings at the facility range from small sheds to large multi-story buildings. The buildings are located mainly in the northern half of the facility, the test stands are located in the southern half of the facility, and natural settings are scattered throughout the facility.

MSFC was notified of its incorporation onto the National Priorities List (NPL) in response to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This regulatory action is documented in the May 31, 1994, Federal Register (59 FR 27989-28031).

MSFC is a large-quantity generator of hazardous wastes for temporary storage. MSFC also maintains interim status post-closure care for three former surface impoundments associated with the past treatment of metal finishing wastes.

In 1985, NASA undertook initial environmental compliance audits of its facilities in response to CERCLA legislation. The initial audit identified five potential CERCLA sites at MSFC. A second audit identified 30 sites of possible environmental significance. A preliminary assessment/site investigation (PA/SI) of the 30 CERCLA candidate sites (including sample collection at 19 of the sites) was reported in February 1989.

EPA performed a visual site inspection (VSI) in June 1989, which formed the basis of a RCRA Facility Assessment (RFA) for MSFC. This assessment used the results of NASA's PA and identified 77 sites of possible environmental significance; many of them identified as solid waste management units (SWMUs). The EPA recommended sites that were believed to have had no effect on the environment for no further action (NFA) status.

Redstone Arsenal (RSA) performed an RFA to evaluate the sites of potential environmental significance located on RSA property in February 1991. The RFA identified an additional 11 sites at MSFC requiring investigation, bringing the total number of sites to be addressed to 95. A memorandum of agreement between NASA and the Department of Army (DA) transferred 13 of these sites to the responsibility of the Department of Army, thus bringing the total number of sites to be addressed by MSFC to 82.

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

GROUNDWATER

Groundwater is contaminated onsite and offsite, and some plausible onsite and offsite human exposures are not controlled.

Releases from SWMUs and AOCs have contaminated groundwater at concentrations above relevant action levels. Groundwater investigations are ongoing at MSFC. So far, there have been seven different plumes identified. These plumes are mostly in the residuum aquifer. The primary constituents of concern with their maximum concentration detected are trichloroethene (333,000 ppb), tetrachloroethene (3,240 ppb), carbon tetrachloride (271,133 ppb), and chloroform (44,030 ppb). The extent for most of the plumes is confined within the boundary of the facility. The closest potable water supply well to MSFC is 2.5 miles and lies within a groundwater recharge basin that is separated hydraulically from MSFC according to a Geological Survey of Alabama publication. At this time action levels have not been set.

In addition to the observed groundwater contamination, there are plausible human exposures to this contamination. For example, there are some springs within the MSFC boundary that could discharge contaminated groundwater to the surface, which would make human exposures possible.

Groundwater sampling is ongoing at MSFC. In the near future MSFC should have a better understanding of their groundwater contamination and be in a position to make remedial action decisions.

Based on the above discussion, plausible human exposures to groundwater contamination are not controlled and control measures for groundwater are necessary.

SURFACE WATER

Surface water is reasonably expected not to be contaminated.

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

SOIL

Soil is contaminated on-site, and some plausible onsite human exposures are not controlled.

Soil at the facility is contaminated at concentrations above relevant action levels. For the sites that have been investigated, PAHs were ubiquitous in the surface soil and sediments. Arsenic and PCBs also were detected, although less frequently. Arsenic concentrations are elevated above background levels in only a few samples. Most of the estimated human health risks and hazard indices (HIs) are associated with PAHs. Sites with PCBs had some contributions to the overall risk and HI estimates. However, none of the estimated risks were significant (risks were less than 10^{-4} and HIs were less than 1.0) for current or future site workers. The future trespasser pathway was closer to the current worker in the estimated risks and HIs, and none were significant.

In addition to the soil contamination at the facility, there are plausible human exposures to this contamination. For example, because of the occurrence of contamination in subsurface soils, there is a potential for human contact through current occupational activities at this site. During construction or utility maintenance activities, exposures could occur through incidental ingestion and direct dermal contact with affected subsurface soils, and through the inhalation of volatiles and any dust emitted from affected subsurface soils.

Soil sampling is ongoing at MSFC. In the near future MSFC should have a better understanding of their soil contamination and be in a position to make remedial action decisions.

Based on the above discussion, plausible human exposures to contaminated soil are not controlled and control measures are necessary at this time.

AIR

OPTION 1: Air is reasonably expected not to be contaminated.

Releases to air from soil, groundwater and/or surface water contaminated 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:

CA725 NO Facility does not meet definition

As explained in Section IV, because human exposures to contamination are not currently controlled for groundwater and soil, it is recommended that CA725 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 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 is 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 Marshall Space Flight Center. 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:

- Phase I RI Groundwater Summary

VII. STATUS CODE RECOMMENDATION FOR CA750:

CA750 NO; Releases to groundwater have occurred, and all groundwater releases at the facility are not controlled

Based on data contained in the documents referenced in Section V and summarized in the groundwater portion of Section IV, releases from SWMUs and/or AOCs have contaminated groundwater at concentrations above relevant action levels.

Although the groundwater is contaminated above relevant action levels, control measures have not been implemented yet to control the migration of contaminated groundwater. Studies are underway to decide the best alternative to control groundwater. Because all groundwater contamination at or emanating from the facility is not controlled, it is recommended that CA750 NO be entered.

VIII. SUMMARY OF FOLLOW-UP ACTIONS

MSFC is continuing to investigate sites on their facility. There will be at least two more Remedial Investigation Reports submitted for review. Quarterly groundwater monitoring along with a dye trace study, is being performed to get a better understanding of the complex hydrogeology in the area. In the near future MSFC should have a better understanding of their groundwater contamination and be in a position to make remedial action decisions.