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The Honorable John Conyers, Jr.
Chairman
The Honorable Alfred A. McCandless
Ranking Minority Member
Legislation and National
Security Subcommittee
Committee on Government Operations
House of Representatives

In April 1991,[1] we issued a report on the National Aeronautics and Space Administration's (NASA) agencywide program for environmental compliance and restoration. The report included several recommendations for program improvement. In March 1994, you asked that we examine the status of NASA's actions regarding this program. As requested, we are providing the preliminary results of our work that discuss NASA's environmental remediation program, its hazardous waste sites inventory, and its preliminary cost estimates for remediation activities. We are continuing our review and will issue a final report to you later this year.

BACKGROUND

Several laws, as well as Environmental Protection Agency, state, and local regulations, govern federal agencies' management and disposal of hazardous wastes and the cleanup of contamination. In accordance with these requirements, NASA's policy is to prevent, control, and abate environmental pollution.

To carry out its policy, NASA uses a decentralized management approach. Its center directors are responsible for day-to-day compliance with environmental laws. At the

[1] Environmental Protection: Solving NASA's Current Problems Requires Agencywide Emphasis (GAO/NSIAD-91-146, Apr. 5, 1991).

headquarters level, program offices are responsible for overseeing and ensuring the management of environmental protection actions at the centers they monitor, and the Environmental Management Division is the focal point for environmental compliance and protection matters.

In our 1991 report, we stated that NASA had not adequately implemented its policy to prevent, control, and abate environmental pollution. NASA had delegated responsibility for implementing its policy to its centers without establishing an agencywide strategy and an effective monitoring and management system. We also stated that without effective headquarters management, NASA was unaware of serious noncompliance problems, did not ensure that problems identified at one center were investigated at other centers with similar facilities, and did not ensure that centers perform periodic environmental compliance audits.

RESULTS IN BRIEF

NASA has undertaken several initiatives to improve the management of its environmental restoration and compliance program. Since our last report, NASA has (1) developed an environmental strategic plan, (2) established an Environmental Management Division at the headquarters level and named a Director of Environmental Management, (3) created an Environmental Management Council and a NASA Operational Environment Team, (4) developed an environmental remediation program, (5) identified potential hazardous waste sites, and (6) completed environmental self-assessments at its major facilities.

These initiatives, if fully implemented, should help NASA manage its environmental compliance and restoration program more efficiently and effectively. The program, however, lacks implementation schedules, and if current funding levels continue, the cleanup effort could take longer than NASA predicts. NASA's preliminary estimate to clean up its 650 potential hazardous waste sites was almost $2 billion as of August 1994, and agency officials predict it will take at least 20 years to complete the remedial action phase. Our past work involving Department of Defense environmental programs has indicated that preliminary cost estimates are likely to increase substantially as more accurate data become available.

ENVIRONMENTAL REMEDIATION PROGRAM

This program provides for studies, assessments, remedial investigations, feasibility studies, design, related

engineering, and remedial action projects for environmental compliance and restoration measures at NASA field installations. Also, the program covers government-owned industrial plants supporting NASA activities and other locations where NASA operations have contributed to environmental problems and NASA is obligated to contribute to cleanup costs.

A discussion of NASA's hazardous waste sites inventory and the environmental compliance self-assessments follows. Descriptions of the NASA Operational Environment Team, the Environmental Management Council, the environmental strategic plan, and the Environmental Management Division are provided in enclosure 1.

Hazardous Waste Sites Inventory

NASA and Ebasco Environmental, an environmental consulting firm under contract to NASA, have identified about 650 sites that may require remediation. On June 7, 1994, Ebasco provided a NASA-wide hazardous waste sites inventory consisting of 360 sites. Through preliminary assessments, site inspections, and miscellaneous studies, NASA identified an additional 290 potential sites. This inventory will be expanded to include underground storage tanks and petroleum spill sites.

According to NASA officials, the current listing is being automated and prioritized for remediation. They also said that completion of the inventory remains a high priority and that site investigations and the development of detailed cost estimates are continuing. NASA's goal is to have all sites either closed (the regulatory agency has determined that the sites require no further action, or remediation has been completed) or under assessment and remediation by 1997.

Environmental Compliance Self-Assessments

In the spring of 1992, NASA initiated a series of environmental self-assessments at its major installations. The last assessment report was completed in August 1994. Ebasco evaluated the area of environmental compliance relative to 16 statutes such as the Clean Air Act, the Clean Water Act, and the Safe Drinking Water Act. A team composed of NASA headquarters and center personnel evaluated the facilities' management of the environmental program based on a checklist developed by NASA's Facilities Engineering Division. For example, the team evaluated the organizational structure, the environmental management

office, civil service training, contractor training, and community relations.

The prime environmental management factor found to be impeding full compliance was inadequate staffing. Other factors included (1) inadequate standard operating procedures, (2) processes lacking for identifying environmental issues, (3) limited cross-organizational support, (4) organizational structure limiting senior management involvement, and (5) limited facility-wide awareness training. To address these factors, the facilities were to submit compliance plans within 6 months of the final assessment reports. The plans were to address the reports' recommendations and the status of actions to implement or resolve them. As of August 1994, the seven centers for which plans were due had submitted them to NASA headquarters.

The Director, Facilities Engineering Division, who had responsibility for environmental management prior to the establishment of the Environmental Management Division, directed each center to continue to perform self-assessments of the environmental management function at least once every 3 years. Each center is to provide a summary of the assessment to NASA headquarters and the other centers. The summary is to include a narrative identification of any major weaknesses or deficiencies and the overall level of program vulnerability and a plan and schedule for corrective actions. Any process improvements that could have application to other centers also are to be described.

CLEANUP EFFORTS WILL TAKE TIME AND COSTS ARE UNCERTAIN

NASA environmental officials told us that Ebasco's preliminary cost estimate for cleanup of the 360 sites was $1.2 billion as of June 1994, assuming they all require cleanup. Enclosure 2 shows the estimated cost by NASA facility and briefly discusses the environmental areas of concern resulting from the compliance evaluations. While NASA has not finalized its estimate of the cost of environmental compliance and restoration, as of August 1994, NASA estimates preliminary funding requirements of about $2 billion to clean up the 650 potential hazardous waste sites. However, NASA is only budgeting $35 million to $50 million a year over the next 5 years for this purpose.

NASA officials believe the $2 billion represents an upper limit. They said that the estimate was developed using a Department of Defense model and that NASA sites are

generally not as complex or as large as most Defense sites. On the basis of our previous review of Defense's environmental cleanup efforts, we believe these cost estimates are optimistic and are likely to increase substantially. As NASA stated, these estimates are based on preliminary information.

Our work concerning Defense environmental issues has shown that it is difficult to accurately estimate the remediation costs for a contaminated site before (1) the nature and extent of contamination are known and (2) an agency selects the remediation options and cleanup goals that meet the approval of the regulatory agencies. For example, in October 1991, we reported[2] that in 1985, Defense's cost estimate ranged from $5 billion to $10 billion for assessment, study, and potential cleanup of 400 to 800 sites. In April 1994, we reported[3] that Defense officials, in June 1993, stated the estimate to clean up about 20,000 potential hazardous waste sites had risen to about $30 billion.

NASA officials told us that they are reluctant to estimate the time frame for cleanup because of the factors that affect this parameter over which they have limited control. These factors include budget constraints, regulatory approval, technology developments, changing laws and regulations, and unknown site conditions. However, NASA officials said that through the remedial action phase, a 20-year time frame is reasonable. However, if the current funding levels continue, the cleanup effort could take a longer period of time.

SCOPE AND METHODOLOGY

To determine the status of NASA's environmental compliance and restoration program, we interviewed officials from the Environmental Management Division and reviewed documents describing efforts to address the concerns raised in our April 1991 report, including a hazardous waste sites inventory with estimated cleanup costs and environmental self-assessments of NASA's major installations. We also

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[2]Hazardous Waste: DOD estimates for Cleaning Up Contaminated Sites Improved but Still Constrained (GAO/NSIAD-92-37, Oct. 29, 1991).

[3]Environmental Cleanup: Too Many High Priority Sites Impede DOD's Program (GAO/NSIAD-94-133, Apr. 21, 1994).

reviewed management instructions, policies, and the environmental strategic plan.

We conducted our review at NASA headquarters from April 1994 to September 1994 in accordance with generally accepted government auditing standards. As requested, we did not obtain agency comments on this letter. However, we discussed our findings with NASA environmental management personnel and included their comments as appropriate.

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We plan no further distribution of this letter until 30 days from its issue date, unless you publicly announce its contents earlier. At that time, we will send copies to the NASA Administrator; the Director, Office of Management and Budget; and interested congressional committees. Copies will also be made available to others upon request.

Please contact me on (202) 512-8412 if you or your staff have any questions concerning this letter.

Donna M. Heivilin
Director, Defense Management
and NASA Issues

Enclosures - 2

MANAGEMENT INITIATIVES
(In Chronological Sequence)

NASA OPERATIONAL ENVIRONMENT TEAM

The NASA Operational Environment Team was established in April 1992 under the direction of a team leader. A representative from each NASA center is also on the team. The team is to (1) manage, plan, coordinate, and recommend policy for all NASA operational environmental technology initiatives regarding propulsion and replacement technology for aerospace systems; (2) support the approach and advocate funding necessary for timely compliance of technology development with all laws, regulations, and national goals for the care and protection of the environment; and (3) investigate and recommend propulsion and replacement technology having the minimum practicable adverse impact on environmental quality while maintaining an objectivity to priorities, cost, and value added. It is also to encourage the implementation of engineering changes that are driven by environmental requirements and provide an effective channel of communication within NASA, between NASA and educational institutions, other government agencies, and contractors on environmental issues related to propulsion and replacement (manufacturing) technology.

ENVIRONMENTAL MANAGEMENT COUNCIL

On February 26, 1993, the NASA Administrator established the NASA Environmental Management Council to serve as a policy body, providing general policy direction on environmental issues requiring agencywide policy guidance. The Council provides oversight of NASA's environmental activities and serves as a continuing forum for reviewing and addressing agency policies, practices, and issues regarding all environmental concerns. The Council's functions also include

-- ensuring a consistent approach to environmental requirements across the agency, including approval of proposed priorities for addressing environmental concerns;

-- providing oversight of the management and implementation of agency environmental efforts; and

-- reviewing and approving recommended agency environmental policies and implementation strategies.

ENVIRONMENTAL STRATEGIC PLAN

In April 1994, the NASA Administrator signed an environmental strategic plan entitled Environmental Excellence for the

Twenty-First Century. The plan defines the commitment of the agency's leadership and sets forth a framework for meeting current environmental needs and preparing for future challenges. The strategy is expanded into four "focus areas" -- prevention, compliance, restoration, and conservation. These focus areas are further defined by a group of objectives that will form the basis of implementation plans. However, the effectiveness of the plan may be severely weakened by the absence of specific time frames for achieving the objectives.

ENVIRONMENTAL MANAGEMENT DIVISION

On May 10, 1994, the NASA Administrator established the Environmental Management Division within the Office of Management Systems and Facilities. The Director of this Division is responsible for (1) submitting an annual plan for the control of environmental pollution to the Director, Office of Management and Budget, through the Administrator of the Environmental Protection Agency; (2) reviewing and approving, as appropriate, all funded environmental activities, including facilities projects, environmental compliance and restoration measures, and abatement plans; (3) providing support, guidance, and assistance to NASA program offices and field installations in interpreting environmental policies, requirements, and standards, including the preparation of appropriate pollution abatement plans; (4) ensuring the conduct of environmental appraisals, as required, at NASA field installations to assess progress toward compliance with NASA environmental pollution policy; (5) preparing and presenting NASA's budget requests for environmental compliance and restoration before the Office of Management and Budget and the Congress; and (6) ensuring overall coordination with the cognizant program offices for the prevention, control, and abatement measures at NASA field installations.

ENCLOSURE 2

CLEANUP COST PER FACILITY AND AREAS OF CONCERN

Table 2.1: Facility Restoration Cost Summary
Dollars in thousands

Facility	Estimated cost
Ames Research Center	$65,100
Dryden Flight Research Facility	62,950
Goddard Space Flight Center	5,600
Jet Propulsion Laboratory	77,420
Jet Propulsion Lab - Edwards	87,700
Jet Propulsion Lab - Goldstone	0
Johnson Space Center	8,000
Johnson Space Center - El Paso	0
Johnson Space Center - Ellington	0
Kennedy Space Center	337,820
Langley Research Center	28,250
Lewis Research Center	11,550
Lewis Research Center - Plum Brook	14,700
Marshall Space Flight Center	202,700
Marshall Space Flight Center - Yellow Creek	58,560
Michoud Assembly Facility	53,970
Santa Susana Field Laboratory	33,730
Stennis Space Center	59,150
Wallops Flight Facility	49,720
White Sands Test Facility	41,040
Total	$1,197,960

Note: The total cost reflects Ebasco's preliminary estimate of $1.2 billion for 360 sites.

AREAS OF CONCERN

From the Ebasco compliance evaluations, five general areas of concern at NASA facilities were identified.

-- Clean Air Act: Findings in this area related to unpermitted sources, sources operating at rates greater than the permitted amount, and improper operation of equipment.

-- Wastewater Discharges: Wastewater discharge-related findings concerned unpermitted discharges and discharge of unpretreated water identified as a Clean Water Act concern, and potential unpermitted underground injection wells were identified as a concern under the Safe Drinking Water Act.

-- Hazardous Waste Management: Concerns included management of retail hazardous waste accumulation points (i.e., satellite accumulation areas), photography waste management, hazardous waste

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documentation management, drum management, and operation of unpermitted hazardous waste treatment facilities.

-- Cultural Resources: Concerns involved NASA's historic resources, which include Mission Control at Johnson Space Center, the wind tunnel at Langley Research Center, and the test stand complex at Stennis Space Center.

-- National Environmental Policy Act: Findings in this area concerned the act's requirement that federal agencies incorporate into their planning and decision-making processes an analysis of the potential environmental effects of their actions and consider alternatives to the proposed actions.

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