National Aeronautics and Space Administration

OFFICE OF INSPECTOR GENERAL

Audit of NASA's Environmental Restoration Efforts

OFFICE OF AUDITS

AUDIT REPORT
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Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOD	Department of Defense
ECR	Environmental Compliance and Restoration
EMD	Environmental Management Division
EPA	Environmental Protection Agency
FY	Fiscal Year
GAO	Government Accountability Office
JPL	Jet Propulsion Laboratory
NETS	NASA Environmental Tracking System
NPL	National Priorities List
NPR	NASA Procedural Requirements
OIG	Office of Inspector General
RCRA	Resource Conservation and Recovery Act

OVERVIEW

AUDIT OF NASA'S ENVIRONMENTAL RESTORATION EFFORTS

The Issue

Decades of rocket testing, research, and other activities by NASA and the Department of Defense (DOD) have resulted in significant environmental contamination at several NASA Centers and facilities involving substances, which in sufficient concentrations, research has shown to cause cancer, birth defects, developmental issues, and other serious ailments. Federal and state laws require NASA to evaluate the environmental and safety impacts of Agency operations and clean up pollutants released into the environment from past activities.

The Environmental Management Division (EMD) at NASA Headquarters manages the Agency's Environmental Compliance and Restoration (ECR) Program. EMD provides guidance on how to comply with Federal, state, and local environmental laws and regulations, while ECR Program officials sample, monitor, and oversee Agency restoration and cleanup efforts.[1]

To facilitate the budget planning and project management process, Agency officials input information regarding funding requirements for environmental restoration projects into a database known as the NASA Environmental Tracking System (NETS). Officials also use NETS to estimate unfunded liabilities associated with environmental issues as part of NASA's annual financial statements.[2] As of April 2013, NETS included 142 environmental projects at Headquarters, all nine Centers, the Jet Propulsion Laboratory (JPL), and four supporting facilities.[3] These projects ranged from periodic monitoring of sites for which cleanup is complete to ongoing projects estimated to cost hundreds of millions of dollars.

In this audit, we examined the extent of NASA's environmental restoration needs and the effectiveness of the Agency's current activities to address those needs. Specifically, we reviewed whether NASA has an effective program for prioritizing and implementing environmental restoration projects and whether the Agency is taking advantage of opportunities to share restoration costs in appropriate cases. Details of the audit's scope and methodology are in Appendix A.

[1] NASA EMD, "Guidance for Implementation of Environmental Compliance and Restoration Program Requirements Defined in NASA Procedural Requirements 8590.1A," April 19, 2013.

[2] Unfunded environmental liabilities are the amounts estimated but not yet funded to clean up environmental sites and the associated cost of operations, maintenance, and monitoring expected to take place over a 30-year period.

[3] NASA's organizational structure includes a Headquarters Office in Washington, D.C.; nine Centers located across the country; the Jet Propulsion Laboratory (a federally funded research and development center); and supporting facilities, such as the White Sands Test Facility, Michoud Assembly Facility, Wallops Flight Facility, and the Santa Susana Field Laboratory. For purposes of this report, we use the generic term "Center" to refer to NASA's official-designated Centers and related component facilities.

Results

NASA faces significant challenges to appropriately prioritize and manage Agency environmental restoration projects with the limited funds available for this purpose. Since 2006, NASA has spent or budgeted an average of $62 million per year to address an estimated $1.1 billion in unfunded environmental liabilities (see Appendix B for FY 2013 unfunded environmental liabilities by Center). One project – the Santa Susana cleanup – has a fast approaching deadline and an associated cost that could consume NASA's entire restoration budget. Moving forward, NASA will make limited progress in addressing the Agency's significant environmental cleanup responsibilities without an appropriately funded restoration program that effectively prioritizes the highest risk projects, monitors the status of those projects, and shares restoration costs with other entities when appropriate.

Challenges with Project Prioritization. NASA policy dictates that the Agency prioritize environmental projects that (1) pose the greatest risk to human health or the environment, (2) are likely to proactively reduce risks to the environment, or (3) threaten neighboring property.[4] In addition, as part of the prioritization process, EMD managers consider whether a particular site is subject to an agreement with state or Federal regulators. Consequently, projects governed by such agreements score higher than projects that may pose similar or more serious health risks but are not subject to such agreements. Because EMD starts funding from the top of its project priority list and works down the list until funding is exhausted, a project's priority ranking is important.

According to EMD officials, agreements with regulators can raise project scores by as many as 3 to 4 points. For example, a project at Ames Research Center to remediate a trichloroethylene plume in the groundwater is subject to an agreement with the Environmental Protection Agency and received a score of 22. However, another cleanup project involving a trichloroethylene plume at Goddard Space Flight Center that is not governed by a regulatory agreement received a score of 20. As of July 2013, seven NASA Centers had agreements with Federal or state regulators governing various restoration projects (see Appendix C).

When deciding which cleanup projects to fund, NASA also considers secondary factors, such as the level of political and public interest in a project. As a result, a project that receives a considerable amount of political and public attention may rank higher on the Agency's priority list than a project that does not generate such attention, regardless of the relative potential impact of the contamination on human health or the environment. This dynamic was most apparent in the Agency's cleanup efforts at Santa Susana. As we reported in February 2013, although NASA did not rank the Santa Susana site as its

[4] NASA EMD, "Guidance for Implementation of Environmental Compliance and Restoration Program Requirements Defined in NASA Procedural Requirements 8590.1A," April 2013. According to NASA Procedural Requirement 8553.1B, a "high-priority environmental aspect" is a NASA environmental aspect that shall be managed to (1) avoid or prevent a serious adverse environmental impact or (2) create a substantial beneficial environmental impact.

highest risk to human health and safety, the Agency agreed to the most extensive and expensive restoration option under pressure from California politicians and nearby residents.[5]

NASA's estimate of more than $200 million to clean the site to background levels is more than two times the cost of restoring the land for residential use and more than eight times the estimated cost of restoring the site for recreational use.[6] In our 2013 report, we questioned whether NASA's agreement to clean the Agency's portion of the Santa Susana site to background levels is the best use of NASA's limited environmental remediation funds, particularly in light of the expected use of the property and the Agency's need to address other higher-risk environmental issues. While to date the Santa Susana cleanup has had little impact on NASA's ability to fund other restoration projects, the cleanup – coupled with NASA's other environmental commitments and the fiscal constraints facing the Federal Government – will pose a tremendous challenge to the Agency in the coming years.[7] Although NASA has developed a process to allocate restoration funds to address the most serious environmental hazards first, this process is susceptible to influences from public and political interests and legal agreements with regulators that may require the Agency to adjust its restoration priorities.

Effectiveness of NASA's Environmental Management Tracking System. As part of NASA's environmental prioritization process, Center managers annually enter data into NETS to request funding for ongoing restoration projects and to enable NASA to estimate unfunded environmental liabilities for the Agency's annual financial statements. Although NETS may be helpful for these limited purposes, we found that the varied ways in which the Centers use the system and inconsistencies in how Center officials enter information into the system led us to question whether NETS is a useful tool for managing restoration projects across the Agency.

Centers reported that because NETS is limited in its ability to track and manage projects, they use it only to respond to the annual Headquarters data call. For example, White Sands officials reported using various databases to manage groundwater treatment program activities, a function not available in NETS. Centers' use of NETS varied to

[5] NASA Office of Inspector General, "NASA's Environmental Remediation Efforts at the Santa Susana Field Laboratory" (IG-13-007, February 14, 2013).

[6] Background level means returning the site to its natural state prior to the introduction of contaminants. Residential level assumes that an adult or child could live on the remediated site 24 hours per day, 350 days per year, for 30 plus years. Recreational level assumes that an adult or child could be exposed several hours a day for about 50 days per year over a 30-year period without adverse health effects.

[7] Based on the President's fiscal year 2015 budget submission to Congress, NASA's projected budget for the entire ECR Program for fiscal years 2016 and 2017 is about $153 million.

such an extent that the information contained in the system could not generally be relied upon except for when the Centers updated the system in response to the annual Headquarters data call. In addition, we identified under- and over-counting of projects, which caused us to question the usefulness of NETS as an Agency-wide management tool.

We also found that neither Headquarters nor the Centers timely updated the information in NETS, which makes the data incomplete and unreliable. For example, as of February 2014, a Marshall Space Flight Center project with an estimated completion date of May 2012 had a milestone status of "ongoing." We also noted several projects with no milestone dates at all. We question the value of a system that contains such limited information.

Promotion of Potential Cost-Sharing Opportunities. When NASA was established in 1958, some of the property transferred to the new Agency by other Government agencies had existing environmental issues. However, we found a decided lack of interest on the part of EMD officials to encourage Centers to explore cost-sharing cleanup efforts with other agencies that may share responsibility for contamination on NASA sites. While we found that some NASA Centers engage in small-dollar cost-sharing activities, we remain concerned that the Agency is not maximizing opportunities to share the cost of expensive cleanup projects when liability for the contamination is shared. Given NASA's limited environmental budget, we believe NASA should increase its efforts to pursue cost-sharing opportunities as a means of maximizing Agency restoration funding.

Management Action

To assist NASA in strengthening Agency environmental restoration efforts, we recommended that the Director of the Environmental Management Division revise Agency implementation guidance for scoring environmental restoration projects to clarify the methodology used and improve transparency in the scoring process; establish a mechanism at Headquarters to centrally track Agency- and Center-level agreements to ensure such agreements receive appropriate consideration in Agency funding and management decisions; expand NETS capabilities or develop an alternate system and require Centers to use NETS or the alternate system for tracking and reporting on restoration projects, require Centers and Headquarters to update the information in the system, and establish a process to periodically verify the accuracy and reliability of the data in the system; and strengthen Agency guidance to actively promote cost sharing when appropriate.

In response to a draft of this report, NASA's Associate Administrator for Mission Support concurred with our recommendations to clarify guidance for scoring environmental restoration projects, establish a mechanism to track Agency- and Center-level agreements, and strengthen Agency guidance to promote cost sharing when appropriate. The Associate Administrator partially concurred with our recommendation related to the NETS system, stating that by June 2015 NASA will establish a process to

periodically update NETS, populate the new fields, and verify the data. However, the Associate Administrator stated that because progress on projects does not change significantly over the period of a year, NASA plans to update the system only semiannually to coincide with the unfunded environmental liability review and Agency budget processes.

We consider the corrective actions proposed by the Associate Administrator responsive to our recommendations and will close the recommendations upon completion and verification of those actions. We incorporated management's technical comments on our draft into the final report, as appropriate. Management's full response to the draft report is reprinted in Appendix D.

CONTENTS

INTRODUCTION

Background

Decades of rocket testing, research, and other activities by NASA and the Department of Defense (DOD) have resulted in significant environmental contamination at several NASA Centers and facilities involving substances, which in sufficient concentrations, research has shown to cause cancer, birth defects, developmental issues, and other serious ailments. Federal and state laws require NASA to clean up pollutants released into the environment from past activities and evaluate the environmental and safety impacts of current operations.

The Environmental Management Division (EMD) manages NASA's Environmental Compliance and Restoration (ECR) Program. Based at NASA Headquarters, EMD provides guidance on how to comply with Federal, state, and local environmental laws and regulations, while ECR Program officials sample, monitor, and oversee Agency restoration and cleanup efforts.[8]

An EMD staff member is assigned to each NASA Center to act as a liaison between Headquarters and the Centers, as well as to be responsible for understanding and keeping up to date on environmental and cleanup issues at the Center, reviewing funding requests for new and existing restoration projects, and reviewing estimates for unfunded environmental liabilities. Center officials work with their respective EMD liaisons to identify environmental projects each year as part of the annual budget planning process.

To facilitate the budget planning and project management process, Agency officials input information regarding funding requirements for environmental restoration projects into a database known as the NASA Environmental Tracking System (NETS). Officials also use NETS to estimate unfunded liabilities associated with environmental issues as part of NASA's annual financial statements.[9] As of April 2013, NETS included 142 environmental projects at Headquarters, all nine Centers, the Jet Propulsion Laboratory (JPL), and four supporting facilities.[10] These projects ranged from periodic monitoring of completed cleanup actions to ongoing restoration projects estimated to cost hundreds of millions of dollars.

[8] NASA EMD, "Guidance for Implementation of Environmental Compliance and Restoration Program Requirements Defined in NASA Procedural Requirements 8590.1A," April 2013.

[9] Unfunded environmental liabilities are the amounts estimated but not yet funded to clean up environmental sites and the associated cost of operations, maintenance, and monitoring expected to take place over a 30-year period.

[10] NASA's organizational structure includes a Headquarters Office in Washington, D.C., nine Centers located across the country, the Jet Propulsion Laboratory (a federally funded research and development center), and supporting facilities, such as the White Sands Test Facility, Michoud Assembly Facility, Wallops Flight Facility, and the Santa Susana Field Laboratory. For purposes of this report, we use the generic term "Center" to refer to NASA's Centers and related component facilities.

Federal Environmental Laws. Two of the most significant Federal laws governing environmental management responsibilities at Federal installations are the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). CERCLA, commonly known as Superfund, requires Federal agencies to investigate and clean up contamination at their facilities. The Environmental Protection Agency (EPA) designates for inclusion on a CERCLA National Priorities List (NPL) sites with significant contamination or that pose a threat of releasing hazardous substances, pollutants, or contaminants. Four NASA facilities are on the NPL: Marshall Space Flight Center (Marshall), Langley Research Center (Langley), Moffett Field at the Ames Research Center (Ames), and JPL.[11] See Appendix C for more information on these sites.

Federal agencies with facilities on the NPL are required to enter into an interagency agreement – sometimes called a Federal Facility Agreement – with the EPA to govern cleanup of a site. Affected states are often signatories to these agreements. For example, the Alabama Department of Environmental Management is a signatory to Marshall's Federal Facilities Agreement with the EPA. EPA monitors the cleanup schedule and milestones for these sites to ensure proper and timely implementation and can impose penalties on agencies for noncompliance.

RCRA governs Federal management of hazardous waste facilities and establishes an environmental corrective action program administered by the EPA. Under RCRA, the EPA may authorize states to serve as the lead regulatory agency on certain cleanup projects, allowing the states to specify the environmental cleanup requirements Federal agencies must meet. Under this authority, states may issue formal administrative actions, such as a compliance order or corrective action order requiring specified actions and milestones and providing for penalties for noncompliance.

NASA's Environmental Restoration Budget. NASA's budget for cleaning contaminated sites is part of the Agency's Construction and Environmental Compliance and Restoration appropriation. The ECR budget has two program elements: (1) Restoration and (2) Environmental Compliance and Functional Leadership. NASA described these elements in its fiscal year (FY) 2014 budget submission:

> Restoration projects address cleanup liabilities at all NASA Centers and component facilities . . . with many of the individual cleanup projects estimated to take more than 25 years to complete. NASA policy is to address these liabilities using a "worst first" approach to ensure human health and the environment are protected and to facilitate mission readiness. . . . Projects are ranked according to the relative urgency and the potential health and safety hazards related to each individual cleanup. As studies, assessments, investigations, plans, regulatory approvals, and designs progress, and as new discoveries or regulatory requirements change, NASA expects that program priorities may change.

[11] In addition, Dryden Flight Research Center (now known as Armstrong Flight Research Center) is a tenant of the Edwards Air Force Base, which is listed on the NPL.

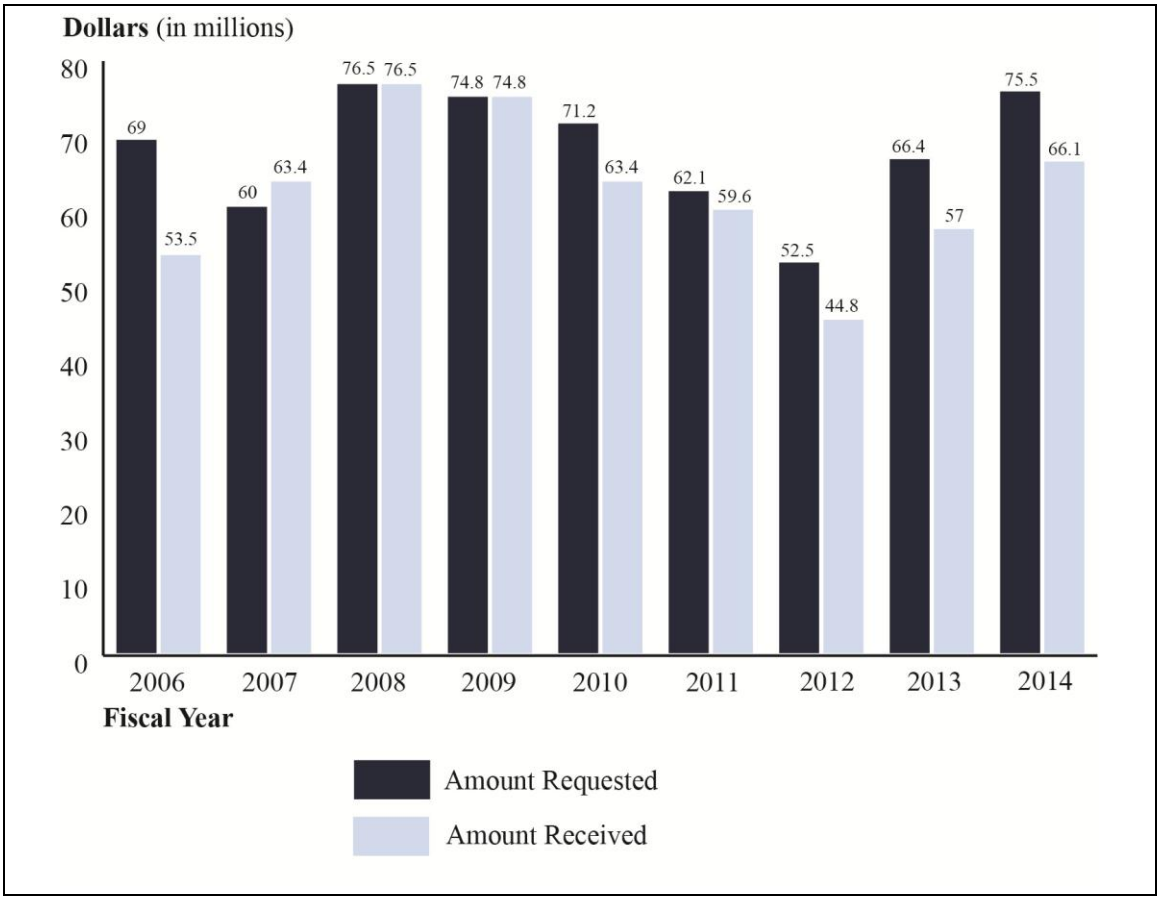
> [Environmental Compliance and Functional Leadership projects] invest in environmental methods and risk reduction practices that ensure NASA may continue to carry out its scientific and engineering missions. This includes methodologies for sustainably reducing energy intensity and greenhouse gas emissions, and supporting operational activities by ensuring that advances in chemical risk management are incorporated early in mission design phases.

As of September 30, 2013, NASA identified approximately $1.1 billion in unfunded environmental liabilities over the next 30 years (see Appendix B for FY 2013 unfunded environmental liabilities by Center).[12] In preparing annual budget requests, Centers prepare and submit estimates of funding they will need to meet established milestones and commitments to their regulators for that fiscal year. NASA Headquarters personnel consolidate and review these submissions. The amount the Agency requests to fund environmental restoration programs fluctuates year-to-year depending on the work scheduled for completion during the covered period. NASA also frames its budget submission based on guidance from the Office of Management and Budget and Agency leaders on the funding level it may reasonably expect to receive given other budget priorities both within and outside NASA.

Funding Levels for NASA's Environmental Restoration Program. Over the last 9 years, NASA's environmental restoration program funding has fluctuated by as much as 41 percent. For example, in FY 2008, NASA received $76.5 million in ECR funding, a figure that decreased to $44.8 million in FY 2012. For FY 2013, the Agency requested $66.4 million for its environmental restoration projects and received $57 million. NASA spent approximately 92 percent ($52 million) of the $57 million on restoration projects, with the remaining 8 percent ($5 million) dedicated to Environmental Compliance and Functional Leadership projects. For FY 2014, NASA requested $75.5 million and received approximately $66.1 million. As shown in Figure 1, in each of the last 5 years, NASA has received somewhat less funding than requested for the Agency's environmental restoration efforts.

[12] NASA recognizes unfunded environmental liabilities in the Agency's annual financial statements based on estimated cleanup costs associated with its environmental restoration projects over the next 30 years. These estimates and related supporting documentation are evaluated as part of NASA's annual financial statements audit.

Figure 1: ECR Funding



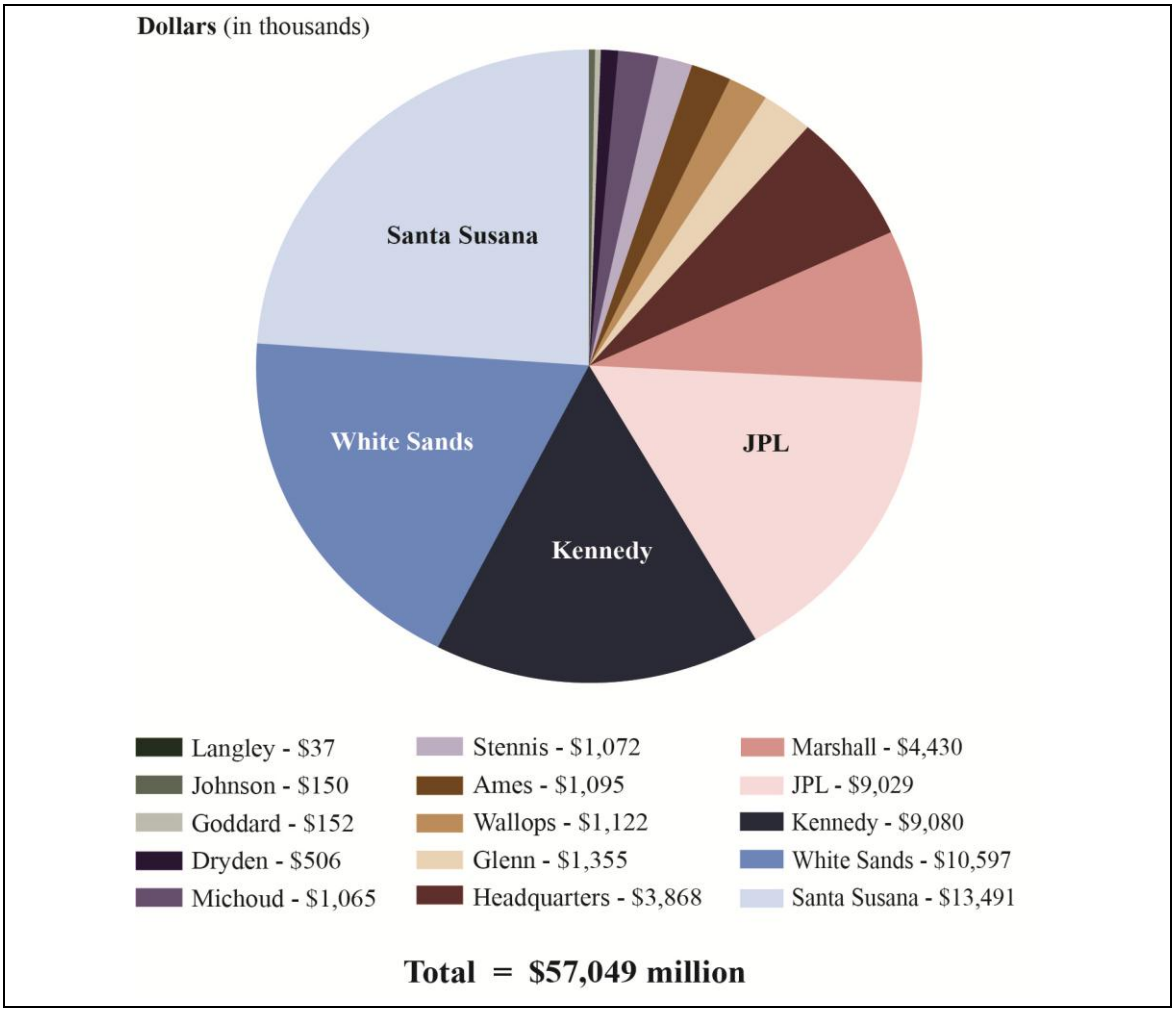
Note: The FY 2014 "amount received" is an estimate of what EMD expects to receive from the Construction and Environmental Compliance and Restoration appropriation.

Source: NASA budget submissions.

NASA's ECR Program funds a variety of activities to clean up hazardous materials that have contaminated soil or groundwater at NASA installations. For example, in FY 2012, NASA received final license termination from the Nuclear Regulatory Commission for the completed decommissioning of the Plum Brook Reactor Facility. This action culminated 13 years of work to dispose of materials that remained at the facility after the reactor was shut down in 1973. The Plum Brook decommissioning cost more than $200 million and included demolishing the remaining structures and returning the site to green space. Currently NASA is funding a variety of restoration projects, including the remediation of groundwater pollution at Marshall that resulted from rocket engine testing and industrial operations, and in some cases production of munitions and chemicals prior to when NASA assumed control of the property; groundwater and soil contamination at Kennedy Space Center (Kennedy) resulting from polychlorinated biphenyl and trichloroethylene from launch and payload processing operations; and a solid waste disposal site at Ames.

As Figure 2 depicts, four NASA facilities – JPL, the White Sands Test Facility (White Sands), the Santa Susana Field Laboratory (Santa Susana), and Kennedy – accounted for approximately 74 percent of NASA's $57 million FY 2013 restoration budget. The contamination at JPL resulted from DOD and contractor waste disposal practices in the 1940s and 1950s that left chemicals in the soil and groundwater. Similar groundwater contamination resulted from cleaning operations and propulsion testing performed at White Sands. NASA has constructed and is operating water treatment facilities at JPL and White Sands to protect the water supply of neighboring communities from the groundwater plumes that resulted from the contamination.[13]

Figure 2: Fiscal Year 2013 Center ECR Funding



Note: On March 1, 2014, Dryden was renamed the Armstrong Flight Research Center.

Source: EMD budget prioritization listing as of July 2013.

[13] A groundwater plume is a volume of contaminated groundwater that extends downward and outward from a specific source.

Years of rocket testing for defense and space exploration by the U.S. Air Force and NASA at the NASA-administered portion of the Santa Susana site resulted in chemical contamination of soil and groundwater. In December 2010, NASA signed an Administrative Order of Consent with California officials agreeing to the most extensive and expensive option for cleaning contaminated soil at the site.[14] Balancing the demands of this agreement against the Agency's other high priority cleanup projects will be extremely challenging. Specifically, NASA anticipates spending more than $200 million between FYs 2016 and 2017 to remediate soil contamination at the site.[15] However, NASA's projected budget for the entire ECR Program for that 2-year period is only about $153 million. In past years, EMD has had sufficient funding to address the requirements of the legal agreements, as well as NASA's highest risk projects; however, EMD officials said this will change if the Agency is required to meet the terms of the current Santa Susana agreement without a significant increase to its environmental restoration budget.

Project Risk Analysis. EMD prioritizes restoration projects using a scoring system that considers the risks the site poses to human health and the environment, whether the contamination extends beyond the NASA site, and whether a legal agreement governs the project. Officials categorize and prioritize projects using a risk-based matrix that assesses the likelihood that an event will occur and the consequence of the event should it occur.[16] Numerous factors go into the analysis of consequences and likelihood. For example, when analyzing consequences, EMD considers such factors as whether the project would eliminate a potential source of death or disabling injury, NASA faces a loss of mission or institutional capability as a result of the contamination, and significant sanctions are possible for failing to comply with a governing agreement. This analysis is then combined to obtain a composite score for consequence on a scale of 1 to 5, with 5 signifying a very severe consequence.

For likelihood, EMD assesses how likely NASA is to face the predicted consequence. Consequences deemed nearly certain to occur are scored a 5 for likelihood, while those deemed extremely unlikely to occur receive a 1. For example, if the Agency faces a sanction for noncompliance with a regulatory agreement but EMD managers believe it is highly unlikely the regulator would impose the sanction, the project would receive a likelihood score of 1. Generally, individual scores for likelihood and consequence are multiplied to derive a total score for each project, with the highest possible score being 25. EMD officials told us that in some instances the consequence score may be given greater weight, which produces a final score that differs from the score that would be derived from straight multiplication of the individual scores. Scores may also be adjusted to account for other factors, such as the level of public and political interest in a project.

[14] NASA Office of Inspector General, "NASA's Environmental Remediation Efforts at the Santa Susana Field Laboratory" (IG-13-007, February 14, 2013).

[15] This estimate of more than $200 million is for the soil cleanup effort under the terms of the 2010 Administrative Order of Consent. The figure does not include the cost of groundwater cleanup at the site to comply with a previous consent order.

[16] The term consequence is used to denote the impact of a particular project, which in many instances is a negative impact. However, it can also be used to denote a benefit, such as if taking action would result in eliminating a potential source of substantial injury or providing a significant cost savings to the Agency.

EMD starts funding from the top of the priority list working down the list until funding is exhausted. Accordingly, the higher ranked a project, the more likely it is to receive funding. Projects typically span multiple years, so funding needs and scores for individual projects may fluctuate from year to year depending on the work that needs to be accomplished. If higher-ranked projects require a greater share of the funding in a given year, less funding will be available for lower-ranked projects. Conversely, if higher-ranked projects require less funding in a given year, more of the lower-ranked projects would receive funding.

At the time of our review, EMD officials reported that of the 88 restoration projects on NASA's prioritization list for FY 2013 funding, 3 received the highest score of 25 and another 61 received scores between 20 and 23. Table 1 shows the full distribution of scores.

Table 1: Number of Projects at Each Prioritization Level

Score	Total Number of Projects	Number of Projects Subject to an Agreement
25[a]	3	3
23[b]	10	10
22	7	6
20	44	5
19	9	9
18	8	0
below 18 or no score	7	6
Total	**88**	**39**

Note: There may be more than one project associated with a contaminated site.

[a] These projects are associated with the contamination at JPL and White Sands. NASA operates treatment facilities to protect the water supplies in neighboring communities.

[b] These projects are associated with Santa Susana.

Source: Data from NASA EMD.

Objectives

Our objective was to examine the extent of NASA's environmental restoration needs and the effectiveness of the Agency's current activities to address those needs. Specifically, we reviewed whether NASA has an effective program for prioritizing and implementing environmental restoration projects and whether NASA is taking advantage of cost-sharing opportunities in those restoration efforts. Details of the audit's scope and methodology are in Appendix A.

NASA FACES SUBSTANTIAL CHALLENGES IN MANAGING ITS ENVIRONMENTAL RESTORATION PROGRAM

NASA faces significant challenges to appropriately prioritize and manage the Agency's environmental restoration projects with the limited funds available for this purpose. Since 2006, NASA has spent or budgeted an average of $62 million per year to address an estimated $1.1 billion in unfunded environmental liabilities. One project – the Santa Susana cleanup – has a fast approaching deadline and an associated cost that could consume NASA's entire restoration budget. Moving forward, NASA will make limited progress in addressing its significant environmental cleanup responsibilities without an appropriately funded restoration program that effectively prioritizes the highest risk projects; monitors the status of those projects; and shares restoration costs with other entities, when appropriate.

NASA Faces Challenges with Project Prioritization

NASA policy dictates the Agency prioritize environmental projects that (1) pose the greatest risk to human health or the environment, (2) are likely to proactively reduce risks to the environment, or (3) threaten neighboring property.[17] In addition, as part of the prioritization process, EMD managers consider whether regulatory agreements govern a particular site. Consequently, projects governed by such agreements score higher than projects that may pose similar or more serious health risks but are not subject to such agreements. As of July 2013, seven NASA Centers had agreements with Federal or state regulators governing various restoration projects (see Appendix C).

According to EMD, legal agreements with regulators can raise project scores by as many as 3 to 4 points. For example, a project at Ames to remediate a trichloroethylene plume in the groundwater that is subject to a Federal Facilities Agreement with the EPA received a score of 22. Ames operates a treatment system along the Center's border to mitigate the migration of the plume onto Ames property. However, a project related to a trichloroethylene plume at Goddard Space Flight Center (Goddard) that is not governed by a regulatory agreement received a score of 20. In this instance, Goddard is monitoring the contamination to ensure it is not a significant risk. An EMD official confirmed the Ames project scored higher because of the existence of the legal agreement.

[17] NASA EMD, "Guidance for Implementation of Environmental Compliance and Restoration Program Requirements Defined in NASA Procedural Requirements 8590.1A," April 2013. Also, according to NASA Procedural Requirement (NPR) 8553.1B, a "high-priority environmental aspect" is a NASA environmental aspect that shall be managed to (1) avoid or prevent a serious adverse environmental impact or (2) create a substantial beneficial environmental impact.

In another case, Johnson Space Center (Johnson) is working to contain trichloroethylene and other chemicals in groundwater on the Center from reaching a baseball field near its property boundary. As this project is not subject to an agreement or order with regulators, it scored an 18 on EMD's risk matrix. However, a groundwater project at Marshall that is not considered a significant risk to Marshall employees or the public scored a 19 because the site is listed on the NPL. According to EMD officials, while the Marshall project is significantly larger than the Johnson project, an EMD official confirmed that Marshall's project scored higher than it otherwise would have because of its inclusion on the NPL.

Center officials have broad authority to negotiate the details of cleanup agreements, and the respective Center Directors sign the agreements committing the Agency to the requirements. Since 2011, NASA has required Headquarters' approval of these agreements prior to Center Director signature.[18] However, many of the agreements cover work that will span a number of years, with the full cost not known until well after the agreement is signed. Because of the legal implications of these agreements, they must be considered in the prioritization process. Nevertheless, the agreements generally reflect the priorities of the respective regulator or the public's priority for a particular site, and therefore may not fully align with the overall priorities of NASA. Although all of the projects discussed previously received funding in FY 2013, going forward EMD officials must carefully monitor regulatory agreements to manage their impact on NASA's environmental restoration budget. If not appropriately tracked across the Agency, these agreements have the potential to threaten funding for projects that although not subject to legal agreements have greater potential to affect human health and the environment.

Secondary factors like the level of political and public interest in a project can also influence the order in which projects are funded. As we previously reported, political and public interests played a significant role in NASA's agreement to clean up contaminated groundwater at the Santa Susana site, resulting in the project scoring higher on NASA's priority list than it otherwise would have. In August 2007, NASA, Boeing, and the Department of Energy signed consent orders with California agreeing to clean up groundwater and soil at the facility to residential exposure levels.[19] However, due to negative reactions from members of the local community and political pressure, in December 2010, NASA signed a more restrictive Administrative Order of Consent under which the Agency agreed to the most extensive and expensive option for cleaning the contaminated soil.[20]

[18] NASA Procedural Requirement "8590.1A, NASA Environmental Compliance and Restoration Program," July 2011.

[19] Residential exposure level assumes that an adult or child could live on the remediated site 24 hours a day, 350 days per year for 30 years without adverse health impacts.

[20] In April 2013, subsequent to release of our February 2013 report, California environmental officials sent a letter to the Mayor of the City of Simi Valley near the Santa Susana site stating "[t]o date we have not found evidence of off-site contamination from SSFL [Santa Susana Field Laboratory] that would pose a risk to human health or the environment."

NASA's estimate of more than $200 million to clean the Santa Susana site to background levels is more than two times the cost of restoring the land for residential use and more than eight times the estimated cost of restoring the site for recreational use.[21] In our 2013 report, we questioned whether NASA's agreement to clean its portion of the site to background levels is the best use of NASA's limited environmental remediation funds, particularly in light of the expected use of the property and the Agency's need to address other higher-risk environmental issues. While to date the Santa Susana cleanup has had little impact on NASA's ability to fund other restoration projects, that cleanup – coupled with NASA's other environmental commitments and the fiscal constraints facing the Federal Government – will pose a tremendous challenge to the Agency in the coming years.[22] Although NASA has developed a process to allocate restoration funds to address the most serious environmental hazards first, this process is susceptible to influences from public and political interests and legal agreements with regulators that may require the Agency to adjust restoration priorities.

EMD officials support the need to adjust project prioritization scores to account for various factors, such as when management increases the consequence score or due to the level of public and political interest in a project. However, EMD officials also acknowledge that improved transparency is necessary to ensure changes to project scores are documented and tracked, including when management or political interest result in adjustments, regardless of the reason for the change.

NASA Lacks an Effective Environmental Management Tracking System

The NASA Environmental Tracking System (NETS) was originally created to support the reporting and management of environmental projects across the Agency, allow Centers to request funding for restoration projects, and enable NASA to track unfunded environmental liabilities. However, the questionable reliability of NETS data and the system's limited utility as a project management tool means NETS is ill-equipped to serve as an effective overall management tool for Agency officials responsible for making funding and other programmatic decisions about environmental restoration projects. As a result, EMD officials depend on other, informal means of obtaining information about environmental projects.

Reliability of NETS Data. As part of NASA's environmental prioritization process, Center managers annually enter data in NETS to request funding for ongoing restoration projects and enable the Agency to estimate unfunded environmental liabilities for its annual financial statements. Although NETS may be helpful for these limited purposes,

[21] Background level means returning the site to its natural state prior to the introduction of contaminants. Residential level assumes that an adult or child could live on the remediated site 24 hours per day, 350 days per year, for 30 plus years. Recreational level assumes that an adult or child could be exposed several hours a day for about 50 days per year over a 30-year period without adverse health effects.

[22] Based on the President's FY 2015 budget submission to Congress, NASA's projected budget for the entire ECR Program for FYs 2016 and 2017 is about $153 million.

we found that the varied ways in which the Centers use the system and inconsistencies in how Center officials enter information into the system led us to question whether NETS is a useful tool for managing restoration projects across the Agency.

Using a standardized questionnaire, we asked each Center how it prioritized and reported restoration projects in NETS and compared the Center-reported data with information in the system. We identified under- and over-counting of projects that caused us to question NETS' usefulness as a management tool. For example, the Centers reported in response to the questionnaire 185 projects, while NETS showed only 142 (as shown in Table 2).

Table 2: Differences in Restoration Projects Reported

Center	Reported by Centers	Reported in NETS	Project Difference
Ames Research Center	6	10	-4
Dryden Flight Research Center	1	2	-1
Glenn Research Center	8	11	-3
Goddard Space Flight Center	1	2	-1
Jet Propulsion Laboratory	3	4	-1
Johnson Space Center	2	2	0
Kennedy Space Center	111	47	64
Langley Research Center	6	7	-1
Marshall Space Flight Center	9	9	0
Michoud Assembly Facility	7	8	-1
Stennis Space Center	9	9	0
Wallops Flight Facility	12	14	-2
White Sands Test Facility	10	17	-7
Total	**185**	**142**	**43**

Note: This table does not include data from Headquarters and Santa Susana Field Laboratory. On March 1, 2014, Dryden was renamed the Armstrong Flight Research Center.

Source: Center data call responses and NETS data.

The difference between those projects reported by the Centers, as compared to NETS, is generally the result of Centers separating out phases of a single project or consolidating several smaller efforts into one project. For example, Kennedy reported 111 projects in response to our questionnaire while NETS listed only 47 projects at the Center. Kennedy personnel explained that the difference was due, in part, to the grouping of long-term projects for reporting in NETS. Similarly, White Sands reported 10 projects in response to our data call while NETS listed 17 projects. White Sands personnel explained that they further combined and reduced their projects from 10 to 7 after our initial data call. While the number of projects in NETS at year-end should be an accurate reflection of Center project activity, the differences noted in Table 2 illustrate the difficulty of using the system to inform Headquarters management decisions throughout the year. EMD officials acknowledged that project data changes throughout the year and that these changes are not consistently reflected in NETS. Officials said they rely on Center liaisons to provide up-to-date information about projects, rather than relying solely on NETS.

We also found that neither the Centers nor Headquarters fully utilized or timely inputted data into NETS. For example, the status of a Marshall project showing an estimated completion date of May 2012 had not been updated as of February 2014, almost 2 years later. We also noted that some projects had no milestones identified in the system, which would make it difficult for Headquarters to make funding decisions. Additionally, other fields in NETS appeared to be either infrequently or never used, including a "[Potentially Responsible Party] Determination Completed" field and an "EMD Approval" field to validate specific milestones. EMD personnel told us that they have been working to expand NETS' capabilities so it is a work in progress and was not being fully utilized at the time of our audit fieldwork. That said, we question the usefulness of a system containing such limited and unreliable information.

Utilization of NETS. We found that neither Headquarters nor the Centers consistently use NETS information throughout the year to manage and track restoration projects. The NETS database captures information, such as cost and risk score, as well as data about other NASA programs, such as energy, water, and cultural resource management.[23] While EMD Headquarters officials told us that NETS was developed to assist with Center project management efforts, Center officials said they used the database sparingly and primarily to meet annual reporting requirements.

When we asked EMD officials about the Centers limited use of NETS, they said the system is unable to do much more than collect data about the number of projects, funding requests, and risk scores. EMD officials acknowledged that NETS' capabilities do not meet Center project management needs and that the system cannot be used to manage restoration projects. For example, White Sands officials reported using various databases to manage groundwater treatment program activities, a function not available in NETS. Table 3 provides a sample of comments from Center officials related to their utilization of NETS.

[23] Cultural resource management is a program that employs personnel to identify, evaluate, and preserve cultural and historic resources encountered at planned construction projects or existing facilities.

Table 3: Centers Comments on Utilization of NETS

Centers	Utilization of NETS
Glenn Research Center	Does not use NETS except for annual data call
Goddard Space Flight Center	Uses NETS to manage the project planning and limited support in tracking project cost
Kennedy Space Center	Uses NETS and Center specific system to manage projects
Marshall Space Flight Center	Does not use NETS except for annual data call
Wallops Flight Facility	Uses NETS to manage the project planning and limited support in tracking project cost

Source: NASA Office of Inspector General data call.

Similarly, officials at Marshall and Glenn reported using NETS only to respond to the annual Headquarters data call and not to manage or track restoration projects. Goddard and Wallops Flight Facility officials said that while they use NETS to help manage project planning, the system has limited capability to track project costs. Kennedy officials said they use NETS and a Center-developed spreadsheet to manage their cleanup projects.

We believe that the inclusion of additional fields in NETS, such as milestones and Headquarters approval of certain milestones, if appropriately used by Headquarters and the Centers, are a step in the right direction. However, due to the questionable accuracy of NETS data and limited utilization of the system by Centers, we question how decision makers at Headquarters can effectively manage NASA's overall restoration budget without an Agency-wide system that provides reliable data throughout a project's life cycle.

NASA Does Not Promote Use of Potential Cost-Sharing Opportunities

When NASA was created in 1958, property from other Government agencies – including some with existing environmental issues – was transferred to the new Agency. We found that NASA does not aggressively pursue cost-sharing arrangements for cleanup projects with other entities who may share responsibility for contamination at NASA installations. EMD officials said that prior attempts by NASA to cost share have had limited success. In addition, they expressed the opinion that because funding for all Federal environmental restoration projects comes from the U.S. Treasury it does not matter which agency funds the project. As a result, NASA sometimes uses its funds to remediate contamination the Agency did not cause. This reduces the funding available to address other environmental restoration efforts for which the Agency has primary responsibility.

Laws and Guidance. NASA policy defines cost sharing as "sharing expenses related to contemplated remedial activities or the sharing of the work in performing remedial activities."[24] Federal law and NASA guidance require Centers to identify potentially responsible parties that could share responsibility for cleaning up contamination. However, NASA's guidance does not require Centers to pursue those parties to share in cleanup costs. According to NASA policy, Centers are to evaluate the potential for cost-sharing or cost-recovery arrangements with potential responsible parties and, if such opportunities exist, forward this information to EMD and NASA Headquarters Office of Procurement.[25] EMD and Procurement have 30 days to approve cost sharing for the project. After receiving Headquarters approval, the Centers take responsibility for negotiating potential cost-sharing agreements and any such agreements are tracked solely at the Center level.

Previous Attempts at Cost Sharing. According to EMD officials, NASA is reluctant to pursue cost sharing on many of its projects. EMD officials told us that some past efforts to cost share were largely unsuccessful. Further, they expressed the view that because all Federal cleanup projects are funded through the U.S. Treasury, whether NASA or another agency finances the project is insignificant. Lastly, EMD officials informed us that NASA is reluctant to seek cost-sharing agreements because it could find itself in litigation with other agencies for years over the issue of responsibility.

In one example, the U.S. Navy and NASA disagreed on aspects of the cleanup associated with Hangar One near Ames, and ultimately, the Office of Management and Budget settled the dispute.[26] In another case, NASA identified DOD as a potential responsible party for soil and groundwater contamination at JPL. However, after discussions with DOD, Agency officials decided that because NASA had occupied the property for more than 40 years NASA was responsible for facility maintenance, including environmental cleanup and compliance. Therefore, NASA did not pursue a cost-sharing agreement for this project.

Current Cost-Sharing Efforts. Despite the position of Headquarters EMD officials that little can be gained from pursuing cost sharing, we identified several Centers that have entered into such agreements on a variety of cleanup projects. For example, some of the contamination on Marshall property was caused by U.S. Army activities prior to Marshall's existence. Marshall coordinates with the Army to clean up contaminants at

[24] NASA Procedural Requirement "8590.1A, NASA Environmental Compliance and Restoration Program," July 2011.

[25] NASA EMD, "Guidance for Implementation of Environmental Compliance and Restoration Program Requirements Defined in NASA Procedural Requirements 8590.1A," April 2013.

[26] NASA Office of Inspector General, "NASA's Hangar One Re-Siding Project" (IG-11-020, June 22, 2011). Even though the U.S. Navy transferred the area of Moffett Field adjacent to Ames to NASA in 1994, it retained responsibility for environmental restoration of the site. In 2002, NASA discovered that contaminants in the skin of the Hangar were leaking. The Navy and NASA disagreed on which agency should be responsible for residing the hangar. In 2010, the Office of Management and Budget ruled that the Navy would pay for the environmental cleanup but NASA would need to pay to reside the hangar.

several locations on the Center.[27] Further, since early FY 2006, Stennis Space Center (Stennis) has engaged in a small cost-sharing agreement with the U.S. Air Force to address contaminated drums and other debris the Air Force disposed of on the Center. The contents of the drums combined with trichloroethylene from earlier NASA operations contaminated groundwater at the site. Under terms of the agreement, the Air Force will provide Stennis $120,000 over the next 20 years for restoration efforts. Stennis personnel told us they followed EMD guidance and obtained NASA Headquarters concurrence before engaging in this cost-sharing arrangement. These examples illustrate that NASA Centers can and do engage in cost-sharing efforts that contribute to more effective utilization of ECR restoration funds. Both types of agreements are consistent with NASA's cost-sharing guidance, which promotes the identification of other potentially responsible parties to ensure the most cost-effective restoration efforts both in the sharing of work and funding.

Some Centers utilize what EMD refers to as "resource sharing" to further their restoration efforts while also maximizing available resources. Resource sharing involves utilizing another agency's environmental restoration contract and contractors to accomplish NASA's restoration efforts. For example, Langley uses U.S. Navy contracts and contractors to perform the majority of restoration work at the Center. According to EMD officials, this type of effort allows NASA to complete restoration efforts more efficiently since the other agency has an existing contract and the work can be performed for NASA on a reimbursable basis. EMD officials acknowledged that resource sharing is not discussed in their policies or guidance, and efforts to encourage Centers to look for opportunities or share existing opportunities have primarily been through verbal communications.

In sum, while we recognize the difficulties NASA has experienced in past attempts to seek cost sharing for environmental restoration work, the current budget climate and the scope of NASA's unfunded environmental liabilities necessitate that the Agency attempt to share cleanup costs whenever possible. While several Centers are currently utilizing cost or resource-sharing agreements, we are concerned that the apparent lack of recognition, advocacy, and general interest on the part of EMD officials to promote such agreements may discourage Centers from pursuing these potentially valuable opportunities.

[27] Marshall's property, owned by the U.S. Army, is located within Redstone Arsenal's boundaries. Marshall and the Redstone Arsenal are located in Huntsville, Alabama.

Conclusion

NASA is required by law to clean up chemicals and other contaminants released into the environment on Agency property and as a result of Agency activities. These responsibilities necessitate that NASA effectively prioritize its cleanup projects to efficiently utilize the Agency's limited environmental restoration budget. While NASA has developed a process to allocate restoration funds to address the most serious environmental hazards first, this process is susceptible to influences from public and political interests and legal agreements with regulators, which may not be in the best interest of the Agency as a whole. In particular, if NASA moves forward under the terms of its current agreement with California officials to clean up the Santa Susana site, other projects with a higher risk to human safety may not receive necessary funding.

Furthermore, as part of the Agency's annual risk prioritization process, NASA Centers are required to input data for their environmental restoration project requirements into the NETS database. We identified significant issues with the accuracy of the data in NETS that caused us to question the usefulness of the system as a management tool and oversight mechanism for Headquarters.

Finally, we found a decided lack of interest on the part of EMD officials to encourage Centers to explore cost-sharing cleanup efforts with other agencies. While we found that some NASA Centers engage in small-dollar cost-sharing activities, we remain concerned that the Agency is not maximizing opportunities to share the cost of expensive cleanup projects when liability for the contamination is shared. Given NASA's limited environmental budget, we believe NASA should increase its efforts to pursue cost-sharing opportunities as a means of maximizing Agency restoration funding.

Recommendations, Management's Response, and Evaluation of Management's Response

To assist NASA in strengthening its environmental restoration efforts, we are making the following recommendations to the Director of the Environmental Management Division:

Recommendation 1. Revise Agency implementation guidance for NPR 8590.1A for scoring environmental restoration projects to clarify the methodology used and improve transparency in the scoring process.

Management's Response. The Associate Administrator for Mission Support concurred with our recommendation, stating that by June 2015 NASA will reevaluate and revise its guidance to clarify the process by which projects are prioritized for funding and improve the transparency of funding decisions.

Evaluation of Management's Response. Management's comments are responsive; therefore, the recommendation is resolved and will be closed upon verification and completion of the proposed corrective actions.

Recommendation 2. Establish a mechanism at Headquarters to centrally track Agency and Center-level agreements to ensure such agreements receive appropriate consideration in Agency funding and management decisions and strengthen communication between Headquarters and the Centers about the agreements.

Management's Response. The Associate Administrator concurred with our recommendation, stating that by June 2015 NASA will revise NETS to include a repository for all Agency- and Center-level enforceable agreements related to cleanup. NASA will also revise its guidance on prioritization to explain how enforceable agreements are used in deriving preliminary scoring decisions and ensure that enforceable agreements are approved by NASA Headquarters, as required.

Evaluation of Management's Response. Management's comments are responsive; therefore, the recommendation is resolved and will be closed upon verification and completion of the proposed corrective actions.

Recommendation 3. Expand NETS capabilities or develop an alternate system and require Centers to use NETS or the alternate system for tracking and reporting on restoration projects, require Centers and Headquarters to update the information in the system either monthly or quarterly, and establish a process to periodically verify the accuracy and reliability of the data in the system.

Management's Response. The Associate Administrator partially concurred with our recommendation, stating that by June 2015 NASA will establish a process to periodically update NETS, populate the new fields, and verify the data and will include the revised process in the implementation guidance for NPR 8590.1. The Associate Administrator further stated that because progress on projects does not change significantly over the period of a year, the Agency plans to update NETS only semiannually to coincide with the unfunded environmental liability review and Agency budget processes.

Evaluation of Management's Response. Although the Agency plans to update NETS less frequently than we suggested, we appreciate that management has agreed to place a priority on ensuring that NETS data is current and accurate and, in light of the other actions NASA is taking, we believe that semiannual updates should be sufficient to maintain data integrity. Accordingly, we consider management's comments to be responsive and the recommendation is resolved and will be closed upon verification and completion of the proposed corrective actions.

Recommendation 4. Strengthen NPR 8590.1A and EMD implementation guidance to actively promote cost sharing when appropriate. The revised guidance should also define and promote resource-sharing opportunities and provide a process for disseminating information about resource sharing opportunities among Centers.

Management's Response. The Associate Administrator concurred with our recommendation, stating that by June 2015 NASA will revise its guidance to clarify the definition of "cost sharing" and promote the idea of "resource sharing" between NASA Centers and with other agencies. NASA will also evaluate the Potentially Responsible Party – "cost sharing" – language in NPR 8590.1 as part of the next scheduled update of the NPR in 2016.

Evaluation of Management's Response. Management's comments are responsive; therefore, the recommendation is resolved and will be closed upon verification and completion of the proposed corrective actions.

APPENDIX A

Scope and Methodology

We performed this audit from March 2013 through June 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Our objectives included examining the extent of NASA's environmental restoration needs and the effectiveness of the Agency's current activities to address those needs.

We performed work at Marshall Space Flight Center, including meeting with the environmental project manager for Michoud Assembly Facility, and with NASA Headquarters' Environmental Division. We also issued a data call questionnaire requesting information about their overall environmental restoration program, including how the Centers prioritize and implement environmental projects and whether NASA is taking advantage of cost-sharing opportunities. We issued this questionnaire to the following NASA Centers and component facilities:

- Ames Research Center
- Dryden Flight Research Center (known as the Armstrong Flight Research Center as of March 1, 2014)
- Glenn Research Center
- Goddard Space Flight Center
- Jet Propulsion Laboratory
- Johnson Space Center
- Kennedy Space Center
- Langley Research Center
- Stennis Space Center
- Wallops Flight Facility
- White Sands Test Facility

We interviewed representatives from NASA Headquarters EMD Division and NASA's legal counsel. We reviewed each Center's response to the data call questionnaire and subsequently identified four Centers for additional follow-up questions:

- Jet Propulsion Laboratory
- Kennedy Research Center
- Stennis Space Center
- White Sands Test Facility

We held additional meetings with the four identified Centers and reviewed their respective environmental resource document, FY 2013 project listing, FY 2013 Center briefing document to Headquarters, and other various documents provided by the Centers. In addition, we reviewed NASA EMD's FYs 2012 and 2013 Unfunded Environmental Liability Data Call; EMD's Planning, Programming, Budgeting, and Execution Data Call; EMD's FY 2013 Project List; EMD's Environmental, Compliance, and Restoration Guidance; and NETS data.

Criteria. We reviewed Federal and state laws, NASA environmental policies, regulations, and procedures to determine the requirements, criteria, and processes for assessing environmental restoration cleanup. The documents reviewed included the following:

- NPD 8500.1B, "NASA Environmental Management," December 20, 2007
- NPR 8553.1B, "NASA Environmental Management System," September 22, 2009
- NPR 8590.1A, "NASA Environmental Compliance and Restoration Program," July 18, 2011
- NPR 8800.15B, "Real Estate Management Program," June 21, 2010
- NPR 9090.1A, "Reimbursable Agreements" February 25, 2013
- NPR 9260.1, "Revenue, Unfunded Liabilities and Other Liabilities," September 30, 2008
- National Environmental Policy Act of 1969 (NEPA), January 1, 1970
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), December 11, 1980
- Resource Conservation and Recovery Act (RCRA), October 21, 1976

Use of Computer-Processed Data. We used computer-processed data to perform portions of this audit. We collected computer-processed data from the NASA Centers in the form of their responses on the data call, environmental resource documents, FY 2013 project listings, FY 2013 Center briefing documents to Headquarters, EMD's funded FY 2013 Project List, and information from NASA's Environmental Tracking System. Specifically, we compared the Center's reported number of projects and cost with EMD's FY 2013 Project List and NETS's FY 2013 final numbers. For our audit objectives, we reviewed the data to compare and validate projects data reported by the Centers for FY 2013 with NASA's NETS system data, and EMD's FY 2013 Project List in order to conclude the accuracy and effectiveness of reporting NASA's Environmental Restoration program. However, we did not rely solely on the computer-processed data to support our findings, conclusions, or recommendations. As discussed in this report, we found that the data in NETS was not reliable for our purposes.

Review of Internal Controls

We reviewed and evaluated the internal controls associated with identifying, prioritizing, and implementing NASA's environmental restoration program. Our review included a review and evaluation of the oversight and guidance provided by EMD to the Centers for this program. We also reviewed the internal controls associated with the processes used by NASA Headquarters to prioritize Center environmental projects for funding. We found deficiencies in these areas, as discussed in this report.

Prior Coverage

During the past several years, the NASA Office of Inspector General (OIG) and the Government Accountability Office (GAO) have issued 12 reports of particular relevance to the subject of this report. Unrestricted reports can be accessed over the Internet at http://oig.nasa.gov/ (NASA OIG) and at http://www.gao.gov (GAO).

NASA Office of Inspector General

"Cost Sharing for Santa Susana Field Laboratory Cleanup Activities" (IG-98-024, August 18, 1998)

"Cost Sharing for Environmental Cleanup Efforts" (IG-01-007, December 8, 2000)

"Audit of the National Aeronautics and Space Administration's Fiscal Year 2009 Financial Statements" (IG-10-002, November 13, 2009)

"Audit of the National Aeronautics and Space Administration's Fiscal Year 2010 Financial Statements" (IG-11-006, November 15, 2010)

"NASA's Hanger One Re-Siding Project" (IG-11-020, June 22, 2011)

"NASA's Environmental Remediation Efforts at the Santa Susana Field Laboratory" (IG-13-007, February 14, 2013)

Government Accountability Office

"Environmental Cleanup Costs: NASA is Making Progress in Identifying Contamination, but More Effort Is Needed" (GAO/NSIAD-97-98, June 27, 1997)

"Military Base Closures: Overview of Economic Recovery, Property Transfer, and Environmental Cleanup, Statement of Barry W. Holman, Director, Defense Capabilities and Management" (GAO-01-1054T, August 28, 2001)

"Military Base Closures: Opportunities Exist to Improve Environmental Cleanup Cost Reporting and to Expedite Transfer of Unneeded Property" (GAO-07-166, January 30, 2007)

"NASA: Agency Faces Challenges Defining Scope and Costs of Space Shuttle Transition and Retirement" (GAO-08-1096, September 30, 2008)

"Environmental Contamination: Information on the Funding and Cleanup Status of Defense Sites, Statement of Anu Mittal, Director Natural Resources and Environment" (GAO-10-547T, March 17, 2010)

"Superfund: Interagency Agreements and Improved Project Management Needed to Achieve Cleanup Progress at Key Defense Installations" (GAO-10-348, July 15, 2010)

FY 2013 UNFUNDED ENVIRONMENTAL LIABILITIES BY CENTER

The following table shows the amount of unfunded environmental liabilities for each Center and component installation.

Center	Unfunded Environmental Liability (dollars in thousands)
Ames Research Center	$29,326
Dryden Flight Research Center[a]	6,473
Glenn Research Center	14,118
Goddard Space Flight Center	572
Jet Propulsion Laboratory	89,710
Johnson Space Center	1,116
Kennedy Space Center	129,940
Langley Research Center	7,415
Michoud Assembly Facility	72,026
Marshall Space Flight Center	136,326
Stennis Space Center	12,747
Santa Susana Field Laboratory	308,467
Wallops Flight Facility	5,791
White Sands Test Facility	256,206
Headquarters	39,579
Total	**$1,109,812**

[a] On March 1, 2014, Dryden Flight Research Center was renamed the Armstrong Flight Research Center.

Source: Unfunded liabilities as of September 30, 2013, pulled from NETS on October 29, 2013 and verified by the Office of the Chief Financial Officer.

CENTERS WITH CLEANUP AGREEMENTS

The following table describes the various cleanup agreements that some Centers have with their applicable regulators.

Center	National Priorities List	Type of Agreements – Date	Description of Environmental Issues
Marshall Space Flight Center	Yes	Federal Facility Agreement – signed September 17, 2001	Soil and groundwater contaminated with metals, polychlorinated biphenyls, and volatile organic compounds including trichloroethylene
Langley Research Center	Yes	Federal Facility Agreement – signed December 16, 1993	Soil and groundwater contaminated with polychlorinated biphenyls and polychlorinated triphenyls
Ames Research Center	Yes (Moffett Field)	Unilateral Administrative Order – signed March 15, 2013	Soil contaminated with polychlorinated biphenyls, lead, chromium, cadmium, and zinc
Santa Susana Field Laboratory	No	Administrative Order on Consent for Remedial Action – signed December 6, 2010	Soil and groundwater contaminated with trichloroethylene, metals, and dioxins. Soil cleanup set to be completed by 2017
Wallops Flight Facilities	No	Administrative Order on Consent – signed September 28, 2004	Soil contaminated with metals, volatile organic compounds, and semi-volatile organic compounds; groundwater contaminated with lead and chromium
Jet Propulsion Laboratory	Yes	Federal Facility Agreement – signed December 23, 1992; and legal agreement between JPL/Caltech, and two local water boards – signed January 30, 2006	Contamination to groundwater includes trichloroethylene, carbon tetrachloride, and perchlorate
White Sands Test Facility	No	Final Order to issue a final Hazardous Waste Permit – signed November 3, 2009	Contamination to groundwater includes n-nitrosodimethylamine, trichloroethylene, Freon, and other volatile organic compounds

Source: Data provided by NASA's EMD.

MANAGEMENT COMMENTS

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001

JUN 27 2014

Reply to Attn of: Mission Support Directorate

TO: Assistant Inspector General for Audits

FROM: Associate Administrator for Mission Support

SUBJECT: Response to OIG Draft Report, "NASA's Environmental Restoration Efforts" (Assignment No. A-12-011-00)

The Mission Support Directorate (MSD) appreciates the opportunity to review and comment on the Office of Inspector General (OIG) draft report entitled "NASA's Environmental Restoration Efforts" (Assignment No. A-12-011-00), dated June 5, 2014.

To assist NASA in strengthening its environmental restoration efforts, the OIG made the following recommendations to the Director of the Environmental Management Division (EMD):

Recommendation 1: Revise its implementation guidance for NPR 8590.1A for scoring environmental restoration projects to clarify the methodology used and improve the transparency in the scoring process.

Management's Response: Concur. By June 2015, NASA will reevaluate and revise its implementation guidance for NASA Procedural Requirements (NPR) 8590.1, "Environmental Compliance and Restoration Program," to clarify the process by which NASA prioritizes its projects for funding and improve the transparency for final funding decisions.

Recommendation 2: Establish a mechanism at Headquarters to centrally track Agency and Center-level agreements to ensure such agreements receive appropriate consideration in Agency funding and management decisions and to strengthen communication between Headquarters and the Centers about the agreements.

Management's Response: Concur. By June 2015, NASA will revise the NASA Environmental Tracking System (NETS) to include a repository for all Agency- and Center-level enforceable agreements related to cleanup. NASA will revise its implementation guidance on prioritization to indicate how the enforceable agreements are used in deriving preliminary scoring decisions and ensure compliance with NPR 8590.1 to ensure that all enforceable agreements related to cleanup are approved by NASA HQ, as required.

Recommendation 3: Expand NETS capabilities or develop an alternate system and require Centers to use NETS or the alternate system for tracking and reporting on restoration projects; require Centers and Headquarters to update the information in the system either monthly or quarterly; and establish a process to periodically verify the accuracy and reliability of the data in the system.

Management's Response: Partially Concur. The current structure of the project data in NETS will be evaluated, and the data updated and validated, as we continue implementation of this new functionality with the goal of improving visibility on the progression of each Center's cleanup program, including the number of sites in a project, milestones, and accomplishments. By June 2015, NASA will establish a process to periodically update NETS, populate the new fields, and verify the data. The process shall be included in the implementation guidance for NPR 8590.1. Since progress on projects does not change significantly over a year timeframe, we recommend updates shall be no more frequently than semiannually, to coincide with the Unfunded Environmental Liability review and the Agency budget processes. Updates more frequently would only cause additional workload without significant improvements in data quality.

Recommendation 4: Strengthen NASA Procedural Requirements 8590.1A and EMD implementation guidance to actively promote cost sharing when appropriate. The revised guidance should also define and promote resource sharing opportunities and provide a process for disseminating information about resource sharing opportunities among Centers.

Management's Response: Concur. By June 2015, NASA will revise its implementation guidance to clarify the definition of "cost sharing" (determination and agreement of who is responsible for the cleanup) and to promote the idea of "resource sharing" between NASA Centers and with other Agencies (e.g., using other agencies' contract vehicles and collaborating on innovative cleanup projects).

NASA will evaluate the Potentially Responsible Party (PRP) / "cost sharing" language in NPR 8590.1 accordingly for its next scheduled update in 2016. However, given that "cost-sharing," as applied in NPR 8590.1A Section 4.3.i, is negotiated/designated by NASA and/or the Department of Justice (DOJ) only once for each site as a part of the PRP Analysis, NASA has few opportunities to reexamine cost-sharing, limited to the very few new projects while PRP Analysis is being assessed. We will emphasize and promote the use of cost-sharing opportunities on future cleanup projects, within our policy and guidance documents.

We have reviewed the draft report for information that we believe should not be publicly released and have provided our concerns regarding public release of that information to the OIG.

Again, thank you for the opportunity to review and comment on the subject draft report. If you have further questions or require additional information on NASA's response to the subject draft report, please contact Mark Schoppet, Restoration Program Manager at (202) 358-0159.

Richard Keegan

cc:
Assistant Administrator for Office of Strategic Infrastructure/Mr. Williams
Director, Environmental Management Division/Mr. Leatherwood

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JULY 2, 2014

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