

National Aeronautics and  
Space Administration  
Lyndon B. Johnson Space Center  
**White Sands Test Facility**  
P.O. Box 20  
Las Cruces, NM 88004-0020



November 30, 2021

Reply to Attn of: RE-21-173

Mr. Rick Shean, Bureau Chief  
New Mexico Environment Department  
Hazardous Waste Bureau  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, NM 87505

Subject: NASA White Sands Test Facility (WSTF) 2021 Waste Minimization Program Certification and Plan

Through this submittal, NASA is certifying that a program is in place to reduce the volume and toxicity of hazardous waste generated at WSTF to the degree determined to be economically practicable. NASA also certifies that the treatment, storage, and disposal methods of waste generated at WSTF minimize present and future threats to human health and the environment. This certification is provided in accordance with 40 CFR 264.73(b)(9) and Section II.D of the WSTF Hazardous Waste Permit (No. NM8800019434). Enclosure 1 provides a paper copy of the 2021 WSTF Waste Minimization Plan. Enclosure 2 provides an electronic copy of the document on CD-ROM. The enclosed report was prepared for federal fiscal year 2021 (October 1, 2020 – September 30, 2021) in accordance with Permit requirements.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or comments concerning this submittal, please contact Amanda Skarsgard of my staff at 575-571-9668.

**TIMOTHY  
DAVIS**

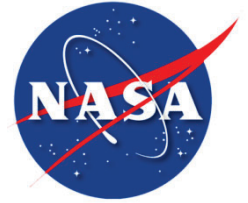
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Timothy J. Davis  
Chief, Environmental Office

2 Enclosures

cc: (with enclosures)  
Mr. Gabriel Acevedo  
New Mexico Environment Department  
Hazardous Waste Bureau  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, NM 87505

National Aeronautics and Space Administration



Hazardous and Solid Waste Amendments (HSWA)  
Waste Minimization Plan

October 1, 2020 to September 30, 2021

NM8800019434

NASA Johnson Space Center White Sands Test Facility  
Hazardous and Solid Waste Amendments (HSWA)  
Waste Minimization Plan

October 1, 2020 to September 30, 2021

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Chief, NASA Environmental Office

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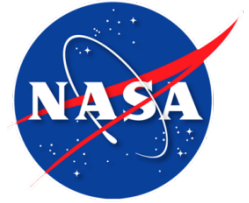
Date

National Aeronautics and Space Administration

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National Aeronautics and Space Administration



Hazardous and Solid Waste Amendments (HSWA)  
Waste Minimization Plan

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## List of Acronyms and Abbreviations

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BFP	Backflow preventers
CEQ	Council for Environmental Quality
EMP	Environmental Management Program
EMS	ISO 14001 Environmental Management System
Freon 11	Trichlorofluoromethane
Freon 113	Trichlorotrifluoroethane
FY	Fiscal Year
HSWA	Hazardous and Solid Waste Amendments
ISO	International Organization for Standardization
kg	Kilogram(s)
NASA	National Aeronautics and Space Administration
NDMA	N-nitrosodimethylamine
NETS	NASA Environmental Tracking System
NMED	New Mexico Environment Department
NMRC	New Mexico Recycling Coalition
OMB	Office of Management and Budget
PCE	Tetrachloroethene
PV	Photovoltaic
ReMaP	Reuse Market Place
RSA	Recycling and Sustainable Acquisition
S2WG	Site-Wide Sustainability Working Group
SCSWA	South Central Solid Waste Authority
TCE	Trichloroethene
WSC	White Sands Complex
WSTF	NASA Johnson Space Center White Sands Test Facility



## 1.0 Introduction

The New Mexico Environment Department (NMED) Hazardous Waste Permit (Permit) was issued to the National Aeronautics and Space Administration (NASA) Johnson Space Center for White Sands Test Facility (WSTF) on November 3, 2009, with the most recent update on December 11, 2019. The Permit requires that WSTF institute a waste minimization program to reduce the volume and toxicity of hazardous wastes generated by the facility's operation, to the degree determined by NASA to be economically practicable.

## 2.0 Objectives and Scope

The Permit requires that NASA submit a copy of the annual certified statement regarding the WSTF waste minimization program to NMED by December 1st for the previous 12-month period ending September 30. The reporting period included in this document is October 1, 2020 through September 30, 2021, or the 2021 NASA fiscal year (FY). Source reduction, recycling, and planning activities for this reporting period are addressed below. Each Permit requirement and NASA response is listed below.

## 3.0 Waste Minimization Program Plan Components (Permit-specified)

### 3.1 Policies and Programs

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *Any written policy or statement that outlines goals, objectives, and methods for source reduction and recycling of hazardous waste at the Facility.* This section includes descriptions of existing policies and ongoing programs that support waste minimization at WSTF.

#### 3.1.1 Environmental Management System

The International Organization for Standardization (ISO) 14001:2015 Environmental Management System (EMS) is incorporated into the WSTF Integrated Management System. NASA uses EMS procedures to evaluate environmental aspects of WSTF activities, products, and services to determine their environmental impacts. Stakeholders annually rank environmental impacts of each aspect and identify those with significant impacts as "significant aspects." Once the significant aspects are identified, NASA establishes an Environmental Management Program (EMP) for each significant aspect. Each EMP outlines objectives and targets developed to lessen the environmental impact and reduce the consumption of natural resources at WSTF. Actions taken to meet EMP objectives and targets are specified by tasks that may be directed toward regulatory compliance, pollution prevention, waste reduction and diversion, and resource conservation (materials, energy, water, and fuel). If warranted, EMPs may be carried over two or more years.

The FY 2021 significant aspects and associated EMPs were:

- Drinking Water System Improvements
- Resource Conservation Measures
- Environmental Improvement and Outreach Initiatives

Objectives and accomplishments for each EMP are discussed below.

### 3.1.1.1 Drinking Water System Improvements

The objective of this EMP is to maintain the quality of WSTF drinking water by upgrading and improving the overall system components. The following steps were completed in FY 2021.

- The Public Water System Loop Improvement Project and installation of Tank 4 and Booster 5 were completed in July 2021.
- Supply well J2 installation is 75 percent complete.
- Backflow preventers (BFP) were installed between potable and non-potable water systems at Buildings 272 and 111.
- A BFP was installed between WSTF and the White Sands Complex (WSC) Second Tracking and Data Relay Satellite Ground Terminal as part of the network improvements project.
- Design completed for installation of BFPs between potable and industrial water systems at 300 and 400 areas to mitigate cross contamination.

### 3.1.1.2 Resource Conservation Measures

The objective of this EMP is to reduce WSTF energy and water consumption. FY 2021 accomplishments are listed below.

- Completed installation of water meters at Building 113, 655, and 800 Area LOX pad.
- Photovoltaic (PV) energy storage system is in design and projected to be online by the third quarter of FY 2023.
- WSC PV energy storage project has been awarded and design efforts are underway.
- Replaced R22 refrigerant heating, ventilation, and air conditioning units with gas furnace package units at Building 104.
- Installed high efficiency boilers at Buildings 200, 201, and 415.
- WSTF is leading the NASA initiative in energy conservation measures to determine the baseline and need for water auditing improvements and energy management control systems upgrades at each NASA center.

### 3.1.1.3 Environmental Improvement and Outreach Initiatives

This EMP emphasizes employee awareness and outreach initiatives for continual improvement in pollution prevention, resource conservation and reuse for waste reduction and environmental stewardship. The Site-Wide Sustainability Working Group (S2WG) is a forum for WSTF employees from all departments to identify resource conservation and waste minimization opportunities across the site. Management approved the continuation of the group in FY 2021. A list of S2WG accomplishments and initiatives is below:

- The S2WG supports WSTF Stakeholders to raise awareness for continual improvement toward NASA Sustainability Goals.
- The S2WG vets and reviews Green Project Proposals for funding consideration. The approved projects are funded by recycling funds and must meet criteria outlined in Public Law 103-329 Section 608. Project categories include sustainable acquisition, waste reduction and prevention,

recycling programs, hazardous waste management, and pollution prevention. The following green (pollution prevention) projects were funded during FY 2021 and are in progress

- Replacement of Hypervelocity vacuum pumps - Involves the upgrade of two old and leaking vacuum pumps.
- Above Ground Fuel Station – Involves the removal of underground petroleum storage tanks with aboveground storage tanks.
- S2WG partnered with Johnson Space Center (Houston, TX) sustainability personnel for several sustainability campaigns and outreach events, including the Refuse, Reduce, Reuse (3R) single use plastics campaign.

### 3.1.2 WSTF Sustainability Program

WSTF Environmental Department administers the WSTF Sustainability Program in accordance with federal laws, executive orders, and NASA procedural requirements. Recycling and waste minimization, pollution prevention, sustainable acquisition, and resource conservation initiatives fall under the umbrella of sustainability. Sustainability Program Personnel manage the EMP, *Environmental Improvement and Outreach Initiatives*, and facilitate S2WG meetings. S2WG allows NASA to expand its reach by encouraging employees across WSTF to identify opportunities to continue to reduce WSTF's environmental impact.

NASA sustainability goals are based on statutory requirements in the following areas: building efficiency and energy cost reduction; renewable energy and electricity; reduction of potable and non-potable water consumption; employing performance contracts to achieve energy; water, building modernization and infrastructure goals; sustainable design and efficient use of building space; toxic, hazardous, and solid waste prevention and recycling; and, sustainable acquisition and life cycle management of materials. Federal agencies are required to track and report progress and performance measures on an annual basis to the Office of Management and Budget (OMB) and the Council for Environmental Quality (CEQ).

The WSTF Environmental Department maintains records of sustainable actions categorized according to NASA sustainability goals. As applicable, metrics from each FY are entered into the NASA Environmental Tracking System (NETS). NETS information is compiled annually to prepare the agency Sustainability Report and Implementation Plan submitted annually to the OMB and CEQ.

## 3.2 Training and Incentive Programs

The Permit specifies that the following be included in the Waste Minimization Program Plan: *Any employee training or incentive programs designed to identify and implement source reduction and recycling opportunities.*

EMS awareness training is included in the environmental briefing section of the new hire orientation. The training content emphasizes sustainability, pollution prevention, continuous improvement, and compliance with environmental laws. All WSTF employees are required to attend annual Environmental Compliance Awareness Training which includes specific content related to waste source reduction and recycling program elements. Annual sustainable acquisition training specific to the WSTF procurement systems is mandatory for all employees that order goods and services for the site.

WSTF Sustainability Program Personnel and the S2WG determine content and maintain the ongoing site-wide awareness campaign to strengthen the sustainability culture at the site. Information is circulated to site employees through various forms of communication, such as WSTF Today emails, the WSTF entry sign, and articles posted in the two WSTF newsletters; the bi-weekly "Porcelain Press" and the monthly

“What’s Going On at WSTF.” Topics such as new sustainability initiatives, environmental awareness, process reminders, site accomplishments, and employee awards for sustainable actions are shared using the site newsletters, emails, and sign postings. Earth Day (April 22) America Recycles Day (November 15) are celebrated with virtual activities and awareness updates.

### 3.3 Source Reduction and Recycling Measures

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *Any source reduction and/or recycling measures implemented in the last five years or planned for the near future.*

NASA reduced the amount of acute hazardous waste generated at WSTF over the last FY by continuing to use a molecular sieve to reclaim off-specification oxidizer. Approximately 3,000 gallons of oxidizer were reclaimed. This effort reduced the need to purchase new product and eliminated the need to dispose of the off-specification oxidizer as acute hazardous waste.

The Sustainability Program software application is used by WSTF employees to access sustainable acquisition references and metrics, recycling metrics, sustainable actions, and resource conservation tools. This application also provides resources for identifying less toxic and sustainable products during the procurement process. Identifying and procuring non-hazardous replacement products reduces the amount of toxic chemical products on-site. The application is also used to collect, share, and compile data for annual sustainability reporting requirements.

NASA centers are directed to purchase environmentally preferable products and services to reduce negative environmental impacts of resource consumption. Federal requirements for environmentally responsible products (and services) are listed on the Green Products Compilation at <https://sftool.gov/GreenProcurement>. This site lists 27 product categories and specifies biobased, less toxic, energy saving, water conserving, recycled/recovered content, environmentally preferable, and non-ozone depleting requirements for hundreds of products. The General Services Administration maintains and updates the database continually. Services with green requirements and guidance for contract language is available.

The WSTF Sustainable Acquisition Program requires that requestors identify any green requirements prior to submitting procurement requests for products or services. The WSTF Environmental, Procurement, and Logistics Departments work to replace conventional products with environmentally preferable products wherever feasible. Sustainable acquisition waivers are used to document the justification for continued use of conventional products when specific green products do not meet project specifications or exceed budget constraints.

The Reuse Market Place (ReMaP) is an award-winning application that was developed as a tool for employees to share excess resources across WSTF. If resources, including office supplies, furniture, and consumables cannot be used by the department that purchased them, the item can be posted in ReMaP for other departments to claim for use on-site. Unused chemical products are included on the list of acceptable materials to post on ReMaP. Employees are encouraged to check the ReMaP inventory prior to placing orders for new materials and supplies.

Single-stream recycling is included in the solid waste contract for WSTF. Single-stream materials include office paper, shiny paper (catalogs and magazines), newspaper, paper board, paper bags, books, junk mail, clean plastic containers numbered 1 and 2, and tin and aluminum cans. One or more recycling stations are located inside each building and 8 cubic yard single-stream recycling containers are located outside buildings in each area. Custodians empty recycling bins in the buildings regularly and transfer the materials to exterior recycling containers. The solid waste contractor empties these containers monthly

and hauls the materials to the county's recycling facility. A large roll-off container for accumulating cardboard at the warehouse is also serviced as needed.

The WSTF solid waste and recycling contract also includes construction and demolition debris recycling for wood. WSTF's Maintenance and Operations Department transports green waste to the city yard waste facility for composting. Concrete is hauled to the same facility where it is used for clean fill.

Every effort is made to divert materials from the landfill through reuse, repurposing, or recycling. In addition to traditional recyclables, the Sustainability Program personnel work to divert usable excessed material to other federal agencies, schools, and non-profit agencies through a partnership with the South Central Solid Waste Authority (SCSWA) which manages the Doña Ana County Recycling Program.

Sustainability Program personnel work with the WSTF Logistics Department to determine the best method of disposition for site materials to achieve landfill diversion. The WSTF recycling/waste diversion rate has ranged from 63 to 97 percent. WSTF tracks all recycling and solid waste diversion metrics for annual reporting purposes. Specific hazardous waste source reduction and recycling measures for the current reporting period are presented in [Appendix A](#). Approximately 800 kilograms (kg) of potentially hazardous waste was recycled as universal waste.

### **3.4 Operating Costs**

The Permit specifies that the following information be included in the Waste Minimization Program Plan: *An itemized list of the dollar amounts of capital expenditures (plant and equipment) and operating costs devoted to source reduction and recycling of hazardous waste.*

Capital expenditures and operating costs associated with source reduction and recycling are not specifically tracked, however, activities initiated or continuing during the reporting period reflect significant investments and cost avoidances. Approximately \$23,930 in service and labor was spent in FY 2021 recycling routine hazardous waste. Approximately 74.2 tons (148,350 pounds) of scrap metal were recycled in FY 2021 through NASA's property management process and environmental services at WSTF. NASA also continued to fund the Sustainability Program as part of the overall Environmental Department compliance budget. Approximately \$187,000 of the total WSTF Environmental Department compliance budget was devoted to the Sustainability Program during the reporting period.

### **3.5 Limiting Factors**

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *Factors that have prevented implementation of source reduction and/or recycling.*

NASA tests and evaluates spacecraft materials, components, and propulsion systems to enable safe space exploration and utilization. Federal and industry funding supports NASA test programs often on a program-by-program basis. One-time, short-term, and inconsistent testing schedules generate dynamic and variable waste streams that are difficult to manage for source reduction and recycling. Customer/test requirements, military specifications, original equipment manufacturer specifications, and program timelines limit the use and feasibility of recycling test materials. Future NASA programs, National Defense System rocket engine testing, commercial industry contracts, missile demilitarization, and decommissioning and decontamination of antiquated aerospace equipment will increase customer-testing requirements and limit the feasibility of source reduction. However, the WSTF Environmental Department works closely with the Testing and Laboratory Departments to identify and implement any opportunities for source reduction and recycling.

### 3.6 Information Sources

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *Sources of information on source reduction and/or recycling received at the facility (e.g., local government, trade associations, suppliers, etc.).*

The NASA Principal Center for Regulatory Risk Analysis and Communication reviews the federal register and issues weekly emails with specific information pertaining to changing regulations. The reviews compel WSTF Environmental Department personnel to develop white papers or perform regulatory reviews to evaluate impacts to WSTF operations.

Sustainability Program personnel participate in the NASA Recycling and Sustainable Acquisition (RSA) Community of Practice video conferences, WebEx presentations, and virtual workshops sponsored by the NASA RSA Principal Center. These forums facilitate the sharing of information about recycling, sustainability, and pollution prevention strategies between NASA centers.

WSTF Sustainability Program personnel work with the SCSWA to align the WSTF recycling program with community efforts. The WSTF Environmental Department is a member of the New Mexico Recycling Coalition (NMRC) which sponsors a website, training opportunities, and conferences on waste reduction and recycling opportunities in New Mexico. A Sustainability Program employee is certified as a Recycling Facility Operator by the NMRC and the New Mexico Solid Waste Bureau and as national Sustainable Resource Management Certified Professional through the NMRC in association with Pennsylvania State Altoona.

WSTF personnel also use online resources, including webinars, that continually offer information related to source reduction and recycling. Online resources include the NMED, the NMRC, Keep America Beautiful (America Recycles Day Initiative), the Environmental Protection Agency, the Office of Federal Sustainability and the Council for Environmental Quality, the United States Department of Agriculture, the General Services Administration, other NASA centers, other federal agencies and organizations from the recycling and waste management industry.

### 3.7 Additional Waste Minimization Efforts

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *An investigation of additional waste minimization efforts which could be implemented at the facility. This investigation shall analyze the potential for reducing the quantity and toxicity of each waste stream through production reformulation, recycling, and all other appropriate means. The analysis shall include an assessment of the technical feasibility, cost, and potential waste reduction for each option.*

The Permit requires frequent review and characterization of waste streams. These ongoing activities promote a closer look at waste generation and minimization at WSTF, modification of the hazardous waste generation process, improvement of waste determinations, and generator attention to waste stream constituents and concentrations.

### 3.8 Hazardous Waste Matrix

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *The Permittee shall submit a flow chart or matrix detailing all hazardous wastes it produces by quantity, type, and building/area.*

The Hazardous Waste Matrix ([Appendix B](#)) identifies the FY 2021 WSTF hazardous waste streams by waste name, WSTF area designation, accumulation site identification number, waste code, WSTF Individual Waste Profile Sheet number, and quantity. The table is sorted by WSTF area first, accumulation site identification number second, and waste code third.

### **3.9 Limitations to Waste Reduction**

The Permit specifies inclusion of the following in the Waste Minimization Program Plan: *The Permittee shall demonstrate the need to use those processes which produce a particular hazardous waste due to a lack of alternative processes or available technology that would produce less hazardous waste.*

WSTF test programs support the federal and commercial aerospace industry. The wastes generated in association with this testing are derived from the following processes: engine firings; developmental research; equipment cleaning/repair; missile demilitarization; aerospace equipment decommissioning and decontamination; facility construction/maintenance; laboratory work and analyses; and computer and electrical support. The products used and resultant wastes are often dependent upon contractor test requirements, military specifications, program timelines, and additional conditions mandated by contracts.

Appendix A  
Source Reduction and Recycling Tables



NASA White Sands Test Facility

**Table A-1 WSTF Hazardous Waste Source Reduction (Oct. 1, 2020 – Sept. 30, 2021)**

YEAR	SOURCE REDUCTION EFFORT	NET REDUCTION
Since 2010	Contamination control continued emptying cleaning tanks with corrosive solutions (Oakite <sup>®1</sup> ) on a yearly schedule, rather than weekly (as previously done), with tank recharge as needed.	Approximately 360 gallons annually
Since 2010	Molecular Desorption Analysis Lab replaced organic solvents with HFE 7100 for the cleaning of collector plates used in Volatile Condensable Materials process.	3 to 5 gallons of hazardous waste organics (spent toluene, chloroform, and ethanol) annually. Also 80 to 90% of the HFE 7100 goes to Component Services for cleanup and reuse.
FY 2021	Electronic waste recycled	11,153 kg
Since 2011	<p>Working to meet federal requirements for sustainable acquisition: <a href="https://sftool.gov/greenprocurement">https://sftool.gov/greenprocurement</a>. Some examples include</p> <ol style="list-style-type: none"> <li>1) Replacing ozone depleting substances with products that meet the Significant New Alternatives Policy: (<a href="https://www.epa.gov/snap">https://www.epa.gov/snap</a>),</li> <li>2) Replace toxic products with less toxic (Safer Choice; <a href="https://www.epa.gov/saferchoice/products">https://www.epa.gov/saferchoice/products</a>) alternatives,</li> <li>3) Substitute petroleum based cleaning products, lubricants, and other materials with USDA Biopreferred alternatives: <a href="https://www.biopreferred.gov/BioPreferred/faces/catalog/Catalog.xhtml">https://www.biopreferred.gov/BioPreferred/faces/catalog/Catalog.xhtml</a></li> </ol>	NA

<sup>1</sup> Oakite is a registered trademark of Chemetall US, Inc.

**Table A-2 WSTF Waste Recycling for Oct. 1, 2020 – Sept. 30, 2021**

<b>HAZARDOUS AND NON-HAZARDOUS WASTE RECYCLED</b>	<b>NET REDUCTION</b>
Used Oil, recycled (includes Fomblin Oil)	3,883 kg
Used Oil Filters, recycled	282 kg
Spent dry cell batteries (alkaline) batteries	92 kg
Non-PCB Ballasts	520 kg
Non-PCB Capacitors	34 kg
Non-PCB Transformers	5,507 kg
<b>The following materials were collected and shipped off site for recycling as universal waste rather than disposed of as hazardous waste.</b>	
Lead acid batteries	1690 kg
Lithium and lithium ion batteries	8 kg
Spent dry cell batteries (NiCad, silver zinc)	273 kg
Spent fluorescent lamps (including odd shaped)	235kg
Spent UV mercury containing lamps	52 kg
Mercury Containing Equipment	3 kg

**NASA White Sands Test Facility**

**Table A-3 WSTF Hazardous Waste Source Reduction/Recycling Future Plans**

<b>TIME FRAME</b>	<b>PLANNED SOURCE REDUCTION/RECYCLING</b>	<b>NET REDUCTION</b>
Ongoing	The NASA Plume Front Treatment System continues to treat groundwater contaminated with trichloroethene (TCE), tetrachloroethene (PCE), Trichlorotrifluoroethane (Freon <sup>®2</sup> 113), trichlorofluoromethane (Freon 11), and N-nitrosodimethylamine (NDMA).	> 99.9 %
Ongoing	The NASA Mid-plume Interception and Treatment System continues to treat groundwater contaminated with Freon 113, TCE, PCE, Freon 11, and NDMA.	> 99.9 %
Ongoing	NASA will continue to use a portable molecular sieve to reclaim off-specification oxidizer in the future. No oxidizer was reclaimed during FY 2021, but the additional reclamation is planned in FY22. Reclaiming off-specification reduces the need to purchase new product and reduces the amount of hazardous waste that would have been generated from discarding the off-specification oxidizer.	TBD by project requirements
Ongoing	WSTF continues to provide integral support for government and private space efforts. WSTF operations are a critical component of NASA’s core ability to test rocket engines at simulated altitudes. The WSTF Propulsion Test Office will continue to test systems that use methanol, liquid oxygen, and other propellants instead of hydrazine(s) and nitrogen tetroxide to reduce the generation of highly toxic hazardous wastes.	TBD
Ongoing	Unused commercial chemical products are added to ReMaP to increase reuse opportunities for these items at WSTF. This activity will reduce the amount of new hazardous materials brought onto WSTF and reduce the amount of hazardous waste that would have been generated through disposal of these products if they were not reused. Data is under evaluation.	TBD
In progress	NASA procured a distillation system that has the capability of maintaining propellants within the parameters required by NASA customer-driven specifications. Using fuel from this distillation system will reduce the need to purchase new propellant and will reduce the need to dispose of off-specification fuel as hazardous waste. Verification testing of the unit is planned for first quarter of 2022. The system will be placed into operation if verification test results are favorable.	TBD. System verification is planned for the first quarter of 2022.
Ongoing	1.64-megawatt Photovoltaic System is complete and online This system reduces the amount of natural resources and emissions required to provide electricity to WSTF. In FY2021, the system provided 23% of the WSTF kWh.	23%

<sup>2</sup> Freon is a registered trademark of The Chemours Company FC, LLC.

Appendix B  
Hazardous Waste Matrix

Table B-1  
Hazardous Waste Matrix

Waste Stream	WSTF Area	Accumulation Site ID	WIWPS	EPA Codes	Weight (kg)
Contaminated Debris	100	1003	10202133-99	D004, D006, D007, D008, D018	70.0
Contaminated Debris	100	1003	10-02-09	D005, D007, D008, D018	73.0
Contaminated Debris And Waste Paint Related Materials	100	1003	10-03-08, 10202134-99	D018	18.0
Gaseous Standards	100	1003	60202125-99	D001	5.0
Gaseous Standards	100	1003	60202125-99	D001, D003	23.0
Mercury Contaminated Debris	100	1003	10202080-99	D009	6.0
Petroleum Contaminated Debris	100	1003	60-11-05	D004, D006, D007, D008, D018	9.0
Spent Acetic Acid Solutions	100	1003	20202041-99	D002	6.0
Unused Commercial Product	100	1003	10202076-99	D002	26.0
Contaminated Debris	100	1006	10202093-99, 10-02-09, 60-11-05, 6020212-99,	D004, D005, D006, D007, D008, D018	59.0
Contaminated Debris	100	1006	102020101-99, 10-02-09	D005, D007, D008, D018	107.0
Contaminated Debris	100	1007	10202118-99	D007, D008	68.0
Spent Coolant	100	1007	10202117-99	D007, D008	1009.0
Spent Machine Shop Cleaning Solution	100	1007	10202118-99	D007	617.0
Spent Machine Shop Cutting Fluid	100	1007	102020100-99	D007	103.0
Spent Machine Shop Cutting Fluid	100	1007	10-02-18	D007, D008	204.0
Unused Commercial Chemical Products	100	1011	10202112-99	D001, D035	4.0
Contaminated Debris	100	1018	10-01-08	D004, D005, D006, D007, D008, D018, D039, F002, F005	111.0
Filters, Fuel Spent	100	1021	10202077-99	D018	44.0
Waste Water, Fuel	100	1021	10202078-99	D001, D018	45.0
Spent Aerosol Cans	100	1033	10-20-43	D001, D003, D018	21.0
Spent Aerosol Cans	100	1033	10202071-99	D001, D003, D018, D035	18.0
Fuel Contaminated Debris/Water Mixture	200	1003	10202073-99, 10202095-99, 10202125-99, 1020213-99, 10202139-99, 1020219-99	P068, U098, U133	179.0
Analytical Process Waste	200	2006	20202035-99	D011, D018	4.0
Spent Inorganic Etchants	200	2006	20202029-99	D002, D007	3.0
Instrument Process Waste	200	2007	20-04-66	D002	22.0

Table B-1  
Hazardous Waste Matrix

Waste Stream	WSTF Area	Accumulation Site ID	WIWPS	EPA Codes	Weight (kg)
Metal Solutions, Waste	200	2007	20202114-99	D002, D004, D005, D006, D007, D008, D009, D010, D011	7.0
Off- Spec Analytical Standards	200	2007	20202110-99	D040, D001, D039, F003	2.0
Organic Acid Waste	200	2013	20202121-99	D002	33.0
Organic Liquids, Waste	200	2013	20202118-99, 20202031-99	D001, D018, D022, F003	27.0
Contaminated Debris	200	2021	20202117-99, 2020218-99	D004, D005, D006, D007, D008, D018	45.0
Contaminated Debris	200	2021	2020212-99	D004, D006, D007, D008, D018	44.0
Contaminated Debris	200	2021	20202036-99	D004, D006, D007, D008, D018, D035	18.0
Isopropyl Alcohol, Spent	200	2025	20202032-99	D001	48.0
Brulin 815, Spent	200	2030	20202040-99	D006	354.0
Spent Oakite 31 Cleaning Solution	200	2030	20202039-99	D002	359.0
Fixer Solution, Spent	200	2043	20202112-99, 20202116-99	D011	64.0
Oakite 33 Rust Stripper Solution, Spent	200	2053	20-01-13	D002	20.0
Oakite 33 Rust Stripper Solution, Spent	200	2053	2020215-99	D002, D005, D007, D008	152.0
Contaminated Debris	270	2032	20202037-99, 20202111-99, 20202115-99, 2020216-99, 27-01-23	D004, D005, D006, D007, D008, D018	205.0
Dynalene EG (Heat Transfer Fluid)	270	2032	20202030-99, 2020214-99	D006, D008	190.0
Contaminated Water (Hydrazines)	300	3003	50202012-99	P068, U098, U133	205.0
Contaminated Water (Hydrazines)	500	5002	5020211-99, 20-01-67, 20-04-03, 20-04-102, 30-01-01, 5020213-99, 50202012-99, 20-04-61, 5020217-99	P068, U098, U133	1051.0
Fuel Hoke Bottle Flush Water	500	5002	5020215-99	P068, U098, U133	101.0
Oxidizer Aspirator Water	500	5002	50202013-99	P078	450.0
P078 ADGAS Treatment Residual (Water)	500	5002	50202110-99, 5020212-99, 5020214-99, 5020216-99, 5020218-99	P078	333.0
Contaminated Debris, IDW	600	1003	60202028-99, 60202120-99, 60202035-99, 6020216-99	F001, F002	104.0
Contaminated Debris, IDW	600	6001	60202114-99, 6020214-99	F001, F002	127.0
Discarded Chemical Products (Class 8 Acidic Compounds)	600	6001	60202117-99	D002, F001, F002	4.0

Table B-1  
Hazardous Waste Matrix

Waste Stream	WSTF Area	Accumulation Site ID	WIWPS	EPA Codes	Weight (kg)
Discarded Chemical Products (Class 8 Basic Compounds)	600	6001	60202118-99	D002	3.0
Discarded Commercial Chemical Products	600	6001	60202119-99	D001, U154	4.0
Petroleum Contaminated Debris	600	6001	60-11-05	D004, D006, D007, D008, D018	39.0
Broken UV Mercury Lamp	600	6003	60202130-99	D009	2.0
Mercury Contaminated Debris	600	6004	6020213-99	D009	8.0
Remediation System Water Filters and Debris, IDW	600	6004	60-04-07, 6020211-99	F001, F002	648.0
Contaminated Soil, IDW	600	6065	60202033-99	F001, F002	716.0
Contaminated Solids, IDW	600	6070	60202111-99	F001, F001	196.0
Igniter Waste, Rinsate	800	8005	8020206-99	D002	23.0
Contaminated Debris, OX	200, 300, 400, 500, 800	1003	10202074-99, 10202075-99, 10202096-99, 10202097-99, 10202110-99, 10202111-99, 10202126-99, 10202127-99, 10202140-99, 10202141-99, 1020214-99, 1020215-99	P078	92.0
Fuel Contaminated Debris	200, 300, 400, 500, 800	1003	10202072-99, 10202094-99, 10202138-99, 10202124-99, 1020218-99	P068, U098, U133	41.0