

# **POLLUTION PREVENTION PROGRAM PLAN**

National Aeronautics and Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, Virginia




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Reviewed by:



Associate Chief, Medical and Environmental Management  
Division

6-12-19

Date



**POLLUTION PREVENTION PROGRAM PLAN REVIEW**

| <b>Annual Review Date</b> | <b>Comments</b>   | <b>Initials</b> |
|---------------------------|---|-----------------|
| 6/5/2015                  | 2014 updates include changing Executive Order number to 13693, and updating Tables A.1, A.2, and A.3. | MFS             |
| 12/16/2016                | 2015 updates include Tables 4.1, 5.1, A.1, and A.2. Graphs were added to Section 4.0                  | MFS             |
| 3/31/2017                 | 2016 updates include Tables 4.1 and A.2   | MFS             |
| 4/24/2018                 | 2017 updates include Environmental Policy, website location, Tables 4.1, 5.1, A.1 and A.2             | MFS             |
| 5/13/2019                 | 2018 updates include Environmental Policy, website location, Tables 4.1, 5.1, A.1 and A.2             | MFS             |
|                           |   |                 |
|                           |   |                 |
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## **P.1 PURPOSE**

The purpose of the Pollution Prevention Program Plan (P3) is to provide a formal procedure for conducting Pollution Prevention (P2), waste minimization, and green procurement activities at Goddard Space Flight Center's (GSFC's) Wallops Flight Facility (WFF), including roles and responsibilities, evaluation of P3 opportunities, implementation of P3 projects, and development of metrics to evaluate those projects. This plan will be reviewed annually.

## **P.2 APPLICABILITY**

This plan is applicable to all GSFC WFF personnel, facilities, and activities, including all permanent and temporary activities at Wallops Island, Virginia only. It also applies to all WFF tenants organizations, contractors, grantees, clubs, and other entities operating under the auspices of GSFC's WFF or on GSFC's WFF property as required by law and as directed by contractual, grant, and agreement documents.

## **P.3 AUTHORITY**

Authority for this P3 plan comes from:

- NASA Policy Directive (NPD) 8500.1C NASA Environmental Management
- NASA Procedural Requirements (NPR) 8530.1A Affirmative Procurement Program and Plan for Environmentally Preferable Products
- Goddard Policy Directive (GPD) 8500.1C, Environmental Policy and Program Management
- Annual NASA Strategic Sustainability Performance Plan

## **P.4 REFERENCES**

References for this document include:

- Emergency Planning and Community-Right-to Know Act of 1986 (EPCRA) Public Law 99-499: Superfund Amendments and Reauthorization Act (SARA), Title III, Section 312 and 313
- Clean Air Act (CAA), Public Law 101-549, amended November 15, 1990
- Pollution Prevention Act of 1990 (42 U.S.C. 13101 et seq.)
- Resource Conservation and Recovery Act (RCRA) of 1977, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 U.S.C. 6002)
- 40 CFR 372 –Toxic Chemical Release Reporting Community Right-to-Know
- 2002 and 2008 Farm Security and Rural Investment Act, Section 9002
- EO 13693, Planning for Federal Sustainability in the Next Decade
- GPR 8500.3 Waste Management
- GPR 8500.4 Air Quality Management
- GSFC 23-54 Hazardous Waste Disposal Inventory

## P.5 CANCELLATION

Pollution Prevention Plan for Wallops Flight Facility, dated March 2017, is cancelled by this document.

## P.6 SAFETY

Assessment Team members will be advised of relevant safety procedures by process owners in each work area prior to the start of the assessment.

## P.7 METRICS

Monitoring metrics are specific to the project but may include any or all of the following:

- changes in volume of waste generation
- changes in volume of raw materials purchased
- changes in toxicity of waste streams
- quantity of material recycled
- revenue from recycling
- dollars saved
- estimated GHG emissions reduced

## P.8 DEFINITIONS

- a. **Affirmative Procurement** - Environmental stewardship through the utilization of the Federal Government's purchasing power to create markets, spur competition, create business and employment opportunities, enhance local and regional economies, reduce depletion of natural resources, and reduce the amount of material ending up in landfills through the preferential procurement of environmentally preferable goods and services. This program for acquiring Environmental Protection Agency (EPA)-designated products is required by the Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. 6962) .
- b. **BioPreferred Product** - As defined by Farm Security and Rural Investment Act of 2002 (FSRIA), a product determined by the Secretary of Agriculture to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine mammals) or forestry materials. Biobased industrial products are produced from renewable plant and animal sources, and are generally presumed to be more environmentally benign than their petroleum counterparts.
- c. **Comprehensive Procurement Guidelines (CPG)** - The list of Environmental Protection Agency (EPA) designated items that must contain recycled content when purchased by federal, state, and local agencies, or by government contractors using appropriated federal funds. EPA is required to update the CPG every 2 years.
- d. **Environmentally Preferable** - Products or services that have a lesser or reduced adverse effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw

- materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.
- e. **Life Cycle Cost Analysis** - A comparison of the amortized annual costs of using a product with respect to a product that is not CPG-compliant. Costs under consideration include capital costs, installation costs, operating costs, maintenance costs, and disposal costs discounted over the lifetime of the product.
  - f. **Ozone Depleting Substances (ODS)** - Any substances containing chlorofluorocarbons (CFC) and/or having characteristics of depleting tri-atomic oxygen.
  - g. **Persistent, Bioaccumulative, and Toxic (PBT) Chemicals** - Highly toxic, long-lasting substances that can build up in the food chain to levels that are harmful to human and ecosystem health. They are associated with a range of adverse human health effects, including neurological, reproductive, and developmental problems; cancer; and genetic impacts.
  - h. **Pollution** - Any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment, including fugitive emissions.
  - i. **Pollution Prevention (P2)** – Source reduction as defined in the Pollution Prevention Act and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources; or protection of natural resources by conservation.
  - j. **Pollution Prevention Program (P3)** - At WFF, the Pollution Prevention Program includes pollution prevention (P2), waste minimization, and green procurement.
  - k. **Recovered Material** - Waste materials and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original manufacturing process. .
  - l. **Recycling** – The series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products, other than fuel for producing heat or power by combustion.
  - m. **Release** - Any planned or unplanned release of toxic chemicals to the environment including air emissions, off-site transfers of chemicals, waste water discharges, underground injections of waste, and wastes disposed of in on-site landfills. Examples include shipments of hazardous wastes to Treatment, Storage, and Disposal Facilities (TSDF).
  - n. **Request Originator** - The individual generating the procurement specification.
  - o. **Recovered Materials Advisory Notices (RMANs)** – Notices through which, EPA provides purchasing guidance and recommends recovered and post-consumer material content levels for designated items. RMAN recommendations are guidance only.
  - p. **Source Reduction** - Any practice that either reduces the amount of hazardous substance, pollutant, or contaminant entering any waste stream or released into the environment before recycling, treatment, or disposal or reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.

- q. **Toxic Release Inventory (TRI) Chemical** - A chemical or chemical category listed in 40 CFR 372.65. Through EPCRA, Congress mandated that a TRI be made public. The TRI provides citizens with accurate information about potentially hazardous chemicals and their use so that communities have more power to hold companies accountable and make informed decisions about how toxic chemicals are to be managed.
- r. **Waste Minimization** – A program required by Resource Conservation and Recovery Act involving source reduction and/or environmentally sound recycling of hazardous waste.

## 1.0 COMMITMENT

In its Policy Directive GPD 8500.1D, *Environmental Program Management*, Goddard Space Flight Center states:

“The Goddard Space Flight Center (GSFC) missions expand knowledge of the Earth and its environment, the solar system, and the universe. To maintain our nation's leadership in this endeavor, GSFC commits to conducting missions in a manner that promotes environmental stewardship. As an integral part of all mission planning and implementation, GSFC’s environmental policy is to:

- a. Comply with applicable Federal, state, and local laws and legislation, Executive Orders, NASA policies, and other requirements;
- b. Prevent pollution, conserve natural resources, and consider the environmental impacts of Center actions during planning;
- c. Implement pragmatic and cost effective solutions to environmental challenges;
- d. Communicate with GSFC community, our partners, and the public;
- e. Continue to improve our environmental performance by:
  - 1) Promoting awareness through education and training;
  - 2) Integrating environmentally sustainable best management practices into our daily work activities;
  - 3) Exploring advances in environmental technology; and
  - 4) Providing a framework for setting goals, objectives, and targets through our Environmental Management System.

These commitments demonstrate GSFC’s environmental stewardship in our community.

To accomplish these objectives, WFF will implement projects for reducing or eliminating generation of waste through source reduction and other pollution prevention methodologies. These projects will extend to air emissions, wastewater effluents, solid wastes, and hazardous wastes.

Priority is given to source and/or toxicity reduction. Where this is infeasible, recycling will be explored. Where recycling is not an alternative, treatment to reduce waste volume and/or toxicity shall be implemented. Finally, waste will be managed in a manner to minimize present and future effects on human health and the environment. WFF is

committed to reducing the quantity and toxicity of generated wastes.

Pollution prevention is the responsibility of *all* of WFF employees. WFF is committed to identifying and implementing P3 opportunities through solicitation, encouragement, and involvement of all employees.

## **2.0 PROGRAM IMPLEMENTATION**

Pollution prevention activities at WFF will be managed in accordance with this plan. This plan and the policies and procedures established to implement the plan are developed by the Wallops Environmental Office and approved by the Associate Chief, Medical and Environmental Division. The Plan is implemented by the Pollution Prevention Program Manager with the assistance of other Wallops employees who may originate, develop, evaluate, and implement specific pollution prevention projects.

Employees will be trained on the elements of P3 through the Environmental Management System training and at RCRA Annual Generator Training. The plan will also be available on the website at.

<https://code200-external.gsfc.nasa.gov/250-wff/program-areas-pollution-prevention>

## **3.0 ROLES AND RESPONSIBILITIES**

### **3.1 ASSOCIATE CHIEF, MEDICAL AND MEDICAL AND ENVIRONMENTAL MANAGEMENT DIVISION**

The Associate Chief is responsible for environmental issues at WFF. As such he/she will approve overall P3 policies and procedures. The Associate Chief signature will be evidence of plan approval.

### **3.2 POLLUTION PREVENTION PROGRAM MANAGER**

The program manager has overall responsibility for the development and implementation of the P3 plan. The program manager has the responsibility for organizing, implementing, managing, or monitoring the following conducting P2, waste minimization, and green procurement activities methods and programs.

- integrating pollution prevention into the installation's comprehensive planning;
- preparing and updating baselines for hazardous material use and waste generation;
- coordinating the performance of opportunity assessments to identify and evaluate P3 procedural changes, projects, and equipment;
- recommending P3 projects and equipment;
- recommending policies for identifying, procuring, and tracking hazardous materials;
- and
- developing the installation's P3 training programs.

### 3.3 ASSESSMENT TEAM

An assessment team will be formed as needed to perform P3 opportunity assessments. The primary responsibilities of the assessment team are to:

- perform opportunity assessments;
- aid in the implementation of projects identified by the opportunity assessment, if recommended by the program manager and approved by management of the process owner's organization, and
- monitor the performance of P3 projects.

The assessment team may be led by the P3 manager or by a team leader who has a vested interest in the particular waste streams or operations to be investigated. The results of all pollution prevention projects will be reported to the Environmental Office.

### 3.4 EMPLOYEES

Pollution prevention is the responsibility of all WFF employees.

### 4.0 WFF POLLUTION PREVENTION PROGRAM GOALS

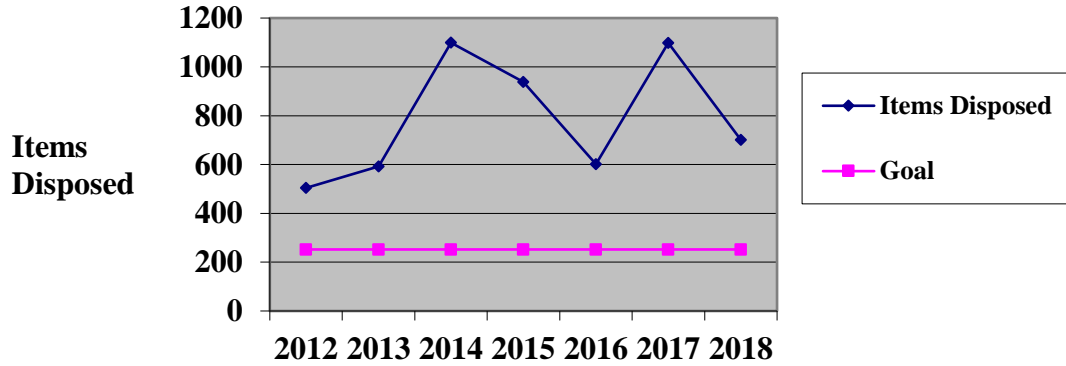
The long-term goals of WFF are to minimize the use of hazardous materials, minimize the generation of wastes, and minimize emissions of pollutants to the environment. Table 4.1 lists WFF Pollution Prevention Goals and progress towards reaching those goals. Progress on continuing goals are also displayed after Table 4.1 in a series of graphs.

Table 4.1 WFF Pollution Prevention Goals

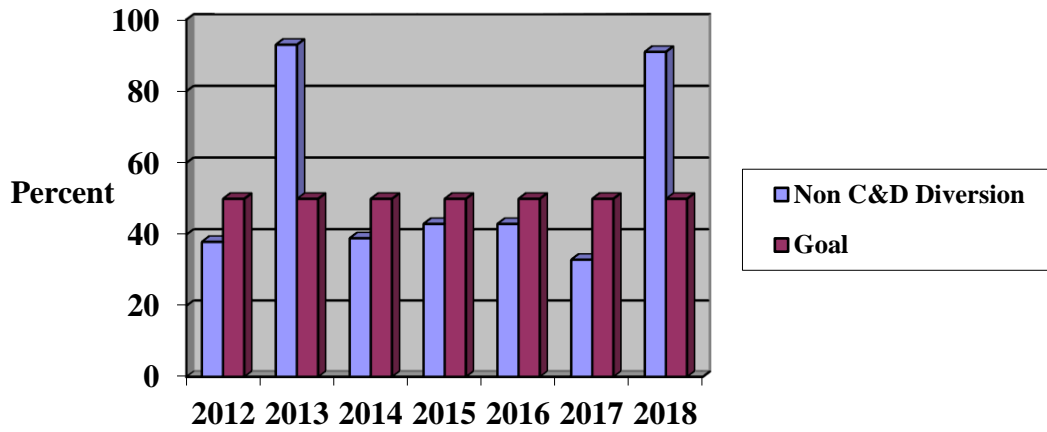
| Waste Type                                   | Goal (%) | Baseline Year | Target Year<br>December<br>31 | Goal Progress  | Comments  |
|--|----------|---------------|-------------------------------|--|---|
| Reduce Quantity of Virgin Chemicals Disposed | 50%      | 2012          | 2023                          | Reduced from 1353 items (2008) to 504 items (2012 63%) and 592 items (2013 17 % increase) up to 1099 items in 2014, 939 items in 2015, 602 items in 2016, 1098 items in 2017, 701 items in 2018. | New goal set in 2013 extending to 2015, in 2016 extending it to 2018, and in 2019 extending goal to 2023. |

| Waste Type   | Goal (%) | Baseline Year | Target Year December 31 | Goal Progress   | Comments  |
|--|----------|---------------|-------------------------|---|---|
| Achieve Nonhazardous Solid Waste Diversion Rate (recycling, donation, reuse, repair) | 50%      | N/A           | 2023                    | NETS data lists WFF diversion rate at 38% (2012), 93% (2013), 39% (2014), 43% (2015), 43% (2016), 33% (2017), 91% (2018)  | NETS data includes all material recycled even items not part of the solid waste wastestream such as used oil. |
| Achieve Construction and Demolition Materials Solid Waste Diversion Rate             | 50%      | N/A           | 2023                    | NETS data lists WFF diversion rate at 82% (2013), 99% (2014), 98% (2015), and 99% (2016, 2017, 2018)                      | Working with Code 228 to improve data collection.   |
| Increase Purchase of Green Products and Services                                     | 40%      | 2012          | 2023                    | NETS data (Green Purchases by Site ) 44% (2012), 48% (2013), 39% (2014) 39% (2015) 56% (2016), 84% (2017), and 90% (2018) | New goal set in 2013, in 2016 extending goal to 2018, and in 2019 extending goal to 2023.                     |
| Reduce Direct Greenhouse Gas Emissions   | 47%      | 2008          | 2025                    | Percent change from FY08 to FY17 is -33%  | WFF on target to meet 2025 goal with construction of airfield solar project                                   |
| Reduce Indirect Greenhouse Gas Emissions   | 32%      | 2008          | 2025                    | Percent change from FY08 to FY17 is -32.1%  | WFF has met the 2025 target   |

**Virgin Items Disposed Compared to 50 Percent Reduction Goal  
(2012 Baseline)**

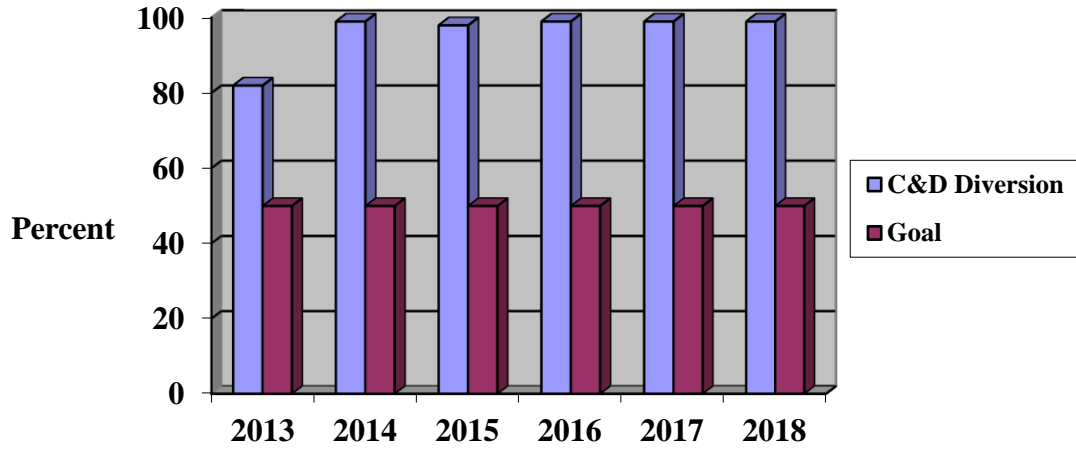


**Solid Waste Diversion (Non C&D)**

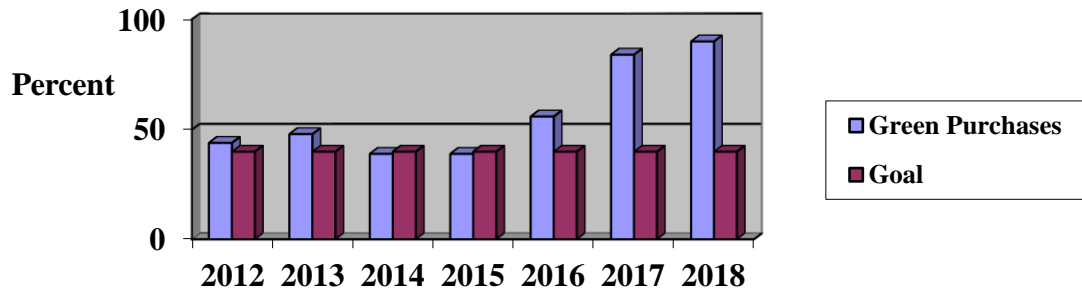




**Construction and Demolition Solid Waste Diversion**



**Green Purchases**



**5.0 BASELINE DATA**

A baseline data is necessary to assess and thereby target specific waste streams, hazardous materials, and activities for P3. Data can be compiled from annual Tier II, Toxic Release Inventory (TRI), ODS, Biennial Hazardous Waste reports, NASA Environmental Tracking System (NETS) reporting calls, chemical inventories, and from the pertinent year’s Hazardous Waste Disposal Inventory forms.

**5.1 TOXIC AND HAZARDOUS CHEMICALS**

The following waste streams shown in Table 5.1 below will be reviewed annually for project opportunities to reduce the quantity of toxic and hazardous chemicals.

Table 5.1 WFF Waste Streams

| Bldg                                | POC  | Type of area |               |           |         |              | Codes                       | Description  |
|-------------------------------------|--|--------------|---------------|-----------|---------|--------------|-----------------------------|--|
|                                     |  | HW           | Oil/Oily rags | Universal | Project | Parts Washer |                             |  |
| A1<br>301                           | Justin<br>Benner<br>1306                                 |              |               | •         |         |              | UW                          | Batteries (1x5G)   |
| A41<br>100 and<br>101               | Dan<br>Rothwell<br>1207<br>Zach 1406                     | •            |               |           |         |              | D008, D001                  | Solder (1 can, room 100), Aerosol cans (1x5G room 101),  |
| A41A                                | Dan<br>Rothwell<br>1207                                  |              | •             |           | •       |              | Non                         | Hydraulic oil from antenna changes(project), oily rags (1x5G)  |
| B29<br>Cage                         | Rodney<br>Godwin   | •            |               |           |         |              | D001                        | Aerosols from locating (1x30G)   |
| B31<br>102<br>GM                    | John<br>Conquest<br>1485                                 |              | •             |           |         |              | Non                         | Used oil from mowers (1x55G), Oily rags (1x55G)  |
| B31<br>101                          | Chuck<br>Amrhein<br>1430                                 |              | •             |           |         |              |                             | Oily rags (1x5G)   |
| B129 101                            | Tim<br>McCready<br>1508                                  | •            | •             | •         |         |              | D001F002 F003, D001,UW, Non | Solvent rags (3x5G), Aerosols (1x5G), Batteries (1x5G), Oil/water (1x5G)                                     |
| C15<br>102                          | Matt<br>Alterkruse<br>1185                               | •            |               |           |         |              | D001, D001 F001, F003 F005  | Aerosols (1x5G), Solvent rags (1x5G)   |
| C15<br>103                          | Billy<br>Young<br>1939<br>Robert<br>Windsor              | •            |               |           |         | •            | D001, F001 F003 F005, Non   | Aerosols (1x5G), Solvent rags (1x30G), Simple green partswasher  |
| D1<br>Hangar                        | Matt<br>Altekruse<br>1185<br>Blake<br>Tomlinson<br>asst. | •            | •             |           |         |              | D001, Non, D001, D001       | Jet A (1x5G), Used Oil(1x55G), Solvent rags (1x30G, 2x55G), Aerosols (1x20G), Flamm Labpacks (1x5G)          |
| D1 2 <sup>nd</sup> flr N<br>kitchen | Jennifer<br>Neeb<br>1233                                 |              |               | •         |         |              | UW                          | Batteries (1x5G)   |
| D50<br>108 Garage                   | Bobby<br>Wilt<br>1083                                    | •            | •             |           |         |              | D001 F001 F003 F005, Non    | Solvent rags with methylene chloride, TCE, toluene, xylene, (1x5G) Used oil from maintenance at FOTW (1x55G) |
| E2<br>N110                          | Dean<br>Morris<br>1362                                   |              |               | •         |         |              | UW                          | Batteries (1x5G)   |
| E2<br>C150                          | Chris<br>Perry<br>2275                                   | •            |               |           |         |              | D001 F001 F003 F005         | Solvent rags (1x5G), 1X5G USED OIL   |

| Bldg                                  | POC  | Type of area |               |           |         |              | Codes                     | Description   |
|---------------------------------------|--|--------------|---------------|-----------|---------|--------------|---------------------------|---|
|                                       |  | HW           | Oil/Oily rags | Universal | Project | Parts Washer |                           |   |
| E2<br>N125A                           | Matt<br>Griffin<br>1382                    | •            |               |           |         |              | D008, D001                | Solder, (1 can)<br>Alcohol rags (1x5G)                                      |
| E2<br>N117                            | Dean<br>Morris<br>1362                     | •            |               |           |         |              | D008, D001                | Solder (1 can),<br>Alcohol rags (1x5G)                                      |
| E104<br>100                           | Susan<br>Rodgers<br>2391                   |              |               | •         |         |              | UW                        | Batteries (1x5G)  |
| E106<br>Room 101                      | Steve<br>Annis<br>1542                     |              |               | •         |         |              | UW                        | Batteries (1x5G)  |
| E107 206<br>2 <sup>nd</sup> Fl<br>Kit | Roland<br>Wescott<br>1624                  |              |               | •         |         |              | UW                        | Batteries (1x5G)  |
| E109<br>170                           | Tom<br>Gadson<br>1080                      | •            |               | •         |         |              | D008, D001, UW            | Solder (3 cans),<br>Aerosols (1x5G),<br>Batteries (1x5G)                    |
| E109<br>144                           | Gabe<br>Garde<br>2598<br>Nathan<br>Cordrey |              |               | •         |         |              | UW                        | BATTERIES 1X5G  |
| E109<br>152                           | Gabe<br>Garde<br>2598<br>Nathan<br>Cordrey | •            |               | •         |         |              | D001, F002, F003,<br>F005 | Acetone/epoxy rags<br>(1x5g) acetone<br>(1x5g)                              |
| E109<br>272                           | Alex<br>Coleman<br>1976                    | •            |               | •         |         |              | D001 D008, UW             | Alcohol wipes solder<br>rags (1x5G),<br>Batteries (1x5G)                    |
| E109<br>273                           | Alex<br>Coleman<br>1976                    | •            |               | •         |         |              | D001 D008, UW,<br>D008    | Alcohol wipes solder<br>rags (1x5G),<br>Batteries (1x5G),<br>Solder(5 cans) |
| E109<br>276                           | Ricky<br>Satterfield<br>1877               | •            |               |           |         |              | D001, D008,               | Alcohol wipes<br>(1x5G), Solder (2<br>cans)                                 |
| F5<br>Dining                          | Debbie<br>Toth<br>1697                     |              |               |           |         |              | Non                       | Alkaline batteries  |
| F6<br>211                             | Rebecca<br>Chew<br>1275                    |              |               |           |         |              | Non                       | Alkaline batteries  |
| F7<br>140                             | Steve<br>Lang<br>1490                      | •            |               |           |         |              | D001 F001 F003            | Methylene Chloride,<br>Acetone and MIBK<br>rags (1x5G)                      |

| Bldg   | POC  | Type of area |               |           |         |              | Codes                             | Description   |
|--|--|--------------|---------------|-----------|---------|--------------|-----------------------------------|---|
|  |  | HW           | Oil/Oily rags | Universal | Project | Parts Washer |                                   |   |
| F10<br>machine<br>shop                           | Logan<br>Wright<br>854-4621<br>Harold<br>Farrington<br>1239<br>Robert<br>Windsor<br>854-7564 | •            | •             |           |         | •            | D001 F003, Non,<br>Non, D006      | Acetone alcohol rags<br>(10 x5G), Nonhaz<br>cutting fluid<br>(1x55G), Used oil<br>(1x55G), and Blast<br>grit from machine<br>shop for rocket<br>assembly (1x55G), |
| F10<br>machine<br>shop<br>(outside<br>stockroom) | Ryan<br>McCreedy<br>2462   | •            |               | •         |         |              | UW, D001                          | Nicad batteries<br>(1x5G, Aerosols<br>(1x5G)  |
| F10<br>S130                                      | Harold<br>Farrington<br>1239   | •            |               |           |         |              | D001F003F005<br>D035              | Acetone rags alcohol<br>rags (1 x5G)  |
| F10B   | Charlie<br>Cathell<br>2461   | •            |               |           |         |              | D001 F003F005,<br>D001 F003F005   | Petroleum naphtha,<br>toluene, n-Butyl<br>alcohol from cleaning<br>paint gun (1x30G),<br>rags associated with<br>above (1x20G)                                    |
| F10<br>S144                                      | Charlie<br>Cathell<br>2461   | •            |               |           |         |              | D001 F003                         | Acetone oily rags<br>(1x5G)   |
| F10<br>S264<br>mezzanine                         | Melissa<br>Waterfield<br>1842  | •            |               |           |         |              | D008, D001F003                    | Solder (5 cans),<br>Alcohol,acetone<br>solder rags (1x5G)   |
| F10 N111   | Melissa<br>Smith<br>1842<br>Logan<br>Wright<br>854-4621                                      | •            |               |           |         |              | D001 F003 D008,<br>D008           | Acetone solder rags<br>(1x5G), Solder (3<br>cans)   |
| F10<br>W100                                      | John<br>Doughty<br>1866  | •            |               |           |         |              | D008, D001 F003                   | Solder (2 cans)<br>Alcohol acetone rags<br>(1x5G),  |
| F10<br>N101                                      | John<br>Doughty<br>1866  | •            |               |           |         |              | D008, D001 F003                   | Solder (1 can),<br>Alcohol acetone rags<br>(1x5G)   |
| F10<br>N103                                      | John<br>Doughty<br>1866  | •            |               |           |         |              | D008, D001 F003<br>D008           | Solder (1 can),<br>Solder alcohol,<br>acetone rags (1x5G)   |
| F10<br>N103A                                     | Andrew<br>Muesler<br>1830  | •            |               |           |         |              | D008                              | Solder (1 can)  |
| F10<br>N130 and<br>N130A<br>ACS                  | Tim<br>Wilson<br>1100<br>Terri<br>Snyder<br>2181   | •            |               |           |         |              | D008, D001 F003<br>D008,D001, Non | Solder (2 cans),<br>Alcohol acetone lead<br>rags (1x5G) ,<br>Isopropanol (2x1G),<br>Branson (1x5G)  |
| F10<br>N125<br>Env/T&E                           | Rob<br>Marshall<br>1431  | •            |               |           |         |              | D001 F003                         | Alcohol acetone rags<br>(4x5G)  |

| Bldg                                | POC                          | Type of area |               |           |         |              | Codes  | Description   |
|-------------------------------------|------------------------------|--------------|---------------|-----------|---------|--------------|--|---|
|                                     |                              | HW           | Oil/Oily rags | Universal | Project | Parts Washer |  |   |
| F10<br>N119                         | Rob<br>Marshall<br>1431      | •            | •             |           |         |              | Non, D001 F003,<br>D001D008  | Used oil (1x5G),<br>Alcohol acetone rags<br>(2x5G),<br>Aerosols(1x5G),<br>Solder(1 can)   |
| F10<br>N203                         | Scott<br>Blake<br>1042       | •            |               |           |         |              | D008   | Solder (1 can)  |
| F10<br>N213                         | Scott<br>Blake<br>1042       | •            |               |           |         |              | D008   | Solder (1 can)  |
| F10 N230,<br>N234,<br>N235,<br>N236 | Terri<br>Snyder<br>2181      | •            |               |           |         |              | D001 D008 F003,<br>D008  | Alcohol solder<br>rags(1x5G N230),<br>Solder (1 can each<br>room)   |
| F10 W302                            | Tim<br>Sherman<br>1187       | •            |               | •         |         |              | D001 F003, UW,<br>D008, D001   | Alcohol acetone,<br>wipes from circuit<br>board for rockets,<br>(2x5G) Nicad<br>batteries(1x5G),<br>Solder (13 cans),<br>Aerosols(1x5G)   |
| F10<br>W301                         | Tim<br>Sherman<br>1187       | •            |               |           |         |              | D001 D008 F003,<br>D008  | Solder paste and<br>wipes alcohol,<br>acetone (2x5G),<br>Solder (5 cans)  |
| F10<br>W301A                        | Tim<br>Sherman<br>1187       | •            |               |           |         |              | D001 D008  | Solder paste and<br>wipes alcohol,<br>acetone (1x5G)  |
| F10<br>W301B                        | Tim<br>Sherman<br>1187       | •            |               |           |         |              | D008   | Solder (2 cans)   |
| F29<br>Shed                         | Harold<br>Farrington<br>1239 |              | •             |           |         |              | Non  | Oily rags (1x5G)  |
| F16<br>128<br>Garage                | Gene<br>Merritt<br>1939      | •            | •             |           |         | •            | Non, D001D018,<br>Non, D001 F003<br>F002F005, D008,<br>D001, UW, D008,<br>D006 | Used oil (1x55G),<br>Fuel filters(1x5G),<br>Nonhaz PW, Solvent<br>rags<br>(tetrachloroethane,<br>Bladeen) (1x55G),<br>Lead tire weights<br>(1x5G), Aerosols<br>(1x5G), Batteries<br>(1x5G), Solder (1<br>can) |
| F16<br>106<br>Electric<br>Shop      | Phil<br>Crofton<br>1446      | •            |               | •         |         |              | UW, D001 F001<br>F003, D001, Non   | Lamps (1x4', 1x8')<br>U tubes (1x4') CFL<br>(1x5G), Batteries<br>(1x5G), Solvent rags<br>(1x5G), Aerosols<br>(1x5G) Lead acid<br>batteries  |
| F16<br>105<br>ECS Shop              | Phil<br>Crofton<br>1446      | •            |               |           |         |              | D008   | Solder (1 can)  |

| Bldg                     | POC   | Type of area |               |           |         |              | Codes  | Description  |
|--------------------------|---|--------------|---------------|-----------|---------|--------------|--|--|
|                          |   | HW           | Oil/Oily rags | Universal | Project | Parts Washer |  |  |
| F16<br>103<br>AC Shop    | Prestine<br>Crosby<br>1753                  | •            | •             | •         |         |              | Non, D001F002<br>F003 F005, UW,<br>D001        | Refrigerant oil<br>(1x55G), Rags<br>contaminated with<br>TCE, petroleum<br>distillates (1x30G),<br>Batteries (1x5G),<br>Thermostats from<br>change-outs(1x5G),<br>Aerosols(1x5G) |
| F16<br>124<br>Paint Shop | Gene<br>Merritt<br>1939                     | •            |               |           |         |              | D001 D035 F003<br>F005, D001 D035<br>F003 F005 | Paint related<br>materials thinner<br>(1x5G), Paint rags<br>(1x5G), Aerosols<br>(2x55G)  |
| F26                      | Lenell<br>Reid                              | •            |               |           |         |              | D001   | Aerosols (1x55G)   |
| F-160<br>C125            | Ed<br>Woodring<br>2368<br>Daniel<br>Simes   | •            |               | •         |         |              | D001, UW                                       | Alcohol wipes<br>(1x5G), Batteries<br>(1x5G)   |
| F160<br>C107             | Susan<br>Savage<br>2183                     | •            |               |           |         |              | D001 D008, D008                                | Alcohol solder rags<br>(1x5G), Solder (10<br>cans)   |
| F160<br>C120             | Susan<br>Savage<br>2183<br>Ralph<br>Hickman | •            |               |           |         |              | D001   | Alcohol (1 x5G)  |
| F160<br>E114             | Jason<br>Freischlag<br>2352                 | •            |               |           |         |              | D001 F003                                      | Jet Fuel /Acetone<br>rags (1x 5G)  |
| F160<br>E115             | Jason<br>Freischlag<br>2352                 | •            | •             | •         |         |              | D001, D001 F003,<br>UW, D009                   | Fuel samples, oil +<br>ethanol (1x5G), JP8,<br>JetA, oil, ethylene<br>glycol, IPA, solvent<br>rags, acetone rags<br>(1x5G), Batteries (1<br>can), Thermometers<br>(1 can)        |
| F160<br>E113             | Jason<br>Freischlag<br>2352                 | •            |               |           |         |              | D001 RCRA 8<br>metals , D002,<br>RCRA 8 metals | Oil alcohol and<br>possible metals from<br>ICP analytical<br>machine (1x5G)<br>Acid and possible<br>metals from ICP<br>analytical machine<br>(1x5G)                              |
| F160<br>E110             | Brian<br>Cornwell<br>1155                   | •            |               |           |         |              | D001 F003                                      | Acetone rags (1x5G)  |
| F160<br>E108             | Brian<br>Cornwell<br>1155                   | •            |               |           |         |              | D002 D007 D009<br>D011, D001 F003              | COD vials containing<br>sulfuric acid,<br>mercury sulfate,<br>Silver sulfate,<br>chromic acid(1x5G)<br>Acetone, alcohol rags<br>(1x5G)   |

| Bldg                       | POC   | Type of area |               |           |         |              | Codes   | Description   |
|----------------------------|---|--------------|---------------|-----------|---------|--------------|---|---|
|                            |   | HW           | Oil/Oily rags | Universal | Project | Parts Washer |   |   |
| F160<br>W148               | Lari Ann<br>Gentry<br>1766  |              |               | •         |         |              | UW  | Batteries (1x1qt)   |
| H-100<br>105               | Joe<br>Ruffing<br>1255<br>757-894-<br>6028                                      |              |               | •         | •       |              | UW  | Batteries (1x5G)  |
| H-100<br>101               | Joe<br>Ruffing<br>1255<br>Jeff<br>Matthews<br>757-894-<br>9883                  | •            |               |           |         |              | D001F002 F003<br>F005                               | Solvent rags from<br>processing Cygnus<br>(2x5G)  |
| J-20<br>Hallway            | Kim<br>Check<br>1148  |              |               |           |         |              | Non   | Alkaline battery (1x<br>1qt)  |
| M15<br>104                 | Larry<br>Rovin<br>1112  | •            |               |           |         |              | D001F002 F003<br>F005, UW                           | Alcohol acetone rags/<br>Ensolve rags(1x5G),<br>UW batteries (1x5G)                     |
| M15<br>108                 | Larry<br>Rovin<br>1112  | •            |               |           |         |              | D001  | Aerosols (2x5G),<br>Alcohol acetone rags/<br>Ensolve rags(1x5G)                         |
| M16<br>104                 | Larry<br>Rovin<br>1112  | •            |               |           | •       |              | F002 F003 D001                                      | Alcohol acetone rags<br>(1x5G),   |
| M-16<br>102                | Larry<br>Rovin<br>1112  | •            |               | •         |         |              |   | Aerosols(1x5G), UW<br>batteries (1x5G)  |
| N-159<br>Hangar<br>(5 SAA) | Osiris<br>Macias<br>4692<br>Andy<br>Maguire<br>Brian<br>Yates<br>Dave<br>Stiles | •            | •             |           |         |              | D001, D001F003<br>F005 D035, Non;<br>D001           | JetA (1x5G, 1x55G<br>pump), Solvent rags<br>(3x55G), Oil<br>(1x55G) ,Aerosols<br>(1x5G) |
| N-159<br>W143              | Osiris<br>Macias<br>4692  |              |               | •         |         |              | UW  | Batteries (1x5G)  |
| N159<br>W142               | Jason<br>Bashor<br>1093   | •            |               |           |         |              | D008  | Solder (1 can)  |
| N159<br>PB                 | Osiris<br>Macias<br>4692  | •            |               |           |         |              | D001D035F003<br>F005,<br>D001D035F003<br>F005, D001 | Paint Rags(1x5G),<br>Paint Thinner(1x5G),<br>Aerosols(1x5G)                             |

| Bldg            | POC   | Type of area |               |           |         |              | Codes                            | Description   |
|-----------------|---|--------------|---------------|-----------|---------|--------------|----------------------------------|---|
|                 |   | HW           | Oil/Oily rags | Universal | Project | Parts Washer |                                  |   |
| N-159<br>E106   | Matt Linkswiler 1020<br><br>Kyle Krabill 1432 | •            |               | •         |         |              | UW, D008                         | Batteries (1x5G), Solder (1 can)  |
| N-159<br>E108   | Osiris Macias 4692                            | •            |               |           |         |              | D008                             | Solder (1 can)  |
| N159<br>E113    | Gary King 1038                                | •            |               |           |         |              | D008                             | Solder (1 can)  |
| N-159<br>E114A  | Ted Miles                                     | •            |               |           |         |              | D008                             | Solder (1 can)  |
| N-159<br>E121   | Chris Asburn 1761                             | •            |               |           |         |              | D008                             | Solder (1 can)  |
| N161<br>Hall    | Ginger Lamberson 1136                         |              |               | •         |         |              | UW                               | Batteries (1x5G)  |
| N162<br>Rm 104  | Bob Ross 2371                                 | •            |               | •         |         |              | UW, D008                         | Batteries (1x5G), Solder (1 can)  |
| N162<br>Rm 114  | Janel Strand 1621                             |              |               | •         |         |              | UW                               | NiCad batteries from antennae controls change-outs(1x5G)  |
| N162<br>Rm 115  | John VanKleef 1447                            | •            |               |           |         |              | D008                             | Solder (2 cans)   |
| N162<br>Rm 202  | Jim Evans 1509                                | •            |               |           |         |              | D008, D001                       | Solder (1 can), Alcohol rags (1x5G)   |
| N162<br>Rm 203  | Jim Evans 1509                                | •            |               |           |         |              | D008                             | Solder (1 can)  |
| N165            | William Kambar 1260                           | •            | •             | •         |         | •            | Non, Non, D001 F003 F005 D035,UW | Used oil from antenna changes(1x55G), PW Nonhaz, Solvent rags(1x30G), Batteries (1x5G)  |
| U25             | Ray Davis 2630                                | •            | •             |           |         |              | D008, Non, D001                  | Solder (1 can), Used oil (1x55G), Oily rags (1x55G), Aerosols (1x5g)  |
| U30<br>100, 110 | Ray Davis 2630                                | •            | •             |           |         |              | D008, Non, Non                   | Solder (1 can), Alkaline batteries (1x5G), Oily rags (1x55G)  |
| U40<br>107      | Tom Singer 2611                               | •            |               | •         |         |              | D001 F003 F005, D008, D001       | Rags with oil, grease, CRC 2-26, CRC3-36, alcohol, crud cutter; (1x30G), Solder(1 can), Aerosols (1x5G), Nid batteries, Lithium batteries and alkaline batteries (3 cans total) |



| Bldg                     | POC   | Type of area |               |           |         |              | Codes  | Description   |
|--------------------------|---|--------------|---------------|-----------|---------|--------------|--|---|
|                          |   | HW           | Oil/Oily rags | Universal | Project | Parts Washer |  |   |
| U55                      | William Wallace<br>2751                                 | •            |               |           |         |              | D008, non  | Solder(1 can), Alkaline batteries(1x1qt), Oily rags (1x5G)  |
| U70, U72                 | Bill Dize<br>2789                                       | •            | •             | •         | •       |              | Non, D008, UW  | Used oil (1x5G),Solder(1 can room 101), Nicd batteries (1x5G)   |
| V27<br>Fire truck bat    | Capt. On duty   |              | •             |           |         |              | Non  | Alkaline batteries 1x5g, 1x5g oily rags, 1x5g grill grease  |
| V-55                     | Mark Macaione<br>894-9866<br>Michael Fields             | •            |               |           | •       |              | D001   | Alcohol rags(1x55G)   |
| ASR 8<br>(near V66)      | Kevin Downing<br>2858<br>Norm Reasonover                | •            | •             |           |         |              | Non, D008  | Used oil (1x55G), Oily rags (1x5G), Solder (1 can)  |
| W15                      | Rick Sarbry<br>824-6578                                 |              | •             |           |         |              | Non  | Used oil (1x55G)  |
| W40                      | Mick Sharpe<br>1418                                     | •            |               | •         |         |              | UW, D001, D008, D001 F003 F002 F001 F005 D035                      | Batteries(1x5G), Aerosols(1x5G), Solvent rags (1x30G) Solder (1 can)  |
| X15                      | David Justice<br>1753                                   | •            |               |           |         |              | D001F002F003   | Solvent rags (1x55G)  |
| X30<br>Hood Room         | Mark Marsh<br>2133                                      | •            |               |           |         |              | D001 F003 F005 D035, D001 F003 F005 D035, D001 F003 F005 D035, non | Thinner(1x5G), Paint rags(1x55G), Spray gun clean (1x5G), Blast grit  |
| X35<br>100               | Adam Mason<br>2133                                      |              | •             |           |         |              | Non  | Used oil (1x5G)and oily rags(1x55G) from launcher maintenance   |
| X55<br>106               | Justin Revell<br>2607                                   |              |               | •         |         |              | UW   | UW batteries  |
| X79<br>Bay and logistics | Barbara Huffman<br>824-6520<br>Kevin Midder<br>824-6578 | •            | •             | •         |         |              | Non,UW,D001, D001 F003, D001, Non,                                 | UW batteries (1x5G logistics area), Flamm Lab packs (1x5G), Acetone, alcohol, and AK225 rags (1x30G), Aerosols (1x5G), Used oil (1x55G) |
| Y55<br>101/200           | Charles Knitter<br>2653                                 | •            | •             |           |         |              | D008, F002F003 F005 D035, Non                                      | Solder(1 can room 200), Rags with crc 226 paint simple green IPA oil grease (1x5G), Used oil (1x5G)                                     |

| Bldg | POC   | Type of area |               |           |         |              | Codes  | Description   |
|------|---|--------------|---------------|-----------|---------|--------------|--|---|
|      |   | HW           | Oil/Oily rags | Universal | Project | Parts Washer |  |   |
| Z65  | Darrell Gheen<br>757-894-7900<br>321-544-1635 |              |               | •         |         |              | UW   | Batteries (1x5G)  |
| Z40  | Daryl Moore<br>Cell: 540-450-4044             | •            |               | •         |         |              | D001, D001 F002<br>F003 F005, D008,<br>Non, UW | Aerosols(1x5G),<br>Solvent rags(1x10G),<br>Solder (1 can), Blast<br>grit (1x20G),<br>Batteries (1X5G) |

**5.2 SOLID WASTE DIVERSION AND RECYCLING**

Opportunities for solid waste diversion may include recycling, donation, reuse and repair. Fiscal year 2018 recycling totals are included in Appendix A, Table A.2. Current recycling opportunities include:

- drum and pail reuse,
- plastic beverage containers,
- aluminum beverage containers,
- toner cartridges,
- scrap metal,
- packing peanuts,
- cardboard and paperboard,
- white paper, colored paper, newspapers, and magazines.

Recycling activities at WFF will be conducted in accordance with GPR 8500.3 Waste Management.

**5.3 GREEN PURCHASING**

The Federal green purchasing program gives preference to:

- recycled content products
- Energy Star products
- water efficient products
- energy from renewable sources
- biobased products
- environmentally preferable products and services, including Electronic Product Environmental Assessment Tool (EPEAT) –registered electronic products
- alternative fueled Vehicles and alternative fuels
- products with low or no toxic or hazardous constituents
- non-ozone depleting substances

Recycled content and biobased products will be discussed below

### **5.3.1 RECYCLED CONTENT PRODUCTS**

Federal agencies and their contractors are directed by Resource Conservation and Recovery Act (RCRA) Section 6002 to develop “affirmative procurement” programs to ensure that designated items with recycled content are purchased by the government and its contractors whenever possible, and to obtain a waiver if purchase of a designated item is not possible because of any of a number of pre-specified reasons. In addition, 40 CFR 247.6 requires affirmative procurement programs to have the following four elements: a preference program for purchasing designated items; a promotion program; procedures for obtaining and verifying estimates and certification of recovered material content; and annual review and monitoring of the program.

The Affirmative Procurement Program will be conducted in accordance with the protocols established in NPR 8530.1A Affirmative Procurement Program and Plan for Environmentally Preferable Products. Those initiating a purchase will be responsible for determining if the item is designated on the Environmental Protection Agency’s Comprehensive Procurement Guidelines (CPG) List. The Procurement Office will ensure that affirmative procurement is considered in every purchase and aid the initiator in market research.

The Environmental Office will enter CPG purchase data into the NASA Environmental Tracking System (NETS) annually to quantify and review the progress of the program. The Affirmative Procurement program will be promoted by the Environmental Office through Special Announcements, Safety and Environmental newsletter, Inside Wallops, Wallops All, Earth Day, America Recycles Day, training classes or other appropriate avenues. The Environmental office will also annually spot check estimates and certification of recovered material content on non-construction products. Certification of recovered material for construction related products will be checked by Facilities Management personnel.

### **5.3.2 BIOBASED PRODUCTS**

The Bio-Based program will be conducted in a similar manner to the affirmative procurement program. Those initiating a purchase will be responsible for determining if the item is on the Department of Agriculture product designation list. All other elements of the program will mirror the affirmative procurement program.

## **6.0 POLLUTION PREVENTION PROGRAM OPPORTUNITY ASSESSMENT**

The P3 manager will examine the previous year’s inventory against the baseline inventory to target opportunities for assessment. Once a candidate chemical or waste stream is selected, the P3 manager will search the past pollution prevention program project data base in Appendix A for similar previous projects. Then the P3 manager may

form an assessment team or utilize an existing team to perform the opportunity assessment. The assessment team will examine the alternatives available for P3. Each opportunity assessment will identify the waste stream and its generating operation(s), describe the process, and present several pollution prevention alternatives. Each alternative will be described along with its advantages and disadvantages. Alternatives will be evaluated for their:

- effectiveness in achieving WFF's P2 goals,
- feasibility,
- ease of implementation, and
- return on investment.

The assessment team can use the pollution prevention survey forms to perform the opportunity assessment. An example of a survey form is found in Appendix B. This form contains questions and notes areas to examine when interviewing or working with personnel during an opportunity assessment.

Process owners will advise assessment team members of relevant safety procedures in each work area prior to the start of the assessment. Process owners will provide process descriptions and metrics which directly contribute of the success of the project. Once P3 alternatives are proposed, process owners will assist in the evaluation of the alternatives.

Once the opportunity assessment has been completed, results will be submitted to the process owner's organization along with the assessment team's recommendation for the preferred alternative for reduction. The process owner's organization will review the assessment and either approve the recommended alternative, another alternative, or deny funding for the P3 project.

Implementation of the projects shall be conducted by the process owner, with assistance from the assessment team. Effectiveness of the P3 project will be monitored by the assessment team, which will report to the program manager.

## **7.0 ANNUAL POLLUTION PREVENTION PROGRAM REPORTING REQUIREMENTS**

The program manager will answer the annual Headquarters P2, Recycling, Solid Waste and Green Purchasing data calls and report the data in NETS.

**Appendix A**  
**Pollution Prevention Program Data**

Table A.1 Past Pollution Prevention Program Projects

| Project Start      | Location      | Topic   | File                        |
|--------------------|---------------|---|-----------------------------|
| 1996 to Present    | Facility-wide | Florescent Lighting and Exit Sign Upgrades - WFF saves \$45,000 annually in decreased energy costs.   | 70.02.03.12911 (2/1/2006)   |
| 1997               | B-31, X-30    | Paint Thinner Distillation - Paint thinner was distilled and reused. Paint shop employees were not satisfied with the reclaimed product.  |                             |
| 2000               | F-8           | Printed Circuit Board Shop – In early 2000, WFF switched from processing circuit boards on site to purchasing them off site. In 1997, the circuit board shop generated 5,123 pounds of hazardous waste. This is no longer generated.  | 38.05.01.12880 (12/10/2001) |
| 2000               | N-222         | Wood Recycling – Wood recycling was tried for a few months, but vendor was not reliable and a suitable replacement could not be found.  |                             |
| 11/2001 to Present | Facility-wide | Class 1 ODS – Except for nominal amounts, the Class 1 ODS have been replaced except for Halon.  | 38.04.03.12962 (11/20/2001) |
| 11/2001 to Present | E-2           | Digital Photography – WFF switched from film photography and in-house processing to digital photography for all except high speed, outsourcing the processing of high speed film. This conversion eliminated the average hazardous waste generation of 1138 pounds per year from the photography lab.   | 38.05.01.12892 (12/10/2001) |
| 2001 to Present    | B-29          | Chemical Reuse – WFF makes available chemicals that are in date but not needed by their organization available to other organizations through the Code 250 website. Although no chemicals are currently available, during 2005, \$500 of disposal cost was avoided through reuse.   | 38.06.03.7570               |
| 3/2004 to Present  | F-10          | Parts Washer – WFF participated in a NASA agency project to test various parts washer solvents. WFF tested Inland Technology Breakthrough solvent which is an odorless solvent that has a low vapor pressure to control VOC emissions. It is used in a parts washer which filters the solvent contaminants to 0.1 micron. The machine shop that tested the parts washer elected to purchase the parts washer. | 38.04.01.12729 (11/5/2004)  |
| 6/04 to Present    | Facility-wide | Green cleaning chemicals – WFF developed a spreadsheet to screen housekeeping chemicals and continually tests new replacements.   | 38.04.01.12890 (06/30/2004) |

| Project Start      | Location                                 | Topic   | File                        |
|--------------------|--|---|-----------------------------|
| 6/04 to Present    | Main Base                                | Plastic Recycling – Beginning with a pilot project, plastic recycling has increased from 3 building to 24 locations   |                             |
| 2005 to Present    | Sites 2, 7, 10, 11, , 2, 20, 24, and F-8 | Remediation – WFF restored 8.15 historically contaminated acres to residential levels. Restoration to residential levels is beyond what is required by the RCRA 7003 Administration Agreement on Consent.   |                             |
| 2005 to 2006       | F-16                                     | Glycol Recovery Unit - A recovery and distillation unit for a glycol/water mixture generated by the air conditioning shop was investigated. However, a cost effective unit could not be found.  |                             |
| 11/2005 to Present | Facility-wide                            | Non Paradichlorobenzene Urinal Screens – WFF replaced paradichlorobenzene screens with no para screens and eliminated 300 pounds of paradichlorobenzene in the environment per year.  | 38.04.01.12893 (06/30/2004) |
| 1/2/06 to 4/1/06   | Wallops Island                           | Christmas Tree project – Diverted from the landfill, donated Christmas trees were strategically placed at a cost savings of \$1100 to protect the \$500,000 runway which launched the first Unmanned Aerial Vehicle to fly into a hurricane.  | 70.03.01.12882 (06/08/2006) |
| 2/2006 to 3/2009   | B-31 and Facility-wide                   | Methylene Chloride – The sling test shop was looking for an effective fast-acting paint stripper to eliminate the hazardous effects of methylene chloride. Turco 6813E – Chemical Stripper was found to be a viable alternative. All users have either discontinued their use or are actively engaged in researching substitutes. Disposal of methylene chloride waste has decrease from 440 to 60 pounds annually. | 38.04.01.12895 (2/1/2006)   |
| 05/06 to Present   | F-16                                     | Garage Glycol – The upgrade of ethylene glycol recycling equipment in the automotive garage eliminates the need for extender agents and has a return on investment of 1.1 years.  | 38.02.01.12900 (05/01/2006) |
| 2006 to Present    | E-109                                    | Green Building –The new engineering building incorporates many green building features including building orientation for optimal energy performance, natural lighting and ventilation, central courtyard, and use of low VOC materials.  | 38.03.03.12961 (3/17/2003)  |
| 10/2006 to 6/2008  | E-11                                     | VOC Remediation Project – A VOC filtration technology was tested at WFF which could have kept 6500 pounds of VOC's from the environment a year. The VOC's are produced during air   | 38.05.01.12903 (06/12/2006) |

| Project Start   | Location      | Topic   | File                                    |
|-----------------|---------------|---|---|
|                 |               | sparging at an old aviation tank farm remediation site. However, the air sparging is currently not producing enough VOC to use the technology.  |   |
| 2007 to 2008    | Facility-wide | Electrical Metering – Electrical metering was installed on all buildings. This metering feeds the utility information system which engages buildings in energy savings competition and helps identify problem areas. Corrections made as a result of meters save 200,000 kW h annually. |   |
| 6/07 to 8/08    | F-160         | Mercury Replacement Pilot Project – WFF investigated the accuracy of several non-mercury thermometers which could replace mercury thermometers. Non- mercury thermometers were found to be less accurate than hoped and only one substitution was made at D-50.                         |   |
| 2008 to Present | Facility-wide | Building Tune-Ups – Adjusting HVAC operations at each building to include equipment schedules, outside air dampers, and night time schedules saves WFF \$25,000 annually.   |   |
| 1/09 to 3/09    | E-2           | Grill Cleaner Substitution – A high pH grill cleaner used in the cafeteria was replaced with Scotch-Brite Quick Clean Griddle Liquid, a less toxic alternative  |   |
| 3/09 to Present | D-8           | Nozzle Cleaner Substitution - Gum Cutter Carb Cleaner, which contains toluene, xylene, and acetone, was replaced with a food grade cleaner, eliminating the hazardous waste associated with the use of the original product.  |   |
| 10/08 to 9/2012 | F-10          | Metal Machining Coolant Recycling – Use of coolant recycler had prolonged the life of coolant life in the machine shop and with a 1 year pay back period, the reconditioning system has reduced off-site disposal by 45%.   |   |
| 2009            | N-159         | Solar Powered Street Light Pilot Project – This project is projected to save 3000 kW per year.  |   |
| 6/2009          | E-2           | Biodegradable Take-out Containers – The cafeteria began to replace the styrofoam containers with corn and paper take-out containers.  |   |
| 7/09            | E-107         | Single Stream Recycling Pilot – A pilot project was starting to assess compliance with mixed stream desk-side recycling. See 2011 update.   | Prelim<br>38.02.03.14954<br>(6/12/2002) |
| 8/09            | F-10          | Closed Loop Water Jet – The Machine Shop upgraded its garnet metal cutting machine to a closed loop system saving 41,000 gallons of water.  |   |
| 11/09           | F-16          | Recycling of Cell phones – Cell phones are  |   |



| Project Start     | Location | Topic  | File |
|-------------------|----------|--|------|
| to 2010           |          | collected for donation to Cell phone for life. In FY2010, 86 phones were collected.  |      |
| 10/2010 to 3/2011 | WFF      | Operation Clean Sweep – Base cleanup recycled all paper, cardboard, scrap metal, concrete, tires, and wood for a Main Base total of 241 tons.  |      |
| 2011              | WFF      | Energy Savings Performance Project - New propane boilers at 35 buildings, electrical upgrades, and HVAC controls planned to result in a 99% reduction in direct SOx emissions per year (E4 Project), 53% reduction in direct NOx emissions per year, fewer aboveground storage tanks, and a 35% energy consumption reduction. See updates below.   |      |
| 01/2011           | WFF      | Introduced Freecycle at Work to WFF community in Safety and Environmental newsletter.  |      |
| 9/2011            | WFF      | Switched to Single Stream recycling – Cardboard, paperboard, aluminum cans, metal cans, glass, colored paper, newspapers, magazines and books with soft covers are all recycled in one container.  |      |
| 2/2012            | WFF      | WFF received a certificate from Safety-Kleen stating that “NASA WFF avoided 37 metric tons of Greenhouse Gas Emissions (CO2e) through Safety-Kleen’s closed-loop recycling program for used oil from January 01, 2011 to December 31, 2011.”   |      |
| 2/2012            | WFF      | All 46 remaining Nike motors sent for reuse to Naval Air Warfare Center Weapons Division in exchange for 24 Talos motors.  |      |
| 12/2012           | WFF      | The WFF Energy Savings Performance Project has accomplished the following:<br><ul style="list-style-type: none"> <li>-Reduced pollutant emissions including greenhouse gases (99 percent reduction in sulfur oxides (SOX) and 50 percent reduction in nitrogen oxides (NOX), and a 40 percent reduction in greenhouse gases, a 39 percent reduction in carbon monoxide, a 17 percent reduction in VOC and a 39 percent reduction in particulates, exceeding the 18.3 percent requirement, These pollutant emissions reductions translate to the elimination of 20.9 tons of SOX, 9.85 tons of NOX, and 2761 tons of greenhouse gases.</li> <li>-Reduced 30 percent of energy consumption by 2012, well ahead of the 2020 target year goal,</li> <li>-Saved 1 million gallons of water per year or 3</li> </ul> |      |

| Project Start    | Location | Topic   | File |
|------------------|----------|---|------|
|                  |          | percent of potable water previously consumed by central steam plant exceeding the 2 percent annual requirement for 2012,<br>-Eliminated 20 fuel oil tank systems and their associated environmental liability, and<br>-Administered upgrades from R-22 refrigerant to non-ozone depleting R-410a on air-conditioning units.   |      |
| 2/2013           | WFF      | VEEP Project - Reduction in Sulphur Oxides (SO <sub>x</sub> ) from 6.86 tons to 0.68 tons as a result of switching form #6 fuel oil boilers to propane.   |      |
| 2/2013           | WFF      | VEEP Project – Single Stream Recycling increased from 52.5 tons in 2011 to 62.4 tons in 2012. (See 2014 entry below)  |      |
| 2/2013 to 9/2016 | WFF      | VEEP Project – Reduced the tons of fuel oil stored in above ground storage tanks by installing geothermal heating ventilating and air conditioning systems at WFF. Reduced from 405,361 tons in 2011 to 256,743 tons in 2012. Reduced tons used (note change to used) from 276.9 tons used in 2013 to 130 tons used in 2014 to 102 tons used in 2015 and 125.9 tons used in 2016. |      |
| 2/2013           | WFF      | VEEP Project – Restored 0.46 acres to residential levels in 2011, 1.0 acres in 2012, 6.07 acres in 2013, 0.1 acres in 2014, 0.08 acres in 2015, 0.18 acres in 2016, 0.1492 acres in 2017, 0 acres in 2018.  |      |
| 2013             | E-109    | Collecting data and completing building tune-ups to certify Building E-109 as a LEED EB Building  |      |
| 2014             | WFF      | VEEP Project – Single Stream Recycling increased from 52.5 tons in 2011 to 62.4 tons in 2012 to 63.8 tons in 2013. 2014 showed a decrease to 40.32 tons. 2015 showed an increase to 45.39 tons. 2016 showed an increase to 50.4 tons. 2017 showed a decrease to 47.1 tons. 2018 showed an increase to 50.4 tons. Project is on-going.   |      |
| 2014             | E-109    | Building E-109 achieves LEED EB certification adding 52,779 square feet of LEED certified space to NASA's total.  |      |
| 2014 to 2016     | X-79     | VEEP Project - A hybrid cooling system was installed at Building X-79. The hybrid system uses both geothermal and the existing cooling tower. The geothermal system will be used as much as possible to reduce the gallons of water used by the   |      |

| Project Start | Location  | Topic   | File            |
|---------------|-----------|---|-----------------|
|               |           | cooling tower. From 2013 to 2015, there was reduction from 634,000 gallons to 295,000 gallons to 126, 000 gallons. 233,000 gallons were used in 2016.   |                 |
| 2015          | WFF       | CHARGE Wallops – Charging Hubs for Accessories and Reuse of Government Excess - This project would utilize excess solar panels and batteries to provide 12-volt DC current in E-2 Cafeteria and on a mobile trailer to power USB charging stations for cell phones, laptops, and other mobile devices. This project started in 2015 in the design phase and as of 2018 is not yet operational.  |                 |
| 2016 to 2017  | WFF       | WFF is collaborating with HQ NASA Technology Evaluation for Environmental Risk Mitigation (TEERM) office based out of KSC, to evaluate metal coatings used on NASA’s launch facilities and aircraft. The primary objective of this effort is to demonstrate and validate environmentally-preferable alternatives which can then be added to the NASA’s approved product list. The focus of the project is corrosion resistance and survivability, with the goal to reduce the amount of maintenance required to preserve the performance of launch facilities and aircraft, while reducing down time and mission risk. Test panels were prepared and in coordination with MARS, attached to the launch facilities at Pad 0A prior to the Oct 2016 and November 2017 launches. Test panels were also attached to the WFF sounding rocket launchers to test their durability against solid rocket propellant. The post-launch results are currently being evaluated. C-130 and P-3 aircraft panels were prepared and are ready to be installed on WFF assets when those two aircraft are in annual maintenance. |                 |
| 2017          | M-15/M-16 | Bikes are used to travel between Building M-15 and M-16, reducing vehicle emissions in this area.   |                 |
| 2017          | MLCC      | Within the scope of the MLCC project, the LEED subcontractor researched the availability of recycling rigid foam insulation. No options were found.   | E/38.02.03/2017 |
| 2017          | GSFC wide | DRInK - Direct reduction in Kilowatts proposed to WEMA, GEMA, and GSFC Code 200   | E/38.08.03/2017 |

| Project Start | Location               | Topic   | File   |
|---------------|------------------------|---|--|
|               |                        | Management. The project would remove the lamps from drink machines (projected 30% energy savings) and install Vending Misers (projected 50 percent energy savings) to the machines. The project is projected to save GSFC 1,100 Mwh in five years.  |  |
| 2017          | GSFC wide              | NASA RIDES (Reduction in Driving Emissions and Smog) – This contest was proposed to GSFC Code 200 Senior Management as a way to encourage the reduction of indirect Greenhouse Gas emissions to meet the NASA SSPP Goal 1 by 12.3% by 2020.   | E/38.08.03/2017  |
| 2017          | WFF wide               | Carpooling to Greenbelt, MD – Information is available in MOSI to assist those needing to travel to Greenbelt, MD with the travelers name and date of travel so that multiple government vehicles do not need to be taken to GSFC on the same day.  | E/25/09/draft issues/safety newsletter rough publication76th |
| 2017          | W-40/X-15              | VEEP project - This project will track use of Honeywell's Solstice PF, non-ozone depleting chemical, against the declining use of AK-225, an ozone depleting chemical. Values reported will be pounds of Honeywell's Solstice PF used in building W-40 and /or X-15. In 2017 0.5 lbs/28 lbs, in 2018 0/30 lbs of Soltice used/lbs of AK-225 used, respectively. |  |
| 2018          | MOCC/ Island Firehouse | MLCC name changed to MOCC. MOCC and Island Firehouse received LEED silver certification. Contact Code 228 project managers R. Simko and R. Stanley for more information.  |  |
| 2018          | F16 Garage             | The F-16 garage collaborated with Code 250 to substitute the previously used BRAKLEEN (contains Trichloroethylene), containing chlorinated solvents for the non-chlorinated BRAKLEEN. Results are pending   |  |

Table A.2 Wallops Flight Facility (WFF) Recycled Material :  
Fiscal Year 2018

| Item                                  | Quantity (tons) |
|---------------------------------------|-----------------|
| Asphalt                               | 14,561.00       |
| Batteries                             | 5.14            |
| Cement and Concrete                   | 10,500.00       |
| Cooking Grease                        | 1.55            |
| Fluorescent Lamps                     | 0.68            |
| Oil Filters                           | 0.20            |
| Scrap Metal                           | 149.00          |
| Single Stream                         | 50.40           |
| Solvents                              | 1.04            |
| Tires (1 for 1 swap)                  | 2.85            |
| Toner Cartridges and Electronic Scrap | 2,672.00        |
| Used Oil                              | 10.06           |
| Total                                 | 27,953.92       |

**Appendix B**  
**Pollution Prevention Program Opportunity Assessment Survey Form**

**Pollution Prevention Program Opportunity Assessment Survey Form**

Date:

Assessment Team:

Unit Designation, Shop Name, Building:

Description of Operation:

Chemicals Used:

Wastes Generated:

Current Waste Minimization Practices:

Problems:

**Waste Minimization Opportunities:**

Alternative 1:

Prevention Type:

Estimated Reduction:

Technical Evaluation (feasibility and ease of implementation):

Economic Evaluation

Investment Cost:

Annual Savings:

Payback Period:

Alternative 2:

Prevention Type:

Estimated Reduction:

Technical Evaluation (feasibility and ease of implementation):

Economic Evaluation

Investment Cost:

Annual Savings:

Payback Period: