National Aeronautics and Space Administration

Headquarters
Washington, DC 20546-001

January 4, 2017

Reply to Attn of: Environmental Management Division

TO: Goddard Space Flight Center
Attn: Director

THRU: Assistant Administrator for Strategic Infrastructure

FROM: Acting Director, Environmental Management Division

SUBJECT: Goddard Space Flight Center (GSFC) Environmental and Energy Functional Review (EEFR) Final Reports

Enclosed are the final reports for the GSFC EEFR, for both Greenbelt (GB) and Wallops Flight Facility (WFF), conducted during April 24 – May 5, 2017. The reports provide summary and detailed information regarding positive findings and areas requiring improvement in the Facility's environmental and energy management programs.

NASA Senior Management approved the use of the EEFR to monitor Agency compliance with environmental and energy requirements. The EEFR consists of an environmental management system (EMS) review using a NASA-generated protocol, energy and water management review, and a technical compliance review using the U.S. Army Construction Engineering Research Laboratory environmental protocols listed in Enclosure 1. A NASA team conducted the environmental and energy management review while AECOM conducted the compliance review under a NASA Headquarters contract. Enclosure 2 lists EEFR team members and GSFC personnel interviewed for the management review.

Aside from using the EEFR as a tool for obtaining visibility into a Center's Environmental Program, the EEFR provides an opportunity to improve communication between NASA Headquarters and the Centers regarding environmental compliance issues, lessons-learned, and success stories. Enclosure 3 contains the Environmental and Energy Program Health Indicator and Risk Charts for both GB and WFF. Enclosures 4 and 5 contain the Summary of the EMS Review for GB and WFF, respectively. Enclosures 6 and 7 contain the results of the Energy and Water Management Review for GB and WFF, respectively. Enclosures 8 and 9 contain the results of the technical phase of the EEFR for GB and WFF, respectively.

The compliance team found an overall strong program at both sites. At WFF, one area of concern was related to deficiencies in storm water management. At GB, one area of concern due to wastewater exceeding permit limits to the municipal sanitary system. Greenbelt was aware of the wastewater concern and is actively addressing the issue. The review determined the EMS to be well implemented at both sites with one minor non-conformance identified at GB for updating environmental management programs.

The review team also found that the GSFC Energy Manager is strengthening the Energy and Water Management Program for the GSFC-GB site, as well as the other sites under her management. It is apparent, based on reviews at other Centers and during the review at GSFC-GB, that such responsibilities require more than one person. Support from others, civil servants and/or contractors, is imperative to continue to manage the larger Energy and Water Management Programs. The new WFF Energy Site Manager is working well with the GSFC Energy Manager, the Sustainability Program Manager, and others to improve the program. Energy and water management responsibilities are collateral duties for the WFF Energy Site Manager so support from others is often required. Because of WFF's location away from a major metropolitan area, local training opportunities are limited and travel funds are often required to send someone to training. There has been limited success with bringing training courses to the site.

Please review the reports and submit to NASA Headquarters an action plan, within 90 days after receipt of the report, on how GB and WFF will implement the management and technical "recommendations for improvement." Your action plan should identify implementation constraints related to budget issues, as well as additional detail on actions with a targeted closure date greater than 6 months. All comments and questions regarding the contents of this memorandum and final report can be addressed to the EEFR Team Leader, Michael Green, at 202-358-1097; email: <michael.j.green-1@nasa.gov>.

Finally, we would like to thank your environmental, facilities, and other personnel for their assistance during the EEFR. Their professionalism and hospitality were respected and appreciated by the entire EEFR Team.

Denise Thaller

Denise Thaller

9 Enclosures

cc:
Acting Associate Administrator/Ms. Paquin (w/o Enclosures)
Acting Associate Administrator for Mission Support Directorate/Mr. Tenney (w/o Enclosures)
Associate Administrator for Science Mission Directorate/Dr. Zurbuchen (w/o Enclosures)
Office of Infrastructure/Mr. Robinson (w/o Enclosure 8 and 9)
Goddard Space Flight Center /Ms. Baskin (w/o Enclosure 8 and 9)
Goddard Space Flight Center/Mr. Connell (Enclosure 9 via email)
Goddard Space Flight Center /Mr. Gatto (via email)
Goddard Space Flight Center/Mr. Nessler (Enclosure 8 and 9 via email)
Goddard Space Flight Center/Mr. Rubilotta (Enclosure 8 and 9 via email)
Johnson Space Center/SD345/Mr. Plaza (via email)
Wallops Flight Facility/Mr. Meyer (Enclosure 8 via email)
Wallops Flight Facility/Ms. White (w/o Enclosure 4, 6, 8, and 9)
Wallops Flight Facility/Mr. Wrobel (w/o Enclosures)

NASA Environmental Functional Review Protocols
U.S. Army Construction Engineering Research Laboratory (CERL)
Environmental Protocols

1. Air Emissions Management
2. Cultural Resources Management
3. Emergency Planning and Community-Right-to-Know
4. Hazardous Waste Management
5. National Environmental Policy Act
6. Pesticide Management
7. Petroleum, Oil and Lubricant Management
8. Solid Waste Management
9. Storage Tank Management
10. Toxic Substances Management (Asbestos and PCBs)
11. Wastewater Management
12. Water Quality Management

Goddard Space Flight Center (GSFC)
Environmental and Energy Functional Review
April 24 – May 5, 2017

NASA Headquarters, Environmental Management Division, EEFR Team

NASA Personnel:
Michael Green, HQS EMD/EEFR Team Leader
Denise Thaller, KSC/Chief, Medical and Environmental Services Division
Mark Schoppet, HQS EMD/Management & Technical Associate (GB only)
Paul Robert /HQS/Energy and Water Management Review Lead

ITB Contractor Personnel (Energy and Water Management)
Kevin Callahan

URS Contractor Personnel:
Bobbie Harward/Project Manager
Gerald Baribeau
Mikael Blotzer
Dr. Daniel Cassedy
Paul Lorenz
Annette Barndt (GB only)
Laura Waterworth/Project Administrator

GSFC Personnel Interviewed (EMS Review Only)
Greenbelt Personnel:

E. Connell	M. Hess	R. Carter
K. Yargus	P. Hancock	B. Despanza
A. Cherock	J. Becker	D. Hymer
P. Nessler	B. Ramon	G. Blaunt
E. Baskin	C. Mattiello	L. Bednarik
K. Busquets	J. Henderson	C Wellington
R. Rubilotta	D. Campbell	T. Weis

Wallops Flight Facility Personnel:

T. J. Meyer	W. Wrobel	J. Eggers	J. Schafer
C. Ward	B. Underwood	M. Hurney	J. Hickman
M. Simko	K. Webb	J. McWilliams	B. Justis
H. White	J. Milliner	D. Lilly	J. Eggers
B. Pagliaro	T. Paterson	F. Uptegrow	S. Seaman
M. Bunting	C. Parks	M. Izzo	
R. Stanley	J. Atkins	G. Garde	

Goddard Space Flight Center (GSFC) Environmental and Energy Functional Review Health Indicator Summary and Top Risk Charts

NASA Headquarters
Environmental Management Division

Greenbelt EMS Program
Health Indicator Summary

1.0 General	G		4.6 Operational Control	G	P
2.0 Environmental Policy	G		4.7 Emergency Preparedness	G	
3.1 Aspects and Impacts	G		5.1 Monitoring and Measurement	G	P
3.2 Legal Requirements	G	P	5.2 Evaluation of Compliance	G	
3.3 Objectives and Targets and Management Programs	Y		5.3 Corrective Action	G	
4.1 Resources, Roles, and Responsibilities	G	R	5.4 Records	G	R
4.2 Environmental Training	G		5.5 EMS Audit Review	G	
4.3 Communications	G		6.0 Management Review	G	R
4.4 & 4.5 Documentation	G				

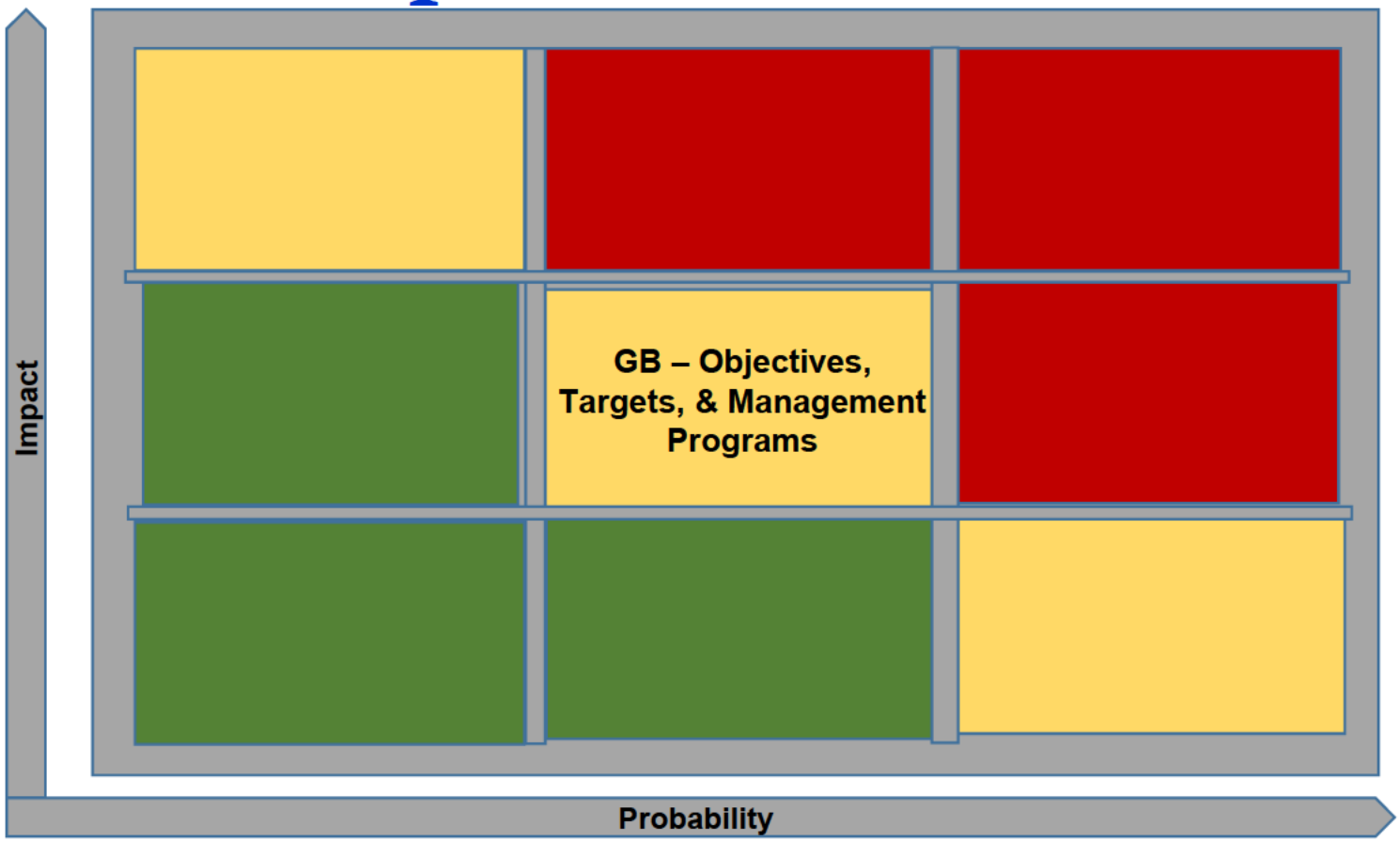
R = Recommendation **P = Positive**

WFF EMS Program Health Indicator Summary

1.0 General	G	P	4.4 & 4.5 Documentation	G	
2.0 Environmental Policy	G		4.6 Operational Control	G	P
3.1 Aspects and Impacts	G		4.7 Emergency Preparedness	G	
3.2 Legal Requirements	G		5.1 Monitoring and Measurement	G	
3.3 Objectives and Targets	G		5.2 Evaluation of Compliance	G	
3.4 Management Programs	G	R	5.3 Corrective Action	G	
4.1 Resources, Roles, and Responsibilities	G		5.4 Records	G	
4.2 Environmental Training	G		5.5 EMS Audit Review	G	
4.3 Communications	G	P	6.0 Management Review	G	R

R = Recommendation P = Positive

GSFC EMS Program
Top Risk Matrix



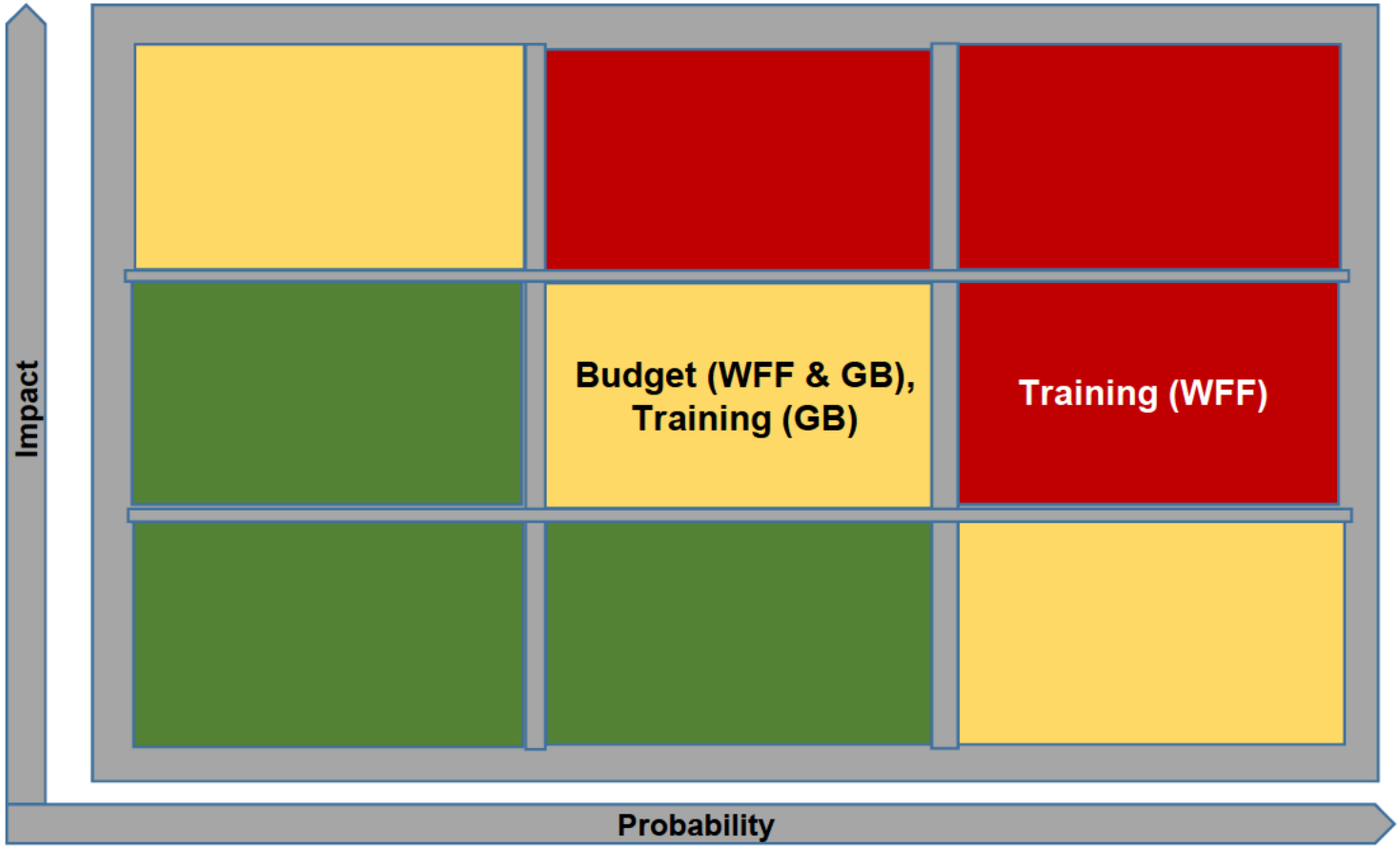
Greenbelt Energy/Water Program Health Indicator Summary

FY 2017	Energy	Water	FY 2017	Energy	Water
Roles & Responsibilities			**Utilities Management**		
1.1 Organization	G	G	4.1 Cost	G	G
1.2 Policies	G	G	4.2 Demand	G	NA
1.3 E/W Manager	G	G	**Federal Goals – FY 2016**		
1.4 E/W Team	G	G	5.1 Energy Intensity	G	NA
1.5 Training	Y	Y	5.2 Renewable Electric Energy	G	NA
Planning & Budgeting			5.3 Clean Energy	G	NA
2.1 Plan	G	G	5.4 Water Intensity	NA	G
2.2 Budget	Y	Y	**Investments**		
Communications & Reporting			6.1 Facility Projects	G	G
3.1 Senior Management	G	G	6.2 O&M	G	G
3.2 Reporting	G	G	6.3 Metering / Information	G	G
3.3 Awareness / Awards	G	G	6.4 Audits	G	G

WFF Energy/Water Program Health Indicator Summary

FY 2017	Energy	Water	FY 2017	Energy	Water
Roles & Responsibilities			**Utilities Management**		
1.1 Organization	G	G	4.1 Cost	G	G
1.2 Policies	G	G	4.2 Demand	G	NA
1.3 E/W Manager	G	G	**Federal Goals – FY 2016**		
1.4 E/W Team	G	Y	5.1 Energy Intensity	G	NA
1.5 Training	R	R	5.2 Renewable Electric Energy	G	NA
Planning & Budgeting			5.3 Clean Energy	R	NA
2.1 Plan	G	G	5.4 Water Intensity	NA	G
2.2 Budget	Y	Y	**Investments**		
Communications & Reporting			6.1 Facility Projects	G	G
3.1 Senior Management	G	G	6.2 O&M	G	G
3.2 Reporting	G	G	6.3 Metering / Information	G	Y
3.3 Awareness / Awards	Y	Y	6.4 Audits	G	G

GSFC Energy/Water Program Top Risk Matrix



Greenbelt Technical Program Health Indicator Summary

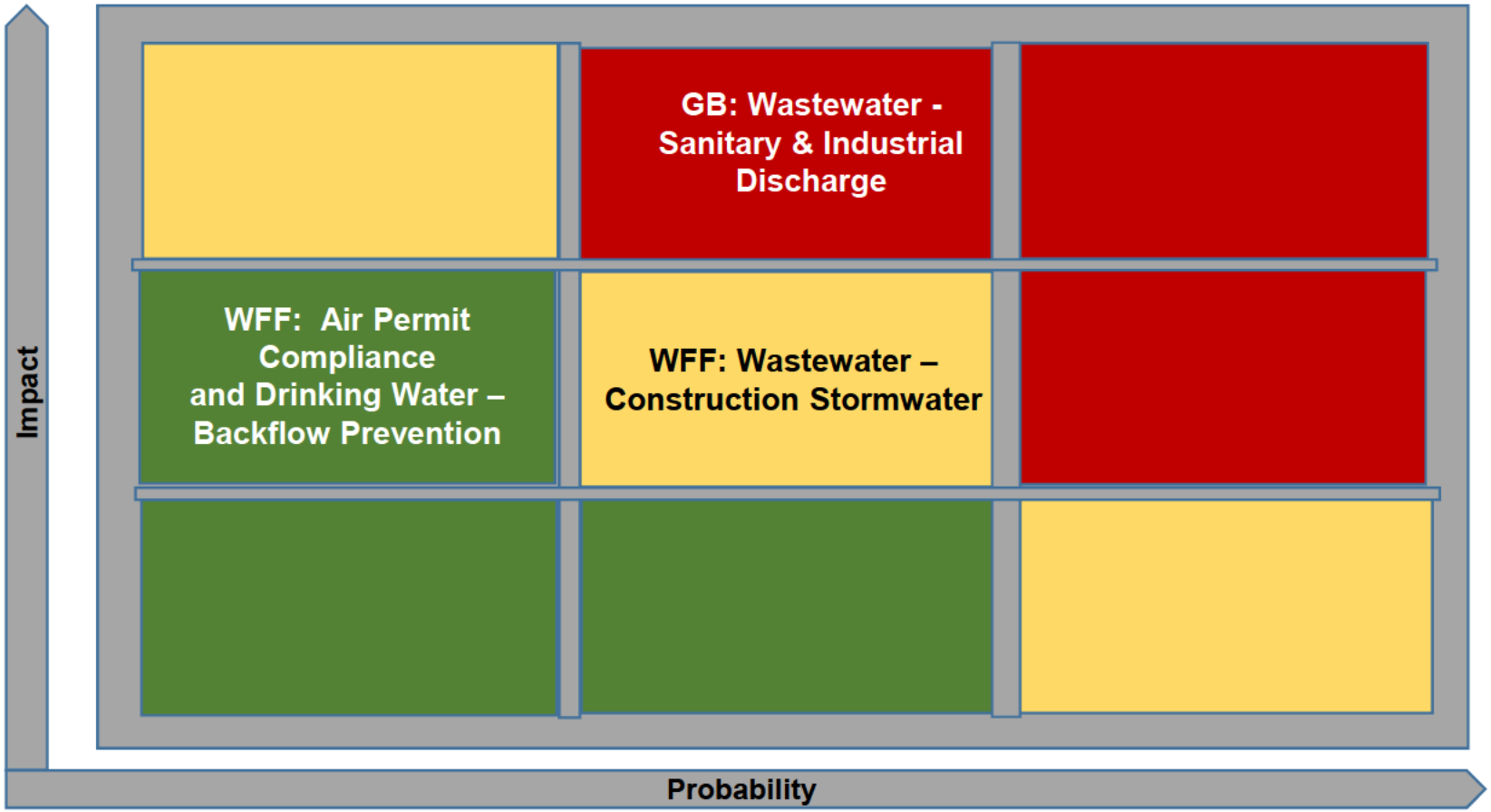
Air Emissions	G	POL	G
Cultural Resources	G	Solid Waste	G
Drinking Water	G	Storage Tanks	G
Hazardous Materials – EPCRA	G	Toxics – Asbestos	G
Hazardous Waste	G	Toxics – PCB	G
Other Env Issues – NEPA	G	Wastewater	R
Pesticides	G		

WFF Technical Program Health Indicator Summary

Air Emissions	G	POL	G
Cultural Resources	G	Solid Waste	G
Drinking Water	G	Storage Tanks	NR
Hazardous Materials – EPCRA	NR	Toxics – Asbestos	G
Hazardous Waste	G	Toxics – PCB	G
Other Env Issues – NEPA	G	Wastewater	Y
Pesticides	G		

NR = Not Reviewed

GSFC Technical Program Top Risk Matrix



Environmental and Energy Functional Review (EEFR)
Goddard Space Flight Center – Greenbelt
Summary of Environmental Management System (EMS) Review

This summary provides an evaluation of the detailed interview notes from the EMS Review of GSFC. The "General Observations" section contains review findings that either did not relate to a specific single element of the EMS review, or related to the EMS in general. A review of each EMS element follows, and is arranged and numbered based upon the elements' relationship to the NASA EMS Procedures Manual and the associated checklist.

Findings are categorized into one of the following evaluations:

- **Conformant :**
  Activities that meet the requirements of a particular environmental standard.
- **Nonconformance :**
  Activities which do not meet the requirements of the EMS.
- **Significant Nonconformance :**
  Nonconformance requiring immediate attention and mitigation.
- **Positive :**
  Activities that go beyond what is required by a particular environmental standard.

---

2 Environmental Policy

- **Conformant**
  Policy is contained in GPD 8500.1C "Environmental Policy and Program Management." GPD 8500.1C meets NASA EMS requirements. The policy is available on the Goddard Directives Management System (GDMS). The policy is communicated to on-site employees and contractors through EMS awareness training which is required every 3 years.

3.1 Environmental Aspects

- **Conformant**
  The aspect and impact analysis process had been completed and reviewed. The process meets the requirements of the NASA EMS NPR 8553.1B. The EMS Manager coordinates with EMS points-of-contact at least annually to review and update the environmental aspects and impacts. Changes are presented to Center management at the annual EMS Management Review.

- **Recommendation**
  The risk assessment process utilizes a mathematical procedure to assess risk which could be streamlined by following a process similar to the example in NPR 8553.1B.

3.2 Legal and Other Requirements

- **Conformant**

  GSFC-GB utilizes a variety of sources, e. g, RRAC Principle Center, to assess legal and other requirements and to disseminate the information to appropriate organizations. Updates are maintained in the EMS SharePoint document library "Regulatory Review." Managers interviewed noted that the Environmental Team does a good job of providing current information on legal requirements. GSFC-GB has an appropriate process in place for reviewing and implementing legal requirements.

- **Positive**

  The environmental contractor reviews Regulatory Risk Analysis and Communication summaries to provide regulatory updates and recommendations to GSFC.

3.31 Objectives & Targets

- **Conformant**

  Environmental Objectives and Targets were developed for High Priority Aspects. Targets have been established for each objective with tasks, responsible parties and deadlines. Objectives and Targets are managed with environmental management programs (EMPs) and maintained in SharePoint. Progress is monitored at least annually during the management review.

3.32 Management Programs

- **Nonconformance**

  EMPs are established to address each objective and target (O&T). In addition to the lead for the O&T, responsible personnel/ organizations are identified for each EMP. Progress on the EMPs is tracked on the EMS SharePoint site and monitored at least annually. However, the following Minor Non-Conformance was noted: Requirement: NPR 8553.1B, Section 3.3, requires the Center to establish and update O&Ts, and EMPs for high priority aspects. EMPs shall also address resource requirements. Observation: Several O&Ts and EMPs have not been updated for 2017 or contains outdated information. Several EMPs did not address resource requirements. Completed EMPs have not been archived. Recommendation: The O&Ts and EMPs should be reviewed to verify that they are current and updated as appropriate. Resource requirements should be identified. Completed EMPs should be archived. EMPs with "ongoing" status should be considered operational controls and moved into a GPR, work instruction, or similar document.

4.1 Resources, Roles, Responsibilities, and Authorities

- **Conformant**

  Overall, Greenbelt environmental roles and responsibilities are described in GPD 8500.1A and are also described in the Environmental Management Manual and the Environmental Website. Roles and responsibilities within the Environmental Management Team are defined for civil servants and contractors. An EMS Team serving as points-of-contact consist of knowledgeable personnel from across the Center exists. Cease and Desist authority can be initiated in accordance with GPD 8500.1A.

- **Recommendation**

  Formalize the EMS Core Team and follow-up with team on status of high priority environmental aspects, O&Ts, and EMPs.

4.2 Competence, Training, and Awareness

- **Conformant**

  GSFC requires all employees to take the GSFC Environmental Awareness Training every three years. The training is available online in SATERN which records names and completion dates. The environmental awareness training package appeared to be appropriate. Requirements for media-specific training are identified in Center Plans. Environmental staff also provides training in their areas. Contractors maintain their training records.

- **Recommendation**

  The internal EMS training is overall good, but it was noted that it has not been updated in 3 years.

4.3 Communications

- **Conformant**

  GSFC-GB uses a variety of internal communication vehicles, such as the daily e-mail Dateline, the GSFC Internal Website, and the Goddard View. In addition, the Center uses events, such as Earth Day and America Recycles Day to conduct environmental outreach. External Communications are the responsibility of the Office of Communications. The public can also submit Freedom of Information Act (FOIA) requests through the NASA FOIA Center. When inquires come from the general public of an environmental nature, this information is documented by the GSFC MEMD and tracked to completion in the External Communications List on the EMS SharePoint Site.

- **Recommendation**

  The internal communications should include more information on high priority aspects.

4.4 Documentation

- **Conformant**

  GSFC policy documents and procedural requirements are maintained and controlled on the Goddard Directives Management System (GDMS). The Environmental Management Manual describes the core elements of the EMS and is available on the SharePoint site. EMPs and other EMS documentation is available on the SharePoint site. Documents are reviewed annually and updated, as necessary, with the exception of EMPs noted previously.

4.5 Control of Documents

- **Conformant**

  GSFC policy documents and procedural requirements are maintained and controlled on the Goddard Directives Management System (GDMS). The Environmental Management Manual describes the core elements of the EMS and is available on the SharePoint site. EMPs and other EMS documentation is available on the SharePoint site. Documents are reviewed annually and updated, as necessary, with the exception of EMPs noted previously.

4.6 Operational Control

- **Conformant**

  GPR 8500.1, Environmental Planning and Impact Assessment, outlines procedures and responsibilities to ensure that the GSFC performs environmental planning and review of proposed actions in compliance with the National Environmental Policy Act (NEPA) and other applicable Federal, state, and local regulations. GSFC requires that all facilities and flight projects complete an environmental checklist. GSFC has established operational controls in Procedural Requirements and Guidelines and Work Instructions. Other operational controls include the ICP and the Storm Water Pollution Prevention Plan (SWPPP).

- **Positive**

  The Initiator's Acquisition Checklist helps ensure that environmental requirements are included in procurements.

4.7 Emergency Preparedness and Response

- **Conformant**

  Emergency Preparedness and Response are the responsibility of the Office of Protective Services. The Emergency Preparedness Program Plan for Greenbelt provides overall direction to the process. An Integrated Contingency Plan (ICP) has been developed to address hazardous waste emergency response procedures and oil management. The Center Emergency Management Officer conducts post incident "Hot Washes" and publishes after action reports when appropriate. ICP training is required annually for staff who handle petroleum products.

5.1 Monitoring & Measurement

- **Conformant**

  EMS metrics are maintained in the EMS SharePoint Site and are reported at least annually to Center management as part of the EMS Management Review. The metrics are updated quarterly, when data become available. Where monitoring and measurement require field sampling and analysis, it is conducted in accordance with work instructions in GDMS.

- **Positive**

  The DSRs effectively communicate status of environmental issues and sustainable practices to Management Operations Director.

5.2 Evaluation of Compliance

- **Conformant**

  GSFC-GB conducts compliance inspections of individual environmental programs (e.g., annual SWPPP inspections described in the SWPPP, Satellite Accumulation Area inspections, tank inspections, etc.). Evaluations of compliance are described in Center GPRs, Work Instructions, and in Plans, such as the ICP and SWPPP. Findings are entered in SHEtrak, assigned to the appropriate person/organization, and tracked to closure

5.3 Nonconformity, Corrective Actions, and Preventive Action

- **Conformant**

  GSFC-GB tracks findings from external inspections, EFRs, and internal audits through the SHEtrak database. Findings are not closed until reviewed by the appropriate Environmental Team member. SHE-track is an excellent tool to track corrective actions.

5.4 Control of Records

- **Conformant**

  GSFC has a records management and retention system. Record types and requirements are described for each media in relevant GPRs. Environmental records are maintained in paper copies in the MEMD file room. GSFC follows the NASA record retention schedule unless it conflicts with regulatory or permit requirements.

- **Recommendation**

  Based on the retention schedule, many of the EMS records should be removed or archived.

5.5 Internal Audit

- **Conformant**

  GSFC conducts an internal EMS audit annually except for years when the EEFR is conducted. Results are communicated to Center Management during the EMS Management Review. The last 2 EMS audits were reviewed along with the EMS audit schedule. Non-conformances are entered into SHEtrack.

6 Management Review

- **Conformant**

  The Center Director and senior management review the environmental policy and status of the EMS at least annually at the EMS Management Review. Environmental information and status is also reported to the Management Operations Directorate via weekly reports, tag-ups and DSRs. The Center Director has issued the Declaration of Conformance.

- **Recommendation**

  Following are several recommendations for improving the management review: A chart summarizing the status of sustainable practices would help communicate those programs to management. Status of open findings/corrective actions should be included. Greenbelt review should provide more detail on status of O&Ts and Actions. Greenbelt should consider expanding the audience of the Management Review in order to share results with the other organizations.

Environmental and Energy Functional Review (EEFR)
Goddard Space Flight Center - Wallops Flight Facility
Environmental Management System (EMS) Review

This summary provides an evaluation of the detailed interview notes from the EMS Review of WFF. The "General Observations" section contains review findings that either did not relate to a specific single element of the EMS review, or related to the EMS in general. A review of each EMS element follows, and is arranged and numbered based upon the elements' relationship to the NASA EMS Procedures Manual and the associated checklist.

Findings are categorized into one of the following evaluations:

- **Conformant :**
  Activities that meet the requirements of a particular environmental standard.
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  Activities which do not meet the requirements of the EMS.
- **Significant Nonconformance :**
  Nonconformance requiring immediate attention and mitigation.
- **Positive :**
  Activities that go beyond what is required by a particular environmental standard.

---

2 Environmental Policy

- **Conformant**
  Policy is contained in GPD 8500.1C "Environmental Policy and Program Management." GPD 8500.1C meets NASA EMS requirements. The policy is available on the Goddard Directives Management System (GDMS). The policy is communicated to supervisors, personnel, and partners through EMS awareness training which is required every 3 years.

3.1 Environmental Aspects

- **Conformant**
  The aspect and impact analysis process has been completed and reviewed. The process follows the requirements of the NASA EMS NPR 8553.1B. The Environmental Office, Environmental Program Mangers and the Project Team identify and prioritize, on an annual basis, the impacts that WFF has on the environment with the involvement of subject matter experts from WFF areas of operation as necessary.

3.2 Legal and Other Requirements

- **Conformant**
  WFF utilizes a variety of sources, e. g, RRAC Principle Center, to assess legal and other requirements. Environmental program managers serve as subject matter experts and disseminate the information to appropriate organizations. Managers interviewed noted that the Environmental Team does an excellent job of providing current information on legal requirements. New requirements are communicated through email, meetings and

training. WFF has an appropriate process in place for reviewing and implementing legal requirements.

3.31 Objectives & Targets

- **Conformant**

  WFF has developed objectives and targets for their high-priority aspects as well as several medium low priority aspects. Objectives and targets are clear and achievable, and are embedded into environmental management programs. Senior management approves objectives and targets during annual Environmental Management Review.

3.32 Management Programs

- **Conformant**

  WFF has developed and maintains environmental management programs (EMPs) that identify the actions required to achieve the environmental objectives and targets for their high-priority aspects as well as several medium low priority aspects. The EMPs address objectives and targets, resources, and schedules for achievement. EMPS for high priority aspects are reviewed quarterly while the other EMPS are reviewed semiannually.

- **Recommendation**

  Some EMPs could be streamlined by reducing Actions that are “ongoing” or adequately addressed by operational controls.

4.1 Resources, Roles, Responsibilities, and Authorities

- **Conformant**

  Overall, WFF environmental roles and responsibilities are described in GPD 8500.1A and are also described in the Environmental Management Manual (WFF EM-001). Roles and responsibilities within the Environmental Management Team are defined for civil servants and contractors. An EMS Project Team consisting of mid-level managers from across the facility exists. Cease and Desist authority can be initiated in accordance with GPD 8500.1A.

4.2 Competence, Training, and Awareness

- **Conformant**

  WFF has developed a good training program. The EMS module is available on-line and is required for all employees and contractors. The EMS training is required for all new employees and every 3 years for all employees. Classroom training is provided for those without SATERN access. Other required training is provided as appropriate.

4.3 Communications

- **Conformant**

  WFF effectively uses the website, newsletters, fact sheets and other means to transmit environmental information and reference material to WFF personnel. The Environmental Office has established a website that provides an excellent source of information on environmental activities. External communication procedures follow the requirements established by NPR 8553.1. The Office of Public Affairs also provides excellent support. Managers interviewed believed that the Environmental Office did a good job of communicating on environmental issues.

- **Positive**

  Multiple tools are used for communicating environmental information resulting in overall good awareness of the environmental program.

4.4 Documentation

- **Conformant**

  GSFC policy documents and procedural requirements are maintained and controlled on the Goddard Directives Management System (GDMS). The WFF Environmental Management Manual (EMM) WFF-EM-001 describes the core elements of the Wallops EMS and defines the documentation requirements. The EMM is available on the Environmental Management Office Website. Supporting documents such as Work Instructions are available on the Environmental Management Office share drive.

4.5 Control of Documents

- **Conformant**

  GSFC policy documents and procedural requirements are maintained and controlled on the Goddard Directives Management System (GDMS). The WFF Environmental Management Manual (EMM) WFF-EM-001 describes the core elements of the Wallops EMS and defines the documentation requirements. The EMM is available on the Environmental Management Office Website. Supporting documents such as Work Instructions are available on the Environmental Management Office share drive.

4.6 Operational Control

- **Conformant**

  WFF has established operational controls for all environmental media consisting of GPRs, GPDs, Procedural Guidance, and Statements of Work. Procedures are established for NEPA, waste management, air quality, water management, and remediation. Contractors and tenants are also required to follow these requirements. The NEPA Checklist, Environmental Management Programs (EMPs), WFF EMS Manual WFF-EM-001, GPRs and PGs also include documented procedures. In addition, WFF has Host Tenant/Space Act Agreements with tenants and other partners. Each tenant received an environmental conditions letter.

- **Positive**
  The WFF Information Management System (WIMS) automatically includes the Environmental Office in the review process.

4.7 Emergency Preparedness and Response

- **Conformant**
  WFF has a Fire Department that is responsible for overall emergency preparedness and response. The WFF Emergency Operations Plan is reviewed annually. WFF has developed an Integrated Contingency Plan (ICP) with appropriate training. WFF also conducts emergency response drills and has measures to assess their effectiveness in a drill mode or during an actual response.

5.1 Monitoring & Measurement

- **Conformant**
  Procedures for monitoring and measurement are described in GPRs, PGs and in the WFF EMS Manual. The Environmental Office monitors and measures significant environmental aspects and progress towards meeting the objectives and targets through quarterly monitoring of metrics and action items in the EMPs. Data is reviewed annually to identify any trends and underlying causes. This information is reported annually to WFF senior management during the Management Review. WFF also reports on status of metrics for Sustainable Practices through Directorate Status Reviews. Equipment used for collecting environmental data are calibrated and records of calibration retained in accordance with GPR 8730.1

5.2 Evaluation of Compliance

- **Conformant**
  The WFF Environmental Office conducts periodic compliance inspections for its program areas and permit related areas. Compliance findings resulting from inspections, daily operations, and employee observations are documented, analyzed to determine a root cause, and tracked electronically.

5.3 Nonconformity, Corrective Actions, and Preventive Action

- **Conformant**
  WFF tracks findings from external inspections, EFRs, and internal audits through an electronic database. Any corrective actions and changes to procedures are reviewed and approved by the Environmental Office. EMPs are developed if necessary. Follow-up inspections may be conducted if appropriate. Results are summarized in the EMS Management Review.

5.4 Control of Records

- **Conformant**

  Environmental record keeping conforms to WFF record keeping requirements established under GDMS directives and procedures. Records falling under EMS requirements are maintained as described in the EMS Manual, on the WFF internal computer server for the environmental area, and in the Lektriever Unit.

5.5 Internal Audit

- **Conformant**

  WFF conducts annual internal EMS audits during the years when there is no EEFR. Audit findings and status of corrective actions are tracked electronically. Corrective and preventive actions are implemented as appropriate. Status of findings are discussed at the annual Management Review.

6 Management Review

- **Conformant**

  WFF senior management reviews the status and viability of the EMS annually, to ensure its continued suitability, adequacy, and effectiveness. The management review slides provided good level of detail and minutes were prepared. A current Declaration of Conformance was on file. Overall, there was strong management support of the environmental program.

- **Recommendation**

  A summary chart already developed to report status of sustainable practices for Directorate Status Reviews would further help communicate those programs to WFF management. In addition, the status of open findings and corrective actions should be explained.

Environmental and Energy/Water Functional Review Report

Goddard Space Flight Center - Greenbelt
(GSFC-GB)

May 1–5, 2017

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1. Executive Summary

NASA Headquarters (HQ) Environmental Management Division conducted an Environmental and Energy/Water Functional Review (EEFR) of the Goddard Space Flight Center - Greenbelt (GSFC-GB) on May 1–5, 2017. The review assessed how the site's energy and water management program supports the NASA mission by pursuing compliance with Federal requirements, which have become significantly more challenging since the previous review in 2014. Because these requirements drive a decrease in energy and water intensity and an increase in the use of renewable electric and clean energy, progress toward these requirements helps the site reduce energy and water risk to mission and manage the increasing unit cost pressure on its annual utility expenditures - $16.8 million in Fiscal Year (FY) 2016. The review also provides an opportunity for the site to identify support needed from HQ in fulfilling the requirements.

This Executive Summary documents the results provided to site senior management during the review out brief in the form of Performance Metrics, Program Element Health Indicators, Positive Observations, and Recommendations requiring follow-up action by GSFC-GB. The remainder of the report documents the review methodology, participants, review questions, site self-assessments, HQ observations, HQ recommendations, and consensus scores.

The review included interviews of a cross-section of personnel from the following organizations:

- Management Operations Directorate
  - Director & Center Chief sustainability Officer
  - Facilities Management Division
    - Engineering Branch
    - O&M Branch
    - Planning Branch
    - Institutional Support Office
  - Procurement Operations Division
- Office of Chief Counsel
- Medical & Environmental Management Division
- Flight Projects & Applied Engineering & Technology

1.1 Performance Metrics

Federal energy and water management requirements such as the National Energy Conservation Policy Act (NECPA), Executive Order (EO) 13423 - Strengthening Federal Environmental, Energy, and Transportation Management, EO 13514 - Federal Leadership in Environmental, Energy, and Economic Performance, Energy Policy Act of 2005, and the Federal Leadership on Energy Management Presidential Memorandum establish primary performance metrics for reducing energy intensity, reducing water intensity, and increasing the percentage of electricity from renewable energy use. In addition, EO 13693 - Planning for Federal Sustainability in the Next Decade, was released in March 2015. While it rescinded some of the regulations listed above, it upholds and extends many of the requirements within them through FY 2025.

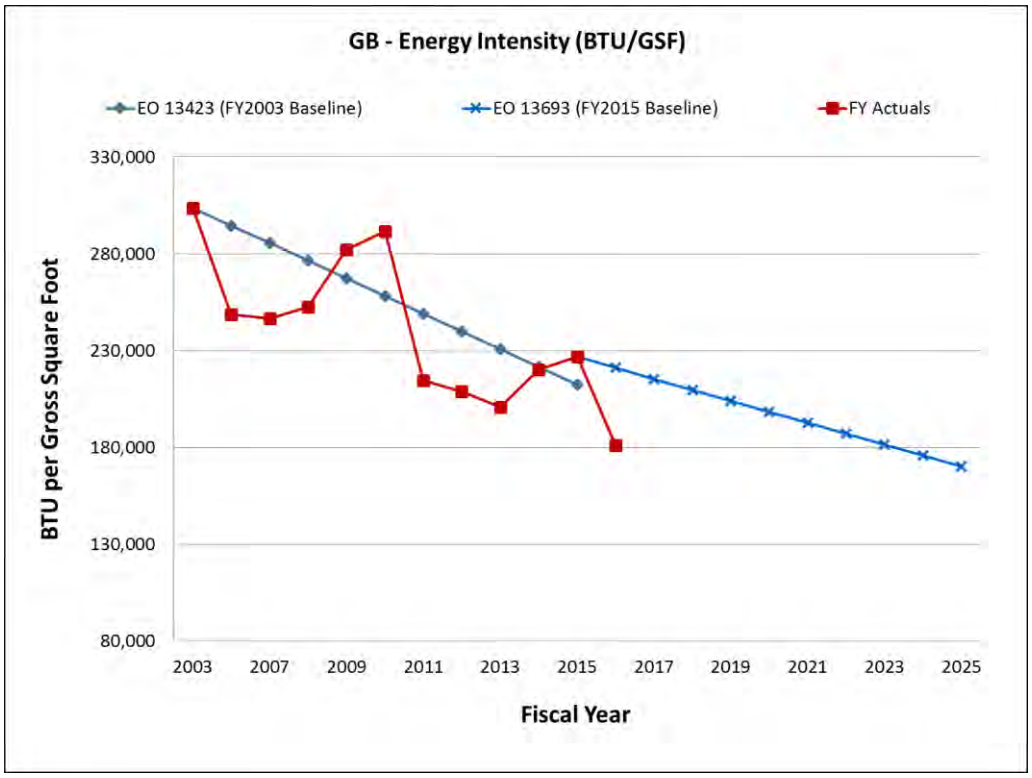
In summary, the GSFC Energy Manager is strengthening the Energy and Water Management Program for the GSFC-GB site, as well as the other sites under her management. It is apparent, based on reviews at other Centers and during the review at GSFC-GB, that such responsibilities require more than one person. Support from others, civil servants and/or contractors, is imperative to continue manage the larger Energy and Water Management Programs. There are a several opportunities to share information with Center management including weekly Project Status Reviews (PSR), monthly Division Status Reviews (DSR), semi-annual presentations to the Facilities Review Committee (FRC), and the annual Environmental

Management System (EMS) presentation. The Energy and Water Management Program does not receive an annual budget; however, the site has pursued other funding opportunities such as Energy Savings Performance Contracts (ESPC), Utility Energy Service Contracts (UESC), NASA Institutional Construction and Environmental Compliance and Restoration (CECR) funding, and utility rebates.

The following subsections summarize GSFC-GB's performance on these metrics at the time of the review based on energy and water consumption data provided by GSFC-GB to HQ via the NASA Environmental Tracking System (NETS). The metrics show that GSFC-GB is currently meeting the Federal requirements for energy intensity, renewable electric energy, clean energy, and water intensity.

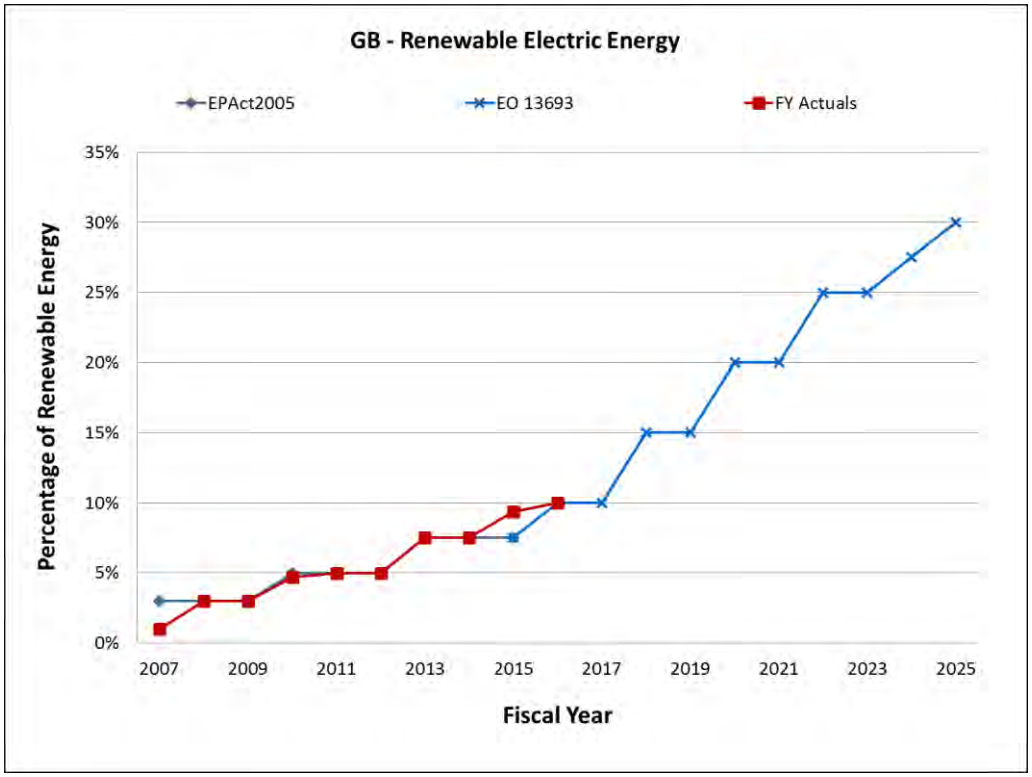
1.1.1 Energy Intensity

The following NETS Energy Intensity Reduction metric depicts the energy intensity in British Thermal Units (BTU's) per gross square foot for GSFC-GB Goal Subject facilities. FY 2003 was the previous baseline energy intensity, and the Goal line (dark blue with diamond markers) represents the 3% per year reduction (30% total by the end of FY 2015) from the baseline energy intensity as required by NECPA and EO 13423. Executive Order 13693, released in March 2015, set new requirements for energy intensity reduction. FY 2015 is the new baseline year, from which Federal agencies are required to reduce energy intensity by 2.5% each year (light blue line with x markers), through FY 2025 (25% total reduction). The Actual line (red with square markers) represents GSFC-GB's energy intensity. GSFC-GB's Actual energy intensity measured for FY 2016 was 20.1% below the baseline, which met the required 2.5% reduction goal for that year.



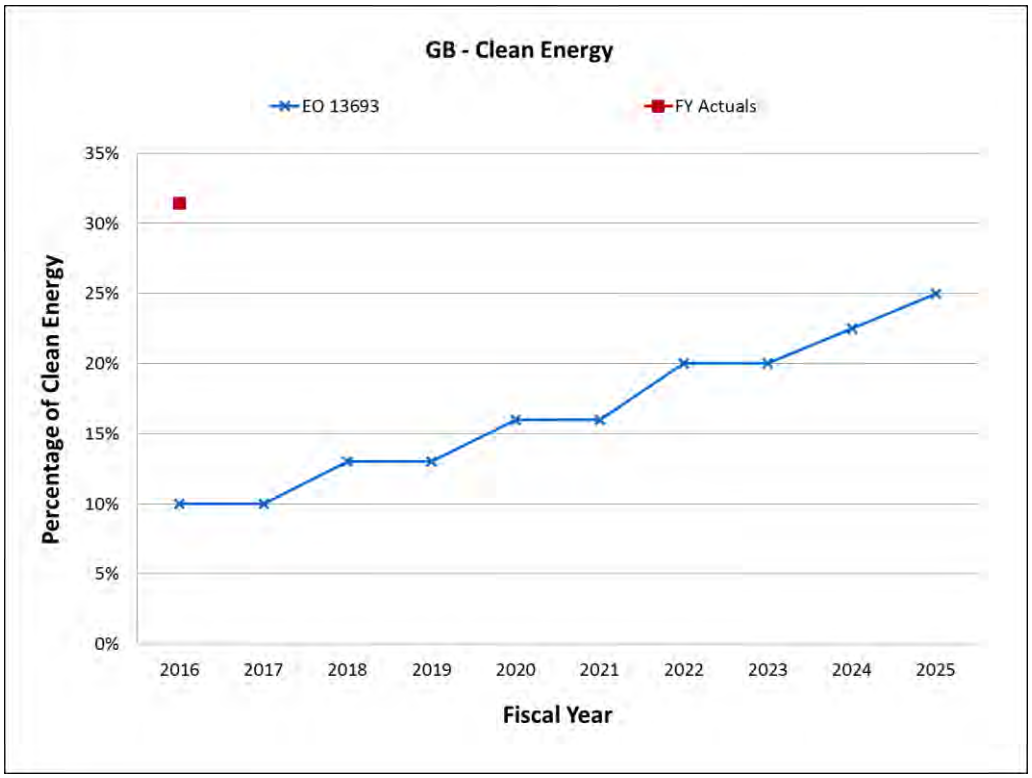
1.1.2 Renewable Electric Energy

The following NETS Renewable Electric Energy metric depicts the percentage of electricity from renewable energy sources for all GSFC-GB facilities. The Goal line (dark blue with diamond markers) represents the use of renewable electricity (3% in FY 2007 through FY 2009, 5% in FY 2010 through FY 2012, and 7.5% for FY 2013 through FY 2015) as required by the Energy Policy Act of 2005. EO 13423 further required that at least half of renewable energy use originate from new renewable energy sources placed into service after January 1, 1999. Executive Order 13693 set new requirements for renewable energy. Starting in FY 2016, Federal agencies will be required to consume 10% of their electric energy from renewable electric sources. From there, the requirement increases until eventually reaching 30% in FY 2025 (light blue line with x markers). The Actual line (red with square markers) represents GSFC-GB's percentage of electricity from renewable electric energy sources. GSFC-GB's Actual renewable electric energy use measured for FY 2016 was 10%. GSFC-GB met this goal through purchase of real renewable electric energy through their utility contract.



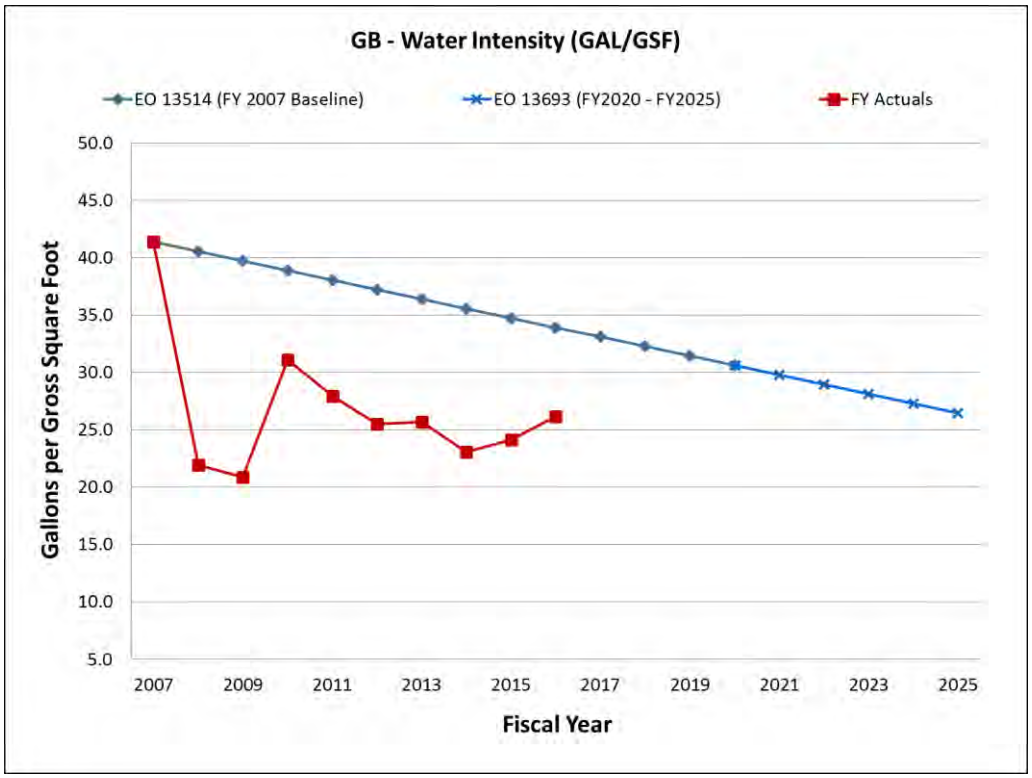
1.1.3 Clean Energy

The following NETS Clean Energy metric depicts the percentage of energy from clean energy sources for all GSFC-GB facilities. The Goal line (light blue line with x markers) represents the use of clean energy (10% in FY 2016 and FY 2017, 13% in FY 2018 and FY 2019, 16% in FY 2020 and FY 2021, 20% in FY 2022 and FY 2023, 22.5% in FY 2024, and 25% in FY 2025 and each year thereafter) as required by Executive Order 13693, which established this new goal accounting for renewable electric energy and alternative energy (thermal) consumption. The Actual line (red with square markers) represents GSFC-GB's percentage of energy from clean energy sources. GSFC-GB's Actual clean energy use measured for FY 2016 was 31.4%. GSFC-GB met this goal through consumption of landfill methane and through self-generated clean energy.



1.1.4 Water Intensity

The following NETS Water Intensity Reduction metric depicts the water intensity in gallons per gross square foot for all GSFC-GB facilities. FY 2007 is the baseline water intensity, and the Goal line (dark blue with diamond markers) represents the 2% per year reduction (26% total by the end FY 2020) below the baseline water intensity as required by EO 13514. Executive Order 13693 set new requirements for water intensity reduction. The baseline year, FY 2007, remains the same as in previous requirements. However, the Executive Order extends reduction requirements from FY 2020 to FY 2025, for a total water intensity reduction of 36% (light blue line with x markers). The Actual line (red with square markers) represents GSFC-GB's water intensity. GSFC-GB's actual water intensity measured for FY 2016 was 36.8% below the baseline, which met the required 18% reduction goal for that year.



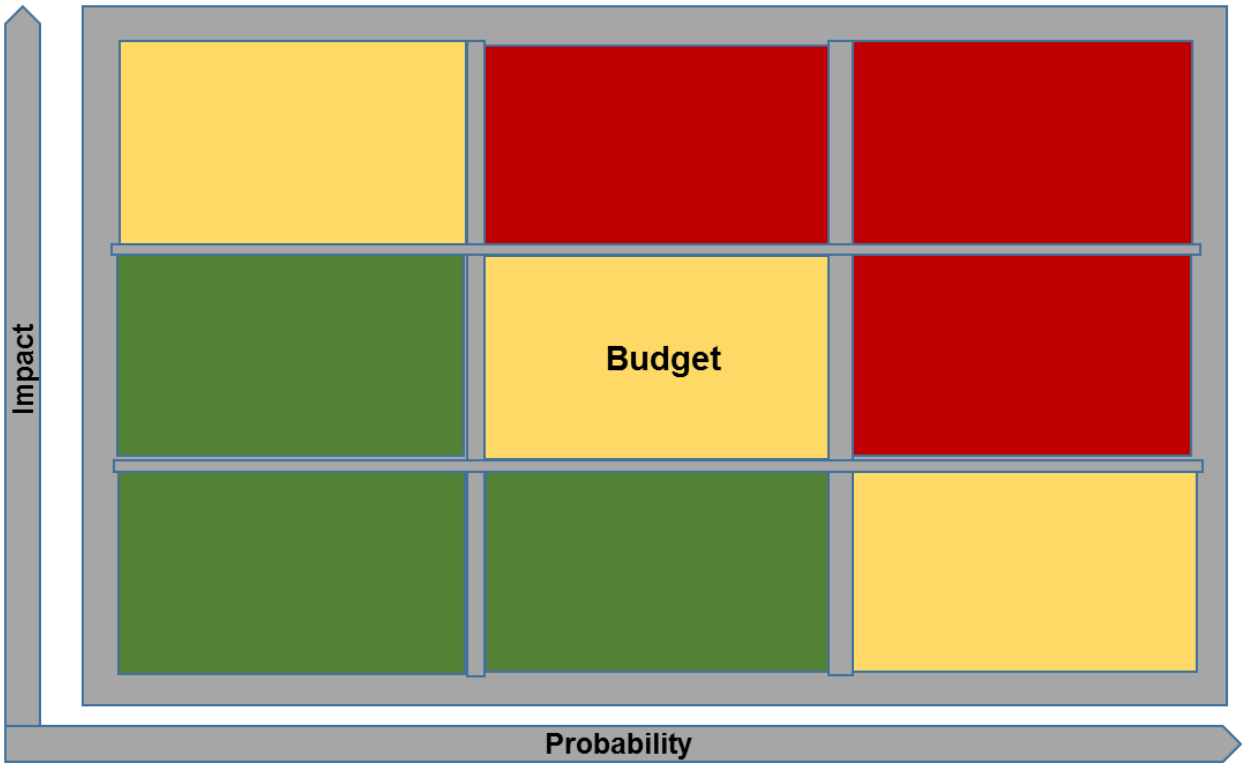
1.2 Program Element Health Indicators

HQ and GSFC-GB reached consensus on the following program element health indicator scores. In general, the review observed several good practices. GSFC-GB is meeting the energy intensity, renewable electric energy, clean energy, and water intensity requirements. The GSFC Energy Manager has successfully pursued alternative financing opportunities to support projects at the site; however, a budget line item to support the Program should be initiated.

Category	Energy	Water	Category	Energy	Water
Roles and Responsibilities			**Utilities Management**		
1.1 Organization	3	3	4.1 Cost	3	3
1.2 Policies	3	3	4.2 Demand	3	NA
1.3 Energy/Water Manager	4	4	**Federal Goals – FY 2016**		
1.4 Energy/Water Team	3	3	5.1 Energy Intensity	4	NA
1.5 Training	3	3	5.2 Renewable Electric Energy	4	NA
Planning and Budgeting			5.3 Clean Energy	4	NA
2.1 Plan	3	3	5.4 Water Intensity	NA	4
2.2 Budget	2	2	**Investments**		
Communications and Reporting			6.1 Facility Projects	3	3
3.1 Senior Management	3	3	6.2 O&M	3	3
3.2 Reporting	4	4	6.3 Metering/Information	3	3
3.3 Awareness/Awards	3	3	6.4 Audits	3	3

Legend	
Green (4's and 3's)	• Program is generally effective and on track in meeting a majority of the requirements, and/or • Issues identified represent isolated incidents as opposed to systemic problems, and/or • Little risk of regulatory enforcement action(s) exists.
Yellow (2's)	• Program does not meet regulatory and procedural requirements in one or more program areas, and/or • Issues identified point to systemic problems rather than isolated incidents, and/or • Some risk of regulatory enforcement action(s) exists.
Red (1's)	• Program does not achieve major requirements in multiple program areas and/or • Program is in significant noncompliance/nonconformance with requirements, and/or • Direct environmental damage, health impacts, mission impacts, or Notice of Violation (NOV) with more than administrative implications may result, and/or • Significant risk of regulatory enforcement action(s) exists, and/or • Requires Center management involvement.
4	Positive, exceptional method or performance
3	Adequate, meets requirements
2	Needs some improvement (nearly adequate)
1	Needs substantial improvement

This 3x3 Top Risk Matrix identifies program areas that pose an elevated risk based on their relative impact and probability.



The following two sections explain GSFC-GB's energy and water program health further in the context of Positive Observations and Recommendations.

1.3 Positive Observations

- Using interns when available, and taking advantage of rebates to help fund small energy efficiency projects and training
- Planning to use new Energy Management Control System for building optimization, preventative maintenance, and on-going commissioning
- Wide-spread participation in Gold Day, and email requesting load reduction, with energy conservation tips
- Continuing to evaluate combined heat and power (CHP)
- Implementing project to upgrade Central Power Plant, which is expected to save $287K per year and qualifies for a significant rebate
- Building 36 recently certified LEED Gold, and Building 37 is designed to be LEED Gold and Net Zero ready
- Excellent coordination amongst Facilities Management Division
- Responded to HQ data call for 10-Year Plan and Forecasting effort

1.4 Recommendations

- Ensure sufficient resources, including a budget line item to execute the Energy/Water Management Program

- Consider utility budget underruns from energy conservation projects as mechanism to jumpstart reinvestment program
- Ensure additional support to the E/W Management Program through FOMS III contract by issuing task orders for building audits and energy and water conservation requirements under IDIQ
- Ensure that Energy/Water Management Program support personnel (e.g. designers, O&M, etc.) receive sufficient training
- Approve Center-wide and Code 200 Energy Efficiency Team charters to ensure regular attendance by members and to formalize roles
- Investigate and consider overall impacts of LEED buildings and upgraded EMCS on facilities operations and FOMS III contract
- Evaluate resource impact of the current curtailment scenarios listed in the Emergency Energy Security and Conservation Plan

2. Review Methodology

NASA's Energy Efficiency Panel developed twenty review questions structured around the six program elements of Roles and Responsibilities, Planning and Budgeting, Communication and Reporting, Utility and Fuel Cost and Demand, Goals Performance, and Investment; each question contains citations of the source requirements.

HQ based this EEFR on requirements primarily originating from the following requirements:

- National Energy Conservation Policy Act (NECPA)
- Energy Policy Act of 2005 (EPAct 2005)
- Energy Independence and Security Act of 2007 (EISA 2007)
- Executive Order 13221 – Energy Efficient Standby Power Devices
- Department of Energy Guidance
- NASA Policy Directive (NPD) 8500.1C, NASA Environmental Management
- NASA Procedural Requirement (NPR) 8570.1A, NASA Energy Management Program
- Executive Order 13693 – Planning for Federal Sustainability in the Next Decade

HQ and the site utilized NETS for documenting the review information. Prior to the review, HQ created a new EEFR record in NETS and notified the site to respond to each review question with a self-assessment. During the review, HQ interviewed a cross-section of site personnel to discuss and expound on the site self-assessment responses in NETS and to show supporting documentation. HQ then made observations and recommendations based on the information provided by the site. HQ and the site energy/water manager established consensus score evaluations for each question; scores range from 4 to 1 as follows:

4. Positive, exceptional method or performance
3. Adequate, meets requirements
2. Needs some improvement (nearly adequate)
1. Needs substantial improvement

The consensus scores drove the determination of the health indicator score for each program element. The Executive Summary of this report included definitions of the health indicator scores.

After receiving this EEFR report, the site will document in NETS its response to each recommendation including the target closure date. Upon closing a recommendation, the site will add the actual closure date to NETS.

3. GSFC-GB EEFR Participation

First Name	Last Name	Organization	Role
Evelyn	Baskin	224	GSFC Energy Manager
Richard	Carter	224	Branch Head, Engineering
Ernest	Phillips	224	Lead Mechanical Engineer
William	Ridenhour	224	Mechanical Engineer Project Manager
Todd	Sanders	224	Lead Electrical Engineer
Jeff	McLellan	201	Business Manager
Brad	Jewitt	220	FMD Division Chief
Braulio	Ramon	221	Planning Branch Head
Karen	Smith	210I	Procurement Manager
Jim	Becker	210	Procurement Analyst
Everett	King	227	SR System Owner
Nick	Tasheuras	227	O&M Engineer
Dennis	Campbell	227	O&M Branch Head
Dan	Hymer	140	Attorney Advisor
Ray	Rubilotta	200	Director of MOD, GSFC Chief Sustainability Officer
Ken	Yargus	250	EMS Manager
Carmine	Mattiello	549	Branch Head
Michael	Paoletta	585	BLDG 3 & 14 FOM
David	Ford	441	BLDG 3 & 14 AFOM
Eric	Mount	452	BLDG 13 AFOM

4. NETS Report

Review Participants, Review Questions, Site Self-Assessments, Headquarters Observations, Headquarters Recommendations, and Consensus Scores.

(Report from NETS begins on following page)

FY 2017 Environmental and Energy/Water Functional Review

Goddard Space Flight Center - Greenbelt (GSFC-GB)

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1. Roles & Responsibilities

1.1 Organization:

How has the Center incorporated energy and water management responsibilities into the organization structure? Provide examples of position descriptions and performance evaluations that include successful implementation of Federal energy and water requirements by key personnel (i.e., senior managers, the Center Energy and Water Manager, members of the energy and water team, and facility managers).

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The overall Goddard Space Flight Center (GSFC) Energy and Water (E/W) Management Program is managed from the Greenbelt (GSFC-GB) location by the GSFC E/W Manager. The E/W Management Program resides in the Facilities Management Division under the Management Operation Directorate. E/W management responsibilities are included in the position description and/or performance evaluations of members of the Engineering, O&M, and Planning Branches under Facilities Management.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

1.2 Policies:

How does the Center utilize policies to document energy and water management roles, responsibilities, and requirements of organizations (including key utility-using organizations, support organizations, and contractors), key personnel, and general personnel? Summarize and provide copies.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
GSFC-GB follows NPR 8570.1, NPD 8831.1, and NPR 8831.2, as well as EISA 2007, Executive Order 13693, and other applicable policies, including site-specific policies, to ensure the E/W Management Program is implemented per applicable requirements. GSFC-GB also uses contract clauses and site-specific design policies to ensure E/W management is incorporated into contracted work. In addition, GSFC-GB is considering a site-specific temperature set point policy once the Energy Management Control System (EMCS) upgrade is complete.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

1.3 Energy and Water Manager:

How does the Center Energy and Water Manager fulfill energy and water management responsibilities within the Center and in support of the NASA energy and water team?

Energy Score: 4 - Positive, exceptional method or performance

Water Score: 4 - Positive, exceptional method or performance

Headquarters Observation:
The E/W Manager is responsible for overseeing the GSFC E/W Management Program, which include GB, WFF, WSC, and CSBF. She provides leadership for two Energy Efficiency Teams (EET), and is a voting member of the NASA Energy Efficiency Panel (EEP). The E/W Manager also provides input during project designs and support contractor statements of work, and forecasts, reviews, and validates utility billing.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

1.4 Team:

How does the Center utilize its formal Energy and Water Efficiency Team, comprised of representation from key utility-using organizations, support organizations, and contractors, to generate progress towards benefiting mission and complying with Federal and NASA requirements?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The E/W Manager has established two EETs. One EET is referred to as the "Operational Team" and includes members from Code 200 (Management Operation Directorate). This team meets monthly, and is working toward developing and implementing E/W conservation projects. The second EET is the "Center-wide Team" and includes members from all Center directorates. This team meets bi-monthly and is working toward increasing E/W awareness. Charters for both teams have been drafted and are in review.

Headquarters Recommendation:

1. Approve Center-wide and Code 200 Energy Efficiency Team charters to ensure regular attendance by members and to formalize roles.

Action Required: Yes

Status: Open

1.5 Training:

How does the Center ensure that appropriate members of the Energy and Water Efficiency Team are trained energy managers? How does the Center take maximum advantage of Federal and NASA training opportunities? Are maintenance and operations personnel being trained on LEED building maintenance?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The E/W Manager is a Certified Energy Manager (CEM), and attends the DOE Energy Exchange and the annual EEP face-to-face meeting. Team members are notified of various training opportunities such as web-based FEMP and ASHRAE training, and local training by energy service providers. E/W training slides are included in the annual SATERN training for all Center personnel. The E/W Manager is also pursuing a training rebate opportunity to supplement training for team members and other appropriate personnel.

Headquarters Recommendation:

1. Continue to ensure the E/W Manager receives appropriate training for the position and that they attend the annual DOE Energy Exchange Conference and NASA EEP face-to-face meeting.
2. Ensure that appropriate members of the Energy Management Team are trained.
3. Encourage more LEED building O&M training for civil servants and contractor support, including management (decision makers).

Action Required: Yes

Status: Open

2. Planning & Budgeting

2.1 Plan:

How does the Center's Energy-Efficiency and Water Conservation 10-Year Plan document the current energy and water condition of the Center, the targeted condition beneficial to NASA mission beyond Federal requirements or Federally required, planned projects and initiatives to benefit mission and achieve compliance, and the resources (civil servant, contractor, funding) to implement the planned projects and initiatives?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The GSFC 10-Year Energy Conservation Performance Plan includes GB, WFF, and WSC. CSBF, a recent acquisition, should be included in the next update. The Plan was developed as part of the Executive Order (EO) 13693 Center 10-Year Performance Plan and Forecasting effort initiated by HQ. GSFC was responsive during this effort and submitted documents to HQ when requested. The 10-Year Plan addresses long term goals, current progress, required actions, risks, and expected outcomes for energy intensity, renewable electric energy, clean energy, and water intensity requirements, and several other areas the GSFC E/W Management Program is responsible for.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

2.2 Budget:

How does the Center budget for or utilize alternative financing to fund the projects and initiatives in the Plan, especially those that have a simple payback of 10 years or less? How is the Center helping NASA meet its portion of the ESPC/UESC pledge for the Presidential Performance Contracting Challenge? How has the Center reinvested the resulting utility budget savings to fund additional utility efficiency projects?

Energy Score: 2 - Needs some improvement (nearly adequate)

Water Score: 2 - Needs some improvement (nearly adequate)

Headquarters Observation:
The E/W Management Program does not receive Center Management and Operations (CMO) funding to implement E/W conservation projects. A budget to support studies and projects should be established. One method for establishing a budget for the E/W Management Program is to reinvest utility cost savings from energy efficiency projects and initiatives into additional energy conservation measures. If there are CMO budget underruns, a portion of the funds could be applied toward shovel-ready projects.

GSFC-GB has pursued other funding opportunities, including Energy Savings Performance Contracts (ESPC), Utility Energy Service Contracts (UESC), and NASA Institutional Construction and Environmental Compliance and Restoration (CECR) funding. Several ESPC and UESC projects have been implemented since 2001. The latest project will optimize the Central Utility Plant, and also qualifies for a significant rebate from the utility. GSFC-GB also successfully competed for CECR funding. The project will implement an upgraded EMCS.

Headquarters Recommendation:

1. Initiate a budget line item to support studies and small conservation projects.
2. Initiate re-investment program for small projects using funds from energy and water savings according to NECPA (42 USC 8256 (e) Retention of Energy and Water Savings):
   > "An agency may retain any funds appropriated to that agency for energy expenditures, water expenditures, or wastewater treatment expenditures, at buildings subject to the requirements of section 8253(a) and (b) of this title, that are not made because of energy savings or water savings. Except as otherwise provided by law, such funds may be used only for energy efficiency, water conservation, or unconventional and renewable energy resources projects. Such projects shall be subject to the requirements of section 3307 of title 40."
3. Continue investigation of performance contracting opportunities (ESPC/UESC).

Action Required: Yes

Status: Open

3. Communication & Reporting

3.1 Communication with Management:

How does the energy and water team regularly status Center management on utility consumption/cost and progress towards planned benefits to mission and compliance with Federal requirements? Describe Center management support and direction obtained as a result of communication from the team.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
There are several opportunities to share information with Center management including weekly Project Status Reviews (PSR), monthly Division Status Reviews (DSR), semi-annual presentations to the Facilities Review Committee (FRC), and the annual Environmental Management System (EMS) presentation.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

3.2 Reporting:

How does the Center manage data quality and populate the NASA Environmental Tracking System (NETS) for NASA-external reporting (e.g., budget exhibits, quarterly utility consumption and cost data, annual report of accomplishments, annual plans for projects and initiatives)? How is the Center ensuring benchmarking data entry for metered buildings into ENERGY STAR Portfolio Manager®?

Energy Score: 4 - Positive, exceptional method or performance

Water Score: 4 - Positive, exceptional method or performance

Headquarters Observation:
Energy and water utility data comes from multiples sources including utility bills, the Power Monitoring System, and manually-read meters. The data is entered in a pre-NETS spreadsheet where data is divided through an algorithm between Goal Subject and Goal Excluded buildings, and reviewed before approval and entry into NETS. A similar process is used for building-level consumption data entry into ENERGY STAR Portfolio Manager. The GSFC E/W Manager also provide reporting support for WFF, WSC, and CSBF.

Headquarters Recommendation:

1. Investigate automating NETS and ENERGY STAR Portfolio Manager data entry from the upgraded EMCS.

Action Required: Yes

Status: Open

3.3 Awareness/Awards:

How does the Center conduct energy and water conservation awareness and awards? Summarize example activities and recognition.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
E/W awareness activities at GSFC-GB include mandatory SATERN training, an E/W Management Program website, weekly tips in a Center-wide email distribution (Dateline), Energy Awareness Month and Earth Day activities. A "Gold Day" email is also distributed to the Center when the utility provider notifies GSFC-GB that they need to temporarily reduce their load. The E/W Manager would like to implement a building competition across the facility once steam and natural gas metering is replaced and working properly.

Headquarters Recommendation:

1. Consider other methods for increasing awareness across the site. Some examples include: a building competition once the metering and the upgraded EMCS is in place, an award program recognizing personnel for achievements in E/W conservation, and using Center entrance signs to convey E/W messages. There are several resources online with more awareness program ideas.

Action Required: Yes

Status: Open

4. Utility/Fuel Cost & Demand

4.1 Cost:

How does the Center contract and budget for purchased utilities and fuels, validate bills for payment, and allocate costs? Describe steps taken or planned to minimize the unit cost of utilities and fuels.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
GSFC-GB receives electricity and natural gas through GSA area-wide purchase authority agreements. GSA area-wide contracts allow for federal agencies to use a simplified process to obtain utility services and offers lower prices. For electricity, PEPCO is the distribution line owner. For natural gas, Washington Gas is the distribution line owner. Natural gas is supplied by two companies, one for the Central Plant (interruptible) and one for several smaller building supplies (non-interruptible). GSFC-GB is the sole customer of landfill methane from a local landfill. The price was fixed when the contract was first established. The current contract ends in 2017 and will be renegotiated. Fuel oil purchases are made through the Defense Logistics Agency (DLA). Potable water is provided through the Washington Suburban Sanitary Commission (WSSC).

The E/W Manager reviews all utility bills before final approval and payment. To determine budget forecasts, historical consumption, future mission requirements, and expected rate changes are reviewed.

Headquarters Recommendation:

1. Evaluate energy intensive activities and schedules to determine if there are opportunities for peak shaving.

Action Required: Yes

Status: Open

4.2 Demand:

How does the Center Emergency Energy Security and Conservation Plan prepare the Center for disruptions in utilities and fuels for a 10 percent, 15 percent and 20 percent reduction over 12 months? Summarize Center demand management systems and participation in utility company demand management programs.

Energy Score: 3 - Adequate, meets requirements

Headquarters Observation:
GSFC-GB developed their Emergency Energy Security and Conservation Plan in FY 2015.

GSFC-GB does not participate in the local EnerNOC demand response program after it was determined the on-site generators did not meet EPA requirements. GSFC-GB does participate in "Gold Day" load reduction when requested by the utility provider. A Center-wide email is sent asking personnel to conserve energy. Many of the organizations we talked to described the efforts they take to help support the load reduction. In addition, an HVAC cycling program can be initiated that systematically turns off HVAC equipment to decrease the load.

Other emergency preparedness includes uninterruptible power supply (UPS) systems and stationary and mobile emergency generators.

Headquarters Recommendation:

1. Evaluate resource impact of the current curtailment scenarios listed in the Emergency Energy Security and Conservation Plan

Action Required: Yes

Status: Open

5. Goals Performance

5.1 Energy Intensity:

How is the Center progressing towards energy intensity (Btu per gross square foot) Federal reduction requirements in Goal Subject facilities, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Energy Score: 4 - Positive, exceptional method or performance

Headquarters Observation:
The FY 2016 energy intensity (BTU/GSF) reduction requirement for Goal Subject buildings was a 2.5% reduction from the FY 2015 baseline. GSFC-GB reported a decrease of 20.1%. GSFC-GB attributes this reduction to the favorable credit received for landfill methane consumption. Other energy conservation measures (ECMs) have been pursued that will support further energy intensity reductions. ECMs include the EMCS upgrade and the Central Plant optimization.

Executive Order 13693, released in March 2015, set new requirements for energy intensity reduction. FY 2015 is the new baseline year, from which Federal agencies are required to reduce energy intensity by 2.5% each year, through FY 2025 (25% total reduction). The Executive Order allows agencies to subtract any measured and verified savings from efficiency upgrades in Goal Excluded buildings from their Goal Subject BTUs consumed. Please see the Executive Order and associated Implementing Instructions for more detail.

Headquarters Recommendation:

1. Investigate a separate chiller plant for the few facilities that dictate lower chilled water temperatures for the entire Center.

Action Required: Yes

Status: Open

5.2 Renewable Electric Energy:

How is the Center progressing towards generating and/or buying at least the minimum Federally-required amount of renewable electric energy, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Energy Score: 4 - Positive, exceptional method or performance

Headquarters Observation:
The FY 2016 renewable electric energy consumption requirement was 10% of total electric consumption. GSFC-GB achieved 10% renewable electric energy use through purchase of renewable electricity from its electric utility provider.

Executive Order 13693 set new requirements for renewable electric energy. Starting in FY 2016, Federal agencies were required to consume 10% of their electric energy from renewable electric sources. From there, the requirement increases until eventually reaching 30% in FY 2025.

Headquarters Recommendation:

1. Continue consideration of renewable energy opportunities at the Center.

Action Required: Yes

Status: Open

5.3 Clean Energy:

How is the Center progressing towards generating and/or buying at least the minimum Federally-required amount of clean energy, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Energy Score: 4 - Positive, exceptional method or performance

Headquarters Observation:
The FY 2016 clean energy consumption requirement was 10% of total energy consumption. GSFC-GB achieved 31.4% clean energy use through consumption of landfill methane and purchase of renewable electricity from its electric utility provider.

Executive Order 13693 set new requirements for clean energy. Starting in FY 2016, Federal agencies were required to consume 10% of their total energy from a combination of renewable electric energy and alternative energy sources. From there, the requirement increases until eventually reaching 25% in FY 2025.

Headquarters Recommendation:

1. Continue to evaluate potential for combined heat and power (CHP).

Action Required: Yes

Status: Open

5.4 Water Intensity:

How is the Center progressing towards water intensity (gallon per gross square foot) Federal reduction requirements, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Water Score: 4 - Positive, exceptional method or performance

Headquarters Observation:
The FY 2016 water intensity (Gal/GSF) reduction requirement was an 18% reduction from the FY 2007 baseline. GSFC-GB reported a reduction of 36.8%. GSFC-GB attributes some of these reductions to installing low-flow fixtures in buildings and installing on-site wells for cooling tower and boiler makeup water.

Executive Order 13693 set new requirements for water intensity reduction. The baseline year, FY 2007, remains the same as in previous requirements. However, the Executive Order extends reduction requirements from FY 2020 to FY 2025, for a total water intensity reduction of 36%. Please see the Executive Order and associated Implementing Instructions for more detail.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

6. Investment

6.1 Facility Projects:

How does the Center ensure that new facilities are designed to meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings? How does the Center ensure that life-cycle cost analyses are used when evaluating sustainable design elements to include in facility projects, and for all appropriate projects, rate the level of sustainable design using the LEED Green Building Rating System? How is the Center working towards the 100 percent reduction of fossil fuel generated energy consumption by buildings by FY 2030? How is the Center meeting the Guiding Principles requirements?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
GSFC-GB designs and constructs new facilities in accordance with NPR 8820.2 (minimum LEED Silver certification, Guiding Principles, and life-cycle cost analysis). GSFC-GB currently maintains five LEED rated buildings, with one additional new building designed to be LEED Gold and net-zero ready.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

6.2 Operations and Maintenance:

How does the Center use performance criteria and incentives to encourage facilities operations and maintenance organizations to improve energy and water efficiency? How do Center operation and maintenance procedures and practices reduce energy and water waste, improve efficiency in buildings and utility plants, and minimize facilities life-cycle costs? How is the metering data being utilized for building optimization?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
Facility O&M is in accordance with NPD 8831.1 and NPR 8831.2. The Facility Operation and Maintenance Support (FOMS) contract is about to be recompeted. New E/W management language and performance criteria were included under the IDIQ section of the SOW, incorporating reference to EO 13693, building/system monitoring and optimization using the EMCS, and performing building audits.

Headquarters Recommendation:

1. Verify LEED building performance through recommissioning and other audit measures to ensure facilities perform as designed. Provide review schedule and summary of building performance to HQ when completed.
2. Investigate and consider overall impacts of LEED buildings and the upgraded EMCS on facilities operations and the FOMS III contract.

Action Required: Yes

Status: Open

6.3 Metering/Information:

How is the Center progressing towards metering electricity, natural gas, and steam at the building level per Federal requirements using advanced metering to the maximum extent practicable, as demonstrated by the Performance Measures in the Department of Energy guidance? Describe any issues anticipated in fulfilling requirements. How does the Center incorporate electricity and other utility/fuels data into energy tracking systems available to Energy and Water Managers and facility managers?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
Electric, natural gas, steam, and chilled water metering is in place. Electricity is 100% metered at the building level. Natural gas metering is in place where it enters the boilers. Forty steam meters, mostly advanced, are installed but many were not working properly. A steam meter replacement project was funded and is in progress. There are 53 chilled water meters across the Center. There is one main meter for potable water along with metering at the power plants and a couple other buildings. New buildings and major renovation projects will include additional water metering.

Executive Order 13693 encourages the installation of water meters to provide additional data about specific water end uses at a building or facility and using the water balance methodology to improve water conservation and management. A water balance analysis identifies the proportion of water consumption for specific end uses, compares total water supplied against the water consumed for each specific end use, and nets out total water loss in a particular building, facility, or portfolio. Please see the Executive Order and associated Implementing Instructions for more detail.

Headquarters Recommendation:

1. Continue installing advanced metering, including water metering, where appropriate to help measure and manage consumption.

Action Required: Yes

Status: Open

6.4 Audits:

How has the Center conducted comprehensive energy and water evaluations for at least 25 percent of its covered facilities each year and benchmarked facilities for the ENERGY STAR Building label? Does the Center maintain a list of projects found during these audits to be performed as funding becomes available?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
EISA 2007 Section 432 requires that Federal facilities perform comprehensive energy and water evaluations on 25% of their covered facilities annually, or 100% every four years. NASA defines a covered facility as one that has been categorized as Goal Subject. GSFC-GB completed its latest evaluation cycle in July 2015, and is currently on track for completing the current cycle by July 2019. Language for performing building audits (25% per year) was included in the IDIQ section of the new FOMS contract. In the past, GSFC-GB has used the local utility to perform audits. Energy and water conservation methods identified during building audits are investigated and investment grade audits are performed if feasible. GSFC-GB provides updates to ENERGY STAR Portfolio Manager for the 35 buildings it has benchmarked in the system.

Headquarters Recommendation:

1. Ensure additional support to the E/W Management Program through FOMS III contract by issuing task orders for building audits and energy and water conservation requirements under IDIQ.

Action Required: Yes

Status: Open

Environmental and Energy/Water Functional Review Report

Goddard Space Flight Center - Wallops Flight Facility (WFF)

April 24–28, 2017

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1. Executive Summary

NASA Headquarters (HQ) Environmental Management Division conducted an Environmental and Energy/Water Functional Review (EEFR) of the Goddard Space Flight Center - Wallops Flight Facility (WFF) on April 24–28, 2017. The review assessed how the site's energy and water management program supports the NASA mission by pursuing compliance with Federal requirements, which have become significantly more challenging since the previous review in 2014. Because these requirements drive a decrease in energy and water intensity and an increase in the use of renewable electric and clean energy, progress toward these requirements helps the site reduce energy and water risk to mission and manage the increasing unit cost pressure on its annual utility expenditures - $3.1 million in Fiscal Year (FY) 2016. The review also provides an opportunity for the site to identify support needed from HQ in fulfilling the requirements.

This Executive Summary documents the results provided to site senior management during the review out brief in the form of Performance Metrics, Program Element Health Indicators, Positive Observations, and Recommendations requiring follow-up action by WFF. The remainder of the report documents the review methodology, participants, review questions, site self-assessments, HQ observations, HQ recommendations, and consensus scores.

The review included interviews of a cross-section of personnel from the following organizations:

- WFF Facility Director & Deputy Director
- Facilities Management Division
- Facilities Management Branch
  - Engineering & Construction Branch
  - O&M Branch
  - Planning Branch
- Medical and Environmental Management Division
- Contracting Oversight
- Advanced Projects Office

1.1 Performance Metrics

Federal energy and water management requirements such as the National Energy Conservation Policy Act (NECPA), Executive Order (EO) 13423 - Strengthening Federal Environmental, Energy, and Transportation Management, EO 13514 - Federal Leadership in Environmental, Energy, and Economic Performance, Energy Policy Act of 2005, and the Federal Leadership on Energy Management Presidential Memorandum establish primary performance metrics for reducing energy intensity, reducing water intensity, and increasing the percentage of electricity from renewable energy use. In addition, EO 13693 - Planning for Federal Sustainability in the Next Decade, was released in March 2015. While it rescinded some of the regulations listed above, it upholds and extends many of the requirements within them through FY 2025.

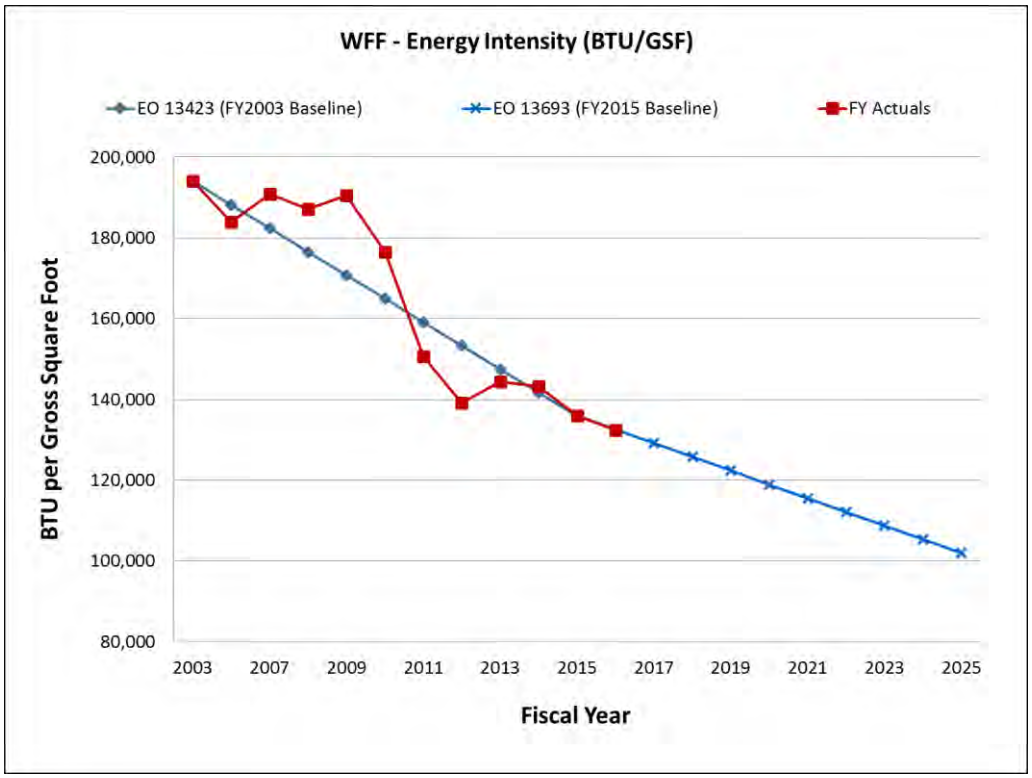
In summary, the new WFF Energy Site Manager is working well with the GSFC Energy Manager, the Sustainability Program Manager, and others to improve the program. Energy and water management responsibilities are collateral duties for the WFF Energy Site Manager so support from others is often required. Because of WFF's location away from a major metropolitan area, local training opportunities are limited and travel funds are often required to send someone to training. There has been limited success with bringing training courses to the site. There are several opportunities to share information with Center management, including quarterly program status presentations to Code 200 management, quarterly Division Status Reviews (DSR), annual meetings with the Center Director, and annual presentations for the

WFF Environmental Management System. The Energy and Water Management Program does not receive an annual budget; however, the site has pursued other funding opportunities such as Energy Savings Performance Contracts (ESPC) and NASA Institutional Construction and Environmental Compliance and Restoration (CECR) funding.

The following subsections summarize WFF's performance on these metrics at the time of the review based on energy and water consumption data provided by WFF to HQ via the NASA Environmental Tracking System (NETS). The metrics show that WFF is currently meeting the Federal requirements for energy intensity, renewable electric energy, and water intensity but not meeting requirements for clean energy.

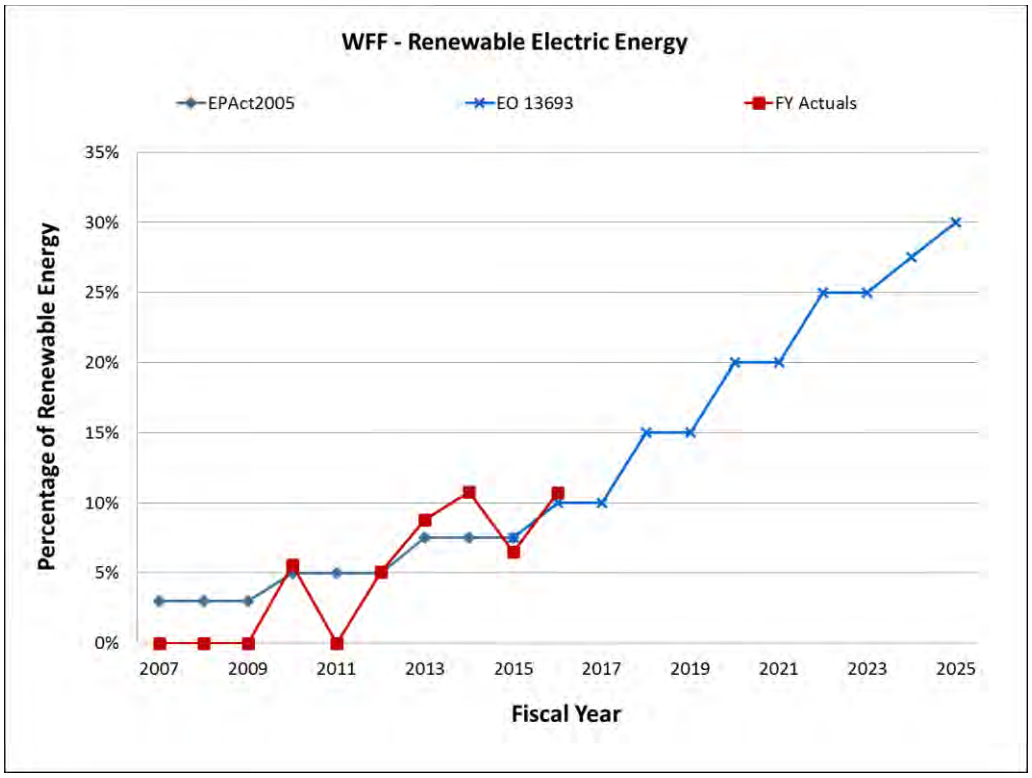
1.1.1 Energy Intensity

The following NETS Energy Intensity Reduction metric depicts the energy intensity in British Thermal Units (BTU's) per gross square foot for WFF Goal Subject facilities. FY 2003 was the previous baseline energy intensity, and the Goal line (dark blue with diamond markers) represents the 3% per year reduction (30% total by the end of FY 2015) from the baseline energy intensity as required by NECPA and EO 13423. Executive Order 13693, released in March 2015, set new requirements for energy intensity reduction. FY 2015 is the new baseline year, from which Federal agencies are required to reduce energy intensity by 2.5% each year (light blue line with x markers), through FY 2025 (25% total reduction). The Actual line (red with square markers) represents WFF's energy intensity. WFF's Actual energy intensity measured for FY 2016 was 2.63% below the baseline, which met the required 2.5% reduction goal for that year.



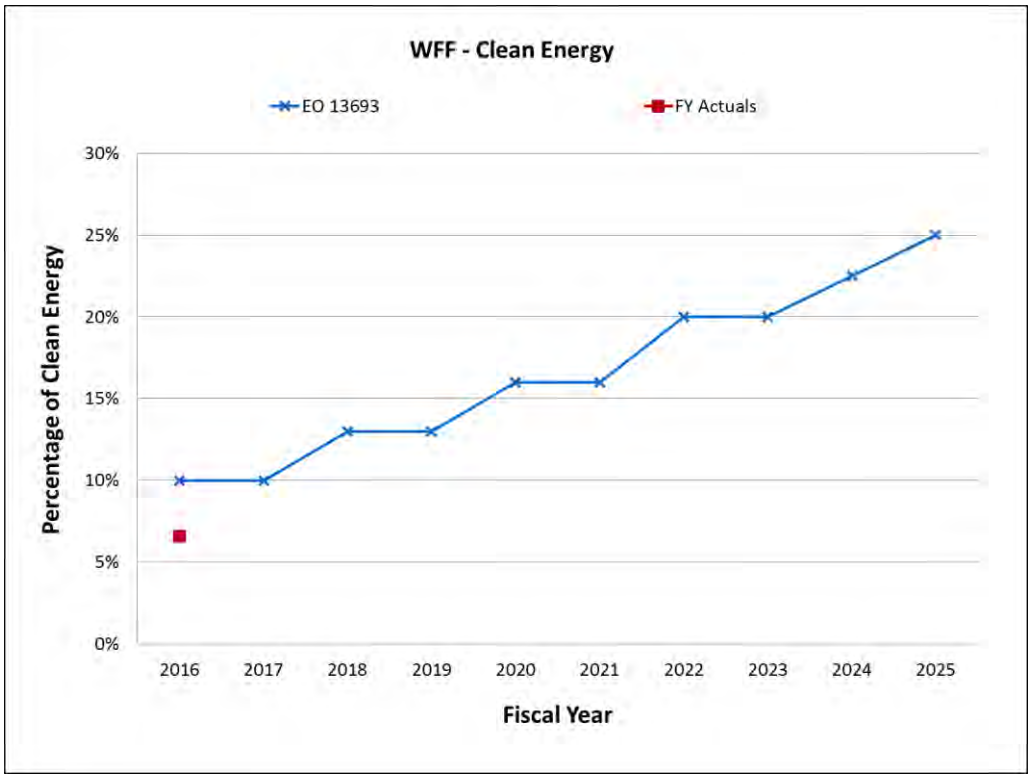
1.1.2 Renewable Electric Energy

The following NETS Renewable Electric Energy metric depicts the percentage of electricity from renewable energy sources for all WFF facilities. The Goal line (dark blue with diamond markers) represents the use of renewable electricity (3% in FY 2007 through FY 2009, 5% in FY 2010 through FY 2012, and 7.5% for FY 2013 through FY 2015) as required by the Energy Policy Act of 2005. EO 13423 further required that at least half of renewable energy use originate from new renewable energy sources placed into service after January 1, 1999. Executive Order 13693 set new requirements for renewable energy. Starting in FY 2016, Federal agencies will be required to consume 10% of their electric energy from renewable electric sources. From there, the requirement increases until eventually reaching 30% in FY 2025 (light blue line with x markers). The Actual line (red with square markers) represents WFF's percentage of electricity from renewable electric energy sources. WFF's Actual renewable electric energy use measured for FY 2016 was 10.8%. WFF met this goal through purchase of renewable energy certificates (RECs).



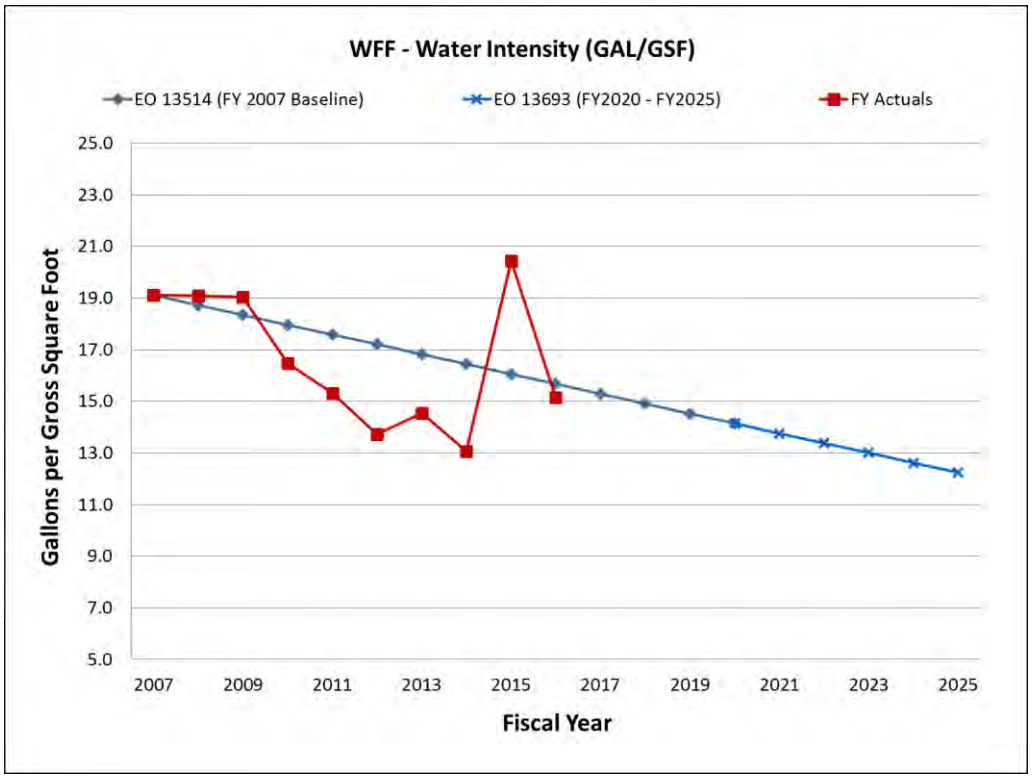
1.1.3 Clean Energy

The following NETS Clean Energy metric depicts the percentage of energy from clean energy sources for all WFF facilities. The Goal line (light blue line with x markers) represents the use of clean energy (10% in FY 2016 and FY 2017, 13% in FY 2018 and FY 2019, 16% in FY 2020 and FY 2021, 20% in FY 2022 and FY 2023, 22.5% in FY 2024, and 25% in FY 2025 and each year thereafter) as required by Executive Order 13693, which established this new goal accounting for renewable electric energy and alternative energy (thermal) consumption. The Actual line (red with square markers) represents WFF's percentage of energy from clean energy sources. WFF's Actual clean energy use measured for FY 2016 was 6.6%. WFF did not meet this goal; however, WFF is expected to meet it when the geothermal heat pump systems are reported in NETS.



1.1.4 Water Intensity

The following NETS Water Intensity Reduction metric depicts the water intensity in gallons per gross square foot for all WFF facilities. FY 2007 is the baseline water intensity, and the Goal line (dark blue with diamond markers) represents the 2% per year reduction (26% total by the end FY 2020) below the baseline water intensity as required by EO 13514. Executive Order 13693 set new requirements for water intensity reduction. The baseline year, FY 2007, remains the same as in previous requirement. However, the Executive Order extends reduction requirements from FY 2020 to FY 2025, for a total water intensity reduction of 36% (light blue line with x markers). The Actual line (red with square markers) represents WFF's water intensity. WFF's actual water intensity measured for FY 2016 was 20.7% below the baseline, which met the required 18% reduction goal for that year.



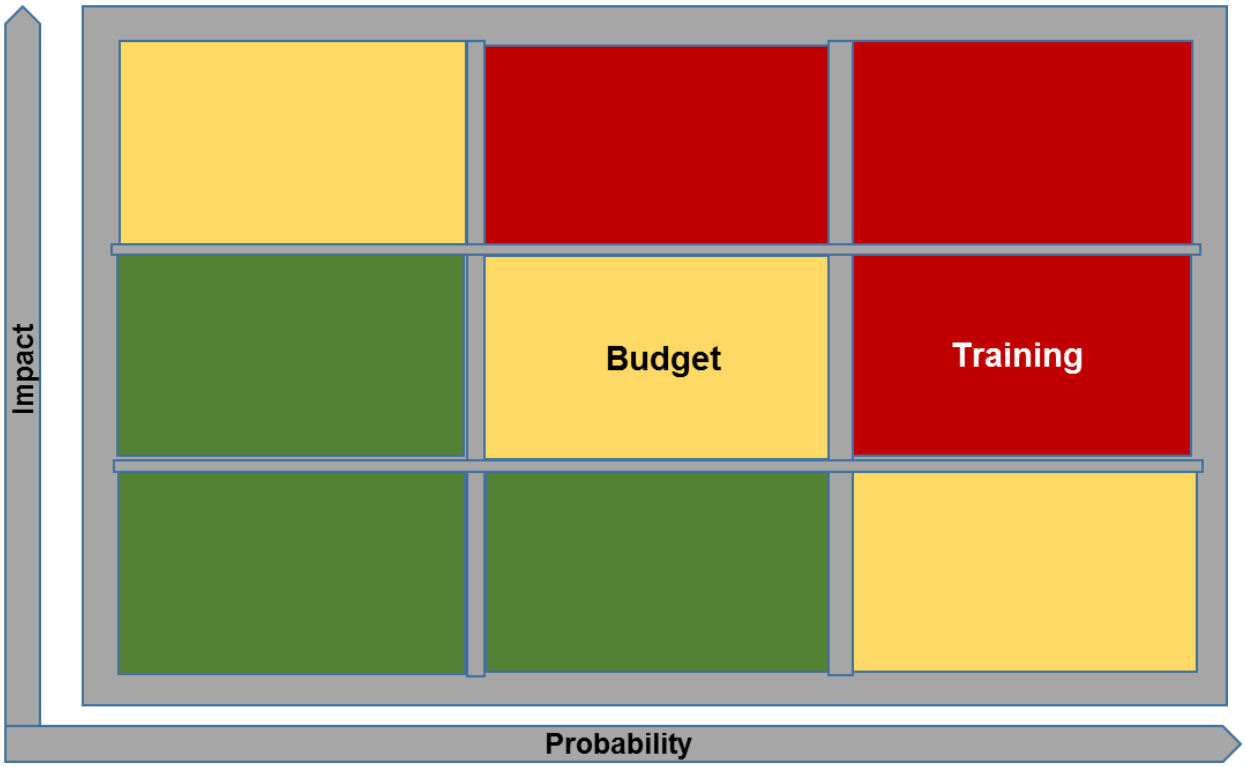
1.2 Program Element Health Indicators

HQ and WFF reached consensus on the following program element health indicator scores. In general, many good practices were observed with some areas for improvement. WFF is meeting the energy intensity, renewable electric energy, and water intensity requirements.

Category	Energy	Water	Category	Energy	Water
Roles and Responsibilities			**Utilities Management**		
1.1 Organization	3	3	4.1 Cost	3	3
1.2 Policies	3	3	4.2 Demand	3	NA
1.3 Energy/Water Manager	3	3	**Federal Goals – FY 2016**		
1.4 Energy/Water Team	3	2	5.1 Energy Intensity	3	NA
1.5 Training	1	1	5.2 Renewable Electric Energy	3	NA
Planning and Budgeting			5.3 Clean Energy	1	NA
2.1 Plan	3	3	5.4 Water Intensity	NA	3
2.2 Budget	2	2	**Investments**		
Communications and Reporting			6.1 Facility Projects	3	3
3.1 Senior Management	3	3	6.2 O&M	3	3
3.2 Reporting	3	3	6.3 Metering/Information	4	2
3.3 Awareness/Awards	2	2	6.4 Audits	3	3

Legend	
Green (4's and 3's)	• Program is generally effective and on track in meeting a majority of the requirements, and/or • Issues identified represent isolated incidents as opposed to systemic problems, and/or • Little risk of regulatory enforcement action(s) exists.
Yellow (2's)	• Program does not meet regulatory and procedural requirements in one or more program areas, and/or • Issues identified point to systemic problems rather than isolated incidents, and/or • Some risk of regulatory enforcement action(s) exists.
Red (1's)	• Program does not achieve major requirements in multiple program areas and/or • Program is in significant noncompliance/nonconformance with requirements, and/or • Direct environmental damage, health impacts, mission impacts, or Notice of Violation (NOV) with more than administrative implications may result, and/or • Significant risk of regulatory enforcement action(s) exists, and/or • Requires Center management involvement.
4	Positive, exceptional method or performance
3	Adequate, meets requirements
2	Needs some improvement (nearly adequate)
1	Needs substantial improvement

This 3x3 Top Risk Matrix identifies program areas that pose an elevated risk based on their relative impact and probability.



The following two sections explain WFF's energy and water program health further in the context of Positive Observations and Recommendations.

1.3 Positive Observations

- Performing comprehensive evaluations (building audits), 25% per year, through WICC II contract
- Construction of 2 LEED Silver buildings is nearing completion (MLCC and Fire Station)
- Improved process between Code 200 and Code 800 on agreements helps E/W program reimbursement of utilities
- Investigating renewable energy project through existing ESPC, considering energy cost savings and energy security benefits balanced with potential future Mission requirements
- Successfully competed for a $1.8M HVAC efficiency project funded by the Institutional CoF CECR account (FY 2018 budget)
- Responded to HQ data call for 10-Year Plan and Forecasting effort
- Developed "Ground Operations Reporting" system to help manage schedule and customer requirements in critical facilities
- Excellent communications with management

1.4 Recommendations

- Support training for WFF Energy Manager certification and attendance of DOE Energy Exchange and NASA EEP face-to-face meeting

- Ensure sufficient resources, including a budget line item to execute the Energy/Water Management Program
- Consider utility budget underruns from energy conservation projects as mechanism to jumpstart reinvestment program
- Investigate and consider overall impacts of LEED buildings on facilities operations and WICC II contract
- Expand Energy Management Team to include water conservation, and members outside Facilities Management Branch (Code 228)
- Expand use of METASYS to maximize energy management and savings
- Evaluate resource impact of the current curtailment scenarios listed in the Emergency Energy Security and Conservation Plan
- Increase energy and water conservation awareness using no-cost/low-cost methods

2. Review Methodology

NASA's Energy Efficiency Panel developed twenty review questions structured around the six program elements of Roles and Responsibilities, Planning and Budgeting, Communication and Reporting, Utility and Fuel Cost and Demand, Goals Performance, and Investment; each question contains citations of the source requirements.

HQ based this EEFR on requirements primarily originating from the following:

- National Energy Conservation Policy Act (NECPA)
- Energy Policy Act of 2005 (EPAct 2005)
- Energy Independence and Security Act of 2007 (EISA 2007)
- Executive Order 13221 – Energy Efficient Standby Power Devices
- Department of Energy Guidance
- NASA Policy Directive (NPD) 8500.1C, NASA Environmental Management
- NASA Procedural Requirement (NPR) 8570.1A, NASA Energy Management Program
- Executive Order 13693 – Planning for Federal Sustainability in the Next Decade

HQ and the site utilized NETS for documenting the review information. Prior to the review, HQ created a new EEFR record in NETS and notified the site to respond to each review question with a self-assessment. During the review, HQ interviewed a cross-section of site personnel to discuss and expound on the site self-assessment responses in NETS and to show supporting documentation. HQ then made observations and recommendations based on the information provided by the site. HQ and the site energy/water manager established consensus score evaluations for each question; scores range from 4 to 1 as follows:

4. Positive, exceptional method or performance
3. Adequate, meets requirements
2. Needs some improvement (nearly adequate)
1. Needs substantial improvement

The consensus scores drove the determination of the health indicator score for each program element. The Executive Summary of this report included definitions of the health indicator scores.

After receiving this EEFR report, the site will document in NETS its response to each recommendation including the target closure date. Upon closing a recommendation, the site will add the actual closure date to NETS.

3. WFF EEFR Participation

First Name	Last Name	Organization	Role
Harold	White	228	Energy Manager – WFF
Evelyn	Baskin	224	Energy Manager – GSFC
Kelly	Busquets	220	Sustainability / Environmental Lead
Jermaine	Starks	228	Planning & Design Group
Susan	Anderson	221	Planner
Don	Lilly	228	FMB Branch Head
Paul	Bull	220	Deputy Division Chief
John	McWilliams	228	Operations & Maintenance Group Lead
Cornell	Wharton	228	Controls Operations & Maintenance
Philip	Smith	802	Formulation Manager
Therese	Patterson	210	Contracting Officer
James	Royal	210	Contracting Officer
James	Hill	228	SOW 3.0 O&M IPT Lead
Bill	Wrobel	800	WFF Director
Bruce	Underwood	800	WFF Deputy Director

4. NETS Report

Review Participants, Review Questions, Site Self-Assessments, Headquarters Observations, Headquarters Recommendations, and Consensus Scores.

(Report from NETS begins on following page)

FY 2017 Environmental and Energy/Water Functional Review

Goddard Space Flight Center - Wallops Flight Facility (WFF)

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1. Roles & Responsibilities

1.1 Organization:

How has the Center incorporated energy and water management responsibilities into the organization structure? Provide examples of position descriptions and performance evaluations that include successful implementation of Federal energy and water requirements by key personnel (i.e., senior managers, the Center Energy and Water Manager, members of the energy and water team, and facility managers).

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The overall Goddard Space Flight Center (GSFC) Energy and Water (E/W) Management Program is managed from the Greenbelt (GSFC-GB) location by the Center E/W Manager. An E/W Site Manager is designated for WFF, to support the GSFC-GB E/W Manager. A new WFF E/W Site Manager recently took over the collateral responsibilities of E/W Management at the facility. E/W responsibilities will be included in his position description and performance evaluation. Members of the local Energy Management Team, from the Engineering Branch and O&M Branch, have E/W responsibilities in their performance evaluations.

Headquarters Recommendation:

1. Ensure that E/W responsibilities are incorporated into the position description and performance evaluation of the new WFF E/W Site Manager.

Action Required: Yes

Status: Open

1.2 Policies:

How does the Center utilize policies to document energy and water management roles, responsibilities, and requirements of organizations (including key utility-using organizations, support organizations, and contractors), key personnel, and general personnel? Summarize and provide copies.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
In addition to the responsibilities described in NPR 8570.1, WFF also employs a seasonal temperature policy and a space heater policy (through Safety). They also maintain building schedules through METASYS, and have a load-rolling program in place. WICC II SOW 3 (on-site O&M support contractor) includes E/W management responsibilities, such as performing building audits and proposing at least 12 energy saving projects per year.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

1.3 Energy and Water Manager:

How does the Center Energy and Water Manager fulfill energy and water management responsibilities within the Center and in support of the NASA energy and water team?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The E/W Site Manager is collaterally responsible for overseeing the WFF E/W Management Program, and supporting the GSFC E/W Manager. He leads the local Energy Management Team and is a voting member of the NASA Energy Efficiency Panel (EEP). He ensures metrics are reported during data calls, and forecasts, reviews, and validates electric and propane utility billing. As an Electrical Engineer and Project Manager, he also reviews design documents for E/W requirements.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

1.4 Team:

How does the Center utilize its formal Energy and Water Efficiency Team, comprised of representation from key utility-using organizations, support organizations, and contractors, to generate progress towards benefiting mission and complying with Federal and NASA requirements?

Energy Score: 3 - Adequate, meets requirements

Water Score: 2 - Needs some improvement (nearly adequate)

Headquarters Observation:
WFF has a local Energy Management Team that discusses future projects and energy conservation measures identified in building audits. This team meets quarterly. If free online training is identified and applicable to the team, the E/W Site Manager will notify members. Team members also participate on the GSFC Energy Efficiency Team. Water conservation topics should be incorporated and a water system representative should be on the team.

Headquarters Recommendation:

1. Expand the Energy Management Team to include water conservation. Add members outside the Facilities Management Branch (Code 228) if beneficial.

Action Required: Yes

Status: Open

1.5 Training:

How does the Center ensure that appropriate members of the Energy and Water Efficiency Team are trained energy managers? How does the Center take maximum advantage of Federal and NASA training opportunities? Are maintenance and operations personnel being trained on LEED building maintenance?

Energy Score: 1 - Needs substantial improvement

Water Score: 1 - Needs substantial improvement

Headquarters Observation:
The E/W Site Manager is pursuing a Certified Energy Manager (CEM) certification. In the past, the E/W Site Manager has not been approved to attend the DOE Energy Exchange and EEP face-to-face meeting. The E/W Site Manager takes advantage of free web-based training when his schedule allows; however, other training is limited. Several people pay out of pocket to earn and maintain certifications like LEED. There is concern that O&M personnel may not be trained sufficiently to operate and maintain the new LEED buildings.

Headquarters Recommendation:

1. Ensure the new E/W Site Manager receives appropriate training for the position and that they attend the annual DOE Energy Exchange and NASA EEP face-to-face meeting.
2. Ensure that appropriate members of the Energy Management Team are trained and that WFF is taking advantage of Federal and NASA training opportunities as applicable.
3. Encourage more LEED building O&M training for civil servants and contractor support, including management (decision makers).

Action Required: Yes

Status: Open

2. Planning & Budgeting

2.1 Plan:

How does the Center's Energy-Efficiency and Water Conservation 10-Year Plan document the current energy and water condition of the Center, the targeted condition beneficial to NASA mission beyond Federal requirements or Federally required, planned projects and initiatives to benefit mission and achieve compliance, and the resources (civil servant, contractor, funding) to implement the planned projects and initiatives?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
WFF is included in the GSFC 10-Year Energy Conservation Performance Plan. The Plan was developed as part of the Executive Order (EO) 13693 Center 10-Year Performance Plan and Forecasting effort initiated by HQ. GSFC and WFF were responsive during this effort and submitted documents to HQ when requested. The 10-Year Plan addresses long term goals, current progress, required actions, risks, and expected outcomes for energy intensity, renewable electric energy, clean energy, and water intensity requirements, and several other areas the GSFC E/W Management Program is responsible for.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

2.2 Budget:

How does the Center budget for or utilize alternative financing to fund the projects and initiatives in the Plan, especially those that have a simple payback of 10 years or less? How is the Center helping NASA meet its portion of the ESPC/UESC pledge for the Presidential Performance Contracting Challenge? How has the Center reinvested the resulting utility budget savings to fund additional utility efficiency projects?

Energy Score: 2 - Needs some improvement (nearly adequate)

Water Score: 2 - Needs some improvement (nearly adequate)

Headquarters Observation:
The E/W Management Program does not receive Center Management and Operations (CMO) funding to implement E/W conservation projects. A budget to support studies and projects should be established. One method for establishing a budget for the E/W Management Program is to reinvest utility cost savings from energy efficiency projects and initiatives into additional energy conservation measures. If there are CMO budget underruns, a portion of the funds could be applied toward shovel-ready projects.

WFF has pursued other funding opportunities, including Energy Savings Performance Contracts (ESPC) and NASA Institutional Construction and Environmental Compliance and Restoration (CECR) funding. A multi-phased ESPC was used to fund a project that decentralized the central steam system and installed geothermal HVAC systems in several buildings. WFF also successfully competed for FY 2018 CECR funding. The project includes HVAC efficiency improvements in three areas.

Headquarters Recommendation:

1. Initiate a budget line item to support studies and small conservation projects.
2. Initiate re-investment program for small projects using funds from energy and water savings according to NECPA (42 USC 8256 (e) Retention of Energy and Water Savings):
   > "An agency may retain any funds appropriated to that agency for energy expenditures, water expenditures, or wastewater treatment expenditures, at buildings subject to the requirements of section 8253(a) and (b) of this title, that are not made because of energy savings or water savings. Except as otherwise provided by law, such funds may be used only for energy efficiency, water conservation, or unconventional and renewable energy resources projects. Such projects shall be subject to the requirements of section 3307 of title 40."
3. Continue investigation of performance contracting opportunities (ESPC/UESC).

Action Required: Yes

Status: Open

3. Communication & Reporting

3.1 Communication with Management:

How does the energy and water team regularly status Center management on utility consumption/cost and progress towards planned benefits to mission and compliance with Federal requirements? Describe Center management support and direction obtained as a result of communication from the team.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
There are several opportunities to share information with Center management, including quarterly program status presentations to Code 200 management, quarterly Division Status Reviews (DSR), annual meetings with the Center Director, and annual presentations for the WFF Environmental Management System. Other opportunities include bi-weekly Division Chief meetings and weekly Facilities tag-ups, where high priority topics or concerns can be discussed.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

3.2 Reporting:

How does the Center manage data quality and populate the NASA Environmental Tracking System (NETS) for NASA-external reporting (e.g., budget exhibits, quarterly utility consumption and cost data, annual report of accomplishments, annual plans for projects and initiatives)? How is the Center ensuring benchmarking data entry for metered buildings into ENERGY STAR Portfolio Manager®?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
Energy and water utility data is reviewed and verified using metering data in METASYS. Reimbursable tenants are sub-metered and charged for their consumption using a blended rate developed by WFF. Once billing data is verified and approved by the E/W Site Manager, the bills are processed for payment. The E/W Site Manager performs quarterly and annual data entry into NETS and ENERGY STAR Portfolio Manager. The GSFC E/W Manager assists with data entry when needed.

Headquarters Recommendation:

1. Investigate automating NETS and ENERGY STAR Portfolio Manager data entry from METASYS.

Action Required: Yes

Status: Open

3.3 Awareness/Awards:

How does the Center conduct energy and water conservation awareness and awards? Summarize example activities and recognition.

Energy Score: 2 - Needs some improvement (nearly adequate)

Water Score: 2 - Needs some improvement (nearly adequate)

Headquarters Observation:
There are limited E/W awareness activities in place at WFF. Articles are published in the monthly Safety & Environmental Newsletter and posters are displayed on bulletin boards that show historical building electricity consumption and percent change from the previous year. The E/W Site Manager would like to implement a formal building competition across the facility, and should investigate other methods to increase awareness.

Headquarters Recommendation:

1. Consider other methods for increasing awareness across the site. Some examples include: participation in Earth Day and Energy Awareness/Action Month activities, a building competition, an award program recognizing personnel for achievements in E/W conservation, recurring Center training (SATERN) for site personnel, site-wide emails with conservation tips, and using the Center entrance signs to convey E/W messages. There are several resources online with more awareness program ideas.

Action Required: Yes

Status: Open

4. Utility/Fuel Cost & Demand

4.1 Cost:

How does the Center contract and budget for purchased utilities and fuels, validate bills for payment, and allocate costs? Describe steps taken or planned to minimize the unit cost of utilities and fuels.

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
Electricity is provided by Old Dominion through the local electric cooperative, Accomack Northampton Electric Cooperative (ANEC). Propane is provided by Sharp Energy. Fuel oil is contracted through the Defense Logistics Agency (DLA). Potable water is pumped from on-site wells. Tenants are charged for their utility consumption.

The E/W Site Manager reviews all utility bills before final approval and payment. To determine budget forecasts, historical consumption and future mission requirements are reviewed and considered.

Fuel oil is offered at a daily market rate and the propane rate is locked in annually. A large solar PV project is currently being considered that could affect electricity rates for the facility.

Headquarters Recommendation:

1. Evaluate energy intensive activities and schedules to determine if there are opportunities for peak shaving.

Action Required: Yes

Status: Open

4.2 Demand:

How does the Center Emergency Energy Security and Conservation Plan prepare the Center for disruptions in utilities and fuels for a 10 percent, 15 percent and 20 percent reduction over 12 months? Summarize Center demand management systems and participation in utility company demand management programs.

Energy Score: 3 - Adequate, meets requirements

Headquarters Observation:
WFF developed their Emergency Energy Security and Conservation Plan in FY 2015.

WFF does not participate in the local EnerNOC demand response program after it was determined the three 3 MW generators that were previously included in the program did not meet EPA requirements. WFF does initiate a load shedding program through its METASYS control system when the Main Base load reaches 3 MW. This program systematically turns off HVAC equipment in order to decrease the load.

Other emergency preparedness includes stationary and mobile emergency generators. One 3 MW and one 1.75 MW diesel generators serve the Main Base, and two 3 MW diesel generators serve Wallops Island. Mobile generators can be positioned where needed.

Headquarters Recommendation:

1. Evaluate resource impact of the current curtailment scenarios listed in the Emergency Energy Security and Conservation Plan

Action Required: Yes

Status: Open

5. Goals Performance

5.1 Energy Intensity:

How is the Center progressing towards energy intensity (Btu per gross square foot) Federal reduction requirements in Goal Subject facilities, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Energy Score: 3 - Adequate, meets requirements

Headquarters Observation:
The FY 2016 energy intensity (BTU/GSF) reduction requirement for Goal Subject buildings was a 2.5% reduction from the FY 2015 baseline. WFF reported a decrease of 2.63%. WFF attributes this reduction to projects funded through its multi-phased ESPC project. An HVAC project is scheduled for FY 2018 that will support further energy intensity reductions.

Executive Order 13693, released in March 2015, set new requirements for energy intensity reduction. FY 2015 is the new baseline year, from which Federal agencies are required to reduce energy intensity by 2.5% each year, through FY 2025 (25% total reduction). The Executive Order allows agencies to subtract any measured and verified savings from efficiency upgrades in Goal Excluded buildings from their Goal Subject BTUs consumed. Please see the Executive Order and associated Implementing Instructions for more detail.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

5.2 Renewable Electric Energy:

How is the Center progressing towards generating and/or buying at least the minimum Federally-required amount of renewable electric energy, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Energy Score: 3 - Adequate, meets requirements

Headquarters Observation:
The FY 2016 renewable electric energy consumption requirement was 10% of total electric consumption. WFF achieved 10.8% renewable electric energy use through purchase of renewable energy certificates (RECs).

Executive Order 13693 set new requirements for renewable electric energy. Starting in FY 2016, Federal agencies were required to consume 10% of their electric energy from renewable electric sources. From there, the requirement increases until eventually reaching 30% in FY 2025.

Headquarters Recommendation:

1. Continue consideration of renewable energy opportunities at the site.

Action Required: Yes

Status: Open

5.3 Clean Energy:

How is the Center progressing towards generating and/or buying at least the minimum Federally-required amount of clean energy, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Energy Score: 1 - Needs substantial improvement

Headquarters Observation:
The FY 2016 clean energy consumption requirement was 10% of total energy consumption. WFF achieved 6.6% clean energy use through purchase of RECs. WFF is expected to meet this goal when the geothermal systems are reported in NETS.

Executive Order 13693 set new requirements for clean energy. Starting in FY 2016, Federal agencies were required to consume 10% of their total energy from a combination of renewable electric energy and alternative energy sources. From there, the requirement increases until eventually reaching 25% in FY 2025.

Headquarters Recommendation:

1. Ensure the geothermal heat pump systems are reported in NETS during FY 2017 annual reporting.

Action Required: Yes

Status: Open

5.4 Water Intensity:

How is the Center progressing towards water intensity (gallon per gross square foot) Federal reduction requirements, as demonstrated by the corresponding NETS performance metric? Describe any issues anticipated in fulfilling requirements.

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The FY 2016 water intensity (Gal/GSF) reduction requirement was an 18% reduction from the FY 2007 baseline. WFF reported a reduction of 20.7%. WFF attributes these reductions to the elimination of the central steam plant which required 1 Mgal of makeup water per year.

Executive Order 13693 set new requirements for water intensity reduction. The baseline year, FY 2007, remains the same as in previous requirements. However, the Executive Order extends reduction requirements from FY 2020 to FY 2025, for a total water intensity reduction of 36%. Please see the Executive Order and associated Implementing Instructions for more detail.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

6. Investment

6.1 Facility Projects:

How does the Center ensure that new facilities are designed to meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings? How does the Center ensure that life-cycle cost analyses are used when evaluating sustainable design elements to include in facility projects, and for all appropriate projects, rate the level of sustainable design using the LEED Green Building Rating System? How is the Center working towards the 100 percent reduction of fossil fuel generated energy consumption by buildings by FY 2030? How is the Center meeting the Guiding Principles requirements?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
WFF designs and constructs new facilities in accordance with NPR 8820.2 (minimum LEED Silver certification and Guiding Principles). Designs are performed in-house or contracted to an Architect-Engineer firm. For large projects, life-cycle cost analysis is performed, including ECONPACK. For smaller projects, simple payback is calculated. WFF currently maintains one LEED rated existing building, with two LEED buildings (new construction) scheduled to be completed in FY 2017.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

6.2 Operations and Maintenance:

How does the Center use performance criteria and incentives to encourage facilities operations and maintenance organizations to improve energy and water efficiency? How do Center operation and maintenance procedures and practices reduce energy and water waste, improve efficiency in buildings and utility plants, and minimize facilities life-cycle costs? How is the metering data being utilized for building optimization?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
The WICC II SOW 3 O&M contract includes E/W conservation performance criteria. O&M works through a submittal process to ensure energy efficient and water conserving equipment is installed when replacement is needed. The O&M contractor is also required to propose at least 12 energy saving projects (less than $25K) per year. In addition, the METASYS control system is operated by the O&M contractor, which includes an automated load-rolling program, building schedules, and a preventative maintenance schedule.

Headquarters Recommendation:

1. Verify LEED building performance through recommissioning and other audit measures to ensure facilities perform as designed. Provide review schedule and summary of building performance to HQ when completed.
2. Investigate and consider overall impacts of LEED buildings on facilities operations and WICC II contract.
3. Expand use of METASYS to maximize energy management and building optimization.

Action Required: Yes

Status: Open

6.3 Metering/Information:

How is the Center progressing towards metering electricity, natural gas, and steam at the building level per Federal requirements using advanced metering to the maximum extent practicable, as demonstrated by the Performance Measures in the Department of Energy guidance? Describe any issues anticipated in fulfilling requirements. How does the Center incorporate electricity and other utility/fuels data into energy tracking systems available to Energy and Water Managers and facility managers?

Energy Score: 4 - Positive, exceptional method or performance

Water Score: 2 - Needs some improvement (nearly adequate)

Headquarters Observation:
Electric, propane, and water metering is in place. Electricity is 100% smart metered for all buildings over 5,000 square feet. Propane is about 95% smart metered. Manually-read analog water metering is in place at the on-site wells and on tenant buildings; however, no NASA building are metered.

Executive Order 13693 encourages the installation of water meters to provide additional data about specific water end uses at a building or facility and using the water balance methodology to improve water conservation and management. A water balance analysis identifies the proportion of water consumption for specific end uses, compares total water supplied against the water consumed for each specific end use, and nets out total water loss in a particular building, facility, or portfolio. Please see the Executive Order and associated Implementing Instructions for more detail.

Headquarters Recommendation:

1. Continue installing advanced metering, including water metering, where appropriate to help measure and manage consumption.

Action Required: Yes

Status: Open

6.4 Audits:

How has the Center conducted comprehensive energy and water evaluations for at least 25 percent of its covered facilities each year and benchmarked facilities for the ENERGY STAR Building label? Does the Center maintain a list of projects found during these audits to be performed as funding becomes available?

Energy Score: 3 - Adequate, meets requirements

Water Score: 3 - Adequate, meets requirements

Headquarters Observation:
EISA 2007 Section 432 requires that Federal facilities perform comprehensive energy and water evaluations on 25% of their covered facilities annually, or 100% every four years. NASA defines a covered facility as one that has been categorized as Goal Subject. WFF completed its latest evaluation cycle in March 2016, and is currently on track for completing the current cycle by March 2020. Energy and water conservation methods that are identified during the audits are prioritized and further developed for future funding. WFF provides updates for ENERGY STAR Portfolio Manager for the 56 buildings it has benchmarked in the system.

Headquarters Recommendation:
None

Action Required: No

Status: Closed

National Aeronautics and Space Administration

Environmental and Energy Functional Review (Q16207)

Goddard Space Flight Center
Greenbelt Campus

NASA Contract No. NNA13AA14C/000210
Task Order 000216

Final Report
December 2017

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ENVIRONMENTAL AND ENERGY FUNCTIONAL REVIEW

FOR

GODDARD SPACE FLIGHT CENTER
GREENBELT CAMPUS

FINAL REPORT

Prepared for:

Environmental Management Division
NASA Headquarters

Prepared by:

AECOM Technical Services, Inc
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560

NASA Contract No. NNA13AA14C/000210
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This report was developed based on information provided to AECOM assessors and observations made by the assessors during the assessment week. The information provided to assessors has undergone limited verification. All information in this report is provided to Center and HQ personnel in draft form so that information can be verified and NASA personnel can provide clarifications and corrections.

This report did not rely on the use of Classified National Security Information (CNSI). Information required to develop this report was received from Center personnel. If an instance occurred in which CNSI was knowingly reviewed, the AECOM policy is (1) Do not accept electronic copies, (2) Only view CSNI in person, on-site, during the EEFR, and (3) Do not extract any sensitive information in notes or for reports.

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List of Acronyms

AACM	Alternative Asbestos Control Method
AST	Aboveground storage tank
Bldg	Building
BMP	Best management practice
BPD	Backflow prevention device
CAA	Clean Air Act
CAC	Center Asbestos Coordinator
CESQG	Conditionally exempt small quantity generator
CFC	Chlorofluorocarbons
CFR	*Code of Federal Regulations*
COD	Chemical oxygen demand
COSS	Center Operations Support Services
CRMP	*Cultural Resources Management Plan*
CWA	Clean Water Act
DAC	Directorate Asbestos Coordinator
EA	Environmental Assessment
EEFR	Environmental and Energy Functional Review
EIS	Environmental Impact Statement
EMS	Environmental management system
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know
FAC	Facilities Asbestos Coordinator
FONSI	Finding of No Significant Impact
FPMR	Federal Property Management Regulations System
FY	Fiscal year
GB	Greenbelt Campus
GHG	Greenhouse gas
gpd	Gallons per day
gpm	Gallons per minute
GSFC	Goddard Space Flight Center
GSA	General Services Administration
HAP	Hazardous air pollutant
HAZCOM	Hazard communication
HCFC	Hydrochlorofluorocarbons
HMIS	Hazardous Materials Information System
HMMS	Hazardous Materials Management System
HMR	Hazardous Material Regulations
HPO	Historic Preservation Officer
HQ	Headquarters
HVAC	Heating, ventilation, and air conditioning
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resource Management Plan
IHO	Industrial Hygiene Office

List of Acronyms (continued)

IRIS	Integrated Risk Information System
kg	Kilogram
LDR	Land disposal restriction
LEPC	Local Emergency Planning Commission
MACT	Maximum Achievable Control Technology
MEMD	Medical and Environmental Management Division
MDE	Maryland Department of the Environment
mg	Milligram
mmBtu	Million British thermal units
MW	Megawatts
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NACA	National Advisory Committee for Aeronautics
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	No further action
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPE	Nonylphenol ethoxylates
NPR	NASA Procedural Requirements
NPRM	Notice of Proposed Rulemaking
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NWP	Nationwide Permit
O&M	Operation and maintenance
O_3	Ozone
ODS	Ozone-depleting substance
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OU	Operable unit
OWS	Oil/water separator
P2	Pollution prevention
PCB	Polychlorinated biphenyl
PE	Professional Engineer
POL	Petroleum, oil, and lubricant
PP	Proposed plan
PPE	Personal protective equipment
ppm	Parts per million
PSD	Prevention of Significant Deterioration

List of Acronyms (continued)

psi	Pounds per square inch
PTE	Potential to emit
REC	Recommendation
RICE	Reciprocating Internal Combustion Engine
RPA	Registered Professional Archaeologist
RRAC	Regulatory Risk Analysis and Communication
SAP	Satellite accumulation point
SDS	Safety Data Sheet
SERC	State Emergency Response Commission
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SPCC	Spill prevention, control, and countermeasure
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TEAM	*The Environmental Assessment and Management*
tpy	Tons per year
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSS	Total suspended solids
UHC	Underlying hazardous constituents
U.S.	United States
UST	Underground storage tank
VO	Volatile organic
WSSC	Washington Suburban Sanitary Commission

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1.0 Environmental and Energy Functional Review Program Summary

1.1 Purpose and Scope

The National Aeronautics and Space Administration Headquarters (NASA HQ), Environmental Management Division, has functional and management oversight of environmental compliance at all of the NASA Centers and component installations. The Environmental and Energy Functional Review (EEFR) Program was established and is managed on a three-year cycle.

The primary purpose of the EEFR Program is to allow NASA HQ to provide visibility and to more accurately assess compliance of each Center's environmental management system (EMS), energy/water, and environmental compliance programs. In addition, the EEFR Program provides an interactive process that brings an external perspective to the Centers' environmental programs and fosters proactive relations and communication between the NASA field installations and NASA HQ. The results of the EEFR meet requirements established by the Government Accounting Office, Inspector General, and Presidential directive and are a means to advise NASA Centers and HQ senior management of environmental management and technical issues that may impact agency EMS, energy/water, and environmental compliance programs.

The scope of the environmental compliance portion of the NASA EEFR Program is to assess compliance with federal, state, and local laws and regulations; applicable executive orders; and NASA environmental policies and procedures using *The Environmental Assessment and Management (TEAM) Guide*, which was developed and is maintained by the United States (U.S.) Army Corps of Engineers Construction Engineering Research Laboratory. The federal guide is updated quarterly and the state guide is updated annually. Table 1-1 shows the environmental media protocols presented in the *TEAM Guide*, although not all of these areas were reviewed during this EEFR.

Table 1-1. TEAM Guide Protocols

Environmental Media/Program Area	*TEAM Guide* Section Number
Air Emissions Management	1
Cultural Resources Management	2
Hazardous Materials Management	3
Hazardous Waste Management	4
Natural Resources Management	5
Other Environmental Issues National Environmental Policy Act Noise Pollution Prevention Remediation	6
Pesticide Management	7
Petroleum, Oil, and Lubricant Management	8
Solid Waste Management	9
Storage Tank Management	10
Toxic Substances Management Asbestos Lead-Based Paint Polychlorinated Biphenyl Radon	11
Wastewater Management	12
Water Quality-Drinking Water Management	13

This review addresses six core media areas including: air emissions; hazardous waste; petroleum, oil and lubricants (POL); storage tanks; wastewater; and water quality-drinking water. Other media protocols reviewed at Greenbelt Campus (GB) included cultural resources, National Environmental Policy Act (NEPA) requirements, hazardous materials - Emergency Planning and Community Right-to-Know Act (EPCRA), pesticides, solid waste, and toxic substances - asbestos and polychlorinated biphenyls (PCBs). In addition, the scope of the NASA EEFR Program includes a review of new and upcoming regulations that have the potential to impact NASA Centers.

1.2 Process

The environmental compliance review was conducted from May 1, 2017 to May 5, 2017 at NASA GB, located in Greenbelt, Maryland. The EEFR team consisted of NASA HQ and AECOM personnel. Table 1-2 presents the names and responsibilities of the AECOM EEFR team members.

Table 1-2. Environmental and Energy Functional Review Team Members and Responsibilities

Team Member	Organization	Responsibility
Mr. Mike Green	NASA Headquarters, Washington DC	NASA Environmental and Energy Functional Review Team Leader
Mr. Bobby Harward, PE	AECOM, Morrisville, NC	Contractor Project Manager Solid Waste and Toxic Substances Management
Mr. Gerald Baribeau	AECOM, Sacramento, CA	Air Emissions Management and EPCRA
Dr. Dan Cassedy, RPA	AECOM, Morrisville, NC	Cultural Resources, Pesticides Management, and NEPA
Ms. Annette Barndt, PE	AECOM, Denver, CO	Hazardous Waste Management
Mr. Mike Blotzer, PE	AECOM, Morrisville, NC	POL and Storage Tanks Management
Mr. Paul Lorenz	AECOM, Denver, CO	Wastewater and Water Quality-Drinking Water Management

Notes:
NASA = National Aeronautics and Space Administration
NEPA = National Environmental Policy Act
PCB = Polychlorinated biphenyl
PE = Professional Engineer
POL = Petroleum, oil, and lubricant
RPA = Registered Professional Archaeologist

The EEFR was divided into three broad areas: Environmental Program Management Assessment, Energy/Water Assessment, and Environmental Compliance Assessment. The AECOM team members were responsible for conducting the Environmental Compliance Assessment, which is a technical review of the Center's environmental program. The NASA HQ personnel focused on the Energy/Water and Environmental Program Management Assessments. This report details the Environmental Compliance Assessment results only. The results of the Energy/Water and Environmental Program Management Assessments are published by NASA HQ under separate cover.

During this assessment, the EEFR assessors reviewed applicable environmental records, reports, and files, and interviewed designated GB civil servant and contractor employees responsible for various aspects of the environmental program. Additionally, the EEFR team toured facilities that performed environmentally related operations. Assessors were escorted to buildings and other work areas, and were provided access to necessary areas at GB.

Following the site visit, this report was developed to present the results of the EEFR. Appendices A, B, C, and D summarize the findings and observations, documents reviewed, personnel interviewed, and the sites/areas visited during the EEFR, respectively.

1.3 Regulations Review

An additional element within the EEFR Program includes a review of new and upcoming regulations that have the potential to impact NASA Centers. AECOM receives periodic reports containing both federal and state regulatory summaries from the NASA Principal Center for Regulatory Risk Analysis and Communication (RRAC). The summaries are screened by RRAC to include environmental and health/safety items judged relevant to NASA or of broad general relevance. As part of the EEFR, team members evaluated new and upcoming regulations related to their protocol areas for potential impacts to the Center.

Reviews of new and upcoming regulations (from October 1, 2016 – April 11, 2017) were conducted by EEFR team members for their protocol areas to determine the potential impact to the Center.

The federal regulations review is provided in Appendix E, and the state regulations review is included in Appendix F. The tables provide the media, topic, summary, citation, effective date, and potential impact of these new and upcoming regulations. The last column within the tables presents a subjective evaluation of the potential impact the regulations may have on NASA at the Center. The EEFR assessor is responsible for providing an evaluation of the regulations in their protocol area, and assigns a ranking of High (H), Medium (M), Low (L), or Not Applicable (NA) for the potential impact. Although 13 media are represented within the *TEAM Guide* protocols, not all 13 media have new or upcoming regulations to be evaluated in the tables.

1.4 Finding and Observation Categories

Environmental compliance findings are categorized as significant, regulatory, or policy. Findings are ordered according to severity, with significant findings being the most severe and requiring immediate action. Significant findings can result in a direct and immediate threat to human health, safety, the environment, or the Center's mission. Regulatory findings indicate noncompliance with a federal, state, or local regulation, an executive order, or permit. Policy findings indicate noncompliance with NASA policy, guidance, or instruction documents.

In addition to environmental compliance findings, this report presents observations identified during the assessment, divided into two categories: recommendations and positive observations. Recommendations are suggestions that are not required by a regulation, but, if implemented, could help reduce the potential for enforcement action or improve environmental

programs. Positive observations are activities that go beyond standard practice or requirement of a particular environmental standard.

1.5 Results of EEFR

Table 1-3 presents numerical summaries of the findings and observations for GB. The EEFR team identified 0 significant findings, 34 regulatory findings, 4 policy findings, 7 recommendations, and 4 positive observations. The media-specific sections of this report provide descriptions of each finding and observation. Appendix A presents a summary listing of the findings and observations, providing the title and category for each.

Table 1-3. Summary of Findings and Observations

Environmental Media	Findings			Total Findings	Observations		Grand Total
	Significant	Regulatory	Policy		Recommendations	Positive	
Air Emissions Management	0	3	0	3	0	0	3
Cultural Resources Management	0	1	1	2	0	0	2
Hazardous Materials Management - EPCRA	0	1	0	1	0	0	1
Hazardous Waste Management	0	11	2	13	0	1	14
Other Issues - NEPA	0	0	1	1	0	0	1
Pesticide Management	0	2	0	2	0	0	2
POL Management	0	6	0	6	1	2	9
Solid Waste Management	0	1	0	1	2	0	3
Storage Tank Management	0	0	0	0	1	0	1
Toxic Substances Management - Asbestos, PCB	0	2	0	2	2	0	4
Wastewater Management	0	5	0	5	0	1	6
Water Quality-Drinking Water Management	0	2	0	2	1	0	3
TOTAL	**0**	**34**	**4**	**38**	**7**	**4**	**49**

Notes:
EPCRA = Emergency Planning and Community Right-to-Know
NEPA = National Environmental Policy Act
PCB = Polychlorinated biphenyl
POL = Petroleum, oil, and lubricant

As part of this EEFR, an overall program health indicator was assigned to each program area (i.e. protocol). Program health indicators are intended to help Center management better understand the overall health effects of their environmental program by evaluating each

environmental program area separately. The assigning of program health indicators is based on a qualitative evaluation of each program area. The indicator categories are defined as follows, with color codes also used for simplicity:

Healthy (Green)

- Program is generally effective and on track in meeting a majority of the requirements, and/or
- Issues identified represent isolated incidents as opposed to systemic problems, and/or
- Little risk of regulatory enforcement action(s) exists.

Needs Improvement (Yellow)

- Program does not meet regulatory and procedural requirements in one or more program areas, and/or
- Issues identified point to systemic problems rather than isolated incidents, and/or
- Some risk of regulatory enforcement action(s) exists.

Requires Immediate Attention (Red)

- Program does not achieve major requirements in multiple program areas and/or
- Program is in significant noncompliance/nonconformance with requirements, and/or
- Direct environmental damage, health impacts, mission impacts or Notice of Violation (NOV) with more than administrative implications may result, and/or
- Significant risk of regulatory enforcement action(s) exists, and/or
- Requires Center management involvement.

Program health indicators are based on the issues identified during the EEFR as well as the assessor's professional judgment. They are generally determined by three factors:

1. Whether the issues identified represent systemic problems versus isolated incidents.
2. Whether the issues identified represent key elements for that program, without which the program is likely to be substantially out of compliance.
3. Whether the issues identified indicate an upward or downward trend in the health of the program. Programs that appear to be declining in compliance status based on observations during the week of the EEFR are listed in Table 1-4 as "regressing" with a downward arrow. Programs that appear to have an improving compliance status are listed as "improving" with an upward arrow in Table 1-4.

Table 1-4 presents the program health indicators for the EEFR protocols and provides information on the health of the program.

Table 1-4. Program Areas, Health Indicators, and Summary

Program Area	Program Health Indicator	Program Summary
Air Emissions Management	**Green**	• Easy to understand, straightforward Title V permit with substantial recordkeeping requirements • Buildings 24 and 31 (Power Plants) boiler fuel, generator usage, and refrigerant records well maintained • Paint booth visible emissions evaluations were conducted during times when painting did not occur • Hours for testing/maintenance vs emergency use for several emergency generators not properly recorded
Cultural Resources Management	**Green**	• Effective relationship with Maryland Historic Trust SHPO • Managing one National Historic Landmark, an historic district, and one archaeological site • 2016 Memorandum of Agreement negotiated with SHPO for Construction of the Instrument Development Facility within the historic district • 2017 updated Integrated Cultural Resource Management Plan needs additional updates to be fully compliant with NPR 8510.1

Hazardous Materials Management - EPCRA	**Green**	• Center is not subject to Form R reporting
		• Center uses Hazardous Materials Management System, Air Management Database and Facility Management Division records for development of Tier II inventory report
		• Some inaccuracies and missing items identified in Tier II inventory
		  ○ Diesel fuel was significantly under-reported
		  ○ Refrigerants, lubricating oils, hydraulic oils, and transformer oils were not included as required

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary
Hazardous Waste Management	**Green**	• Complex program with 3 locations requiring separate generator identification numbers and approximately 150 accumulation points • Excellent management of programmatic records and reporting • Fully-implemented accumulation point training, with compliance checklist and generator notebook at each site • Conflicting hazardous waste container labeling • Improper waste aerosol can management • Discarded chemicals/batteries/mercury in equipment improperly managed

Other Issues - NEPA	**Green**	• NEPA program effectively monitors GB projects and programs
		• Online safety and environmental checklist streamlines review process and ensures systematic evaluations
		• 2002 Master Plan EA has reduced the number of project-specific EAs needed
		• In last three years:
		  o Completed two EAs for both local and off-site programs
		  o Cleared 180 projects through Categorical Exclusions

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary
Pesticides Management	**Green**	• Buildings contractor, grounds contractor, and cafeteria have separate programs - application and recordkeeping conducted appropriately for all three • Buildings and Cafeteria contractors store all pesticides offsite • Grounds contractor stores herbicides onsite appropriately, but water supply used for mixing needs upgraded backflow preventer • No permit or applicator license in place for deer tick pesticide application program
POL Management	**Green**	• Well-managed program with storage tank database to facilitate spill plan revisions and response to questions • Excellent quiz developed to reinforce spill training and improve compliance • Underground piping containment at Building 24 failed leak test • Mobile generator fuel tanks not inspected monthly • Transformers not inspected for leaks • Tanks and piping inside buildings, and elevator hydraulic tanks not included in facility diagrams
Solid Waste Management	**Green**	• Single stream recycling program implemented across Center • Recycling program hampered due to non-recyclable items placed in recycling containers • Medical wastes are properly collected and stored at medical clinic and transported by vendor for disposal • Good waste diversion rates achieved for general refuse

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary
Storage Tanks Management	**Green**	• No currently regulated underground storage tanks on site • Building 27 oil sump, previously exempted, will require upgrade or removal by October 2018
Toxic Substances Management - Asbestos, PCB	**Green**	• Awareness training is conducted for Center personnel whose activities could involve asbestos • Asbestos projects effectively tracked in Safety Division – IH spreadsheet • Asbestos program is challenged by coordination and ownership over several organizations • Center Asbestos Coordinator/IH not provided a copy of 2012 asbestos survey maintained by Facilities • Appropriate recordkeeping usually performed; however, some activities conducted without required IH approval, and some required documentation missing
	Green	• No PCB or PCB-contaminated transformers at Center and minimal other PCB items (e.g., capacitors, ballasts) • PCB-contaminated oil recently removed from elevator hydraulic reservoir • Minor deficiencies noted in PCB Annual Document Logs

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary

Wastewater Management	**Red**	• Received 10 Notices of Violation for 16 exceedances of chemical oxygen demand, biochemical oxygen demand, and total suspended solids in the past 22 months
		  ○ Deemed in Significant Noncompliance by Washington Suburban Sanitary Commission for period of July 1-December 31, 2015
		  ○ Entered into Compliance Agreement on December 28, 2016 - corrective measures must be completed by June 9, 2017
		• Continued exceedances of copper at outfalls 001 and 004
		  ○ 6 of past 15 months for Outfall 001
		  ○ 1 of past 15 months for Outfall 004
		• Unpermitted wastewater discharges to storm sewer identified
		  ○ Car wash overflows
		  ○ Landscaping equipment washing
		• Proactive preparations to reduce impervious surfaces by over 26 acres to comply with new stormwater permit expected to be issued soon

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary

Water Quality-Drinking Water Management	**Green**	• Effectively operating an exempt noncommunity public water system
		• Backflow prevention device inspection records are complete
		• A few improperly protected cross-connections identified:
		  o Pesticide mixing area
		  o Failed device in Building 24
		  o Wet fire suppression systems with single check valves require replacement
		• Equipment to measure well water levels not functioning

Notes:
EA = Environmental Assessment
EPCRA = Emergency Planning and Community Right-to-Know
IH = Industrial Hygienist
PCB = Polychlorinated biphenyl
POL = Petroleum, oil, and lubricant
SHPO = State Historic Preservation Office

1.6 Summary of EEFR Assessment

The intent of this section of the report is to highlight relevant issues identified during the EEFR, including some issues that are not necessarily documented in findings. Findings identified during the EEFR are summarized by protocol area in Sections 3.0 through 15.0. There are four categories of information identified during the assessment that are summarized and presented in this section:

- Risk to Mission.
- Knowledge Transfer
- Regulations Review
- Outbrief Summary

1.6.1 Risk to Mission

In addition to compliance findings, environmentally-related issues posing a potential risk to the mission of the Center are presented to Center management. While these issues may not represent a violation of state or federal regulations, they may be factors to consider in the Center risk management process. There were no risks to mission identified during the EEFR.

1.6.2 Knowledge Transfer

During the EEFR, the assessment team may identify operational practices or technologies used by Center personnel that could be used to improve environmental management or limit environmental liability at other Centers. The following practices were identified during the EEFR:

- Container Database eases spill plan revisions
- Interactive SPCC training quiz reinforces training

1.6.3 Regulations Review

As part of the EEFR assessment, assessors reviewed new and upcoming federal and state regulations to evaluate their impact on Center operations. Summaries of these reviews are presented in Appendices E and F of this report. The impact of regulations to Center operations are rated as high, medium, low and not applicable. Regulations that could represent a medium or high likelihood of impacting the Center are summarized below:

- A wastewater rule finalizes revisions to small MS4 regulations to allow alternative approaches for permitting authorities to determine adequate BMPs and other requirements necessary to reduce pollutants. The Center received a draft of new permit that will specify specific BMPs and require reduction of impervious surfaces by 20% from 2002 baseline level (26.77 acres for GB).

1.6.4 Outbrief Summary

At the conclusion of the EEFR site visit, an outbrief was presented to Center management and the Environmental team to summarize relevant issues identified during the assessment. The information presented in the outbrief is summarized below.

Top Strengths: The assessment team recognized the following as strong, positive attributes of the environmental compliance program:

- Proven ability to halt operations that have imminent danger to health or environment
- Excellent management of hazardous waste programmatic records and reporting

Top Challenge: The assessment team recognized the following issues as ones that may require Center management support or additional resources to address:

- Noncompliant Wastewater Discharges
    - Staff actively addressing issues
    - Exceeding permit limits to sanitary sewer

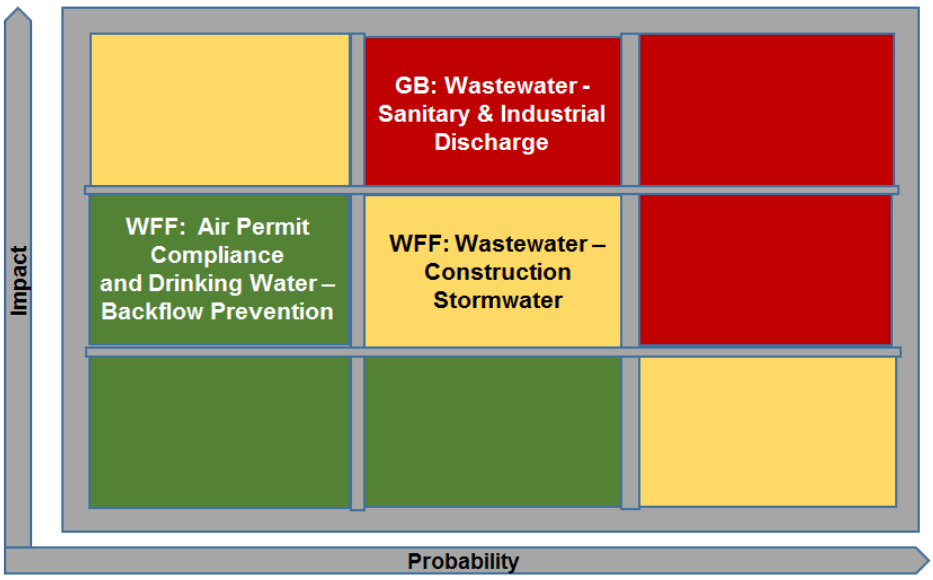
- Continued exceedances of copper permit limits to surface waters
- Vehicle and equipment wash water to stormwater

Program Discussion: This topic provided a discussion of some of the issues identified during the week. The intent of this topic is not to present all findings identified; rather, this discussion provides examples of the type of findings there were identified:

- Inconsistent implementation of hazardous waste accumulation requirements
- Building 27 used oil sump requires upgrade or removal by Oct 2018
- Responsibility for emergency generator fuel tank inspections and runtime records for air compliance

Top Risk Matrix: This 3x3 Top Risk Matrix was presented to identify those programs that pose an elevated risk based on their relative impact and probability.

GSFC Technical Top Risk Matrix



1.7 Report Organization

The remainder of this report is organized as follows: Section 2.0 provides a description of GB, its mission and its work force and Sections 3.0 through 15.0 present the operational descriptions and EEFR results for each protocol area. Appendix A contains a summary list of the findings and observations by presenting the title and category for each finding. Appendix B contains the documents reviewed, Appendix C lists the personnel interviewed, and Appendix D lists the sites or areas visited. The federal regulations review summary is provided in Appendix E, and the state regulations review summary is included in Appendix F.

2.0 GB Center Description

2.1 GB Overview

The majority of the GB organization is located in Greenbelt, Maryland, approximately 7 miles northeast of Washington, DC. It was established in August of 1958 to provide NASA with support for space research and exploration. The primary mission of GB is to expand knowledge of the Earth and its environment, the solar system, and the universe through observations from space. As such, it is home to over 7,500 engineers, scientists, and technical support people (both civil servant and contractor personnel).

GB has core competencies in Science (earth and space), Mission Assurance and Assurance Technologies, End-to-End Mission Systems Engineering, Large Scale Scientific Information Systems, Program and Project Management, Advanced Flight and Ground Systems Development, and Sensor and Instrument Development.

GB covers approximately 1,270 acres adjacent to Greenbelt Road (Route 193). The facility consists of several contiguous areas: the Main Campus, the East Campus, the Antenna Test Range (Area 100), the Geophysical and Astronomical Observatory (Area 200), the Magnetic Test Facility (Area 300), and the Bi-Propellant Test Facility (Area 400). Offices, laboratories, test facilities, a plating shop, a centralized power plant, and data processing, warehouse, and storage facilities occupy approximately 33 major buildings and other structures, providing more than 3,300,000 square feet of space. About 60 additional numbered structures accommodate a wide variety of specialized facilities located in the outlying areas. GB has personnel and facilities to create, build, test, launch, and operate various satellite projects in support of Earth science, space science, and advanced technology programs. A site map of GB is shown on Figure 2-1.

2.2 GB Work Force

The workforce at GB is divided into a number of organizational offices and directorates, which are further divided into smaller functional groups. Environmental functions are managed within the Management Operations Directorate. Within the Management Operations Directorate is the Medical and Environmental Management Division (MEMD) Code 250. The Management Operations Directorate and MEMD organization charts for GB are shown on Figures 2-2 and 2-3, respectively. The MEMD carries out the environmental regulatory compliance functions for GB. The MEMD recommends policies.

Figure 2-1. GB Site Map (Main Campus and East Campus)

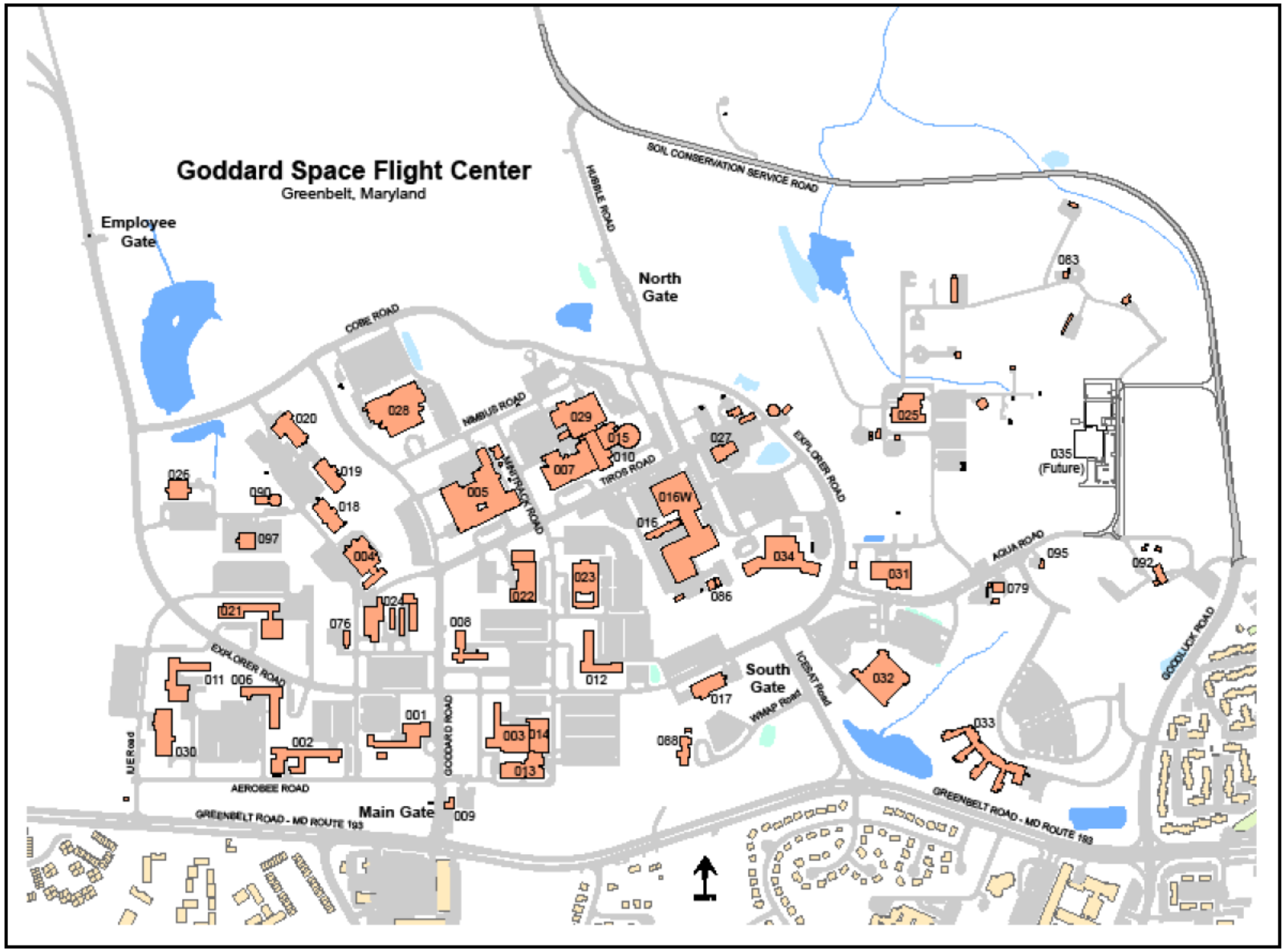


Figure 2-2. GB Organization Chart

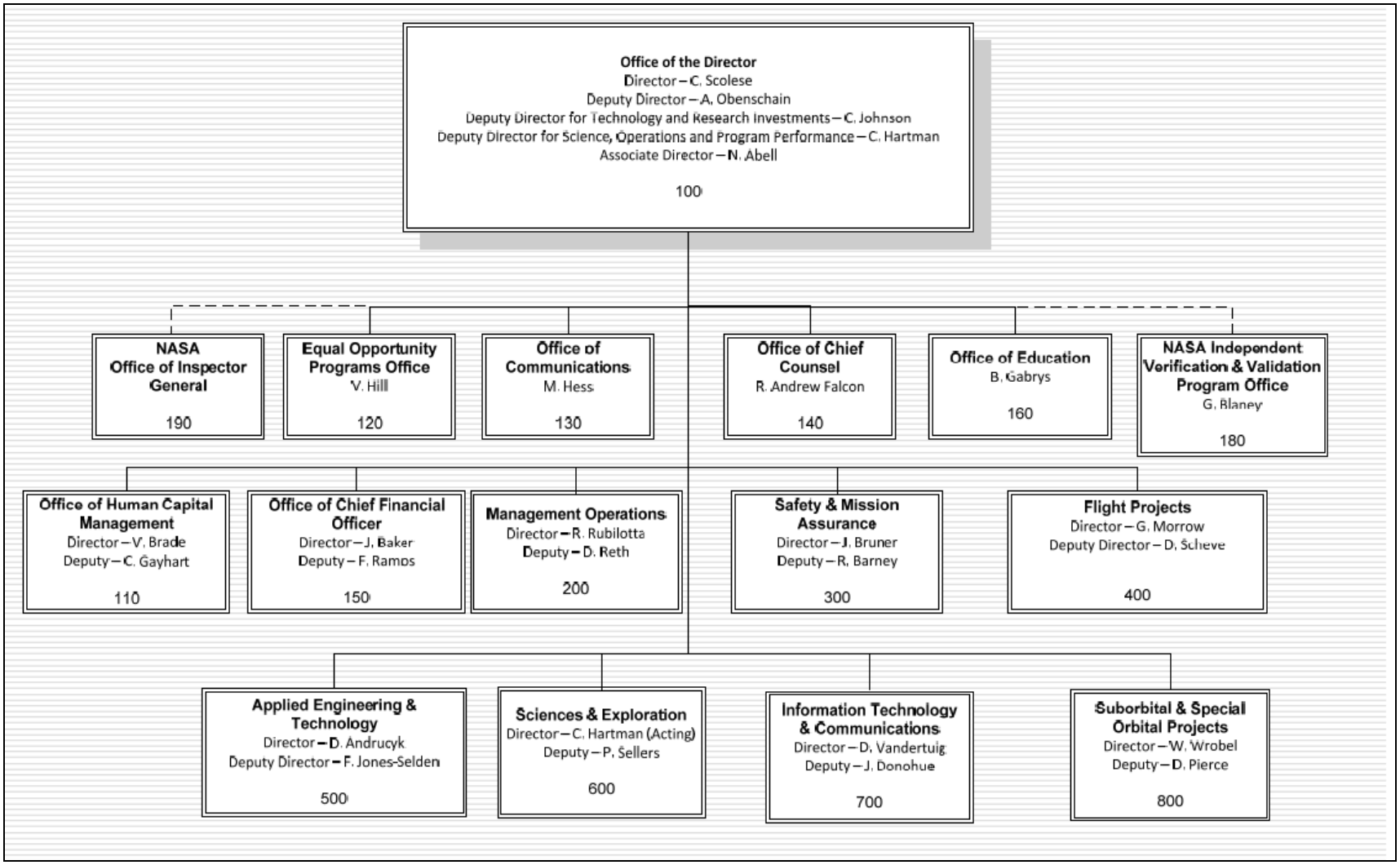
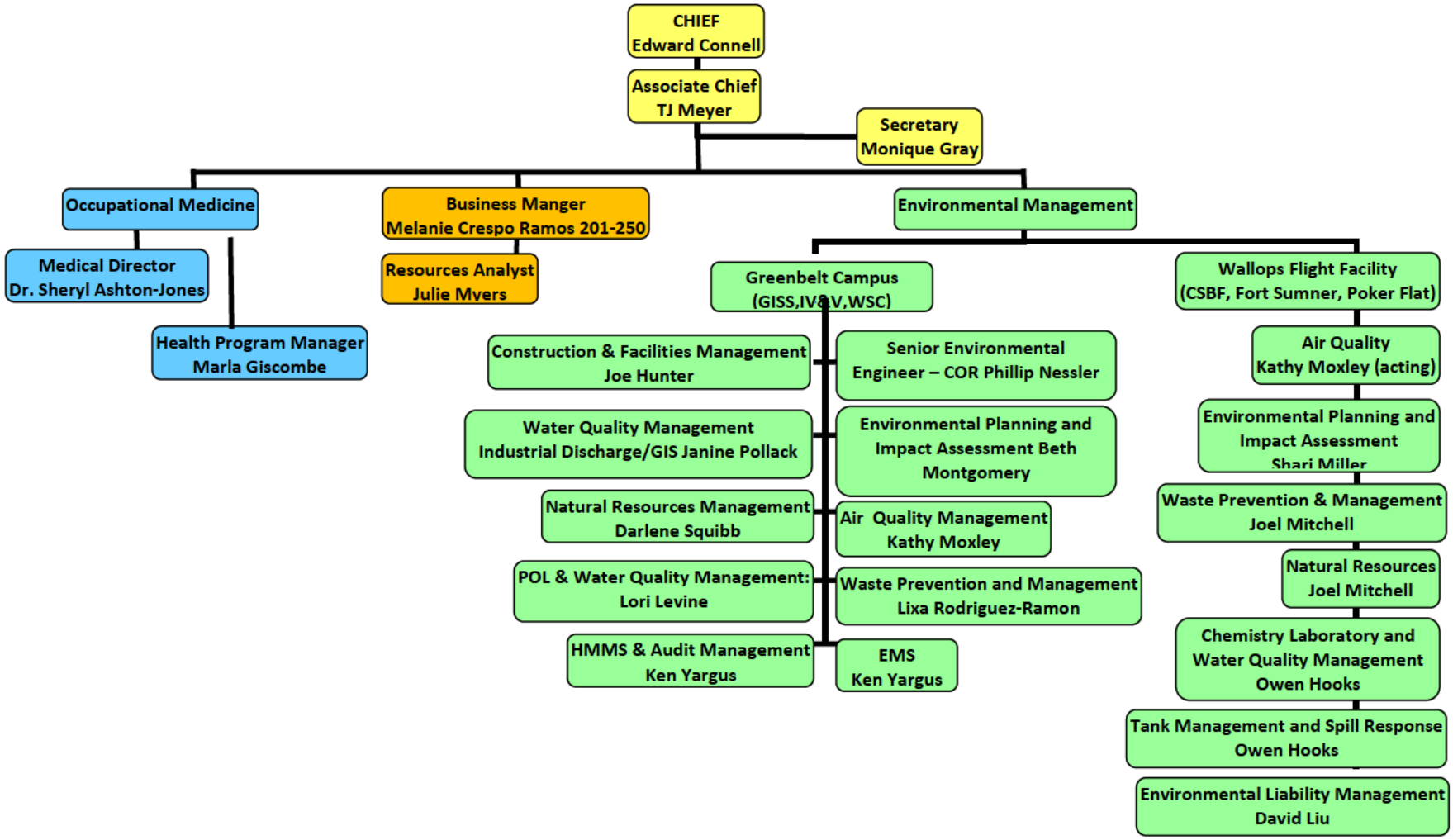


Figure 2-3. GSFC Medical and Environmental Management Division Code 250 Organization Chart



and develops procedures that ensure GB is compliant with applicable environmental laws, regulations, and NASA directives. Program management responsibilities include Soil and Water Quality Remediation, Restoration and Oil Program, Hazardous Waste, P2, NEPA, Environmental Management Systems, Clean Water Act (CWA) and Clean Air Act (CAA).

Contracted environmental management support is provided to GB by Straughan Environmental. Such environmental management support includes, but is not limited to: permitting documentation, completing annual compliance self-assessments, conducting annual facility inspections, preparing and implementing Corrective Action Plans, providing environmental regulatory compliance support, managing on-site hazardous waste activities, preparing internal and external regulatory reports, and tracking the status of environmental programs.

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3.0 Air Emissions Management

This section presents the EEFR results for the air emissions management program at GB. It describes the overall air emissions program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

3.1 Operational Description

GB is considered a major source of air pollution under Title V of the CAA. The authority to enforce the CAA has been delegated by the U.S. Environmental Protection Agency (EPA) to the state of Maryland Department of the Environment (MDE).

The GB Title V Operating Permit No. 24-033-00675, dated January 1, 2015 includes several boilers, the central power plant, several emergency generators, three paint booths, an electro-chemical plating line, a semi-conductor production line, one abrasive blasting unit, several char-broilers, fuel storage and dispensing facility, and numerous emissions units classified as insignificant. The Title V permit expires on December 31, 2019.

GB submits a combined annual emission certification and greenhouse gas emissions report to the MDE and also submits an annual Title V compliance certification statement to MDE and to EPA, Region III. The emission report contains emission data from all of the permitted emission sources. In addition, MDE requires quantification of toxic and hazardous air pollutants from all sources other than fuel burning equipment.

The five large boilers at the central power plant are subject to the performance, monitoring, record keeping, and reporting requirements of the New Source Performance Standards of 40 Code of Federal Regulations (CFR) 60 subpart Dc.

Space research and technology is classified by EPA as an institutional source and therefore “existing” emergency generators (installed prior to June 12, 2006) at GB are exempt from the federal reciprocating internal combustion engine (RICE) National Emission Standard for Hazardous Air Pollutants (NESHAP) requirements of 40 CFR 63 subpart ZZZZ. However, the “existing” generators must continue to meet the definition of emergency generators (such as less than 100 hours per year for testing and maintenance), otherwise the engines will no longer be considered emergency engines and will be subject to the entire RICE NESHAP requirements. Emergency generators installed after June 12, 2006 are subject to the RICE NESHAP regulations of 40 CFR 63 subpart IIII and JJJJ (for compression and spark ignition respectively).

The table below summarizes the environmental elements for the air emissions program:

Element	GB
Regulatory Agency	Maryland Department of the Environment
Attainment Status	Marginal nonattainment for 2008 8-hr Ozone
Major or Area HAP Source	Area
Title V Permit (permit number/expiration date)	Yes, Permit No. 24-033-00675, dated January 1, 2015
Other Air Permits (permit number/issue date/expiration date)	None
GHG major source	No, GHG emissions reported to State as part of annual emissions certification report
NSPS/NESHAP Applicability:	
NSPS Subpart Dc - boilers	Yes
NSPS Subpart VVV - Polymeric Coating of Supporting Substrates Facilities	No
NSPS Subpart IIII - Compression Internal Combustion engines	Yes
NSPS Subpart JJJJ - Spark ignition Internal Combustion engines	No
NSPS Subpart OOO - Nonmetallic Mineral Processing Plants	No
NESHAP - Asbestos	Yes
NESHAP Subpart CCCCCC – Gasoline Dispensing Facilities	Yes
NESHAP Subpart JJJJJJ – Area Source Boilers	Yes
NESHAP Subpart ZZZZ - Existing IC engines	Yes
NESHAP subpart WWWWWW - Area Source plating and polishing	Yes
NESHAP - Aerospace	Yes
Subject to Risk Management Program	No
Boilers Fuel Type	Natural gas / landfill gas, fuel oil backup
Solid or Hazardous Waste Incinerator	No
Open Burn/Open Detonation	No
Spray painting or surface coating	Yes
Systems with 50 lbs refrigerant	Yes
Gasoline Dispensing	Yes
Other State/Local Requirements	NA

3.2 Technical Findings

Three regulatory findings were identified for the air emissions management program.

Finding Number:	AIR-001	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Painting Did Not Occur When Paint Booth Visible Emissions Evaluations Conducted**
Finding Details:	The Title V Permit 24-033-00675, dated January 1, 2015, requires a visible emissions evaluation to be conducted once per year for the Bldg 4 Thermal Coatings Lab spray booths. Painting must be occurring when the visible emissions evaluations are conducted. The annual visible emissions evaluation for the Bldg 4 small paint booth was conducted on 3/13/15 and 4/8/16 and the evaluation was conducted for the Bldg 4 large paint booth on 8/5/15 and 12/8/16. However, the paint usage logs did not indicate that painting had occurred on those dates.
Facility Number:	Bldg 4
Facility Name:	Thermal Coatings Lab
Regulatory Citation:	Title V Permit 24-033-00675, Section IV, Table IV-5, Condition 5.3A
Other Criteria:	Code of Maryland Regulations 26.11.03.06(C)
Question Number:	AE.2.1.MD
Source:	State Team Guide
Root Cause Explanation:	Staff may have been painting non-production parts and did not remember to enter paint usage on the logs on the days that the visible emissions evaluations were conducted.
Violation Type:	Incomplete Records
Finding ID:	Permit Conditions Not Met
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Ensure that painting is occurring on dates that the visible emissions evaluations are conducted and that the paint booth usage logs include entries for painting on those dates.
Corrected During Audit:	No

Finding Number:	AIR-002	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Incomplete Usage Logs for Emergency Generators**
Finding Details:	40 CFR Part 60.4211 requires documentation of emergency generator use to demonstrate that the generators are not used for more than 100 hours per year for maintenance and testing. Emergency generators may be run for unlimited hours in an emergency situation. The documentation must include the hours of operation, engine start and stop times, and the reason for the operation (i.e., maintenance and testing versus emergency use and the nature of the emergency). Emergency generators at Bldg 24 and 31 had run logs that identified hours of operation and the reason for operation. However, other emergency generators at the Center did not have equipment-specific run log books to identify hours of operation when the engines were run for maintenance and testing versus emergency use. Additionally, the emergency generator at Bldg 29 (Spacecraft Systems Development) was run on 6/1/16 presumably for maintenance and testing; however, the usage start time was recorded as 10.9 hours (total run time on the generator) and the stop time was recorded as 10.42 hours.
Facility Number:	Center-wide
Facility Name:	Spacecraft Systems Development
Regulatory Citation:	40 CFR 60.4211(f)
Other Criteria:	NA
Question Number:	AE.21.17.US
Source:	Federal Team Guide
Root Cause Explanation:	Staff from various departments (High Voltage Shop, mechanical repair) ran the emergency generators (except generators in Bldgs 24 and 31) for testing and maintenance; however, there was not a single run log for each engine that identified when the engines were run and the reason for operation (emergency use versus maintenance and testing).
Violation Type:	Incomplete Records
Finding ID:	Emissions Limits or Operational Requirements Not Met
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Develop a run log for each emergency engine and ensure the usage run times are correctly and accurately recorded including the date, hours of operation from the hour meter, and reason for operation (emergency use versus maintenance and testing).
Corrected During Audit:	No

Finding Number:	AIR-003	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Missing Required Warning Labels on Equipment Containing Refrigerants**
Finding Details:	40 CFR 82.106 requires containers of Class I or Class II ozone-depleting substance (ODS) be marked with a specific warning label that states: "WARNING: Contains [or Manufactured with, if applicable] [insert name of substance], a substance which harms public health and environment by destroying ozone in the upper atmosphere." 40 CFR 82.102 indicates the labeling requirements apply to all containers in which a Class I or Class II ODS is stored or transported. The R-22 recovery receivers, new R22 1,000 pound cylinder at the Central Heat Plants and new/recovery cylinders at Plant Operations (facilities) did not have the required warning labels.
Facility Number:	Bldgs 24, 31, and 4
Facility Name:	Central Heat Plants and Plant Operations
Regulatory Citation:	40 CFR 82.106(a)
Other Criteria:	40 CFR 82.102(a)(1)
Question Number:	AE.85.7.US
Source:	Federal Team Guide
Root Cause Explanation:	Facilities staff were not aware of the requirement to label containers used to store Class I and II ODS.
Violation Type:	Labels
Finding ID:	ODS Management Deficiency
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Ensure that all ODS recovery receivers/cylinders and all cylinders of new Class I and II ODS have the required warning label. Ensure that shop personnel are aware of the requirement to label the recovery receivers and cylinders.
Corrected During Audit:	No

3.3 Technical Observations

There were no recommendations or positive observations identified for the air emission program.

4.0 Cultural Resources Management

This section presents the EEFR results for the cultural resources management program at GB. It describes the overall cultural resources program and presents findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

4.1 Operational Description

GB contains both historic structures and archaeological sites that are listed on or have been determined to be eligible for the National Register of Historic Places (NRHP). The Spacecraft Magnetic Testing Facility, Building 305, located in Area 300, is used for testing and research on the magnetic field effects on spacecraft and individual equipment components. This facility was listed in the NRHP in 1984. It has also been designated as a National Historic Landmark (NHL) as part of a "Man In Space" thematic study undertaken by the National Park Service and applied to military and NASA facilities. In 1989, a Programmatic Agreement was signed between NASA, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation regarding management of NASA's NHLs. GB prepared a Historic Preservation Plan for the Spacecraft Magnetic Testing Facility in 1996 that stipulates requirements for changing, altering, or demolishing the facility or its historically significant components.

GB completed an assessment of buildings and structures in 2012 to guide the planning and management of historic resources. In that study, an historic district encompassing most of the main campus as well as the 300 Area was determined to be eligible for the NRHP, and this conclusion was concurred with by the Maryland Historic Trust. In 1999, a Phase 1 Archaeological Reconnaissance Survey was conducted that evaluated the main campus and Areas 300 and 400. Within the 1,122-acre study area, 532 acres were determined to be disturbed by previous activities and did not need field survey. Within the 590 acres of undisturbed land, 11 acres were classified as archaeologically high sensitive and were completely surveyed. A 10 percent sample of the remaining 579 acres was surveyed to confirm the validity of the archaeological sensitivity model. The 1999 survey identified two prehistoric and two historic archaeological sites on GB property. Three of the sites were considered potentially eligible for the NRHP. Subsequent Phase II Archaeological Investigations at these sites were conducted in 2002 and it was determined that only site 18PR548 was eligible for the NRHP. It was avoided by the Soil Conservation Service Road Relocation project and is being preserved in place.

In 2013, an Integrated Cultural Resources Management Plan was completed to guide future efforts at manage significant historic properties and comply with the National Historic Preservation Act and NASA policy, and this plan was updated in January 2017.

The table below summarizes the environmental elements for the cultural resources management program:

Element	GB
Archaeological Sites	4
Historic Structures	92
Properties Eligible for or Listed on National Register of Historic Places	92
National Historic Landmarks	1

4.2 Technical Findings

One regulatory and one policy finding were identified for the cultural resources management program.

Finding Number:	CRM-001	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Annual Reporting Not Completed for National Historic Landmark**
Finding Details:	36 CFR 800 established consultation procedures to ensure that Federal agencies comply with Sections 106 and 110 of the National Historic Preservation Act. As provided for by 36 CFR 800.14, NASA signed a nationwide Programmatic Agreement (PA) in 1989 to guide the Treatment of National Historic Landmarks (NHLs). The PA required NASA to prepare an annual report on any construction, modification, or demolition activities affecting NHLs, even if no such activities have occurred. Goddard had one NHL at the Center (the Magnetic Test Faculty). NASA did not file annual reports for the Magnetic Test Facility.
Facility Number:	Bldg 305
Facility Name:	Magnetic Test Facility
Regulatory Citation:	36 CFR 800.14(b)
Other Criteria:	Programmatic Agreement on National Historic Landmarks
Question Number:	CR.5.4.US
Source:	Federal Team Guide
Root Cause Explanation:	The PA did not provide clear direction concerning reporting responsibilities.
Violation Type:	Reports
Finding ID:	Deficiency in Historic Properties Management
ASTM Description:	4 Managing environmental records.
Suggested Solution:	The Goddard Historic Preservation Officer should coordinate with the NASA Federal Preservation Officer at Headquarters to have annual NHL status reports prepared and filed.
Corrected During Audit:	No

Finding Number:	CRM-002	**Finding Date:**	03-May-17
Finding Rating:	Policy	**Finding History:**	Carryover
Old Tracking Number:	GSCEXT1409	**Previous Finding Number:**	CRM-002

Finding Title: **Integrated Cultural Resources Management Plan Requires Corrections**

Finding Details: NPR 8510.10 requires that Center Historic Preservation Officers (HPOs) develop and implement an Integrated Cultural Resources Management Plan (ICRMP) to identify, manage, and maintain cultural resources in compliance with the requirements of the National Historic Preservation Act.

GB prepared an ICRMP in 2013 and issued an updated version in 2017 ICRMP. The following issues were identified during review of the 2017 version.

The title page had a new date (January 2017) but still retained the names and signature of authors from the consultant who had prepared the 2013 ICRMP. The 2017 update was prepared by NASA staff, but there was no explanation of changes that had been made, and no indication that the original authors had had the opportunity to review the changes.

Throughout Chapters 1 through 6, the page footers contained the date of "August 2013".

Section 3.2.1 mentioned that GSFC managed off-site properties such as Wallops Flight Facility (WFF) in Virginia and that additional data on WFF cultural resources was presented in Appendices D & G. The information provided concerning WFF was incomplete and did not match the information provided in the 2015 WFF ICRMP, which is a separate document.

In the last sentence of the last paragraph of Section 4.3.2.1, it was stated that "The MHT did not recommend sites 18PR548, 18PR550, and 18PR551 eligible for inclusion in the NRHP". As was described in an earlier sentence, site 18PR548 was in fact recommended as eligible for the NRHP.
Chapter 5 was titled "Paleontological Resources" and consisted of two paragraphs. Paleontological Resources are not cultural resources and should not be included in the ICRMP. Standard Operating Procedure (SOP) 7 (Inadvertent Discoveries of Paleontological Deposits) was removed from Chapter 6, but it was still mentioned on page 6-29.

The six SOPs provided in Chapter 6 all listed someone as the contact person who retired almost two years ago.

Facility Number: Center-wide

Facility Name: NA

Regulatory Citation: NA

Other Criteria: NPR 8510.10 (Section 1.3.2)

Question Number: CR.5.1.US

Source: Federal Team Guide

Root Cause Explanation: Key support staff for the Center HPO retired and they had not been replaced. An intern addressed some of the problems with the 2013 ICRMP with support from environmental staff but a comprehensive update was not completed.

Violation Type:	Inadequate/Missing Plan
Finding ID:	Deficiency in Surveys/Plans/Records
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Complete the corrections and clarifications identified and reformat the ICRMP to provide a clean document.
Corrected During Audit:	No

4.3 Technical Observations

There were no recommendations or positive observations identified for the cultural resources management program.

5.0 Hazardous Materials Management - EPCRA

This section presents the EEFR results for the hazardous materials management program at GB. It describes the overall hazardous materials program and presents findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

5.1 Operational Description

The Hazardous Materials Management System (HMMS) is used to generate the EPCRA Tier II report. Twelve chemicals were reported in the 2016 Tier II report including the following Extremely Hazardous Substances: hydrofluoric acid, nitric acid, sulfuric acid, and sodium cyanide.

Data is evaluated from the HMMS database, the Air Management database, and Facilities Management Division records from chiller plant logs and heating ventilation and air conditioning repair shop logs to calculate the thresholds and releases for the EPCRA 313 Toxic Release Inventory Form R reports. The Center was not subject to Form R reporting for CY 2015.

The table below summarizes the environmental elements for the hazardous materials management program:

Element	GB
Report under Tier II (number of chemicals reported)	12
EHS reported on Tier II report (list chemicals reported)	Hydrofluoric acid, Nitric acid, Sulfuric acid, sodium cyanide
Report under Form R (list chemicals reported)	No
State specific requirements	None

5.2 Technical Findings

One regulatory finding was identified for the hazardous materials management program.

Finding Number:	HMM-001	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Incomplete and Inaccurate Emergency Planning Community Right-to-Know Tier II Inventory**
Finding Details:	40 CFR Part 370 requires facilities to complete and submit an annual inventory of hazardous materials above specific threshold levels to the State Emergency Response Commission, Local Emergency Planning Committee and local fire department. This is known as the EPCRA Tier II inventory report. The threshold levels for reporting are 500 pounds for extremely hazardous substances (EHS) or the Threshold Planning Quantity as listed in 40 CFR 355, Appendices A and B, or 10,000 pounds for non-EHS materials. The Tier II inventory report had numerous items missing or inaccurately reported including: -Refrigerants such as R22 and R134A were not included in the inventory -Lubricating oils, hydraulic oils, and transformer oils were not included in the inventory -Diesel fuel (#2 fuel oil) was significantly underreported Additionally, the physical and health hazards for some materials reported in the Tier II report were not accurate. Specifically, sulfuric acid, hydrofluoric acid, and nitric acid were not identified as a reactivity hazard as per OSHA chemical compatibility requirements.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 370.10(a)(2)(i)
Other Criteria:	40 CFR 370.12(a) and 370.13
Question Number:	HM.30.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Staff believed that materials (refrigerants and oils) in equipment did not need to be reported in the Tier II report. Center staff were relying upon information on Safety Data Sheets to determine the physical and health hazards associated with reported materials; this information is not always accurate.
Violation Type:	Inventory/Survey is Incomplete
Finding ID:	Improper/Lacking Reporting (EPCRA/Release)
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Ensure all materials on Center above the reporting threshold are included in the Tier II inventory report. Ensure the quantity reported is accurate. Confirm and verify the chemical and physical hazards associated with each reported chemical.
Corrected During Audit:	No

5.3 Technical Observations

There were no recommendations or positive observations identified for the hazardous materials management program.

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6.0 Hazardous Waste Management

This section presents the EEFR results for the hazardous waste management program at GB. It describes the overall hazardous waste program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

6.1 Operational Description

GB is a large quantity generator of hazardous waste operating under identification number MD9800013865 and maintains identification numbers for two conditionally exempt small quantity generator (CESQG) non-contiguous locations, Area 200 (MDR000001925) and Area 300/400 (MDR000001933) (Note that in Maryland, there is no CESQG status. These two locations are considered small quantity generators under Maryland regulations). GB operates one 90-day accumulation area, located in Building 27A, and holds no hazardous waste permits. The MDE has primacy for hazardous waste enforcement. EPA Region III also inspects GB.

Hazardous waste, used oil and universal waste accumulate at approximately 150 satellite accumulation points at GB. The largest hazardous waste streams at the facility are solvent-contaminated wipes, solvents and chemicals from laboratory research operations, and corrosive wastes from metal plating and laboratory operations. Waste-generating activities include laboratory operations, plating operations, vehicle maintenance, and facility maintenance. GB manages spent lamps (including fluorescent, sodium vapor, mercury vapor, and metal halide), discarded PCB light ballasts (a Maryland universal waste), and batteries as universal waste. Lead-acid batteries at the Motor Pool are managed per the spent lead-acid batteries being reclaimed provisions. GB manages scrap metal (including aluminum, copper, brass, stainless steel, and lead tire weights) for recycling through an off-site contractor.

Environmental contractor personnel manage the 90-day site and waste pickup at GB. Each individual waste generator completes the hazardous waste disposal inventory form via the electronic management operations directorate system to request pickup of the waste. Environmental contractor personnel pick up the waste and provide an empty, labeled container to replace the full container of waste that is picked up. EQ Northeast, Inc. (a U.S. Ecology Inc. company) is the primary waste vendor/transporter for the Center. The commercial waste transporter is responsible for waste pick-up at the off-site locations (including Areas 200, 300 and 400).

The table below summarizes the environmental elements for the hazardous waste management program:

Element	GB
Generator Status	GB = LQG Area 200 = CESQG Area 300/400 = CESQG
ID Number	GB = MD9800013865 Area 200 = MDR000001925 Area 300/400 = MDR000001933
Hazardous Waste Transporter	No
Permit Number	NA
Permit for treatment, storage or disposal	No
Hazardous Waste Tanks	No
Number of 90 day sites	1 at GB Building 27A
Number of satellite sites	GB = 150 Area 200 = 2 Area 300/400 = 3
Aerosol Can Puncturing	Yes
Elementary Neutralization	Yes
Lamp Crushing	No
UW Status	GB = LQ Handler Area 200 = SQ Handler Area 300/400 = SQ Handler
Acute Hazardous Waste	Yes
Military Munitions	No
Pharmaceutical Waste	No

6.2 Technical Findings

Eleven regulatory findings and two policy findings were identified for the hazardous waste management program.

Finding Number:	HWM-001	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Open Satellite Accumulation Point Containers**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.05 referencing COMAR 26.13.05.09 allows generators of hazardous waste to accumulate hazardous waste at or near the point of generation in satellite accumulation point (SAP) containers that are kept closed. The following hazardous waste containers at SAPs were not maintained closed: A container used to collect waste aerosols was not equipped with a latched lid at the Machine Shop in Bldg 5. In addition, non-waste (several pages of labels) were commingled with the waste aerosols within the container. In addition, this drum was not on the designated SAP inventory list. A container used to collect waste aerosols was open with the lid placed under the container at the Metallography Laboratory in Room 177 of Bldg 30
Facility Number:	Bldgs 5 and 30
Facility Name:	Machine Shop and Metallography Laboratory
Regulatory Citation:	COMAR 26.13.03.05(E)(3)(a) referencing 26.13.05.09(D)
Other Criteria:	NA
Question Number:	HW.75.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel accessed the drums frequently during the day and believed that because the drums contained waste aerosols, it was not necessary to close the drums even though waste aerosols were not being actively added to the drums.
Violation Type:	Operational Practices
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Remind personnel to keep the drums closed and latched when not adding waste to the drums. In addition, ensure that only designated hazardous wastes are placed within SAP containers, and that the SAP container at the Machine Shop in Bldg 4 is added to the designated SAP inventory list.
Corrected During Audit:	No

Finding Number:	HWM-002	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Hazardous Waste Moved Between Satellite Accumulation Points**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.05 allows generators to accumulate hazardous waste at or near the point of generation. EPA has clarified that once a satellite accumulation container is full, it must be moved to a 90-day or 180-day accumulation area. It may not be moved to another satellite accumulation point (SAP). At the Polymer Processing Lab in Room 140 of Bldg 30, a red step can was used to accumulate solvent-contaminated waste rags generated in the lab. When full, personnel indicated the red step can would be emptied into a grey plastic satellite accumulation container located within a cabinet within the room. Because the red step can accumulated waste over several days, it should have been considered a SAP. It was not appropriate to empty the red step can into another SAP.
Facility Number:	Bldg 30
Facility Name:	Polymer Processing Lab
Regulatory Citation:	COMAR 26.13.03.05(E)(3)
Other Criteria:	EPA Memorandum February 1999 (RCRA Online #14337)
Question Number:	HW.75.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel did not realize that allowing the hazardous waste to accumulate in the red step can for several days at a time meant the red step can was considered a SAP.
Violation Type:	Operational Practices
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	The red step can was removed from the room and the laboratory personnel agreed to only use the grey designated SAP container to accumulate waste solvent rags generated in the Polymer Processing Lab.
Corrected During Audit:	Yes

Finding Number:	HWM-003	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Satellite Accumulation Point Containers Labeled with Conflicting Information**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.05 allows generators of hazardous waste to accumulate that waste at or near the point of generation. Containers must be labeled with the words "hazardous waste" or a description of the contents. A container of Freon 113 waste (1,1,2-Trichloro-1,2,2-trifluoroethane) was labeled as both non-hazardous waste and Freon 113 waste at the Metallography Lab in Bldg 30. Because Freon 113 waste was an F002-listed RCRA hazardous waste, the non-hazardous waste label inaccurately described this waste stream. A container of Nitric Acid waste was labeled as both "Nonchlorinated Solvents" (typed label), and "Nitric Acid" (hand-written label). According to laboratory personnel, this waste consisted solely of Nitric Acid.
Facility Number:	Bldgs 30 and 33
Facility Name:	Metallography Lab and Atmospheric Research Lab
Regulatory Citation:	COMAR 26.13.03.05(E)(3)(b)
Other Criteria:	NA
Question Number:	HW.75.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel at the Atmospheric Research Lab had requested a container to collect Nitric Acid waste. However, the container was delivered to the wrong room. Therefore, a waste solvent container was instead used to collect the Nitric Acid waste. Personnel at the Metallography Lab were unaware that the Freon 113 waste was a listed F002 RCRA hazardous waste. Therefore, a nonhazardous waste label was applied to the waste container.
Violation Type:	Labels
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Proper labels were provided for these waste containers and these waste streams were properly characterized with new profile forms generated and placed at the SAP sites.
Corrected During Audit:	Yes

Finding Number:	HWM-004	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title: **Uncharacterized Waste**

Finding Details: Code of Maryland Regulations (COMAR) 26.13.03.02 requires that generators of solid waste determine if their wastes are hazardous wastes by analytical testing, generator knowledge, or other means.

An open, unlabeled metal garbage can filled with wood shavings and metal debris and an unlabeled plastic bag filled with an unknown solid waste were observed in the Bldg 5 East Waste Storage area. These wastes had not been characterized to determine if they were hazardous wastes.

An unlabeled plastic bag filled with waste was observed at the Area 200 180-day hazardous waste storage area.

Several bottles labeled "Samples 1-4" and plastic bags labeled "Test Materials" were located in the satellite accumulation point (SAP) at Bldg 407 in Area 400.

Facility Number: Bldg 5 and Areas 200/400

Facility Name: Bldg 5 East Waste Storage Area and Areas 200 and 400

Regulatory Citation: COMAR 26.13.03.02(A)

Other Criteria: NA

Question Number: HW.10.1.US

Source: Federal Team Guide

Root Cause Explanation: According to Bldg 5 personnel, the wood shavings were from a previous project and the metal shavings were from milling operations at Bldg 5. It was unknown why these waste streams were combined and placed in the open metal trash can. According to Bldg 5 personnel, the black trash bag contained oily wipes and was not placed in an appropriately labeled and closed container because such a container was not present at the storage area at the time the bag of wipes was taken to this area for storage.

The wastes at Area 200 were reportedly leftover chemicals from experimental operations that had been discontinued at Area 200. While personnel realized that they needed to be characterized, they neglected to label or otherwise identify the contents of the bag or indicate that a characterization had been requested.

According to personnel, the containers at the Area 400 SAP were left over from previous experiments at the facility and had not been characterized and disposed of by the previous manager at the facility.

Violation Type: Uncharacterized

Finding ID: Waste Analysis Characterization Planning Deficiency

ASTM Description: 3 Operating conditions and best management practices.

Suggested Solution: The commingled waste was placed in a poly drum and the bag of oily wipes

was placed in an appropriately labeled oily wipes container. This commingled waste stream should be properly characterized for RCRA hazardous waste characteristics (i.e., RCRA metals) and managed and disposed/recycled in accordance with the results of the waste characterization.

A ticket had been submitted requesting characterization of the wastes within the bag at Area 200. However, the bag should be placed in a container and labeled as to contents and/or "hazardous waste pending analysis."

The plastic bottles and bags at the Area 400 SAP should be properly characterized by analytical testing. In the interim, the containers should be placed in a container and labeled "Hazardous Waste Pending Analyses," and include an accumulation start date, so that if the waste is determined to be hazardous, it is not kept onsite longer than 90 days.

Corrected During Audit: No

Finding Number:	HWM-005	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Missing Weekly Inspections at 90-Day Hazardous Waste Storage Area**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03 requires that large quantity generators of hazardous waste conduct weekly inspections of 90-day hazardous waste accumulation areas and document these inspections. Weekly inspections had not been conducted at the 90-day hazardous waste storage area between April 3 and 17, 2015, between March 9 and 20 2015, or between January 30 and February 13, 2015.
Facility Number:	Bldg 27A
Facility Name:	90-Day Hazardous Waste Storage Area
Regulatory Citation:	COMAR 26.13.03.05(E)(1)(d) referencing 26.13.05.09(E)
Other Criteria:	NA
Question Number:	HW.80.3.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel responsible for conducting weekly hazardous waste container inspections neglected to conduct the inspections during three periods in 2015. It was unclear why those inspections were missed.
Violation Type:	Incomplete Records
Finding ID:	90-day (180-Day for Small Quantity Generators) Accumulation Point
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Ensure that either the primary or alternate inspector is available and trained on the necessity of conducting inspections at the 90-day storage area at least every seven days.
Corrected During Audit:	No

Finding Number:	HWM-006	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Inconsistent Hazardous Waste Container Labeling**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.05 require that hazardous waste containers at 90-day hazardous waste storage areas be marked with the words "Hazardous Waste" and an accumulation start date, and accumulated on site for no more than 90 days. A container of Blue Dye Waste at the 90-day storage area contained both a "Hazardous Waste" and a "Non-hazardous Waste" label. A lab pack at the 90-day storage area contained two "Hazardous Waste" labels, one with an accumulation start date of July 2016 (indicating greater than 90 days of storage), and one with an accumulation start date of March 2017. The labeling created confusion concerning what wastes were in the container (Blue Dye Waste) and how long the wastes had been accumulating in the container (Lab Pack Waste).
Facility Number:	Bldg 27A
Facility Name:	90-Day Hazardous Waste Storage Area
Regulatory Citation:	COMAR 26.13.03.05(E)(1)(a), (E)(1)(e), and (E)(1)(f)(ii)
Other Criteria:	NA
Question Number:	HW.55.1.US
Source:	Federal Team Guide
Root Cause Explanation:	The old labels from the containers had not been removed prior to the time new wastes were placed in the containers. Therefore, two labels with conflicting information were on these two hazardous waste containers.
Violation Type:	Labels
Finding ID:	90-day (180-Day for Small Quantity Generators) Accumulation Point
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Ensure that once a container is emptied of wastes/contents, all previous labels and markings are removed.
Corrected During Audit:	Yes

Finding Number:	HWM-007	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Improper Universal Waste Battery Management**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.10.17 requires generators of universal waste batteries to label the batteries as "universal waste - batteries," "waste batteries," or "used batteries." In addition, universal waste may not be accumulated for more than one year from the date the universal waste is generated. The generator must be able to demonstrate the time that the universal waste has been accumulating by marking the container with the earliest date the waste was placed in the container, maintaining an inventory system, or other method. Universal waste batteries, including lead-acid batteries, lithium batteries, and nickel metal halide batteries were placed in a flammables cabinet at the 180-day storage area at Area 200. Neither the batteries nor the flammables cabinet housing the batteries were labeled as required, and a date or other inventory tracking system was not in place to demonstrate the length of time that the batteries had accumulated onsite.
Facility Number:	Area 200
Facility Name:	180-day Storage Area
Regulatory Citation:	COMAR 26.13.10.17(A)(2)(a) and 26.13.10.17(B)(1)
Other Criteria:	NA
Question Number:	HW.280.2.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel at Area 200 responsible for managing universal waste batteries had been trained, but did not appear to be aware of the labeling and accumulation time requirements for universal wastes.
Violation Type:	Labels
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Ensure that the required label is placed either on each battery or the container used to store the universal waste batteries and that an accumulation start date is placed on the container at the time the first battery is placed in the container.
Corrected During Audit:	Yes

Finding Number:	HWM-008	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Improper Waste Aerosol Management at Recycling Center**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.05 allows generators of hazardous waste to accumulate that waste at or near the point of generation. Containers must be labeled with the words "hazardous waste" or a description of the contents and be maintained closed except when adding or removing wastes. At the Recycling Center, a waste aerosol can (Raid insect propellant) was collected together with other waste materials, including power steering fluid and spill cleanup materials in an open, unlabeled container.
Facility Number:	Bldg 25
Facility Name:	Recycling Center
Regulatory Citation:	COMAR 26.13.03.05(E)(3)(a) referencing 26.13.05.09(D) and 26.13.03.05(E)(3)(b)
Other Criteria:	NA
Question Number:	HW.75.1.US
Source:	Federal Team Guide
Root Cause Explanation:	The container had likely been left by an unauthorized individual. Because the Recycling Center is not regularly manned, the container had not been previously identified and appropriately managed.
Violation Type:	Labels
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Ensure that either a satellite accumulation point is established for waste aerosol can management at the Recycling Center, including the placement of a properly labeled and closed container for the collection of waste aerosol cans and implementation of monthly inspections to ensure compliance and/or that daily inspections are conducted at the Recycling Center and any unauthorized materials or wastes are immediately moved and managed in accordance with applicable regulations.
Corrected During Audit:	No

Finding Number:	HWM-009	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Satellite Accumulation Point Not at or Near the Point of Generation**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.05 allows generators to accumulate up to 55-gallons of hazardous waste at or near the point of generation. A satellite accumulation point (SAP) was established outside Bldg 27 to accumulate waste aerosol cans. The accumulation point was located outside the building, and out of line of site or control of the Motor Pool Vehicle Maintenance Shop personnel where the waste aerosol cans were generated. The accumulation point would not be considered at or near the point of generation or under the control of the operator.
Facility Number:	Bldg 27
Facility Name:	Motor Pool
Regulatory Citation:	COMAR 26.13.03.05(E)(3)
Other Criteria:	NA
Question Number:	HW.75.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel did not think there was room for the drum to be inside the building; however, upon further discussion, it was determined that the container could be placed within the building.
Violation Type:	Operational Practices
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Establish a SAP inside the building, within the line of sight of the generators of the waste.
Corrected During Audit:	No

Finding Number:	HWM-010	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Discarded Chemicals Not Properly Characterized or Managed at Closed Auto Tech Center**
Finding Details:	Code of Maryland Regulations (COMAR) 26.13.03.02 requires that generators of solid waste determine if their wastes are hazardous wastes by analytical testing, generator knowledge, or other means. In addition, large quantity generators of hazardous wastes must accumulate their hazardous waste in containers and be marked with the words "Hazardous Waste" and an accumulation start date, and accumulated on site for no more than 90 days. At the Auto Tech Center, which was shut down and vacated in March 2017, several leftover chemical containers, including aerosols, brake fluid, paints, oils, and waste lead tire weights were observed throughout the facility. These chemicals, which meet the definition of solid wastes because they have been discarded, had not been evaluated for hazardous waste characteristics, and were not being managed in accordance with hazardous waste container management requirements for large quantity generators of hazardous wastes (i.e., no hazardous waste label, no accumulation start date). Because activities generating hazardous wastes were no longer occurring at the Auto Tech Center, this waste accumulation area did not meet the definition of a satellite accumulation point.
Facility Number:	Bldg 95
Facility Name:	Auto Tech Center
Regulatory Citation:	COMAR 26.13.03.02
Other Criteria:	NA
Question Number:	HW.10.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Although the Auto Tech Center had been shut down, and some cleanup and disposal had occurred, many chemicals had been left onsite. It was unclear why these chemicals had not been properly characterized and disposed of at the time the facility was shut down.
Violation Type:	Uncharacterized
Finding ID:	Waste Analysis Characterization Planning Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Ensure that a thorough inventory is conducted at the Auto Tech Center and that any solid wastes that have the potential to be hazardous wastes be properly characterized by generator knowledge (Safety Data Sheet chemical composition) or analytical analyses and managed and disposed in accordance with applicable hazardous waste regulations for large quantity generators.
Corrected During Audit:	No

Finding Number:	HWM-011	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title: **Discarded Mercury-containing Thermostats and Thermometers Not Managed as RCRA Wastes**

Finding Details: Code of Maryland Regulations (COMAR) 26.13.10.17 allows generators of discarded mercury-containing thermostats to manage those devices as universal waste.

Discarded mercury-containing thermostats and thermometers had been accumulated in a drum labeled "Mercury for Recycling" at the 90-day hazardous waste storage area since November 2013 under the guidance from an EPA regulator that these wastes were subject to the Mercury Export Ban Act of 2008 which prohibits the sale, distribution, or transfer of elemental mercury by federal agencies.

Based on EPA's Questions and Answers (Q&A's) on the Mercury Export Ban Act available at https://www.epa.gov/mercury/questions-and-answers-mercury-export-ban-act-meba-2008, EPA generally does not believe that elemental mercury contained in products (consumer and nonconsumer), including discarded products, fall within the scope of the export and federal agency transfer ban (Q& A 9). In addition, since EPA believes that the ban does not apply to discarded products, the ban does not effect a federal agency's requirements to comply with RCRA waste management requirements. For example, once the discarded product is sent to a recycler, the mercury is no longer under the control or jurisdiction of the federal agency, and thus the federal agency transfer ban does not apply (Q&A 10).

Based on this EPA guidance, discarded mercury-containing thermostats and thermometers at GB should be managed either as universal waste mercury-containing equipment in accordance with COMAR 26.13.10.06-26.13.10.21 or as RCRA hazardous wastes in accordance with COMAR 26.13.01-26.13.03.

Facility Number: Bldg 27A

Facility Name: 90-Day Hazardous Waste Storage Area

Regulatory Citation: COMAR 26.13.10.21(A) and 26.13.10.17(A)(1)(d)

Other Criteria: COMAR 26.13.02.07-1, 26.13.10.20.20-21

Question Number: HW.400.2.MD

Source: State Team Guide

Root Cause Explanation: Center personnel had received guidance from an EPA inspector in 2013 indicating that discarded mercury-containing equipment was subject to the Mercury Export Ban Act and that these items should be stored onsite until a federal storage facility is constructed by DOE.

Violation Type: Operational Practices

Finding ID: 90-day (180-Day for Small Quantity Generators) Accumulation Point

ASTM Description: 3 Operating conditions and best management practices.

Suggested Solution: In accordance with universal waste requirements, ensure that the container is

labeled "Used Mercury-Containing Equipment," "Universal Waste Mercury-Containing Equipment," or "Waste Mercury-Containing Equipment," marked with an accumulation start date, and shipped offsite for recycling in accordance with universal waste requirements.

Corrected During Audit: No

Finding Number:	HWM-012	**Finding Date:**	01-May-17
Finding Rating:	Policy	**Finding History:**	Repeat
Old Tracking Number:	GSCEXT1409	**Previous Finding Number:**	HWM-014

Finding Title: **Monthly Satellite Inspections Not Completed**

Finding Details: Goddard Procedural Requirement (GPR 8500.3F) requires that satellite accumulation points be inspected on a monthly basis and that this inspection be documented.

Inspections on the satellite accumulation points had not been conducted in several locations including:

Room 219, Bldg 33 (Atmospheric Research Lab): inspections had not been completed in March and April 2017;

Room 195C, Bldg 4 (Sprayed Coatings Facility): inspections had not been completed prior to 2016;

Rooms 70, 70A, and 70B, Bldg 5 (Optics Labs): inspections had not been completed in 2017;

Room 190, Bldg 7 (Integration and Test Lab): inspections missing for March, May, August, and September of 2016 and all of 2015; and

Room 2, Building 10: inspections missing for June 2015 and July 2016-April 2017.

Facility Number: Center-wide

Facility Name: NA

Regulatory Citation: NA

Other Criteria: GPR 8500.3F, Section 2.4.3.7

Question Number: HW.75.1.US

Source: Federal Team Guide

Root Cause Explanation: Inspections had not been performed monthly either because the person performing the inspections was on medical leave, assigned to another project, and/or simply neglected to complete and document the inspection.

Violation Type: Incomplete Records

Finding ID: Satellite Accumulation Point Deficiency

ASTM Description: 3 Operating conditions and best management practices.

Suggested Solution: Remind personnel of the importance of completing the monthly satellite accumulation point inspections. Ensure the responsible individual(s) document(s) monthly inspections.

Corrected During Audit: No

Finding Number:	HWM-013	**Finding Date:**	02-May-17
Finding Rating:	Policy	**Finding History:**	New

Finding Title:	**Improperly Maintained Satellite Accumulation Point Containers**
Finding Details:	Goddard Procedural Requirement (GPR 8500.3F) requires that satellite accumulation point containers be in good condition with no leaks or materials on the outside. In addition, all containers with liquid materials shall have secondary containment with a capacity at least equal to its largest container in the event of a leak. At the Sprayed Coatings Facility in Bldg 4, Room 195C, a container used to collect waste chlorinated solvents mixed with paint residue contained significant paint residue on the outside of the container indicating evidence of past spills as well as significant amounts of paint and other waste debris inside the containment. At the Mech Chem Cleaning Lab in Bldg 33, Room 105, three 5-gallon containers of waste solvents were placed within approximately 0.5-gallon plastic secondary containment plates.
Facility Number:	Bldgs 4 and 33
Facility Name:	Sprayed Coatings Facility and Mech Chem Cleaning Lab and
Regulatory Citation:	NA
Other Criteria:	GPR 8500.3F, Sections 2.4.3.2 and 2.4.3.4
Question Number:	HW.75.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel were not aware of the NASA Policy requirements to provide adequate secondary containment to contain the contents of the largest container and to maintain containers free of residue from leaks or materials on the outside.
Violation Type:	Operational Practices
Finding ID:	Satellite Accumulation Point Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Provide adequate secondary containment (at least 5-gallons capacity) for the containers at the Mech Chem Cleaning Lab and provide a new container and secondary containment for the waste chlorinated solvents mixed with paint residue container at the Sprayed Coatings Facility and ensure that leaks are minimized and that the container and secondary containment are maintained clean and free of waste residue.
Corrected During Audit:	No

6.3 Technical Observations

One positive observation was identified for the hazardous waste management program.

Finding Number:	HWM-014	**Finding Date:**	04-May-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Excellent Management of Hazardous Waste Programmatic Records**
Finding Details:	Personnel at the 90-Day hazardous waste accumulation facility did an excellent job of successfully completing and maintaining required hazardous waste generator records including manifests, land disposal restriction notices, waste characterization records, and biennial reports.
Facility Number:	Bldg 27A
Facility Name:	90-Day Hazardous Waste Accumulation Facility
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

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7.0 Other Environmental Issues - NEPA

This section presents the EEFR results for the NEPA program at GB. It describes the NEPA program area and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

7.1 Operational Description

The Environmental Management Division is principally responsible for NEPA compliance at GB. There are two general categories of projects that can potentially be subject to NEPA review. These include construction and research projects associated with both Flight and Facilities activities. The NEPA coordinator completes an Environmental Checklist early in the planning phase for flight and facilities projects to determine the appropriate level of NEPA documentation.

GB developed an Environmental Assessment (EA) for the GB Facilities Master Plan, including Soil Conservation Road Realignment in 2002, for guiding and coordinating physical development at the GB in terms of buildings, utilities, roads, landscaping, and amenities over a 20-year timeframe. As projects are implemented, they are reviewed against the Master Plan EA to determine if any additional environmental assessment activities are needed. Construction for the Instrument Development Facility was the subject of an individual EA in 2016, and in 2011, the EA for Launch of NASA Routine Payloads was updated.

The table below summarizes the environmental elements for the NEPA program:

Element	GB
EIS (number of active or completed in the last three years)	0
EA (number of active or competed in the last three years)	2

7.2 Technical Findings

One policy finding was identified for the NEPA program.

Finding Number:	OTH-001	**Finding Date:**	04-May-17
Finding Rating:	Policy	**Finding History:**	New

Finding Title:	**Environmental Resource Document Needs Updating**
Finding Details:	NPR 8580.1A requires that Centers prepare an Environmental Resource Document (ERD). Chapter 1.2.8(n) of the NPR requires that the ERD be updated continually as required by changing conditions, reviewed thoroughly at 5-year intervals, and revised, if necessary, to ensure adequacy. The Goddard ERD was prepared in December 2012 and had not been updated since. Multiple sections contained inaccurate or outdated information.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NPR 8580.1A, Chapter 1.2.8(n)
Question Number:	O1.5
Source:	NA
Root Cause Explanation:	Staff had not had the time to complete the required updates.
Violation Type:	Reports
Finding ID:	NEPA Other (please indicate in the “details” field the nature of the finding)
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Revise the ERD to incorporate the most recent information available.
Corrected During Audit:	No

7.3 Technical Observations

There were no recommendations or positive observations identified for NEPA program.

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8.0 Pesticide Management

This section presents the EEFR results for the pesticide management program at GB. It describes the pesticide program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

8.1 Operational Description

Contractors conduct most of the pesticide and herbicide applications at GB. There are three organizations at GB responsible for pesticide application:

- Melwood Horticulture Training Center (Center landscape contract),
- J.C. Ehrlich (indoor building pest control), and
- Regional Pest Management for the Cafeteria.

These three contractor businesses and personnel have the appropriate business licenses and applicator certifications. Neither Regional Pest Management nor Ehrlich store any pesticides at GB. Melwood manages a pesticide storage shed, and mixes and applies the required pesticides onsite following appropriate regulations. There are no restricted-use pesticides used by any of the contractors at GB.

Straughn personnel apply pesticide to the deer population for the tick reduction program but Straughn is not a licensed pesticide business and does not have a certified applicator.

The table below summarizes the environmental elements for the pesticide management program:

Element	GB
Application of pesticides or herbicides by Center personnel	No
Application of pesticides or herbicides by contractor	Yes
Store pesticides or herbicides onsite	Yes
Mix pesticides or herbicides onsite	Yes

8.2 Technical Findings

Two regulatory findings were identified for the pesticide management program.

Finding Number:	PES-001	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Inadequate Backflow Prevention Device on Water Supply Used for Mixing Pesticide**
Finding Details:	Code of Maryland Regulations (COMAR) 15.05.01.03 requires the use of an effective anti-siphon device or backflow preventer on all hoses or lines used to fill or rinse pest control equipment, pesticide containers, or areas where pesticides are mixed, loaded, or stored to prevent backflow into water supply systems. At the maintenance shed near Bldg 83, the grounds contractor used a hose connected to the public drinking water supply system to mix herbicides into sprayers. The supply valve was equipped with a hose connection vacuum breaker type of backflow prevention device (BPP), but this type of device was inadequate because it was not testable and had limited protection levels.
Facility Number:	NA
Facility Name:	Grounds Maintenance Shed Near Bldg 83
Regulatory Citation:	COMAR 15.05.01.03(C)(1)
Other Criteria:	NA
Question Number:	PM.10.3.MD
Source:	State Team Guide
Root Cause Explanation:	Staff was not aware that the hose bib vacuum breaker type of BPP was inadequate.
Violation Type:	Inadequate Equipment/Containers
Finding ID:	Other (please indicate in the "details" field the nature of the finding)
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Replace the vacuum breaker device with a more effective unit such as a Reduced Pressure Principle device or a Double Check Valve Assembly. Ensure that the BPP is included in the annual inspection program.
Corrected During Audit:	No

Finding Number:	PES-002	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	Repeat
Old Tracking Number:	GSCEXP1409	**Previous Finding Number:**	PES-001

Finding Title: **Unlicensed Contractor Applying Pesticide in Deer Tick Treatment Program**

Finding Details: Code of Maryland Regulations (COMAR) 15.05.01 define a pesticide business as any business that is offering pest control services or is applying general or restricted use pesticides for hire as part of a service or contract agreement. Pest control means engaging in, or offering to engage in, recommending, advertising, soliciting the use of, supervising the use of, or using, a pesticide or device for the identification, control, eradication, mitigation, detection, inspection, or prevention of a pest in, on, or around any house, building, water, air, land, plant, structure, or animal. A pesticide business license from the Maryland Department of Agriculture (MDA) is required in order to provide these services. Individuals conducting applications for pesticide businesses must obtain a certificate from the MDA.

At GB, a contractor was tasked with applying pesticide to deer to reduce the population of ticks on Center. This was done by weekly refilling of permethrin applicators attached to feeding stations. The contractor did not have a pesticide business license or a certified pest control applicator.

Facility Number: Center-wide

Facility Name: NA

Regulatory Citation: COMAR 15.05.01.01 and 15.05.01.03A

Other Criteria: NA

Question Number: PM5.5.1.MD

Source: State Team Guide

Root Cause Explanation: Greenbelt believed that state licensing and certification requirements did not apply to this program. However, documentation of an exemption from these requirements was not provided.

Violation Type: Lack of a Permit

Finding ID: Applicator Certification Deficiency

ASTM Description: 2 Required permits and approvals for releases or alterations to the envir

Suggested Solution: Ensure that the contractor obtains a pesticide business license and employs a certified pest control applicator. Alternatively, NASA can obtain a public agency permit and designate an individual who is certified in those categories in which the agency is permitted to do pest control.

Corrected During Audit: No

8.3 Technical Observations

There were no recommendations or positive observations identified for pesticide management program.

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9.0 Petroleum, Oil, and Lubricant Management

This section presents the EEFR results for the petroleum, oil, and lubricant (POL) management program at GB. It describes the overall POL program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

9.1 Operational Description

GB manages lubricating oil, used oil, dielectric fluid, hydraulic fluid, waste cooking oil, No. 2 fuel oil, diesel fuel, E-85 fuel, bio-diesel fuel, and gasoline. Lubricating oil and used oil are managed at the Vehicle Maintenance Shop in Building 27, the Auto Tech Center in Building 95, and the Heating and Refrigeration Plants located at Buildings 24 and 31. Virgin lubricating oil is procured in 55-gallon drums and distributed throughout the Center. Used oil is collected in aboveground storage tanks (ASTs) at Buildings 24, 27, 31, and 95, and in 55-gallon drums at Buildings 5 and 7. A contractor pumps the used oil from these tanks into drums and transports it off site for reclamation.

GB owns and operates 66 transformers throughout the Center that contained 55 gallons or more of dielectric fluid. The transformers are considered qualified oil-filled operational equipment and an oil spill contingency plan has been prepared in lieu of providing secondary containment. Two high voltage transformers were provided with underground concrete vaults that serve as a secondary containment structures. These containment structures are fitted with oil sensors that trigger an alarm if oil is detected.

Thirty-seven elevators and mechanical lifts throughout GB have hydraulic tanks with capacities of 55 gallons or more. Most of the hydraulic equipment is located inside building mechanical rooms. Waste cooking oil is accumulated in 55-gallon drums stored on plastic containment pallets associated with the cafeteria operations in Buildings 1 and 21. An outside vendor pumps the waste animal fats, greases, and vegetable oils from these drums and hauls it off site for recycling.

The majority of the ASTs at the Center contain diesel fuel and No. 2 fuel oil for vehicle refueling, space heating, and emergency power generation. The largest quantity of diesel fuel is stored at Building 24, the Central Heating and Refrigeration Plant, in three 50,000-gallon ASTs; and at Building 31, the East Heating/Refrigeration Plant, in two 20,000-gallon ASTs. Diesel fuel at other GB buildings is stored in ASTs with capacities ranging from 100 to 5,000 gallons. GB

also has one 300-gallon mobile storage tank for delivery of diesel fuel within the Center. An outside contractor supplies fuel to all ASTs throughout the Center.

Gasoline is used for vehicle and equipment refueling, and is stored in one 5,000-gallon AST at Building 27. The site also has three additional 5,000-gallon ASTs for diesel fuel, bio-diesel fuel and E-85 fuel. GB does not have any underground storage tanks (USTs).

The total quantity of oil stored at the Center requires the preparation and implementation of a Spill Prevention, Control, and Countermeasure (SPCC) Plan under 40 CFR 112.7. SPCC provisions are included in an Integrated Contingency Plan that was last updated November 2016. The Above Ground Storage Tank Inventory in Appendix K of the ICP is frequently updated to document current oil storage conditions. The Center is not considered a Substantial Harm Facility and is, therefore, exempt from the requirements to have a Facility Response Plan.

All of the ASTs at GB are regulated by the MDE. The storage tanks are regulated under MDE Oil Operations Permit No. 2014-OPT-3356, dated January 15, 2014. The permit includes requirements to perform integrity testing on underground piping connected to the three 5 0,000-gallon ASTs and the 2,000-gallon used oil tank at Building 24 and the two 20,000-gallon ASTs at Building 31.

The table below summarizes the environmental elements for the POL management program:

Element	GB
SPCC Plan Required	Yes
Last Date of SPCC Plan	Nov-16
Facility Response Plan Required	No
Total Gallons of Oil Stored on site	228,795
Storing Diesel Fuel greater than 55 gallons	Yes
Storing Gasoline greater than 55 gallons	Yes
Storing E-85 greater than 55 gallons	Yes
Storing Jet Fuel greater than 55 gallons	No
Storing Used Oil greater than 55 gallons	Yes

Element	GB
Storing Waste Cooking Oil greater than 55 gallons	No
Storing Lubricating Oil greater than 55 gallons	Yes
Storing Hydraulic Fluid greater than 55 gallons	Yes
Transformers with coolant oil greater than 55 gallons	Yes

9.2 Technical Findings

Six regulatory findings were identified for the POL management program.

Finding Number:	POL-001	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Dispensing Pumps and Pipes Not Included in Monthly Inspections**
Finding Details:	Code of Maryland Regulations (COMAR) 26.10.01.12 requires that all nozzle connections, valves, pumps, and pipelines directly connected to aboveground storage tanks (ASTs) be visually examined at least once a month for any oil leaks. Monthly inspections of the four 5,000-gallon ASTs located at Bldg 27 did not include an inspection of the pumps and sections of pipeline inside the dispensing unit enclosures.
Facility Number:	Bldg 27
Facility Name:	Mobile Equipment Support Building
Regulatory Citation:	COMAR 26.10.01.12(B)(5)
Other Criteria:	NA
Question Number:	PO.20.3.US
Source:	Federal Team Guide
Root Cause Explanation:	The employee conducting the inspections was unaware that the pump and pipes inside the dispenser enclosures required inspection.
Violation Type:	Inadequate/Missing Plan
Finding ID:	Spill Plan Deficiency
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Revise the Integrated Contingency Plan to include inspection of pumps and piping connected to ASTs. Include the inspection of the interior of fuel dispensers at Bldg 27 on the monthly inspection checklist for Bldg 27.
Corrected During Audit:	No

Finding Number:	POL-002	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Notifications of Changes Not Made**
Finding Details:	Code of Maryland Regulations (COMAR) 26.10.01.07 requires that facilities with aboveground storage of oil in quantities of 10,000 U.S. gallons or more obtain an Oil Storage Operating Permit. Oil Storage Operating Permit No. 2014-OPT-3356 required that the Center report any anticipated changes that would result in new, different or increased oil operations to the Maryland Department of the Environment (MDE). The permit also included a list of mobile and permanent aboveground storage tanks (ASTs) at the Center. Since the issuance of the permit in January 2014, the Center had added the following ASTs and had not reported the additions to the MDE, as required. 1) 028-GEN001 with a capacity of 70 gallons 2) 000-GEN021 with a capacity of 1,000 gallons 3) 000-GEN009 with a capacity of 190 gallons
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	COMAR 26.10.01.07(A)(1)
Other Criteria:	Permit No. 2014-OPT-3356
Question Number:	PO.100.2.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel were not aware of requirement.
Violation Type:	Reports
Finding ID:	Other (please indicate in the "details" field the nature of the finding)
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Report the additional ASTs to the MDE and establish procedures for reporting anticipated changes that will result in new, different or increased oil operations to the MDE.
Corrected During Audit:	No

Finding Number:	POL-003	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Mobile Generator Monthly Inspections Not Conducted**
Finding Details:	40 CFR 112.7 requires that inspections and tests be completed in accordance with written procedures in the spill prevention, control and countermeasure (SPCC) plan with a record of the inspections and tests, signed by the appropriate supervisor or inspector, and maintained for a period of three years. The Integrated Contingency Plan (ICP), which included the SPCC Plan, required visual monthly inspections be performed and documented using the Monthly Inspection Procedures Checklist in the ICP, Appendix O. These required monthly inspections were not performed or documented for the following mobile generator fuel tanks: 1) 028-GEN001 had been inspected quarterly. 2) 000-GEN007 and 000-GEN009 had no record of inspections.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 112.7(e)
Other Criteria:	GB ICP Section 7.4.1 and Appendix O
Question Number:	PO.5.5.US
Source:	Federal Team Guide
Root Cause Explanation:	Monthly inspections of portable generators were the responsibility of the Electrical Shop which scheduled the inspections on a quarterly instead of monthly basis
Violation Type:	No Testing/Verification
Finding ID:	Spill Plan Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Schedule and complete mobile generator inspections monthly.
Corrected During Audit:	No

Finding Number:	POL-004	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	Repeat
Old Tracking Number:	GSCEXT1409	**Previous Finding Number:**	POL-002

Finding Title: **Incomplete Facility Diagrams in Integrated Contingency Plan**

Finding Details:

40 CFR 112.7 states that the spill prevention, control and countermeasure (SPCC) plan must include the physical layout of the facility and include a facility diagram, which must mark the location and contents of each container. In addition, the diagram must also include all connecting pipes.

The EPA publication "SPCC Guidance for Regional Inspectors" dated December 16, 2013, states in Section 6.4.4 that the facility diagram must include all fixed and mobile/portable containers (including oil-filled equipment) that store 55 gallons or more of oil. Section 6.4.9 of the guidance allows less detailed piping diagrams, such as block diagrams, for piping too complex to represent on a facility diagram, as long as more detailed drawings are available at the facility.

The facility diagrams provided in the Integrated Contingency Plan (ICP) did not show any piping runs inside buildings, not even simplified drawings.

The following items were missing from the ICP:

Bldg 24:
1) The supply and return piping inside Bldg 24 that connects the boilers to the underground lines from the Pump House.

Bldg 24 C:
1) The location of two 750-gallon diesel fuel day tanks, 024C-FDT003 and 024C-FDT004.
2) The piping inside the building connecting the diesel fuel day tanks to the outdoor 50,000-gallon ASTs and from the day tanks to the diesel generators.
3) The piping inside the building that connects to the outdoor 2,000-gallon used oil AST.
4) Lubricating oil tanks, 024C-LOT001 and 024C-LOT002.

Bldg 31:
1) The location of the three 750-gallon diesel fuel day tanks, 031-FDT001, 031-FDT002, and 031-FDT003.
2) The piping inside the building connecting the diesel fuel day tanks to the diesel generators and the piping inside the building connecting the day tanks to the lines entering the building from the outdoor 20,000 gallon ASTs.
3) The location of 500-gallon lubricating oil tank, 031-LOT001.
4) The location of the 2,000-gallon used oil tank, 031-WST001.

Bldg 27:
1) The piping connecting the 5,000-gallon ASTs located outside Bldg. 27 to the vehicle fuel dispensers.

Center-wide:
1) The locations of elevator hydraulic reservoirs with a capacity of 55 gallons or more.

Facility Number: Bldgs 24, 27, and 31

Facility Name:	Aboveground Storage Tanks
Regulatory Citation:	40 CFR 112.7(a)(3)
Other Criteria:	Greenbelt ICP (January 2013), Appendix C
Question Number:	PO.5.2.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel believed that they could omit piping inside of buildings from the facility diagrams as long as detailed drawings were available elsewhere upon request.
Violation Type:	Inadequate/Missing Plan
Finding ID:	Spill Plan Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Revise the existing facility diagrams to include the day tanks, emergency generator engines, and the piping routes within each building, as well as the piping to the fuel dispensers. If necessary, create separate drawings that reference only the interior area of each building to provide the level of detail required. If it is too difficult to show multiple or complex piping runs within each building, then provide simplified layouts on the facility diagrams and include a statement that more detailed drawings of the pipeline routes within each building are available. Include the locations of elevator hydraulic reservoirs.
Corrected During Audit:	No

Finding Number:	POL-005	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Required Inspections of Transformers Not Performed**
Finding Details:	40 CFR 112.7 requires that inspections and tests be completed in accordance with written procedures in the spill prevention, control and countermeasure (SPCC) plan with a record of the inspections and tests, signed by the appropriate supervisor or inspector, and maintained for a period of three years. Section 7.4.4 of the Integrated Contingency Plan (ICP), which included the SPCC Plan, required that visual inspections of oil-containing transformers for leaks be performed and documented during normally scheduled transformer maintenance, and that the inspection records be maintained for at least three years. Preventive maintenance procedures for high voltage, pad-mounted, and low voltage transformers did not include a step to inspect the transformers for leaks, as required.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 112.7(e)
Other Criteria:	GB ICP Section 7.4.4
Question Number:	PO.5.5.US
Source:	Federal Team Guide
Root Cause Explanation:	Required inspection element was not incorporated into preventive maintenance procedures.
Violation Type:	Operational Practices
Finding ID:	Other (please indicate in the "details" field the nature of the finding)
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Add visual inspection for oil leaks in the preventive maintenance procedures for high voltage, pad-mounted, and low voltage transformers and perform the inspections. Instruct personnel who perform transformer maintenance in the inspection and recordkeeping requirements of the ICP.
Corrected During Audit:	No

Finding Number:	POL-009	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Unlabeled Used Cooking Oil Drum**
Finding Details:	40 CFR 279.22 requires that containers and tanks used to store used oil at generator facilities must be labeled or marked clearly with the words "Used Oil." The 55-gallon drum used to store used cooking oil at Bldg 21 was not labeled with the words "Used Oil."
Facility Number:	Bldg 21
Facility Name:	Meteorological System Development Lab
Regulatory Citation:	40 CFR 279.22(c)
Other Criteria:	NA
Question Number:	POL.65.6.US
Source:	Federal Team Guide
Root Cause Explanation:	The label had been removed.
Violation Type:	Labels
Finding ID:	Deficiency in Used Oil Management
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Apply a new label to the drum.
Corrected During Audit:	No

9.3 Technical Observations

One recommendation and two positive observations were identified for POL management program.

Finding Number:	POL-006	**Finding Date:**	04-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Possible Failure of Secondary Containment for Fuel Piping Increases Potential Liability**
Finding Details:	The underground fuel lines from the three 50,000-gallon aboveground storage tanks that supply fuel to the boilers and emergency diesel generators in Bldg 24 were enclosed in secondary pipes to contain any leaks that might occur. The interstitial space between the fuel pipes and the secondary containment pipes were outfitted with sensors to detect any liquid in the interstitial space and sound an alarm to alert personnel of a possible fuel leak. The primary supply line had passed the annual pressure testing conducted as required by the Center's Oil Operations Permit; however, the permit did not require pressure testing of the secondary pipe. Operating personnel stated that the interstitial sensor alarm sounded daily, indicating a possible leak, and the alarm would be reset after each alarm. The alarm and results of the pressure test were consistent with a potential leak in the secondary pipe that allowed ground water to enter the interstitial space. If the secondary line was not intact it would not provide effective containment of a fuel leak, allowing potential contamination of the surrounding soil and groundwater.
Facility Number:	Bldg 24
Facility Name:	Central Heat/Refrigeration Plant Complex
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	Pressure test the secondary piping to determine if it is leaking. If the piping is leaking, determine whether the leak is occurring in an underground or aboveground portion of the secondary piping. Repair or replace any leaking sections of piping.
Corrected During Audit:	NA

Finding Number:	POL-007	**Finding Date:**	03-May-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Container Database Eases Spill Plan Revisions**
Finding Details:	GB maintained a comprehensive database of all aboveground storage tanks (ASTs), hydraulic reservoirs, drum storage areas, and oil-filled transformers, with a volume of 55 gallons or more. The database records included an item description, photographs, container volume, product information, and whether the equipment was active or out-of-service. The detailed database was used to quickly perform volume calculations and generate tables that were an integral part of the spill prevention, control, and countermeasures plan (SPCC) and to answer ad hoc queries from auditors and regulatory personnel. The database reduced the amount of time required to revise the SPCC and respond to queries.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

Finding Number:	POL-008	**Finding Date:**	04-May-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Interactive Quiz Reinforces Training**
Finding Details:	The annual spill prevention, control, and countermeasures (SPCC) training provided to personnel who handle oil and lubricants at the Center included an interactive quiz that showed photos of tanks at the site and challenged attendees to identify issues in the photo. The quiz was an excellent tool to reinforce training and inform end users of issues, improving compliance.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

10.0 Solid Waste Management

This section presents the EEFR results for the solid waste management program at GB. It describes the solid waste program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

10.1 Operational Description

The solid waste protocol includes the assessment of waste receptacles, solid waste storage, construction debris, medical waste, and recycling. Refuse and recycling is transported by Encore Recycling, a contractor to Melwood. Refuse is disposed of at the Ameriwaste Transfer Station in Elkridge, Maryland owned by EnviroSolutions, Inc. Multiple landfills are used; therefore, capacity is not a concern. Recycling material is transported to Encore's facility in Laurel, Maryland. There are no active landfills at Greenbelt for solid waste or construction debris.

A single stream recycling program was initiated in September 2011. Recyclables that can be placed into a single container include drink containers, white and mixed papers, cardboard, glass, plastic bottles, aluminum cans, magazines, newspapers, files, and envelopes. All recyclables are brought from the buildings to centralized locations by the custodial staff. Recycling centers are located at Buildings 25 and 28. Other materials recycled include scrap metal, precious metal, batteries, used oil, oil filters, antifreeze, toner cartridges, fluorescent lamps, wood, and construction and demolition waste. Pallets are no longer recycled but are accumulated at the Building 25 recycling area for reuse or disposal.

A review of Greenbelt solid waste data from the last three years indicated:

Year	Total Recycled (lbs)	Disposed Quantity (lbs)	% Diverted
FY 14	1,925,184	1,841,900	51%
FY 15	2,343,826	2,229,021	51%
FY 16	2,021,146	1,733,260	54%

Notes:
FY = Fiscal Year
lbs = Pounds

A vendor (Grayhound Trash Removal, Inc.) picks up waste tires collected from the Motor Pool for recycling and takes them to Emanuel Tire Company.

The NASA Health Clinic generates medical waste that is labeled and packed by the facility in red-bag containers located throughout the clinic. Sharps are placed in compliant rigid containers and placed in the red-bag containers when full. When the red-bag containers are full, they are placed within another red bag in a central container for pick up, and then they are transported and disposed of by a contractor (Stericycle) about once every two months. Infectious waste generated is less than 50 pounds per month. These wastes are collected every few months and disposed of at an appropriately licensed infectious waste treatment and disposal facility.

The table below summarizes the environmental elements for the solid waste management program:

Element	GB
On-site landfill	No
Solid Waste Incinerator	No
Receive garbage from outside US	No
Medical Waste	Yes

10.2 Technical Findings

One regulatory finding was identified for the solid waste management program.

Finding Number:	SWM-001	**Finding Date:**	03-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Open Dumping of eWaste**
Finding Details:	40 CFR 257.1 requires all solid waste and all materials separated for recycling to be stored in accordance with specific guidelines and, if they are not, they are considered open dumps. Wastes should be stored so as not to create a nuisance and to avoid the accumulation of solid wastes. In addition, solid wastes must not create fire, health, or safety hazards. Several boxes of trash and debris were found outside of an inactive project trailer, specifically eWaste including circuit boards, cables, and electrical equipment.
Facility Number:	North of Bldg 29
Facility Name:	Project Trailer Area
Regulatory Citation:	40 CFR 257.1(a)(2)
Other Criteria:	NA
Question Number:	SO.30.5.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel, potentially from a project group that was using the trailer, used the area to dump old equipment rather than properly disposing of the eWaste.
Violation Type:	Operational Practices
Finding ID:	Improper/Unpermitted Storage
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	The debris should be cleaned up immediately and the area monitored to avoid any reoccurrences at this location or elsewhere on the Center. Communicate and discuss with personnel who may have been responsible for the generation of the waste to ensure they follow proper disposal methods in the future.
Corrected During Audit:	No

10.3 Technical Observations

Two recommendations were identified for solid waste management program.

Finding Number:	SWM-002	**Finding Date:**	04-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Recycling Contaminated with Non-recyclables**
Finding Details:	A single stream recycling program was effectively implemented across GB. Numerous recycling bins were distributed throughout the Center. There was a trend of contamination of recycling containers with non-recyclable trash that was observed by MEMD and custodial contractor personnel. MEMD initiated studies using local college students to determine the root cause of the problem.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	Currently, many of the trash containers and recycling containers are identical or similar in color and design. Consider differentiating trash containers from recycling containers by using color coded containers, such as blue containers and/or bright blue stickers for recycling bins. Continue evaluating with the student studies and recommendations, including modified signage to better communicate recycling requirements to Center personnel. Additionally, expand Center-wide communication in environmental newsletters to bring to the attention of Center personnel the challenges of non-recyclable items in recycling containers.
Corrected During Audit:	NA

Finding Number:	SWM-003	**Finding Date:**	04-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Suggested Segregation of Medical Waste and Trash Containers**
Finding Details:	In an exam room at the Health Unit, a medical waste container was positioned between two trash containers. The containers were identical with the exception that the medical waste container had a red bag and a Biohazard sticker while the trash containers had clear bags. This arrangement could easily lead to potential improper disposal of medical waste in trash containers.
Facility Number:	Bldg 97
Facility Name:	Health Unit
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	Locate the medical waste containers and the trash containers apart from each other. Consider using different types of containers so the containers can be readily distinguished, and avoid misplacement of medical waste.
Corrected During Audit:	NA

11.0 Storage Tank Management

This section presents the EEFR results for the storage tank management program at GB. It describes the overall storage tank program and presents findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

11.1 Operational Description

GB has no regulated USTs. An underground used oil sump at Building 27 appears to exceed 110 gallons capacity and will come under Federal UST regulations effective in October 2018 if still in use at that time. The Center operates three ASTs that contain used oil that are in good condition.

The table below summarizes the environmental elements for the storage tank management program:

Element	GB
Total Number of Underground Storage Tanks (USTs)	0
State Registration Required?	NA
Total Number of Bulk Aboveground Storage Tanks (ASTs) (>660 gallons)	19
Number of Mobile Tanker Trucks	0
Number of Portable ASTs	12
Number of Emergency Generator Base ASTs	11
Number of Used Oil ASTs	3
Number of Oil-Filled Op Equipment (Hydraulic Tanks)	38
Number of Oil-Filled Op Equipment (Transformers)	66
Number of Used Cooking Oil Tanks	2

11.2 Technical Findings

There were no findings identified for the storage tank management program.

11.3 Technical Observations

One recommendation was identified for the storage tank management program.

Finding Number:	STM-002	**Finding Date:**	03-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Used Oil Sump No Longer Excluded from Regulation**
Finding Details:	On July 15, 2015 the United States Environmental Protection Agency(EPA) issued revised underground storage tank (UST) regulations that removed the exclusions for field-constructed USTs. After October 13, 2018, field-constructed USTs must meet specific regulatory requirements, including submitting a one-time notification form required under 40 CFR 280.251 and the spill, overfill protection, release detection and financial responsibility requirements of 40 CFR 280.252. The used oil collection sump at Bldg 27 met the definition of a field-constructed UST and did not meet the new regulatory requirements.
Facility Number:	Bldg 27
Facility Name:	Mobile Equipment Support Building
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	Verify the capacity of the used oil sump. If the capacity is greater than 110 gallons, permanently close the sump or upgrade the sump to meet the requirements of 40 CFR 280.252 and submit the notification form in 40 CFR 280 Appendix I to the Maryland Department of the Environment.
Corrected During Audit:	NA

12.0 Toxic Substances Management - Asbestos and PCB

This section presents the EEFR results for the toxic substances management program at GB. It describes the toxic substances program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

The toxic substances management program includes polychlorinated biphenyls (PCBs), and asbestos. The operational description of each area is provided below.

12.1 Operational Description

Asbestos - Asbestos was extensively used in the construction of buildings and facilities when Greenbelt was constructed. An asbestos survey was completed in 2012 for all buildings on the Center constructed prior to 1981. Survey data is entered into a building management database, and a hard copy of the completed survey findings is maintained by the Facilities Asbestos Coordinator (FAC)/ Directorate Asbestos Coordinator (DAC) in the Facilities Management Division.

Greenbelt evaluates and manages its asbestos-containing materials on an as-needed basis. The Center Asbestos Coordinator (CAC) from the Industrial Hygiene Office (IHO) is the chairperson of the Asbestos Working Group. The CAC reviews and approves Asbestos Abatement Plans and verifies notification requirements are met. The FAC/DAC maintains the official project files for asbestos activities and is located in the Facilities Management Division. The FAC/DAC also ensures abatement contractor staff are licensed, ensures signs and labels identifying asbestos are appropriately placed, develops asbestos management plans, procedural guidance/work instructions, coordinates both maintenance and large demolition/renovation abatement projects, and coordinates with the IHO. Asbestos abatement operations are outsourced to Maryland-licensed contractors with properly trained asbestos abatement workers.

PCBs - Maryland classifies PCBs as hazardous materials and regulates them under the Maryland hazardous waste regulations, with the exception of fluorescent light ballasts if they are managed as universal wastes. Oversight of PCB management at Greenbelt is performed by MEMD. All identified PCB and PCB-contaminated transformers have been removed from Greenbelt. Additional transformers are tested and appropriately disposed of as they are encountered.

The Center is systematically removing all of the PCB light ballasts and replacing them with non-PCB ballasts on a project by project basis. PCB articles and PCB-contaminated items are disposed of through the less than 90-day storage building, Building 27A. Greenbelt prepares an annual document log detailing the management and disposal of all PCBs from the facility. These reports are prepared by 1 July following the calendar year that the report summarizes

The table below summarizes the environmental elements for the toxics substances management program:

Element	GB
PCB Transformers (>500 ppm)	No
PCB Contaminated Transformers (>50ppm, <500ppm)	No
PCB Capacitors	Yes
Other PCB Equipment/Articles	Yes
PCB Storage Area	Yes
On-site Asbestos	Yes
Asbestos Survey	Yes

12.2 Technical Findings

Two regulatory findings were identified for the toxic substances management program.

Finding Number:	TOX-001	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Missing Asbestos Records**
Finding Details:	40 CFR 61.150 requires that the owner or operator of the disposal site provide a copy of a signed waste shipment record to the waste generator within 45 days of the date the waste was accepted by the initial transporter; and that the owner or operator of any source retain a copy of all waste shipment records, including a copy of the waste shipment record signed by the owner or operator of the designated waste disposal site, for at least 6 years. Shipment records, as well as other records including abatement plans and Industrial Hygiene (IH) reports, were missing from the files. Specific examples were: 1. Bldg.11, Rm S118 missing abatement plan 2. Bldg. 8, Suite 445 missing IH report - plan start date -9/23/2016 3. Bldg. 24B exterior, Electrical System -missing revised abatement plan - plan submittal date- 11/22/2016 4. Bldg. 13, Rm C000 emergency – missing waste shipment report - plan start date 12/28/2016
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 61.150(d)(3)
Other Criteria:	COMAR 26.11.21.09(A) and (B)
Question Number:	T2.2.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Files were not provided by Facilities to the Safety Division Industrial Hygienist, and were not maintained by Facilities.
Violation Type:	Manifests
Finding ID:	Deficiency in Documentation
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Ensure all records are properly completed and maintained to be available as needed. Consider having the Center Asbestos Coordinator maintain all official asbestos files so they are readily available and organized.
Corrected During Audit:	No

Finding Number:	TOX-002	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**PCB Annual Document Log Deficiencies**
Finding Details:	40 CFR 761.180 requires that the written PCB annual document log include requisite information from each manifest. The calendar year 2014 PCB Annual Report included a manifest for a PCB ballast; however, an incorrect date was entered into the annual log.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 761.180(a)(2)
Other Criteria:	NA
Question Number:	T1.15
Source:	Federal Team Guide
Root Cause Explanation:	The PCB Annual Document Logs were completed, however, personnel inadvertently entered incorrect dates.
Violation Type:	Reports
Finding ID:	PCB Other (please indicate in the “details” field the nature of the finding)
ASTM Description:	4 Managing environmental records.
Suggested Solution:	When preparing future PCB Annual Document Logs, ensure accurate information is entered by conducting quality reviews of data.
Corrected During Audit:	No

12.3 Technical Observations

Two recommendations were identified for toxic substances management program.

Finding Number:	TOX-003	**Finding Date:**	04-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Asbestos Management Recommendations**
Finding Details:	The Safety Division's Industrial Hygienist (IH) effectively tracked asbestos projects using a tracking spreadsheet. When required records were not provided by the Facilities project manager, they were noted in the spreadsheet. If the missing item was considered paperwork and not a safety issue, direction was provided to not enter them into SHEtrak. However, these could include regulatory-required documents including shipping verification and industrial hygiene closure reports. When these records were missing, it was difficult to successfully get them provided by Facilities. SHEtrak would be an effective tool to ensure all records were provided. Additionally, the Facilities Division had an asbestos inventory developed that was completed in 2012, but it did not appear to be sufficiently accessible to all who needed access to it. The survey was maintained by the Facilities Asbestos Coordinator/Directorate Asbestos Coordinator. The Center Asbestos Coordinator (CAC)/IH in the Safety Division was not provided a hardcopy or electronic copy by Facilities, therefore, the IH had to go to Facilities to review the survey whenever information was needed, even in an emergency situation.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	In addition to safety issues, noncompliant regulatory requirements could be reported through SHEtrak to ensure appropriate focus and attention is made to promote compliance. A hardcopy or electronic copy of the asbestos survey should be provided to the CAC/IH for routine and emergency access.
Corrected During Audit:	NA

Finding Number:	TOX-004	**Finding Date:**	04-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Outdated Asbestos Warning Signs Need Replaced**
Finding Details:	Although this is not a regulatory compliance issue, it is provided as a recommendation since it is not in the scope of the TEAM Guide for the EEFR. 29 CFR 1910.1001(j) requires warning signs to be provided to inform employees of the presence of asbestos containing material (ACM) or presumed ACM. Since June 1, 2016, all signs are required to bear the following legend: DANGER ASBESTOS MAY CAUSE CANCER CAUSES DAMAGE TO LUNGS AUTHORIZED PERSONNEL ONLY Signs across the Center were using outdated verbiage. Goddard Procedural Requirements (GPR) 1840.b did not include the current wording requirement.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	Replace the existing signage across the Center and update the GPR using the following requisite language: DANGER ASBESTOS MAY CAUSE CANCER CAUSES DAMAGE TO LUNGS AUTHORIZED PERSONNEL ONLY
Corrected During Audit:	NA

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13.0 Wastewater Management

This section presents the EEFR results for the wastewater management program at GB. It describes the overall wastewater program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

13.1 Operational Description

GB generates industrial and domestic wastewater. The wastewater discharges are permitted through two mechanisms. A portion of the wastewater is discharged to the Washington Suburban Sanitary Commission (WSSC) and is authorized by Permit No. 00449 issued by the WSSC and expiring on May 29, 2020. The other wastewater is discharged to the storm sewer and is authorized by an individual National Pollutant Discharge Elimination System (NPDES) permit (State Discharge Permit No 08-DP-3156, which is the same as NPDES Permit No. MD0067482) issued by the MDE. The permit renewal was issued on June 1, 2012, was modified on May 1, 2017 to change the pH sample location for Outfall 001, and expires on May 31, 2017. An application to renew this permit was submitted to MDE on April 22, 2016.

Industrial and domestic wastewater discharged under the WSSC permit exits GB through two discharge points, one on the west side of the facility and one on the east side. The permit has general discharge requirements as well as special conditions. There are monitoring and effluent limitation requirements on the west side, where the majority of the flow leaves the facility, but presently there are no limitations or monitoring requirements on the east side. The east side presently serves only Buildings 32, 33 and 34 plus the auto club and other small buildings. The facility has 16 relatively small lift stations with their associated short run force mains.

For discharges from the west side, GB conducts 24-hour flow-proportional monitoring two days per quarter from a manhole near the main gate. WSSC also conducts periodic monitoring of this discharge. On April 21, 2015, WSSC conducted monitoring from this location, found that the discharge exceeded daily limits for both chemical oxygen demand (COD) and total suspended solids (TSS), and issued a NOV on June 1, 2015. Since this first NOV, GB has received 9 additional NOVs for exceeding daily effluent limitations for COD, biochemical oxygen demand, and TSS from this location 16 separate times. Due to the repeated violations, GB was determined to be in Significant Noncompliance for the six month period of July to December 2015 and entered into a Settlement and Compliance Agreement with WSSC on

December 28, 2016. As a requirement of the Settlement and Compliance Agreement, GB developed and submitted a Plan of Action, dated January 17, 2017, with specific corrective measures to reduce pollutant concentrations. The corrective measures specified in the Plan of Action must be complete by June 9, 2017.

Three discharges to the WSSC system have pre-treatment systems to control pH. Building 5 has two metal plating lines where rinse waters are discharged to a concrete sump. From the sump, water is pumped to a 170-gallon neutralization tank that is continuously monitored for pH. Based on the pH in the tank, either sulfuric acid or sodium hydroxide is automatically fed to the tank to bring the pH into the range of 6.5-8.5. A solenoid valve on the outlet of the tank prevents discharge of water from the tank unless the pH is between 6.5 and 8.5. Certified wastewater operators operate and maintain this system and manually control all discharges from the neutralization tank. Because of the plating operations, this discharge is a Categorical Discharge that must be sampled for two days each quarter and results provided to WSSC.

Building 30 has the other two pre-treatment systems. The Detector Development Lab generates wastewater from the production of semiconductors. All process wastewater from the lab is directed to a neutralization tank where a dilute solution of sodium bicarbonate is trickled in at a rate of 117 gallons per day. The pH of the neutralization tank is monitored continuously by pH probes. As the pH decreases, a bubbler in the tank is activated to increase circulation and the flow of sodium bicarbonate is automatically increased. When the pH is between 6-10, a valve on the outlet of the tank is automatically opened to allow discharge of the wastewater to WSSC.

Building 30 also has the Materials Engineering Labs that discharge rinse water that is occasionally acidic. Each of the sinks in the South Wing of the building have small acid neutralization systems. In the North Wing, effluent from sink drains is directed to a central neutralization tank with limestone rocks. The pH of this neutralization tank is continuously measured with pH meters and two control points. As the pH drops to 6.7, an air sparging system in the tank turns on to provide better mixing with the limestone. If the pH drops to 6.1 the effluent valve shuts to prohibit discharge to WSSC.

The other major source of wastewater leaving GB is associated with storm water outfalls. There are two outfalls (001 and 004) authorized in State Discharge Permit No 08-DP-3156 (NPDES Permit No. MD0067482) and the principal source of wastewater is blowdown and condensate from the boiler and chiller systems. In addition to these industrial discharges, the permit addresses storm water associated with industrial activity. The individual NPDES permit

does not employ the multi-sector approach used in the NPDES general permit program, but does require a Stormwater Pollution Prevention Plan (SWPPP). Additionally, GB must comply with the Municipal Separate Storm Sewer System stormwater program. The facility has prepared the required SWPPP and two of the stormwater outfalls have effluent limitations and monthly/quarterly monitoring requirements.

Outfalls 001 and 004 have long term periodic incidents of non-compliance with copper and pH limits. Several improvements have been made over the past several years in controlling the violations. Since January 2016, there have been no exceedances of pH, but copper limits were exceeded six times at Outfall 001 and one time at Outfall 004.

There were no major ongoing construction projects during the EEFR. The most recent project at Building 36 had been fully stabilized, but maintenance was required on the manufactured rain gardens before MDE would issue the Notice of Termination. Another project at Building 24 had received coverage under the NPDES/Maryland General Permits for Storm Water Associated with Construction Activity, but this project was temporarily on hold and the minor amount of land disturbance that had taken place was fully stabilized and inspections were being conducted weekly by the contractor.

GB also has coverage under a General Permit for Discharge from Tanks, Pipes and Other Liquid Containment Structures at Facilities Other Than Oil Terminals, Discharge Permit No. 11-HT (NPDES Permit No. MDG67).

The following areas are served by septic tanks, all of which serve fewer than 20 individuals and only accept domestic sewage:

- Buildings 83 and 84;
- Area 200 – Buildings 201, 205, 206, and 208;
- Area 300 – Buildings 302 and 304; and
- Area 400 – Buildings 405 and 407.

No Class V injection wells have been identified at GB.

The table below summarizes the environmental elements for the wastewater management program:

Element	GB
Wastewater Treatment Facility	No
Sludge disposal	No
Wastewater discharge to waters of the state	Yes
Wastewater discharge to POTW	Yes
Wastewater Collection System	Yes
Wastewater Treatment	Yes
Oil/Water Separator(s)	Yes
Wastewater pretreatment	Yes
Stormwater discharge associated with construction activities	Yes
Stormwater discharge associated with industrial activities	Yes
Stormwater associated with municipal separate storm sewer system	Yes
Infiltration/Inflow to wastewater collection system	Unknown
Water cooling tower discharges	Yes
Boiler feedwater blowdown discharges	Yes
Septic Tanks	No
Groundwater Injection Wells	No

13.2 Technical Findings

Five regulatory findings were identified for the wastewater management program.

Finding Number:	WWM-001	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Unpermitted Discharge of Wastewater**
Finding Details:	Code of Maryland Regulations (COMAR) 26.08.04.01 requires permits for the disposal of waste or wastewater into the waters of the State, or a system which may result in a discharge into these waters, regardless of quality or volume. The trench drains associated with the vehicle wash rack at Bldg 27 periodically plugged with sediment from washing vehicles and caused the resulting waste wash water to be discharged from the building and flow across the parking lot to the nearby storm water outlet and receiving pond. No permit had been obtained for this discharge.
Facility Number:	Bldg 27
Facility Name:	Vehicle Maintenance
Regulatory Citation:	COMAR 26.08.04.01(B)(2)
Other Criteria:	NA
Question Number:	WA.15.1.MD
Source:	State Team Guide
Root Cause Explanation:	Although personnel working at the Vehicle Maintenance Shop were aware of this problem, it had not been communicated to MEMD for action.
Violation Type:	Spills, Leaks, or Releases
Finding ID:	Unpermitted Discharge
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Clean the trench drains in Bldg 27 to allow the wash water to flow to the sanitary sewer without impediment. Establish a policy to frequently clean these trench drains to ensure wastewater is always directed to the sanitary sewer instead of overflowing the drains and entering the environment.
Corrected During Audit:	No

Finding Number:	WWM-002	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	Carryover
Old Tracking Number:	GSCEXT1409	**Previous Finding Number:**	WWM-001

Finding Title: **Copper Levels Exceeded in Surface Water Discharges**

Finding Details: Maryland Department of the Environment (MDE) Discharge Permit Number 08-DP-3156A, National Pollutant Discharge Elimination System (NPDES) Permit MD0067482, Section I.A requires that discharges from Outfalls 001 and 004 not exceed the specific copper limit of 0.013 milligrams per liter (mg/l) on any day and 0.009 mg/l for a quarterly average. The permit requires the pH to be between the values of 6.5 and 8.5.

As a result of a history of issues with copper and pH levels at these outfalls, GB staff had initiated a series of actions to address these constituents. However, for the past 15 months of data (January 2016 through March 2017), Outfall 001 exceeded the daily copper limit 6 times and the quarterly average limit 4 times. Outfall 004 exceeded the daily copper limit 1 time and the quarterly average limit 1 time. For the same timeframe, neither outfall exceeded the pH limits. These results seem to indicate that the pH issue had been addressed, but copper levels continue to be a challenge.

Facility Number: Bldgs 24 and 31

Facility Name: Outfalls 001 and 004

Regulatory Citation: MDE Discharge Permit Number 08-DP-3156(A) (NPDES Permit 0067482), Section I.A

Other Criteria: NA

Question Number: WA.15.2.MD

Source: State Team Guide

Root Cause Explanation: Personnel were aware of the exceedances and had been trying various actions to try and reduce the level of copper in the discharges.

Violation Type: Excess Chemical Parameter

Finding ID: Noncompliance with Discharge Permit

ASTM Description: 1 Preventing and responding to actual releases, emissions, discharges, o

Suggested Solution: Continue to implement various remedies to combat the high copper levels. Continue to report exceedances of the limits to MDE as they occur.

Corrected During Audit: No

Finding Number:	WWM-003	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Conventional Pollutant Concentrations Exceeded in Sanitary Sewer Discharges**
Finding Details:	Washington Suburban Sanitary Commission (WSSC) Discharge Authorization Permit, Permit Number 00449, requires that discharges through Outfall FAC meet the maximum daily limits of 300 milligrams per liter (mg/l) for biochemical oxygen demand (BOD), 500 mg/l for chemical oxygen demand (COD), and 400 mg/l for total suspended solids (TSS). Starting in June 2015, GB received 10 notices of violation (NOVs) for exceedances of BOD (twice), COD (11 times), and TSS (3 times). As a result of these exceedances, GB was determined to be in Significant Noncompliance for a six month period of July-December 2015. GB entered into a Settlement and Compliance Agreement with WSSC on December 28, 2016 to develop and complete a Plan of Action to reduce the concentrations of these conventional pollutants.
Facility Number:	Center-wide
Facility Name:	NA
Regulatory Citation:	WSSC Discharge Authorization Permit, Permit Number 00449, Section II.A.1
Other Criteria:	NA
Question Number:	WA.15.2.MD
Source:	State Team Guide
Root Cause Explanation:	WSSC identified exceedances of BOD, COD, and TSS in April 2015 but the sources of the exceedances were not known. Personnel were conducting sampling to determine potential sources of these pollutants and were implementing the Plan of Action submitted to WSSC on January 17, 2017.
Violation Type:	Excess Chemical Parameter
Finding ID:	Noncompliance with Discharge Permit
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Clean the manhole outside of Bldg 21 cafeteria as soon as possible to eliminate one possible source of pollution. Request an extension to the June 9, 2017 deadline for completing corrective actions under the January 2017 Plan of Action. Meet with WSSC management to discuss discrepancies with sampling techniques and quantify the level of noncompliance with these pollutants. Conduct additional sampling and analysis to determine sources of BOD and COD and begin identifying projects to reduce the discharge of these constituents.
Corrected During Audit:	No

Finding Number:	WWM-004	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Missing Visual Inspection Records**
Finding Details:	Maryland Department of the Environment (MDE) Discharge Permit Number 08-DP-3156A, National Pollutant Discharge Elimination System (NPDES) Permit MD0067482, Section I.T requires development and implementation of a stormwater pollution prevention plan (SWPPP). The 2016 SWPPP for GB required that the Salt Dome be inspected weekly during the peak season and quarterly during off seasons. Visual inspection records for the Salt Dome only included inspections up through November 2016. No records were available for inspections conducted during December 2016 through April 2017.
Facility Number:	Bldg 27D
Facility Name:	Salt Dome
Regulatory Citation:	MDE Discharge Permit Number 08-DP-3156(A) (NPDES Permit 0067482), Section I.T
Other Criteria:	2016 Greenbelt SWPPP, Section 4.6
Question Number:	WA.15.2.MD
Source:	State Team Guide
Root Cause Explanation:	Personnel had forgotten to complete the inspection record during December 2016 through April 2017, which is the peak season of salt use.
Violation Type:	Incomplete Records
Finding ID:	Storm Water Management Deficiency
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Emphasize the requirement to conduct inspections of the Salt Dome and nearby areas weekly during the peak season and quarterly during the off season.
Corrected During Audit:	No

Finding Number:	WWM-005	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Unpermitted Discharge of Equipment Wash Water**
Finding Details:	Code of Maryland Regulations (COMAR) 26.08.04.01 requires permits for the disposal of waste or wastewater into the waters of the State, or a system which may result in a discharge into these waters, regardless of quality or volume. The landscape maintenance contractor was using a hose attached to a water spigot near the fence of the maintenance facility to wash equipment. Occasionally, this washing activity included use of a degreaser. The water from this washing activity was discharged to the adjacent paved area and allowed to flow into the environment.
Facility Number:	Bldg 83C
Facility Name:	Landscaping Maintenance Area
Regulatory Citation:	COMAR 26.08.04.01(B)(2)
Other Criteria:	NA
Question Number:	WA.15.1.MD
Source:	State Team Guide
Root Cause Explanation:	MEMD personnel were not aware that equipment was being washed at this location and landscaping personnel were not aware that this activity was prohibited.
Violation Type:	Lack of a Permit
Finding ID:	Unpermitted Discharge
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Work with the landscaping contractor to find a location and procedure for washing equipment in compliance with the regulations.
Corrected During Audit:	No

13.3 Technical Observations

One positive observation was identified for wastewater management program.

Finding Number:	WWM-007	**Finding Date:**	04-May-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Proven Ability to Halt Actions with Imminent Danger to Health or Environment**
Finding Details:	Goddard Policy Directive (GPD) 8500.1C gives MEMD the authority to cease any process or operation that in its judgment presents a clear and imminent concern to human health or the environment. MEMD staff have successfully implemented this provision on several occasions to better the environment. For example, the Auto Club had a history of environmental compliance concerns as demonstrated through weekly inspections and documentation of deficiencies in SHEtrak. After over a year of unsatisfactory corrective actions, Code 200 made the decision to lock out the Auto Club and temporarily shut it down. On a smaller scale, MEMD staff had implemented this policy to force maintenance contractors to change chemical storage practices.
Facility Number:	Bldg 26
Facility Name:	MEMD Office
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

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14.0 Water Quality-Drinking Water Management

This section presents the EEFR results for the water quality-drinking water management program at GB. It describes the overall water quality program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

14.1 Operational Description

GB has a non-transient non-community public water system that serves approximately 7,500 persons. GB purchases all of its potable water supply from the WSSC. Water is metered at two locations as it enters the facility. There are only two or three internal water meters located on the facility premises.

Because GB meets the following four criteria (as specified in the state regulations), the water system is not subject to the Safe Drinking Water Act monitoring requirements:

- Consists only of distribution and storage facilities, and does not have any collection and treatment facilities;
- Obtains all of its water from, but is not owned or operated by, a supplier of water to which the regulation applies;
- Does not sell water to any person; and
- Is not a carrier which conveys passengers in interstate commerce.

GB does not provide any treatment, but there is concern with the aggressive nature of the WSSC water. Discussion with financial managers at GB confirmed that the facility does not sell water to any tenants. Charges for water are included as part of the utility costs, which are distributed as an overhead item among all projects.

GB utilizes two groundwater supply wells for boiler feed and cooling water makeup. The system can be fed from either the groundwater supply or the potable supply. The systems are not interconnected because the water supply to the feed tank is protected from cross connection by an air gap. Because of cost, the groundwater supply is used for boiler feed and cooling water makeup except when one of the wells is taken out of service for maintenance.

The Center has a Water Appropriation and Use Permit #PG 1998G023(03) effective May 1, 2006 and expiring May 1, 2018 for the two wells. The only requirement of the permit is limits on the combined total use, namely: a daily average use of 257,000 gallons per day on a

yearly basis, and an average use of 375,000 gallons per day on a monthly basis. GB has approached but not exceeded the daily permissible limits.

The last facility wide cross-connection survey was conducted by the Navy in 1997 and found 966 cross-connections. As part of the contract, the Navy installed the majority of the required backflow prevention devices (BPDs). There are presently about 150 BPDs inspected and tested on an annual basis. A majority of the older buildings do not have BPDs on the fire suppression systems. Chugash performs tests on BPDs scheduled through Maximo and test results are kept in Maximo and in hardcopies in the Plant Operations Building. Occasionally WSSC reviews test results.

There is no record that the state has ever conducted a sanitary survey of the water supply system or the condition of the water supply storage tanks.

The table below summarizes the environmental elements for the water quality-drinking water management program:

Element	GB
Public Water System	Yes
Consecutive Water System	Yes
Community Water System	No
Non-transient non-community water system	Yes
Water Treatment (in addition to disinfection)	No
Water Disinfection	No
Water Pumping Stations	Yes
Water Distribution System	Yes
Water Sold to Tenants	No
Cross Connection Control/Backflow Prevention Program	Yes
Water storage tanks	Yes
Water wells	Yes - 2
Surface water supply	No
Ground water supply	Yes - Industrial only

14.2 Technical Findings

Two regulatory findings were identified for the water quality-drinking water management program.

Finding Number:	WQM-001	**Finding Date:**	02-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Failed Backflow Prevention Device Not Repaired or Replaced**
Finding Details:	The 2015 version of the Washington Suburban Sanitary Commission (WSSC) Plumbing and Fuel Gas Code, Section 503.2 requires customers to immediately correct any malfunction of a backflow preventer revealed by periodic testing or observation. A six-inch backflow prevention device in Bldg 24 was tested annually, but the results of the 2015 and 2016 tests indicated that the device had failed. This device had not been replaced and no records were available to demonstrate that it had been repaired.
Facility Number:	Bldg 24
Facility Name:	Central Heat and Refrigeration Plant
Regulatory Citation:	WSSC 2015 Plumbing and Fuel Gas Code, Section 503.2
Other Criteria:	International Plumbing Code, August 2015, Section 102.3
Question Number:	WQ.2.1.US
Source:	Federal Team Guide
Root Cause Explanation:	After testing the device and determining that it did not pass, personnel did not submit a work order to have the device repaired or replaced.
Violation Type:	Inadequate Equipment/Containers
Finding ID:	Backflow Prevention Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Submit a work order to have the device repaired and/or replaced. Remind the backflow prevention device tester of the requirement to have failed devices repaired or replaced.
Corrected During Audit:	No

Finding Number:	WQM-003	**Finding Date:**	04-May-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Inoperable Groundwater Measuring Device on Withdrawal Wells**
Finding Details:	Maryland Water Appropriation and Use Permit, Permit Number PG1998G023(03) requires that the water wells on GB be installed with equipment that allows water levels to be measured during pumping and nonpumping periods without dismantling any equipment. The two water withdrawal wells at Bldgs 24 and 31 were equipped with gauges to measure water levels, but the gauges were broken and were not capable of reading water levels.
Facility Number:	Bldgs 24 and 31
Facility Name:	Water Withdrawal Wells
Regulatory Citation:	Maryland Water Appropriation and Use Permit, Permit Number PG1998G023(03), paragraph 15
Other Criteria:	NA
Question Number:	WQ.2.1.MD
Source:	State Team Guide
Root Cause Explanation:	The gauges were broken and it was not clear if they had been identified for repair or replacement.
Violation Type:	Inadequate Equipment/Containers
Finding ID:	Noncompliance With Withdrawal Permit
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Repair or replace the existing gauges on the water withdrawal wells. Ensure that they are capable of measuring water levels during pumping and nonpumping periods.
Corrected During Audit:	No

14.3 Technical Observations

One recommendation was identified for water quality-drinking water management program.

Finding Number:	WQM-002	**Finding Date:**	03-May-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title: **Fire Protection Systems Lack Appropriate Backflow Protection**

Finding Details: The applicability of the 2015 Washington Suburban Sanitary Commission

(WSSC) Plumbing and Fuel Gas Code to isolation-type backflow prevention devices within the Greenbelt campus is not clear. For example, Section 102.8 of the WSSC code provides special exemptions for Federal Property. However, Section 102.8.2 indicates that the exemptions do no exempt the federal government from compliance with other specific provisions of the code such as Chapter 5: Cross-Connection Control. In Section 502.3.5, the code indicates federal properties shall maintain an effective backflow program in accordance with federal standards. So, while it is clear that Greenbelt is exempt from certain parts of the cross-connection control program as a federal facility (e.g., submittal of backflow prevention test reports), it is not clear how other portions of the cross-connection control program in Chapter 5 of the Plumbing and Fuel Gas Code apply.

The WSSC Plumbing and Fuel Gas Code, Section 506.12 requires that existing wet fire protection systems with no chemical addition be upgraded to a double check valve assembly. Existing systems with a single check valve do not require upgrade as long as the check valve is replaced every five years and is tagged with the installation date; the expiration date; and a notice identifying the requirement to replace by the expiration date. The WSSC website (https://www.wsscwater.com/customer-service/customer-regulations/cross-connection-control/commercial-and-industrial-water html) for Commercial and Industrial Water Customers specifies the same replacement schedule for single check valves on existing fire protection systems, but it is not clear if this is also applicable to Federal customers of WSSC.

Several buildings at Greenbelt Campus were equipped with wet fire protection systems that did not have backflow protection or were equipped with single check valves. These valves were not labeled with an install date, expiration date, and a requirement to replace by the expiration date.

Facility Number: Center-wide

Facility Name: NA

Regulatory Citation: NA

Other Criteria: WSSC 2015 Plumbing and Fuel Gas Code, Section 506.12 referencing Section 506.10

Question Number: NA

Source: NA

Root Cause Explanation: NA

Violation Type: Not Applicable

Finding ID: Not Applicable

ASTM Description: 0 Not applicable.

Suggested Solution: Contact WSSC to determine the applicability of the Cross-Connection Control Program (Chapter 5 of the Plumbing and Fuel Gas Code) to the Greenbelt campus. If possible, request that this determination be made in writing for future reference.

After reviewing the applicability of the cross-connection program to the Greenbelt campus and if it is determined that Greenbelt must implement the isolation backflow prevention requirements, review the fire protection systems at each building on the Greenbelt Campus. Determine the status of the backflow prevention assemblies installed at each location. For locations without any protection, program a project to install double check valves at these locations. For locations with only a single check valve, consider replacing them with double check valves as funding is available. If funding is not available, replace the single check valve with a new one and install a sign identifying the install date and five-year expiration date. Ensure double check valve assemblies are included on annual testing program. If these older buildings undergo renovation such that more than 10 sprinkler heads are added or moved during renovation, then install a double check valve at that time in accordance with Section 12.2.1 of the WSSC 2015 Plumbing and Fuel Gas Code.

Corrected During Audit: NA

APPENDIX A

Summary of Findings and Observations

Appendix A

Table A presents a summary of the findings and observations discovered during the EEFR conducted at NASA GB from May 1, 2017 to May 5, 2017.

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Table A -- Summary of NASA Functional Review Findings

Goddard Space Flight Center - Greenbelt Campus - May 2017

Finding Number	Finding Title	Facility Number	Rating
Air Emissions Management			
AIR-001	Painting Did Not Occur When Paint Booth Visible Emissions Evaluations Conducted	Bldg 4	Regulatory
AIR-002	Incomplete Usage Logs for Emergency Generators	Center-wide	Regulatory
AIR-003	Missing Required Warning Labels on Equipment Containing Refrigerants	Bldgs 24, 31, and 4	Regulatory
Cultural Resources Management			
CRM-001	Annual Reporting Not Completed for National Historic Landmark	Bldg 305	Regulatory
CRM-002	Integrated Cultural Resources Management Plan Requires Corrections	Center-wide	Policy
Hazardous Materials Management			
HMM-001	Incomplete and Inaccurate Emergency Planning Community Right-to-Know Tier II Inventory	Center-wide	Regulatory
Hazardous Waste Management			
HWM-001	Open Satellite Accumulation Point Containers	Bldgs 5 and 30	Regulatory
HWM-002	Hazardous Waste Moved Between Satellite Accumulation Points	Bldg 30	Regulatory
HWM-003	Satellite Accumulation Point Containers Labeled with Conflicting Information	Bldgs 30 and 33	Regulatory
HWM-004	Uncharacterized Waste	Bldg 5 and Areas 200/400	Regulatory
HWM-005	Missing Weekly Inspections at 90-Day Hazardous Waste Storage Area	Bldg 27A	Regulatory
HWM-006	Inconsistent Hazardous Waste Container Labeling	Bldg 27A	Regulatory
HWM-007	Improper Universal Waste Battery Management	Area 200	Regulatory
HWM-008	Improper Waste Aerosol Management at Recycling Center	Bldg 25	Regulatory
HWM-009	Satellite Accumulation Point Not at or Near the Point of Generation	Bldg 27	Regulatory
HWM-010	Discarded Chemicals Not Properly Characterized or Managed at Closed Auto Tech Center	Bldg 95	Regulatory

NA = Not Applicable

Table A -- Summary of NASA Functional Review Findings Goddard Space Flight Center - Greenbelt Campus - May 2017 (continued)

Finding Number	Finding Title	Facility Number	Rating
HWM-011	Discarded Mercury-containing Thermostats and Thermometers Not Managed as RCRA Wastes	Bldg 27A	Regulatory
HWM-012	Monthly Satellite Inspections Not Completed	Center-wide	Policy
HWM-013	Improperly Maintained Satellite Accumulation Point Containers	Bldgs 4 and 33	Policy
HWM-014	Excellent Management of Hazardous Waste Programmatic Records	Bldg 27A	Positive
Other Environmental Issues			
OTH-001	Environmental Resource Document Needs Updating	Center-wide	Policy
Pesticide Management			
PES-001	Inadequate Backflow Prevention Device on Water Supply Used for Mixing Pesticide	NA	Regulatory
PES-002	Unlicensed Contractor Applying Pesticide in Deer Tick Treatment Program	Center-wide	Regulatory
POL Management			
POL-001	Dispensing Pumps and Pipes Not Included in Monthly Inspections	Bldg 27	Regulatory
POL-002	Notifications of Changes Not Made	Center-wide	Regulatory
POL-003	Mobile Generator Monthly Inspections Not Conducted	Center-wide	Regulatory
POL-004	Incomplete Facility Diagrams in Integrated Contingency Plan	Bldgs 24, 27, and 31	Regulatory
POL-005	Required Inspections of Transformers Not Performed	Center-wide	Regulatory
POL-006	Possible Failure of Secondary Containment for Fuel Piping Increases Potential Liability	Bldg 24	Recommendation
POL-007	Container Database Eases Spill Plan Revisions	Center-wide	Positive
POL-008	Interactive Quiz Reinforces Training	Center-wide	Positive
POL-009	Unlabeled Used Cooking Oil Drum	Bldg 21	Regulatory
Solid Waste Management			
SWM-001	Open Dumping of eWaste	North of Bldg 29	Regulatory
SWM-002	Recycling Contaminated with Non-recyclables	Center-wide	Recommendation

NA = Not Applicable

Table A -- Summary of NASA Functional Review Findings Goddard Space Flight Center - Greenbelt Campus - May 2017 (continued)

Finding Number	Finding Title	Facility Number	Rating
SWM-003	Suggested Segregation of Medical Waste and Trash Containers	Bldg 97	Recommendation
Storage Tank Management			
STM-002	Used Oil Sump No Longer Excluded from Regulation	Bldg 27	Recommendation
Toxic Substances Management			
TOX-001	Missing Asbestos Records	Center-wide	Regulatory
TOX-002	PCB Annual Document Log Deficiencies	Center-wide	Regulatory
TOX-003	Asbestos Management Recommendations	Center-wide	Recommendation
TOX-004	Outdated Asbestos Warning Signs Need Replaced	Center-wide	Recommendation
Wastewater Management			
WWM-001	Unpermitted Discharge of Wastewater	Bldg 27	Regulatory
WWM-002	Copper Levels Exceeded in Surface Water Discharges	Bldgs 24 and 31	Regulatory
WWM-003	Conventional Pollutant Concentrations Exceeded in Sanitary Sewer Discharges	Center-wide	Regulatory
WWM-004	Missing Visual Inspection Records	Bldg 27D	Regulatory
WWM-005	Unpermitted Discharge of Equipment Wash Water	Bldg 83C	Regulatory
WWM-006	This Recommendation Has Been Deleted		Deleted
WWM-007	Proven Ability to Halt Actions with Imminent Danger to Health or Environment	Bldg 26	Positive
Water Quality Management			
WQM-001	Failed Backflow Prevention Device Not Repaired or Replaced	Bldg 24	Regulatory
WQM-002	Fire Protection Systems Lack Appropriate Backflow Protection	Center-wide	Recommendation
WQM-003	Inoperable Groundwater Measuring Device on Withdrawal Wells	Bldgs 24 and 31	Regulatory

NA = Not Applicable

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APPENDIX B

Documents Reviewed

Appendix B

Table B presents a summary of the documents reviewed during the EEFR conducted at NASA GB from May 1, 2017 to May 5, 2017.

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Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title)

Protocol	Document Title
Air Emissions	2015 Annual emissions certification report, March 25, 2016
Air Emissions	Annual asbestos notification, January 2017
Air Emissions	Boiler house monthly reports generator usage, boiler natural gas use
Air Emissions	Boiler visual emissions observations, February 2016
Air Emissions	Database of boiler use (natural gas and LF gas) diesel rolling 12 month totals
Air Emissions	Fuel delivery inspection forms, 2015 through 2017
Air Emissions	Fuel oil certifications, March 28, 2016
Air Emissions	Generator usage logs, 2017 through 2017
Air Emissions	Lab results for fuel oil sample, April 6, 2016
Air Emissions	Paint booth 1 visual emissions observations for Building 4, March 13, 2015 and December 8, 2016
Air Emissions	Paint booth 2 visual emissions observations for Building 4, August 5, 2015 and April 8, 2016
Air Emissions	Paint booth use logs for Building 4, 2015 through 2016
Air Emissions	Refrigerant usage log book for Buildings 24 and 31
Air Emissions	Review of air compliance database including boiler fuel usage, generator fuel usage, generator hours of operation, rolling 12 month nitrogen oxides calculations
Air Emissions	Semi-annual fuel report for boilers and generators, July 2016 through December 2016, January 26, 2017
Air Emissions	Title V Permit 24-033-00675, January 1, 2015
Cultural Resources	Curation agreement between NASA and Maryland Archaeological Laboratory, April 2015
Cultural Resources	Integrated Cultural Resources Management Plan, January 2017
Cultural Resources	Memorandum of Agreement for water tower redevelopment site, August 2016
Cultural Resources	State Historic Preservation Office correspondence package for Geodetic Observatory Project, 2017
Cultural Resources	State Historic Preservation Office correspondence package for water tower redevelopment, 2015 and 2016
EPCRA	2015 TRI applicability determination cover letter, May 25, 2016
EPCRA	2015 TRI persistent bioaccumulative toxics spreadsheet, May 2016
EPCRA	2015 TRI usage spreadsheet, May 2016
EPCRA	Tier II inventory report, February 27, 2017
Hazardous Waste	2015 Biennial Report, February 2016
Hazardous Waste	90-day hazardous waste accumulation inventory, May 1, 2017
Hazardous Waste	90-day weekly hazardous waste inspections, 2014 through 2017
Hazardous Waste	Analytical report for Building 4 filters waste analysis, phase separation science, October 12, 2016
Hazardous Waste	Goddard Procedural Requirement 8500.3F, Waste Management, August 5, 2013

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Hazardous Waste	Hazardous waste generator training records, 2014 through May 2017
Hazardous Waste	Hazardous waste manifests, 2014 through May 2017
Hazardous Waste	Integrated Contingency Plan, May 2013
Hazardous Waste	Land disposal restriction notices, 2014 through May2017
Hazardous Waste	Less than 90-day waste accumulation facility and program procedures March 2016
Hazardous Waste	Satellite accumulation point monthly inspections, 2014 through May 2017
Hazardous Waste	Waste characterization records, 2014 through May 20187
NEPA	Environmental Assessment for Implementation of Instrument Development Facility Area Development Plan, June 2015
NEPA	Environmental Assessment of Satellite Ground Communications Terminal Facility, October 2014
NEPA	Environmental checklist – Ascension Island Radiosonde Launches, May 2015
NEPA	Environmental Resources Document, December 2012
NEPA	Record of Environmental Consideration Building 83A Deconstruct Trailer, February 2017
NEPA	Record of Environmental Consideration for a Remote Studies for Science and Exploration, May 2015
NEPA	Record of Environmental Consideration for Gabon Africa Mangrove Field Campaign, January 2017
NEPA	Record of Environmental Consideration for Geomagnetically Induced Current in Powerlines, July 2014
NEPA	Record of Environmental Consideration for Mini Track Road Pedestrian Improvement, March 2017
NEPA	Record of Environmental Consideration for Olympic Mountain Experiment Field Campaign, November 2015
NEPA	Record of Environmental Consideration for Operation Ice Bridge Arctic Campaign, February 2017
NEPA	Record of Environmental Consideration Hosting Honeybee Hives, December 2016
NEPA	Record of Environmental Consideration Siberian Field Measurements, April 2016
Pesticides	Pest control application certification for Jeffrey H auf, 2017
Pesticides	Pest control application certification for Johnny Chaney, 2017
Pesticides	Pest control application certification for William Green III, 2017
Pesticides	Pesticide application records for Ehrlich, 2017
Pesticides	Pesticide application records for Melwood Training Center, 2017
Pesticides	Pesticide application records Regional Pests Management, 2017
Pesticides	Pesticide business license for Ehrlich, 2017

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Pesticides	Pesticide business license for Melwood Training Center, 2017
Pesticides	Pesticide business license Regional Pests Management, 2017
POL/Storage Tanks	Bi-monthly elevator preventive maintenance protocol, undated
POL/Storage Tanks	Bi-monthly elevator preventive maintenance records, May 25, 2016 through April 26, 2017
POL/Storage Tanks	Email from Juraj Mastar, Maryland Department of the Environment regarding diesel fuel secondary lines at Buildings 24, 24E, and 31, March 3, 2017
POL/Storage Tanks	Email from Thomas Yoo, Maryland Department of the Environment regarding oil operations permit integrity testing (24-OPT-3356), October 28, 2014
POL/Storage Tanks	Integrated Contingency Plan, 2013, amended November 9, 2016
POL/Storage Tanks	Letter from Edward A Connell chief, Medical and Environmental Management Division to Ms. Jackie Ryan, Maryland Department of the Environment responding to report of observations, February 13, 2015
POL/Storage Tanks	Oil Plant Operations Permit 2014-OPT-3356, January 15, 2014
POL/Storage Tanks	Preventive maintenance work order for Building 16 emergency generator, May 1, 2017
POL/Storage Tanks	Report of Observations by Maryland Department of the Environment, Land Management Administration, Oil Control Program, December 12 2014
POL/Storage Tanks	SHEtrack finding information inspection identification number 78738, Finding 73805, September 27, 2016
POL/Storage Tanks	Underground fuel piping assessment and corrective action plan for Buildings 24 and 31, February 11, 2015
POL/Storage Tanks	USPS test report for underground fuel pipe test dates December 10, 11, 12, and 19, 2014; and January 12, 2015, January 13, 2015
POL/Storage Tanks	USPS test report for underground fuel pipe test dates December 21 and 22, 2015, January 6, 2016
POL/Storage Tanks	USPS test report for underground fuel pipe test dates December, 7, 8, and 15, 2016, December 16, 2016
Solid Waste	Goddard Procedural Requirement 8500.3F, Waste Management, August 5, 2013
Solid Waste	Grayhand Trash Removal invoice, October 21, 2015 and October 1, 2016
Solid Waste	Medical waste shipment records, July 3, 2014 through April 26, 2017
Solid Waste	NETS waste diversion status, fiscal years 2014, 2015, and 2016
Solid Waste	Recycling receipts from Proco company, various
Solid Waste	Scrap tire worksheet, 2014-1, 2014-2, 2015-1, 2015-2, 2016-1, and 2016-2

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Solid Waste	Semi-annual scrap tire collections facility report and cover letter, January 1, 2014 through June, 30, 2014
Solid Waste	Semi-annual scrap tire collections facility report and cover letter, July 1, 2014 through December 31, 2014
Solid Waste	Semi-annual scrap tire collections facility report and cover letter, January 1, 2015 through June 30, 2015
Solid Waste	Semi-annual scrap tire collections facility report and cover letter, July 1, 2015 through December 31, 2015
Solid Waste	Semi-annual scrap tire collections facility report and cover letter, January 1, 2016 through June 30, 2016
Solid Waste	Sharps and biomedical waste management with the sharps recovery systems – by Sharps Compliance, Inc.
Solid Waste	Weight ticket for tire disposal, September 2, 2016
Toxic Substances	Asbestos awareness training slides
Toxic Substances	Asbestos certification for Tracy Avant, Sylvia Grimes, and Randy Denbrowicz, 2016 and 2017
Toxic Substances	Asbestos Hazard Emergency Response Act inspection report for Building 90, May 7, 2013
Toxic Substances	Asbestos Licenses for Tracy Avant and Sylvia Grimes, 2016
Toxic Substances	Asbestos survey for Building 90, spot check 2012
Toxic Substances	Electronic files of asbestos submittals for Buildings 1, 5, 8, 11, and 13, spot check 2014 through 2017
Toxic Substances	Goddard Procedural Requirement 1840.1B Asbestos Management Program, October 21, 2010
Toxic Substances	Polychlorinated biphenyl annual document log, calendar year 2014, 2015, and 2016
Toxic Substances	Polychlorinated biphenyl manifests and certificates of recycling – spot check 2014 through 2016
Toxic Substances	Tracking spreadsheet for asbestos submittals
Wastewater	Correspondence with state regarding water treatment chemicals, various
Wastewater	Erosion and Sediment Control Plan for replacing primary electric construction project, August 1, 2014
Wastewater	Grease trap and oil/water separator service log, 2016 through 2017
Wastewater	Greenbelt Settlement and Compliance Agreement Plan of Action, January 17, 2017
Wastewater	Greenbelt Stormwater Pollution Prevention Plan, May 2016
Wastewater	Inventory of total nitrogen and total phosphorous, July 2, 2012
Wastewater	List of Notice of Violations and pollutant concentrations for Washington Sanitary Sewer Commission discharge, February 2017

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Wastewater	Maryland Department of the Environment Discharge Permit 08-DP-3156A, National Pollutant Discharge Elimination System Permit MD0067482 quarterly discharge monitoring reports, January 2016 through March 2017
Wastewater	Maryland Department of the Environment Discharge Permit 08-DP-3156A, National Pollutant Discharge Elimination System Permit MD0067482, July 2, 2015
Wastewater	Monthly status updates for Settlement Agreement, January 3, 2017, January 31, 2017, February 27, 2017, April 3, 2017, and May 1, 2017
Wastewater	National Pollutant Discharge Elimination System monitoring test results, 1st round December 3, 2012
Wastewater	National Pollutant Discharge Elimination System bio monitoring test results, 2nd round, March 5, 2013
Wastewater	Semi-annual oil/water separator cleaning records, March 2011 through January 2017
Wastewater	Stormwater inspection records for Building 27, January 2015 through April 2017
Wastewater	Stormwater inspection records for landscaping contractor, 2016 through 2017
Wastewater	Stormwater inspection records for Salt Dome, 2016
Wastewater	Washington Sanitary Sewer Commission Discharge Monitoring Reports, March 2015 through February 2017
Wastewater	Washington Sanitary Sewer Commission Discharge Authorization Permit 00449, May 26, 2016
Wastewater	Washington Sanitary Sewer Commission Settlement and Compliance Agreement, December 28, 2016
Water Quality-Drinking Water	Backflow prevention device inspection records, 2015 through 2017
Water Quality-Drinking Water	Backflow prevention device inventory, May 2017
Water Quality-Drinking Water	State Water Appropriation Permit PG1998G023 (D3), May 22, 2006

Notes
EPCRA = Emergency Planning and Community Right-to-Know Act
NEPA = National Environmental Policy Act
POL = Petroleum, oil, and lubricant

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APPENDIX C

Personnel Interviewed

Appendix C

Table C presents a summary of the personnel interviewed during the EEFR conducted at NASA GB from May 1, 2017 to May 5, 2017.

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Table C -- Personnel Interviewed (sorted alphabetically by last name)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Abhilashi, Wellington ATA 321-286-2479	X			X								
Allen, Barry Chugach 301-286-7777	X						X	X			X	
Avant, Tracy NASA 301-286-2888										X		
Baker, Tony Chugach	X											
Balvin, Manual NASA 321-286-5364												X
Bavaria, Mark Trax International 301-286-6977	X						X	X			X	
Bentley, Kyle NASA 301-286-0441				X								
Best, David Shenondoah 301-286-6340				X			X	X	X	X		
Bicke, Ellen NASA 301-286-4124				X								
Blumenstock, Ken NASA 301-286-4268				X								
Boisclair, Jim Advantus 301-286-2509											X	

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Boschert, William NASA 301-286-2276				X								
Chaney, Johnny Ehrlich 240-375-7492						X						
Cherok, Ian Straughn 301-286-1562						X						
Cook, Jamie NASA 301-286-9160				X								
Dembrowicz, Randy NASA 301-286-8343										X		
Denney, Zach SSAI 301-286-8724				X								
DeVos, Pete 10 Creations 301-286-6730							X	X				
DiVenti, Tony NASA 301-286-6507				X								
Dravey, Gina Chugach 301-286-9156							X	X				
Edwards, Adam Chugach 301-286-9156							X	X				
Eigenbrode, Jennifer NASA 301-286-5967				X								

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Fatogona, Ouattara Straughn 321-286-4118	X											
Gavel, Frank Chugach 301-286-1135											X	X
Goddard, Diane NASA 301-286-5924	X											
Goode, Cindy Orbital ATK 301-286-8739				X								
Graff, Mark Chugach 301-286-60942	X											
Green, William Melwood 202-617-0530						X						
Grimes, Sylvia Inspection Expert, Inc. 301-286-0940										X		
Groff, Mark Chugach 301-286-8942							X	X				
Gross, Kelly ASCIS				X								
Grossman, Mollie NASA 301-286-8145				X								
Hall, Keene NASA 301-286-0947											X	

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Hiltz, Michael Chugach 301-286-0942	X											
Hrybyk, Leo ASCIS 301-286-9233			X	X						X		
Iliesh, Brad ILC Catering 301-286-6730						X						
Kellinhauser, Mark NASA 301-286-8658						X			X			
Kisser, Phyllis NASA 301-286-6530				X								
Kolos, Lynette NASA 301-286-3856				X								
Kutyrev, Alexander University of Maryland 301-286-6150				X								
Lehmann, Dorothy, Orbital ATK 301-286-7261							X	X				
Levine, Lori NASA 301-286-6741							X	X				
Levine, Lori NASA 301-286-6741											X	
Maks, Mark Chugach 301-286-4194	X											

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
McClendan, Mark NASA 301-286-4748				X							X	
McIntyre, Gerry NASA 301-614-6343				X								
McLain, Hannah The Catholic University of America 301-614-6920				X								
McLan, Jason				X								
Miller, Grace SGT 321-286-5738	X			X								
Montgomery, Beth NASA 321-286-0469		X	X									
Moxley, Kathy NASA 321-286-0717	X											
Mundell, Ruth Melwood 301-286-0805									X			
Nwagwe, Anthony Nalco 301-792-4349											X	
Odom, James NASA 301-286-5632				X								
Pavey, Jim Trax, International 301-286-9597							X	X				

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Perry, Mike Harris, Inc., 301-286-5300				X								
Phillips, Larry NASA 301-286-6035				X								
Pollack, Janine NASA 301-286-0509											X	X
Ramon, Braulio NASA 321-286-9952		X										
Reeves, Gregory NASA 321-286-9841	X											
Richardson, Troy Sierra Lobo 301-286-2775							X	X				
Rodriguez-Ramon, Lixa NASA 321-286-4613			X	X						X		
Santos, Joe NASA 321-286-0673	X											
Schauermann, Juri NASA 301-286-3076				X								
Siguelnitzky, Ariel NASA 301-792-2674				X								
Simmons, Jessie ASCIS				X								

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Spriggs, Cedric Chugach 321-286-4194	X											
Squib, Darlene NASA 321-286-6137						X			X			
Stein, Henry ASCIS 321-286-8874			X									
Syvarth, Howard ASCIS 301-286-8856							X	X				
Taminelli, Rob SSAI 301-614-6738				X								
Taylor, Michael NASA 301-286-2607							X	X				
Thomas, Byron Chugach 301-286-6330							X	X				
Thornton, Audra Federal Occupational Health 301-286-8351									X			
Van Meter, Doug Chugach 301-286-5422											X	
Westberg, John NASA 301-614-6385				X								

Table C -- Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
White, Ben Sierra Lobo 321-286-6464	X			X							X	
White, Dave Melwood 301-286-0026											X	
Wright, David Chugach 321-286-6330	X											

AIR = Air Emissions Management
CUL = Cultural Resources Management
EPCRA = Emergency Planning and Community Right-to-Know Act
HW = Hazardous Waste Management
NEPA = National Environmental Policy Act
POL = Petroleum, Oil, and Lubricant Management
PST = Pesticide Management
ST = Storage Tanks Management
SW = Solid Waste Management
TXS = Toxic Substances Management
WW = Wastewater Management
WQ-DW = Water Quality-Drinking Water Management

APPENDIX D

Sites/Areas Visited

Appendix D

Table D presents a summary of the sites/areas visited during the EEFR conducted at NASA GB from May 1, 2017 to May 5, 2017.

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Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Area 200				X								
Center-wide	X	X	X		X	X	X	X				
Outfall 001											X	
Outfall 004											X	
Sanitary Sewer Outfall											X	
Building 4, Plant Operations							X	X	X			X
Building 4, Plant Operations - Thermal Coatings Laboratory	X			X								
Building 4, Room 136, Lead Acid Battery Collection Site				X								
Building 5, Electroplating	X			X							X	
Building 5, Optics Laboratories				X								
Building 6, Space Sciences Laboratory										X		
Building 10, Environmental Testing Laboratory							X	X				
Building 12, Tracking/Telemetry Laboratory - Asbestos Abatement Areas										X		
Building 15, Aerospace Parts Cleaning Operations				X								
Building 18, Administrative Support										X		

Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Building 21, Meteorological System Development Laboratory							X	X				
Building 24 Central Heating/Refrigeration Complex	X						X	X			X	
Building 24, Central Heating/Refrigeration Complex - Replace Primary Electrical System											X	
Building 25, Network Training/Test Facility - Recycling Station									X		X	
Building 26, Management Operations									X	X		
Building 27, Mobile Equipment Support	X			X			X	X	X	X	X	
Building 27A, 90-day Storage										X		
Building 27F, Salt Dome											X	
Building 28, Technical Processing Facility - Recycling Station									X			
Building 29 (north of building), Open Dumping at Trailer									X			
Building 30, Detector Development Laboratory	X										X	X

Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Building 30, Materials Engineering Laboratories											X	
Building 30, Metallography Laboratory				X								
Building 30, Polymer Processing Lab				X								
Building 30, Tribology Laboratory				X								
Building 31, Heating and Refrigerant Plant											X	
Building 33, D219 Atmospheric Laboratory				X								
Building 33, Earth Sciences				X								
Building 33, Laser Laboratory				X								
Building 33, Mechanical Chemical Cleaning Laboratory				X								
Building 34, Exploration Sciences				X								
Building 34, Low Frequency Radio Laboratory				X								
Building 34, Soldering Area				X								
Building 34, Room 201A, Astro-chemistry Laboratory				X								

Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name) (continued)

POC NAME	AIR	CR	EPCRA	HW	NEPA	PST	POL	ST	SW	TXS	WW	WQ-DW
Building 34, Room 238A, Observational Cosmology Laboratory				X								
Building 34, Room C157, MOMA Laboratory				X								
Building 36, Flight Projects											X	
Building 38, F Suite Jedi Clean Room				X								
Building 83C, Landscape Maintenance											X	
Building 95, Auto Tech Center				X								
Building 97, Health Unit									X	X		
Building 416, Prop Test Site				X								

AIR = Air Emissions Management
CUL = Cultural Resources Management
EPCRA = Emergency Planning and Community Right-to-Know Act
HW = Hazardous Waste Management
NEPA = National Environmental Policy Act
POL = Petroleum, Oil, and Lubricant Management
PST = Pesticide Management
ST = Storage Tanks Management
SW = Solid Waste Management
TXS = Toxic Substances Management
WW = Wastewater Management
WQ-DW = Water Quality-Drinking Water Management

APPENDIX E

Upcoming Federal Regulations

Appendix E

Table E presents a review of upcoming federal regulations that have the potential to impact NASA Centers at some point in the future.

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Table E -- Upcoming Federal Regulations, 2017

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	Greenhouse Gases	Proposes to revise the following: • Definitions in PSD and Title V regulations • PSD provisions on GHG PALs • Various provisions to ensure that PSD or Title V rules do not require a source to obtain a permit based solely on GHG PTE Also proposes a SER of 75,000 tpy CO_2e for GHGs under the PSD program that would establish a threshold below which BACT is not required for GHG emissions	81 FR 68110	Proposed Rule	NA – Could be positive. Sources would not be required to obtain PSD or Title V permits based only on Greenhouse Gas potential to emit. Also proposes a 75,000 ton-per-year threshold for GHGs for installing Best Available Control Technology under PSD program.
Air	NAAQS – O3	Finalizes revisions to the 2007 Exceptional Events Rule for the exclusion of event-affected air quality data from regulatory decisions. Also announces availability of the final document, "Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations."	81 FR 68216	Final Rule Effective 9/30/2016	NA – Applicable to agencies. Exempts emissions associated with exceptional events (such as wildfires, hurricanes, etc.) from regulatory decisions. For example, if a hurricane caused wide-spread power outages and facilities had to use emergency generators for long periods of time and this resulted in exceedances of ozone standards, this would not count toward attainment status.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)

Air	ODS	Finalizes listing the following substances as acceptable substitutes in certain end use applications under the SNAP program:
		• Air conditioning and refrigeration:
		  • R-448A
		  • R-449A
		  • R-449B
		• Fire suppression and explosion protection:
		  • Solstice® FS
			81 FR 70029	Final Rule Effective 10/11/2016	NA – Could be positive as it adds additional materials as acceptable substitutes for ODS materials.

Air	Permits	Finalizes revisions to NSR and Title V program provisions to require electronic noticing of draft air permits and certain other program actions.	81 FR 71613	Final Rule Effective 11/17/2016	NA – Requires agencies to provide electronic notices of draft permits and other related actions.
Air	NAAQS	Proposes updates to nonattainment area classification thresholds and implementation requirements for the 2015 Ozone NAAQS, including establishing provisions for the 2015 standards in new Subpart CC of Part 51. Also solicits comments on two approaches for revoking the 2008 Ozone NAAQS.	81 FR 81276 https://www.gpo.gov/fdsys/pkg/FR-2016-11-17/html/2016-27333.htm	Proposed Rule	NA – GB is already in a non-attainment area for the 2008 ozone standard. The proposed rule is primarily an update to the implementing regulations previously promulgated for the 2008 ozone standard. EPA proposes to retain without significant revision the majority of the previous provisions to implement the new 2015 ozone standard.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	PSD	Finalizes revisions to PSD regulations to remove a date restriction from the current permit rescission provision. Also corrects an outdated cross-reference.	81 FR 78043 https://www.gpo.gov/fdsys/pkg/FR-2016-11-07/html/2016-26593.htm	Final Rule Effective 12/7/2016	NA – Greenbelt does not have a PSD permit.
Air	Refrigerants	Finalizes revisions to regulations on servicing or disposing of air-conditioning and refrigeration equipment, including: • Extending refrigerant management requirements to non-ODS refrigerants, such as HFCs • Lowering leak rate thresholds that trigger repair for equipment containing 50 lb or more of refrigerant • Requiring quarterly or annual leak inspections or continuous monitoring devices for equipment exceeding the threshold leak rate • Requiring owners and operators to submit reports if systems containing 50 lb or more of refrigerant leak 125% or more of a full charge in 1 calendar year • Requiring technicians to keep records of refrigerants recovered during disposal from systems with a charge size from 5 to 50 lb	81 FR 82272 https://www.gpo.gov/fdsys/pkg/FR-2016-11-18/html/2016-24215.htm	Final Rule Effective 1/1/2017	Low – Will require Greenbelt to maintain better records and control of their refrigerant management system.
Air	NSPS	Direct final rule revises NSPS procedures for assessing the acceptability of PM CEMS	81 FR 83160 https://www.gpo.gov/fdsys/pkg/FR-2016-11-21/html/2016-27849.htm	Final Rule Effective 2/21/2017	NA – Greenbelt does not have any PM continuous emissions monitoring systems.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	ODS	Finalizes revisions to expand the list of acceptable substitutes, list as unacceptable, and change the status of several acceptability determinations for certain substances and blends in multiple end-use categories, including: • Foam blowing agents • Fire suppression and explosion protection • Refrigeration and air conditioning Also finalizes the following narrowed use limits: • Space and aeronautics-related applications of certain spray and pour foam blowing agents through 12/31/2024 • Human-rated spacecraft and related support equipment applications of HFC-134a and R-404A in centrifugal and positive displacement chillers beginning 01/01/2024	81 FR 86778 https://www.gpo.gov/fdsys/pkg/FR-2016-12-01/html/2016-25167.htm	Final Rule effective /30/2017	Low – NASA made comments to the proposed rule. EPA rule will reduce the number of acceptable ODS substitutes. This primarily affects NASA regarding chillers and foam blowing agents. Greenbelt does not conduct foam blowing. Although not applicable to Greenbelt, rule does provide extension for human rated spacecraft and support equipment chillers and space and aeronautics applications through 2024. NASA is working to develop alternative foam blowing agents that meet the performance requirements and ODS restrictions.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	GHG	Finalizes revisions to the GHGRP that: • Streamline and simplify reporting, including removing unnecessary reporting requirements and requirements for certain facilities that report minimal or no emissions • Improve data quality, including revisions to improve verification and accuracy of data used to inform the U.S. GHG Inventory • Make clarifications and corrections • Amend calculation, monitoring, and measurement methods	81 FR 89188 https://www.gpo.gov/fdsys/pkg/FR-2016-12-09/html/2016-28564.htm	Final Rule effective in a phased approach between 1/1/2017 and 1/1/2019	NA – Greenbelt is not subject to GHG reporting.
Air	SIP – PM2.5	Proposes attainment designations for the 2006 24-hour PM2.5 NAAQS, including the following: • Attainment • San Francisco Bay Area, California Failure to Attain • Logan, Utah-Idaho • Salt Lake City, Utah	81 FR 91088 https://www.gpo.gov/fdsys/pkg/FR-2016-12-16/html/2016-30174.htm	Proposed Rule	NA – Greenbelt is not in any of the listed areas.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	NESHAP	Proposes the following: • Revise requirements for existing, new, or reconstructed industrial and non-industrial POTW • Revise applicability criteria, names, and definitions of industrial and non-industrial subcategories • Revise requirements related to emissions during SSM • Add requirements for electronic reporting • Make miscellaneous edits and technical corrections	81 FR 95352 https://www.gpo.gov/fdsys/pkg/FR-2016-12-27/html/2016-30471.htm	Proposed Rule	NA – Greenbelt does not have a POTW.
Air	Emissions	Proposes a federal plan to control emissions from existing CISWI units not covered under an approved state plan.	81 FR 3554 https://www.gpo.gov/fdsys/pkg/FR-2017-01-11/html/2016-31203.htm	Proposed Rule	NA – Greenbelt does not have any incinerators.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	RMP	Finalizes revisions to RMP regulations, including: • Revising accident prevention requirements for Program Level 2 or 3 processes • Requiring a root cause analysis as part of an incident investigation of a catastrophic release or similar near-miss • Requiring an independent third party to perform a compliance audit after a reportable release • Expanding emergency response requirements for Program Level 2 or 3 processes • Requiring certain facilities to conduct full field and tabletop exercises • Requiring facilities to make certain information publicly available and hold a public meeting after an RMP reportable incident	81 FR 4594 https://www.gpo.gov/fdsys/pkg/FR-2017-01-13/html/2016-31426.htm	Final Rule Effective 3/14/17	NA – Greenbelt is not subject to the RMP rule.
Air	PSD	Finalizes revisions to guidance and preferred dispersion models used in air quality assessments for ambient concentrations of air pollutants under the PSD program.	81 FR 5182 https://www.gpo.gov/fdsys/pkg/FR-2017-01-17/html/2016-31747.htm	Final Rule Effective 3/21/17	NA – Greenbelt does not have a PSD permit.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	SIP - Ozone	Finalizes finding that certain states failed to submit SIP revisions to satisfy requirements for the 2008 Ozone NAAQS for nonattainment areas and states in the OTR.	82 FR 9158 https://www.federalregister.gov/documents/2017/02/03/2017-02188/findings-of-failure-to-submit-state-implementation-plan-submittals-for-the-2008-ozone-national	Final Rule Effective 3/6/2017	NA – GB is in an area that the State failed to submit SIP revisions in a timely manner. However, any implications will be upon the State.
Hazardous Waste	Generator Rules	Finalizes revisions to the HW generator program, including: • Revising multiple definitions for classes of HW generators • Adding provisions to allow certain classes of generators to retain generator status following a single episodic event • Revising satellite accumulation area provisions • Revising record-keeping and reporting requirements • Providing additional guidance for HW determinations • Allowing certain transfers of HW • Revising various marking and labeling requirements	81 FR 85732 https://www.gpo.gov/fdsys/pkg/FR-2016-11-28/html/2016-27429.htm	Final Rule Effective 5/30/2017	Low – The federal hazardous waste rule changes were not yet effective and Maryland state hazardous waste regulations implementing these changes have not yet been promulgated.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Hazardous Waste	Import/Export	Finalizes revisions to regulations for export and import of HW from and into the U.S., including: • Allowing electronic submission of export and import documents • Allowing electronic validation of AES consent for shipments subject to RCRA export requirements prior to export • Aligning regulations with current OECD requirements	81 FR 85696 https://www.gpo.gov/fdsys/pkg/FR-2016-11-28/html/2016-27428.htm	Final Rule effective 12/31/2016	NA – The federal hazardous waste rule changes were not yet effective and Maryland state hazardous waste regulations implementing these changes have not yet been promulgated. In addition, the export and import of HW had not occurred at the facility.
Water	NPDES	Finalizes revisions to small MS4 regulations to allow alternative approaches for permitting authorities to determine adequate BMPs and other requirements necessary to reduce pollutants.	81 FR 89320 https://www.gpo.gov/fdsys/pkg/FR-2016-12-09/html/2016-28426.htm	Final Rule Effective 1/9/2017	High – Facility received draft of new permit that will specify specific BMPs and require reduction of impervious surfaces by 20% from 2002 baseline level (26.77 acres for GB).
Wastewater	Water	Interim final rule implements a new program and issues guidelines and criteria for EPA to provide credit assistance to eligible water and wastewater infrastructure projects.	81 FR 91822 https://www.gpo.gov/fdsys/pkg/FR-2016-12-19/html/2016-30194.htm	Final Rule Effective 12/19/16	NA – Would not be eligible.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Water Quality	Drinking Water	Finalizes requirement for PWSs to collect occurrence data for certain contaminants that may be present in drinking water but are not subject to SDWA standards.	81 FR 92666 https://www.federalregister.gov/documents/2016/12/20/2016-30469/revisions-to-the-unregulated-contaminant-monitoring-rule-ucmr-4-for-public-water-systems-and	Final Rule Effective 1/19/2017	NA – Exempt from monitoring requirements.
Water Quality	Drinking Water	Proposes to establish labeling requirements to differentiate plumbing products that meet lead free requirements from exempt products and to require manufacturers to certify compliance with requirements.	82 FR 4805 https://www.gpo.gov/fdsys/pkg/FR-2017-01-17/html/2017-00743.htm	Proposed Rule	NA – GB is not a manufacturer.

APPENDIX F

Upcoming State Regulations

Appendix F

Table F presents a review of upcoming state regulations that have the potential to impact NASA Centers at some point in the future.

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Table F – Upcoming Maryland, 2017

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	SIP	Finalizes SIP revisions, including: • Establishing separate regulations and requirements for COMs and CEMs required for large fuel-burning equipment • Removing requirement to use TM 90 on certain fuel-burning equipment	https://www.gpo.gov/fdsys/pkg/FR-2016-11-07/html/2016-26866.htm	Final Rule Effective 12/7/2016	NA – Greenbelt does not have any continuous opacity monitors or continuous emissions monitors.
NEPA	Planning	Proposes to revise and clarify provisions, including making information on certain EA materials available on the Department of Planning website.	http://www.dsd.state.md.us/MDR/4403.pdf	Proposed Rule	NA – Relates to public notification and outreach that NASA is already doing.
Water	Sediment Control	Proposes to amend requirements related to sediment control plans, including: • Amending the definition of "grading unit" • Extending the time period an approved sediment control plan is valid • Eliminating the requirement to inspect sites once every 2 weeks	http://www.dsd.state.md.us/MDR/4402.pdf	Proposed Rule	Low – Applicable, but will not have much impact.
Wastewater	Wastewater	Finalizes amendments to allow installation of conventional septic systems outside the Chesapeake Bay and Atlantic Coastal Bays Critical Area.	http://www.dsd.state.md.us/MDR/4323.pdf	Final rule effective 11/24/2016	Low – Doubtful GB will be installing septic systems.

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National Aeronautics and Space Administration

Environmental and Energy Functional Review (Q16207)

Goddard Space Flight Center
Wallops Flight Facility

NASA Contract No. NNA13AA14C/00210
Task Order 000216

Final Report
December 2017

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ENVIRONMENTAL AND ENERGY FUNCTIONAL REVIEW

FOR

WALLOPS FLIGHT FACILITY

FINAL REPORT

Prepared for:

Environmental Management Division
NASA Headquarters

Prepared by:

AECOM Technical Services, Inc
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560

NASA Contract No. NNA13AA14C/000210
Task Order 000216

December 2017

This report was developed based on information provided to AECOM assessors and observations made by the assessors during the assessment week. The information provided to assessors has undergone limited verification. All information in this report is provided to Center and HQ personnel in draft form so that information can be verified and NASA personnel can provide clarifications and corrections.

This report did not rely on the use of Classified National Security Information (CNSI). Information required to develop this report was received from Center personnel. If an instance occurred in which CNSI was knowingly reviewed, the AECOM policy is (1) Do not accept electronic copies, (2) Only view CSNI in person, on-site, during the EEFR, and (3) Do not extract any sensitive information in notes or for reports.

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List of Acronyms

AACM	Alternative Asbestos Control Method
AST	Aboveground storage tank
Bldg	Building
BMP	Best management practice
BPD	Backflow prevention device
CAA	Clean Air Act
CFC	Chlorofluorocarbons
CFR	*Code of Federal Regulations*
COSS	Center Operations Support Services
CRMP	*Cultural Resources Management Plan*
CWA	Clean Water Act
EEFR	Environmental and Energy Functional Review
EIS	Environmental Impact Statement
EMS	Environmental management system
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know
FONSI	Finding of No Significant Impact
FPMR	Federal Property Management Regulations System
FY	Fiscal year
GB	Greenbelt Campus
GHG	Greenhouse gas
gpd	Gallons per day
gpm	Gallons per minute
GSFC	Goddard Space Flight Center
GSA	General Services Administration
HAP	Hazardous air pollutant
HAZCOM	Hazard communication
HCFC	Hydrochlorofluorocarbons
HMIS	Hazardous Materials Information System
HMMS	Hazardous Materials Management System
HMR	Hazardous Material Regulations
HPO	Historic Preservation Officer
HQ	Headquarters
HVAC	Heating, ventilation, and air conditioning
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resource Management Plan
IRIS	Integrated Risk Information System
kg	Kilogram
LDR	Land disposal restriction
LEPC	Local Emergency Planning Commission
MACT	Maximum Achievable Control Technology
MEMD	Medical and Environmental Management Division

List of Acronyms (continued)

mg	Milligram
mmBtu	Million British thermal units
MW	Megawatts
NA	Not applicable
NAAQS	National Ambient Air Quality Standards
NACA	National Advisory Committee for Aeronautics
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	No further action
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPE	Nonylphenol ethoxylates
NPR	NASA Procedural Requirements
NPRM	Notice of Proposed Rulemaking
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NWP	Nationwide Permit
O&M	Operation and maintenance
O_3	Ozone
ODS	Ozone-depleting substance
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OU	Operable unit
OWS	Oil/water separator
P2	Pollution prevention
PCB	Polychlorinated biphenyl
PE	Professional Engineer
POL	Petroleum, oil, and lubricant
PP	Proposed plan
PPE	Personal protective equipment
ppm	Parts per million
PSD	Prevention of Significant Deterioration
psi	Pounds per square inch
PTE	Potential to emit
REC	Recommendation
RICE	Reciprocating Internal Combustion Engine
RPA	Registered Professional Archaeologist
RRAC	Regulatory Risk Analysis and Communication
SAA	Satellite accumulation area
SDS	Safety Data Sheet
SERC	State Emergency Response Commission

List of Acronyms (continued)

SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SPCC	Spill prevention, control, and countermeasure
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TEAM	*The Environmental Assessment and Management*
tpy	Tons per year
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
UHC	Underlying hazardous constituents
U.S.	United States
UST	Underground storage tank
VO	Volatile organic
WFF	Wallops Flight Facility

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1.0 Environmental and Energy Functional Review Program Summary

1.1 Purpose and Scope

The National Aeronautics and Space Administration Headquarters (NASA HQ), Environmental Management Division, has functional and management oversight of environmental compliance at all of the NASA Centers and component installations. The Environmental and Energy Functional Review (EEFR) Program was established and is managed on a three-year cycle.

The primary purpose of the EEFR Program is to allow NASA HQ to provide visibility and to more accurately assess compliance of each Center's environmental management system (EMS), energy/water, and environmental compliance programs. In addition, the EEFR Program provides an interactive process that brings an external perspective to the Centers' environmental programs and fosters proactive relations and communication between the NASA field installations and NASA HQ. The results of the EEFR meet requirements established by the Government Accounting Office, Inspector General, and Presidential directive and are a means to advise NASA Centers and HQ senior management of environmental management and technical issues that may impact agency EMS, energy/water, and environmental compliance programs.

The scope of the environmental compliance portion of the NASA EEFR Program is to assess compliance with federal, state, and local laws and regulations; applicable executive orders; and NASA environmental policies and procedures using *The Environmental Assessment and Management (TEAM) Guide*, which was developed and is maintained by the United States (U.S.) Army Corps of Engineers Construction Engineering Research Laboratory. The federal guide is updated quarterly and the state guide is updated annually. Table 1-1 shows the environmental media protocols presented in the *TEAM Guide*, although not all of these areas were reviewed during this EEFR.

Table 1-1. TEAM Guide Protocols

Environmental Media/Program Area	*TEAM Guide* Section Number
Air Emissions Management	1
Cultural Resources Management	2
Hazardous Materials Management	3
Hazardous Waste Management	4
Natural Resources Management	5
Other Environmental Issues National Environmental Policy Act Noise Pollution Prevention Remediation	6
Pesticide Management	7
Petroleum, Oil, and Lubricant Management	8
Solid Waste Management	9
Storage Tank Management	10
Toxic Substances Management Asbestos Lead-Based Paint Polychlorinated Biphenyl Radon	11
Wastewater Management	12
Water Quality-Drinking Water Management	13

This review addresses five core media areas including: air emissions; hazardous waste; petroleum, oil and lubricants (POL); wastewater; and water quality-drinking water. Other media protocols reviewed at Wallops Flight Facility (WFF) included cultural resources, National Environmental Policy Act (NEPA) requirements, pesticides, solid waste (medical waste only), and toxic substances - asbestos and polychlorinated biphenyls (PCBs). Storage tanks, hazardous materials – Emergency Planning and Community Right-to-Know, and Solid Waste (except medical waste) were not reviewed at WFF. In addition, the scope of the NASA EEFR Program includes a review of new and upcoming regulations that have the potential to impact NASA Centers.

1.2 Process

The environmental compliance review was conducted from April 24, 2017 to April 28, 2017 at NASA WFF, located in Chincoteague, Virginia. The EEFR team consisted of NASA HQ and AECOM personnel. Table 1-2 presents the names and responsibilities of the AECOM EEFR team members.

Table 1-2. Environmental and Energy Functional Review Team Members and Responsibilities

Team Member	Organization	Responsibility
Mr. Mike Green	NASA Headquarters, Washington DC	NASA Environmental and Energy Functional Review Team Leader
Mr. Bobby Harward, PE	AECOM Morrisville, NC	Contractor Project Manager Solid Waste (Medical Waste Only) and Toxic Substances Management
Mr. Gerald Baribeau	AECOM Sacramento, CA	Air Emissions and Hazardous Waste Management
Dr. Dan Cassedy, RPA	AECOM Morrisville, NC	Cultural Resources and Pesticides Management, and NEPA
Mr. Mike Blotzer, PE	AECOM Morrisville, NC	Hazardous Waste and POL Management
Mr. Paul Lorenz	AECOM Denver, CO	Wastewater and Water Quality-Drinking Water Management

Notes:
NASA = National Aeronautics and Space Administration
NEPA = National Environmental Policy Act
PCB = Polychlorinated biphenyl
PE = Professional Engineer
POL = Petroleum, oil, and lubricant
RPA = Registered Professional Archaeologist

The EEFR was divided into three broad areas: Environmental Program Management Assessment, Energy/Water Assessment, and Environmental Compliance Assessment. The AECOM team members were responsible for conducting the Environmental Compliance Assessment, which is a technical review of the Center's environmental program. The NASA HQ personnel focused on the Energy/Water and Environmental Program Management Assessments. This report details the Environmental Compliance Assessment results only. The results of the Energy/Water and Environmental Program Management Assessments are published by NASA HQ under separate cover.

During this assessment, the EEFR assessors reviewed applicable environmental records, reports, and files, and interviewed designated WFF civil servant and contractor employees responsible for various aspects of the environmental program. Additionally, the EEFR team toured facilities that performed environmentally related operations. Assessors were escorted to buildings and other work areas, and were provided access to necessary areas at WFF.

Following the site visit, this report was developed to present the results of the EEFR. Appendices A, B, C, and D summarize the findings and observations, documents reviewed, personnel interviewed, and the sites/areas visited during the EEFR, respectively.

1.3 Regulations Review

An additional element within the EEFR Program includes a review of new and upcoming regulations that have the potential to impact NASA Centers. AECOM receives periodic reports containing both federal and state regulatory summaries from the NASA Principal Center for Regulatory Risk Analysis and Communication (RRAC). The summaries are screened by RRAC to include environmental and health/safety items judged relevant to NASA or of broad general relevance. As part of the EEFR, team members evaluated new and upcoming regulations related to their protocol areas for potential impacts to the Center.

Reviews of new and upcoming regulations (from October 1, 2017 – April 11, 2017) were conducted by EEFR team members for their protocol areas to determine the potential impact to the Center.

The federal regulations review is provided in Appendix E, and the state regulations review is included in Appendix F. The tables provide the media, topic, summary, citation, effective date, and potential impact of these new and upcoming regulations. The last column within the tables presents a subjective evaluation of the potential impact the regulations may have on NASA at the Center. The EEFR assessor is responsible for providing an evaluation of the regulations in their protocol area, and assigns a ranking of High (H), Medium (M), Low (L), or Not Applicable (NA) for the potential impact. Although 13 media are represented within the *TEAM Guide* protocols, not all 13 media have new or upcoming regulations to be evaluated in the tables.

1.4 Finding and Observation Categories

Environmental compliance findings are categorized as significant, regulatory or policy. Findings are ordered according to severity, with significant findings being the most severe and requiring immediate action. Significant findings can result in a direct and immediate threat to human health, safety, the environment, or the Center's mission. Regulatory findings indicate noncompliance with a federal, state, or local regulation, an executive order, or permit. Policy findings indicate noncompliance with NASA policy, guidance, or instruction documents.

In addition to environmental compliance findings, this report presents observations identified during the assessment, divided into two categories: recommendations and positive observations. Recommendations are suggestions that are not required by a regulation, but, if implemented, could help reduce the potential for enforcement action or improve environmental programs. Positive observations are activities that go beyond standard practice or requirement of a particular environmental standard.

1.5 Results of EEFR

Table 1-3 presents numerical summaries of the findings and observations for WFF. The EEFR team identified 0 significant findings, 22 regulatory findings, 1 policy finding, 2 recommendations, and 4 positive observations. The media-specific sections of this report provide descriptions of each finding and observation. Appendix A presents a summary listing of the findings and observations, providing the title and category for each.

Table 1-3. Summary of Findings and Observations

Environmental Media	Findings			Total Findings	Observations		Grand Total
	Significant	Regulatory	Policy		Recommendations	Positive	
Air Emissions Management	0	1	0	1	0	0	1
Cultural Resources Management	0	1	0	1	0	0	1
Hazardous Waste Management	0	0	0	0	1	1	2
Other Issues - NEPA	0	1	0	1	0	1	2
Pesticide Management	0	0	0	0	0	0	0
POL Management	0	6	0	6	0	2	8
Solid Waste Management	0	3	1	4	1	0	5
Toxic Substances Management - Asbestos, PCB	0	0	0	0	0	0	0
Wastewater Management	0	3	0	3	0	0	3
Water Quality-Drinking Water Management	0	6	0	6	0	0	6
TOTAL	**0**	**21**	**1**	**22**	**2**	**4**	**28**

Notes:
NEPA = National Environmental Policy Act
PCB = Polychlorinated biphenyl
POL = Petroleum, oil, and lubricant

As part of this EEFR, an overall program health indicator was assigned to each program area (i.e. protocol). Program health indicators are intended to help Center management better

understand the overall health effects of their environmental program by evaluating each environmental program area separately. The assigning of program health indicators is based on a qualitative evaluation of each program area. The indicator categories are defined as follows, with color codes also used for simplicity:

Healthy (Green)

- Program is generally effective and on track in meeting a majority of the requirements, and/or
- Issues identified represent isolated incidents as opposed to systemic problems, and/or
- Little risk of regulatory enforcement action(s) exists.

Needs Improvement (Yellow)

- Program does not meet regulatory and procedural requirements in one or more program areas, and/or
- Issues identified point to systemic problems rather than isolated incidents, and/or
- Some risk of regulatory enforcement action(s) exists.

Requires Immediate Attention (Red)

- Program does not achieve major requirements in multiple program areas and/or
- Program is in significant noncompliance/nonconformance with requirements, and/or
- Direct environmental damage, health impacts, mission impacts or NOV with more than administrative implications may result, and/or
- Significant risk of regulatory enforcement action(s) exists, and/or
- Requires Center management involvement.

Program health indicators are based on the issues identified during the EEFR as well as the assessor's professional judgment. They are generally determined by three factors:

1. Whether the issues identified represent systemic problems versus isolated incidents.
2. Whether the issues identified represent key elements for that program, without which the program is likely to be substantially out of compliance.
3. Whether the issues identified indicate an upward or downward trend in the health of the program. Programs that appear to be declining in compliance status based on observations during the week of the EEFR are listed in Table 1-4 as "regressing" with a downward arrow. Programs that appear to have an improving compliance status are listed as "improving" with an upward arrow in Table 1-4.

Table 1-4 presents the program health indicators for the EEFR protocols and provides information on the health of the program.

Table 1-4. Program Areas, Health Indicators, and Summary

Program Area	Program Health Indicator	Program Summary

Air Emissions Management	**Green**	• Notable progress made to address air program issues-need to maintain course
		• Monthly and annual emissions calculations well-documented
		• Significant permit modifications requested in July 2016:
		  o Reclassifying generators as emergency generators
		  o Awaiting response from Virginia Department of Environmental Quality
		• WFF still operating under existing permits
		  o Facility remains in non-compliance with portions of the Reciprocating Internal Combustion Engine National Emissions Standards for Hazardous Air Pollutants requirements for non-emergency generators

Cultural Resources Management	**Green**	• Effective relationship with Virginia SHPO
		• Currently only one aboveground historic property and three archaeological sites to manage
		• A Programmatic Agreement established in 2014 streamlines consultation with SHPO and facilitates implementation of WFF programs
		• Several stipulations agreed to in the PA have not been completed
		  o Re-examine the archeological predictive model
		  o Develop a plan for the management of the Revolutionary War earthworks site
		  o Provide an annual status report

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary

Hazardous Waste Management	**Green**	• Well-managed hazardous waste program implemented across WFF
		• Three 90-day areas, 95 SAA, and permitted treatment unit
		• Excellent compliance at SAAs facilitated by best management practices
		  ○ Guidance specific to each SAA posted for users
		  ○ Monthly inspections completed by users

Other Issues - NEPA	**Green**	• NEPA program effectively monitors a high volume of WFF projects and programs
		• Wallops Institutional Consolidated Contract online portal includes tracking module that streamlines review process and ensures systematic evaluations
		• In last three years:
		  ○ Completed eight Environmental Assessments for both local and off-site programs
		  ○ Cleared 36 projects via Record of Environmental Consideration and 508 through Categorical Exclusions

Pesticides Management	**Green**	• Buildings contractor and grounds contractor have separate programs - application and recordkeeping conducted appropriately for both • United States Department of Agricultural employee licensed to apply bird repellent to flightline as needed • Grounds contractor stores pesticides on-site at secure storage facility

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary
POL Management	**Green**	• Comprehensive spill prevention, control, and countermeasure plan updated and certified annually • AST program well-managed with knowledgeable tank managers, good tank maintenance, and thorough inspection documentation • Excellent coverage of potential issues in annual training • Minor issues with portable ASTs identified • Inadequate drum storage containment at tenant site
Solid Waste Management (Medical Waste Only)	**Green**	• Medical wastes are properly managed at Health Unit and transported by vendor for disposal • Personnel have bloodborne pathogen training certifications
Toxic Substances Management - Asbestos, PCB	**Asbestos – Green**	• Well-coordinated program led by Facilities Asbestos Coordinator and effectively implemented with Safety, Environmental and contractors • Good recordkeeping including asbestos management and abatement plans, regulatory notifications, and manifests • Comprehensive asbestos inventory helps drive compliance for facilities projects • Contractors make proper notifications to the State prior to abatement activities and have requisite licenses and training certifications • NASA personnel need asbestos training certifications as required in GPR 1840.1B

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary
Toxic Substances Management - Asbestos, PCB, (continued)	**PCB – Green**	• No PCB Transformers, PCB-contaminated transformers, or other PCB equipment at WFF • Large PCB remediation projects were completed in 2015 and 2016 at North Island • PCB Annual Document Logs completed with minor deficiencies

Wastewater Management	**Yellow**	• Improper management of stormwater discharges from construction sites
		  ○ Incomplete stormwater pollution prevention plans
		  ○ Sediment discharging from job sites
		  ○ Paint waste discharged from Fire Station Project
		  ○ Oil sheen in water exiting Airfield Repair Project
		  ○ Appropriate inspections not performed and inspection personnel not trained for Airfield Repair Project
		• Wastewater treatment plant operating effectively and reducing pollutants to concentrations well below permitted levels

Table 1-4. Program Areas, Health Indicators, and Summary (continued)

Program Area	Program Health Indicator	Program Summary

Water Quality-Drinking Water Management	**Green**	• Knowledgeable operators and laboratory staff effectively operate two treatment plants and collect and analyze numerous samples
		• Excellent quality of water with parameters well below regulatory limits
		• Treatment system installed and has successfully reduced total trihalomethane concentrations
		• Multiple (44 of 130) backflow prevention devices not tested annually – root causes include:
		  o Dropped off recurring work program
		  o Certified technician has competing priorities
		  o Lack of comprehensive inventory
		• Missing screen for water tank overflow

Notes:

AST	=	Aboveground storage tank	SAA	=	Satellite accumulation point
PCB	=	Polychlorinated biphenyl	SHPO	=	State Historic Preservation Office
WFF	=	Wallops Flight Facility	POL	=	Petroleum, oil, and lubricant

1.6 Summary of EEFR Assessment

The intent of this section of the report is to highlight relevant issues identified during the EEFR, including some issues that are not necessarily documented in findings. Findings identified during the EEFR are summarized by protocol area in Sections 3.0 through 15.0. There are four categories of information identified during the assessment that are summarized and presented in this section:

- Risk to Mission.
- Knowledge Transfer
- Regulations Review
- Outbrief Summary

1.6.1 Risk to Mission

In addition to compliance findings, environmentally-related issues posing a potential risk to the mission of the Center are presented to Center management. While these issues may not represent a violation of state or federal regulations, they may be factors to consider in the Center risk management process. The following risks to mission were identified during the EEFR:

- Extensive wetlands on Wallops Island may constrain the footprint of future infrastructure without identification of acceptable mitigation strategies
- Poly- and Perfluoroalkyl Substances (PFAS) at Wallops – these emerging contaminants could potentially impact groundwater and surface water, which could require future investigation and remediation efforts

1.6.2 Knowledge Transfer

During the EEFR, the assessment team may identify operational practices or technologies used by Center personnel that could be used to improve environmental management or limit environmental liability at other Centers. The following practices were identified during the EEFR:

- Worst-case scenario spill exercises improve response readiness

1.6.3 Regulations Review

As part of the EEFR assessment, assessors reviewed new and upcoming federal and state regulations to evaluate their impact on Center operations. Summaries of these reviews are presented in Appendices E and F of this report. The impact of regulations to Center operations are rated as high, medium, low and not applicable. Regulations that could represent a medium or high likelihood of impacting the Center are summarized below:

- A final rule regarding wastewater and wastewater works operator licensing regulations may impact the certified operators at WFF.

1.6.4 Outbrief Summary

At the conclusion of the EEFR site visit, an outbrief was presented to Center management and the Environmental team to summarize relevant issues identified during the assessment. The information presented in the outbrief is summarized below.

Top Strengths: The assessment team recognized the following as strong, positive attributes of the environmental compliance program:

- NEPA program enables mission success and environmental protection through technology and personal networks
- Excellent management of hazardous waste satellite accumulation areas

Top Challenge: The assessment team recognized the following issues as ones that may require Center management support or additional resources to address:

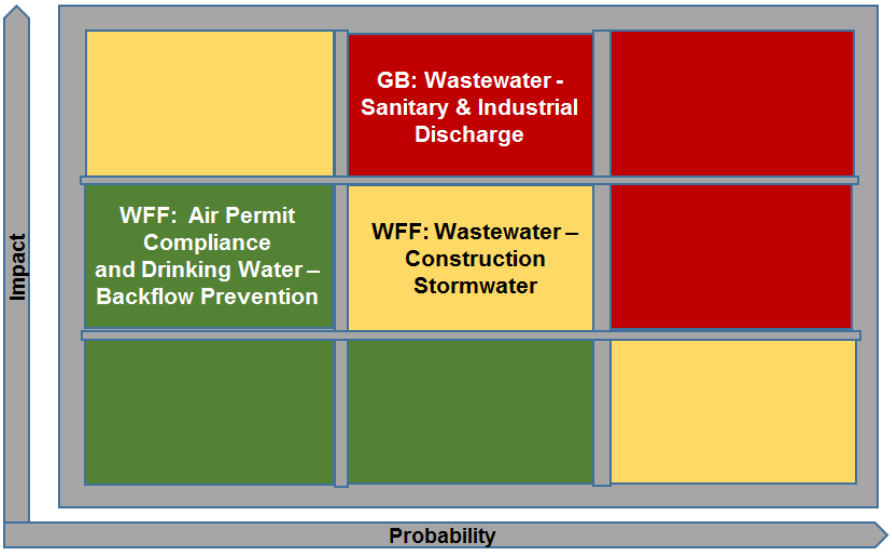
- Improper management of stormwater discharges from construction sites

Program Discussion: This topic provided a discussion of some of the issues identified during the week. The intent of this topic is not to present all findings identified; rather, this discussion provides examples of the type of findings that were identified:

- Multiple backflow prevention devices not tested annually
- Need continued attention to attain compliance with air permit generator requirements
- 2014 Programmatic Agreement for Cultural Resources Compliance has unfulfilled stipulations

Top Risk Matrix: This 3x3 Top Risk Matrix was presented to identify those programs that pose an elevated risk based on their relative impact and probability.

GSFC Technical Top Risk Matrix



1.7 Report Organization

The remainder of this report is organized as follows: Section 2.0 provides a description of WFF, its mission and its work force and Sections 3.0 through 15.0 present the operational descriptions and EEFR results for each protocol area. Appendix A contains a summary list of the findings and observations by presenting the title and category for each finding. Appendix B contains the documents reviewed, Appendix C lists the personnel interviewed, and Appendix D lists the sites or areas visited. The federal regulations review summary is provided in Appendix E, and the state regulations review summary is included in Appendix F.

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2.0 WFF Center Description

2.1 WFF Overview

WFF is located approximately three hours south of Baltimore, Maryland and two hours north of Norfolk, Virginia in the northeastern portion of Accomack County, Virginia on the Delmarva Peninsula. WFF includes three locations on Virginia's Eastern Shore: the Wallops Main Base, the Mainland site, and the Wallops Island launch site. It was established after several land acquisitions, organizational rearrangements, and consolidations under the management of Goddard Space Flight Center (GSFC). GSFC manages WFF; one of the oldest active launch ranges in the continental U.S. and the only rocket testing and launch range owned and operated by NASA. During its early history, the mission of WFF was primarily to serve as a test site for aerospace technology experiments. Over the last several decades, the WFF mission has evolved toward a focus of supporting scientific research through operation services and carrier systems (i.e., airplanes, balloons, rockets, and uninhabited aerial vehicles). Under the Wallops Strategic Implementation Plan, "Wallops Mission 2005," WFF assessed its current Mission Statement against the existing NASA and external environments and defined the overall Vision and Mission.

Elements of WFF priorities for the future (The early mission of WFF was primarily to serve as a test site for aerospace technology experiments and research. The current strategic vision and mission for WFF are:

- **Vision:** Extending NASA's reach for science and technology.
  - Enhance capabilities and increase number of flight opportunities for science and technology development.
  - Produce world-class science focused on earth science, sky-to-sea and coastal zone research.
  - Advance high-quality STEM education using Wallops' unique flight capabilities.
  - Serve as the nation's premier test and operation range offering safe, flexible, efficient access to suborbital and orbital flight operations at Wallops and around the world.

- **Mission**
  - Wallops powers scientific discovery and technology through unique access to space.
  - Wallops provided unique expertise, facilities, and carriers to enable rapid response, frequent, low-cost flight opportunities for a diverse customer base.

The Wallops Main Base, which covers 1,800 acres, is the location of many of the major functions and activities supporting the test range and research airport. It is bordered on the east by extensive marshland and creeks that lead into Chincoteague Bay and Chincoteague Inlet. The Mainland site is a strip of land located west of Wallops Island and covers 100 acres. This site is the location for radar, optical, communications, and command transmitter facilities. Wallops Island, named after a 17th century surveyor, is an Atlantic Ocean barrier island off the coast of Virginia approximately 7 miles southeast of the Wallops Main Base. Wallops Island is connected to the mainland by a causeway and bridge and covers 4,600 acres. Facilities such as the Mid-Atlantic Regional Spaceport (MARS) and the U.S. Navy Surface Combat Systems Center (SCSC) are located on the island. The total for all three locations of WFF comprises 6,500 acres: 3,000 acres of wetlands, 2,400 acres of woodland and brush, and 1,100 acres of cleared land. The AECOM EEFR Team visited all three locations. Maps are shown in Figure 2-1 and Figure 2-2.

2.2 WFF Work Force

The WFF Organization is shown on Figure 2-3. The GSFC Medical and Environmental Management Division/Code 250 is shown in Figure 2.4.

The workforce at WFF is divided into a number of organizational offices and directorates, which are further divided into smaller functional groups. Environmental functions are managed within the Management Operations Directorate. Within the Management Operations Directorate is the Medical and Environmental Management Division (MEMD) (Code 250). The MEMD carries out the environmental regulatory compliance functions for GSFC. The MEMD recommends policies and develops procedures that ensure GSFC is compliant with applicable environmental laws, regulations, and NASA directives. Program management responsibilities include Soil and Water Quality, Remediation, Restoration, Storage Tanks and POL programs, Hazardous Waste, Affirmative Procurement, Pollution Prevention, NEPA, EMS, Clean Water Act, Clean Air Act, Natural Resources, and Recycling.

Contracted environmental management support is provided to WFF by LJT & Associates. Such environmental management support includes, but is not limited to: permitting documentation, completing annual compliance self-assessments, conducting annual facility inspections, preparing and implementing Corrective Action Plans, providing environmental regulatory compliance support, managing on-site hazardous waste activities, preparing internal and external regulatory reports, and tracking the status of environmental programs.

Figure 2-1. Wallops Main Base Map

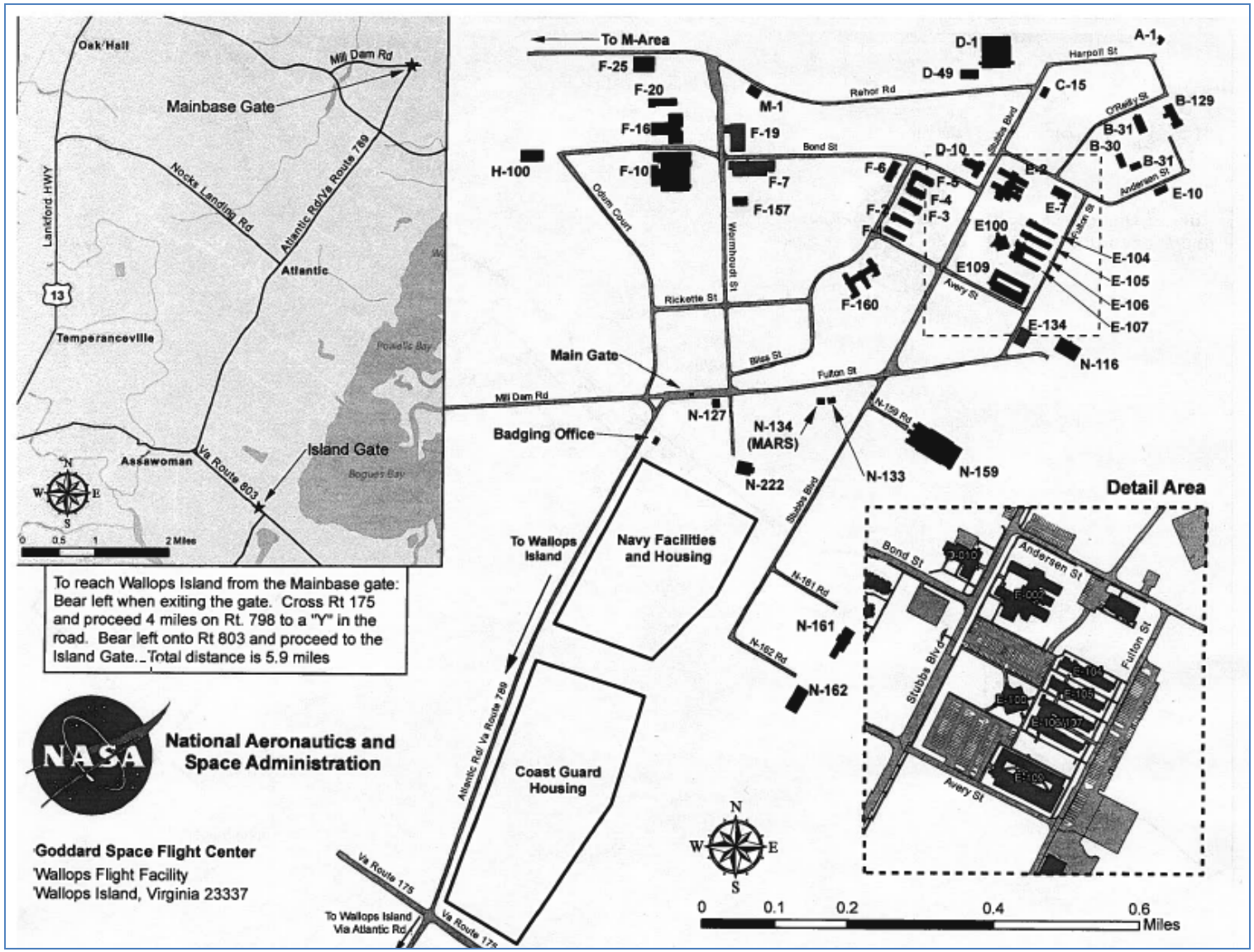


Figure 2-2. Wallops Island and Mainland Map

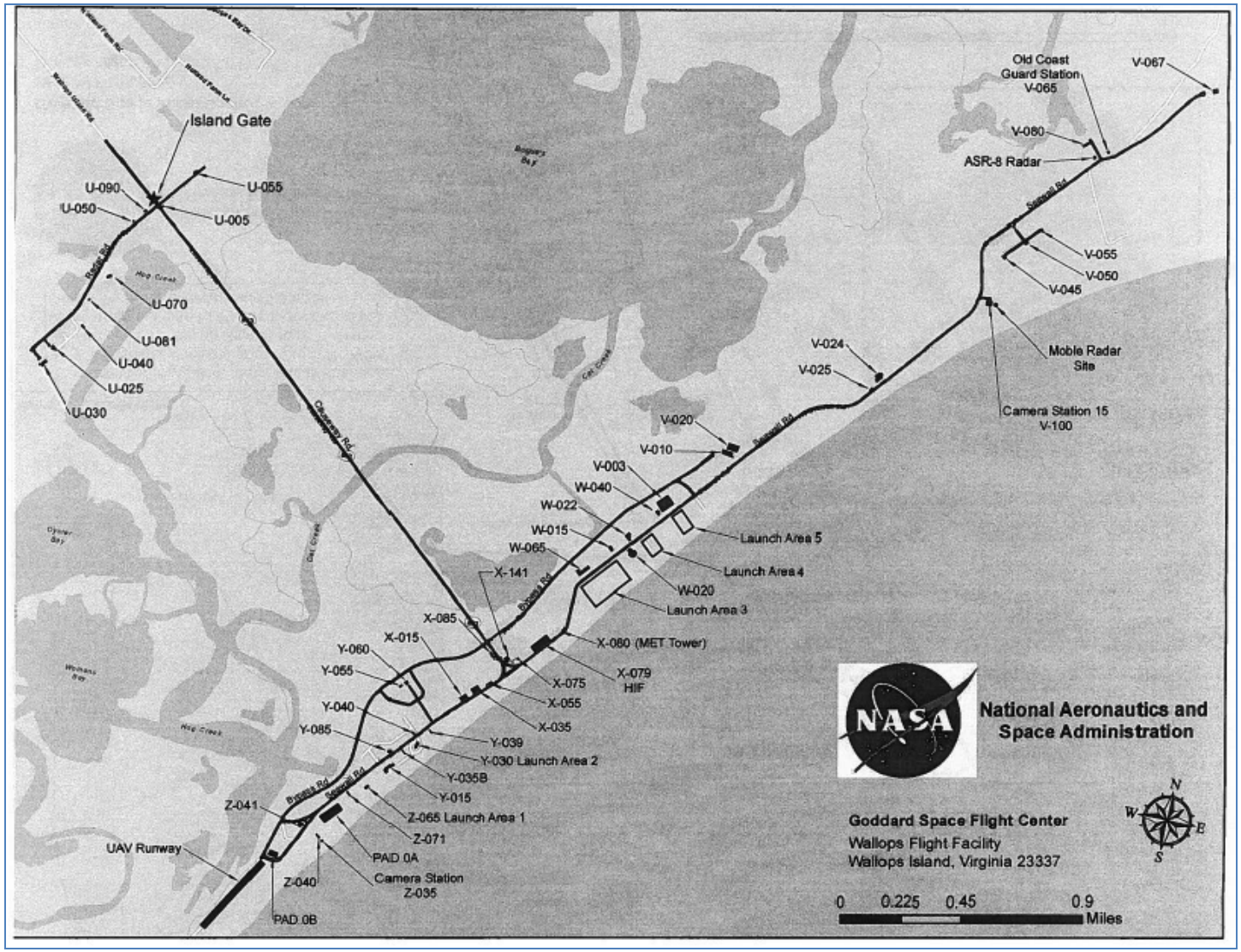


Figure 2-3. WFF Organizational Chart

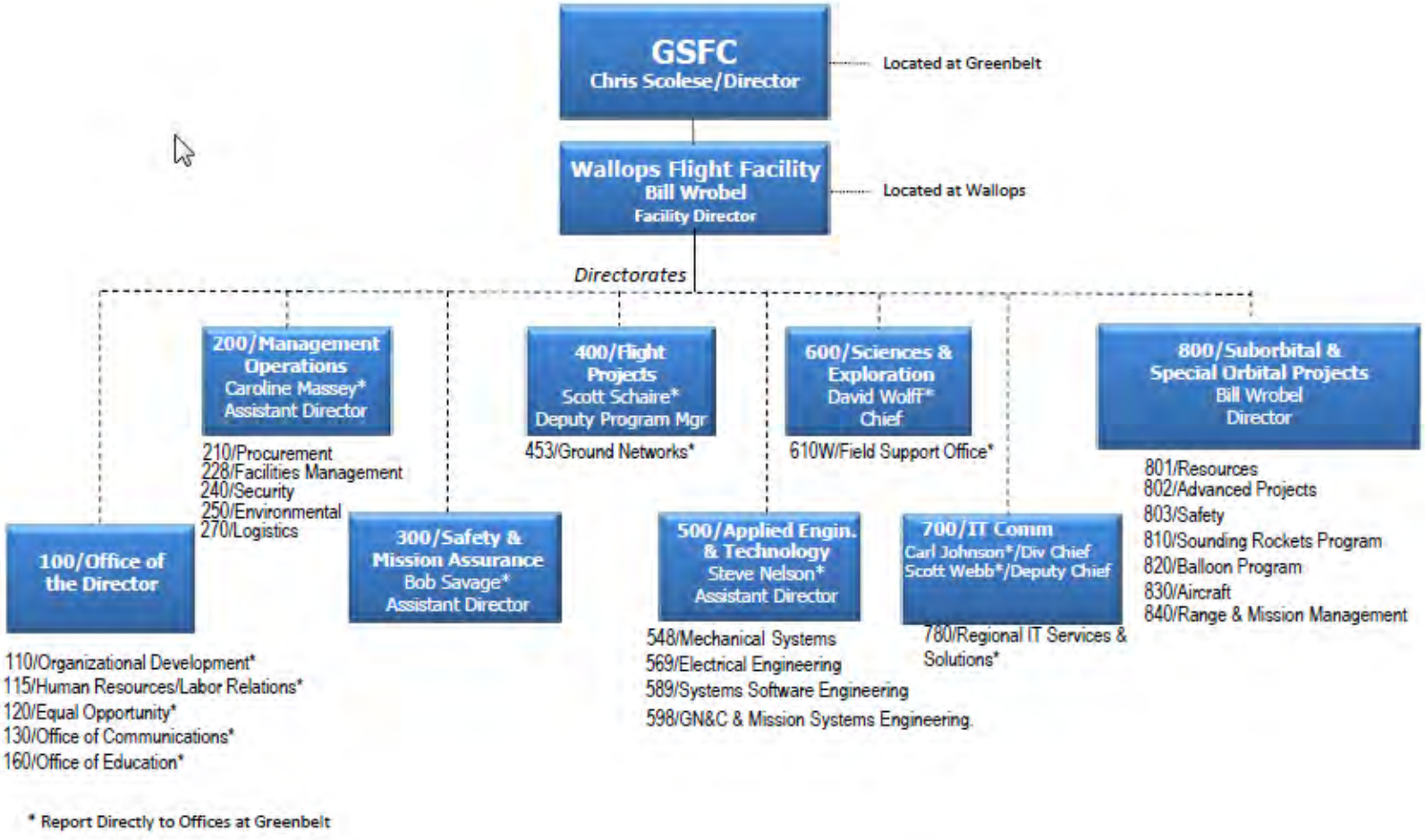
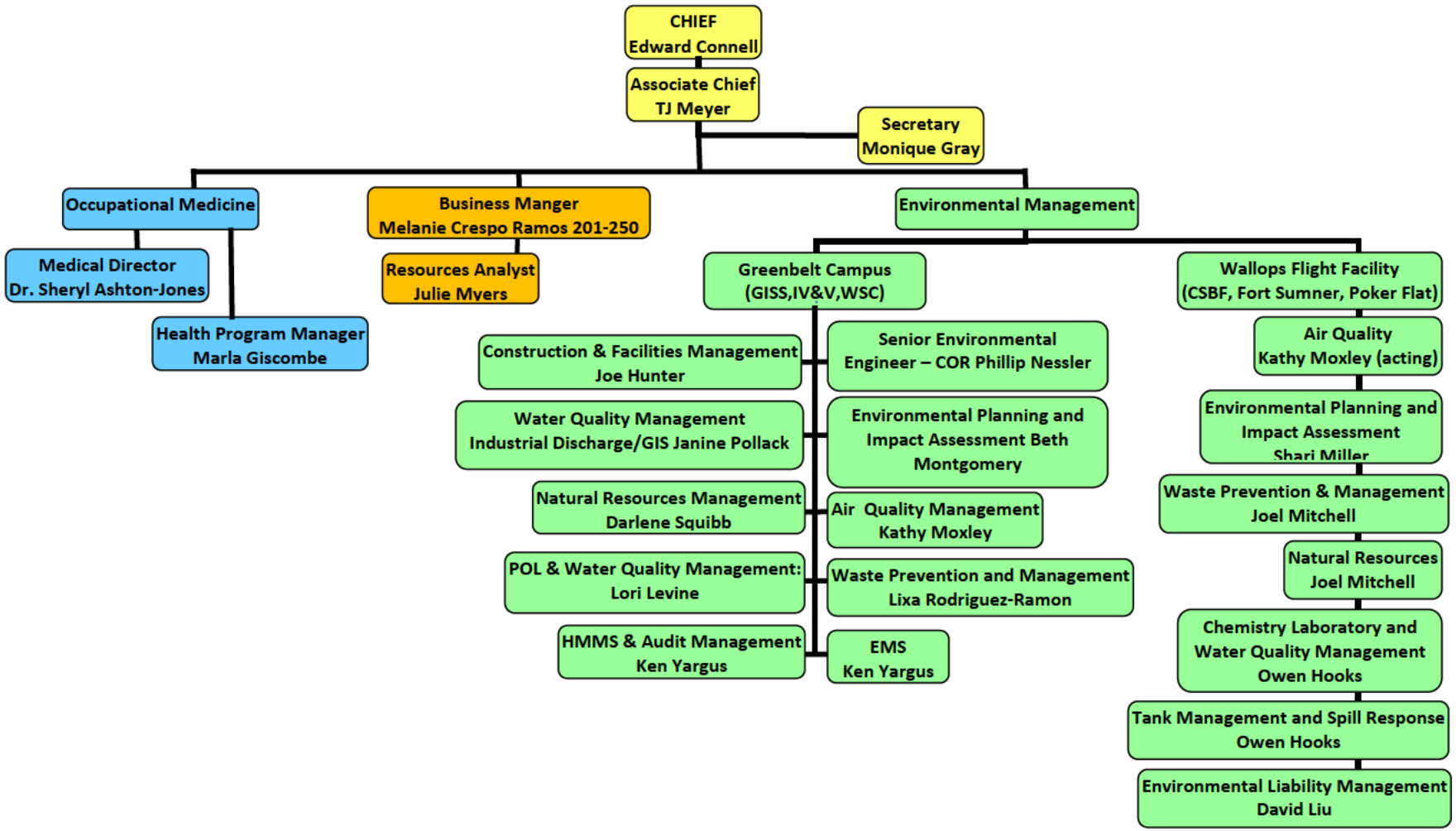


Figure 2-4. GSFC Medical and Environmental Management Division Code 250 Organization Chart



3.0 Air Emissions Management

This section presents the EEFR results for the air emissions management program at WFF. It describes the overall air emissions program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

3.1 Operational Description

The authority to enforce the CAA has been delegated by the U.S. Environmental Protection Agency (EPA) to the Commonwealth of Virginia Department of Environmental Quality (VDEQ). WFF has two permits issued by the VDEQ. Applications for permit modifications were submitted to VDEQ in July 2016, with additional subsequent data requests.

The Main Base State Operating Permit (SOP), registration # 40217, was most recently amended by VDEQ and issued on December 6, 2011. Stationary sources at the Main Base include boilers, generators, paint booths, various fuel storage tanks, parts washers, soldering and welding operations, and numerous small miscellaneous sources.

The Mainland/Island SOP, registration # 40909, was most recently amended by VDEQ and issued on February 10, 2014. Stationary sources on the Mainland/Island SOP include boilers, generators, a fire pump, a paint booth, fuel storage tanks, hydrazine fueling, static rocket testing, including open burning of waste solid rocket propellant.

Space research and technology is classified by EPA as an institutional source and therefore “existing” emergency generators (installed prior to 6/12/2006) at WFF are exempt from the federal Reciprocating Internal Combustion Engine (RICE) National Emissions Standards for Hazardous Air Pollutants (NESHAP) requirements of 40 CFR 63 subpart ZZZZ. However, the “existing” generators must continue to meet the definition of emergency generators (such as less than 100 hours per year for testing and maintenance), otherwise the engines will no longer be considered emergency engines and will be subject to the entire RICE NESHAP requirements. Emergency generators installed after 6/12/2006 are subject to the RICE NESHAP regulations of 40 CFR 63 subpart IIII and JJJJ (for compression and spark ignition respectively). WFF has several non-emergency generators that are subject to the RICE NESHAP regulations.

WFF has removed permitted sources associated with tenant operations from its air permits and those tenants now have their own permits which were not evaluated as part of the WFF EEFR.

The table below summarizes the environmental elements for the air emissions program:

Element	WFF
Regulatory Agency	Virginia Department of Environmental Quality
Attainment Status	Attainment
Major or Area HAP Source	Area
Title V Permit (permit number/expiration date)	No
Other Air Permits (permit number/issue date/expiration date)	Main Base: Registration #40217, issued 12/6/2011 Island/Main land: Registration #40919, issued 2/10/2014
GHG major source	No
NSPS/NESHAP Applicability:	
NSPS Subpart Dc - boilers	No
NSPS Subpart VVV - Polymeric Coating of Supporting Substrates Facilities	No
NSPS Subpart IIII - Compression Internal Combustion engines	Yes
NSPS Subpart JJJJ - Spark ignition Internal Combustion engines	Yes
NSPS Subpart OOO - Nonmetallic Mineral Processing Plants	No
NESHAP - Asbestos	Yes
NESHAP Subpart CCCCCC – Gasoline Dispensing Facilities	Yes
NESHAP Subpart JJJJJJ – Area Source Boilers	Yes
NESHAP Subpart ZZZZ - Existing IC engines	Yes
NESHAP subpart WWWWWW - Area Source plating and polishing	No
NESHAP - Aerospace	Yes
Subject to Risk Management Program	No
Boilers Fuel Type	Propane, diesel
Solid or Haz Waste Incinerator	No
Open Burn/Open Detonation	Yes
Spray painting or surface coating	Yes
Systems with 50 lbs refrigerant	Yes
Gasoline Dispensing	Yes
Other State/Local Requirements	No

3.2 Technical Findings

One regulatory finding was identified for the air emissions management program.

Finding Number:	AIR-001	**Finding Date:**	24-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Diesel Fuel Certifications Incomplete**
Finding Details:	40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, identifies requirements for stationary engines manufactured after April 1, 2007. This references 40 CFR 80.510 for diesel fuel to meet the following standards: maximum of 15 parts-per-million (ppm) sulfur content and either a minimum cetane index of 40 or a maximum aromatic content of 35 percent. Diesel fuel certifications from the facility's fuel supplier identified that the fuel was less than 15 ppm sulfur, but the certification did not indicate the cetane index or aromatic content.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 60.4207(b)
Other Criteria:	40 CFR 80.510(c)
Question Number:	AE.21.14.US
Source:	Federal Team Guide
Root Cause Explanation:	Facility staff had received the diesel supplier certifications and thought the sulfur content reported met the fuel standard and did not consider the cetane index or aromatic content.
Violation Type:	Registration/Certification
Finding ID:	Gasoline/Fuels Management
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Obtain a diesel fuel certification from the supplier that includes the cetane index or aromatic content that meets the standard in addition to the sulfur content.
Corrected During Audit:	No

Finding Number:	AIR-002	**Finding Date:**	27-Apr-17
Finding Rating:	Deleted	**Finding History:**	

Finding Title: **This Finding has Been Deleted**

Finding Details:

Facility Number:

Facility Name:

Regulatory Citation:

Other Criteria:

Question Number:

Source:

Root Cause Explanation:

Violation Type:

Finding ID:

ASTM Description:

Suggested Solution:

Corrected During Audit: NA

3.3 Technical Observations

There were no recommendations or positive observations identified for the air emission program.

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4.0 Cultural Resources Management

This section presents the EEFR results for the cultural resources management program at WFF. It describes the overall cultural resources program and presents findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

4.1 Operational Description

The Facility Historic Preservation Officer within the Facilities Office has been designated as the key point of contact responsible for managing cultural resources in compliance with federal, state, and local laws and regulations, as well as NASA procedures and instructions.

In 2014, NASA signed a programmatic agreement with the Virginia State Historic Preservation Office and the Advisory Council on Historic Preservation regarding the management of facilities, infrastructure, and sites at WFF.

WFF prepared an updated Integrated Cultural Resource Management Plan (ICRMP) in 2015 to guide the planning and management of historic and archaeological resources, and Historic Resources Eligibility Surveys were completed 2004 and 2011 to determine if there were any buildings or structures eligible for listing on the National Register of Historic Places (NRHP). Only one aboveground property has been determined NRHP-eligible: Building V-65 (Coast Guard Station) with its contributing structure, Building V-70 (Coast Guard Observation Tower).

WFF has not yet been subject to a comprehensive archaeological survey. However, the 2006 ICRMP presented an archaeological sensitivity model to help guide assessment of future project impacts. Future archaeological surveys should be limited to areas of high and moderate archaeological sensitivity identified in the model, and the Environmental Office incorporated the archaeological sensitivity model into the Facility Geographic Information System to facilitate review.

The table below summarizes the environmental elements for the cultural resources management program:

Element	WFF
Archaeological Sites	11
Historic Structures	1
Properties Eligible for or Listed on National Register of Historic Places	3
National Historic Landmarks	0

4.2 Technical Findings

One regulatory finding was identified for the cultural resources management program.

Finding Number:	CRM-001	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title: **Programmatic Agreement Stipulations Not Fulfilled**

Finding Details: Section 106 of the National Historic Preservation Act of 1966, as amended, requires federal agencies to consider the effects of projects they carry out, approve, or fund on historic properties. Implementing regulations at 36 CFR 800 outline a process for agencies to develop programmatic agreements to facilitate compliance with this mandate.

In 2014, NASA signed a programmatic agreement (PA) with the Virginia State Historic Preservation Office (HPO) and the Advisory Council on Historic Preservation (ACHP) regarding the management of facilities, infrastructure, and sites at WFF. Stipulation II of the PA stated the following:

"In accordance with NASA's Procedural Requirement for Cultural Resources, NPR 8510.1, NASA WFF HPO shall revise and update the NASA WFF ICRMP. As part of the updated ICRMP, NASA WFF shall:
1. Reexamine the archeological predictive model developed as part of WFF's Cultural Resources Assessment (2003); and
2. Develop a plan for the management of the Revolutionary War Military Earthworks (DHR ID# 44AC0089)."

In 2015, WFF prepared an updated Integrated Cultural Resources Management Plan (ICRMP). The updated ICRMP did not contain a re-examination of the archaeological predictive model or a management plan for the earthworks site.

Stipulation XV of the PA stated the following:

"The NASA WFF HPO shall provide an annual status report on July 1st, to the SHPO and other signatories to this Agreement to review implementation of the terms of this Agreement and to determine whether amendments are needed. The annual status report shall address the following:
1. A list of historic properties treated under this Agreement during the reporting period including activities not requiring review and activities resulting in no adverse and adverse effects to NRHP-eligible or listed properties;
2. A brief conditions assessment outlining the conditions at the Wallops Beach Life Saving Station and Tower and any repairs made or measures taken to ensure the ongoing preservation of the building;
3. Problems with implementation of this Agreement or issues encountered during the year;
4. Changes the NASA WFF HPO believes should be made in implementation of this Agreement; and
5. A list of all professional training opportunities attended by NASA WFF personnel relative to this Agreement provided during the reporting period and number of participants and organizations."

The WFF HPO did not prepare and file an annual status report in 2015 or 2016 as required.

Facility Number: Facility-wide

Facility Name:	NA
Regulatory Citation:	36 CFR 800.14(b)
Other Criteria:	Programmatic Agreement with Virginia State HPO and the ACHP, 2014
Question Number:	CR.5.2.US
Source:	Federal Team Guide
Root Cause Explanation:	Staff failed to review and implement the requirements established by the PA.
Violation Type:	Inadequate/Missing Plan
Finding ID:	Deficiency in Surveys/Plans/Records
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Prepare an update to the ICRMP that includes the required elements, and compile and file the missing annual status reports.
Corrected During Audit:	No

4.3 Technical Observations

There were no recommendations or positive observations identified for the cultural resources management program.

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5.0 Hazardous Materials Management - EPCRA

EPCRA was not reviewed during the EEFR.

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6.0 Hazardous Waste Management

This section presents the EEFR results for the hazardous waste management program at WFF. It describes the overall hazardous waste program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

6.1 Operational Description

WFF is a large quantity generator of hazardous waste operating under two identification (ID) numbers: the Main Base VA8800010763 and Wallops Island/Mainland VA7800020888. There are two 90-day areas on the main base in buildings B-29 and N-223 (N-223 is managed as a 90-day area but typically only accumulates used oil). There is one 90-day area for the Island and Mainland located at U-81. The VDEQ is the primary regulatory agency overseeing hazardous waste at WFF. EPA Region III also has enforcement authority over the site.

WFF also operates a permitted open burn treatment facility for unusable rocket motors. The final Part B permit was issued on September 20, 2005 and remains in effect from October 20, 2005 until October 20, 2015. A renewal application for the permit was submitted in May 2015. The facility also has a transporter ID number (VA8000107636) for transporting rocket motors to the open burn unit located at Wallops Island. Personnel at Wallops Island maintain documentation for the treatment activity at Building X-55.

There are multiple tenants located at WFF but all tenants have their own EPA ID number and manage their own wastes. Therefore, tenants with their own EPA ID number were not evaluated as part of the EEFR.

Hazardous waste accumulates at approximately 95 satellite accumulation areas at WFF. Used oil and/or universal waste is also accumulated in satellite areas. The largest hazardous waste streams at the facility are solvent-contaminated rags and paint-related wastes (e.g., waste paints and thinner). Typical hazardous wastes also include expired materials and miscellaneous wastes such as batteries and fluorescent lamps. Used oils from general facilities and equipment maintenance as well as spent rocket motors are also generated.

Each individual waste generator completes the hazardous waste disposal inventory form (GSFC 23-54) to request pickup of the waste. Personnel may provide Safety Data Sheets with this form as well as a description of the chemical constituents and wastes to be picked up. Based

on this information and, if appropriate, analytical results, Environmental personnel determine applicable waste codes and provide this information to Veolia, the off-site hazardous waste contractor. Veolia develops the profiles for off-site treatment and disposal. A spreadsheet is maintained that links the waste pickup to the line item of the manifest and the associated profile.

LJT personnel pick up wastes where they are generated and transport them to the appropriate less than 90-day accumulation area. They are also responsible for performing the required weekly inspections of the less than 90-day accumulation areas. Temporary 90-day sites are established where needed for specific projects. VDEQ is notified, per state rule, when these sites are established and removed.

Environmental personnel also coordinate off-site shipment of wastes from the less than 90-day accumulation areas at WFF to commercial hazardous waste treatment, storage, and disposal facilities. Personnel ensure that original copies of manifests from each shipment are returned within the required timeframe.

The table below summarizes the environmental elements for the hazardous waste management program:

Element	WFF
Generator Status	Main Base=LQG Island/Mainland=LQG
ID Number	Main Base = VA8800010763, Island/Mainland = VA7800020888
Hazardous Waste Transporter	Yes, ID VA8000107636
Permit Number	Unknown
Permit for treatment, storage or disposal	Yes, open burn treatment of waste rockets
Hazardous Waste Tanks	No
Number of 90 day sites	2 at Main Base and 1 at Island/Mainland
Number of satellite sites	~95
Aerosol Can Puncturing	No
Elementary Neutralization	No
Lamp Crushing	No
UW Status	SQ Handler
Acute Hazardous Waste	No
Military Munitions	No
Pharmaceutical Waste	Yes

6.2 Technical Findings

There were no findings identified for the hazardous waste management program.

6.3 Technical Observations

One recommendation and one positive observation were identified for the hazardous waste management program.

Finding Number:	HWM-001	**Finding Date:**	26-Apr-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title:	**Inspection Records Could Cause Confusion**
Finding Details:	The Bldg N-223 less than 90-day hazardous waste storage area only stored used oil, which was a non hazardous waste material that had no time limit for storage. WFF personnel were still required to conduct weekly inspections of the less than 90-day facility. All inspections were completed by personnel with appropriate and current training. The inspection form had questions regarding "are all containers marked as Hazardous Waste," and "Is the accumulation start date on all containers." Most of the inspections completed for the facility identified that these items were not applicable (NA) and stated "non-haz." However, the inspection completed on 4/11/17 identified "yes" to the questions and "non-haz." Additionally, the inspection completed on 1/3/17 identified both "yes" and "NA" to these questions, again with the words "non-haz." Identifying "yes" to these questions could cause confusion.
Facility Number:	Bldg N-223
Facility Name:	Hazardous Waste Storage Facility
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	Ensure that only NA is checked for the inspection questions "are all containers marked as Hazardous Waste." and "Is the accumulation start date on all containers" when only used oil is stored at the less than 90-day facility.
Corrected During Audit:	NA

Finding Number:	HWM-002	**Finding Date:**	26-Apr-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Excellent Guidance Posted at Satellite Accumulation Areas**
Finding Details:	WFF personnel posted instructions and guidance for the management of waste at each hazardous waste satellite accumulation area (SAA) that was specific to the waste generated at that SAA. This helped ensure that the waste was properly managed. Additionally, the individuals responsible for each individual SAA conducted monthly inspections of that SAA which provided ownership for and helped ensure compliance.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

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7.0 Other Environmental Issues - NEPA

This section presents the EEFR results for the NEPA program at WFF. It describes the NEPA program area and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

7.1 Operational Description

The Environmental Office is responsible for NEPA compliance at WFF. There are three general categories of projects that can potentially be subjected to NEPA review. These include two categories of institutional projects (those that exceed construction of facilities funding thresholds and those that fall below) and research programs.

WFF issued a Site-Wide Programmatic Environmental Impact Statement for expanding operations at WFF in July 2011. There is also an Environmental Assessment (EA) for recurring and proposed future activities. The EA incorporates as an attachment a comprehensive NEPA checklist. This detailed checklist allows the project proponent to methodically determine if the proposed action is covered by the EA. Completed checklists are reviewed by the NEPA coordinator at the Environmental Office. Based on the checklist information, and in compliance with NEPA, a Categorical Exclusion, EA, or Environmental Impact Statement is prepared. The NEPA determination is documented in the Record of Environmental Consideration. The Environmental Office coordinates public and agency involvement in this process and participates on the Facilities Utilization Review Board, which discusses all institutional projects at WFF, and the Range and Mission Management Office review process.

The table below summarizes the environmental elements for the NEPA program:

Element	WFF
EIS (number of active or completed in the last three years)	0
EA (number of active or competed in the last three years)	8

7.2 Technical Findings

One regulatory finding was identified for the NEPA program.

Finding Number:	OTH-001	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Commitment Made in Environmental Assessment Not Met**
Finding Details:	NASA regulations for implementing the National Environmental Policy Act (NEPA) include a requirement (14 CFR 1216.309) to assure that mitigation measures and other commitments associated with a decision and its implementation and described in an environmental assessment (EA) are carried out and have the intended effects. In addition, NASA Procedural Requirements 8580.1A, Chapter 1.2.7 j require that NASA NEPA Managers and Program Managers ensure that any mitigation and monitoring commitments that may be in a final NEPA document are executed. In June 2012, WFF issued an EA for Construction and Operation of an Unmanned Aerial Systems (UAS) Airstrip on North Wallops Island. The EA noted that the airstrip would be constructed adjacent to a Revolutionary War earthworks site (ID Number 44AC0089) that had been determined to be eligible for the National Register of Historic Places. The layout of the airstrip was designed to avoid direct impacts to the earthworks site, and in Section 4.2 of the EA, a commitment was made which stated that a long-term maintenance plan for the site would be developed by WFF to provide procedures for yearly vegetation removal. The EA stated that the plan would include monitoring for erosion and/or other damage to the earthworks through photo documentation and include provisions for short and long term stabilization techniques and emergency stabilization in the event of natural disasters, including hurricanes. The airstrip was constructed, but by April 2017, the maintenance and monitoring plan had not been developed and implemented.
Facility Number:	NA
Facility Name:	Unmanned Aerial Systems Airstrip
Regulatory Citation:	14 CFR 1216.309
Other Criteria:	NPR 8580.1A, Chapter 1.2.7 j
Question Number:	O1.5.14.US
Source:	Federal Team Guide
Root Cause Explanation:	Staff did not systematically track commitments made in the Environmental Assessment.
Violation Type:	No Testing/Verification
Finding ID:	Compliance Tracking/Reporting Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Prepare and implement the management and monitoring plan that was detailed in the EA.
Corrected During Audit:	No

7.3 Technical Observations

One positive observation was identified for NEPA program.

Finding Number:	OTH-002	**Finding Date:**	27-Apr-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Highly Effective NEPA Program**
Finding Details:	The NEPA program at WFF handled an unusually large case load of projects relative to the size of the facility. In last three years, they had completed eight Environmental Assessments for both local and off-site programs, which was more than most NASA facilities. They participated on the Facilities Utilization Review Board, which discussed all institutional projects at WFF, they worked closely with Range and Mission Management, and they implemented an environmental review component of the WICC online portal that created a tracking module to streamline reviews and ensured systematic evaluation of possible impacts. Environmental personal developed extensive personal networks throughout the facility that allowed them to support both agency mission success and environmental protection.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

8.0 Pesticide Management

This section presents the EEFR results for the pesticide management program at WFF. It describes the pesticide program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

8.1 Operational Description

Contractors conduct all pesticide and herbicide applications at WFF. The Wallops Institutional Consolidated Contract holder uses Advanced Pest Management (APM) to apply pesticides and NASA's grounds maintenance contractor, Didlake, to apply herbicides. Both APM and Didlake have pesticide business licenses.

APM stores and mixes pesticides at an off-site location, and then brings them onsite for application. Pesticides are applied to control mosquitoes, termites, and other nuisance pests. APM has certified applicators who perform treatment on the facility.

Herbicides are stored in a shed at the grounds maintenance facility (B-31) and are mixed outdoors at WFF. Roundup and Medal are the most common herbicides used at WFF. Didlake has multiple certified applicators that perform treatment on the facility.

United States Department of Agricultural applies pesticides to manage wildlife hazards to aviation safety. They do not currently use restricted-use pesticides, but could if needed for the removal of birds. The staff holds an appropriate applicator license and stores pesticide in a secure cabinet it Building A-1.

The table below summarizes the environmental elements for the pesticide management program:

Element	WFF
Application of pesticides or herbicides by Center personnel	No
Application of pesticides or herbicides by contractor	Yes
Store pesticides or herbicides onsite	Yes
Mix pesticides or herbicides onsite	Yes

8.2 Technical Findings

There were no findings identified for the pesticide management program.

8.3 Technical Observations

There were no recommendations or positive observations identified for pesticide management program.

9.0 Petroleum, Oil, and Lubricant Management

This section presents the EEFR results for the petroleum, oil, and lubricant (POL) management program at WFF. It describes the overall POL program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

9.1 Operational Description

WFF manages Jet-A, diesel fuel, No. 2 fuel oil, unleaded gasoline, lubricating oil, used oil, hydraulic fluid, mineral oil, and waste cooking oil. Hydraulic fluid and lubricating oils are used in vehicles and heavy equipment. Large users of lubricating oil and hydraulic fluid receive new oil in 55-gallon drums, while small users receive the oil in quart containers. Used oil is collected from several locations throughout the facility and stored in 55-gallon drums at Building N-223 prior to off-site disposal.

Diesel fuel and No. 2 fuel oil are stored throughout the facility in aboveground storage tanks (ASTs). The largest diesel fuel and No. 2 fuel oil ASTs are two 20,000-gallon tanks: D-9A and D-9B at the Central Heat Plant, Building D-8. Other ASTs located at various buildings at the Facility contain diesel fuel for emergency generators or No. 2 fuel oil for space heating. Contractors deliver all fuel to WFF.

Jet fuel is stored and used in bulk quantities at the airfield. NASA personnel manage a 30,000-gallon AST containing Jet-A fuel at the airfield tank farm. Fuel is delivered to this AST by tanker truck. Jet fuel from the AST is transported to aircraft on the flightline by two 6,000-gallon tanker trucks owned by NASA. These trucks are normally parked within a sloped secondary containment area when not in use next to the airfield.

Building F-26 has a 10,000-gallon gasoline AST and a 10,000-gallon diesel AST for dispensing fuel into automotive vehicles.

Since the storage of oils and fuels at WFF is greater than the regulatory threshold, the facility developed an Integrated Contingency Plan (ICP), which contains their spill prevention, control, and countermeasure plan. The ICP was last revised in January 2017. WFF is not a considered a Substantial Harm Facility, as defined by the Oil Pollution Act of 1990, and as a result, the facility is not required to have a Facility Response Plan.

WFF also has several tenants who manage diesel fuel, No. 2 fuel oil, unleaded gasoline, lubricating oil, used oil, hydraulic fluid, and kerosene. The tenants include the U.S. Navy, the National Oceanic and Atmospheric Administration (NOAA), the MARS, and the U. S. Coast Guard. The roles and responsibilities for oil management at each facility are defined in separate Memoranda of Understanding established between NASA and each tenant. While tenants were responsible for registration and management of their ASTs, the tenant oil POL usage was covered under the WFF Integrated Contingency Plan which was submitted and approved by the State.

The table below summarizes the environmental elements for the POL management program:

Element	WFF
SPCC Plan Required	Yes
Last Date of SPCC Plan	Jan-17
Facility Response Plan Required	No
Total Gallons of Oil Stored on site	342,696
Storing Diesel Fuel greater than 55 gallons	Yes
Storing Gasoline greater than 55 gallons	Yes
Storing E-85 greater than 55 gallons	No
Storing Jet Fuel greater than 55 gallons	Yes
Storing Used Oil greater than 55 gallons	Yes
Storing Waste Cooking Oil greater than 55 gallons	Yes, 1-300gal cooking oil tank
Storing Lubricating Oil greater than 55 gallons	Yes - drum storage
Storing Hydraulic Fluid greater than 55 gallons	Yes
Transformers with coolant oil greater than 55 gallons	Yes

9.2 Technical Findings

Six regulatory findings were identified for the POL management program.

Finding Number:	POL-001	**Finding Date:**	25-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Incomplete Inspection of Above Ground Storage Tank**
Finding Details:	40 CFR 112.7 requires that inspections and tests be completed in accordance with written procedures in the spill prevention, control and countermeasure (SPCC) plan with a record of the inspections and tests, signed by the appropriate supervisor or inspector maintained for a period of three years. Section 7.5 of the WFF Integrated Contingency Plan (ICP) required that the secondary containment provided for an aboveground storage tank (AST) be inspected monthly for signs of leakage from the AST. In addition, the ICP required that sensors installed to detect leaks into the interstitial space of double-walled ASTs be inspected and tested annually to ensure proper operation. The interstitial space of AST MSP-4, a double-walled, 200-gallon AST supplying diesel fuel to a mobile generator, was not inspected monthly for signs of leakage of diesel fuel into the interstitial space. In addition, it appeared that the leak detection sensor for the interstitial space was not connected to alarm or provide notification of a leak into the interstitial space, nor was there documentation that the leak detection sensor was inspected and tested annually to ensure proper function.
Facility Number:	Bldg E-134
Facility Name:	Mobile Electric Power
Regulatory Citation:	40 CFR 112.7(e)
Other Criteria:	WFF ICP, Section 7.5
Question Number:	PO.5.10.US
Source:	Federal Team Guide
Root Cause Explanation:	The tank manager was not aware that the tank was double-walled with interstitial leak detection and instead inspected the generator enclosure for signs of leakage from the AST.
Violation Type:	Operational Practices
Finding ID:	Spill Plan Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Connect the interstitial space leak detector sensor to alert personnel when there is a potential leak from the tank into the interstitial space. Inspect the interstitial space monthly for leaks and test the interstitial space sensor annually as required by the WFF ICP.
Corrected During Audit:	No

Finding Number:	POL-002	**Finding Date:**	25-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Replaced Aboveground Storage Tank Not Tagged Out-of-Service**
Finding Details:	40 CFR 112.7 requires that the spill prevention, control and countermeasure (SPCC) plan provide the type of oil and storage capacity of mobile containers or provide an estimate of the potential number of mobile or portable containers, the types of oil, and anticipated storage capacities. 40 CFR 112.7 also requires that inspections and tests be completed in accordance with written procedures in the SPCC plan with a record of the inspections and tests, signed by the appropriate supervisor or inspector maintained for a period of three years. A portable 500-gallon aboveground storage tank (AST) MSP-2 had been removed from service and replaced by another AST, also designated MSP-2. The out-of-service tank was located in the same general area where two other portable ASTs were staged for use. The out-of-service tank MSP-2 had not been marked or tagged to indicate that it was no longer in use, was not included in the WFF tank inventory, and was not being inspected as required by the WFF SPCC plan.
Facility Number:	Bldg E-134
Facility Name:	Mobile Electric Power
Regulatory Citation:	40 CFR 112.7(a)(3)
Other Criteria:	NA
Question Number:	PO.5.2.US
Source:	Federal Team Guide
Root Cause Explanation:	The WFF Integrated Contingency Plan (ICP) did not include procedures or processes for removing ASTs from service.
Violation Type:	Inadequate/Missing Plan
Finding ID:	Spill Plan Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Remove the out-of-service AST from the site or follow State of Virginia requirements for closure of tanks which are followed for tanks greater than 660 gallons in volume, including securing the tank against tampering and painting "permanently closed" on the sides of the tank.
Corrected During Audit:	Yes

Finding Number:	POL-003	**Finding Date:**	25-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Improper Spill Response**
Finding Details:	40 CFR 279.22 requires that responses to releases of used oil include clean up and proper management of the released oil and other materials. Section 4.1 of the WFF Integrated Contingency Plan (ICP) required immediate notification of the WFF Fire Department for minor (non-emergency) discharges of oil, which the ICP defined as involving less than 25 gallons of oil. The ICP also required discharge debris to be placed in properly labeled waste containers in the satellite accumulation area of Bldg B-129. A release of used oil at the 300-gallon used oil storage tank outside the Cafeteria kitchen was cleaned up using rags and the rags and recovered oil were placed in a 5-gallon plastic bucket. After removing the rags for disposal the bucket, containing residual oil, was left outside next to the storage tank. The bucket was observed completely filled to the point of overflowing with water and oil.
Facility Number:	Bldg E-2
Facility Name:	Cafeteria and Photo Lab
Regulatory Citation:	40 CFR 279.22(d)
Other Criteria:	WFF ICP, Section 4.1
Question Number:	POL.65.1.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel did not follow the discharge procedures contained in the ICP.
Violation Type:	Operational Practices
Finding ID:	Spill Cleanup Deficiency
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Train Cafeteria personnel in the required discharge response procedures.
Corrected During Audit:	No

Finding Number:	POL-004	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Surface Corrosion on Storage Tank**
Finding Details:	40 CFR 112.8 requires that the outside surface of oil storage containers be frequently inspected for signs of deterioration. In addition, if corrosion damage is found, additional examination and corrective action must be undertaken as indicated by the magnitude of the damage. The WFF Integrated Contingency Plan (ICP) required that monthly inspections of ASTs include identifying signs of deterioration, leaks, corrosion, and thinning; and that all problems regarding tanks, piping, or containment be recorded on the inspection form for initiation of a work order. Surface corrosion was observed on AST MSP-3 and work orders had not been initiated.
Facility Number:	Bldg E-134
Facility Name:	Mobile Electric Power
Regulatory Citation:	40 CFR 112.8(c)(6)
Other Criteria:	WFF ICP, Section 7.2
Question Number:	PO.20.4.US
Source:	Federal Team Guide
Root Cause Explanation:	Tank manager for AST MSP-3 did touch-up painting of the tanks under his control.
Violation Type:	Operational Practices
Finding ID:	Other (please indicate in the "details" field the nature of the finding)
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Submit work orders for removal of the tank corrosion and repainting to protect tank integrity.
Corrected During Audit:	No

Finding Number:	POL-005	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Inadequate Drum Storage Secondary Containment**
Finding Details:	40 CFR 112.8 requires that all bulk storage tanks, including portable containers 55-gallons capacity or greater, be provided with a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. The WFF Integrated Contingency Plan (ICP) required that 55-gallon drums be stored inside maintenance areas or storage areas where secondary containment was provided by spill containment pallets or other engineered designed system. The Mid-Atlantic Regional Spaceport periodically stored 55-gallon drums of lubricant and hydraulic fluid outdoors on containment pallets adjacent to the MARS-33 aboveground storage tank. The two-drum containment pallets had a capacity of approximately 30-gallons, which was 25 gallons below the capacity of a single 55-gallon drum. The four-drum containment pallets had a capacity of approximately 60-gallons. A 300-gallon capacity plastic tote used to accumulate used hydraulic oil was stored on a four-drum pallet with a capacity of approximately 60-gallons, which was 240 gallons below the capacity of the tote. None of the containment pallets had adequate freeboard to accommodate precipitation. Due to recent rains the containment pallets were about half-full of rain water, reducing their capacity to roughly 15- and 30-gallons.
Facility Number:	MARS Pad 0-A
Facility Name:	Launch Complex
Regulatory Citation:	40 CFR 112.8(c)(2)
Other Criteria:	WFF ICP, Section 2.2.3
Question Number:	PO.20.4.US
Source:	Federal Team Guide
Root Cause Explanation:	Personnel were not familiar with containment requirements.
Violation Type:	Containment
Finding ID:	Deficiency in Spill Equipment
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Collect used hydraulic fluid in 55-gallon drums. Store drums in outdoor storage containment lockers with a minimum sump containment capacity of at least 55 gallons.
Corrected During Audit:	No

Finding Number:	POL-006	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Drum Storage Not Included in Plan**
Finding Details:	40 CFR 112.7 requires that spill prevention, control, and countermeasure (SPCC) plans describe the physical layout of the facility and include a facility diagram, which marks the location and contents of each fixed oil storage container and the storage area where mobile or portable containers are located. For mobile or portable containers, the SPCC plan must either provide the type of oil and storage capacity for each container or provide an estimate of the potential number of mobile or portable containers, the types of oil, and anticipated storage capacities. The WFF Integrated Contingency Plan (ICP), which incorporates the WFF SPCC, identified the locations, contents, and capacities of the WFF drum storage areas in Table C-5; however, the table did not identify the drum storage area at the Mid-Atlantic Regional Spaceport (MARS) located adjacent to the MARS-33 aboveground storage tank. In addition, the locations of the drum storage areas were not identified on the facility diagrams in Appendix B.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 112.7(a)(3)
Other Criteria:	NA
Question Number:	PO.5.2.US
Source:	Federal Team Guide
Root Cause Explanation:	WFF personnel were not aware that the locations needed to be indicated on the facility diagrams.
Violation Type:	Inadequate/Missing Plan
Finding ID:	Spill Plan Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Add the MARS drum storage area to the WFF ICP Table C-5. Add the locations of the drum storage areas to the facility diagrams in Appendix B.
Corrected During Audit:	No

9.3 Technical Observations

Two positive observations were identified for POL management program.

Finding Number:	POL-007	**Finding Date:**	26-Apr-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Excellent Spill Prevention Training**
Finding Details:	Employees involved in handling petroleum, oils, and lubricants attended the WFF annual Integrated Contingency Plan (ICP) and Stormwater Pollution Prevention Plan (SWP3) Training. The training contained excellent examples of good spill prevention practices, equipment, and potential impacts of a spill on the local coastal environment.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

Finding Number:	POL-008	**Finding Date:**	27-Apr-17
Finding Rating:	Positive	**Finding History:**	New

Finding Title:	**Excellent Use of Spill Exercises to Evaluate Worst-case Scenario Spill Response**
Finding Details:	The WFF Integrated Contingency Plan included not only regulatory-required estimates of worst-case spill scenarios, but also included descriptions of spill drills based on worst-case spills at the Mid-Atlantic Regional Spaceport and the WFF Main Base runway apron. The drills allowed WFF personnel to evaluate weather effects, potential flow, time to shut down and contain the leaks, and options for containing a leak before it reached a waterway. Post-drill discussions resulted in identifying changes in staging spill response equipment and other improvements in spill response planning.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	NA
Question Number:	NA
Source:	NA
Root Cause Explanation:	NA
Violation Type:	Not Applicable
Finding ID:	Not Applicable
ASTM Description:	0 Not applicable.
Suggested Solution:	NA
Corrected During Audit:	NA

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10.0 Solid Waste Management

This section presents the EEFR results for the solid waste management program (medical waste only) at WFF. It describes the solid waste program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

10.1 Operational Description

The NASA Health Clinic generates medical waste which is collected in red-bag containers located throughout the clinic. Sharps are placed in compliant rigid containers and placed in the red-bag containers when full. When the red-bag containers are full, they are placed in a shipment box in a locked storage room, labeled and packed by the facility, and as needed transported and disposed of by a contractor Curtis Bay. Historically the clinic contractor (LJT) would call Curtis Bay when a pickup is needed, which has averaged about twice per year. A contract modification will result in future pickups every 3 months. Manifests are prepared by MEMD and the shipment container is taken to the gate to meet the Curtis Bay representative for transport and disposal.

The table below summarizes the environmental elements for the solid waste management program:

Element	WFF
On-site landfill	NR
Solid Waste Incinerator	NR
Receive garbage from outside US	NR
Medical Waste	Yes

NR – Not Reviewed

10.2 Technical Findings

There were no findings identified for the solid waste management program.

10.3 Technical Observations

There were no recommendations or positive observations identified for solid waste management program.

11.0 Storage Tank Management

The storage tank management program was not reviewed during the EEFR.

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12.0 Toxic Substances Management - Asbestos and PCB

This section presents the EEFR results for the toxic substances management program at WFF. It describes the toxic substances program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

The toxic substances management program includes polychlorinated biphenyls (PCBs), and asbestos. The operational description of each area is provided below.

12.1 Operational Description

Asbestos - Most friable materials were removed in the late 1980s. Some transite (non-friable), ACM floor tile & mastic (non-friable), ACM roofing materials (non-friable), and a limited amount of mudded fittings at pipe elbows still remain. Suspect material inventories of all buildings constructed prior to 1981 have been produced and a list of ACM's and PACM's, including locations of known ACM's, were included in the 2007 reports. Additionally, detailed reports (including sampling of all PACM's) were produced for 17 priority buildings in 2009. The reports are included in FMB's GIS database.

A facility-wide survey that was completed in two phases, in 2007 and 2009, identified areas with asbestos-containing materials (ACMs), although asbestos is no longer used extensively at WFF. The facility manages asbestos abatement projects according to federal, state, and local regulations and maintains records of asbestos abatement projects. These projects include major demolition and renovation projects as well as routine maintenance activities. The WFF Facilities Asbestos Coordinator collaborates with safety, environmental and contractors to evaluate and assist with WFF's compliance with Federal and State asbestos regulations and facility policies and procedures.

A WFF Asbestos Management Plan has been developed in conjunction with GPR 1840.1, Asbestos Management Program at Goddard Space Flight Center (GSFC). This plan applies only to Wallops. Per GPR 1840.1, a Wallops Facility Asbestos Coordinator has been designated.

Buildings scheduled for renovations, modifications, or demolition are first checked by reviewing the suspect inventories and additional reports prior to determining the need for further testing. If an affected area includes either PACM's or ACM's from the report, a further inspection and abatement plan is produced by a licensed company contracted by NASA's WFF FMB. The abatement plan is reviewed by the Safety Office and FMB, approved, and all

submittals/notifications are received before abatement and after abatement. All hazardous material (i.e.-ACM) identification and abatement strategies are built into the design process where scheduled projects are concerned.

All abatement work is contracted to outside companies. A NASA civil servant from the Environmental Office signs all disposal manifests (both on-site and off-site contractors). Manifests are stored in the Environmental Office.

PCBs - PCB equipment such as transformers and light ballasts were previously used extensively at WFF. Between 1985 and 1995 NASA implemented a transformer inventory, management, replacement/change-out, and disposal program at WFF. The program consisted of identifying those in-service and out-of-service transformers that were regulated by TSCA, the replacement and tracking of those units, and the disposal of regulated and non-regulated out-of-service transformers and dielectric fluids. Concurrent with this program, NASA initiated a separate base-wide environmental survey to assess environmental conditions at WFF and to identify areas within the facility where past activities may potentially present an environmental impact.

All PCB transformers have been replaced with transformers that use non-PCB mineral oil. Switch gears, capacitors, and circuit breakers do not use PCB fluids but use air insulation. An energy reduction program drove this change-out. Also, all electrical equipment is inspected by the Environmental Office prior to release to salvage.

PCB management at WFF is performed by the Environmental Office, the electrical shop, and the engineering and construction group. The Environmental Office maintains annual PCB logs and disposal and transportation manifests.

Two areas on the Island (Area of Interest 20-Pole-Mounted Transformer and North Island Transformers) were evaluated and remediated for PCB contamination. No additional PCB-contaminated areas have been identified at WFF.

The transformer room of Building E-106 was the site of a previous release of PCB containing oil. Although PCBs remain in place, the room is locked, has limited access, and the floor has been triple-washed and encapsulated with a double coat of paint, with PCB warning signs posted in the room

The table below summarizes the environmental elements for the toxics substances management program:

Element	WFF
PCB Transformers (>500 ppm)	No
PCB Contaminated Transformers (>50ppm, <500ppm)	No
PCB Capacitors	No
Other PCB Equipment/Articles	No
PCB Storage Area	No
On-site Asbestos	Yes
Asbestos Survey	Yes

12.2 Technical Findings

Three regulatory findings and one policy finding were identified for the toxic substances management program.

Finding Number:	TOX-001	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Incorrect Asbestos Waste Generator Signature**
Finding Details:	40 CFR 61.150, and associated Figure 4, requires waste shipment records to be maintained and signed by the waste generator. The asbestos waste shipment record for Bldg U-30 was signed by a contractor on October 22, 2014 and not by NASA personnel (the generator) as required.
Facility Number:	Bldg U-30
Facility Name:	Spandar
Regulatory Citation:	40 CFR 61.150(d)(1)
Other Criteria:	NA
Question Number:	T2.15.2.US
Source:	Federal Team Guide
Root Cause Explanation:	The abatement contractor signed the shipment record without coordinating with NASA personnel prior to the shipment.
Violation Type:	Operator Certification
Finding ID:	Deficiency in Documentation
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Ensure that contractors know not to sign waste shipment forms and to coordinate all shipment authorizations through NASA personnel.
Corrected During Audit:	No

Finding Number:	TOX-002	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**PCB Annual Document Log Deficiencies**
Finding Details:	40 CFR 761.180 requires that the written annual document log include requisite information from each manifest. The calendar year 2014 PCB Annual Report included a manifest for a PCB article container; however, it was missing the date of disposal. The calendar year 2015 PCB Annual Report included manifest information for 17 bulk PCB waste shipments and 2 PCB container (drums) shipments; however, they were missing the first date it was removed from service for disposal (container storage date) and the dates of disposal.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 761.180(a)(2)(ii)(A)
Other Criteria:	NA
Question Number:	T1.15.US
Source:	Federal Team Guide
Root Cause Explanation:	The PCB Annual Document Logs were completed, however, personnel did not realize additional information was needed.
Violation Type:	Reports
Finding ID:	PCB Other (please indicate in the “details” field the nature of the finding)
ASTM Description:	4 Managing environmental records.
Suggested Solution:	When preparing future PCB Annual Document Logs, ensure all requisite information is included by comparing the information for each type of PCB being disposed to the requirements found at 40 CFR 761.180(a)(2).
Corrected During Audit:	No

Finding Number:	TOX-003	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**PCB Certificate of Disposal Received After 30 Days and Missing Date of Removed from Service**
Finding Details:	40 CFR 761.218 requires the owner or operator of the disposal facility to send the Certificate of Disposal (COD) to the generator within 30 days of the date that disposal of each item of PCB waste identified on the manifest was completed. 40 CFR 761.217 requires the generator to contact the transporter and/or the disposal facility to determine the status of the PCB waste if the COD is not received in 35 days and submit an Exception Report to the EPA Regional Administrator if not received within 45 days. 40 CFR 761.207 requires the generator to specify on the manifest the earliest date of removal from service for disposal (or container storage date). Manifest #000790470 shipped on 9/30/15 had two PCB items. The COD for one PCB item (noted as Sequence 1) was not treated until 11/13/15 and signed by the disposal facility until 12/1/15, after the 30 day requirement. The COD for one PCB item (noted as Sequence 2) was not treated until 2/3/16 and signed until 2/8/16, after the 30 day requirement. Additionally, the same manifest did not have an earliest date of removal from service for disposal (or container storage date).
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	40 CFR 761.218(b)
Other Criteria:	40 CFR 761.217(a) and 40 CFR 761.207(a)
Question Number:	T1.50.1.US and T1.45.2.US
Source:	Federal Team Guide
Root Cause Explanation:	This was not a typical shipment of PCB wastes, which may have caused confusion and miscommunication with the disposal facility. The container storage date was likely inadvertently omitted.
Violation Type:	Manifests
Finding ID:	Deficiency in Documentation
ASTM Description:	4 Managing environmental records.
Suggested Solution:	In the future, a contractual agreement between the generator and the disposer should be prepared to change the time frame for the COD to be provided and/or an Exception Report should be submitted to the EPA Regional Administrator if the COD is not received within 45 days
Corrected During Audit:	No

Finding Number:	TOX-004	**Finding Date:**	26-Apr-17
Finding Rating:	Policy	**Finding History:**	New

Finding Title:	**Asbestos Personnel Do Not Have Requisite Training**
Finding Details:	Goddard Procedural Requirement (GPR) 1840.1B, Asbestos Management Program, requires that personnel performing asbestos work shall receive initial and annual training. GPR Sections P.7.g, h, and i state that personnel that prepare, approve asbestos management plans, asbestos abatement plans and statements of work, and who observe abatement activities performed by contractors have requisite initial and annual refresher training, including Building Inspector, Project Designer, and/or Project Monitor training. The WFF Facilities Asbestos Coordinator (FAC) and the WFF Industrial Hygiene Office (IHO) required training, as their roles were defined in GPR Section 1.10.2.3 (FAC) and GPR Section 1.6 (IHO). The FAC had initial project designer training in 2012 but it expired and annual refresher training was not received. The IHO did not have any current asbestos training.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	NA
Other Criteria:	GPR 1840.1B, Sections P7.g, h, and i
Question Number:	NA
Source:	NA
Root Cause Explanation:	Personnel did not realize it was a requirement to have and maintain asbestos training.
Violation Type:	Training
Finding ID:	Deficiency in Personnel Certification/Training
ASTM Description:	4 Managing environmental records.
Suggested Solution:	The FAC and IHO should take and maintain their required training as specified in the GPR 1840.1B.
Corrected During Audit:	No

12.3 Technical Observations

One recommendation was identified for toxic substances management program.

Finding Number:	TOX-005	**Finding Date:**	26-Apr-17
Finding Rating:	Recommendation	**Finding History:**	New

Finding Title: **Missing and Outdated Asbestos Warning Signs Needed**

Finding Details: Although this is a regulatory compliance issue, it is provided as a recommendation since it is not in the scope of the TEAM Guide for the EEFR.

29 CFR 1910.1001(j) requires warning signs to be provided to inform employees of the presence of asbestos containing material (ACM) or presumed ACM (PACM). Since June 1, 2016, all signs are required to bear the following legend:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

Building X-35 had an interior room/structure that had previous asbestos removal of floor tiles. There was the potential for other asbestos to be in the room, and the structure might be removed in it's entirety. The warning on the sign did not have the currently required language.

Building E-105 was not being used but was planned to be renovated. An area of floor tile was identified as having PACM. No signs were demarcating the area and no signs were on the entrance to that section of the building.

Facility Number: Bldgs E-105 and X-35

Facility Name: Library and Admin Offices, Launch Service Shop and Storage

Regulatory Citation: NA

Other Criteria: NA

Question Number: NA

Source: NA

Root Cause Explanation: NA

Violation Type: Not Applicable

Finding ID: Not Applicable

ASTM Description: 0 Not applicable.

Suggested Solution: Replace the existing sign on the door to the interior structure of Building X-35. Place appropriate signs at Building E-105 using the following requisite language:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

Make similar changes to any other asbestos signage across the facility as appropriate, as well as update any Goddard procedural documents.

Corrected During Audit: NA

13.0 Wastewater Management

This section presents the EEFR results for the wastewater management program at WFF. It describes the overall wastewater program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

13.1 Operational Description

WFF is serviced by a central Wastewater Treatment Plant (WWTP) and several septic tanks. The Main Base and the Island are served by a system of gravity sewers connected to the WWTP. There are 15 active septic tanks located on the property, plus about three septic tanks that are inactive. The known active septic tanks are located at A-41, A-131, J-17, N-165, N-167, U-10, U-25, U-30, U-40, U-55, U-70, U-90, V-25, V-50 and V-100. The septic tanks were constructed between 1947 and 1995 and most have been permitted. For the tanks without a permit, WFF submitted drawings of the approximate locations of the septic tanks to Virginia Department of Health in 2005. The septic tanks are pumped at least annually and hauled to the WWTP for treatment.

There are two oil/water separators at WFF: one near D-33 (fuel loading area) and one at D-1 (vehicle wash rack). A majority of the wastewater is collected by gravity sewers and transported by force mains to the WWTP. There are multiple lift stations on the Main Base, including D-12, D-55, F-167, J-17, B-31, M-17, and R-24. The latter is located in Navy housing and is very deep. It pumps the wastewater through a force main to the F-167 lift station, which has been upgraded to dual capacity. The island also has lift stations and one large pumping station at Z-52 that pumps the wastewater from the Island to the Main Base WWTP.

The WWTP has a design capacity of 300,000 gallons per day (gpd), but operates only half the plant equipment at an average flow rate of approximately 50,000 gpd. The headworks of the WWTP is located several hundred feet from the rest of the plant and consists of two grit chambers, two comminuters and a pump station that conveys the wastewater to the balance of the treatment plant. Prior to the wastewater being introduced to the treatment units, it is injected with MetClear MR2405 to assist with the precipitation of metals from the wastewater. The WWTP has two identical parallel treatment chains consisting of flow equalization tanks, extended aeration activated sludge treatment, continuous upflow sand filtration, ultraviolet disinfection, and post aeration. The WWTP also includes the capability of adding soda ash for pH adjustment, but this equipment has never been used. The effluent from the wastewater

treatment plant is discharged through Outfall 001, which flows into an unnamed tributary of Little Mosquito Creek. There are four Class II certified waste water works operators.

Solids from the WWTP undergo diffused aeration for aerobic digestion followed by decanting and drying on three of four porous asphalt drying beds enclosed in a greenhouse structure. Dried solids are removed after a three to four month drying time and shipped to the Accomack County North Municipal Landfill where they are blended with soil and used for daily cover. Solids are tested for RCRA metals at least once per year. Solids from system upsets (e.g., broken lines) are dried in an open-air drying bed near the greenhouse structure. When dry, these solids are analyzed for RCRA metals each time prior to being co-mingled with the WWTP sludge and hauled to the Accomack County North Municipal Landfill.

Storm drainage on the main facility is provided by side ditches along streets without curbs and gutters, drop inlets on curbed streets, and cross culverts to provide drainage to natural waterways. On the mainland, storm drainage is generally handled by overland flow to the bay. On Wallops Island, storm drainage is handled by isolated cross culverts on the existing north-south bypass road. Two storm water pumps serve the dike system surrounding Buildings Y-55 and Y-60, which are situated in a low section called the basin.

Discharges from WFF are covered by Virginia Pollutant Discharge Elimination System Permit No. VA0024457, which covers discharges of processed wastewater from outfall 001, and stormwater discharges from 24 outfalls. The facility has a Stormwater Pollution Prevention Plan for stormwater associated with industrial activities as a requirement of Permit No. VA0024457. Outfalls 001, 003, 037, 038, and 039 are designated for analytical water sampling, while the other 20 stormwater outfalls only require visual observation. As the discharge location for the WWTP, Outfall 001 is required to be sampled monthly for a variety of parameters. Outfall 003 is required to be sampled quarterly and Outfalls 037, 038, and 039 are required to be sampled once every six months.

Construction activities disturbing more than one acre are required to obtain coverage under the Virginia General Permit for Discharges of Stormwater from Construction Activities, VAR10. WFF requires each applicable construction contractor to obtain coverage under this permit before beginning earth disturbing activities. WFF personnel conduct periodic inspections to verify compliance with the requirements of this permit.

The table below summarizes the environmental elements for the wastewater management program:

Element	WFF
Wastewater Treatment Facility	Yes
Sludge disposal	Yes
Wastewater discharge to waters of the state	Yes
Wastewater discharge to POTW	No
Wastewater Collection System	Yes
Wastewater Treatment	Yes
Oil/Water Separator(s)	Yes
Wastewater pretreatment	No
Stormwater discharge associated with construction activities	Yes
Stormwater discharge associated with industrial activities	Yes
Stormwater associated with municipal separate storm sewer system	No
Infiltration/Inflow to wastewater collection system	Yes
Water cooling tower discharges	No
Boiler feedwater blowdown discharges	Yes
Septic Tanks	Yes - 13
Groundwater Injection Wells	Yes - 1

13.2 Technical Findings

Three regulatory findings were identified for the wastewater management program.

Finding Number:	WWM-001	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Improper Management of Construction Site Stormwater - Fire Station Construction Site**
Finding Details:	The General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater (SW) from Construction Activities, VAR10, effective July 1, 2014 through June 30, 2019 prohibits the discharge of wastewater from washout of paint. In addition, it requires that operators: 1) select, install, implement, and maintain control measures identified in the stormwater pollution prevention plan (SWPPP); 2) update the SWPPP no later than seven days following any modification; 3) properly maintain all control measures in effective operating condition in accordance with good engineering practices; and 4) conduct inspections at least every 5 business days, or at least every 10 business days and no later than 48 hours after a measureable storm event. The contractor for the Fire Station Construction Site had developed a SWPPP that required certain erosion and sediment controls and inspections to be conducted at least once every 7 days or within 24 hours of a measureable storm event. The following deficiencies were identified at the Fire Station Construction Site: 1) wastewater from washout of paint was discharged outside the project site into the adjacent marsh; 2) the silt fence on the west side of the facility was badly damaged and not maintained, which resulted in a discharge of sediment from the project site and into the adjacent marsh; 3) the SWPPP had not been updated to reflect changes to the erosion and sediment controls since it was last updated on October 28, 2016; and 4) inspections were not being routinely conducted within 24 hours after measureable storm events such as a 1.5-inch rain on March 30 (inspection conducted on April 4), a 3-inch rain event on January 22 (inspection conducted on January 25), and a 2-inch rain event on January 1 (inspection conducted on January 6).
Facility Number:	NA
Facility Name:	Fire Station Construction Site
Regulatory Citation:	General VPDES Permit for Discharges of SW from Constr. Activities, VAR10, Parts I.D.2, I.G.1, II.B.4, II.E.1, and II.F.2
Other Criteria:	9 Virginia Administrative Code (VAC) 25-870-10
Question Number:	WA.10.33.VA
Source:	State Team Guide
Root Cause Explanation:	WFF personnel conducted inspections of the site and documented deficiencies, but the contractor did not always implement corrective actions based on these inspections. Personnel were unaware that NASA could ultimately be held liable for the management of this construction site because the definition of "operator" in 9 VAC 25-870-10 means any person associated with a construction project that meets either of the following two criteria: 1) the person has direct operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or 2) the person has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other state permit.

Violation Type:	Spills, Leaks, or Releases
Finding ID:	Storm Water Management Deficiency
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Develop a corrective action plan to provide additional oversight to construction sites and their compliance with permit conditions. Consider implementing practices that leverage NASA's ability to affect the contractor's actions (e.g., withholding payment, management influence, etc.). Consider implementing a program similar to the KSC Environmental Point of Contact program for construction activities to oversee the contractors and provide an additional set of eyes on the projects.
Corrected During Audit:	No

Finding Number:	WWM-002	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Improper Management of Construction Site Stormwater - Airfield Repair Project Construction Site**
Finding Details:	The General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater (SW) from Construction Activities, VAR10, effective July 1, 2014 through June 30, 2019 prohibits the discharge of oils from spills or other releases. In addition, it requires that operators: 1) select, install, implement, and maintain control measures identified in the stormwater pollution prevention plan (SWPPP); 2) develop and implement a SWPPP for the construction activity, including any support activity; 3) include the identity of impaired waters and waters with a total maximum daily load (TMDL) in the SWPPP; 4) update the SWPPP no later than seven days following any modification; 5) properly maintain all control measures in effective operating condition in accordance with good engineering practices; 6) conduct inspections at least every 4 business days, or at least every 5 business days and no later than 48 hours after a measureable storm event when discharging to impaired waters; 7) include all perimeter erosion and sediment controls in the inspections; and 8) develop a storm water inspection report that includes certain items. The contractor for the Airfield Repair Project had developed a SWPPP that required certain erosion and sediment controls. The following deficiencies were identified at the Airfield Repair Project: 1) water with an oil sheen had discharged from the project site; 2) the SWPPP required a construction entrance to reduce the tracking of sediment from the site to be installed at the entrance to the asphalt and concrete batch plants, but it had not been installed; 3) the SWPPP did not identify impaired waters that would be affected by the discharge; 4) the silt fence adjacent to the concrete rubble piles was not installed properly and allowed sediment to travel beneath it; and 5) daily inspections did not include all items such as perimeter controls and an inspection report meeting the requirements of the permit had not been developed.
Facility Number:	NA
Facility Name:	Airfield Repair Project Construction Site
Regulatory Citation:	General VPDES Permit for Discharges of SW from Constr. Activities, VAR10, Parts I.D.4, I.G.1, II.B.4, II.E.1, and II.F.4
Other Criteria:	9 Virginia Administrative Code (VAC) 25-870-10
Question Number:	WA.10.33.VA
Source:	State Team Guide
Root Cause Explanation:	WFF personnel conducted inspections of the site and documented deficiencies, but the contractor did not always implement corrective actions based on these inspections. Personnel were unaware that NASA could ultimately be held liable for the management of this construction site because the definition of "operator" in 9 VAC 25-870-10 means any person associated with a construction project that meets either of the following two criteria: 1) the person has direct operational control over construction plans and specifications, including the ability to make modifications to those plans

	and specifications; or 2) the person has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other state permit.
Violation Type:	Spills, Leaks, or Releases
Finding ID:	Storm Water Management Deficiency
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Develop a corrective action plan to provide additional oversight to construction sites and their compliance with permit conditions. Consider implementing practices that leverage NASA's ability to affect the contractor's actions (e.g., withholding payment, management influence, etc.). Consider implementing a program similar to the KSC Environmental Point of Contact program for construction activities to oversee the contractors and provide an additional set of eyes on the projects.
Corrected During Audit:	No

Finding Number:	WWM-003	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Improper Management of Construction Stormwater - Mission Launch Control Center Construction Site**
Finding Details:	The General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater (SW) from Construction Activities, VAR10, effective July 1, 2014 through June 30, 2019 requires that operators: 1) select, install, implement, and maintain control measures identified in the stormwater pollution prevention plan (SWPPP); 2) develop and implement a SWPPP for the construction activity, including any support activity; 3) properly maintain all control measures in effective operating condition in accordance with good engineering practices; and 4) conduct inspections at least every 5 business days, or at least every 10 business days and no later than 48 hours after a measureable storm event. The contractor for the Mission Launch Control Center (MLCC) Construction Project had developed a SWPPP that required certain erosion and sediment controls such as inlet protection to prevent sediment from entering the storm system, and installation of construction entrances to prevent the tracking of sediment from the site. The following deficiencies were identified at the MLCC Construction Project: 1) a storm drain had become damaged and large amounts of sediment entered the storm drain system during a 2-inch rain event; 2) two construction entrances had been installed at the main project site, but were not maintained to effectively stop the track out of sediment; and 3) the laydown area adjacent to the project site had land disturbance and outdoor storage of materials for the project but was not included in the SWPPP.
Facility Number:	NA
Facility Name:	Mission Launch Control Center Construction Site
Regulatory Citation:	General VPDES Permit for Discharges of SW from Constr. Activities, VAR10, Parts I.G.1, II, and II.E.1
Other Criteria:	9 Virginia Administrative Code (VAC) 25-870-10
Question Number:	WA.10.33.VA
Source:	State Team Guide
Root Cause Explanation:	WFF personnel conducted inspections of the site and documented deficiencies, but the contractor did not always implement corrective actions based on these inspections. Personnel were unaware that NASA could ultimately be held liable for the management of this construction site because the definition of "operator" in 9 VAC 25-870-10 means any person associated with a construction project that meets either of the following two criteria: 1) the person has direct operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or 2) the person has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other state permit.
Violation Type:	Spills, Leaks, or Releases

Finding ID:	Storm Water Management Deficiency
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Develop a corrective action plan to provide additional oversight to construction sites and their compliance with permit conditions. Consider implementing practices that leverage NASA's ability to affect the contractor's actions (e.g., withholding payment, management influence, etc.). Consider implementing a program similar to the KSC Environmental Point of Contact program for construction activities to oversee the contractors and provide an additional set of eyes on the projects.
Corrected During Audit:	No

13.3 Technical Observations

There were no recommendations or positive observations identified for wastewater management program.

14.0 Water Quality-Drinking Water Management

This section presents the EEFR results for the water quality-drinking water management program at WFF. It describes the overall water quality program and presents the findings and observations identified during the EEFR. Appendices B, C, and D include documents reviewed, personnel interviewed, and sites visited, respectively.

14.1 Operational Description

WFF receives all of its potable water from groundwater supply wells located within the boundaries of the installation. WFF operates two independent public water systems (PWSs) – one on the Main Base and one on the Island.

The Main Base PWS is a community water system serving approximately 1,625 persons. This PWS utilizes five groundwater wells to achieve a design capacity of 598,400 gpd. Well No. 1 is 260 feet deep and has a 171-gallon per minute (gpm) submersible pump. Well No. 2 is 150 feet deep and has a 55 gpm submersible pump. Well No. 3 is 253 feet deep and has a 214 gpm submersible pump. Well No. 4 is 265 feet deep and has a 163 gpm submersible pump. Well No. 5 is 260 feet deep and has a 167 gpm submersible pump. Well No. 2 is in the upper Miocene aquifer, while the other wells are screened within the Middle Miocene aquifer. All of the wells were installed from February 1990 to December 1992.

Raw water from these wells is treated with a liquid sodium hypochlorite chlorination system that uses a peristaltic pump. Chlorine injection is flow-paced depending on the raw water flow rate from the wells. A zinc orthophosphate corrosion control system was installed in August 2005 in order to reduce the lead concentrations below the lead action levels. The lead levels have decreased in the water system and it now meets the lead action level requirements. As a result, sampling has been reduced to triennially.

Water is stored in a 500,000-gallon ground level tank located adjacent to the treatment facility prior to being pumped to the 150,000-gallon elevated water tank for distribution to the facilities at the Main Base. The Main Base PWS is also regulated by a water withdrawal permit that limits the withdrawal of groundwater to a maximum rate of 8,153,000 gallons per month.

The Island PWS is a non-transient, non-community water system that utilizes two groundwater wells and serves an average population of 400 persons, mostly associated with a Navy tenant. In addition to the potable water supply wells, there are two observation wells associated with the island PWS that are used for water level monitoring. The potable water

supply wells are 245 and 265 feet below the ground surface and are screened within the Middle Miocene aquifer.

Similar to the Main Base PWS, raw water for the island PWS is treated with a liquid sodium hypochlorite chlorination system that uses a peristaltic pump. A zinc orthophosphate corrosion control system was installed in August 2005 in order to reduce the lead concentrations below the lead action levels. The lead levels have decreased in the water system and it meets the lead action level requirements. The lead and copper monitoring has been reduced to triennially.

Water is stored in an 80,000-gallon ground level tank located adjacent to the treatment facility, prior to being pumped to one of three elevated distribution tanks. To maintain sufficient water pressure throughout the island system, the elevated tanks are located at the north end, middle, and south end of Wallops Island. The elevated tank on the north end has a capacity of 50,000 gallons, the tank in the middle has a capacity of 150,000 gallons, and the tank at the south end has a capacity of 100,000 gallons. The island PWS is also regulated by its own groundwater withdrawal permit that limits groundwater withdrawal to 1,800,000 gallons per month and 13,300,000 gallons per year.

Three certified operators maintain the potable water treatment systems for the Main Base and island PWSs. One individual has a Class III certification and the two others have Class IV certifications. Daily pH, chlorine, and totalized flow readings are taken at the entry point to the distribution systems for the Main Base and island PWSs and are maintained in log books. Operational reports are submitted monthly to the state.

The NASA Analytical Laboratory, a state-certified laboratory, collects the required bacteriological samples from the Main Base PWS and the island PWS every month. The state conducts a sanitary survey of the main base and island PWS annually, with the most recent being conducted in November 2016.

WFF exceeded the operational evaluation level for total trihalomethanes for the Main Base system in August 2015 and developed an Operational Evaluation Level report that was submitted to the state in December 2015. WFF upgraded the aeration system in the ground tank for the Main Base and the levels dropped well below the maximum contaminant level for total trihalomethanes for the running annual average.

The main base and island PWS' have received a waiver from the Virginia Department of Health (VDH) for sampling and analysis for synthetic organic chemicals (SOC). Additionally, the state has waived all requirements for asbestos sampling. And the facility is on a reduced

monitoring program for lead and copper. The facility also prepares an annual consumer confidence report.

WFF maintains a cross-connection control program, which includes approximately 130 testable backflow prevention devices (BPDs). An additional 60-70 BPDs are associated with wet fire protection systems, but these have not been inventoried or included in the annual test program. One certified backflow technician conducts annual tests on the BPDs according to work orders from the recurring work program.

The table below summarizes the environmental elements for the water quality-drinking water management program:

Element	WFF
Public Water System	Yes - 2 separate systems
Consecutive Water System	No
Community Water System	Yes - 1 system
Non-transient non-community water system	Yes - 1 system
Water Treatment (in addition to disinfection)	No
Water Disinfection	Yes
Water Pumping Stations	Yes
Water Distribution System	Yes - 2 separate systems
Water Sold to Tenants	Yes
Cross Connection Control/Backflow Prevention Program	Yes
Water storage tanks	Yes
Water wells	Yes - 5
Surface water supply	No
Ground water supply	Yes

14.2 Technical Findings

Six regulatory findings were identified for the water quality-drinking water management program.

Finding Number:	WQM-001	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Inadequate Backflow Prevention Device on Water Supply Used for Mixing Pesticides**
Finding Details:	2 Virginia Administrative Code (VAC) 5-670-170 requires that all hoses, pumps, or other equipment used to fill pesticide handling, storage, or application equipment shall be fitted with an effective valve or device to prevent backflow into water supply systems, streams, lakes, other sources of water, or other materials. At Bldg B-31, the onsite grounds contractor used a hose connected to the public drinking water supply system to mix herbicides in portable backpack applicators. The supply valve was equipped with a hose connection vacuum breaker type of backflow prevention device (BPD), but this type of device was not adequate because it was not testable and had limited protection levels.
Facility Number:	Bldg B-31
Facility Name:	Program Stock Warehouse
Regulatory Citation:	2 VAC 5-670-170
Other Criteria:	NA
Question Number:	PM.15.1.VA
Source:	State Team Guide
Root Cause Explanation:	Staff were not aware that the vacuum breaker type of BPD was inadequate.
Violation Type:	Drinking Water/Groundwater Contamination
Finding ID:	Backflow Prevention Deficiency
ASTM Description:	1 Preventing and responding to actual releases, emissions, discharges, o
Suggested Solution:	Replace the vacuum breaker device with a more effective unit such as a Reduced Pressure Principle device or a Double Check Valve Assembly.
Corrected During Audit:	No

Finding Number:	WQM-002	**Finding Date:**	26-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Late Submittal of Bacteriological Monitoring Data**
Finding Details:	12 Virginia Administrative Code (VAC) 5-590-530 requires that the results of any required monitoring activity shall be reported by the owner no later than the 10th day of the month following the month during which the test results were received, or the 10th day following the end of the monitoring period, whichever is shorter. WFF reported bacteriological sample results by the 10th of each month following the sampling activity except for the report for January 2016, which was submitted to the state on February 16, 2016.
Facility Number:	Bldg F-160
Facility Name:	Quality Lab
Regulatory Citation:	12 VAC 5-590-530(A)
Other Criteria:	NA
Question Number:	WQ.30.1.VA
Source:	State Team Guide
Root Cause Explanation:	Personnel typically met the reporting timeframe, but had missed it for January 2016. There was no documentation available to demonstrate that the initial report had been submitted on time or that there were problems with the electronic system for submitting the results.
Violation Type:	Reports
Finding ID:	Notification/Recordkeeping Deficiency
ASTM Description:	4 Managing environmental records.
Suggested Solution:	Continue meeting the requirement for submitting the monitoring results by the 10th of each month. For months that miss the deadline, ensure proper documentation is retained demonstrating the effort spent to meet the deadline and the reason for the late submittal.
Corrected During Audit:	No

Finding Number:	WQM-003	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Backflow Prevention Devices Not Tested or Maintained Annually**
Finding Details:	12 Virginia Administrative Code (VAC) 5-590-600 requires that thorough inspections and operational tests be made at least annually of backflow prevention devices (BPDs), which are required and installed at the service connection. Records maintained of testing and repairs conducted on BPDs throughout WFF demonstrated that 44 of 130 backflow prevention devices had not been tested annually. Several of these devices had not been inspected since 2011.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	12 VAC 5-590-600(B)(3)
Other Criteria:	NA
Question Number:	WQ.8.1.VA
Source:	State Team Guide
Root Cause Explanation:	Some of the devices had been removed from the recurring work program and others were not tested due to competing work priorities for the one certified backflow prevention technician.
Violation Type:	No Testing/Verification
Finding ID:	Backflow Prevention Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Conduct a cross-connection survey of the water systems at WFF, including the Main Base system and the island system. From this survey develop a comprehensive inventory of BPDs installed within the system. Ensure that each of these devices is included in the recurring work program and set to require annual testing and maintenance. Evaluate the manpower requirements for testing these devices and ensure that the appropriate number of people are available to support the BPD testing program and other programs performed by the plumbers.
Corrected During Audit:	No

Finding Number:	WQM-004	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Cross-Connections Not Adequately Protected**
Finding Details:	12 Virginia Administrative Code (VAC) 5-590-610 requires that certain cross-connections, including fire protection systems, be protected with an appropriate backflow prevention device (BPD). Several buildings at WFF, including buildings A-1, A-41, B-29, F-1, F-2, F-3, F-4, B-31, B-129, D-1, F-5, D-10, F-6, F-7, F-10, E-100, F-16, E-104, E-105, E-106, E-106A, F-19, E-107, E-109, E-134, F-159, F-160, H-100, J-20, M-15, M-16, M-20, M-22, N-116, N-117, N-159, N-161, N-162, N-165, U-25, U-30, U-40, U-70, U-55, V-45, V-50, V-55, W-15, W-20, X-15, X-55, X-30, X-85, Y-15, Y-55, Y-60, Z-20, Z-25, and X-79 had wet fire protection systems. The existing inventory of BPDs did not list BPDs installed on these systems.
Facility Number:	Facility-wide
Facility Name:	NA
Regulatory Citation:	12 VAC 5-590-610(E)
Other Criteria:	NA
Question Number:	WQ.2.1.VA
Source:	State Team Guide
Root Cause Explanation:	The fire suppression systems at WFF had been overlooked as potential cross-connections that needed to be evaluated.
Violation Type:	Facility Inadequacy
Finding ID:	Backflow Prevention Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Conduct a cross-connection survey of the water systems at WFF, including the Main Base system and the island system. Ensure all cross-connections, including those associated with wet fire suppression systems, are eliminated or have adequate protection from BPDs.
Corrected During Audit:	No

Finding Number:	WQM-005	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Missing Screen on Overflow Pipe**
Finding Details:	12 Virginia Administrative Code (VAC) 5-590-1080 requires that all nonpressure type finished water storage structures shall be provided with a downward discharging screened overflow. The Ground Water Storage Reservoir associated with the Main Base Water Plant was provided with a downward discharging overflow, but the screen had corroded and was no longer covering the opening.
Facility Number:	Bldg D-095
Facility Name:	Main Base Ground Water Reservoir
Regulatory Citation:	12 VAC 5-590-1080(D)(3)
Other Criteria:	NA
Question Number:	WQ.2.1.VA
Source:	State Team Guide
Root Cause Explanation:	The missing screen had been identified by the Virginia inspector as part of the sanitary survey and was identified as a deficiency in a letter sent to WFF on November 17, 2016. Personnel had misinterpreted the location of the missing screen and sent a letter to the Virginia Health Department on February 20, 2017 stating that the missing screen had been replaced.
Violation Type:	Inadequate Equipment/Containers
Finding ID:	Water Tank/Reservoir Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	The screen was installed during the EEFR.
Corrected During Audit:	Yes

Finding Number:	WQM-006	**Finding Date:**	27-Apr-17
Finding Rating:	Regulatory	**Finding History:**	New

Finding Title:	**Chlorine Meters Not Calibrated**
Finding Details:	12 Virginia Administrative Code (VAC) 5-590-1000 requires that the measurement of chlorine residual be performed with equipment employing any method in the most current version of Standard Methods for the Examination of Water and Wastewater. The equipment should enable residual chlorine measurement to the nearest 0.1 milligram per liter in the range below 0.5 milligram per liter, and to an accuracy of approximately 25 percent above 0.5 milligram per liter. Standard Methods for the Examination of Water and Wastewater calls for periodic monitoring of an external standard to ensure that the result is within acceptable limits. No records were available to demonstrate that the portable chlorine colorimetric meters used at the Water Treatment Plants had ever been compared to an external standard.
Facility Number:	Bldgs D-004 and U-050
Facility Name:	Water Treatment Plants
Regulatory Citation:	12 VAC 5-590-1000(G)(2)
Other Criteria:	Standard Methods for the Examination of Water and Wastewater
Question Number:	WQ.2.1.VA
Source:	State Team Guide
Root Cause Explanation:	Personnel were not aware of the requirement to evaluate the meter against a known standard to ensure that it was accurate to the nearest 0.1 milligram per liter in the range below 0.5 milligram per liter, and to an accuracy of approximately 25 percent above 0.5 milligram per liter.
Violation Type:	Sampling
Finding ID:	Monitoring/Sampling Deficiency
ASTM Description:	3 Operating conditions and best management practices.
Suggested Solution:	Conduct periodic evaluations of the colorimetric chlorine meters. Ensure that they measure the known standards to the required accuracy based on the concentration of the standard. The meters were evaluated during the EEFR.
Corrected During Audit:	Yes

14.3 Technical Observations

There were no recommendations or positive observations identified for water quality-drinking water management program.

APPENDIX A

Summary of Findings and Observations

Appendix A

Table A presents a summary of the findings and observations discovered during the EEFR conducted at NASA WFF from April 24, 2017 to April 28, 2017.

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Table A -- Summary of NASA Functional Review Findings

Goddard Space Flight Center - Wallops Flight Facility - April 2017

Finding Number	Finding Title	Facility Number	Rating
Air Emissions Management			
AIR-001	Diesel Fuel Certifications Incomplete	Facility-wide	Regulatory
AIR-002	This Finding has Been Deleted		Deleted
Cultural Resources Management			
CRM-001	Programmatic Agreement Stipulations Not Fulfilled	Facility-wide	Regulatory
Hazardous Waste Management			
HWM-001	Inspection Records Could Cause Confusion	Bldg N-223	Recommendation
HWM-002	Excellent Guidance Posted at Satellite Accumulation Areas	Facility-wide	Positive
Other Environmental Issues			
OTH-001	Commitment Made in Environmental Assessment Not Met	NA	Regulatory
OTH-002	Highly Effective NEPA Program	Facility-wide	Positive
POL Management			
POL-001	Incomplete Inspection of Above Ground Storage Tank	Bldg E-134	Regulatory
POL-002	Replaced Aboveground Storage Tank Not Tagged Out-of-Service	Bldg E-134	Regulatory
POL-003	Improper Spill Response	Bldg E-2	Regulatory
POL-004	Surface Corrosion on Storage Tank	Bldg E-134	Regulatory
POL-005	Inadequate Drum Storage Secondary Containment	MARS Pad 0-A	Regulatory
POL-006	Drum Storage Not Included in Plan	Facility-wide	Regulatory
POL-007	Excellent Spill Prevention Training	Facility-wide	Positive
POL-008	Excellent Use of Spill Exercises to Evaluate Worst-case Scenario Spill Response	Facility-wide	Positive
Toxic Substances Management			
TOX-001	Incorrect Asbestos Waste Generator Signature	Bldg U-30	Regulatory
TOX-002	PCB Annual Document Log Deficiencies	Facility-wide	Regulatory

NA = Not Applicable

Table A -- Summary of NASA Functional Review Findings Goddard Space Flight Center - Wallops Flight Facility - April 2017 (continued)

Finding Number	Finding Title	Facility Number	Rating
TOX-003	PCB Certificate of Disposal Received After 30 Days and Missing Date of Removed from Service	Facility-wide	Regulatory
TOX-004	Asbestos Personnel Do Not Have Requisite Training	Facility-wide	Policy
TOX-005	Missing and Outdated Asbestos Warning Signs Needed	Bldgs E-105 and X-35	Recommendation
Wastewater Management			
WWM-001	Improper Management of Construction Site Stormwater - Fire Station Construction Site	NA	Regulatory
WWM-002	Improper Management of Construction Site Stormwater - Airfield Repair Project Construction Site	NA	Regulatory
WWM-003	Improper Management of Construction Stormwater - Mission Launch Control Center Construction Site	NA	Regulatory
Water Quality Management			
WQM-001	Inadequate Backflow Prevention Device on Water Supply Used for Mixing Pesticides	Bldg B-31	Regulatory
WQM-002	Late Submittal of Bacteriological Monitoring Data	Bldg F-160	Regulatory
WQM-003	Backflow Prevention Devices Not Tested or Maintained Annually	Facility-wide	Regulatory
WQM-004	Cross-Connections Not Adequately Protected	Facility-wide	Regulatory
WQM-005	Missing Screen on Overflow Pipe	Bldg D-095	Regulatory
WQM-006	Chlorine Meters Not Calibrated	Bldgs D-004 and U-050	Regulatory

NA = Not Applicable

APPENDIX B

Documents Reviewed

Appendix B

Table B presents a summary of the documents reviewed during the EEFR conducted at NASA WFF from April 24, 2017 to April 28, 2017.

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Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title)

Protocol	Document Title
Air Emissions	Diesel, gasoline, LP gas and paints monthly usage spreadsheet, 2015 through 2017
Air Emissions	Dime oil fuel delivery certification, 2016
Air Emissions	Fire pump usage logs, 2016
Air Emissions	Generator usage logs, 2016
Air Emissions	Island Permit 40909 Annual Emissions Report for February 2016 to January 2017; February 2017
Air Emissions	Main Base air permit equipment list
Air Emissions	Main Base Permit 40217 Annual Emissions Report for February 2016 through January 2017, February 2017
Air Emissions	Main Base State Operating Permit 40217, December 6, 2011
Air Emissions	Mainland and Island air permit equipment list
Air Emissions	Mainland and Island State Operating Permit 40909, February 10, 2014
Air Emissions	Paint booth usage logs for Buildings N159, F10B, and X30
Air Emissions	Virginia Department of Environmental Quality air inspection report – Mainland/Island, February 7, 2017
Air Emissions	Virginia Department of Environmental Quality air inspection report – Mainland/Island, August 9, 2013
Air Emissions	Virginia Department of Environmental Quality air inspection report – Main Base, June 11, 2012
Cultural Resources	Archaeological survey for V-12 tract
Cultural Resources	Archaeological survey of the Mission Launch Control Center tract, 2011
Cultural Resources	Cultural resources investigation of the proposed uninhabited aerial system airstrip, 2009
Cultural Resources	Integrated Cultural Resources Management Plan, 2015
Cultural Resources	Programmatic Agreement regarding management of facilities, 2014 (with 2016 amendment)
Cultural Resources	State Historic Preservation Office consultation package for Air Force Instrumental Tower Project, 2016 through 2017
Cultural Resources	State Historic Preservation Office consultation package for Mission Launch Control Center tract, 2011
Cultural Resources	State Historic Preservation Office consultation package for Uninhabited Aerial System Airstrip, 2009 through 2011
Cultural Resources	State Historic Preservation Office consultation package for upgrades to J20 Visitors Center, 2015
Cultural Resources	State Historic Preservation Office consultation package for V-12 Backup Generators, 2011

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Hazardous Waste	5-day letter to Virginia Department of Environmental Quality following fire from open burn event, December 9, 2016
Hazardous Waste	90-day area weekly inspection records, 2017
Hazardous Waste	Hazardous Waste Report for 2015, February 24, 2016
Hazardous Waste	Inspection records, 2013 through 2017
Hazardous Waste	List of satellite accumulations areas, April 21, 2017
Hazardous Waste	Manifests, 2013 through 2017
Hazardous Waste	Open burn operating record, 2016
Hazardous Waste	Pollution prevention certification, January 29, 2016 and January 5, 2017
Hazardous Waste	Satellite accumulation area monthly inspection sheets for Buildings F16, F159, F10, and X30
Hazardous Waste	Six months visual inspection records of grounding points at open burn, November 9, 2016
Hazardous Waste	Taurus static fire work instruction
Hazardous Waste	Training records for open burn workers, various, 2014 through 2016
NEPA	Draft Environmental Assessment for Installation and Operation of Air and Missile Defense Radar AN/SPY-6 at WFF, Wallops Island, VA, December 2016
NEPA	Environmental Resources Document, June 2016
NEPA	Final Environmental Assessment and Finding of No Significant Impact for the Low Density Supersonic Decelerator Technology Demonstration Mission, February 2015
NEPA	Final Environmental Assessment Establishment of Restricted Area Airspace R-6604C/D/E, September 2016
NEPA	Final Environmental Assessment for E-2/C-2 Field Carrier Landing Practice Operations at Emporia-Greensville Regional Airport, Greensville County, Virginia, and National Aeronautics and Space Administration WFF, Accomack County, Virginia, January 2013
NEPA	Final Environmental Assessment for the East Coast Home Basing of the MQ-4C Triton Unmanned Aircraft System, February 2017
NEPA	Final Environmental Assessment for the North Wallops Island Unmanned Aerial Systems Airstrip, June 2012
NEPA	Final Supplemental Environmental Assessment Antares 200 Configuration Expendable Launch Vehicle at WFF, September 2015
NEPA	Initial Environmental Evaluation/Environmental Assessment Southern Hemisphere Ultra Long Duration Ballooning Operations Expansion, August 2014
NEPA	Southern Hemisphere Ultra Long Duration Ballooning Operations Expansion Finding of No Significant Impact, August 2014
NEPA	U.S. Navy Testing of Hypervelocity Projectiles and an Electromagnetic Railgun EA, May 2014

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
NEPA	Wallops Island Post-Hurricane Sandy Beach Re-nourishment Federal Consistency Determination, March 2013
NEPA	Wallops Island Post-Hurricane Sandy Shoreline Repair Final Environmental Assessment, June 2013
Pesticides	Application records for Advanced Pest Management, 2014 through 2017
Pesticides	Application records for Animal and Plant Health Inspection Service bird control program, 2014 through 2016
Pesticides	Application records for Didlake, Inc., 2014 through 2017
Pesticides	Pesticide applicator license for Brian Scharle, 2016 and 2017
Pesticides	Pesticide applicator licenses for Advanced Pest Management technicians, 2014 through 2017
Pesticides	Pesticide applicator licenses for Didlake, Inc. technicians, 2014 through 2017
Pesticides	Pesticide business licenses for Advanced Pest Management, 2014 through 2017
Pesticides	Pesticide business licenses for Didlake, Inc., 2014 through 2017
POL	CROMPCO certificate of storage tank system testing for tanks F-026A and F-026F, September 15, 2016
POL	Inspection records, 2013 through 2017
POL	Integrated Contingency Plan and Storm Water Pollution Plan Training records, 2016
POL	Letter to Virginia Department of Environmental Quality regarding WFF August 2016 inspection, February 1, 2017
POL	Virginia Department of Environmental Quality Letter approving renewal of the WFF Oil Discharge Contingency Plan, August 31, 2016
Solid Waste	Bloodborne pathogen training certifications for Sherry Pruitt, Michelle Bedford, and Marcia Garcia, 2016 through 2016
Solid Waste	Bloodborne pathogens training presentation
Solid Waste	Environmental Resources Document, April 2016
Solid Waste	Goddard Procedural Requirements 8500.3F – Waste Management, August 5, 2013
Solid Waste	Medical bio-hazardous waste disposal displayed procedures, January 2017
Solid Waste	NASA Procedural Requirement 1800.1D – Occupational Health Program Procedure, May 13, 2016
Solid Waste	Regulated medical waste display policy
Solid Waste	Special medical waste tracking forms, September 3, 2014, April 15, 2015, April 25, 2016, September 28, 2016, and March 10, 2017

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Toxic Substances	Asbestos and lead-based paint survey report for Building E105, March 13, 207
Toxic Substances	Asbestos awareness training attendance sheet and feedback forms, December 13, 2016
Toxic Substances	Asbestos inspection report, March 2009
Toxic Substances	Asbestos project designer initial course, John Saecker, March 23, 2012; expired March 23, 2013
Toxic Substances	Certified industrial hygienist certification – Marvin Bunting, Express December 31, 2017
Toxic Substances	Construction Completion Report – North Island Transformers (NIT 1, 7, 14, and 17), December 2016
Toxic Substances	Construction Completion Report Area of Interest 20 (Pole-mounted Transformer), July 2016
Toxic Substances	Email correspondence regarding potential asbestos, December 16, 2016 and January 24, 2017
Toxic Substances	Environmental Resources Document, April 2016
Toxic Substances	Facility Asbestos Management Plan, April 2008
Toxic Substances	Goddard Procedural Requirements 1840.1B – Asbestos Management Program, October 21, 2010
Toxic Substances	Goddard Procedural Requirements 8500.3F – Waste Management, August 5, 2013
Toxic Substances	Polychlorinated biphenyl annual document log, calendar year 2014 and 2015
Toxic Substances	Polychlorinated biphenyl manifests, spot checked 2016 through 2017
Toxic Substances	Preconstruction hazardous material inspection report for Building 129, December 2009
Toxic Substances	Project files including manifests, regulatory notifications, asbestos licenses, and abatement plans: Building F1 renovation Building F3, tile removal Building U30, core drilling Building V25, demolition Building X75 modifications Steam line and old Wastewater Treatment Plant
Toxic Substances	Suspect asbestos material inventory, August 2007
Wastewater	Letter from Virginia Department of Environmental Quality regarding coverage under Virginia Pollutant Discharge Elimination System Construction Permit VAR10, March 1, 2017
Wastewater	Monthly, quarterly, and semi-annual discharge monitoring reports, January 2016 through March 2017
Wastewater	Septic tank permits, various 1961 through 2005

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Wastewater	Stormwater Pollution Prevention Plan for Airfield Repair Project, September 2016
Wastewater	Stormwater Pollution Prevention Plan for Fire Station Project, July 1, 2015, updated October 28, 2016
Wastewater	Stormwater Pollution Prevention Plan for Mission Launch Control Center, March 2016
Wastewater	Stormwater Pollution Prevention Plan for Wallops Airfield Repair Project, Construction of Facilities Phase 1, January 1, 2017
Wastewater	Stormwater Pollution Prevention Plan for WFF, March 2017
Wastewater	Virginia Pollutant Discharge Elimination System VA0024457 Modification, July 18, 2016
Wastewater	Virginia Pollutant Discharge Elimination System VA0024457, October 1, 2015
Wastewater	Wastewater Treatment Plant operational daily test results, April 2017
Water Quality-Drinking Water	Backflow prevention device inventory
Water Quality-Drinking Water	Backflow prevention device test records, 2016
Water Quality-Drinking Water	Bacteriological Sample Siting Plans for Public Water System identifications 3001500 and 3001535, February 5, 2016
Water Quality-Drinking Water	Cyanide sample results for Island and Main Base, June 2005 through May 2014
Water Quality-Drinking Water	Daily operational monitoring records for Main Base and Island, April 2017
Water Quality-Drinking Water	Disinfection byproducts operational evaluation level report, December 7, 2015
Water Quality-Drinking Water	Disinfection byproducts sample results for Island, August 30, 3016
Water Quality-Drinking Water	Disinfection byproducts sample results for Main Base, November 20, 2013 through February 17, 2017
Water Quality-Drinking Water	Follow-up correspondence to November 17, 2016 sanitary surveys, April 20, 2017
Water Quality-Drinking Water	Groundwater System Sanitary Survey Report for Public Water System identification 3001500 (Flight Center), November 17, 2016
Water Quality-Drinking Water	Groundwater System Sanitary Survey Report for Public Water System identification 3001535 (Wallops Island), November 17, 2016
Water Quality-Drinking Water	Inorganic sample results for Island and Main Base, December 2006 through July 2016
Water Quality-Drinking Water	Lead and copper monitoring results for Mainland/Island Pubic water System identification 3001535, September 27, 2016
Water Quality-Drinking Water	Lead and copper sample results for Island, September 2009 through August 2016

Table B -- Documents Reviewed (sorted alphabetically by protocol, then by title) (continued)

Protocol	Document Title
Water Quality-Drinking Water	Lead and copper sample results for Main Base, September 2009 through August 2015
Water Quality-Drinking Water	Metals sample results for Island and Main Base, December 2006 through October 2015
Water Quality-Drinking Water	Nitrate/nitrite sample results for Island and Main Base, November 2005 through August 2016
Water Quality-Drinking Water	Radiological sample results for Main Base, June 2014
Water Quality-Drinking Water	Total coliform sample results, January 2016 through March 2017
Water Quality-Drinking Water	Virginia Department of Health approval of Stage II disinfection byproducts sample locations, June 16, 2008
Water Quality-Drinking Water	Virginia Department of Health notification and approval of total triholomethane treatment system, April 21, 2014
Water Quality-Drinking Water	Volatile organic compound sample results for Island and Main Base, June 2005 through May 2014
Water Quality-Drinking Water	Waterworks operator certifications

Notes
NASA = National Aeronautics and Space Administration
NEPA = National Environmental Policy Act
POL = Petroleum, oil, and lubricant
WFF = Wallops Flight Facility

APPENDIX C

Personnel Interviewed

Appendix C

Table C presents a summary of the personnel interviewed during the EEFR conducted at NASA WFF from April 24, 2017 to April 28, 2017.

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Table C – Personnel Interviewed (sorted alphabetically by last name)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Barnes, Michael VT Group 757-824-1451						X				
Bedford, Michelle LJT 757-824-1266							X			
Bongtoel, Michael LJT 757-824-1724	X									
Borowicz, Monica LJT 757-824-1023										X
Bunting, Marvin NASA 757-824-2030								X		
Cathell, Charlie, LJT 757-824-2461	X		X							
Chandler, Jack VT Griffin 757-824-1083									X	
Chedzoy, Jeremy Lagan Construction Group 703-901-3572									X	
Clarke, Tom VT Griffin 757-824-1511										X
Cold, Bob NASA	X		X							
Coleman, Alex NASA 757-824-1976			X							

Table C – Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Conquest, John Didlake 757-824-1485					X					
Dunn, Susan LJT 757-824-1832						X		X		
Fostrom, Greg NOAA Hooks Mike 757-824-7346						X				
Hancock, Gary LJT 757-824-1775					X					
Hill, George VT Griffin 757-824-1083										X
Hooks, Mike Navy Hooks Mike 757-824-7705						X				
Hooks, R. Owen NASA 757-824-1941						X			X	X
Lara, Jose Lagan Construction Group 619-577-9255									X	
LaVoie, Mickey 609-240-5764									X	
Meyer, TJ NASA 757-824-1987	X									

Table C – Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Miller, Shari NASA 757-824-2327		X		X						
Mitchell, Joel NASA 757-824-1127			X		X		X			
Moore, Daryl Virginia Commercial Space Flight – MARS 540-450-4044						X				
Moxley, Kathy NASA 301-286-0717	X									
Nelson, Richard LJT 757-824-2566						X				
Phillips, Bob WEMA 757-824-1457						X				
Pruitt, Sherry LJT 757-824-1266							X			
Saecker, John NASA 757-824-1695								X		
Scharle, Brian USDA 757-824-1254					X					
Simko, Marianne LJT 757-824-2127			X							

Table C – Personnel Interviewed (sorted alphabetically by last name) (continued)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Smith, Regan Virginia Commercial Space Flight – MARS 410-713-8010						X				
Stanley, Randall NASA 757-824-1309		X								
Swartz, Paul VT Griffin 757-824-1511	X		X			X				
Townsend, Ed Pinnacle 757-824-4610	X		X							
Ward, Chuck LJT 757-824-2418						X				
Whealton, Shane LJT 757-824-1090			X							
Wilson, Josh Air Tech 757-824-1185						X				
Wright, Logan Orbital ATAK 757-824-4621	X		X							

Notes:

AIR	=	Air Emissions Management	POL	=	Petroleum, Oil, and Lubricant Management
CUL	=	Cultural Resources Management	SW	=	Solid Waste Management
HW	=	Hazardous Waste Management	TXS	=	Toxic Substances Management
NEPA	=	National Environmental Policy Act	WW	=	Wastewater Management
PST	=	Pesticide Management	WQ-DW	=	Water Quality-Drinking Water Management

APPENDIX D

Sites/Areas Visited

Appendix D

Table D presents a summary of the sites/areas visited during the EEFR conducted at NASA WFF from April 24, 2017 to April 28, 2017.

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Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Archaeological Site 44AC89		X								
Archaeological Site 44AC558		X								
Facility-wide	X		X			X				
Mission Launch Control Center Construction Project									X	
NOAA						X				
Uninhabited Aerial System Airstrip		X								
Wallops Airfield Repair Project									X	
Building A-01 Launch Pad									X	
Building A-1, Air Traffic Control					X					
Building D-1 Hangar						X				
Building D-4, Water Plant										X
Building E-2, Optics Laboratory						X				
Building F-10B, Paint Shop	X		X							
Building F-16, Air Conditioning Shop	X		X							
Building F-26, Fueling Station						X				
Building Q-29, Public Works						X				
Building X-30, Island Paint Shop	X		X							

Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name) (continued)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Building B-31, Program Stock Warehouse					X					
Building X-35, Launch Service Shop and Storage (interior of building)								X		
Building X-46, Elevated Storage Tank										X
Building D-50, Wastewater Treatment Plant									X	
Building V-50, Island Water Plant										X
Building V-65, Historic Lift Saving Station		X								
Building Z-65, Blockhouse No. 1						X				
Building E-105, Library and Administrative Office								X		
Building E-106, Electrical								X		
Building E-107, Sounding Rocket/Balloon								X		
Building E-109, Lab 272 Electronics			X							
Building E-134, Mobile Electric Power						X				
Building N-159, Hangar	X		X							

Table D -- Sites/Areas Visited (sorted numerically by building number and then alphabetically by site name) (continued)

POC NAME	AIR	CR	HW	NEPA	PST	POL	SW	TXS	WW	WQ-DW
Building F-160, Health Unit							X			
Building F-160, Personnel/Safety/ Quality Laboratory						X	X	X	X	X
Building N-161, Data Analysis Laboratory								X		

Notes:

AIR = Air Emissions Management
CUL = Cultural Resources Management
HW = Hazardous Waste Management
NEPA = National Environmental Policy Act
PST = Pesticide Management
POL = Petroleum, Oil, and Lubricant Management
SW = Solid Waste Management
TXS = Toxic Substances Management
WW = Wastewater Management
WQ-DW = Water Quality-Drinking Water Management

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APPENDIX E

Upcoming Federal Regulations

Appendix E

Table E presents a review of upcoming federal regulations that have the potential to impact NASA Centers at some point in the future.

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Table E -- Upcoming Federal Regulations, 2017

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	Greenhouse Gases	Proposes to revise the following: • Definitions in PSD and Title V regulations • PSD provisions on GHG PALs • Various provisions to ensure that PSD or Title V rules do not require a source to obtain a permit based solely on GHG PTE Also proposes a SER of 75,000 tpy CO_2e for GHGs under the PSD program that would establish a threshold below which BACT is not required for GHG emissions	81 FR 68110	Proposed Rule	NA – Could be positive. Sources would not be required to obtain PSD or Title V permits based only on Greenhouse Gas potential to emit. Also proposes a 75,000 ton-per-year threshold for GHGs for installing Best Available Control Technology under PSD program.
Air	NAAQS – O3	Finalizes revisions to the 2007 Exceptional Events Rule for the exclusion of event-affected air quality data from regulatory decisions. Also announces availability of the final document, "Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations."	81 FR 68216	Final Rule Effective 9/30/2016	NA – Applicable to agencies. Exempts emissions associated with exceptional events (such as wildfires, hurricanes, etc.) from regulatory decisions. For example, if a hurricane caused wide-spread power outages and facilities had to use emergency generators for long periods of time and this resulted in exceedances of ozone standards, this would not count toward attainment status.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)

Air	ODS	Finalizes listing the following substances as acceptable substitutes in certain end use applications under the SNAP program:
		• Air conditioning and refrigeration:
		  • R-448A
		  • R-449A
		  • R-449B
		• Fire suppression and explosion protection:
		  • Solstice® FS
			81 FR 70029	Final Rule Effective 10/11/2016	NA – Could be positive as it adds additional materials as acceptable substitutes for ODS materials.

Air	Permits	Finalizes revisions to NSR and Title V program provisions to require electronic noticing of draft air permits and certain other program actions.	81 FR 71613	Final Rule Effective 11/17/2016	NA – Requires agencies to provide electronic notices of draft permits and other related actions.
Air	NAAQS	Proposes updates to nonattainment area classification thresholds and implementation requirements for the 2015 Ozone NAAQS, including establishing provisions for the 2015 standards in new Subpart CC of Part 51. Also solicits comments on two approaches for revoking the 2008 Ozone NAAQS.	81 FR 81276 https://www.gpo.gov/fdsys/pkg/FR-2016-11-17/html/2016-27333.htm	Proposed Rule	NA – WFF is in an area that is in attainment.
Air	PSD	Finalizes revisions to PSD regulations to remove a date restriction from the current permit rescission provision. Also corrects an outdated cross-reference.	81 FR 78043 https://www.gpo.gov/fdsys/pkg/FR-2016-11-07/html/2016-26593.htm	Final Rule Effective 12/7/2016	NA – WFF does not have a PSD permit.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	Refrigerants	Finalizes revisions to regulations on servicing or disposing of air-conditioning and refrigeration equipment, including: • Extending refrigerant management requirements to non-ODS refrigerants, such as HFCs • Lowering leak rate thresholds that trigger repair for equipment containing 50 lb or more of refrigerant • Requiring quarterly or annual leak inspections or continuous monitoring devices for equipment exceeding the threshold leak rate • Requiring owners and operators to submit reports if systems containing 50 lb or more of refrigerant leak 125% or more of a full charge in 1 calendar year • Requiring technicians to keep records of refrigerants recovered during disposal from systems with a charge size from 5 to 50 lb	81 FR 82272 https://www.gpo.gov/fdsys/pkg/FR-2016-11-18/html/2016-24215.htm	Final Rule Effective 1/1/2017	Low – Will require WFF to maintain records and better control of their refrigerant management system.
Air	NSPS	Direct final rule revises NSPS procedures for assessing the acceptability of PM CEMS	81 FR 83160 https://www.gpo.gov/fdsys/pkg/FR-2016-11-21/html/2016-27849.htm	Final Rule Effective 2/21/2017	NA – WFF does not have any PM continuous emissions monitoring systems.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	ODS	Finalizes revisions to expand the list of acceptable substitutes, list as unacceptable, and change the status of several acceptability determinations for certain substances and blends in multiple end-use categories, including: • Foam blowing agents • Fire suppression and explosion protection • Refrigeration and air conditioning Also finalizes the following narrowed use limits: • Space and aeronautics-related applications of certain spray and pour foam blowing agents through 12/31/2024 • Human-rated spacecraft and related support equipment applications of HFC-134a and R-404A in centrifugal and positive displacement chillers beginning 01/01/2024	81 FR 86778 https://www.gpo.gov/fdsys/pkg/FR-2016-12-01/html/2016-25167.htm	Final Rule effective /30/2017	Low – NASA made comments to the proposed rule. EPA rule will reduce the number of acceptable ODS substitutes. This primarily affects NASA regarding chillers and foam blowing agents. WFF does not conduct foam blowing. Although not applicable to WFF, rule does provide extension for human rated spacecraft and support equipment chillers and space and aeronautics applications through 2024. NASA is working to develop alternative foam blowing agents that meet the performance requirements and ODS restrictions.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	GHG	Finalizes revisions to the GHGRP that: • Streamline and simplify reporting, including removing unnecessary reporting requirements and requirements for certain facilities that report minimal or no emissions • Improve data quality, including revisions to improve verification and accuracy of data used to inform the U.S. GHG Inventory • Make clarifications and corrections • Amend calculation, monitoring, and measurement methods	81 FR 89188 https://www.gpo.gov/fdsys/pkg/FR-2016-12-09/html/2016-28564.htm	Final Rule effective in a phased approach between 1/1/2017 and 1/1/2019	NA – WFF is not subject to GHG reporting.
Air	SIP – PM2.5	Proposes attainment designations for the 2006 24-hour PM2.5 NAAQS, including the following: • Attainment • San Francisco Bay Area, California Failure to Attain • Logan, Utah-Idaho • Salt Lake City, Utah	81 FR 91088 https://www.gpo.gov/fdsys/pkg/FR-2016-12-16/html/2016-30174.htm	Proposed Rule	NA – WFF is not in any of the listed areas.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	NESHAP	Proposes the following: • Revise requirements for existing, new, or reconstructed industrial and non-industrial POTW • Revise applicability criteria, names, and definitions of industrial and non-industrial subcategories • Revise requirements related to emissions during SSM • Add requirements for electronic reporting • Make miscellaneous edits and technical corrections	81 FR 95352 https://www.gpo.gov/fdsys/pkg/FR-2016-12-27/html/2016-30471.htm	Proposed Rule	NA – WFF does not have a POTW.
Air	Emissions	Proposes a federal plan to control emissions from existing CISWI units not covered under an approved state plan.	81 FR 3554 https://www.gpo.gov/fdsys/pkg/FR-2017-01-11/html/2016-31203.htm	Proposed Rule	NA – WFF does not have any incinerators.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	RMP	Finalizes revisions to RMP regulations, including: • Revising accident prevention requirements for Program Level 2 or 3 processes • Requiring a root cause analysis as part of an incident investigation of a catastrophic release or similar near-miss • Requiring an independent third party to perform a compliance audit after a reportable release • Expanding emergency response requirements for Program Level 2 or 3 processes • Requiring certain facilities to conduct full field and tabletop exercises • Requiring facilities to make certain information publicly available and hold a public meeting after an RMP reportable incident	81 FR 4594 https://www.gpo.gov/fdsys/pkg/FR-2017-01-13/html/2016-31426.htm	Final Rule Effective 3/14/17	NA – WFF is not subject to the RMP rule.
Air	PSD	Finalizes revisions to guidance and preferred dispersion models used in air quality assessments for ambient concentrations of air pollutants under the PSD program.	81 FR 5182 https://www.gpo.gov/fdsys/pkg/FR-2017-01-17/html/2016-31747.htm	Final Rule Effective 3/21/17	NA – WFF does not have a PSD permit.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	SIP - Ozone	Finalizes finding that certain states failed to submit SIP revisions to satisfy requirements for the 2008 Ozone NAAQS for nonattainment areas and states in the OTR.	82 FR 9158 https://www.federalregister.gov/documents/2017/02/03/2017-02188/findings-of-failure-to-submit-state-implementation-plan-submittals-for-the-2008-ozone-national	Final Rule Effective 3/6/2017	NA – WFF is in an area that is in attainment.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Hazardous Waste	Generator Rules	Finalizes revisions to the HW generator program, including: • Revising multiple definitions for classes of HW generators • Adding provisions to allow certain classes of generators to retain generator status following a single episodic event • Revising satellite accumulation area provisions • Revising record-keeping and reporting requirements • Providing additional guidance for HW determinations • Allowing certain transfers of HW • Revising various marking and labeling requirements	81 FR 85732 https://www.gpo.gov/fdsys/pkg/FR-2016-11-28/html/2016-27429.htm	Final Rule Effective 5/30/2017	Low – WFF is located in Virginia which has primacy over the hazardous waste program and it will require Virginia to adopt the EPA changes. The EPA rule reorganizes the hazardous waste generator regulations and consolidates most of the regulatory program into 40 CFR part 262. The rule also changes the recordkeeping and reporting requirements as well as requiring the hazardous waste determination be done at the point of generation. Changes to the labeling requirements for consistency is also included in the rule.
Hazardous Waste	Import/Export	Finalizes revisions to regulations for export and import of HW from and into the U.S., including: • Allowing electronic submission of export and import documents • Allowing electronic validation of AES consent for shipments subject to RCRA export requirements prior to export • Aligning regulations with current OECD requirements	81 FR 85696 https://www.gpo.gov/fdsys/pkg/FR-2016-11-28/html/2016-27428.htm	Final Rule effective 12/31/2016	NA – WFF does not export or import hazardous waste.

Table E -- Upcoming Federal Regulations, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Water	NPDES	Finalizes revisions to small MS4 regulations to allow alternative approaches for permitting authorities to determine adequate BMPs and other requirements necessary to reduce pollutants.	81 FR 89320 https://www.gpo.gov/fdsys/pkg/FR-2016-12-09/html/2016-28426.htm	Final Rule Effective 1/9/2017	NA – WFF is not an MS4.
Wastewater	Water	Interim final rule implements a new program and issues guidelines and criteria for EPA to provide credit assistance to eligible water and wastewater infrastructure projects.	81 FR 91822 https://www.gpo.gov/fdsys/pkg/FR-2016-12-19/html/2016-30194.htm	Final Rule Effective 12/19/16	NA – Will not apply to WFF.
Water Quality	Drinking Water	Finalizes requirement for PWSs to collect occurrence data for certain contaminants that may be present in drinking water but are not subject to SDWA standards.	81 FR 92666 https://www.federalregister.gov/documents/2016/12/20/2016-30469/revisions-to-the-unregulated-contaminant-monitoring-rule-ucmr-4-for-public-water-systems-and	Final Rule Effective 1/19/2017	Low – Will require WFF laboratory staff to perform additional analysis.
Water Quality	Drinking Water	Proposes to establish labeling requirements to differentiate plumbing products that meet lead free requirements from exempt products and to require manufacturers to certify compliance with requirements.	82 FR 4805 https://www.gpo.gov/fdsys/pkg/FR-2017-01-17/html/2017-00743.htm	Proposed Rule	NA – WFF does not manufacture plumbing products.

APPENDIX F

Upcoming State Regulations

Appendix F

Table F presents a review of upcoming state regulations that have the potential to impact NASA Centers at some point in the future.

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Table F – Upcoming Virginia, 2017

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	Incinerators	Finalizes updates to align with recent federal rule amendments, including: • Revising the definitions of "continuing emissions monitoring system data during startup and shutdown periods" and "kiln" • Revising the PM limit for the waste-burning kiln category • Removing provisions for affirmative defense	http://register.dls.virginia.gov/vol33/iss04/v33i04.pdf	Final Rule Effective 11/16/2016	NA – WFF does not have any incinerators.
Air	SIP	SIP revisions to incorporate recent federal rule amendments, including: • Revising the definitions of "continuing emissions monitoring system data during startup and shutdown periods" and "kiln" • Revising the PM limit for the waste-burning kiln category • Removing provisions for affirmative defense	http://townhall.virginia.gov/l/ViewNotice.cfm?GNID=637	Proposed Rule	NA – The State Implementation Plan (SIP) identifies strategies for the state to achieve attainment in areas of non-attainment. WFF is in an area that is in attainment.
Air	SIP	Finalizes approval of SIP revisions that adopt RACT for sources covered by EPA's CTGs for the following: • Industrial solvent cleaning operations • Miscellaneous industrial adhesives • Miscellaneous metal and plastic parts coatings • Offset lithographic printing and letterpress printing	81 FR 72708 https://www.gpo.gov/fdsys/pkg/FR-2016-10-21/pdf/2016-25441.pdf	Final Rule Effective 11/21/2016	NA – The State Implementation Plan (SIP) identifies strategies for the state to achieve attainment in areas of non-attainment. WFF is in an area that is in attainment.

Table F – Upcoming Virginia, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Air	VOC	Proposes to remove the recordkeeping, emissions reporting, photochemical dispersion modeling, and inventory requirements for t-butyl acetate to align with federal regulations.	http://www.deq.virginia.gov/Programs/Air/PublicNotices/AirRegulations.aspx	Proposed Rule	NA – WFF does not use t-butyl acetate.
Air	SIP	SIP revisions to incorporate recent federal amendments, including: • Revising the definitions of "continuing emissions monitoring system data during startup and shutdown periods" and "kiln" • Revising the PM limit for the waste-burning kiln category • Removing provisions for affirmative defense	http://register.dls.virginia.gov/vol33/iss06/v33i06.pdf	Proposed Rule	NA – The State Implementation Plan (SIP) identifies strategies for the state to achieve attainment in areas of non-attainment. WFF is in an area that is in attainment.
Air	Permitting	Proposes to increase Title V permitting fees.	http://register.dls.virginia.gov/vol33/iss10/v33i10.pdf	Proposed Rule	NA – WFF does not have a Title V permit.

Table F – Upcoming Virginia, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Cultural Resources	Historic Resources	Finalizes the following amendments, which address the process of owner objection to designation of properties by the Board of Historic Resources for inclusion in the Virginia Landmarks Register: • Clarifies that written notification of the proposed designation and written notification of the public hearing will be sent to property owners within 90 days prior to the official land recordation or tax records • Requires property owners to submit their formal objections 7 days prior to the board meeting • Requires the objection letter to be notarized, attested, and refer to the property by address or parcel number or both • Requires an objecting party not listed on the official land or tax records to submit a copy of the recorded deed as evidence of transfer of ownership, notarized and attested • Provides formal designations to be reconsidered at a subsequent board meeting if the director receives a written, attested, and notarized statement that there is no longer an objection at least 30 days prior to the board meeting.	33:7 Va.R 740-742 http://register.dls.virginia.gov/vol33/iss07/v33i07.pdf	Final Rule effective 12/9/2016	NA – WFF has no properties being designated for the Virginia Landmarks register.

Table F – Upcoming Virginia, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Hazardous Waste	Mercury-containing Lamps	Finalizes amendments addressing the management of mercury-containing lamps by recycling facilities or universal waste handlers, which qualifies the Virginia mercury-containing lamp universal waste program as a state equivalent program. Amendments include: • Testing, operational, closure, financial, and recordkeeping requirements • Requirements for small and large quantity handlers and destination facilities	33:5 VA.R 575-588 http://register.dls.virginia.gov/vol33/iss05/v33i05.pdf	Final Rule Effective 1/1/2017	NA – This regulation qualifies the Virginia mercury-containing lamp universal waste program as a state equivalent program. WFF has already been subject to the Federal requirements.
Pesticides	Pesticide Management	Proposes various amendments, including: • Revising the title and format to align with other pesticide regulations • mending language to align with VPCA regulation • Clarifying disposal requirements for pesticides and pesticide containers	33:5 Va. R. 539-545 http://register.dls.virginia.gov/vol33/iss05/v33i05.pdf	Proposed Rule	Low – Does not substantially add to requirements for pesticide contractors.
Wastewater	VPDES	Finalizes amendments and reissues the general permit for total nitrogen and total phosphorus discharges and nutrient trading in the Chesapeake Bay watershed in Virginia. The amendments update and clarify: • Definitions • Effective dates • Monitoring frequencies and sample types • Quantification level requirements • Trading ratio provisions	http://register.dls.virginia.gov/vol33/iss10/v33i10.pdf	Final Rule Effective 2/8/17	NA – WFF does not discharge to Chesapeake Bay watershed.

Table F – Upcoming Virginia, 2017 (continued)

Media	Topic	Summary	Citation	Effective Date	Subjective Impact (H/M/L/NA)
Wastewater		Finalizes repeal of existing regulations and creates the following two separate chapters: • Waterworks and Wastewater Works Operators Licensing Regulations [18VAC160-30] • Onsite Sewage System Professionals Licensing Regulations [18VAC160-40]	http://register.dls.virginia.gov/vol33/iss11/v33i11.pdf	Final Rule effective 4/1/2017	Medium – WFF has certified operators, but the requirements do not seem to vary much.

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